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Coastal Federation
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Lake Mattamuskeet Watershed Restoration Plan

February 6, 2018 Public Meeting

Agenda Overview

7:00 p.m.	Welcome
7:05 p.m.	Update on Stakeholder Progress: Erin Fleckenstein
7:10 p.m.	Briefing on Joint Meeting of TWG-Stakeholders: Bill Rich
7:20 p.m.	Story Map Overview: Michael Flynn
7:40 p.m.	Characterizing the Watershed
	Timeline of Changes
8:00 p.m.	Update on County Canal Maintenance: Daniel Brinn
8:10 p.m.	Next Steps of Plan Development: Erin Fleckenstein
8:15 p.m.	Ideas on What to do for the Lake
8:30 p.m.	Adjourn

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Update on Stakeholder Progress

What is a watershed restoration plan?

A voluntary plan for a specific waterbody

Identifies pollutants and causes of impairment

Provides the framework and guidance to restore an impaired waterbody and outlines future action

Recommends management strategies devised by all stakeholders

Adaptive plan that can be updated over time

Once approved, it can be used to secure grant funds for implementation

Key Steps in Developing a Watershed Restoration Plan

Assemble Planning Team

Engage stakeholders and the public in the plan development

Determine Water Quality and Quantity Conditions and Impairments

- Summarize research on the current status and trends of the lake water quality
- Capture oral and written history of changes to or improvements in hydrology around the lake

Complete Watershed Characterization

Establish Plan Goals, Objectives and Action Items

Identify Stormwater Reduction or Water Management Techniques

Analyze impact of solutions

Develop Management Plan including priorities and next steps

Major Progress to Date

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Stakeholder Team

Daniel Brinn- Hyde Drainage

Pete Campbell- U.S. Fish and Wildlife Service

Michael "Slim" Cahoon- Farming Community

Doug Howell- N.C. Wildlife Resources Commission

Art Keeney- Residential Community

Bill Rich- Hyde County Manager

Ben Simmons- Farming Community/Fairfield Drainage

Pat Simmons- Hospitality Industry

J.W. Spencer- Hyde County Soil and Water Board

James "Booboo" Topping- Residential Community

Joey Ben Williams- Impoundments

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Work with Stakeholders and the Public

Three Public Meetings

Eight Stakeholder Meetings

Webpage for updates and comments:

www.nccoast.org/lakemattamuskeet

Press Releases

Email update after Public Meetings

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Draft Plan Goals

Goal 1: Protect the way of life in Hyde County:

Maintain existing land uses and industries in the watershed (residential, farming, fishing and tourism) while supporting the lake's natural resources (waterfowl and wildlife).

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Draft Plan Goals

Goal 2: Reduce flooding:

Improve the ability to control lake levels to prevent flooding of residential, business and farm properties as well as to grow more submerged and emergent vegetation as waterfowl habitat in and around the lake.

Draft Plan Goals

Goal 3: Restore water quality:

Reduce nutrients, sediments and phytoplankton blooms to improve water quality and clarity, promoting the growth of submerged aquatic grasses and removing the lake from the state's impaired water listing.

Major Progress to Date

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Briefing on Joint Meeting of TWG-Stakeholders

Bill Rich

Technical Working Group (TWG)

A joint partnership of the N.C. Wildlife Resources Commission and U.S. Fish and Wildlife Service. They work together to identify, prioritize and conduct monitoring and research at the Mattamuskeet National Wildlife Refuge to inform management actions that can be implemented to improve water quality and restore submerged aquatic vegetation (SAV) in Lake Mattamuskeet.

