WATER QUALITY & QUANTITY ADVISORY BOARD MEETING

THURSDAY, AUGUST 28, 2025

7:00 PM

THIS PAGE WAS LEFT BLANK INTENTIONALLY

Agenda
Water Quality and Quantity Advisory Board
Town of White Lake
7 PM
August 28, 2025

- **Opening and Call to Order 7 PM**
- **Invocation**
- **Pledge of Allegiance**

Agenda Items:

1. Nomination of Officers
    a. Chairman
    b. Vice-Chairman
    c. Secretary
2. Approve Bylaws **(ITEM #2)**
3. Receive the Lumber River Council of Government Lake Management Plan for review. **(ITEM #3)**
4. Brainstorm goals and ideas for this newly formed Advisory Board.
5. Other business
6. Open Forum

Adjourn - Next meeting September 25, 2025

White Lake
Water Quality and Quantity
ADVISORY BOARD BYLAWS

DRAFT

Article I

Name & Purpose:

Section 1. The White Lake Water Quality and Quantity Advisory Board was established in July 2025 by the White Lake Town Board of Commissioners. The purpose of this Advisory Board is to provide guidance and expertise to the Town of White Lake regarding the water resources of White Lake and the areas surrounding the lake that affect these resources.

White Lake is a natural lake-one of the geological formations known as Carolina Bays. These freshwater wetlands occur from Georgia to Delaware, with the highest concentrations primarily in the coastal plains of North Carolina and South Carolina. The bays are elliptical depressions, all with a NW-SE orientation and raised sand rims. These shallow depressions, often with a depth profile that increases from northwest to southeast, are typically found in areas with loose, sandy soil. These bays are also characterized by specific soil and vegetative profiles.

Among the Carolina bays, White Lake is unique in being the only one with clear water. Other water-filled Carolina bays, such as nearby Jones and Singletary Lakes, have tea-colored water. Protecting this special resource is of ecological and economic importance to the area. This Board will recommend and support sustainable and economically viable actions that achieve a healthy lake and watershed for White Lake while preserving the integrity of the Carolina Bay ecosystem.

Section 2. The scope of activities covered by this Board shall include, but is not limited to, the following:

- Support the study of lake clarity and recommend sustainable actions to improve and restore the lake clarity.
- Provide management advice based on sound science and study that includes regular monitoring of lake water and other factors that affect quality, quantity and clarity, and inventory of resources and investigations and research into the actions that affect them.
- Provide accurate information, advice, and assistance to property owners to enable them to take individual and community actions that will protect and preserve the water resources and natural elements that make White Lake unique (e.g., actions that contribute to clear water and that restore natural communities).
- Identify conservation easement areas in White Lake and the surrounding areas that affect the water quality and natural resources, and support actions to implement the easements, including providing easement sources and information on how-to complete an easement.

- Identify all the stakeholders and influencers that affect water resource management for White Lake and advocate for their participation in creating effective management plans and sustainable resource practices.
- Encourage survey and study of the influences of land use types on water resources, including those that affect groundwater levels, lake water level, and water clarity.
- Build and mend relationships with partners (e.g., citizens, state and local governments, non-governmental organizations, private landowners) and encourage their participation in practical, fact-based solutions to management issues.
- Recommend and support actions for continued study of groundwater flow under and around the lake, using the information provided by the Lumber River Council of Governments, provided to the Town Board in 2022. [Jim Perry's presentation]
- Work with the N. C. State Parks and Recreation agency staff to find an alternate public location for the lake outlet, which is now on public property.
- Explore economical and environmentally sustainable means to maintain lake levels for recreation and the health of the aquatic ecosystem.
- Support the development and distribution of accurate information and educational materials for stakeholders and the public on appropriate actions for resource improvement and restoration.
- Advocate for legislative actions where needed, such as permitting sludge removal in the lake (e.g., on the Hwy 53 side of the lake).

Section 3. The duties of the Board are to represent the interests of area citizens, provide information to the public about ways to protect and conserve the natural resources, solicit input and ideas from other stakeholders, along with state agencies.

Article II

Membership

A. Appointment. All applicants desiring an initial appointment to an advisory board must fill out an application, which is available at Town Hall, on the town's website, or by contacting the staff liaison for that advisory board. The application will be turned into the staff liaison for the advisory board and will, in turn, be presented at the next scheduled advisory board meeting in which a vacancy exists. If more applications are presented than existing vacancies, the advisory board will conduct an open vote. The applicant(s) receiving the highest number of votes will be forwarded to the Town Board for final approval. No applicant applying for a vacancy on any advisory board will serve in an official capacity until his or her approval has been finalized by the Town Board.

Section 1. The Board shall be made up of a cross-section of White Lake property owners or others with a strong desire to help in the planning, with a strong commitment to the community. Effective July 8, 2025, membership of the White Lake Water Quality

and Quantity Advisory Board shall consist of seven (7) members, appointed by the Town Board of Commissioners

Section 2. The Town of White Lake Board of Commissioners will appoint initial members on staggered terms.

Section 3. The Town of White Lake Board of Commissioners shall have the authority to remove an Advisory Board Member for failing to comply with rules and regulations set forth herein.

B. **Reappointment.** Members may succeed themselves with no limit on the number of terms they may serve on the advisory board. Stronger consideration will be granted to those applicants seeking reappointment to the advisory board, provided their past performance is satisfactory as defined by the Town Board. Recommendations for reappointment will be forwarded to the Town Board by the advisory board.

C. **Terms of office.** Unless otherwise provided in the bylaws, advisory board members will serve three-year staggered terms. Members will continue to serve until their successors have been appointed by the Town Board. All advisory board members serve at the pleasure of the Town Board.

D. **Qualifications for membership.** All applicants must have a sincere interest in the purpose of the advisory board or possess special skills that uniquely qualify them for an appointment to that advisory board. In addition, citizens are limited to serving on no more than two advisory boards concurrently. Elected Officials serving on the Board of Commissioners are not eligible for appointment to Advisory Boards.

Article III

Meetings

Section 1. The regular meeting of the membership of the Board shall be held on a monthly basis, with day and time determined by the Advisory Board members at the White Lake Town Hall or other designated and advertised location deemed by the consensus of the Committee.

Section 2. A majority of the appointed members of the Board shall constitute a quorum for the transaction of any business at any regular meeting of the Board. In the absence of a quorum at any regularly scheduled meeting, the members present shall function as a full subcommittee, electing an interim chair, if necessary. If the number of members present is 1/3 or greater of the full Board, the agenda for the meeting will be followed, and any recommendations of this full subcommittee shall be presented to the Board at the next regularly scheduled meeting. If the number present is less than 1/3, the members may, if they wish, vote to follow the agenda or postpone the agenda to the next regular meeting.

Section 4. Only the appointed members shall be entitled to vote at any meeting of the Board. However, the public is welcome and their input is invited.

Article IV

Officers

Section 1. The members of the Board shall elect from their membership the following offices at the July meeting (August Meeting in 2025):

A: Chairman

B: Vice-Chairman

C: Secretary

Section 2. The terms of office for all officers shall be one year, beginning at the first regular Board meeting of the year and terminating at the last regular Board meeting of the year, or until their successors are elected at the next regular meeting of the Board.

