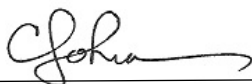


North Carolina Division of Water Resources Ambient Lakes Monitoring Assessment of the Cape Fear Basinwide Lakes and Reservoirs

North Carolina Department of Environmental Quality
Division of Water Resources
Water Science Section
Intensive Survey Branch

This report has been approved for release by:



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Date

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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 a curve known as 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 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 a number of parameters, the most important being temperature. Dissolved oxygen saturation is inversely proportion 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 nutrient, organic matter, and 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 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 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 EPA's Clean Lakes Program and is designed to identify long term trends of 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. Lakes are sampled by river basin on a five-year rotation according to the Division of Water Resources 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 here (<https://www.deq.nc.gov/about/divisions/water-resources/water-sciences/intensive-survey-branch-isb/ambient-lakes-monitoring>)

Overview

The Cape Fear River Basin is the largest in North Carolina, spanning 9,149 square miles across 24 counties. The basin includes approximately 6,300 miles of rivers and streams, primarily located within the Piedmont and Coastal Plain ecoregions. The Cape Fear River itself originates at the confluence of the Deep and Haw Rivers, located at the border between Chatham and Lee Counties. The largest impoundment within the basin is the B. Everett Jordan Reservoir. As the river flows toward the Atlantic Ocean, it is joined by several significant tributaries, including Upper and Lower Little Rivers, Rockfish Creek, Black River, South River, and the Northeast Cape Fear River, ultimately reaching the ocean near Southport.

The basin encompasses a variety of landscapes, with urban and industrial areas concentrated around cities like Greensboro, High Point, Burlington, Chapel Hill, and Durham in the upper watershed, as well as Fayetteville and Wilmington in the middle and lower reaches. While urban and suburban development has drastically increased in this watershed, significant agricultural uses still remain. Additionally, the Fort Liberty (formerly Fort Bragg) Military Reservation occupies a significant portion of the basin. With such a large urban and industrial influence, many lakes in this basin face significant challenges related to water quality, including pollution from industrial discharges, urban runoff, and agricultural activities.

In 2023, staff from the Division of Water Resources (DWR) sampled 32 lakes within the Cape Fear River Basin to assess water quality.

Assessment Methodology

For this report, data from Jan. 1, 2023, through Dec. 31, 2023 were reviewed. Lake monitoring and sample collection activities performed by DWR field staff are in accordance with the Intensive Survey Unit Standard Operating Procedures Manual (<https://www.deq.nc.gov/water-quality/environmental-sciences/isu/isb-sop-version2-1-final/download>)

All lakes were sampled in the growing season from May through September. Data were assessed for deviations from the state's Class C water quality standards for chlorophyll a, pH, dissolved oxygen, water temperature, 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. Ranges for classification are as follows:

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 are 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 the purpose of 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 those 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 are uploaded into the Labworks[®] Database within a week of the sampling date.

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

Information regarding the WSS Chemistry Laboratory Quality Assurance Program is available on the ISB website (<https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/microbiology-inorganics-branch/methods-pqls-qa>).

The Ambient Lakes Monitoring Program (ALMP) Quality Assurance Project Plan can be found on the Intensive Survey Branch Website (<https://www.deq.nc.gov/about/divisions/water-resources/water-sciences/intensive-survey-branch-isb>)

Weather Overview for Summer 2023

Weather conditions were considered average for the basin in the sampling season of May-September 2023. No major hurricanes passed through the Cape Fear River Basin. However, two tropical storms (Idalia Aug 30-31 and Ophelia Sept 22-23) brought heavy rains to the region. Aside from these tropical storms it was a fairly dry summer. Cooler than normal temperatures were observed in May and June followed by more typical high temperatures in July and August. Detailed weather information can be found through the NC State Climate Office Blog (<https://climate.ncsu.edu/climateblog>) and the Southeast Regional Climate center (<https://sercc.com/periodic-reports-monthly>)

Lake and Reservoir Assessments

HUC 03030002

REIDSVILLE LAKE



Reidsville Lake is a water supply reservoir located on Troublesome Creek just outside of, and owned by, the city of Reidsville. The topography of the watershed is characterized by rolling hills and land use is mainly agricultural (row crop and pastures) along with residential and commercial development. Rockingham County has limited activities in the lake watershed with strict zoning laws; the reservoirs have a 100-foot buffer with a 50-foot buffer on all flowing streams. A public city park with a boat launch area is located off SR 2435.