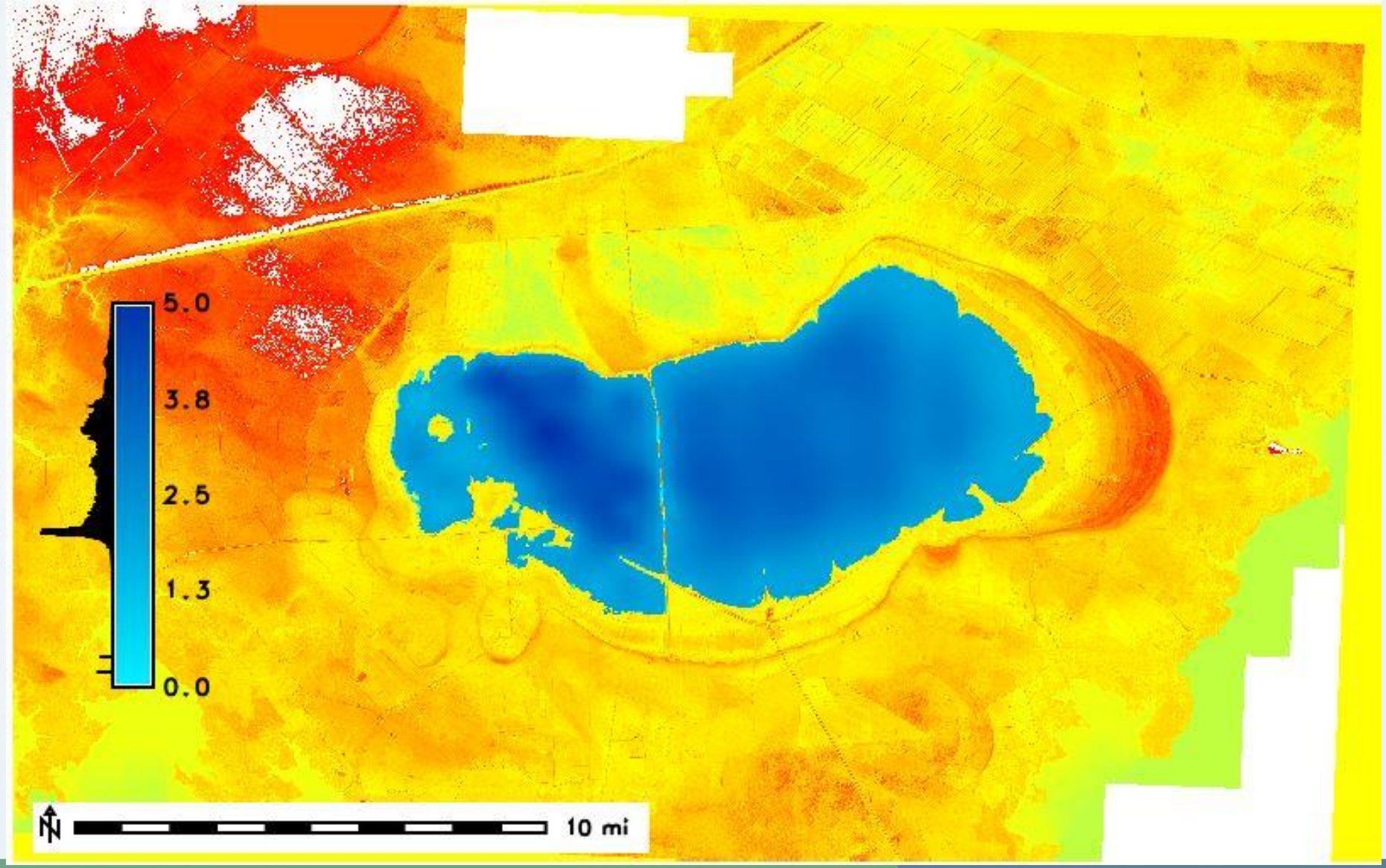
Hydrology

The lake is no longer a "natural" lake due to the hydrologic modifications that have happened in the watershed.

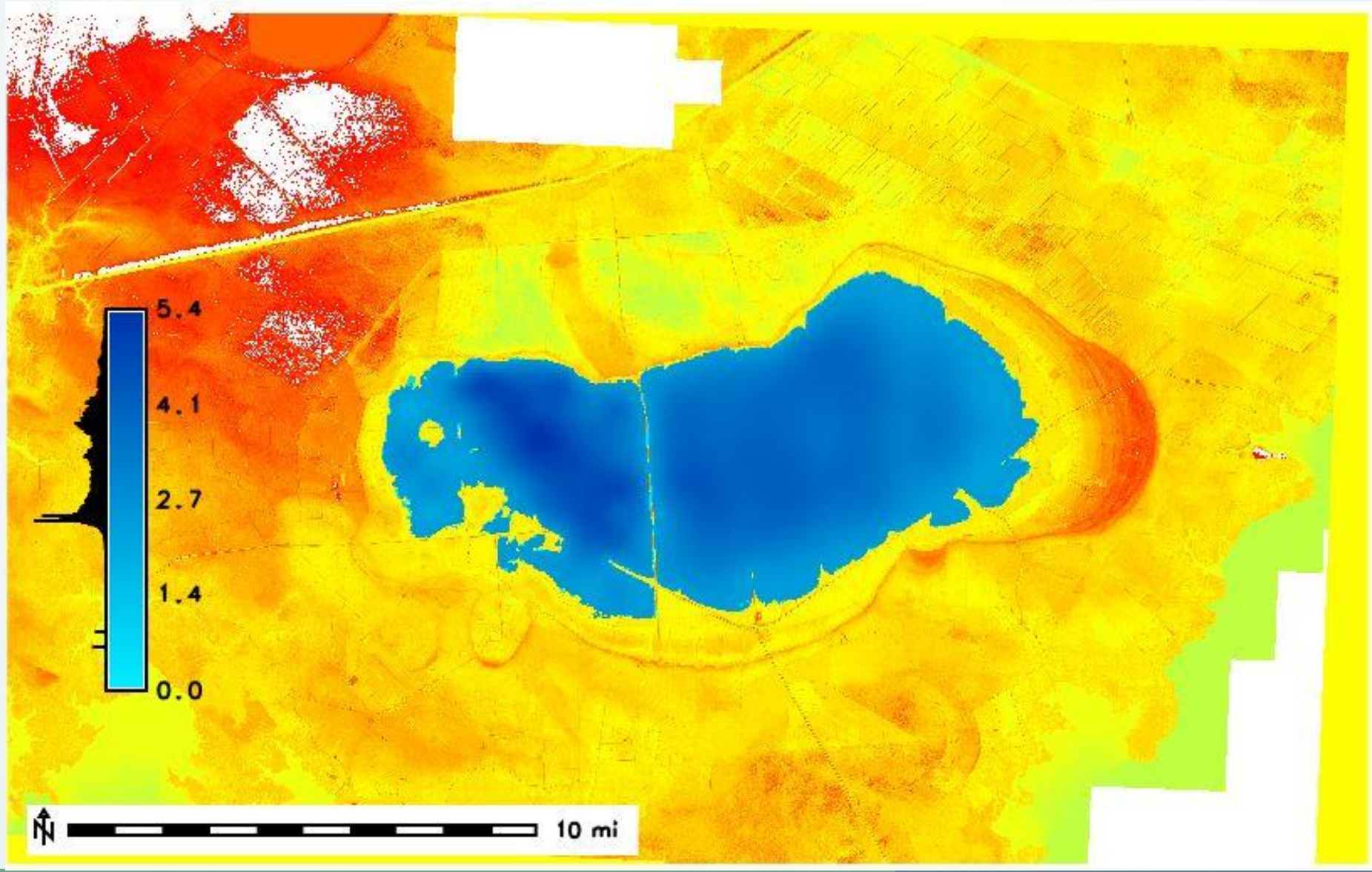
There is more water entering the lake via precipitation than leaving via evaporation- need active management of lake level.

Water management is further complicated with rising sea levels.