Section 3. Any officer may be re-elected for the same office.

Section 4. A vacancy in any office may be filled by the Board at any regular meeting.

Section 5. Duties

Chairman

The Chairman shall preside at all meetings of the Board and conduct all meetings of the Board. He or she shall forward action taken by the Board to the Board of Commissioners for whatever action the Board deems appropriate. The Chairman shall appoint subcommittees as appropriate and deemed necessary by the Board, and notify the Board of such appointments.

Vice-Chairman

In the absence of the Chairman or in the event of his or her inability to act, the Vice-Chairman shall exercise all powers and duties of the Chairman.

Secretary

The Secretary will record minutes of all meetings of the advisory board, preparing minutes for the agenda packet, getting chair's signature on all approved minutes, coordinating with the Town Clerk for the safe-keeping of all minutes and other documents of the advisory board, coordinate with the staff liaison on all comminciation for the advisory board, and perform any other secretarial duties as needed.

Article V

Amendments

Section 1. These bylaws may be amended by the two-thirds vote of the membership present and voting at any regular meeting of the Board after notice of such proposals for an amendment has been given to all members as provided in these bylaws. All such amendments shall be subject to approval by the Board of Commissioners.

Section 2. Notice of any proposed amendment shall be submitted in writing to all members of the Board not less than thirty (30) days before the meeting at which such amendments are to be considered.

Article VI

Rules of Procedure

Section 1. All meetings of the Board shall be conducted informally unless otherwise specified in these bylaws.

Section 2. Agenda items are to be determined by priorities as set by the full Board. All requests from the Board of Commissioners will be honored.

Article VII

Rights & Privileges

Section 1. No individual member shall possess any right, interest, or privilege that may be transferable by that member or which shall continue in any manner if the membership of such individual member ceases.

TOWN OF WHITE LAKE MANAGEMENT STRATEGIC PLAN

Principle Author:
Jim Perry, Special Projects Planner
Lumber River Council of Governments

Contributing Staff:
Jean Klein, Regional Planning Director, LRCOG
Jan Maynor, Special Projects Planner, LRCOG

Contributing Consultants:
Curtis Consolvo – GeoResources
Dr. Diane Lauritsen – LimnoSciences

Special Thanks:
Lane Garner, Park Superintendent, Singletary Lake Group and other staff from the
NC Division of Parks and Recreation

Trent Allen, Environmental Regional Supervisor and Kenneth White, Hydrologist,
Fayetteville Regional Office, NC Department of Environmental Quality

NC Water Resources Commission

WHITE LAKE MANAGEMENT STRATEGIC PLAN SCOPE OF WORK

- STATE LEGISLATION
- DELINEATION OF AUTHORITY
- REVIEW AND CATALOG EXISTING TECHNICAL STUDIES, REPORTS, AND RELATED MATERIALS AND RECOMMEND OTHERS AS NEEDED
- KEY ISSUES
- CONNECTION TO LAND USE PLANNING
- STORMWATER MANAGEMENT
- MANAGEMENT CAPACITY, RESOURCES AND RESPONSIBILITIES
- ACTION STEPS

STATE LEGISLATION – LEGAL TENETS

NC GENERAL ASSEMBLY SESSION LAWS 1828-29

- Expressly forbids the lands covered by waters of any lake within NC from being recorded for private ownership.

NC GENERAL ASSEMBLY SESSION LAWS 1911

- "AN ACT TO SECURE TO THE PEOPLE OF THE STATE OF NORTH CAROLINA THE USE OF THE LAKES OF BLADEN, COLUMBUS, AND CUMBERLAND COUNTIES."
- "That White Lake, Singletary Lake, Black Lake, Waccamaw Lake and any others…**containing 500 acres** or more, shall never be sold or conveyed to any person, firm, or corporation, but shall always be and remain the property of the State of North Carolina for the use and benefit of all people of the State."

NC GENERAL ASSEMBLY SESSION LAWS 1929

- Acreage reduced to **50 acres**.

DELINEATION OF AUTHORITY

4 MAJOR PLAYERS RELATIVE TO THE LAKE AND ITS MANAGEMENT AND/OR HAVE A VESTED INTEREST

- **TOWN OF WHITE LAKE**
- **NC DEPARTMENT OF PARKS AND RECREATION**
- **NC DEPARTMENT OF ENVIRONMENTAL QUALITY**
- **NC WATER RESOURCES COMMISSION**

TOWN AUTHORITY

- Chartered in 1951 by the NC Legislature
- Carries all rights and authority under State statutes – including ability to regulate development through zoning and other legislation, establish and operate utilities like water and wastewater, enact local ordinances like stormwater and land use regulations. ***Town's authority ends at the high water mark of the lake***.
- Currently working through the Planning Board to craft a Comprehensive Development Plan as a companion piece to the updated zoning ordinance. This strategic plan will be included as a component of the Comprehensive Plan.
- Must seek approval from the appropriate state agency to undertake an activity involving the lake.
- The Town's footprint on the land surrounding the lake is significant, especially in terms of land use and development, public utilities, and stormwater discharge.

NORTH CAROLINA DEPARTMENT OF PARKS AND RECREATION (DPR)

- Responsible for Conservation and Protection of natural and ecological resources within the state's park system, provide and promote recreational opportunities, provide educational opportunities, and promote stewardship of state's natural resources.
- White Lake is part of the Singletary Lake Management Area that includes Singletary Lake, Bay Tree Lake, Salters Lake, and White Lake.
- Provides oversight of the lake that includes the inspection of seawalls/bulkheads, permitting and inspecting piers, establishing buoys, general park management duties, enforcement of certain laws, and other duties. It also has provided monitoring duties related to the Turtle Cove outlet.

- Currently monitoring within White Lake:
  - 298 piers (up 6% from 1996)
  - 445 buoys (up 56% from 1996)
  - 151 seawalls/bulkheads (up 59% from 1996)

DPR ISSUES

- **Access by the DPR** – DPR does not own any land around the lake except for .06- acre access point on southern shoreline. Every other state lake in NC has adjacent public land.

- **High Water Mark** – DPR's authority is the surface water of the lake. The exact location of the high water mark is sometimes in dispute. This is especially important with seawalls/bulkheads.

- **Public Access** – Lakeshore almost completely developed with virtually no public access except privately developed facilities. This is counter to the intent expressed in state regulations which were created to "properly control such private use that the public shall not be excluded from its rightful use of state property which has been developed for recreational purposes."

DPR ISSUES continued…

- **Seawalls/Bulkheads** – The proliferation of seawalls and motor craft has resulted in increased congestion, safety issues, and water quality issues. State riparian rights also prohibit impediments to the natural development of water bodies.

- **Access and control of the Turtle Cove outlet** – This outlet is a critical asset to the health of the lake…mixing abilities, flood prevention. The outlet is currently on privately owned land. The Town of White Lake should consider acquiring this outlet or establishing another outlet.