DWR field staff monitored Reidsville Lake monthly from May through September 2023. Surface dissolved oxygen in this lake ranged from 6.7 to 9.4 mg/L and surface pH ranged from 5.9 to 7.8 s.u. (Appendix A). Secchi depths, ranged from 0.7 to 1.3 meters.

Total phosphorus remained below the 0.03 mg/L detection limit. Total Kjeldahl nitrogen ranged from 0.44 to 0.56 mg/L. Ammonia and nitrogen plus nitrite (NOx) remained under the 0.05 mg/L and 0.03 mg/L detection limits, respectively. Chlorophyll *a* values ranged from 14 to 36 $\mu\text{g/L}$, which remained below the state water quality standard of 40 $\mu\text{g/L}$. Reidsville Lake was determined to exhibit elevated biological productivity (eutrophic conditions) during the growing season of 2023.

Ambient Lakes Program Name	Reidsville Lake	
Season Average Trophic Status (NC TSI)	Eutrophic (1.4)	
Mean Depth (meters)	6.0	
Volume (10^6m^3)	0.04	
Watershed Area (mi^2)	53	
Classification	WS-III NSW CA	
Stations	CPF025A	CPF002A1
Number of Times Sampled	5	5

Reidsville Lake Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	1.1	Eutrophic
June	2.2	Eutrophic
July	1.2	Eutrophic
August	1.3	Eutrophic
September	1.3	Eutrophic

Lake Hunt



Lake Hunt is a recreational lake located in Reidsville, North Carolina. Constructed in 1956, this reservoir is owned by the City of Reidsville. The boat launch area, however, is privately owned and public access is restricted. Lake Hunt was Reidsville's primary water supply until Reidsville Lake was built in 1979. An unnamed tributary of Troublesome Creek feeds Lake Hunt.

This reservoir was sampled monthly from May through September 2023. Surface dissolved oxygen ranged from 7.7 to 8.9 mg/L (Appendix A). Surface pH values ranged from 6.7 to 8.3 s.u. Secchi depths for Lake Hunt ranged from 0.8 meter to 1.7 meters.

Total phosphorus concentrations remained below the 0.03 mg/L detection limit. Total Kjeldahl nitrogen ranged from 0.47 to 0.72 mg/L (Appendix A). Ammonia and nitrite plus nitrate values were consistently below the DWR water quality laboratory detection level of 0.05 and 0.03 mg/L respectively. Chlorophyll *a* values were less than the state water quality standard of 40 $\mu\text{g/L}$ and ranged from 9.7 to 19 $\mu\text{g/L}$. Based on the calculated NCTSI scores, Lake Hunt was determined to exhibit elevated biological productivity or eutrophic conditions. This lake also demonstrated eutrophic conditions when it was previously sampled by DWR in 2008, 2011, 2013, and 2018.

Ambient Lakes Program Name	Lake Hunt	
Season Average Trophic Status (NC TSI)	Eutrophic (1.3)	
Mean Depth (meters)	10.0	
Volume (10^6m^3)	2.8	
Watershed Area (m^2)	5	
Classification	WS-III B NSW	
Stations	CPF0021A	CPF0022A
Number of Times Sampled	5	5
Stations Cont'd	CPF0023A	--
Number of Times Sampled	5	--

Lake Hunt Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	0.9	Eutrophic
June	1.6	Eutrophic
July	1.8	Eutrophic
August	1.2	Eutrophic
September	0.8	Eutrophic

Lake Higgins



Lake Higgins is one of three lakes used by the City of Greensboro as a water supply. An impoundment of Brush Creek, this lake drains into Lake Brandt, which, in turn, discharges into Lake Townsend. A public park operated by the City of Greensboro Parks & Recreation Department is located at Lake Higgins off Hamburg Mill Road. Recreational activities include fishing, sailing and canoeing.