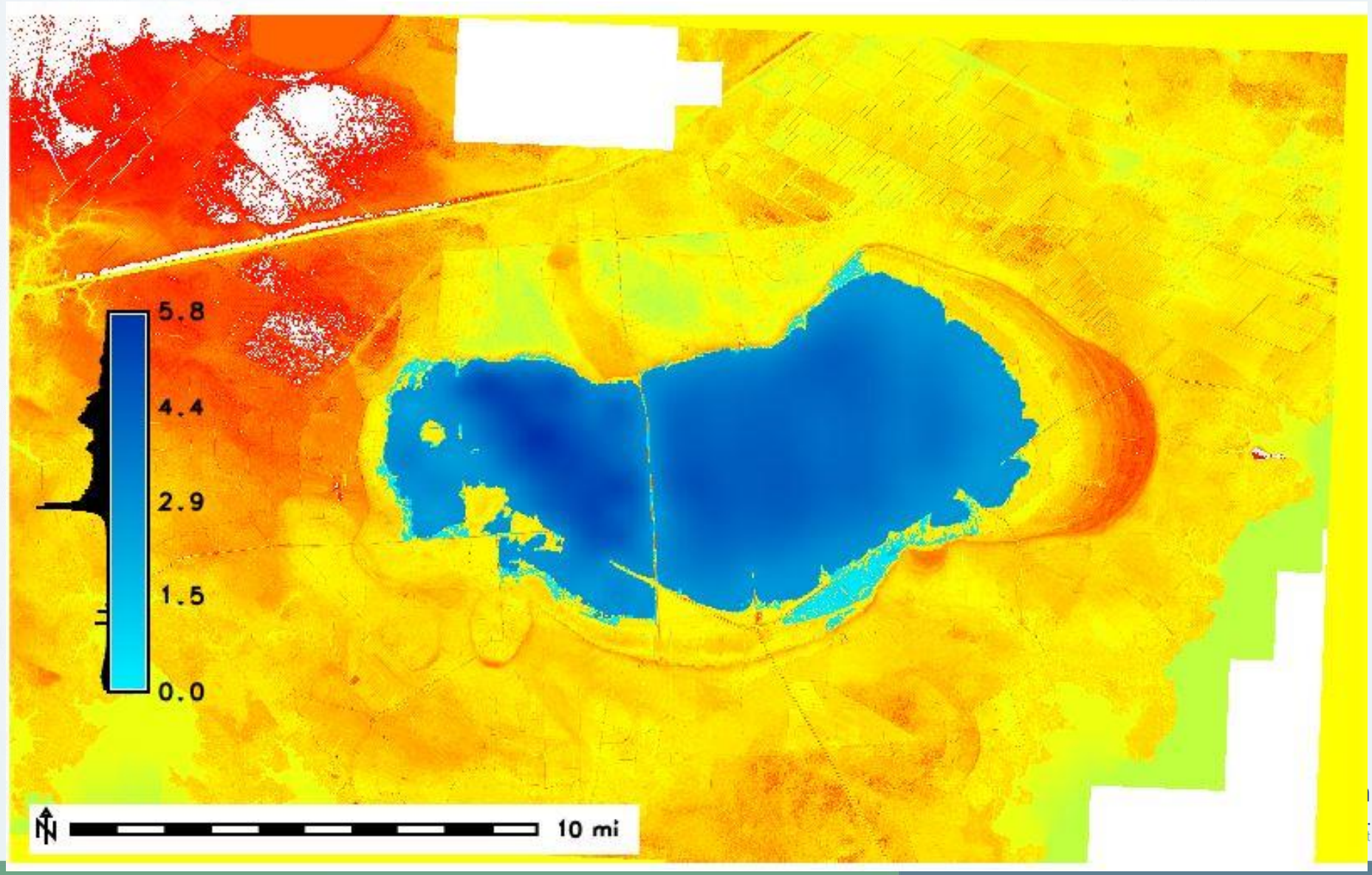
Modeled lake level when water is -0.3 feet



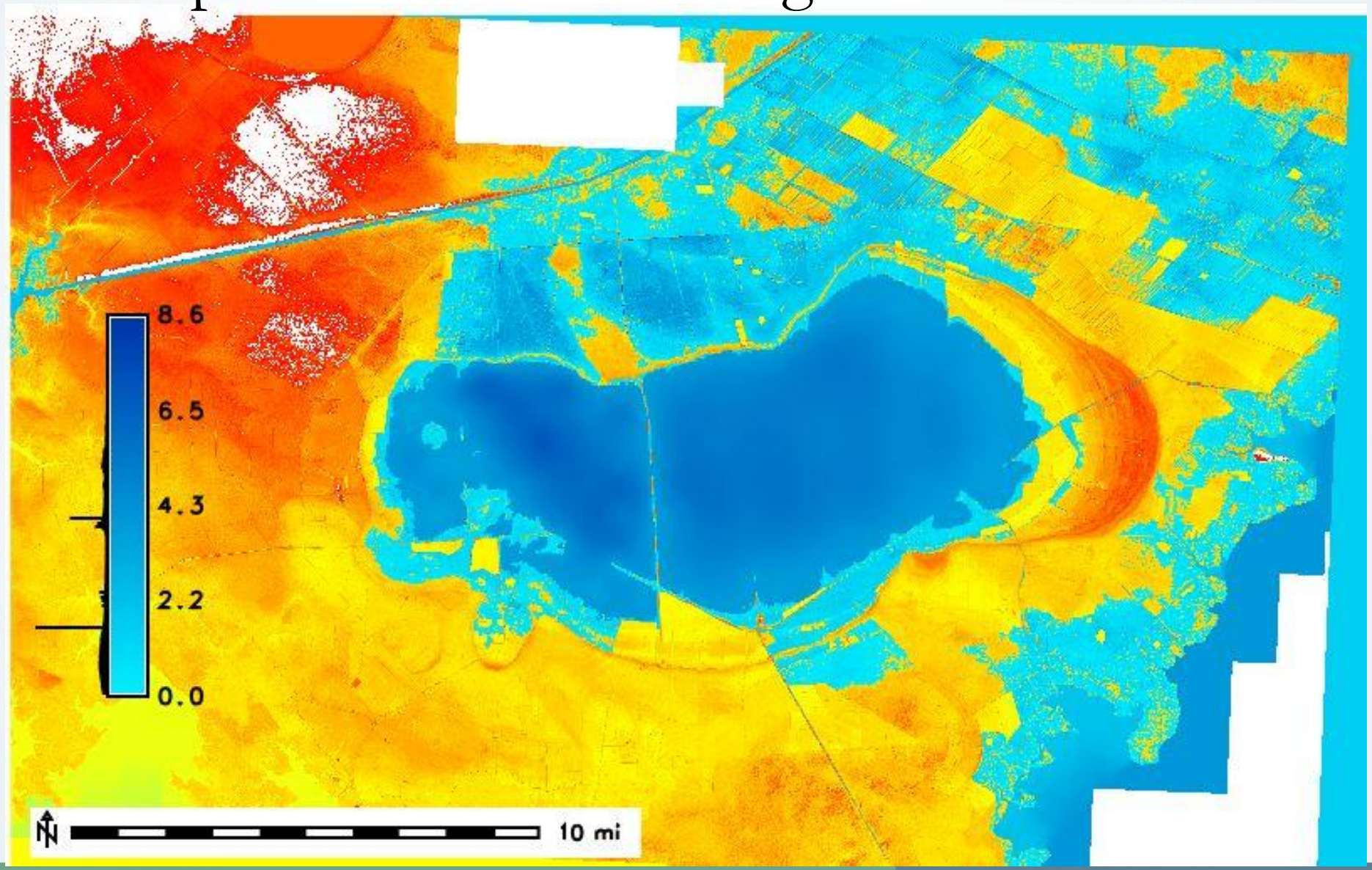
Modeled lake level when water is +0.1 feet