NC DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ)

- Environmental protection and quality of the state's surface and ground water resources.
- Monitor permits issued under the agency's authority (such as wastewater discharge) and conducts other regulatory enforcement.
- Evaluate water quality by taking measurements and samples for testing.
- Develop water quality standards, rules and management strategies, and provide educational awareness.
- Test algae for toxicity. If toxic, samples go to BC Health Department. ***Health Department has authority to close the Lake to public use***.
- DEQ is a regulatory agency not a restoration agency.
- Monitor surface runoff within the roads circling the lake.
- Staff from the Fayetteville Regional Office are assigned to this area.

DEQ – Division of Water Resources

- Responsible for water quantity and quality monitoring, planning and permitting
- Responsible for monitoring groundwater, a significant contributing source for the lake
- Responsible for monitoring droughts

DEQ ISSUES

- No authority or ability to directly address the algae/aquatic vegetation issue and has limited resources with respect to invasive aquatic vegetation. They can take samples and test, but must turn enforcement over to the BCHD.
- Turtle Cove Outlet – The Department agrees that the outlet should be maintained as an asset owned by the state or town. This includes the outfall ditch that runs to NC Hwy 53. An engineered control structure should be added to assist in controlling the flow.
- Exfiltration of untreated wastewater into the groundwater – The seeping of untreated wastewater into the lake is a concern they feel should be addressed. The Department applauds the Town's current pipe replacement project. There is a need to address the many privately owned laterals into the collection system. Many of these are old and built with inferior materials.
- Monitoring stormwater and other outfalls into the lake – without a true public access point, it is difficult to inspect the many outfalls present to determine compliance.

NC WILDLIFE REOURCES COMMISSION (WRC)

- Created to help conserve and sustain the state's fish and wildlife resources.
- Regulatory agency responsible for the enforcement of the state's hunting, fishing, and boating laws.
- Has enforcement authority and jurisdiction over all aspects of:
  - Issues all boat permits
  - Boating and water safety.
  - Hunting and trapping.
  - Fishing exclusive of fishing under jurisdiction of the Marine Fisheries Commission.
  - Activities in woodlands and on inland waters.

WRC Issue

- Increased recreational fishing in White Lake.

AREAS OF CONCERN

In the Spring of 2022, approximately 600 surveys were completed by residents and other interested parties concerning the future of White Lake and the surrounding community. This was a part of the ongoing Comprehensive Plan process. The following issues were overwhelming identified:

- Quality of the lake water,
- Clarity of the lake water,
- Water level of the lake,
- Over development of the lakeshore,
- Lack of public access to the lake.

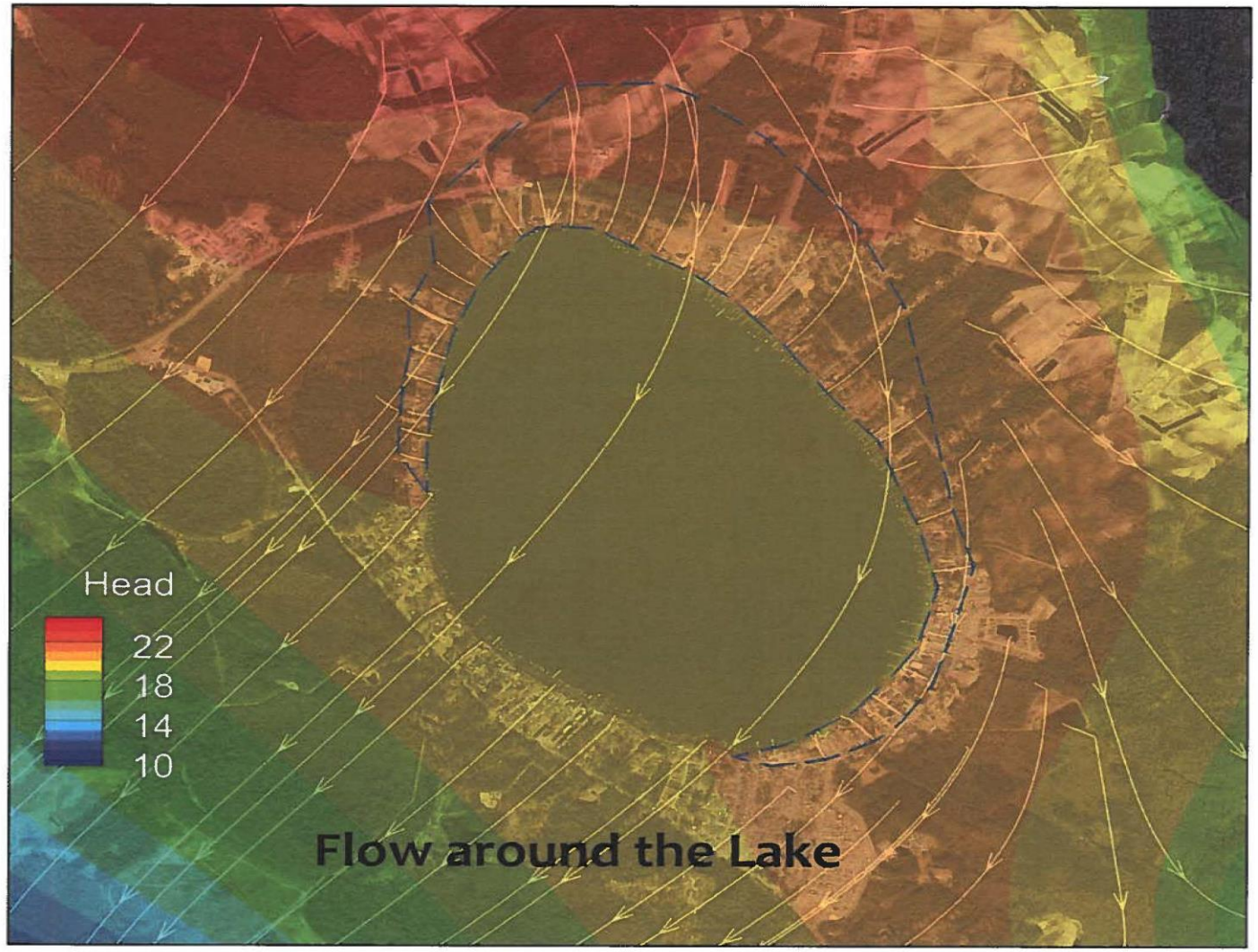
These areas of concern were also expressed by other stakeholders and state agencies. This list was used in helping to identify the points of focus for this study.

