

North Carolina Division of Water Resources Ambient Lakes Monitoring Assessment of the Neuse River Basin Lakes and Reservoirs

North Carolina Department of Environmental Quality
Division of Water Resources
Water Science Section
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This report has been approved for release by:



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Glossary

Algae	Small aquatic plants that occur as single cells, colonies, or filaments. May also be referred to as phytoplankton, although phytoplankton are a subset of algae.
Algal Biovolume	The volume of all living algae in a unit area at a given point in time. To determine biovolume, individual cells in a known amount of sample are counted. Cells are measured to obtain their cell volume, which is used in calculating biovolume.
Algal Density	The density of algae based on the number of units (single cells, filaments and/or colonies) present in a milliliter of water. The severity of an algae bloom may be determined by the algal density as follows: • Mild bloom = 20,000 to 30,000 units/ml • Severe bloom = 30,000 to 100,000 units/ml • Extreme bloom = Greater than 100,000 units/ml
Algal Growth Potential Test (AGPT)	A test to determine the nutrient that is the most limiting to the growth of algae in a body of water. The sample water is split such that one sub-sample is given additional nitrogen, another is given phosphorus, a third may be given a combination of nitrogen and phosphorus, and one sub-sample is not treated and acts as the control. A specific species of algae is added to each sub-sample and is allowed to grow for a given period of time. The dry weights of algae in each sub-sample and the control are then measured to determine the rate of productivity in each treatment. The treatment (nitrogen or phosphorus) with the greatest algal productivity is said to be the limiting nutrient of the sample source. If the control sample has an algal dry weight greater than 5 mg/L, the source water is considered to be unlimited for either nitrogen or phosphorus.
ALMP	Ambient Lake Monitoring Program
Centric Diatom	Diatoms are photosynthetic algae that have a siliceous skeleton (frustule) found in almost every aquatic environment including fresh and marine waters, as well as moist soils. Centric diatoms are circular in shape and are often found in the water column.
Chlorophyll <i>a</i>	Chlorophyll <i>a</i> is an algal pigment that is used as an approximate measure of algal biomass. The concentration of chlorophyll <i>a</i> is used in the calculation of the NCTSI, and the value listed is a lake-wide average from all sampling locations.
Clinograde	In productive lakes where oxygen levels drop to zero in the lower waters near the bottom, the graphed changes in oxygen from the surface to the lake bottom produces what's known as a clinograde curve.
Cocoid	Round or spherical shaped cell.

Conductivity	This is a measure of the ability of water to conduct an electrical current. This measure increases as water becomes more mineralized. The concentrations listed are the range of values observed in surface readings from the sampling locations.
Dissolved Oxygen	The range of surface concentrations of oxygen found at the sampling locations.
Dissolved Oxygen Saturation	The capacity of water to absorb oxygen gas. Often expressed as a percentage, the amount of oxygen that can dissolve into water will change depending on several parameters, the most important being temperature. Dissolved oxygen saturation is inversely proportional to temperature, that is, as temperature increases, water's capacity for oxygen will decrease, and vice versa.
Eutrophic	Describes a lake with high plant productivity and low water transparency.
Eutrophication	The process of physical, chemical, and biological changes associated with nutrients, organic matter, silt enrichment, and sedimentation of a lake.
Limiting Nutrient	The plant nutrient present in lowest concentration relative to need limits growth such that addition of the limiting nutrient will stimulate additional growth. In northern temperate lakes, phosphorus (P) is commonly the limiting nutrient for algal growth.
Manganese	A naturally occurring metal commonly found in soils and organic matter. As a trace nutrient, manganese is essential to all forms of biological life. Manganese in lakes is released from bottom sediments and enters the water column when the oxygen concentration in the water near the lake bottom is extremely low or absent. Manganese in lake water may cause taste and odor problems in drinking water and require additional treatment of the raw water at water treatment facilities to alleviate this problem.
Mesotrophic	Describes a lake with moderate plant productivity and water transparency.
NCTSI	North Carolina Trophic State Index was specifically developed for North Carolina lakes as part of the state's original Clean Lakes Classification Survey (NRCD 1982). It takes the nutrients present along with chlorophyll <i>a</i> and Secchi depth to calculate a lake's biological productivity.
Oligotrophic	Describes a lake with low plant productivity and high-water transparency.
pH	The range of surface pH readings found at the sampling locations. This value is used to express the relative acidity or alkalinity of water.
Photic Zone	The portion of the water column in which there is sufficient light for algal growth. DEQ considers 2 times the Secchi depth as depicting the photic zone.
Secchi Depth	This is a measure of water transparency expressed in meters. This parameter is used in the calculation of the NCTSI value for the lake. The depth listed is an average value from all sampling locations in the lake.
Temperature	The range of surface water temperatures found at the sampling locations.

Total Kjeldahl Nitrogen	The sum of organic nitrogen and ammonia in a water body. High measurements of TKN typically results from sewage and manure discharges in water bodies.
Total Organic Nitrogen (TON)	Total Organic Nitrogen (TON) can represent a major reservoir of nitrogen in aquatic systems during summer months. Similar to phosphorus, this concentration can be related to lake productivity and is used in the calculation of the NCTSI. The concentration listed is a lake-wide average from all sampling stations and is calculated by subtracting Ammonia concentrations from TKN concentrations.
Total Phosphorus (TP)	Total phosphorus (TP) includes all forms of phosphorus that occur in water. This nutrient is essential for the growth of aquatic plants and is often the nutrient that limits the growth of phytoplankton. It is used to calculate the NCTSI. The concentration listed is a lake-wide average from all sampling stations.
Trophic State	This is a relative description of the biological productivity of a lake based on the calculated NCTSI value. Trophic states may range from extremely productive (Hypereutrophic) to very low productivity (Oligotrophic).
Turbidity	A measure of the ability of light to pass through a volume of water. Turbidity may be influenced by suspended sediment and/or algae in the water.
Watershed	A drainage area or catchment in which all land and water areas drain or flow toward a central collector such as a stream, river, or lake at a lower elevation.

Purpose and Scope

The North Carolina Ambient Lake Monitoring Program (ALMP) originated under the Environmental Protection Agency's (EPA) Clean Lakes Program and is designed to identify long term trends in water quality for lakes and reservoirs across North Carolina. The water quality data collected is used to calculate the state of nutrient enrichment (trophic state) and determine if lakes meet their designated use(s). Lakes are sampled by river basin on a five-year rotation according to the Division of Water Resources (DWR) basin sampling schedule. Lakes of 10 acres or greater, that have either public access and/or are used as a drinking supply, qualify for sampling metrics. [An interactive map of the state](#) showing the locations of the ALMP sampling locations by DWR may be found on the ISB website.

Overview

The Neuse River basin is the third largest basin in North Carolina and is one of only three basins that are located entirely within the state. The Neuse River Basin covers 6,192 square miles and spans 19 counties. The Neuse River originates northwest of the City of Durham in Person and Orange counties, and the headwaters start in the Southern Outer Piedmont and the Carolina Slate Belt ecoregions. The uppermost 22 miles of the river's main stem is impounded behind Falls of the Neuse Reservoir dam just northeast of the city of Raleigh. Downstream of the dam, the river continues its course for approximately 185 miles southeasterly past the cities of Raleigh, Smithfield, Goldsboro, and Kinston after which it reaches the tidal waters near Street's Ferry just upstream of New Bern. Downstream of Street's Ferry, the Neuse River significantly broadens and changes into a tidal estuary that empties into the Pamlico Sound. Overall, most of the land use in the Neuse River Basin is agriculture or forest with the only major area of protected forest associated with the Croatan National Forest located in the lower reaches of the basin in Jones and Craven counties. There are several areas of rapidly expanding urban land use particularly associated with the cities of Durham, Raleigh, Clayton, Smithfield, Goldsboro, Kinston, and New Bern.

A statewide fish consumption advisory for multiple fish species due to mercury contamination was issued by the NC Department of Health and Human Services, Division of Public Health. This advisory includes lakes in the Neuse River Basin. Lake monitoring and sample collection activities performed by DWR field staff were in accordance with [The Intensive Survey Branch \(ISB\) Standard Operating Procedures Manual](#).

Assessment Methodology

For this report, data from May 2025 through September 2025 were reviewed. Lake monitoring and sample collection activities performed by DWR field staff were in accordance with [The Intensive Survey Branch \(ISB\) Standard Operating Procedures Manual](#).

All lakes were sampled during the growing season from May through September. Data were assessed for excursions of the state's Class C water quality standards for chlorophyll a, pH, dissolved oxygen, water temperature, and turbidity. Other parameters discussed in this report include Secchi depth and percent dissolved oxygen saturation. Secchi depth provides a measure of water clarity and is used in calculating the trophic or nutrient enriched status of a lake, as well as determining the sampling depth or photic zone. Percent dissolved oxygen saturation gives information on the amount of dissolved oxygen in the water column and may be increased by photosynthesis or depressed by oxygen-consuming decomposition.

Nutrient data is collected to determine the trophic status of a lake or reservoir and is calculated by the North Carolina Trophic State Index (NCTSI) score. The NCTSI score was specifically developed for North Carolina Lakes as part of the state's original Clean Lakes Classification Survey. It utilizes the nutrients present along with chlorophyll-*a* and Secchi depth to calculate a lake's biological productivity. When an analyte was analyzed for but not detected above the PQL (Practical Quantitation Limit) this PQL was utilized in the NCTSI score calculation. It should be noted that prior to 2023 half of the PQL was utilized in this calculation when an analyte was not detected above the PQL. This decision to use the whole PQL came out of an abundance of caution to ensure the most conservative estimate of the NCTSI score. The ranges for classification are as follows:

Trophic Level Classifications	NC TSI Score
Oligotrophic	< -2.0
Mesotrophic	-2.0 to 0.0
Eutrophic	0.0 to 5.0
Hypereutrophic	> 5.0

For algae collection and assessment, water samples were collected from the photic zone, preserved in the field, and taken concurrently with chemical and physical parameters. Samples were quantitatively analyzed to determine assemblage structure, density (units/ml) and biovolume (m³/mm³).