Modeled lake level when water is +0.5 feet



Widespread chronic flooding when water is +1.5



Water Quality

Lake has **poor water quality** for pH, chlorophyll a and cyanotoxins

There are eutrophied waters- waters with high nutrients but still healthy, and then there are **hyper-eutrophied** waters- waters that have high nutrients and are no longer healthy. Lake Mattamuskeet falls in this second category.

There are many **sources** of these nutrients in the watershed and it is difficult to assess how much each of them contribute to the water quality problems.

Poor water quality is also causing **harmful algae blooms**

There is **no SAV** in the lake any more because of the poor water quality- additional causes of the decline are still being researched

On Going Research and Management

Moist Soil Management for Waterfowl Impoundments- Joe Fuller, WRC

SAV Restoration and in-lake Nutrient Research – Dr. Mike Phieler

Carp Removal Research- Dr. Jesse Fisher

Nutrient Inputs from Waterfowl Impoundments and Canal Maintenance Feasibility- Dr. Randall Etheridge

Role of Herbicides in Lake Health- Dr. Greg Cope

Conclusions from the Meeting

We will never know everything about the lake. We must move forward with the best information available at this time. Ongoing research will help us inform our management actions moving forward.

Active water management of the lake is needed.

We need to identify areas where we can work to improve water quality within the watershed.

A carp management plan may be helpful for improving water clarity and restoring SAV.

Canal maintenance may be helpful for improving water flows from the lake, but need to consider rising sound water levels.

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Story Map Overview

Michael Flynn

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Characterizing the Watershed

Erin Fleckenstein

Timeline of Changes in the Watershed

A History of Development Within Lake Mattamuskeet and Surrounding Watershed

1800s Watershed Boundary

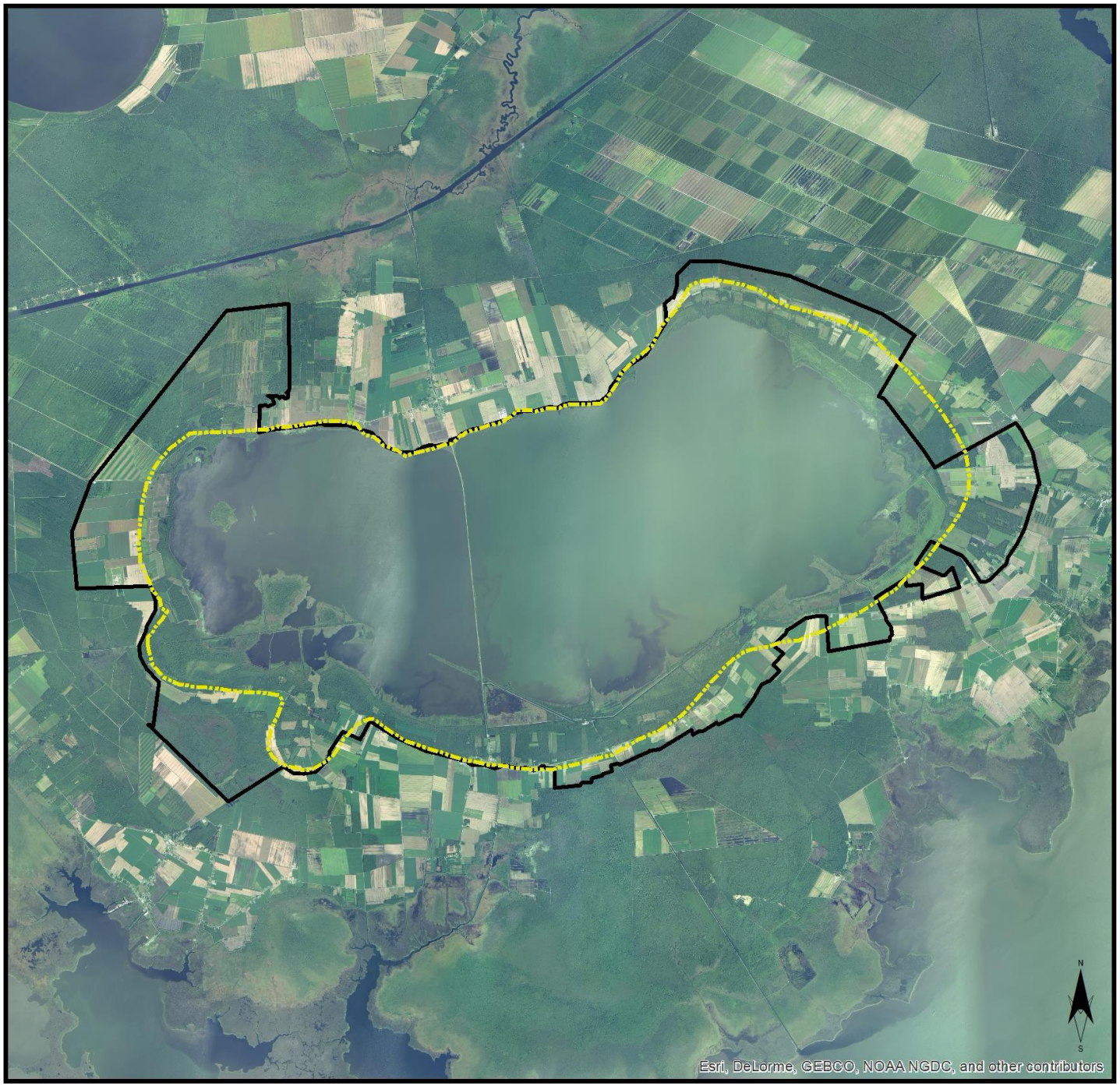
360-1584-	Inputs of organic matter into the lake from the surrounding catchment is extremely limited leaving Lake Mattamuskeet with clear water, a sandy lakebed and few nutrients to support aquatic plant growth. [6]
1773-	Lake Mattamuskeet covers 110,000 acres and is 6-9' deep. An attempt by the Provincial Congress to dig a canal to Pamlico Sound fails, along with another attempt by an appointed drainage board in 1789. [2, 3]
1825-	The NC legislature gifts ownership of the lake to the State Literary Board with the expectation they will improve and sell the surrounding lands to support public education. [2, 3]
Late 1830's-	The State Literary Board assigns $200,000 ($4.5 million today) to the construction of canals to drain Mattamuskeet, Pungo and New Lakes. [3]
1838-	Lake Landing Drainage Canal is dug by hand approximately 10-15' deep and 15-25' wide extending 7 miles from Lake Mattamuskeet to Pamlico Sound at Wysocking Bay. When complete, drainage to the sound reduces the lake from 110,000 to 55,000 acres. [2, 3]
1849-	Fairfield Canal is dug north to the Alligator River, providing drainage and transportation for the city of Fairfield. [3]
1860-	**Heightened European settlement and land alterations dramatically increase organic matter input to the lake.** These nutrients support the growth of phytoplankton within the lake over the following decades. [3, 4, 6]
1909-	NC Public Law 509 is passed authorizing the State Board of Education and around 550 Hyde County landowners to