Ambient Lakes Program Name	Lake Higgins	
Season Average Trophic Status (NC TSI)	Eutrophic (2.4)	
Mean Depth (meters)	3.5	
Volume (10⁶ m³)	3.0	
Watershed Area (m²)	11	
Classification	WS-III NSW CA	
Stations	CPFLH2	CPFLH4
Number of Times Sampled	5	5

Lake Higgins was sampled by DWR field staff monthly from May through September 2023. Surface dissolved oxygen in this lake ranged from 8.9 to 10.5 mg/L (Appendix A). Chlorophyll *a* values ranged from 18 to 39 $\mu\text{g/L}$. Secchi depths in Lake Higgins ranged from 0.6 to 1.3 meters

Lake Higgins Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	2.0	Eutrophic
June	1.8	Eutrophic
July	2.4	Eutrophic
August	3.0	Eutrophic
September	2.7	Eutrophic

Total phosphorus concentrations ranged from under the laboratory detection limit of 0.03 to 0.04 mg/L and total Kjeldahl nitrogen values ranged from 0.55 to 0.80 mg/L (Appendix A). Ammonia and nitrite plus nitrate were less than the DWR laboratory detection level of 0.05 and 0.03 mg/L respectively. Based on the calculated NCTSI scores, Lake Higgins exhibited elevated biological productivity, or eutrophic conditions, from May through September 2023.

Lake Brandt



Lake Brandt is one of three water supplies for the City of Greensboro. Reedy Fork Creek and Horsepen Creek are the main tributaries to the lake. The shoreline is forested, and the watershed consists of a mixture of residential developments, pastures, row crop fields and scattered small businesses.

Lake Brandt was sampled by DWR field staff monthly from May through September 2023. Secchi depths during the summer sampling period ranged from 0.6 to 1.3 meter (Appendix A). Surface dissolved oxygen ranged from 6.3 mg/L to 10.3 mg/L. Surface water temperatures were lowest in May (23.0 °C) and greatest in August (30.6 °C). Surface pH values ranged from 6.2 to 9.1 s.u.

Total phosphorus concentrations in Lake Brandt ranged from below the lab detection limit of 0.03 mg/L to 0.05 mg/L (Appendix A). Ammonia and nitrite plus nitrate values were consistently below the DWR laboratory detection levels of 0.05 mg/L and 0.03 mg/L respectively at each of the three lake sampling sites. Chlorophyll *a* values ranged between 15 to 51 $\mu\text{g/L}$. Based on the calculated NCTSI scores in 2023, Lake Brandt was determined to exhibit elevated biological productivity (eutrophic conditions) from May through September.

Ambient Lakes Program Name	Lake Brandt	
Season Average Trophic Status (NC TSI)	Eutrophic (2.3)	
Mean Depth (meters)	2.0	
Volume (10^6m^3)	84.0	
Watershed Area (m^2)	40	
Classification	WS-III NSW CA	
Stations	CPF007A1A	CPF007A4
Number of Times Sampled	5	5
Stations Cont'd	CPF007B	--
Number of Times Sampled	5	--

Lake Brandt Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	1.8	Eutrophic
June	1.4	Eutrophic
July	2.5	Eutrophic
August	2.4	Eutrophic
September	3.2	Eutrophic

Lake Townsend



The City of Greensboro constructed Lake Townsend in 1969 to provide drinking water for the area. This reservoir drains a watershed, which includes Lake Higgins and Lake Brandt located upstream on Reedy Fork Creek. While the mean retention time for this reservoir is unknown, it takes approximately seven to eight months for water to travel from Lake Higgins downstream to the dam at Lake Townsend. The immediate shoreline of Lake Townsend consists of forested areas and a golf course. The watershed is a mix of urban development, residential development, and agriculture (pastures and row crop fields).

DWR field staff sampled Lake Townsend monthly from May through September 2023. Surface dissolved oxygen ranged from 5.5 to 9.2 mg/L and surface pH values ranged from 6.3 to 8.8 s.u. (Appendix A). The Secchi depth measurements were consistently deeper at the dam than upstream.