For reporting, algal blooms were determined by the measurement of unit density (units/ml). Unit density is a quantitative measurement of the number of filaments, colonies or single celled taxa in a waterbody. Blooms are considered mild if they are between 10,000 and 20,000 units/ml. Moderate blooms are between 20,000 and 30,000 units/ml. Severe blooms are between 30,000 and 100,000 units/ml and extreme blooms are those 100,000 units/ml or greater.

An algal group is considered dominant when it comprises 40% or more of the total unit density or total biovolume. A genus is considered dominant when it comprises 30% or more of the total unit density or total biovolume.

Quality Assurance of Field and Laboratory ALMP Data

Data collected in the field via multiparameter water quality meters were uploaded into the Labworks® database within a month of the sampling date.

Chemistry data from the DWR Water Quality Laboratory were uploaded into Labworks®. If there were data entry mistakes, possible equipment, sampling, and/or analysis errors, these were investigated and corrected, if possible. Chemistry results received from the laboratory that were given a qualification code were entered along with the assigned laboratory code. Laboratory qualification codes are listed in Appendix B.

Information regarding the [WSS Chemistry Laboratory Quality Assurance Program](#) is available on the DEQ website.

The [Ambient Lakes Monitoring Program \(ALMP\) Quality Assurance Project Plan](#) can be found on the Intensive Survey Branch Webpage.

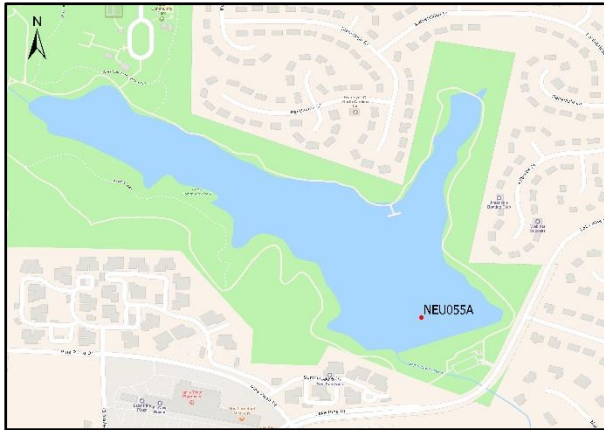
Weather Overview for Summer 2025

Weather conditions were considered relatively dry across the state in 2025, despite having a soaking summer highlighted by Tropical Storm Chantal flooding many western and central counties. A dry winter led to a soaking and warm May to start off the sampling season, with wetter than normal conditions lasting through late summer. This soggy and steamy weather ended in August with a statewide summertime monthly average precipitation of 4.5 inches. August was an overall dry month, with dry weather returning and persisting into the fall and winter. The drought conditions were especially pronounced in several western counties of the state as the year came to an end. The 2025 average temperature of 59.9°F puts 2025 as the 22nd warmest year on record for the state.

Detailed weather information can be found through the [NC State Climate Office Blog](#) and the [Southeast Regional Climate Center](#).

Lake and Reservoir Assessments

Apex Reservoir



Apex Reservoir is a former water supply reservoir for the Town of Apex located in Wake County. The lake was filled in 1923 and has a drainage area of two square miles (six square kilometers). The lake has maximum depth of 13 feet (four meters). Land uses in the watershed consist of residential as well as forested areas. Apex Reservoir was discontinued as a water supply in 1989 although it is still classified as WS-III NSW. The Town of Apex now uses Jordan Lake for their water supply. Apex Reservoir is currently part of a municipal park.

This reservoir was sampled monthly from May through September by DWR field staff. Secchi depths ranged from 0.45 to 1.1 meters at the single sampling site near the dam (Appendix A). Surface dissolved oxygen ranged from 6.7 to 11.2 mg/L and surface pH ranged from 6.5 to 8.7. Total phosphorus in Apex Reservoir remained below the detection limit of 0.05 mg/L and total kjeldahl nitrogen ranged from 0.7 to 1.2 mg/L. Chlorophyll a values ranged from 77 to 16 ug/L.

Based on the calculated NC TSI scores, Apex Reservoir was determined to exhibit extremely elevated biological productivity (hypereutrophic conditions) for two of the five sampling trips, and elevated biological productivity (eutrophic conditions) for the other 3 months. Apex reservoir was previously monitored by DWR in 2020 and exhibited eutrophic conditions.

<i>ALMP Lake Information</i>	<i>Apex Lake</i>
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic
<i>Mean Depth (meters)</i>	3.0
<i>Volume (10⁶m³)</i>	0.34
<i>Watershed Area (mi²)</i>	2.0
<i>Classification</i>	WSA-III NSW
<i>Stations</i>	NEU055A
<i>Number of Times Sampled</i>	5

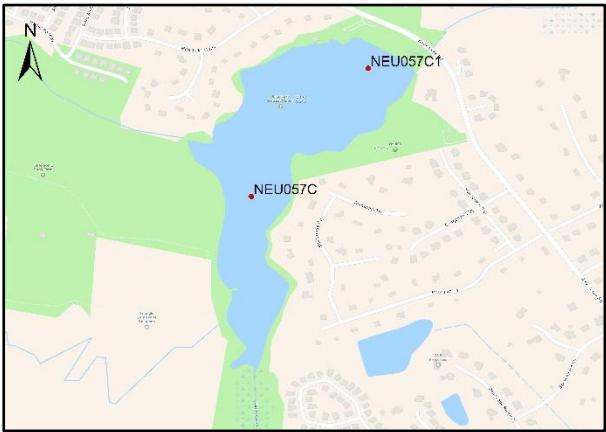
Apex Lake Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	2.1	Eutrophic
June	3.2	Eutrophic
July	5.1	Hypereutrophic
August	5.1	Hypereutrophic
September	4.2	Eutrophic

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

Bass Lake



<i>ALMP Lake Information</i>	<i>Bass Lake</i>
<i>Season Average Trophic Status (NC TSI)</i>	---
<i>Mean Depth (meters)</i>	3.0
<i>Volume (10⁶m³)</i>	0.10
<i>Watershed Area (m²)</i>	9.0
<i>Classification</i>	B; NSW
<i>Stations</i>	NEU057C1
<i>Number of Times Sampled</i>	5

Bass Lake Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	3.2	Eutrophic
June	4.2	Eutrophic
July	---	---
August	---	---
September	---	---

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

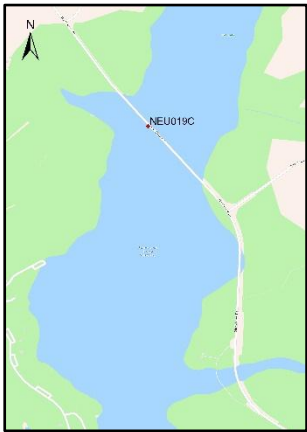
Bass Lake is a 54-acre recreational lake located near Holly Springs in Wake County. Although the lake is primarily fed by Basal Creek, there are also two intermittent unnamed tributaries entering the lake. The original impoundment was created when Basal Creek was dammed to create a rice paddy. This effort was unsuccessful and subsequently the dam was raised, and a gristmill installed. Currently, this lake is part of Bass Lake Park in Holly Springs. The lake is used for activities such as fishing, canoeing and kayaking. The lake is stocked with catfish, along with bream, bass and crappie. A walking trail circles the lake, and a conference center is located at the lake.

Bass Lake was sampled monthly from May through September by DWR field staff. Secchi depths were less than a meter, ranging from 0.6 to 0.9 meters (Appendix A). Surface dissolved oxygen ranged from 8.8 to 10 mg/L and surface pH ranged from 7.1 to 8.2 s.u. Total phosphorus in Bass Lake was found to be above reportable limit only once during the sampling season (0.05 mg/L in September 2025). Total organic nitrogen ranged from 0.77 to 1.1 mg/L. Chlorophyll a values ranged from 20* to 77 ug/L.

Based on the calculated NC TSI scores, Bass Lake was determined to exhibit elevated biological productivity or eutrophic conditions during some sampling events.

*Some data may be qualified, see Appendix A for details.

Beaverdam Lake



<i>ALMP Lake Information</i>	<i>Beaverdam Lake</i>
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic
<i>Mean Depth (meters)</i>	
<i>Volume (10⁶m³)</i>	
<i>Watershed Area (m²)</i>	52.5
<i>Classification</i>	WS-IV B NSW CA
<i>Stations</i>	NEU019C
<i>Number of Times Sampled</i>	5

Beaverdam Lake Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	3.2	Eutrophic
June	3.1	Eutrophic
July	---	---
August	4.2	Eutrophic
September	---	---

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

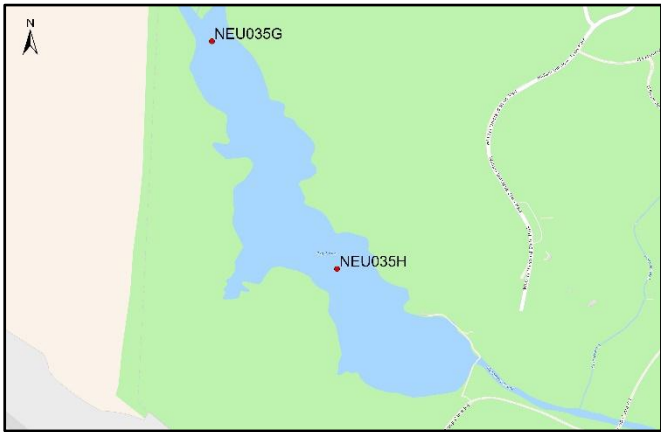
**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

Beaverdam Lake is a small reservoir located on the Beaverdam Creek arm of Falls of the Neuse Reservoir. The shoreline is forested, and the lake is used for recreational fishing, swimming and boating. No data currently is available for the mean depth and volume of Beaverdam Lake.