Lake Mattamuskeet Watershed Boundaries Through Time

1800's Boundary

Current Boundary

Historic Watershed Boundary was delineated through the utilization of historic topographic maps, geologic conditions, datasets and maps from the following sources: Heath 1975, Luke & Mauger 1984



Miles

0 0.75 1.5 3

1932- Lake Mattamusket Drainage Developments

Hyde County Drainage Associations & Historic Drainage District 1

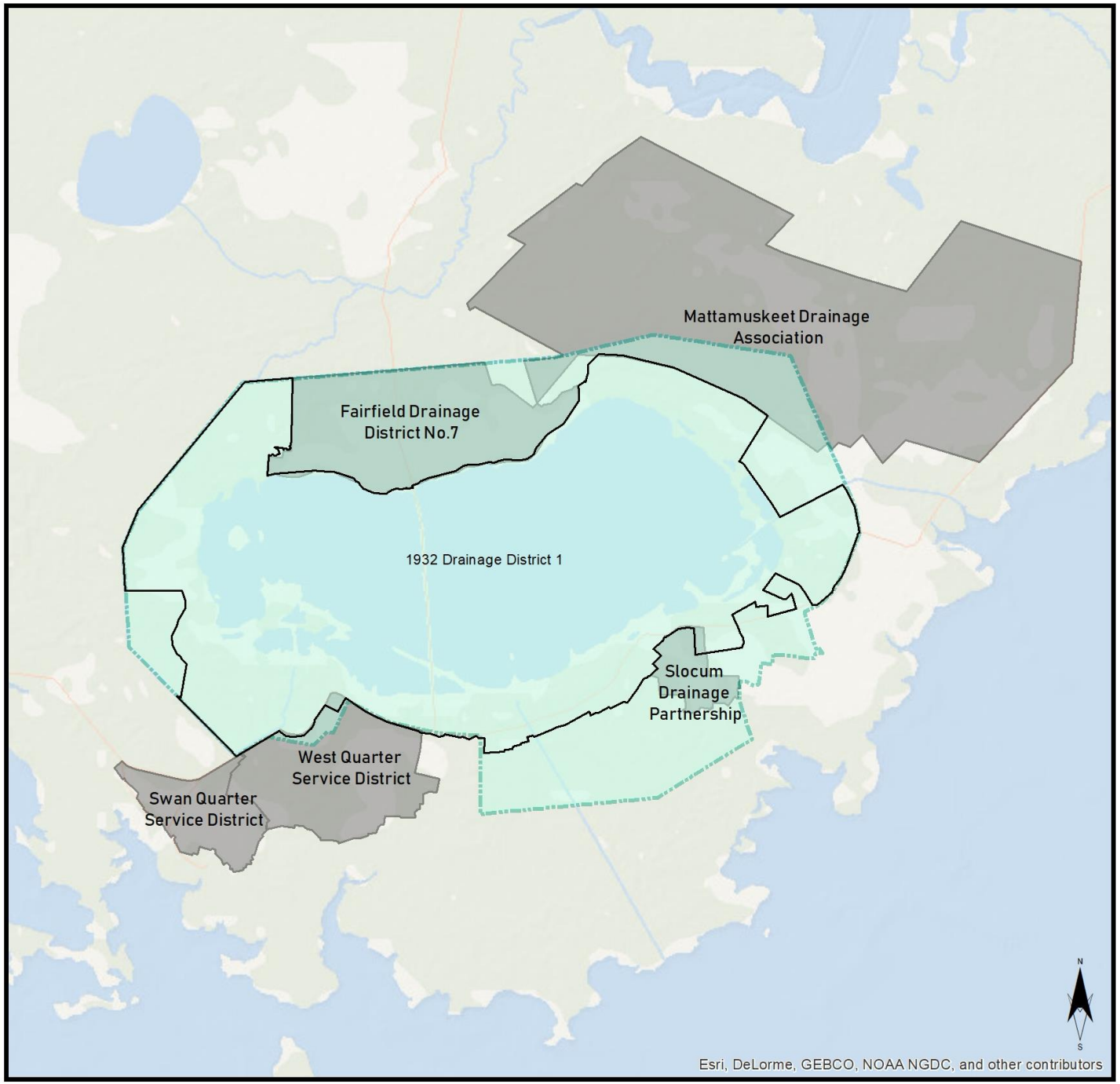
Watershed

Drainage Districts

1932 Drainage District 1

Hyde County

Historic Drainage District 1 was adapted from a 1932 map provided by Hyde County Soil and Water Conservation. DD1 displays the boundaries of the first original drainage association in Hyde County.