Total phosphorus ranged from below detection limit of 0.03 to 0.05 mg/L. Total Kjeldahl nitrogen concentrations ranged from 0.41 to 0.74 mg/L. Ammonia and nitrate plus nitrite values were consistently below the DWR laboratory detection levels of 0.05 and 0.03 mg/L respectively. Chlorophyll *a* values ranged from 10.0 to 43.0 $\mu\text{g/L}$. Based on the calculated NCTSI scores for Lake Townsend in 2023, this lake was determined to exhibit elevated biological productivity (eutrophic conditions).

<i>Ambient Lakes Program Name</i>	Lake Townsend	
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic (1.5)	
<i>Mean Depth (meters)</i>	3.0	
<i>Volume (10^6m^3)</i>	25.0	
<i>Watershed Area (m^2)</i>	105	
<i>Classification</i>	WS-III NSW CA	
<i>Stations</i>	CPFLT4	CPFLT6
<i>Number of Times Sampled</i>	5	5
<i>Stations Cont'd</i>	CPFLT8	--
<i>Number of Times Sampled</i>	5	--

<i>Lake Townsend Monthly Snapshot</i>		
Sample Period	Monthly NC TSI Score	Trophic State
May	0.8	Eutrophic
June	1.2	Eutrophic
July	1.9	Eutrophic
August	1.8	Eutrophic
September	2.0	Eutrophic

Lake Burlington (Stony Creek Reservoir)



Lake Burlington was built as a water supply between 1927 and 1928 by the City of Burlington. Stony Creek and Toms Creek drain the watershed, which is characterized by rolling hills.

This reservoir was monitored monthly from May through September 2023. Surface dissolved oxygen ranged from 8.9 mg/L in May to 9.8 mg/L in September (Appendix A). Surface pH values ranged from 6.6 to 8.5 s.u. Secchi depths ranged from 0.5 to 1.1 meters.

Total phosphorus concentrations in Lake Burlington ranged from 0.03 to 0.05 mg/L and total Kjeldahl nitrogen ranged from 0.6 to 0.92 mg/L (Appendix A). Ammonia and nitrate plus nitrite (NO_x) both remained below the detection limit at 0.05 mg/L and 0.03 mg/L respectively. The turbidity value reached its highest in September at the upper sampling site, CPFSC2, at 10 NTU.

Chlorophyll *a* values for Lake Burlington in 2023 ranged from 14 to 38 $\mu\text{g/L}$. Blue-green algae were determined to be the dominant algae in this reservoir in July, August and September. The bloom magnitude was marked as severe for August and September.

Based on the calculated NCTSI scores, Lake Burlington was determined to exhibit elevated biological productivity (eutrophic conditions) in 2023. This reservoir has exhibited eutrophic conditions since it was first monitored by DWR in 1990.

<i>Ambient Lakes Program Name</i>	Lake Burlington (Stony Creek Res.)	
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic (2.9)	
<i>Mean Depth (meters)</i>	2.0	
<i>Volume (10⁶m³)</i>	3.0	
<i>Watershed Area (mi²)</i>	11	
<i>Classification</i>	WS-III NSW CA	
<i>Stations</i>	CPFSCR2	CPFSCR4
<i>Number of Times Sampled</i>	5	5

Lake Burlington Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	2.3	Eutrophic
June	2.3	Eutrophic
July	3.2	Eutrophic
August	**	**
September	3.9	Eutrophic

**NCTSI score could not be calculated due to qualified chl-a data (J2, P) and was excluded from the annual average. J2 qualifier: The reported value failed to meet the established quality control criteria for either precision or accuracy.

Lake Cammack (Burlington Reservoir)



Lake Cammack (also known as Burlington Reservoir), an auxiliary water supply located at the confluence of Stony Creek and Toms Creek in Alamance County, is owned by the City of Burlington. The lake watershed area consists primarily of forested and agricultural land.

DWR field staff monitored Lake Cammack monthly from May through September 2023. Surface dissolved oxygen values were relatively consistent, ranging between 8.2 and 9.4 mg/L (Appendix A). Surface pH values ranged from 6.5 to 8.8 s.u. Secchi depths, an indicator of water clarity, ranged from 0.3 meters to 1.0 meter.

