Developing a Management Plan for White Lake

Workshop #2, September 12, 2019

Effective lake and watershed management is based on an understanding of the ecosystem—long-term monitoring and special studies--and an understanding of how land use and recreational use can impact water quality and quantity

White Lake is a State-Owned Lake
Multiple Entities With Multiple Responsibilities

State Agencies:

NC Division of Parks and Recreation

NC Wildlife Resources Commission

NC Division of Water Resources

Focused on Lake

Local/Regional:

Lumber River Council of Governments

Town of White Lake

Bladen County

Bladen Soil and Water Conservation District

Focused on Land Use/Watershed

A Brief Look Back: Newspaper Headlines and a 1996 Plan Developed by NC Division of State Parks

White Lake State Lake General Management Plan:

Natural Resource Management Issues

Water Level

”Groundwater inflow to the lake is still not completely understood, and it appears that rainfall and evaporation are by far the most significant factors affecting lake water levels.”

Water Quality

“Many lake users have expressed concerns about the lake’s water quality. It has been suggested that the turbidity problem can be eliminated by banning or restricting motorboats on the lake. Although this has received widespread support, efforts to enact a ban or restrict the size or numbers of boats have so far been unsuccessful.”

Newspaper Headlines:

Grim White Lake Picture Is Painted

Fayetteville Observer, 2/12/1981

Low White Lake Level Not Hurting Business

Fayetteville Observer, 7/13/1981

The Lake: As Facilities Improve, Its Condition Declines

Bladen Journal, 10/26/1981

Boats Stir Up Smelly Algae, Sticky Dispute at White Lake

Raleigh News & Observer, 7/18/1990

Killing the Lake They Love

Raleigh News & Observer, 7/22/1990

Building on What We Know

Hydrology: groundwater changes, drainage concerns

Precipitation Changes: extreme rainfall events increasing, more abnormally dry periods

Atmospheric/Climate Changes: nutrients in rainfall, increasing temperatures

Land Use Changes: change in function of surrounding wetlands, more polluted stormwater runoff

Lake water pH increase: change in the types of lake life

Alum treatment worked to eliminate cyanobacteria

Hydrilla not well-established

In-Lake Management for White Lake: The Process in 2018

Problem: persistent cyanobacterial bloom

Science Advisory Group reviewed options for treatment—alum to remove P and algae selected

Town was able to use mosquito permit for treatment of <1,000 acres

HAB Aquatic Solutions met requirements for treatment; bid prepared and accepted by Town Board

Treatment conducted May 3-16, 2018

State-mandated monitoring conducted before, during and after treatment

In-Lake Management for White Lake: Monitoring and Sediment Studies

The Town has supported ongoing monitoring and special studies

Sediment analysis indicates that treatment of the sediments (Phosphorus inactivation) is not needed—plenty of aluminum and iron to bind up with P

Lake management advisors all recommend continuing monitoring and no treatment until P levels increase

Water column P levels have been quite low (*very good*)—starting to increase in August, but pH remains stable, around 6.5 (*very good*)

Monthly monitoring of aquatic vegetation, rainfall and lake level

In-Lake Management for White Lake: Future Process

NC DWR determined that NC State Parks must apply for NPDES permit for any future treatment

Application process—monitoring data would demonstrate need

State Agency review of completed application, approval by NC DWR

Development of RFP with requirements, dosing level, budget constraints (if any)

Schedule, implement and monitor treatment

In-Lake Management for White Lake: Hydrilla

Monthly monitoring and annual whole lake aquatic vegetation survey—Town Cost Share 50/50

"Early detection, rapid response"

Treatment with specific herbicide if found

Variability from year to year in the amount of vegetation (and filamentous algae)

Boating activity breaks up vegetation and algae—could help distribute fragments of Hydrilla throughout lake

Inspection and boat wash station needed—ballast water problematic

Grant-Funded Project (Lumber River COG and Town): Stormwater Assessments and Management Needs

Locate and map outfalls and ditches

Analyze water samples from pipes, ditches after rainfall

Assess Best Management options (BMPs) for priority spots

Develop Stormwater Management program for Town—include lawn runoff of nutrients and other contaminants (not possible to ban by regulatory action)

Town's WW Collection System Repair and Rehabilitation

State Revolving Fund Loan for $2.038 Million awarded;

Start: March 2020, with completion in Fall 2020

Town applied for (with LRCOG assistance) but did not receive a grant for Asset Management—submitting another application