Miles

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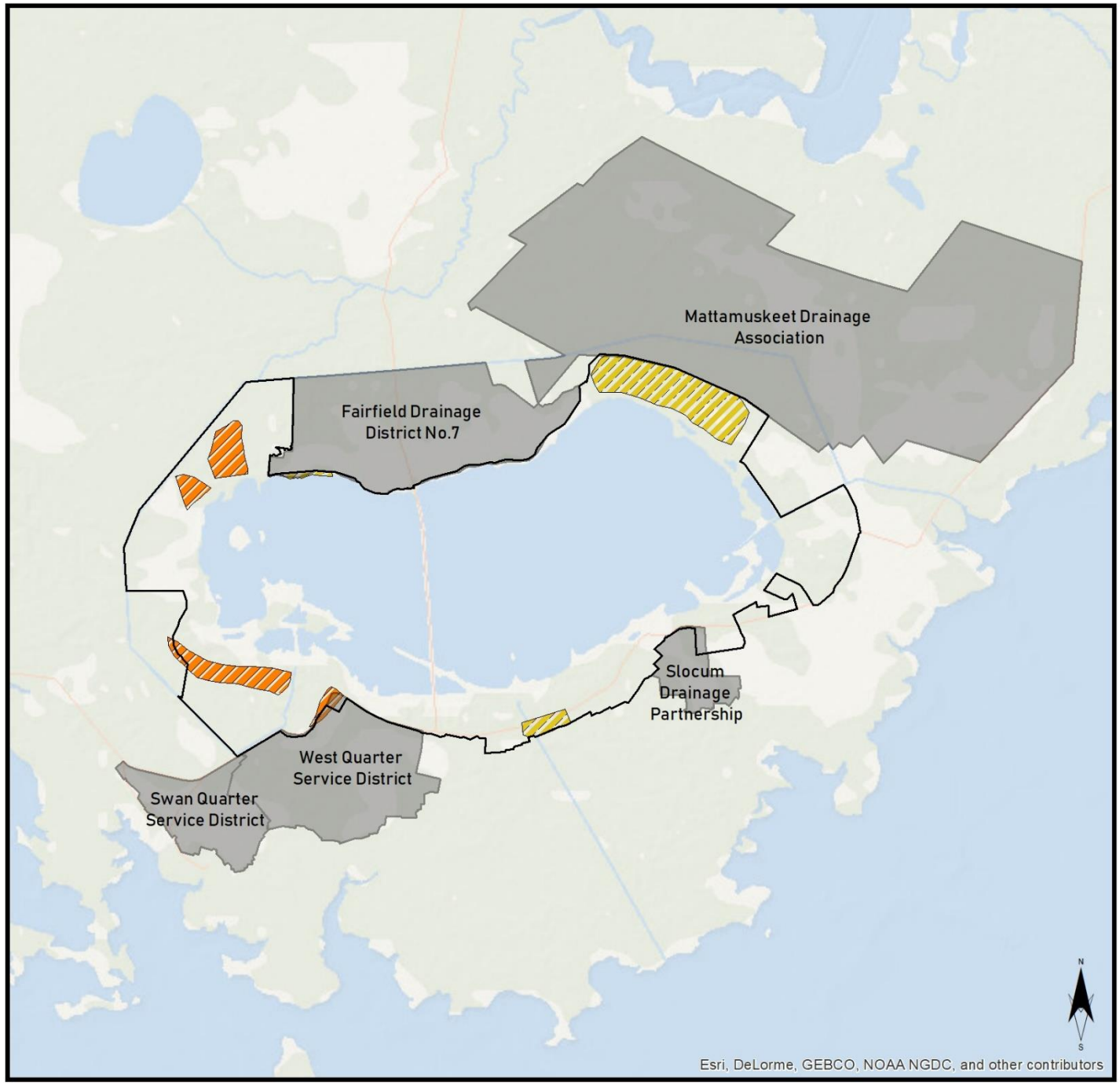
Hyde County Drainage Associations & Hot Spot Flooding Regions



Hot Spot Flooding Regions surrounding Lake Mattamuskeet were broken down into two categories, Residential and Farming. These regions exist in lower elevation or depressional regions surrounding the lake.

Residential areas represent portions of those communitites surrounding Lake Mattamuskeet which experience regular flooding during storms, strong winds, or severe weather events.

Farming areas represent regions of farmland which regularly experience flooding during storms or sever weather events.