Total phosphorus remained below the laboratory detection limit of 0.03 mg/L. Total Kjeldahl nitrogen ranged from 0.60 to 0.93 mg/L (Appendix A). Ammonia and nitrite plus nitrate concentrations were consistently below the laboratory detection limits of 0.05 and 0.03 mg/L, respectively. Chlorophyll *a* values in 2023 ranged from 12 to 29 $\mu\text{g/L}$. Lake Cammack was determined to exhibit elevated biological productivity, or eutrophic conditions, in 2023. This trophic status has not changed since 1981 when Lake Cammack was first monitored by DWR staff.

Ambient Lakes Program Name	Lake Cammack	
Season Average Trophic Status (NC TSI)	Eutrophic (2.4)	
Mean Depth (meters)	4.0	
Volume (10^6m^3)	12.2	
Watershed Area (m^2)	28	
Classification	WS-II HWQ NSW CA	
Stations	CPF0251A	CPF025A
Number of Times Sampled	5	5

Lake Cammack Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	2.0	Eutrophic
June	1.8	Eutrophic
July	3.2	Eutrophic
August	**	**
September	2.7	Eutrophic

**NCTSI score could not be calculated due to qualified chl-a data (J2) and was excluded from the annual average. J2 qualifier: The reported value failed to meet the established quality control criteria for either precision or accuracy.

Graham-Mebane Reservoir



Graham-Mebane Reservoir is a water supply source for the towns of Graham and Mebane. The lake also serves as a drinking water source for the towns of Green Level and Haw River. The lake is located on Quaker and Back Creeks and encompasses the old Quaker Creek Reservoir, which had been previously monitored by DWR. The immediate shoreline is forested except for a few houses, a public school and some farmland.

Graham-Mebane Reservoir was monitored by DWR field staff monthly from May through September 2023. Surface dissolved oxygen ranged from 5.2 to 9.6 mg/L and surface pH values ranged from 6.1 to 8.0 s.u. (Appendix A). Secchi depths were between 0.3 and 1.2 meters.

Total phosphorus concentrations ranged from below the detection limit of 0.03 to 0.08 mg/L. Total Kjeldahl nitrogen ranged from 0.57 to 1.30 mg/L. Ammonia and nitrite plus nitrate concentrations remained below the detection limits of 0.05 and 0.03 mg/L, respectively. Chlorophyll *a* values in 2023 ranged from 6.0 to 68.0 $\mu\text{g/L}$. Graham-Mebane Reservoir is on the 303(d) List of Impaired Waters for turbidity values greater than the state water quality standard of 25 NTU in the Quaker Creek arm (listed in 2008) and 0.3 mile upstream of the NC HWY 119 at the dam to SR 1917 (listed in 2012).

Based on the calculated NCTSI scores, Graham-Mebane Reservoir was determined to have elevated biological productivity (eutrophic conditions) in 2023.

Ambient Lakes Program Name	Graham-Mebane Reservoir	
Season Average Trophic Status (NC TSI)	Eutrophic (3.4)	
Mean Depth (meters)	3.0	
Volume (10^6 m^3)	8.7	
Watershed Area (m^2)	66	
Classification	WS-II HQW NSW CA	
Stations	CPFGMR1	CPFGMR2
Number of Times Sampled	5	5
Stations Cont'd	CPFGMR3	CPFGMR4
Number of Times Sampled	5	5
Stations Cont'd	CPFGMROA	--
Number of Times Sampled	5	--

Graham-Mebane Reservoir Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	2.4	Eutrophic
June	3.3	Eutrophic
July	**	**
August	3.6	Eutrophic
September	4.4	Eutrophic

**NCTSI score could not be calculated due to qualified nutrients data and was excluded from the annual average. X qualifier: sampled, but analysis lost or not performed.