Beaverdam Lake was sampled five times from May through October by DWR field staff. Secchi depths ranged from 0.6 to 1.0 meter (Appendix A). Surface dissolved oxygen ranged from 5.5 to 8.2 mg/L. Total phosphorus in Beaverdam Reservoir ranged from below the detection limit of 0.05 to 0.06 mg/L, while NH₃ and NO_x concentrations were below DWR laboratory detection level of 0.10 and 0.06 mg/L respectively. Total kjeldahl nitrogen, however, ranged from 0.81 to 1.0 mg/L. Chlorophyll a values were below the state water quality standard of 40 ug/L, ranging from 6.4 to 33 ug/L.

In 2025, the trophic state of Beaverdam Lake was biologically elevated or eutrophic. This reservoir has exhibited this productivity state since routine monitoring by DWR began in 2010

Big Lake



ALMP Lake Information	Big Lake	
Season Average Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	2.0	
Volume (10 ⁶ m ³)	0.05	
Watershed Area (m ²)	7.0	
Classification	B; NSW	
Stations	NEU035G	NEU035H
Number of Times Sampled	5	

Big Lake Monthly Snapshot:

Sample Period	Monthly NC TSI Score	Trophic State
May	3.7	Eutrophic
June	3.2	Eutrophic
July	---	---
August	---	---
September	5.2	Hypereutrophic

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

Big Lake is located in Umstead State Park in northwestern Wake County, adjacent to the Raleigh-Durham International Airport. Sycamore Creek is impounded twice within the park, first forming Big Lake and then Sycamore Lake. Land use in Big Lake's watershed is primarily forest, agriculture, and urban development. Big Lake has a maximum depth of 16 feet (five meters) and a mean hydraulic retention time of 25 days.

Big Lake was sampled monthly from May through September by DWR field staff. Surface dissolved oxygen ranged from 7.7 to 10.2 mg/L and secchi depths ranged between 1.0 and 0.45 m. Total phosphorus in Big Lake remained below detection limit of 0.05 mg/L and total kjeldahl nitrogen ranged from 0.74 to 1.4 mg/L. Chlorophyll a values ranged from 29 to 50 ug/L. Turbidity remained below the state water quality standard of 25 NTUs for lakes the entire sampling season.

Based on the calculated NC TSI scores, Big Lake was determined to exhibit eutrophic conditions (elevated biological productivity) in 2025. Big Lake has been consistently eutrophic since it was first monitored by DWR in 1981

Buckhorn Reservoir



ALMP Lake Information	Buckhorn Reservoir	
Season Average Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	1.0	
Volume (10 ⁶ m ³)	3.8	
Watershed Area (m ²)	154.8	
Classification	WS-V; NSW	
Stations	NEU084B	NEU084C
Number of Times Sampled	5	

Buckhorn Reservoir Monthly Snapshot:

Sample Period	Monthly NC TSI Score	Trophic State
May	3.5	Eutrophic
June	3.7	Eutrophic
July	---	---
August	3.2	Eutrophic
September	3.7	Eutrophic

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

Buckhorn Reservoir is a shallow impoundment, which serves as the water supply for the City of Wilson. Completed in 1976, this reservoir has a maximum depth of eight feet (2.4 meters). The drainage area consists of flat land used for agriculture and forests. Turkey Creek and Moccasin Creek are the primary tributaries to Buckhorn Reservoir.

This lake was sampled monthly from May through September by DWR field staff. Secchi depths were less than or equal to a meter, ranging from 0.5 to 1.0 meters through the sampling season. Surface dissolved oxygen ranged from 6.7 to 10.3 mg/L and surface pH ranged from 6.5 to 8.7 s.u. Total phosphorus in Buckhorn Reservoir was found to be above reportable limit only once during the sampling season (0.05 mg/L in May 2025). Total organic nitrogen ranged from 0.84 to 1.1 mg/L. Chlorophyll a ranged from 13* to 37 ug/L

This reservoir was determined to exhibit elevated biological productivity (eutrophic conditions) for all but one month it was sampled in 2025. Buckhorn Reservoir has been consistently eutrophic since it was first monitored by DWR in 1988.

*Some data may be qualified, see Appendix A for details.

Cliffs of the Neuse Lake



Image Source: Map

<i>ALMP Lake Information</i>	<i>Cliffs of the Neuse Lake</i>
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic
<i>Mean Depth (meters)</i>	9.0
<i>Volume (10⁶m³)</i>	0.10
<i>Watershed Area (mi²)</i>	0.4
<i>Classification</i>	B; NSW
<i>Stations</i>	NEU07113A
<i>Number of Times Sampled</i>	5

Cliffs of the Neuse Lake Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	1.0	Eutrophic
June	0.0	Eutrophic
July	---	---
August	1.4	Eutrophic
September	0.8	Eutrophic

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

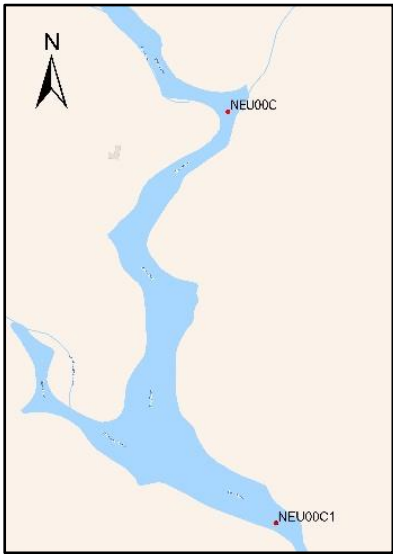
Cliffs of the Neuse Lake is in a state-owned park of the same name in Wayne County. The lake has a maximum depth of 18 meters. Mill Creek, the only significant tributary, was impounded to form the lake in 1953. The small, forested watershed is entirely contained in the park. The lake is used for recreational swimming, boating and education.

This lake was monitored from May through September of 2025 by DWR field staff. Secchi depths in Cliffs of the Neuse Lake ranged from 1.7 to 2.9 meters, indicating very good water clarity for the region (Appendix A). Surface dissolved oxygen ranged from 7.6 to 10.3 mg/L and surface pH ranged from 4.2 to 4.3 s.u. The low pH values observed in this lake are due to the presence of an aquifer beneath the state park that contains iron sulfite, which forms sulfuric acid. Springs are present in the bottom of Cliffs of the Neuse Lake that release this acidic water from the aquifer into the lake. Total phosphorus was less than the DWR laboratory detection level of 0.05 mg/L on all but one sampling event (0.05 mg/L in May) and total kjeldahl nitrogen was less than DWR laboratory detection level of 0.6 mg/L during all 2025 sampling events. Chlorophyll a values ranged from 2* to 16 ug/L.

This small reservoir was determined to have high biological productivity (eutrophic conditions) throughout the sampling season based on the calculated NCTSI scores. Up until 2025, Cliffs of the Neuse Lake has fluctuated between oligotrophic and mesotrophic conditions since it was first monitored by DWR in 1981

*Some data may be qualified, see Appendix A for details.

Corporation Lake



<i>ALMP Lake Information</i>	<i>Corporation Lake</i>	
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic	
<i>Mean Depth (meters)</i>	1.0	
<i>Volume (10⁶m³)</i>	0.9	
<i>Watershed Area (mi²)</i>	40.9	
<i>Classification</i>	WS-II; HQW, NSW, CA	
<i>Stations</i>	NEU00C	NEU00C1
<i>Number of Times Sampled</i>	5	

Corporation Lake Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	1.4	Eutrophic
June	1.9	Eutrophic
July	1.4	Eutrophic
August	1.1	Eutrophic
September	---	---

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

Corporation Lake is a water supply reservoir located on the Eno River downstream of Lake Orange. This lake was built in 1967 by the Orange-Alamance Water Authority. The surface area is 28 acres (11 hectares), and the maximum depth is approximately eight feet (2.5 meters). McGowan Creek is a tributary of Corporation Lake. The watershed is composed of forested and agricultural areas with a rolling topography.

Corporation Lake was sampled monthly from May through September by DWR field staff. Surface dissolved oxygen ranged from 5.6 to 7.6 mg/L and surface pH ranged from 5.9 to 6.8 s.u. (Appendix A). Total phosphorus remained below the detection limit of 0.05 mg/L and total kjeldahl nitrogen ranged from 0.34 to 0.72 mg/L. Chlorophyll a values in Corporation Lake were low, ranging from below the detection limit of 0.6 to 0.72 ug/L.

Based on the calculated NC TSI scores, Corporation Lake was determined to exhibit eutrophic conditions (elevated biological productivity) in 2025. The trophic state of Corporation Lake has ranged between mesotrophic and eutrophic since it was first monitored by DWR in 1988.

Falls of the Neuse Reservoir

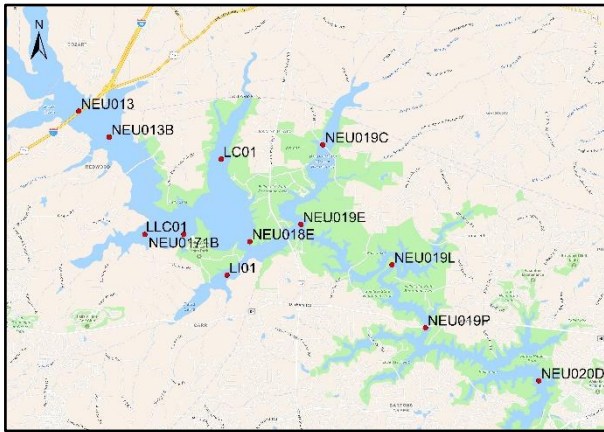


Image Source: Map

ALMP Lake Information			Falls of the Neuse Reservoir	
Season Average Trophic Status (NC TSI)			Eutrophic	
Mean Depth (meters)			5.0	
Volume (10 ⁶ m ³)			176.7	
Watershed Area (mi ²)			769.9	
Classification			WS-IV, B; NSW, CA	
Stations	LC01	LI01	LLC01	NEU013
	NEU013B	NEU0171B	NEU018E	NEU019E
	NEU019L	NEU019P	NEU020D	---
Number of Times Sampled			5	

Falls of the Neuse Reservoir Monthly Snapshot:

Sample Period	Monthly NC TSI Score	Trophic State
May	3.2	Eutrophic
June	2.8	Eutrophic
July	---	---
August	3.7	Eutrophic
October	---	---

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

Falls of the Neuse Reservoir (Falls Lake) is a large impoundment of the upper Neuse River Basin. This reservoir is used for a variety of purposes including recreation, and as the main water supply reservoir for the City of Raleigh and surrounding towns in Wake County, NC. Falls Lake Dam was constructed in 1981 by the US Army Corps of Engineers, and the reservoir began filling in 1983. This reservoir is located on the headwaters of the Neuse River, which is formed by the confluence of the Eno and Flat Rivers in Durham County. The watershed of this lake contains a mixture of urban, residential, agricultural and forested areas.