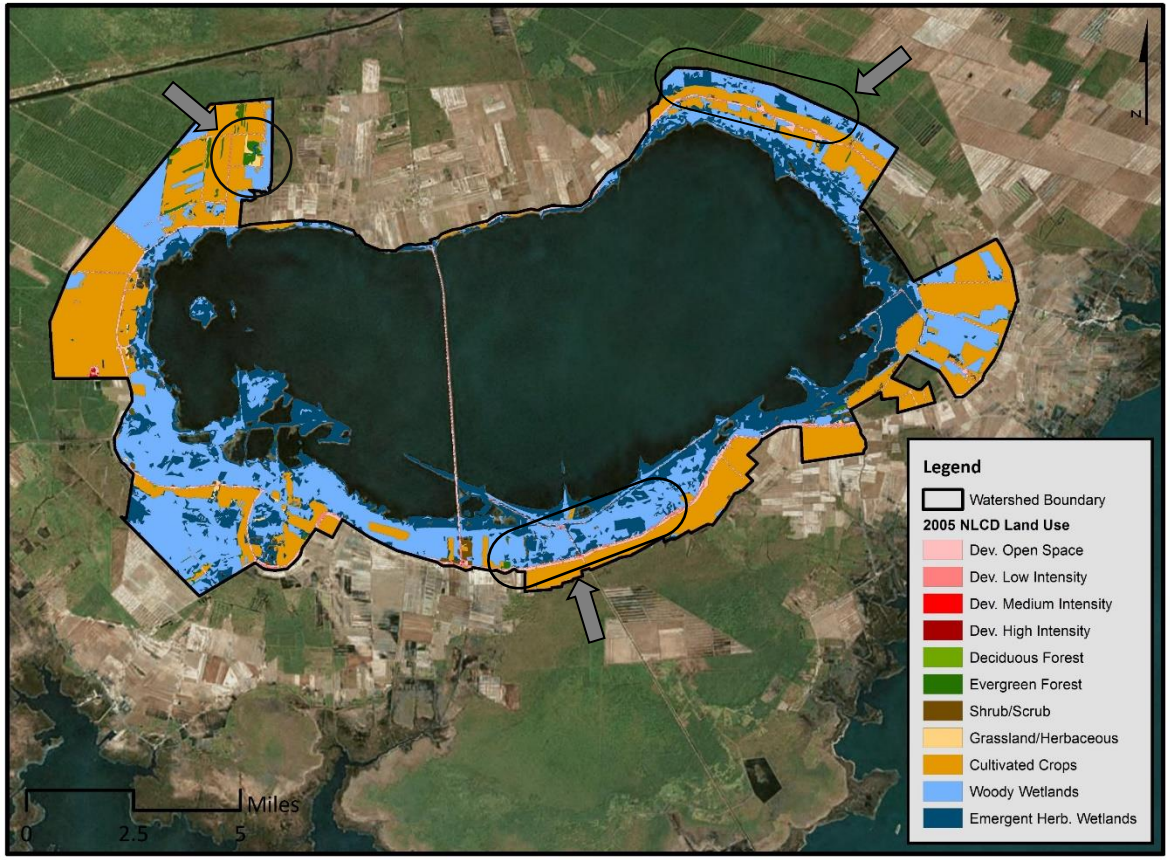
Miles
0 1.25 2.5 5

Tracking Changes in Land Use

Lake Mattamuskeet Watershed Land Use: 2001-2006-2011

NLCD Land Use Class	2001 (Ac)	2006 (Ac)	2011 (Ac)
Developed	1,569	1,569	1,569.8
Forest	279.8	↓ 246.4	250.5
Shrubland	222.2	222.2	↓ 195.8
Herbaceous	34.2	↑ 67.6	↑ 89.1
Planted/Cultivated	10,110.0	10,110.8	10,106.1
Wetlands	17,267	↑ 17,330	↓ 15,010

Lake Mattamuskeet Watershed Land Use: 2011



Top Three Land Uses:

1. Woody Wetlands
2. Cultivated Crops
3. Developed Open Space

Summary: Minor changes in land use over the last 15 years. No significant changes in developed land or agricultural lands

Next Step: Analysis 2016 data set when available; Identify any data for pre-2001 land use.

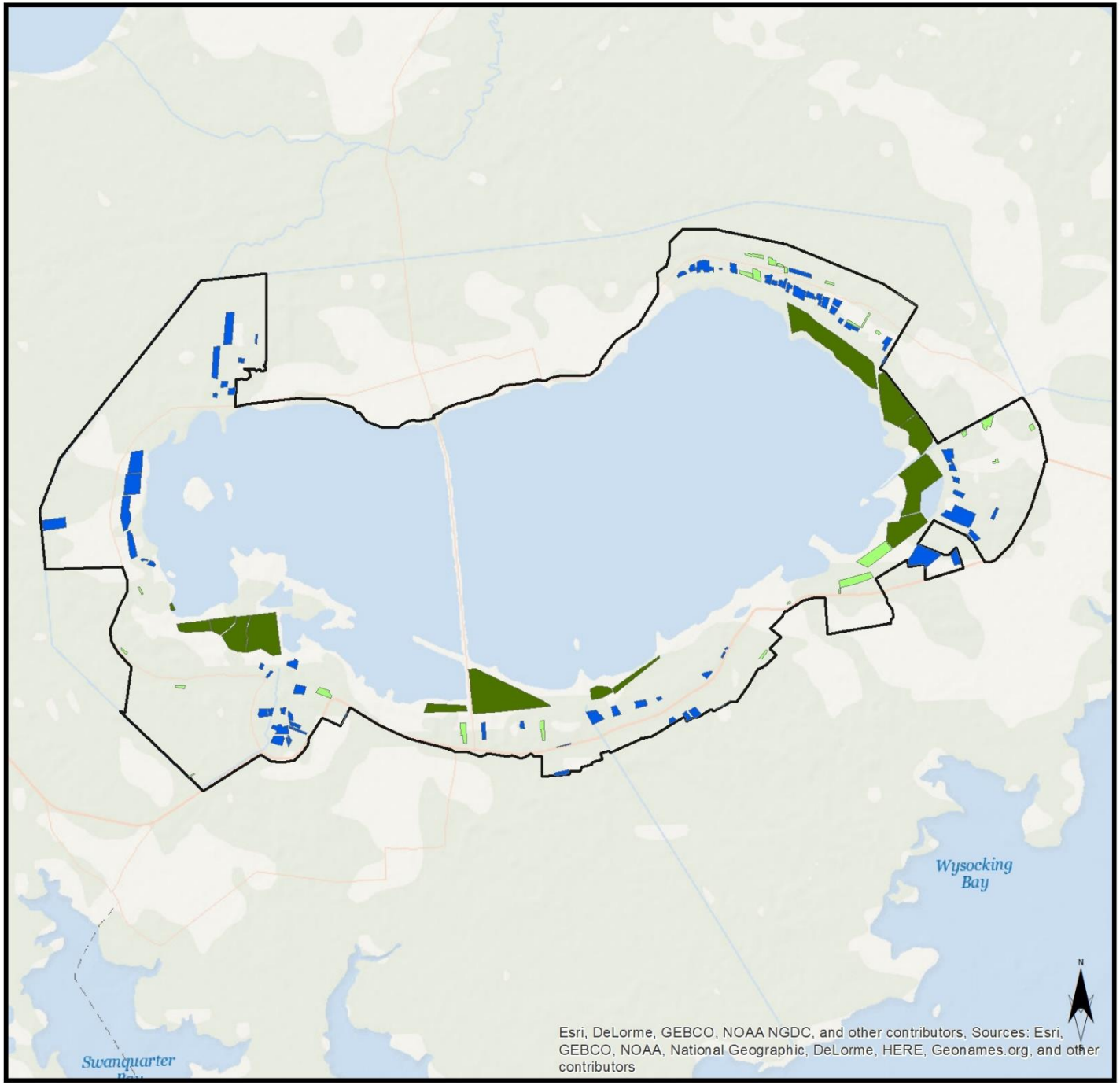
Lake Mattamuskeet Watershed Impoundment Development