Lake Mackintosh



Lake Mackintosh is a water supply reservoir for the City of Burlington. The lake is used for recreational purposes (fishing and boating). Located on Big Alamance Creek, Lake Mackintosh was filled in 1993. The surrounding land is comprised of pastures and farmland with a few houses. Guilford County has established a no wake zone for the Little Alamance arm and boats entering this arm are restricted to electric motors.

DWR field staff sampled monthly from May through September 2023. Surface dissolved oxygen in Lake Mackintosh ranged from 7.3 to 10.4 mg/L (Appendix A). Surface water temperatures ranged from 24.1 °C to 31.3 °C and surface pH values varied from 6.1 to 8.7 s.u. Secchi depths for Lake Mackintosh ranged from 0.7 to 2.1 meters.

Total phosphorus concentrations ranged from below detection limit of 0.03 to 0.05 mg/L. Total Kjeldahl nitrogen ranged from 0.40 to 0.82 mg/L (Appendix A). Ammonia and nitrate plus nitrite values did not exceed the laboratory detection limits of 0.05 and 0.03 mg/L, respectively. Chlorophyll *a* values from May through September ranged from 9.5 to 45.0 $\mu\text{g/L}$.

Based on the calculated NCTSI scores for 2023, Lake Mackintosh was determined to exhibit elevated biological productivity, or eutrophic conditions. This reservoir has been consistently eutrophic since it was first monitored by DWR field staff in 1993.

Ambient Lakes Program Name	Lake Mackintosh	
Season Average Trophic Status (NC TSI)	Eutrophic (1.4)	
Mean Depth (meters)	9.5	
Volume (10^6m^3)	29.0	
Watershed Area (mi^2)	129	
Classification	WS-IV NSW CA	
Stations	CPF038F	CPF038G
Number of Times Sampled	5	5
Stations Cont'd	CPF038H	CPF038J
Number of Times Sampled	5	5
Stations Cont'd	CPF038L	CPF038N
Number of Times Sampled	5	5

Lake Mackintosh Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	1.6	Eutrophic
June	**	**
July	1.7	Eutrophic
August	**	**
September	0.9	Eutrophic

**NCTSI score could not be calculated due to qualified chl-a and nutrients data (J2, J6 respectively) and was excluded from the annual average. J2 qualifier: The reported value failed to meet the established quality control criteria for either precision or accuracy. J6 qualifier: the lab analysis was from an unpreserved or improper chemically preserved sample. The analysis may not be accurate.

Cane Creek Reservoir



Cane Creek Reservoir was built in 1989 by Orange Water and Sewer Authority (OWASA) as a water supply for the City of Chapel Hill. Much of the watershed is forested with some agricultural land interspersed. Two main tributaries entering the lake are Cane Creek and Turkey Hill Creek.

DWR field staff sampled Cane Creek Reservoir monthly from May through September 2023. Surface dissolved oxygen ranged from 6.7 mg/L to 9.4 mg/L (appendix A). Surface water temperature was lowest in May (17.2°C) and highest in September (31.8°C). Surface pH values ranged from 6.3-8.6 and Secchi depths ranged from 0.8 to 1.4 meters. Algal bloom conditions were noted during each sampling event and cyanobacteria were noted on August 3.

Total phosphorus ranged from <0.03 to 0.05 mg/L and total Kjeldahl nitrogen ranged from 0.82 to 1.20 mg/L (Appendix A). Concentrations of ammonia ranged from <0.05 mg/L to 0.15mg/L and nitrite plus nitrate concentrations ranged from <0.03 to 0.26 mg/L. Chlorophyll a values for Cane Creek Reservoir ranged from 12 to 42 ug/L.

Based on the calculated NCTSI scores Cane Creek Reservoir was determined to exhibit eutrophic conditions from May through September. These results are improved compared to 2018 when the reservoir was classified as hyper-eutrophic and had a maximum chl a value of 100 mg/L for the May sampling period.