Sampling for the ALMP at Falls Lake occurred five times between the months of May through October. Secchi depths were generally 1 meter or less, indicating lowered water clarity. Surface dissolved oxygen levels ranged from 2.7 mg/L to 9.7 mg/L. Total phosphorus ranged from <0.05 mg/L to 0.06 mg/L and total organic nitrogen ranged from 0.55 to 1.00 mg/L. Chlorophyll a concentrations ranged from 9.7* to 61* ug/L. This reservoir is considered to have elevated levels of biological productivity (eutrophic conditions) based on the calculated NC TSI scores. Eutrophic conditions have persisted in Falls Lake since it was impounded in the early 1980's

Due to nutrient enrichment and sediment load, upper portions of both Jordan and Falls Lakes are listed on [North Carolina's 303d list for impaired waters](#). As part of a nutrient management strategy developed in 2010, both Falls and Jordan lakes are sampled each month throughout the year. The Falls of the Neuse monitoring reports and study plan (which is separate from the ALMP) can be found [here](#).

Lake Ben Johnson

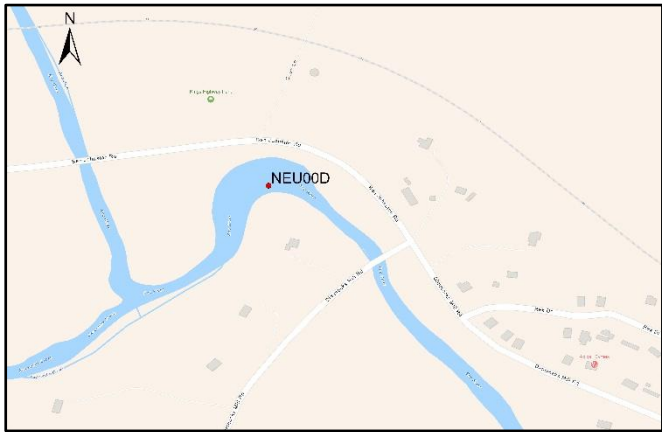


Image Source: Map

ALMP Lake Information	Lake Ben Johnson	
Season Average Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	1.5	
Volume (10 ⁶ m ³)	0.02	
Watershed Area (mi ²)	64.9	
Classification	WS-III; NSW	
Stations	NEU055A3	NEU055A4
Number of Times Sampled	5	

Lake Ben Johnson Monthly Snapshot:

Sample Period	Monthly NC TSI Score	Trophic State
May	3.0	Eutrophic
June	1.2	Eutrophic
July	---	---
August	1.3	Eutrophic
September	0.8	Eutrophic

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

Lake Ben Johnson (also called Lake Ben Johnston) is a run-of-the- river lake formed by a dam on the Eno River downstream of Corporation Lake. This lake has a maximum depth of approximately seven feet (two meters). The watershed consists of a mix of agricultural, urban and forested areas. The City of Hillsborough owns the lake, which is the back-up water supply source for this municipality.

Lake Ben Johnson was monitored monthly from May through September 2025. Secchi depths, a measurement of water clarity, ranged from 0.3 to 1.0 meter (Appendix A). Surface dissolved oxygen ranged from 5.9 to 8.5 mg/L and surface pH ranged from 6.1 to 7.2 s.u. Total phosphorus ranged from 0.04 to 0.05 mg/L and total organic nitrogen ranged from below the detection limit of 0.05 to 0.07 mg/L. Chlorophyll a in Lake Ben Johnson ranged from 3.3 to 29.0 ug/L.

On July 6-7th 2025 Tropical Storm Chantal hit the region causing the Eno River to crest at 23.04 ft, the highest crest ever recorded for the river and constituting major flood conditions. Significant damage along the shoreline and within Lake Ben Johnson itself were noted during the July 9th site visit, just three days following peak flows. Not surprisingly nutrient, turbidity and suspended solid levels were elevated and Secchi disk readings were diminished following the flooding conditions. These changes appear to have been temporary, and conditions were primarily back to normal by the late August sampling.

Based on the calculated NCTSI scores, Lake Ben Johnson was determined to exhibit elevated biological productivity (eutrophic conditions) for all months that could be calculated in 2025. This lake has ranged between mesotrophic to eutrophic (elevated biological productivity) since it was first monitored by DWR in 1988.

Lake Benson

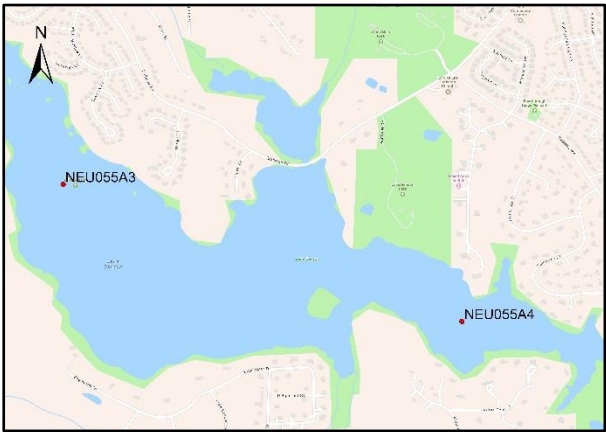


Image Source: Map

<i>ALMP Lake Information</i>	<i>Lake Benson</i>
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic
<i>Mean Depth (meters)</i>	3.0
<i>Volume (10⁶m³)</i>	3.6
<i>Watershed Area (mi²)</i>	64.9
<i>Classification</i>	WSA-III NSW
<i>Stations</i>	NEU055A
<i>Number of Times Sampled</i>	5

Lake Benson Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	2.3	Eutrophic
June	1.8	Eutrophic
July	2.0	Eutrophic
August	2.8	Eutrophic
September	3.0	Eutrophic

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

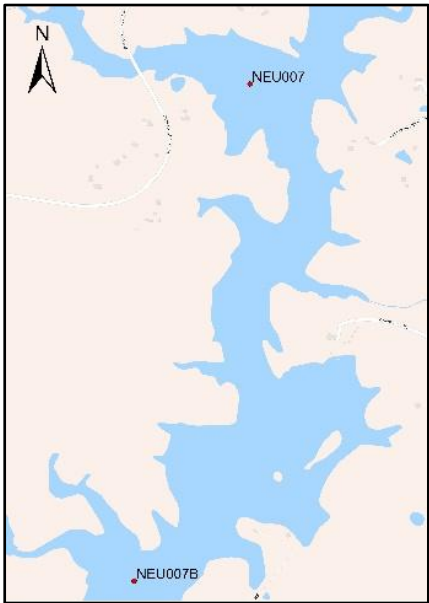
**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

Lake Benson is a man-made impoundment located in southern Wake County. The first impoundment on the site, called Rand's Mill Pond, was built in 1844. In 1927, the City of Raleigh purchased the land and the dam for use as a water supply. Lake Benson was a water supply source for the City of Raleigh from 1953 to 1987. With the increasing growth of Raleigh and surrounding areas in Wake County, a new water treatment facility was constructed at Lake Benson. The Dempsey E. Benton Water Treatment Plant was dedicated in May 2010 and has a capacity of producing 20 million gallons of drinking water per day (MGD) with the possibility of a future increase in production of up to 40 MGD. The primary tributary to the lake is Swift Creek. The topography of the drainage area is characterized by rolling hills with approximately half of the area forested.

Lake Benson was sampled monthly from May through September by DWR field staff. Secchi depths in this reservoir ranged from 0.4 to 1.3 meters (Appendix A). Surface pH ranged from 6.6 to 8.2 s.u. and surface dissolved oxygen ranged from 3.1 to 8.7 mg/L. Total phosphorus was less than the DWR laboratory detection level of 0.05 mg/L for all samples and total organic nitrogen ranged from non-detectable (<0.6 mg/L) to 0.86 mg/L. Chlorophyll a values ranged from 4.7 to 32 ug/L.

Based on the calculated NCTSI scores, Lake Benson was determined to exhibit high biological productivity or eutrophic conditions in 2025.

Lake Butner



ALMP Lake Information	Lake Butner	
Season Average Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	9.0	
Volume (10 ⁶ m ³)	1.4	
Watershed Area (mi ²)	30.1	
Classification	WS-II; HQW, NSW, CA	
Stations	NEU007	NEU007B
Number of Times Sampled	5	

Lake Butner Monthly Snapshot:

Sample Period	Monthly NC TSI Score	Trophic State
May	1.6	Eutrophic
June	1.2	Eutrophic
July	---	---
August	1.0	Eutrophic
September	0.8	Eutrophic

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

Lake Butner (also known as R.D. Holt Reservoir) is located on Knap of Reeds Creek in Granville County. The Town of Butner uses this lake for water supply and for recreational fishing and boating. The maximum depth is 49 feet (15 meters). The watershed is composed of rolling topography characterized by farmland and forests.