CRITICAL ISSUES AND TECHNICAL TASKS

- Examination of the Hydrogeology of White Lake
- Lake Water Levels
- Lake Water Quality
- Detailed analysis of each of these section
- Technical in nature
- Use of individuals with knowledge and background in these issues

Examination of Groundwater Supplying White Lake

- **Key Findings**
- Sources of water supplying the lake are precipitation and groundwater from the surficial aquifer. ***Rainwater is the key factor affecting gains and losses in groundwater which affects the water table and the flow rates***.
- The principle groundwater recharge area for the lake are the higher land elevations to the north of the lake.
- Water level measurements, taken via a temporary pipe about 13 feet into the bottom of the lake near the site of the "springs", show that these springs are responsive to the hydraulic pressures of the flow of groundwater under the lake.
- A clay hardpan layer exists in most places under an around the lake. The thickness of the hardpan varies, but is typically around 7 feet thick, at a depth of 5 to 12 feet under the bottom of the lake or under the surrounding sand ridge. The hardpan does not exist in every area of the lake and surrounding area. It is generally absent around the northeast side of the lake and into the area near the springs. The hardpan pinches out around the edges,


Head
22
18
14
10
Flow around the Lake

Groundwater continued…

- The lake and the hardpan lie entirely within the surficial aquifer sediments. The lake bottom nor the hardpan penetrate the confining unit (clay layer) which separates the surficial aquifer from the Black Creek aquifer.
- It is unlikely that there is seepage from the surficial aquifer into the Black Creek aquifer.
- Openings in the Town's wastewater collection system allow groundwater to seep into the system (infiltration and inflow). This issue is being addressed to a great extent by the Town's pipe replacement project.
- The many ponds at the farms to the northeast and uphill from White Lake are likely to have a lowering impact on the water table because of land drainage and evaporation issues between rain events. The higher elevation areas are where water table elevations can be substantially higher at times than lake levels and help provide the hydraulic 'push' towards the lake.
- For ponds that are pumped for irrigation or freeze protection, water table levels would be further lowered during pumping. However, if the ponds are pumped water from the deeper aquifers, such as the Black Creek, the impact would depend on the levels maintained in the ponds. Impacts from the ditches at the blueberry farms would be similar to ponds.

Groundwater continued…

- The effect of the farms mentioned is fairly minimal. To understand the true effect of the farms, more research would be necessary. This research methodology is laid out in an attachment to this section of the report. It is the opinion of the hydrogeologist that the level of interference is not significant enough to warrant the expenditure.
- Well pumping from deep confined aquifers (Black Creek and Upper Cape Fear) is not likely to have any impact upon groundwater inflow or outflow to/from White Lake. The confining units separating these aquifers from each other is well documented and there has been no documentation that indicates otherwise.
- The impacts of pumping shallow wells (screened in the surficial aquifer) at properties surrounding the lake is likely minor.

LAKE WATER LEVELS

Ditches

- The concern of property owners digging drainage ditches on their property dates back to the late 1940s – early 1950s. Cases involving 2 property owners that started ditches on northwest side of lake, running away from lake. State Attorney General held that the State had no right to stop a property owner from ditching their land.

State Legislation – 2 Acts

- ***HB406 adopted 1971 – "AN ACT TO PREVENT THE DIGGING OF DITCHES BELOW A CERTAIN LEVEL IN BLADEN COUNTY".*** Unlawful to dig any ditch under Hwys 701 and 53 and White Lake Drive below 66 above sea level.

- HB994 adopted in 1973 – Amended previous legislation so as to allow Town to install, repair or replace water and wastewater lines.

LAKE WATER LEVELS …

Geologic Formation of the Lake, Rainfall and Drought

- The lake and hardpan are basically a bowl sitting on top of the surficial aquifer and soils beneath
- Because of the topography of the land immediately surrounding the lake, there is drainage into the lake from this area. Mostly this area is within the three roads encircling the lake.
- There is no inlet into the lake. This is the main reason for the lake's clarity, but it also restricts surface water from supplying water into the lake.
- There is only one outlet for the lake…Turtle Cove.
- Therefore, lake levels are subject to the availability of groundwater flow. If there is limited rainfall, then groundwater and lake levels are going to drop. If there is a severe drought, then the lake levels are subject to even more loss of water through evaporation and a lowering water table.
- Pumping groundwater into the lake will not work…for either filling the lake or lowering pH levels.

WATER QUALITY

Every lake is unique and that is especially true of White Lake.

Effective management involves on-going monitoring – rainfall, lake levels, Ph levels, nutrients and other chemicals, aquatic vegetation, and other key measures of lake health.

General characteristics:

- Small and very shallow Bay Lake with an average depth of 6.2 feet.
- No surface inlet.
- Sediment rich bottom.
- Unique chemistry.
- Excellent clarity.

WATER QUALITY continued…

- Muddy sediments make up about half of the lake bottom, while sand is predominant around the shallow perimeter.
- The shallowness of the lake allows sunlight to penetrate to the lake bottom, allowing aquatic plants and filamentous algae grow fueled by the nutrients in the sediment.
- The shallowness of the lake means that the lake volume to surface area ratio is relatively low…underscoring the importance of rainfall and evaporation in the water budget of the lake.

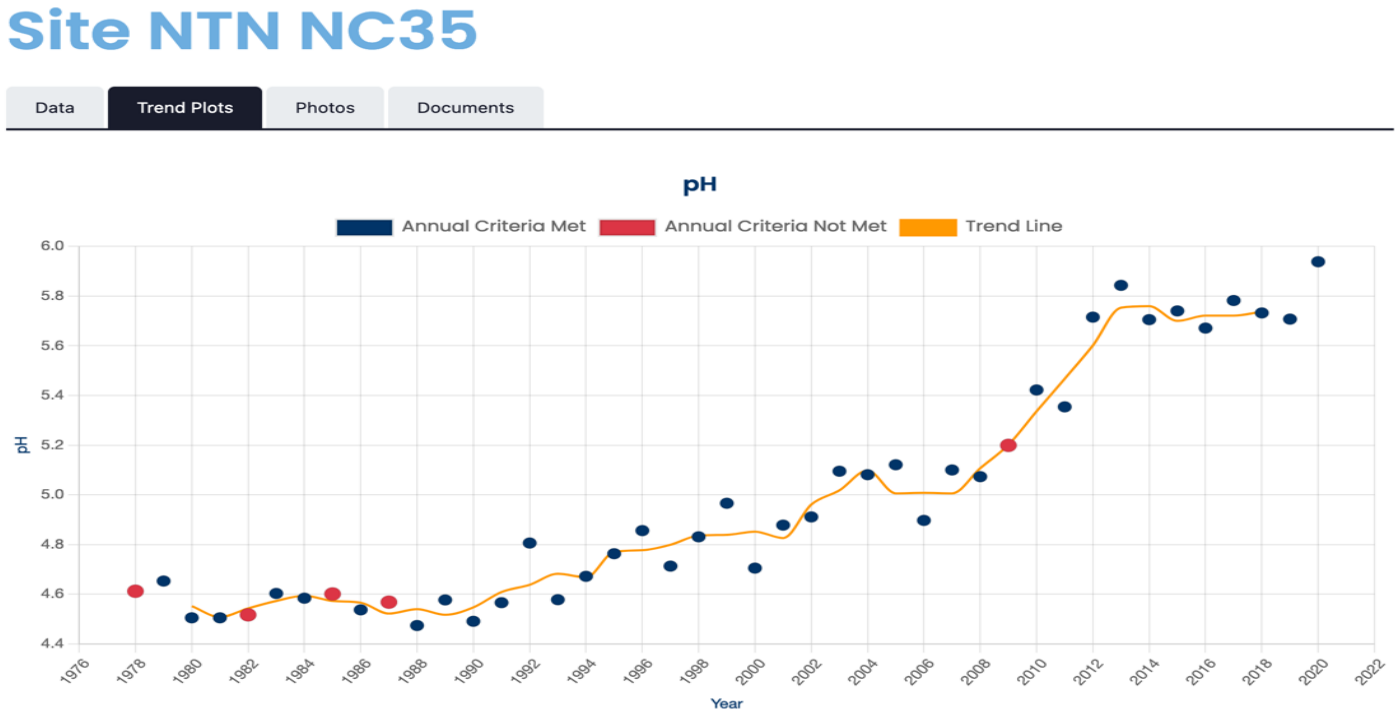
WATER QUALITY continued…

Lake levels and rainfall

- The three-year (2019-2021) mean high water level is 65 feet NAVD 88. Extended periods of high rainfall are needed to sustain lake levels at or above 65 feet.
- Lake levels can drop 4 – 5 inches in a month when rainfall amounts are limited. During severe droughts, lake levels can drop 2 feet or more.
- Annual variations in lake levels range from 10 – 16 inches.
- During the 2019 – 2021 period, the range in lake levels from highest to lowest was 21.1 inches.
- Monthly rainfall amounts during this same period ranged from 0.4 inches to 12.25 inches.