Year Developed

- Unknown
- <1984
- 1990's
- 2000's
- Watershed

Historic aerial imagery and google earth timescales were utilized to track the development of waterfowl impoundments within Hyde County over the years.

Most impoundments were developed during the late '80s and early to mid '90s during the height of the CPR program which promoted the conversion of low producing cropland into waterfowl impoundments.



0 0.75 1.5 3 Miles

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County Canal Maintenance

Daniel Brinn


Hyde Stream Debris Removal Project
Legend
Completed Snagging
Planned Sediment Removal
Planned Snagging
Mattamuskeet Association
Fairfield Drainage District (No. 7)
Lake Landing Canal
Swan Quarter Town Ditch
Hyde
Google Earth
©2018 Google
N
10 mi

Next Steps of Plan Development

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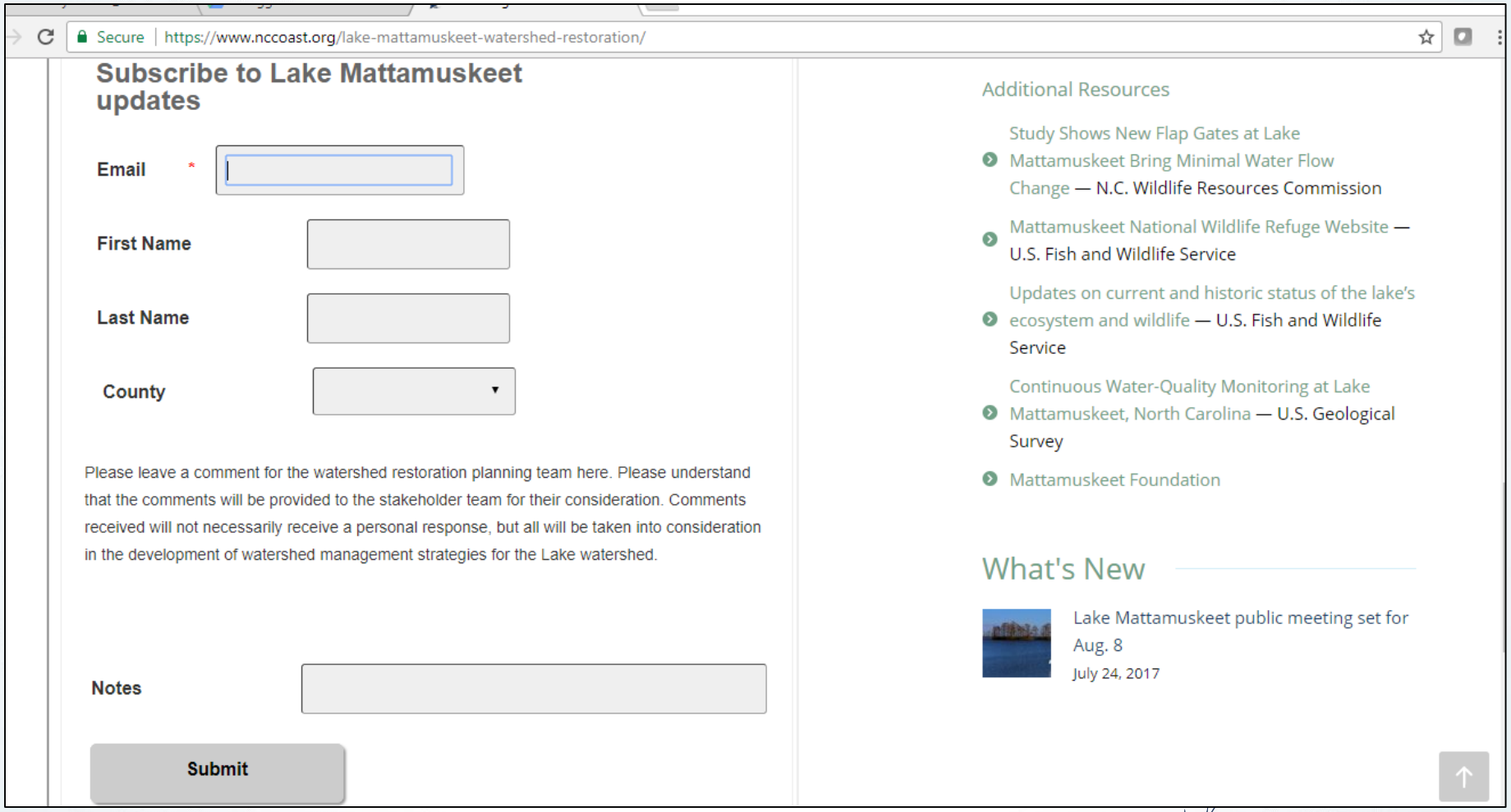
Comments Collected Online



Sign-up for emails and press releases;
Submit Comments

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Questions?

Contact Me:

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