Lake Butner was sampled monthly from May through September by DWR field staff. Secchi depths in this reservoir ranged from 0.7 to 1.8 meters (Appendix A). Surface dissolved oxygen ranged from 7.1 to 9.6 mg/L and surface pH ranged from 6.7 to 7.4 s.u. Total phosphorus concentrations remained below detection limit of 0.05 mg/L and total kjeldahl nitrogen ranged from below detection limit of 0.6 to 0.65 mg/L. Chlorophyll a values ranged from 3.3 to 14 ug/L.

Lake Butner NC TSI scores indicated that the reservoir was eutrophic in 2025. Lake Butner's trophic state has elevated from oligotrophic (very low biological productivity) to eutrophic since it was first monitored by DWR in 1988

Lake Crabtree



<i>ALMP Lake Information</i>	<i>Lake Crabtree</i>		
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic		
<i>Mean Depth (meters)</i>	2.0		
<i>Volume (10⁶m³)</i>	0.50		
<i>Watershed Area (mi²)</i>	51.4		
<i>Classification</i>	B; NSW		
<i>Stations</i>	NEUCL1	NEUCL2	NEUCL3
<i>Number of Times Sampled</i>	5		

Lake Crabtree Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	4.4	Eutrophic
June	4.7	Eutrophic
July	5.7	Hypereutrophic
August	4.6	Eutrophic
September	5.2	Hypereutrophic

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

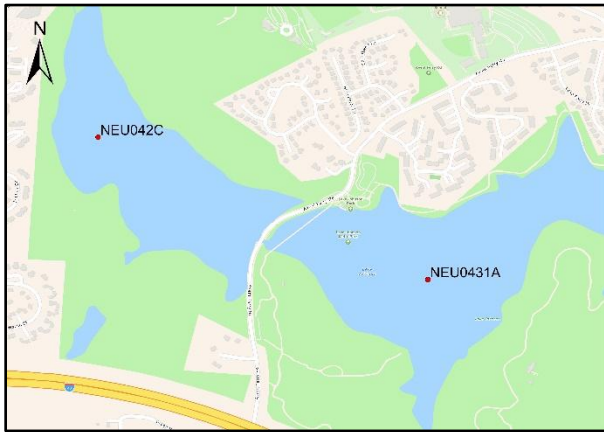
Lake Crabtree was built in 1989 by the Soil Conservation Service as one of 11 lakes constructed for flood control. Wake County owns a park around the lake which is used for recreation. The maximum depth is approximately 13 ft. Several point sources discharge upstream of the lake which is located in an urban area. Three tributaries - Crabtree Creek, Haleys Branch, and Stirrup Iron Creek - drain portions of Cary, Morrisville, and the Raleigh-Durham International Airport.

Lake Crabtree was sampled monthly from May through September by DWR field staff. Secchi depths were very low (0.25 to 0.45 m) indicating low water clarity. Surface dissolved oxygen ranged from 4.5 to 9.1 mg/L. Total phosphorus ranged from below detection limit of 0.05 to 0.09 mg/L and total kjeldahl nitrogen ranged from 0.79 to 1.0 mg/L. Chlorophyll a values, in response to the ready availability of nutrients, ranged from 16 to 56 ug/L. Turbidity in Lake Crabtree ranged from 16 to 37 NTUs with nine of the 15 observations greater than the state water quality standard of 25 NTUs for lakes.

Based on the calculated NCTSI scores for 2025 this lake was determined to exhibit excessive biological productivity or hypereutrophic conditions for two of the months sampled, and eutrophic elevated biological productivity for three of the sampled months.

Lake Crabtree is on the 2018 303(d) List of Impaired Waters for exceedances of the turbidity standard and for a fish consumption advisory related to elevated levels of PCB in fish taken from the lake (https://epi.dph.ncdhhs.gov/oeefish/advisories.html#lake_crabtree)

Lake Johnson



Located in Wake County, Lake Johnson is owned and operated by the City of Raleigh. The original use of the lake was as an auxiliary water supply for the City of Raleigh, but the lake is now used solely for recreation. Lake Johnson is subdivided into two basins by a road crossing at mid-lake. The lake has a maximum depth of 20 feet (six meters) and Walnut Creek is the major lake tributary. In recent years, the predominantly forested and agricultural watershed has become increasingly urban.

Lake Johnson was sampled monthly from May through October by DWR field staff. Secchi depths ranged from 0.7 to 1.0 meters, indicating poor to fair water clarity (Appendix A). Surface dissolved oxygen ranged from 5.7 to 10.6 mg/L and surface pH ranged from 6.5 to 8.8 s.u. Total phosphorus in Lake Johnson ranged from 0.03 to 0.06 mg/L and total organic nitrogen ranged from 0.48 to 0.64 mg/L. Total phosphorus was less than the DWR laboratory detection level of 0.05 mg/L during all sampling events and total organic nitrogen ranged from 0.65 to 0.98 mg/L. Chlorophyll a ranged from 5.8 to 44 ug/L. Chlorophyll a ranged from 12 to 61 ug/L and three of the nine chlorophyll a values (33.3%) were greater than the state water quality standard of 40 ug/L.

Based on the calculated NC TSI scores, Lake Johnson was determined to exhibit excessive biological productivity or eutrophic conditions in 2020 and again in 2025. This reservoir has been eutrophic since it was first monitored by DWR in 1981

<i>ALMP Lake Information</i>	<i>Lake Johnson</i>	
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic	
<i>Mean Depth (meters)</i>	3.0	
<i>Volume (10⁶m³)</i>	0.7	
<i>Watershed Area (m²)</i>	7.1	
<i>Classification</i>	B; NSW	
<i>Stations</i>	NEU042C	NEU0431A
<i>Number of Times Sampled</i>	5	

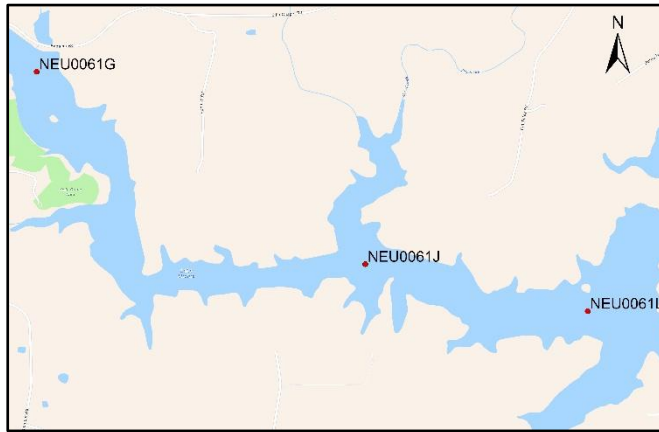
Lake Johnson Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	3.9	Eutrophic
July	---	---
August	3.1	Eutrophic
September	---	---
October	1.7	Eutrophic

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

Lake Michie



<i>ALMP Lake Information</i>		<i>Lake Michie</i>	
Season Average Trophic Status (NC TSI)		Eutrophic	
Mean Depth (meters)		8.0	
Volume (10⁶m³)		15.6	
Watershed Area (mi²)		170	
Classification		WS-III; NSW CA	
Stations	NEU0061G	NEU0061J	NEU0061L
Number of Times Sampled		5	

Lake Michie Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	3.3	Eutrophic
June	4.4	Eutrophic
July	3.8	Eutrophic
August	4.0	Eutrophic
September	3.5	Eutrophic

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

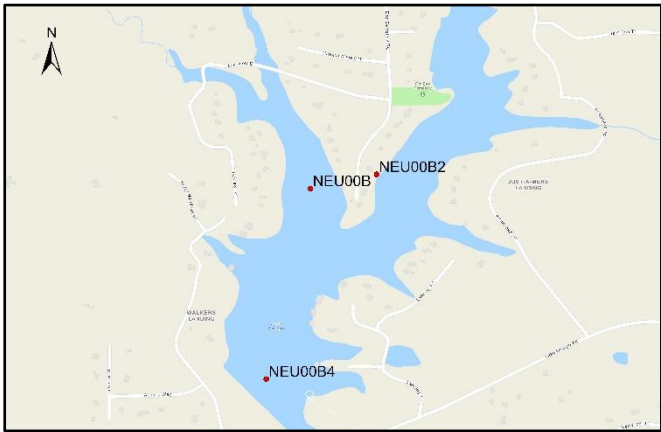
The City of Durham built Lake Michie in 1926 to serve as a water supply. The drainage area of this piedmont reservoir consists of a combination of rural, forested, agricultural and urban land uses. The primary tributary to Lake Michie is the Flat River. In addition to serving as a water supply source, Lake Michie provides public recreation such as fishing and boating.

Lake Michie was sampled monthly from May through September by DWR field staff. Secchi depths ranged from 0.4 to 1.2 meters (Appendix A). Surface dissolved oxygen ranged from 5.1 to 10.6 mg/L and surface pH values ranged from 6.5 to 8.5 s.u. Total phosphorus in Lake Michie ranged from below detection limit of 0.05 to 0.07 mg/L and total kjeldahl nitrogen ranged from 0.71 to 1.1 mg/L. Chlorophyll a, in response to the availability of nutrients in this lake, ranged from 26 to 84 ug/L. Eleven of the 15 chlorophyll a measurements in 2025 were greater than the state water quality standard of 40 ug/L.

Based on the calculated NC TSI scores, Lake Michie was determined to exhibit elevated biological productivity (eutrophic conditions).

Lake Michie was previously determined to be eutrophic in 1988 when it was first monitored by DWR and again in 1995, 2010, and 2020. In 1991, Lake Michie exhibited moderate biological productivity (mesotrophic).

Lake Orange



Lake Orange is a piedmont water supply reservoir for the City of Hillsborough. Maximum depth is 20 feet (six meters). Major tributaries to Lake Orange include the East and West Fork of the Eno River.