WATER QUALITY continued…

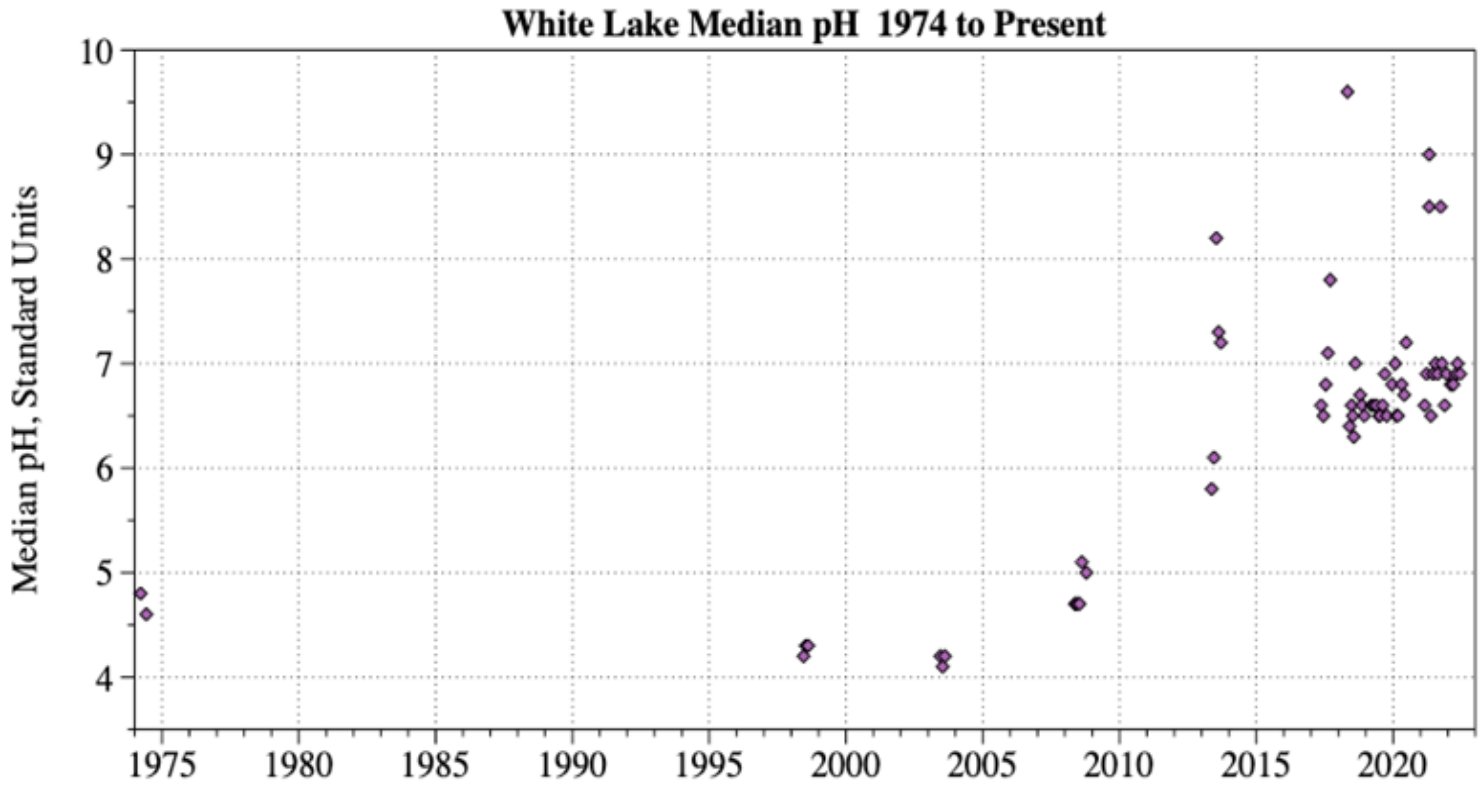
- Atmospheric Monitoring 1974 – 2020
- Acid Rain – Caused by a chemical reaction when compounds like sulfur dioxide and nitrogen oxides are released into the air and mix with water, oxygen and other chemicals to form more acidic pollutants.



WATER QUALITY continued…

- pH – a measure of acidity or alkalinity. Ranges from 0 to 14.
- A measurement of 7 is neutral (pure water). A measurement of less than 7 is acidic (vinegar, orange juice). A measurement of greater than 7 is basic (ammonia, bleach). Each one-unit change represents a 10-fold difference.
- The pH of rainfall has changed considerably in a short period of time, with the most rapid change taking place from 2008-2013.
- The pH level was not significantly changed in recent years despite reductions in acidic emissions from utilities (acid rain).
- The continuing increase in rainfall pH in the region is due to increased emissions of a strongly basic substance, ammonia.

Every five years, DEQ conducts lake monitoring for White Lake. DEQ found pH levels in May 2013 to be significantly higher than in 2008. There was a 2-unit spike in the pH in July 2013 that was associated with an algae bloom. High pH levels can cause algae blooms.
Non-bloom pH levels are now generally in the range of 6.5 to 7.