Town Board Resolution to submit application adopted September 10, 2019

SRF Application for Phase II in progress; letter of intent submitted

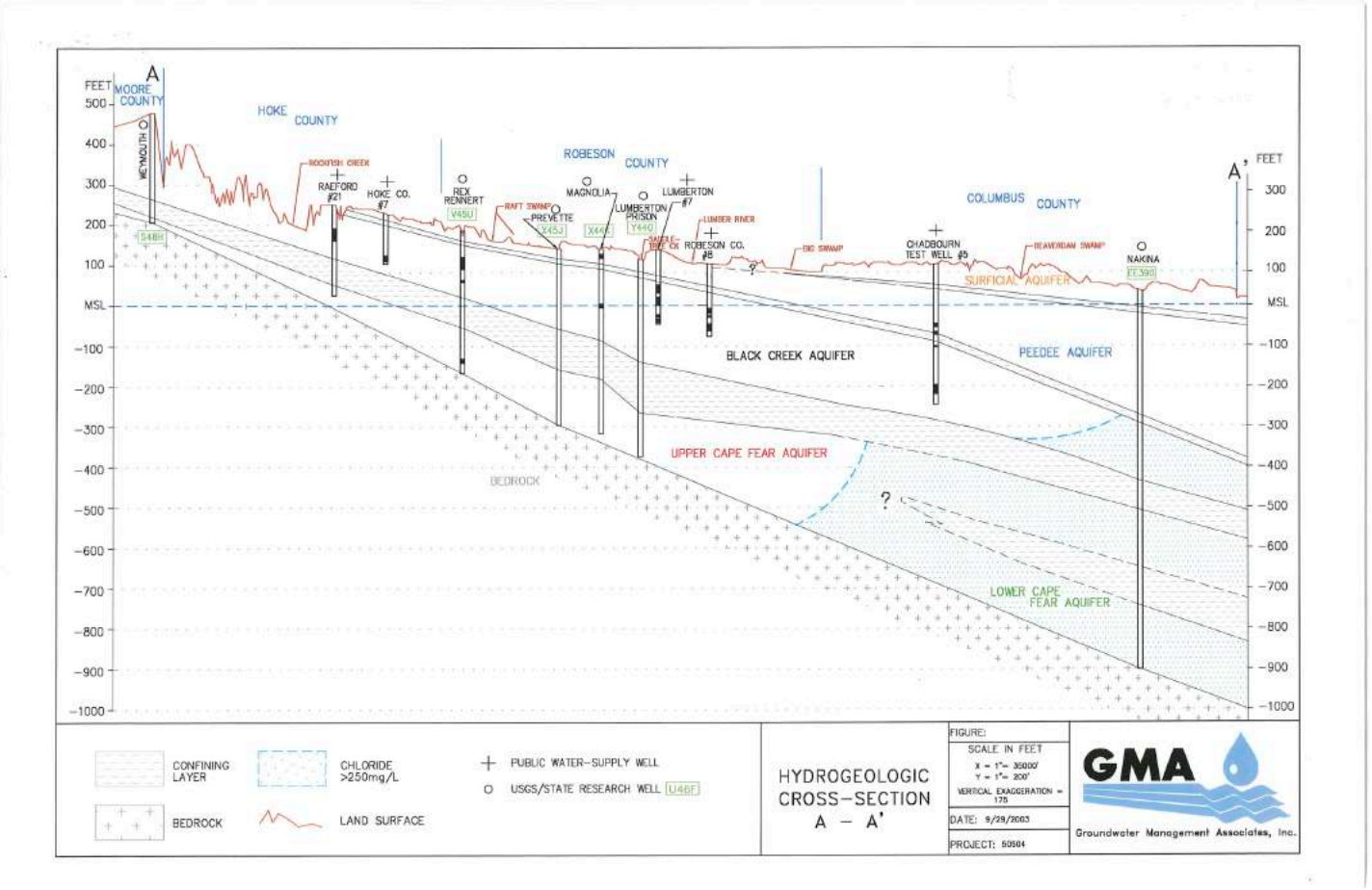
$3.0 Million loan application is in review