Lake Orange was sampled monthly from May through September by DWR field staff. Secchi depths ranged from 0.6 to 1.1 meters (Appendix A). Surface dissolved oxygen ranged from 5.3 to 10.3 mg/L. Total phosphorus remained below the detection limit of 0.05 mg/L and total kjeldahl nitrogen ranged from 0.78 to 1.6 mg/L. Chlorophyll a ranged from 8.6 to 100 ug/L. Seven of the 14 chlorophyll a values recorded in 2025 for Lake Orange were greater than the state water quality standard of 40 ug/L.

For the 2025 sampling season, Lake Orange exhibited elevated biological productivity (eutrophic conditions), and hypertrophic conditions for the month of July.

ALMP Lake Information		Lake Orange	
Season Average Trophic Status (NC TSI)		Eutrophic	
Mean Depth (meters)		4.0	
Volume (10 ⁶ m ³)		0.3	
Watershed Area (mi ²)		10	
Classification		WS-II; HQW, NSW, CA	
Stations	NEU00B	NEU00B2	NEU00B4
Number of Times Sampled		5	

Lake Orange Monthly Snapshot:

Sample Period	Monthly NC TSI Score	Trophic State
May	3.8	Eutrophic
June	3.8	Eutrophic
July	5.3	Hypereutrophic
August	3.8	Eutrophic
September	---	---
*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.		
**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.		

Lake Raleigh



<i>ALMP Lake Information</i>	<i>Lake Raleigh</i>
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic
<i>Mean Depth (meters)</i>	2.0
<i>Volume (10⁶m³)</i>	0.07
<i>Watershed Area (m²)</i>	12.0
<i>Classification</i>	B;NSW
<i>Stations</i>	NEU043A
<i>Number of Times Sampled</i>	5

Lake Raleigh Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	4.2	Eutrophic
June	3.0	Eutrophic
July	---	---
August	3.0	Eutrophic
September	---	---

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

Lake Raleigh is a man-made impoundment that was once used as a water supply for the City of Raleigh. The original earthen dam which was constructed in 1914 was raised two feet in 1919. The lake has a maximum depth of 10 feet (three meters). The water from the lake primarily served the downtown Raleigh area. In 1986, North Carolina State University gained control of Lake Raleigh and the surrounding land to build the Centennial Campus. Walnut Creek is the main tributary of Lake Raleigh. Land use in the drainage area is primarily urban and residential.

Lake Raleigh monitoring was performed from May through September 2025 by DWR field staff. Secchi depths ranged from 0.4 to 1.1 meters. Surface dissolved oxygen ranged from 5.2 to 10.4 mg/L and surface pH values ranged from 6.7 to 8.7 s.u. Total phosphorus ranged from 0.3 to 0.4 mg/L. Total phosphorus was less than the DWR laboratory detection level of 0.05 mg/L for all samples and total organic nitrogen concentrations ranged from 0.47 to 0.59 mg/L. and total organic nitrogen concentrations ranged from 0.62 to 1.0 mg/L. Chlorophyll a values ranged from 18 to 59 ug/L. Lake Raleigh was determined to exhibit elevated biological productivity (i.e., eutrophic conditions) based on the NCTSI calculations.

Because Lake Raleigh is located on Walnut Creek, a [fish consumption advisory](#) is in place related to elevated levels of PCB in fish taken from the creek and lake.

Lake Rogers



<i>ALMP Lake Information</i>	<i>Lake Rogers</i>
<i>Season Average Trophic Status (NC TSI)</i>	Hypereutrophic
<i>Mean Depth (meters)</i>	1.0
<i>Volume (10⁶m³)</i>	0.5
<i>Watershed Area (m²)</i>	17.4
<i>Classification</i>	WS-II; HQW, NSW, CA
<i>Stations</i>	NEU017A
<i>Number of Times Sampled</i>	5

Lake Rogers Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	6.2	Hypereutrophic
June	4.2	Eutrophic
July	6.6	Hypereutrophic
August	4.4	Eutrophic
September	---	---

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

Lake Rogers is the water supply reservoir for the Town of Creedmoor. This reservoir was built in 1939 and has a surface area of approximately 210 acres (57 hectares). The maximum depth of the reservoir is approximately nine feet (three meters). Tributaries to Lake Rogers include Ledge Creek and Holman Creek. Land in the drainage area consists of mostly of forested land along with some residential, agricultural, and wetland areas.

Lake Rogers was sampled monthly from May through September by DWR field staff. Secchi depths at the single lake sampling site were consistently less than one meter, (Appendix A) ranging from 0.25 to 0.6 m. Total phosphorus ranged from 0.06 to 0.14 mg/L and total kjeldahl nitrogen ranged from 1.1 to 2.0 mg/L. In response to the availability of nutrients in the lake, chlorophyll a values ranged 25 ug/L to 70 ug/L. Surface dissolved oxygen was 6.0 to 10.1 mg/L and the surface pH ranged from 6.1 to 8.2 s.u. A scheduling error at the beginning of the season lead to the accidental missed collection of total solids during three of the five sampling rounds. This error has been addressed and will not impact future sampling. Total solids in the sample rounds collected were 90 and 89 mg/L for May and July, respectively. These two values indicate average water quality for a waterbody of this size in the Piedmont Region. Two of the five chlorophyll a measurements for 2025 were greater than the state water quality standard of 40 ug/L.

Based on the calculated NC TSI scores, Lake Rogers was found to have elevated biological productivity (eutrophic conditions) in June and August 2025. In May and July 2025, the NC TSI scores indicated the presence of excessive biological productivity or hypereutrophic conditions.

The trophic status of Lake Rogers has varied from eutrophic to hypereutrophic since monitoring by DWR began in 1991.

Lake Wheeler



<i>ALMP Lake Information</i>	<i>Lake Wheeler</i>	
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic	
<i>Mean Depth (meters)</i>	4.0	
<i>Volume (10⁶m³)</i>	7.6	
<i>Watershed Area (mi²)</i>	28.2	
<i>Classification</i>	WS-III; NSW	
<i>Stations</i>	NEU055A01	NEU055A02
<i>Number of Times Sampled</i>	5	

Lake Wheeler Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	2.4	Eutrophic
June	1.5	Eutrophic
July	2.5	Eutrophic
August	3.2	Eutrophic
September	3.7	Eutrophic
*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.		
**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.		

Lake Wheeler is located in southwestern Wake County upstream of Lake Benson on Swift Creek. Approximately half of the watershed is forested, but urban and residential areas are also significant. This lake has a maximum depth of 30 feet (nine meters) and an average hydraulic retention time of 72 days. Lake Wheeler provides water for the City of Raleigh via flow to Lake Benson, which is located immediately downstream. This lake is also used extensively for recreational purposes including canoeing and kayaking.

Lake Wheeler was sampled monthly from May through September 2025 by DWR field staff. Secchi depths ranged from 0.6 to 1.4 meters. Surface dissolved oxygen ranged from 4.8 to 8.7 mg/L and surface pH ranged from 6.8 to 8.4 s.u. Total phosphorus was less than the DWR laboratory detection level of 0.05 mg/L for all samples and total organic nitrogen ranged from non-detectable (<0.6 mg/L) to 0.96 mg/L. Chlorophyll a values ranged from 11 to 47 ug/L, with two of the ten chlorophyll a values greater than the state water quality standard of 40 ug/L.

Lake Wheeler was determined to exhibit elevated biological productivity (eutrophic conditions) in 2025 based on the calculated NC TSI scores. This lake has been predominantly eutrophic since it was first monitored by DWR in 1981.

Lake Wilson



<i>ALMP Lake Information</i>	<i>Lake Benson</i>
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic
<i>Mean Depth (meters)</i>	1.5
<i>Volume (10⁶ m³)</i>	0.7
<i>Watershed Area (m²)</i>	40.2
<i>Classification</i>	WSA-III NSW
<i>Stations</i>	NEU096B4
<i>Number of Times Sampled</i>	5

Lake Benson Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	4.3	Eutrophic
June	3.2	Eutrophic
July	5.6	Hypereutrophic
August	5.7	Hypereutrophic
September	5.4	Hypereutrophic
*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.		
**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.		

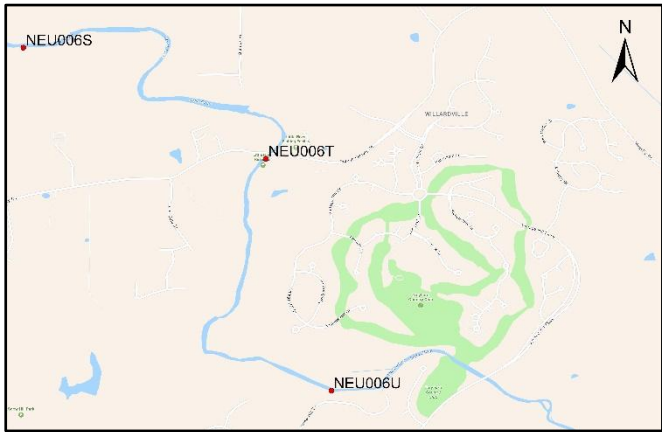
Lake Wilson is a small reservoir located on Toisnot Swamp, downstream of Silver Lake. The maximum depth of this lake is 8.5 feet (2.6 meters), and the drainage area consists of swamps and areas used agriculture and residential homes.

Lake Wilson was sampled monthly from May through September by DWR field staff. Secchi depths ranged from 0.5 to 1.0 meter (Appendix A). These low secchi depths were similar to those previously measured in this lake. Turbidity values in 2025 were below the state water quality standard of 25 NTUs. Surface dissolved oxygen ranged from 6.4 to 10.4 mg/L and surface pH ranged from 6.4 to 7.1 s.u. Total phosphorus ranged from 0.05 to 0.11 mg/L and total kjeldahl nitrogen ranged from 0.93 to 1.3 mg/L. Chlorophyll a in Lake Wilson ranged from 27 to 70 ug/L; four out of the five chlorophyll a observations were greater than the state water quality standard of 40 ug/L.

Lake Wilson was determined to be hypereutrophic (exhibiting extremely high biological productivity) in July, August, and September 2025 and eutrophic in May and June based on the calculated NCTSI scores.