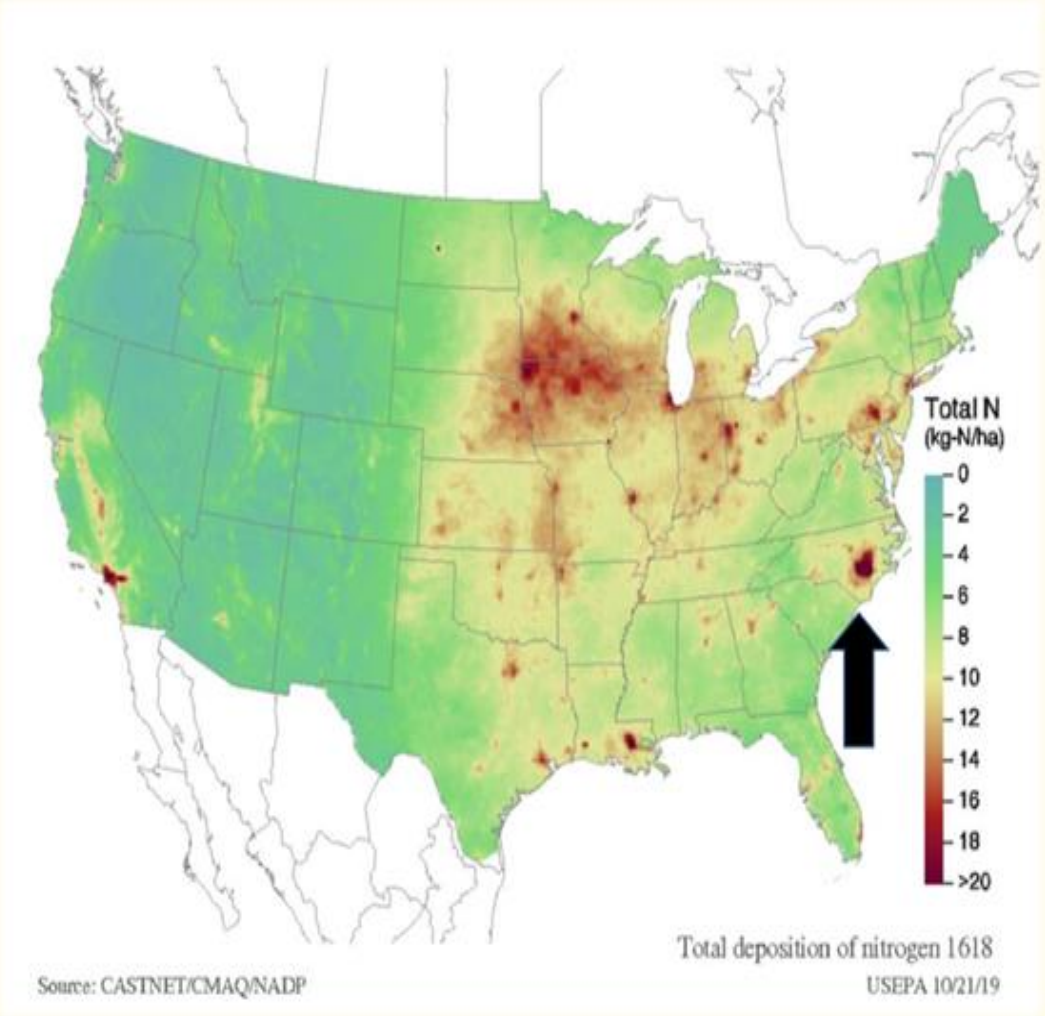


WATER QUALITY continued…

Nutrients in White Lake

- Nutrients play a fundamental role in lake systems. They are critical to the development of plant and animal life. In a healthy lake, nutrients are needed for the growth of algae that help form a complex food system supporting the entire aquatic system.
- The most common nutrients are nitrogen and phosphorus.
- Eutrophication is the natural process of enrichment of lakes and streams with nutrients. Lakes are particularly vulnerable to eutrophication because the level of nutrients continue to build up rather than being carried away by a flow within the water like a stream. White Lake doesn't have a natural 'stream flow' to get rid of this build-up!
- Rainfall contains several forms of nitrogen. One that can be readily utilized by phytoplankton (minute free floating aquatic plants) has been increasing. Atmospheric monitoring by EPA shows that the total annual input of nitrogen to be very high in our region.

Atmospheric Change: A Nitrogen Hot Spot in NC



Reduction in NO_x (acid)

4x Increase in NH_3 (base)

Dry Deposition High

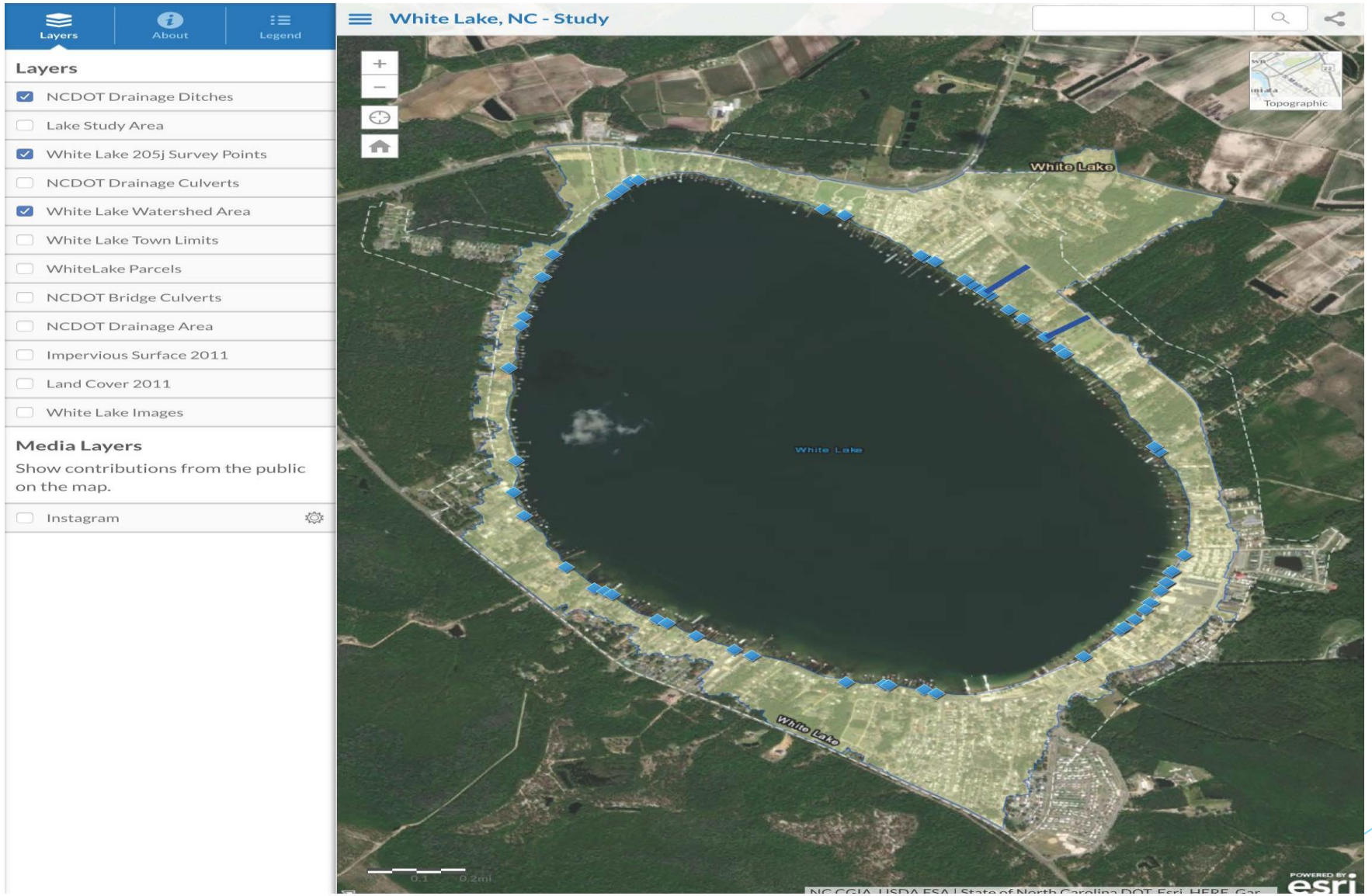
TN Deposition = Wet + Dry
in kg-N/ha/year
(2018 Data)

Data from National Atmospheric Deposition Program, US EPA Clean Air Status and Trends Network (CASTNET)

WATER QUALITY – Nutrients continued

Other sources of nutrients:

- **Stormwater** – Over 50 stormwater outfall pipes and ditches have been identified. This stormwater contains runoff from parking lots and yards, and other surface areas. There are a number of small and large drainage ditches that flow directly into the lake (i.e. drainage from the NCDOT retention ponds on the northwest side of the lake).
- **Groundwater** enriched with nutrients from the Town's wastewater collection system and the laterals from individual businesses and residences flow through the water table into the lake. (The Town is actively addressing the collection system by replacing approximately 26,000 feet of old pipe.)
- **Muddy sediments** are rich in nutrients which are released when they are dislodged by watercraft and other disturbances.