Understanding White Lake's Groundwater Source

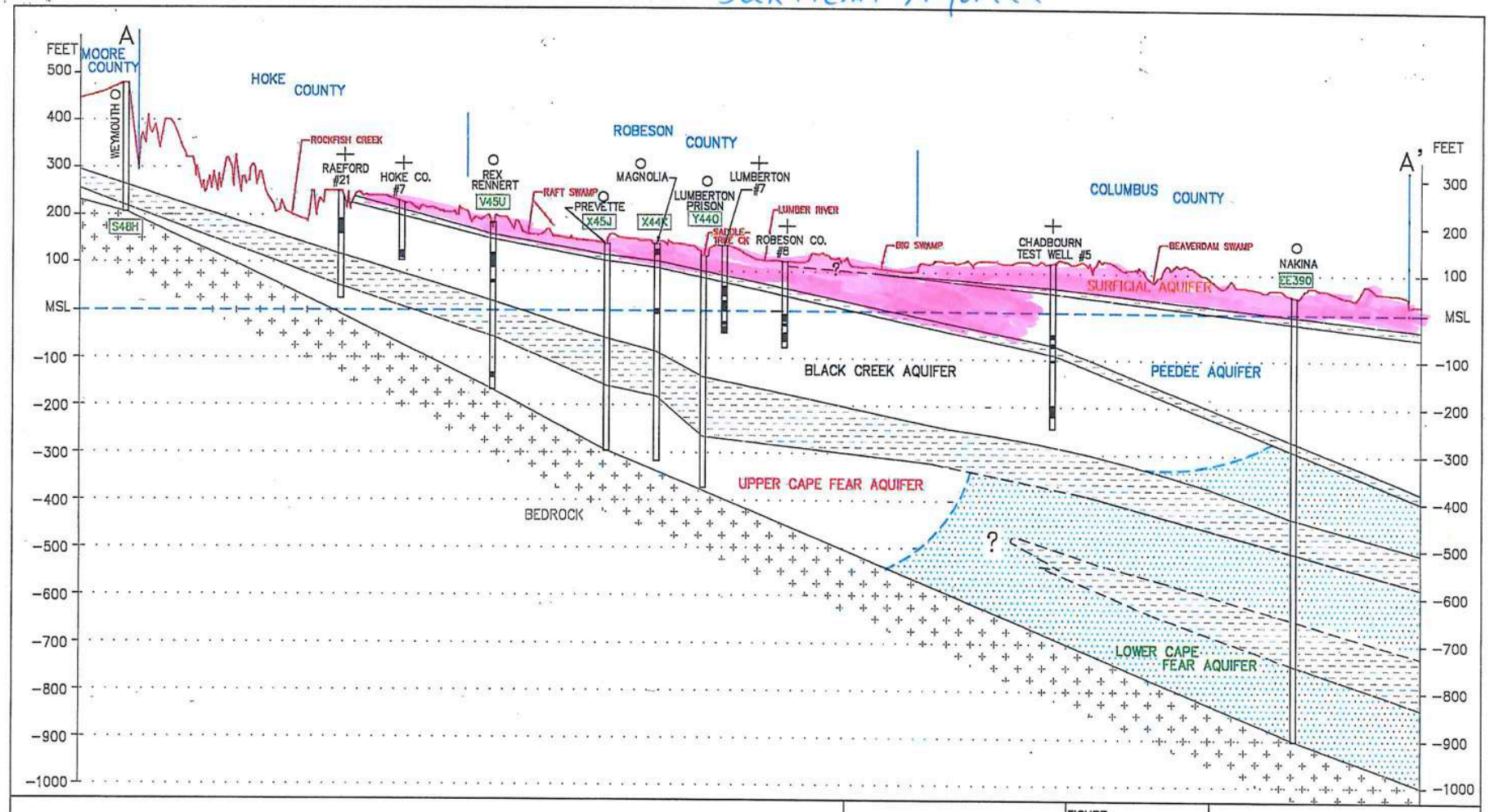
Hydrogeological maps provide cross-sectional views of the earth, with confining layers and groundwater aquifers

Maps for this region were developed by Groundwater Management Associates (GMA) for the Lumber River Council of Governments

Surficial aquifer (not deep aquifer) is source of groundwater entering White Lake



Surficial Aquifer



HYDROGEOLOGIC CROSS-SECTION A – A'

FIGURE:

SCALE IN FEET
X = 1"= 35000'
Y = 1"= 200'
VERTICAL EXAGGERATION = 175

DATE: 9/29/2003

PROJECT: 50504

GMA
Groundwater Management Associates, Inc.

Identification of Lake Issues: Multiple Stakeholder Groups and Interests

Reduced groundwater flow to lake

Drainage and flooding

Regulating outfall at Turtle Cove

Lake level variability

Lake aesthetics—turbidity

Water quality—algae

Boating activity stirring up algae and sediments

Sea walls, other structures in lake

Public health—skin rashes

Public health—*Naegleria fowleri* (brain-eating amoeba)

Public safety—boating speed in no wake areas, nighttime boating accidents (hitting structures)

Introduction of invasive species such as *Hydrilla*

Sport fishing tournaments and fish stocking

Nutrients—waterfowl

Nutrients—stormwater

Nutrients--groundwater

What Does A Natural White Lake Look Like?

The more the lake and watershed is altered, the more difficult it is to maintain its natural and beneficial functions.

Management actions that simulate natural processes are most likely to be successful.

Uses of the lake that we know are harmful should be modified or eliminated (often little cost to implement).

Continue on a collaborative and productive path:

Assessments, decision making, implementation of needed actions