Lake Wilson was previously determined to be eutrophic (having elevated biological productivity) or hypereutrophic since it was first monitored by DWR in 1991

Little River Reservoir



<i>ALMP Lake Information</i>	<i>Little River Reservoir</i>
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic
<i>Mean Depth (meters)</i>	7.5
<i>Volume (10⁶m³)</i>	18
<i>Watershed Area (m²)</i>	97.7
<i>Classification</i>	WS-II; HQW, NSW, CA
<i>Stations</i>	NEU055A
<i>Number of Times Sampled</i>	5

Little River Reservoir Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	4.3	Eutrophic
June	3.5	Eutrophic
July	4.0	Eutrophic
August	3.1	Eutrophic
September	---	---

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

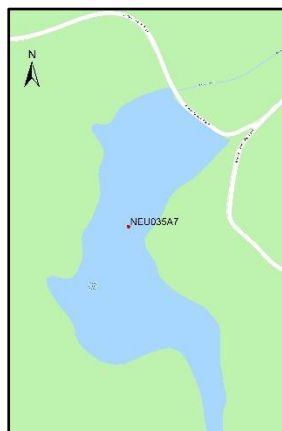
Little River Reservoir is an upper piedmont water supply for the City of Durham. Filled in February 1988, the lake has a maximum depth is 49 feet (15 meters). Retention time is normally about 74 days. Mountain Creek, Buffalo Creek, North Fork and South Fork Little River are the tributaries of this reservoir. The drainage area and is equally divided between forest, agriculture, and residences. The lake was previously classified WS-III but was reclassified to WS-II on request from the City of Durham. An aerator operates near the lower end of this lake to breakdown lake stratification and improve the quality of the raw drinking water taken from this lake.

Little River Reservoir was sampled monthly from May through September 2025 by DWR field staff. Secchi depths ranged from 0.7 to 1.2 meters (Appendix A). Total phosphorus ranged from below the detection limit of 0.05 to a detectable value of 0.06 ug/L. NH₃ was below DWR laboratory detection level (0.10 mg/L) in 2025. Total Kjeldahl nitrogen ranged from 0.67 to 1.1 mg/L. Chlorophyll a was elevated, ranging from 22 to 200 ug/L. The highest chlorophyll a values occurred in May, June, and September. Ten of the 15 chlorophyll a values were greater than the state water quality standard of 40 ug/L.

On July 6-7th 2025, Tropical Storm Chantal hit the region causing the Eno River to crest at 23.04 ft, the highest crest ever recorded for the river and constituting major flood conditions. Significant damage occurred at Little River Reservoir along the shoreline and within lake. Flooding conditions hindered access to the lake until July 24th. Nutrient, turbidity and suspended solid levels appeared still elevated during this survey.

The calculated NC TSI score for Little River Reservoir in 2025 indicated that the reservoir was eutrophic, or very biologically productive.

Reedy Creek Lake



<i>ALMP Lake Information</i>	<i>Reedy Creek Lake</i>
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic
<i>Mean Depth (meters)</i>	2.0
<i>Volume (10⁶ m³)</i>	0.14
<i>Watershed Area (m²)</i>	4.0
<i>Classification</i>	WS-II; HQW, NSW, CA
<i>Stations</i>	B; NSW
<i>Number of Times Sampled</i>	5

Reedy Creek Lake Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	4.1	Eutrophic
June	3.8	Eutrophic
July	---	---
August	---	---
September	3.0	Eutrophic

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

Reedy Creek Lake is located in Umstead State Park, which is adjacent to the Raleigh Durham International Airport. This lake is relatively small with a surface area of 20 acres (eight hectares), a maximum depth of 13 feet (four meters) and a retention time of 11 days. Land use within the watershed is primarily forest and urban. This lake is one of three lakes (Big Lake, Reedy Creek and Sycamore) located within Umstead State Park. Reedy Creek Lake is used primarily for education and recreation.

Reedy Creek Lake was sampled monthly from May through September by DWR field staff. Secchi depths were less than a meter (range = 0.45 to 0.8 meter; Appendix A). Surface dissolved oxygen ranged from 7.9 to 10.4 mg/L. Total phosphorus in Reedy Creek Lake ranged from below the detection limit of 0.05 to 0.06 mg/L and total kjeldahl nitrogen ranged from 0.76 to 1.1 mg/L. In response to the readily available nutrients in the lake, chlorophyll a concentrations ranged from 20 to 56 ug/L with one of the five observations greater than the state water quality standard of 40 ug/L.

Based on the calculated NCTSI scores, Reedy Creek Lake exhibited elevated biological productivity (eutrophic conditions) in May, June, and September. Qualified data prevented scores from being calculated in July and August.

Reedy Creek Lake has been predominantly eutrophic since DWR monitoring began in 1991.

Sunset Lake



<i>ALMP Lake Information</i>	<i>Sunset Lake</i>
<i>Season Average Trophic Status (NC TSI)</i>	---
<i>Mean Depth (meters)</i>	1.5
<i>Volume (10⁶ m³)</i>	75
<i>Watershed Area (m²)</i>	20
<i>Classification</i>	B;NSW
<i>Stations</i>	NEUMC1
<i>Number of Times Sampled</i>	5

Little River Reservoir Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	6.0	Eutrophic
June	6.5	Eutrophic
July	---	---
August	---	---
September	---	---

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

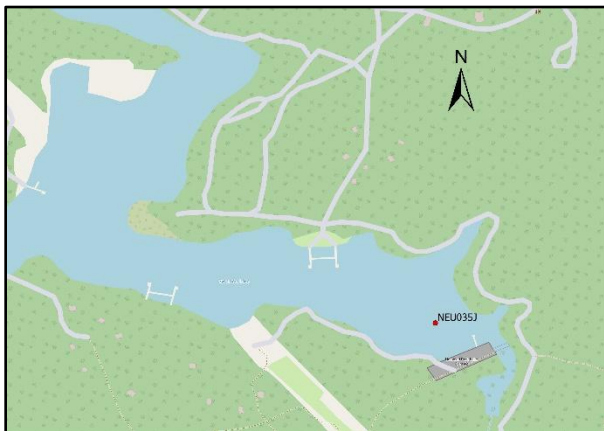
Sunset Lake is a 125-acre lake located in southern Wake County. Originally constructed as a mill pond in 1822 and then reconstructed as a recreational lake for a country club in 1923. The lake still provides recreational activities for local residents today. The lake is fed by Middle and Basal Creek downstream of Bass Lake. The drainage area is mostly made up of urban areas with some forested land. This was the first year DWR has sampled Sunset lake as a request to increase data points in this part of the basin. Sunset lake has a B;NSW classification.

In 2025, DWR field staff sampled Sunset Lake monthly from May through September. Secchi depths ranged from 0.4 to 0.5 meters. Surface dissolved oxygen ranged from 7.3 to 11.6 mg/L and surface pH ranged from 7.4 to 9.1 s.u. Total phosphorus ranged from 0.8 to 0.15 mg/L and total organic nitrogen ranged from 0.98 to 1.3 mg/L. Chlorophyll a ranged from 1.6* to 120 ug/L.

Based on the calculated NC TSI scores, Sunset Lake was determined to exhibit elevated biological productivity (eutrophic conditions) throughout the sampling months.

*Some data may be qualified, see Appendix A for details.

Sycamore Lake



<i>ALMP Lake Information</i>	<i>Sycamore Lake</i>
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic
<i>Mean Depth (meters)</i>	6.6
<i>Volume (10⁶m³)</i>	0.17
<i>Watershed Area (mi²)</i>	4.2
<i>Classification</i>	B; NSW
<i>Stations</i>	NEU035J
<i>Number of Times Sampled</i>	5

Sycamore Lake Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	3.4	Eutrophic
June	3.8	Eutrophic
July	---	---
August	---	---
September	5.4	Hypereutrophic

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

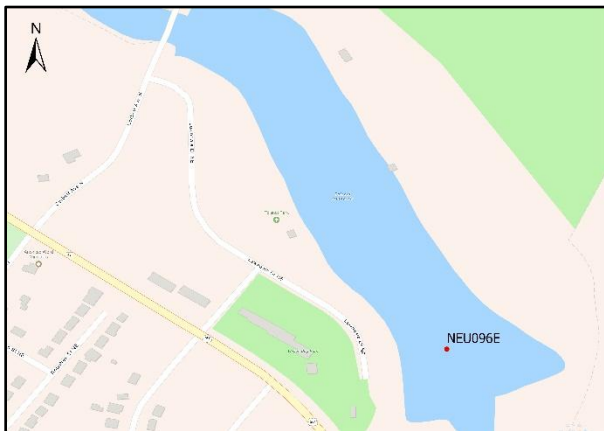
Sycamore Lake is the third of the three lakes monitored in Umstead State Park. Sycamore Lake, with a surface area of 22 acres and is relatively small. The maximum depth is 13 feet (four meters). Land use in the watershed is primarily forest and agriculture. Sycamore is used for recreation and education.

Sycamore Lake was sampled monthly from May through September by DWR field staff. Secchi depths for this lake ranged between 0.4 to 1.0 m (Appendix A). Surface dissolved oxygen ranged from 7.2 to 8.7 mg/L and surface pH values ranged from 6.4 to 7.4 s.u. Total phosphorus remained below the detection limit of 0.05 mg/L and total kjeldahl nitrogen ranged from 0.71 to 1.4 mg/L. Values for chlorophyll a in 2025 ranged from 8.9 to 53 ug/L with one of the five observations greater than the state water quality standard of 40 ug/L.

Based on the calculated NCTSI scores, Sycamore Lake exhibited excessive biological productivity or eutrophic conditions in 2020.