Layers
About
Legend
Layers
NCDOT Drainage Ditches
Lake Study Area
White Lake 205j Survey Points
NCDOT Drainage Culverts
White Lake Watershed Area
White Lake Town Limits
WhiteLake Parcels
NCDOT Bridge Culverts
NCDOT Drainage Area
Impervious Surface 2011
Land Cover 2011
White Lake Images
Media Layers
Show contributions from the public on the map.
Instagram
White Lake, NC - Study
Topographic
White Lake
White Lake
White Lake
0.1
0.2mi
POWERED BY esri

WATER QUALITY - Sediments

- Sediments are solid particles suspended in the water that eventually settle on the lake bottom.
- Sediments are storehouses for nutrient phosphorus which rooted vegetation can easily utilize.
- The top inch of the muddy sediment contains the highest concentration of phosphorus. When sediments are introduced into the water column, the phosphorus levels increase.
- Sediments can be the greatest source of phosphorus for algae.

Algae blooms can appear as surface scums and can be bright green, red, brown, or blue.
Blooms can also appear as dense growths called algal mats that float on the surface.

Much of the materials which have and continue to collect around sea walls are muddy sediments and decomposing algal mats. This is particularly prevalent on the western and southern shores.

WATER QUALITY SUMMARY

- There has been an increase in the number of different phytoplankton in the lake in the past four years, and this diversity offers a stabilizing influence. The ‘good’ phytoplankton are helping to manage the nitrogen.
- The lake’s phytoplankton community is dynamic, with changes month to month.
- Small algae, with a relatively large surface to volume ratio, can respond rapidly to increases in nitrogen provided by rainfall.
- Blooms generally dissipate when inorganic nitrogen is no longer available.
- Continued monitoring of the lake should include detailed monitoring of phytoplankton, with samples checked for potential cyanobacterial bloom development.

WATER QUALITY SUMMARY continued

Boating

- There is a clear association between increased boating activity and reductions in water clarity. This observation has been made in almost every study or report made about lake water quality dating back to the 1930s.
- The shallowness of the lake and the increased size of watercraft has exacerbated this issue in the last few decades.
- The churning of sediments and the dislodging of aquatic plants migrate to the shallow areas where they decompose and congeal, creating an unsightly and odorous mess.
- The displaced sediments also release additional phosphorus into the lake which increases negative effects on water quality.
- The presence of seawalls/bulkheads can exacerbate the situation by deflecting wave action back into the lake, prolonging the period of disturbance.
- In the Action Steps of this report are recommendations for the consideration of some form of recreational capacity use formula for limiting the number of watercraft on the lake at any one time.

CONNECTION WITH LAND USE PLANNING

Zoning

- Most common form of land use regulation used by towns and counties in NC.
- Town of White Lake recently revised its ordinance – adopted July 2021.
- LRCOG also drafted a stormwater ordinance for the Town.
- Stormwater has been identified as a contributing factor affecting lake water quality. It is a growing problem in NC.
- Watershed-based zoning
- As the density of development increases, coupled with reducing setbacks, and allowing paved surfaces on smaller lots, the volume of stormwater increases.
- DEQ has just this summer given notice of a new program for funding “Best Management Practices” to manage stormwater runoff.

MANAGEMENT

- This Lake Strategic Management Plan is intended to be a part of the larger Comprehensive Plan currently being crafted by the Town's Planning Board.
- The survey mentioned earlier brought forth some stark comments.
- "If there is no healthy lake, there is no Town."
- "The future of the lake is not in the hands of nature, but in the hands of man."
- Prior to undertaking the development of a true lake management plan (LMP), partners and stakeholders need to agree on a basic foundation of truths. ***It is imperative for the future of the lake that there is agreement on a path of action that prioritizes the health of the lake***.

Management continued…

There are 2 elements to managing the lake's future that must be included in a LMP. Both will mean the engagement of several parties. No one can go it alone and make a difference.

- The actual management of the lake in terms of implementing changes in use or altering activities that take place on and around the lake.
- Setting up long-term monitoring activities to deal with the issues surrounding water quality, lake levels, and other identified issues.

Management Partners and Monitoring

Management Partners

- A working partnership between the Town, its residents and the State must be developed. The partnership needs to acknowledge the responsibilities and the jurisdiction of each partner and it must be a partnership that works together. These core partners have been identified here and in our report.

Monitoring

- Monitoring activities will require incorporation of stakeholders who have a vested interest in the future of the lake. There already exist several committees. These should be reexamined to see if they are still relevant, functional, and engaged. There may be a need to reformulate some of these groups based on evolving needs and issues brought forth by this plan and any future management plan.

ACTION STEPS: Goal #1. Delineate actors and roles of authority with the Lake

- There are **two actors** with authority roles regarding the Lake and its future – the **State and the Town of White Lake**.
- In the State's role, DPR and DEQ have the most relevant impact on lake issues being discussed in this study.
- The Town has a significant impact on the lake, especially as it relates to water quality and clarity. The Town's footprint on the land surrounding the lake is significant. The amount and density of development around the lake has intensified significantly. Action Steps regarding land use are included under Goal 5.
- The Town also has the ability through a simple real estate purchase or, if necessary, through eminent domain, to acquire land for public purpose. As noted in this study, control of land along the perimeter of the lake is now all in private hands. Also as noted in this study, the major outlet for the lake is in private hands.

GOAL # 1 ACTION STEPS

- The State of North Carolina and the Town of White Lake should work collaboratively on future management of the lake.
- The land area at the location of the Lake outlet, the outfall ditch, and the roadway necessary to access the outlet should be secured by a public entity; preferably the Town.
- The Department of Parks and Recreation should continue in its role to manage the area around the lake outlet.

GOAL # 2: Identify the contributors to lake water quality and quantity.

- Review of the data, reports, and studies, including three years of water level monitoring, reveals that there are a number of factors which contribute to the overall health of the lake.
- Rainfall is a major contributor to the level of the lake.
- Shallow depth of the lake.
- Presence of Nutrients in rainwater.
- Presence of phosphorus in lake sediments.
- Increased development and density.

GOAL # 2 – Action Steps

- As White Lake and other Bay Lakes are state-owned resources, under management authority of State Parks, it is imperative that monitoring and management of all of the lakes be coordinated and fully supported financially for the long-term. All Bay Lakes have unique attributes, and as a group, they have national significance.
- Continue monitoring the Lake levels at set intervals.
- Continue to support and enhance the groundwater model that has been developed for the Lake.
- Continue the lake water quality monitoring for factors such as pH, nutrients, ammonia, and nitrogen levels, toxins, and bacteria.
- Establish a cooperative program with DPR and DEQ to share information and coordinate remediation efforts.