This lake has been eutrophic since monitoring by DWR began in 1991

Toisnot Reservoir



Toisnot Reservoir was constructed between 1961 and 1963 just north of the City of Wilson and serves as the backup water supply for the City. This lake has experienced sedimentation and nutrient problems related to nonpoint source pollution. The maximum depth of this small reservoir is approximately three meters. Toisnot Swamp is the primary inflow to the reservoir. This drainage area is swampy and flat. Land use within the watershed consists of agricultural land, forested land and residential areas. The land immediately adjacent to the reservoir is used for a city park and for residential/urban development.

Toisnot Reservoir was sampled monthly from May through September by DWR field staff. Secchi depths were less than a meter and ranged from 0.5 to 0.8 meters (Appendix A). Surface dissolved oxygen ranged from 6.7 to 9.3 mg/L and surface pH values ranged from 6.2 to 7.3 s.u. Total phosphorus concentrations ranged from 0.06 to 0.13 mg/L and total kjeldahl nitrogen ranged from 0.81 to 1.1 mg/L. Chlorophyll a values in Toisnot Reservoir ranged from 13 to 52 ug/L, which was the only observation that was greater than the state water quality standard of 40 ug/L.

Based on the calculated NC TSI scores for 2025, Toisnot Reservoir was determined to exhibit high biological productivity or eutrophic conditions for May, June, August, and September. The month of July showed hypereutrophic conditions. This lake has been eutrophic since monitoring by DWR began in 1988.

<i>ALMP Lake Information</i>	<i>Toisnot Reservoir</i>
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic
<i>Mean Depth (meters)</i>	1.5
<i>Volume (10⁶ m³)</i>	0.01
<i>Watershed Area (m²)</i>	51627
<i>Classification</i>	WS-III; NSW, CA
<i>Stations</i>	NEU096
<i>Number of Times Sampled</i>	5

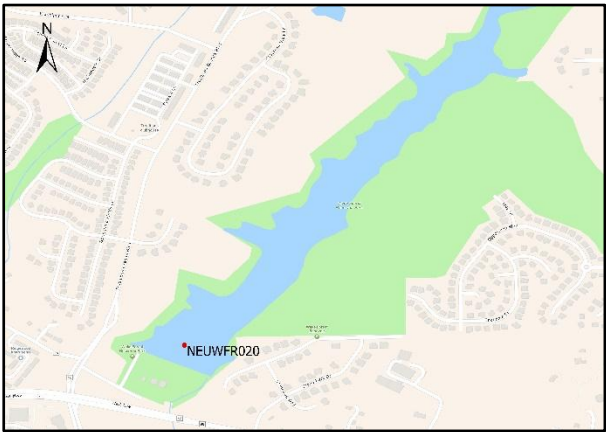
Toisnot Reservoir Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	4.3	Eutrophic
June	2.8	Eutrophic
July	5.8	Hypereutrophic
August	4.1	Eutrophic
September	4.4	Eutrophic

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

Wake Forest Reservoir



<i>ALMP Lake Information</i>	<i>Wake Forest Reservoir</i>
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic
<i>Mean Depth (meters)</i>	
<i>Volume (10⁶m³)</i>	
<i>Watershed Area (m²)</i>	
<i>Classification</i>	WS-II; HQW, NSW, CA
<i>Stations</i>	NEUWFR020
<i>Number of Times Sampled</i>	5

Wake Forest Reservoir Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	2.2	Eutrophic
June	---	---
July	2.1	Eutrophic
August	---	---
September	2.4	Eutrophic

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

Wake Forest Reservoir was constructed on Smith Creek in the early 1960s to serve as a drinking water source for the Town of Wake Forest. Following the construction of Falls of the Neuse Reservoir in the late 1980s, Wake Forest tied into the new reservoir and retired Wake Forest Reservoir. The lake is currently used for recreational fishing, canoeing and kayaking. A 1.6-mile soft trail for hiking was constructed on one side of the lake, with plans to extend the trail around the lake in the future. Currently, the mean depth and volume of Wake Forest Reservoir is not known.

In 2025, DWR field staff sampled Wake Forest Reservoir monthly from May through September. Secchi depths ranged from 0.8 to 1.5 meters. Surface dissolved oxygen ranged from 6.7 to 8.8 mg/L and surface pH ranged from 7.0 to 8.4 s.u. Total phosphorus was less than the DWR laboratory detection level of 0.05 mg/L for all samples and total organic nitrogen ranged from 0.66 to 1.0 mg/L. Chlorophyll a ranged from 9.3 to 41 ug/L with one value measured at site (NEUWFR020) greater than the state Chlorophyll a water quality standard of 40 ug/L.

Based on the calculated NCTSI scores, Wake Forest Reservoir was determined to exhibit elevated biological productivity (eutrophic conditions) throughout the sampling months.

*Some data may be qualified, see Appendix A for details.

West Fork Eno River Reservoir



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ALMP Lake Information		West Fork Eno River Reservoir	
Season Average Trophic Status (NC TSI)		Eutrophic	
Mean Depth (meters)		13	
Volume (10 ⁶ m ³)		3	
Watershed Area (mi ²)		9.5	
Classification		WS-II; HQW, NSW, CA	
Stations	NEUWFE2	NEUWFE2	NEUWFE2
Number of Times Sampled		5	

West Fork Eno River Reservoir Monthly Snapshot:

Sample Period	Monthly NC TSI Score	Trophic State
May	2.7	Eutrophic
June	3.5	Eutrophic
July	---	---
August	4.5	Eutrophic
September	3.0	Eutrophic

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

West Fork Eno River Reservoir is maintained by the Town of Hillsborough, which is the largest water system withdrawer. The reservoir was constructed on the West Fork of the Eno River beginning in 1999 and was completed in 2000. The watershed consists of forested and rural areas with agricultural fields, pastureland and residences.

In 2020, DWR field staff sampled West Fork Eno River Reservoir twice (May and June). In 2025, DWR field staff sampled West Fork Eno River Reservoir monthly from May through September. Secchi depths ranged from 0.6 to 1.7 meters (Appendix A). Surface dissolved oxygen ranged from 7.2 to 9.4 mg/L and surface pH values ranged from 5.9 to 7.8 s.u. Total phosphorus concentrations ranged from less than the detection limit of 0.05 mg/L to a detectable 0.07 mg/L and total kjeldahl nitrogen ranged from 0.72 to 1.3 mg/L. Chlorophyll a values in West Fork Eno Reservoir ranged from 15 to 220 ug/L exceeding the state water quality standard of 40 ug/L on five occasions.

On July 6-7th 2025, Tropical Storm Chantal hit the region causing the Eno River to crest at 23.04 ft, the highest crest ever recorded for the river and constituting major flood conditions. Significant damage along the shoreline and within West Fork Eno River Reservoir itself were noted during the July 9th site visit, just three days following peak flows. Not surprisingly phosphorous, turbidity and suspended solid levels were elevated and Secchi disk readings were diminished following the flooding conditions. These changes appear to have been temporary, and conditions were primarily back to normal by the late August sampling.

Based on the calculated NCTSI scores, this reservoir exhibited elevated biological productivity (eutrophic conditions) in 2025. West Fork Eno River Reservoir has varied between mesotrophic and eutrophic since it was first monitored by DWR in 2010.

Wiggins Mill Reservoir



<i>ALMP Lake Information</i>	<i>Wiggins Mill Reservoir</i>	
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic	
<i>Mean Depth (meters)</i>	0.5	
<i>Volume (10⁶ m³)</i>	0.6	
<i>Watershed Area (m²)</i>	237.1	
<i>Classification</i>	WS-IV; NSW, CA	
<i>Stations</i>	NEU084D	NEU084F
<i>Number of Times Sampled</i>	5	

Wiggins Mill Reservoir Monthly Snapshot:

<i>Sample Period</i>	<i>Monthly NC TSI Score</i>	<i>Trophic State</i>
May	3.6	Eutrophic
June	3.4	Eutrophic
July	4.1	Eutrophic
August	3.4	Eutrophic
September	2.6	Eutrophic

*The monthly NCTSI Score may not have been calculated due to laboratory or sampling-related qualifiers. Please see Appendices A and B for specific details.

**A season average NCTSI is not calculated for lakes with less than three months of usable NCTSI data.

Contentnea Creek was impounded in 1915 to form Wiggins Mill Reservoir. Forty years later, the dam was raised by a foot, increasing the lake to 200 acres (81 hectares) in surface area. The City of Wilson owns Wiggins Mill Reservoir, which uses it as a water supply. Access is restricted to boats with electric motors. Land use in the Contentnea Creek watershed is dominated by agriculture with some forested areas and residential development. The water of Wiggins Mill Reservoir has a distinctive tannin or tea-color which is due to water from Bloomery and Contentnea Creek Swamps flowing into the reservoir.

Wiggins Mill Reservoir was sampled monthly from May through September by DWR field staff. Secchi depths were consistently less than a meter and ranged from 0.6 to 0.9 meter (Appendix A). Surface dissolved oxygen ranged from 6.3 to 10.8 mg/L and surface pH ranged from 6.2 to 7.7 s.u. Total phosphorus in Wiggins Mill Reservoir ranged from below the detection limit of 0.05 to 0.07 mg/L and total kjeldahl nitrogen ranged from 0.76 to 0.95 mg/L. Chlorophyll a ranged from 16 to 46 ug/L, which was the only observation that was greater than the state water quality standard of 40 ug/L.

Based on the calculated NC TSI scores for 2025, Wiggins Mill Reservoir was determined to have elevated biological productivity (eutrophic conditions) for all months sampled.

This reservoir has been consistently eutrophic since it was first monitored by DWR in 1988

Appendix A

**Data for the Neuse River Basin Lakes from
January 1, 2025 through December 31, 2025 is now available for
download as an Excel file using the link below
([Accessible Appendix A Table](#))**

Appendix B

Qualifier codes used at the time of the publication of this report can be found at the link below.

[DWR Chemistry Laboratory Data Qualifier Codes](#)

[NCDEQ WSS Laboratory Quality Assurance Webpage](#) has additional and up to date information on qualifier codes.