Goal # 2 Action Steps continued…

- Implement a stormwater ordinance to better control and mitigate discharges into the lake. Explore an alternate method of disposing of stormwater.
- Implement stronger land use controls such as reducing development densities on lots, decreasing the amount of impervious surface area around the lake.
- Continue to improve the integrity of the wastewater collection system to eliminate as much exfiltration of wastewater into the groundwater as possible. Also, create a program to improve/replace sewer laterals.
- Monitor for the introduction of invasive species into the lake.
- Establish and encourage the use of boat washing stations for nonresident boats entering the lake.

Goal # 2 Action Steps continued…

- Consider obtaining conservation easements for establishing open space areas around the lake.
- Reduce the level of recreational boat traffic by instituting a ***recreational capacity plan*** which would recognize the detrimental effects of too many watercraft utilizing the lake at one time.

GOAL # 3 CONSOLIDATION OF CONCERNS AND IDEAS

- A variety of stakeholders have been present for discussions and report presentations regarding the Lake in the last several years. Review of those reports, minutes, notes, newspaper accounts, etc. reveal that these stakeholders have extremely diverse views on the future of the Lake.
- While it is challenging to consolidate these views and ideas because they are so varied, it is our conclusion that an agreed upon management plan of the Lake for good water quality going forward is essential. We observe that without the Lake and all the things it brings to the Town of White Lake, the region, and the State, ***loss of this natural resource would be economically and environmentally catastrophic***.

Goal # 3 – Action Steps

- Encourage a science-based approach to the management of lake water quality.
- Continue to recognize and invite stakeholders to participate in the process of developing a full Lake Management Plan.

Goal #4: Stakeholders are needed for coordinated, future management of the Lake.

Going forward, the main ingredient for any successful outcome will require stakeholders to work together for a defined common purpose. Going forward without solid cooperation will not bring the desired outcome of a healthy and vibrant lake.

- Action Step: Continue to recognize and invite stakeholders to participate in the process of developing a full Lake Management Plan.

Goal #5: DEFINE THE ROLE OF THE TOWN OF WHITE LAKE

As outlined in #2 above, there are many factors that impact the lake level and lake water quality. We conclude that there is not one action which could be taken in absence of others that will create the opportunity for the desired outcome of a healthy and vibrant lake. There are also factors which influence the lake that are within control of the Town and those which are not. Of those within the Town's control, we recommend the following:

Goal 5: Role of the Town – Action Steps

- Be the convener of the stakeholders in managing the lake.
- Make use of the tools that are at the Town's disposal for protecting the lake:
- Amend the zoning ordinance to include stronger land use controls particularly the area around the lake perimeter.
- Enact a stormwater ordinance.

GOAL # 6 IDENTIFY FUTURE STUDY NEEDS

During the course of this effort, we identified several areas where additional studies may be useful. Several have already been mentioned in other Goals.

Goal # 6 Identify Future Study Needs – Action Steps

- Additional stormwater studies of the Lake perimeter are needed to identify the major contributors/causes of stormwater runoff into the Lake. This could significantly contribute to the refinement needed to develop and enact a Stormwater Management Plan and regulations for the Town of White Lake.

Goal # 6 Identify Future Study Needs – Action Steps continued…

- Extensive monitoring would be necessary to learn more about the factors affecting surficial aquifer levels and especially to quantify the extent to which each factor impacts amounts of groundwater flowing into or out of White Lake. Such studies should incorporate much more of a vertical component for assessing hydraulic gradients than past studies have, with monitoring wells that are deeper, farther from the lake (and nearer to large farms), and also within the lake bottom.

Goal # 6 Identify Future Study Needs – Action Steps continued…

- Further studies can hopefully be done as a cooperative effort with owner/operators of the nearby farms, north and east of White Lake. If information sharing could be arranged and approvals/access established for conducting monitoring activities on farm properties, far more could be learned about possible impacts to Lake White from the ponds, ditches, and pumping wells at the higher elevations. Study plans in the appendix could proceed without that, but it is recommended that the Town explore possibilities for conducting a study as a cooperative effort before proceeding with another extensive one.

IN CONCLUSION

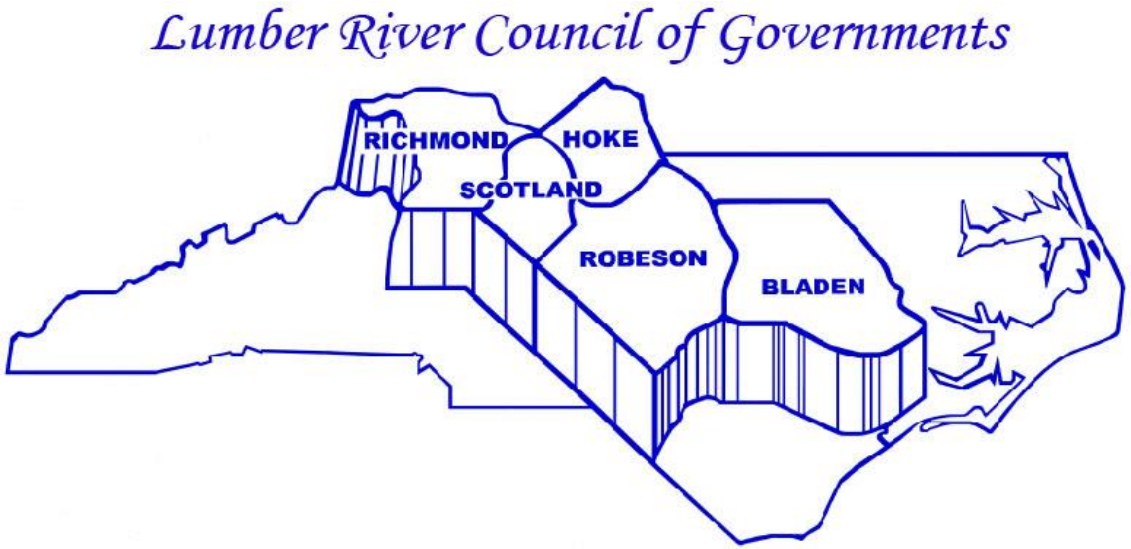
- White Lake is a small, but complex water body.
- It is shallow.
- It depends greatly on adequate amounts of rainfall to maintain lake levels.
- It is susceptible to algae blooms and discoloration.
- Its water quality is heavily influenced by nutrients from ground/surface water sources.
- It is heavily developed around most of its perimeter.

IN CONCLUSION …

- The lake is owned and managed by the State, but it is the lifeblood of the community that surrounds it.
- The lake is a prisoner to the past, current, and future problems.
- Individuals with vested interests are divided as to what the problems are and what needs to be done to resolve them.
- To survive, the lake requires all these parties to work together, identify their path and move forward, sooner rather than later.

PREPARED AND PRESENTED BY LUMBER RIVER COUNCIL OF GOVERNMENTS

SEPTEMBER 2022



THIS PAGE WAS LEFT BLANK INTENTIONALLY