Ambient Lakes Program Name	Cane Creek Reservoir	
Season Average Trophic Status (NC TSI)	Eutrophic (2.4)	
Mean Depth (meters)	2.5	
Volume (10⁶ m³)	11.0	
Watershed Area (mi²)	32	
Classification	WS-II HQW NSW CA	
Stations	CPFCCR2	CPFCCR4
Number of Times Sampled	5	5
Stations Cont'd	CPFCCR6	--
Number of Times Sampled	5	--

Cane Creek Reservoir Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	2.9	Eutrophic
June	2.1	Eutrophic
July	2.3	Eutrophic
August	2.7	Eutrophic
September	1.9	Eutrophic

University Lake



University Lake was constructed in 1932. This reservoir, which is managed by the Orange County Water and Sewer Authority (OWASA), provides drinking water for the City of Chapel Hill. Recreational fishing and boating are allowed at this lake. Major tributaries to the lake include Morgan Creek, Phils Creek, Price Creek, and Prichard Mill Creek

In 2023, University Lake was monitored monthly from May through September. Surface dissolved oxygen in this reservoir ranged from 6.6 mg/L to 10.1 mg/L and percent dissolved oxygen saturation ranged from 73% to 134% (Appendix A). Surface pH values ranged from 6.4 to 8.3 s.u. Secchi depths, a measure of water clarity, were predominantly less than one meter, indicating fair water clarity.

Total phosphorus values ranged from <0.03 to 0.06 mg/L and total Kjeldahl nitrogen ranged from 0.62 to 1.2 mg/L (Appendix A). These values were similar to nutrient concentrations previously observed in this reservoir. Chlorophyll a ranged from 21 to 60 ug/L. Values at CPFUL4 in July, August and September were greater than the state water quality standard of 40 ug/L. The algal community in University Lake was dominated by blue-green algae and the two dominant genera were *Cylindrospermopsis* and *Planktolyngbya*.

Ambient Lakes Program Name	University Lake	
Season Average Trophic Status (NC TSI)	Eutrophic (3.6)	
Mean Depth (meters)	1.5	
Volume (10⁶m³)	2.6	
Watershed Area (m²)	29	
Classification	WS-II HQW NSW CA	
Stations	CPFUL4	CPFUL6
Number of Times Sampled	5	5

University Lake Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	3.8	Eutrophic
June	2.8	Eutrophic
July	4.2	Eutrophic
August	3.8	Eutrophic
September	3.7	Eutrophic

B. Everett Jordan Lake



B. Everett Jordan Reservoir (Jordan Lake) is a multipurpose reservoir constructed in Chatham County and filled in 1981. Major tributaries to the lake include the Haw River, New Hope Creek, and Morgan Creek. Constructed by U.S. Army Corps of Engineers for flood control, this lake is used extensively for recreational activities and as a water supply for several municipalities. Ninety percent of the annual inflow to the lake comes from the Haw River. Most of the shoreline is undeveloped and forested. Numerous NPDES permitted facilities discharge into the watershed. Nutrient enrichment, algal blooms and eutrophic conditions have been present in the lake since impoundment.

DWR field staff monitored Jordan Lake monthly from May through August 2023. Surface dissolved oxygen ranged from 5.6 to 11.4 mg/L, and surface water temperatures ranged from 22.4 °C to 31.1 °C. Surface pH ranged from 6.7 to 9.2 s.u. Secchi depths were frequently less than a meter, ranging from 0.3 to 1.2 meters.

Total phosphorus ranged from under the detection limit of 0.03 to 0.13 mg/L and total Kjeldahl nitrogen concentrations ranged from 0.64 to 1.90 mg/L. Ammonia ranged from <0.05 to 0.06 mg/L, and nitrite plus nitrate ranged from <0.03 to 0.11 mg/L. Chlorophyll *a* values ranged from 28 to 120 $\mu\text{g/L}$. Jordan Lake is listed on the 303(d) List of Impaired Waters for exceedances of the state water quality standards for turbidity, pH and Chlorophyll *a* values. During the sampling effort in 2023, none of the turbidity observations were greater than 25 NTU. Four of 45 surface pH values were greater than 9.0 s.u. in 2023. Based on the calculated NCTSI scores, Jordan Lake was determined to exhibit elevated biological productivity or eutrophic conditions in 2023 with hyper-eutrophic conditions occurring in July and August. This reservoir has been eutrophic since it was first monitored by DWR in 1982.

Ambient Lakes Program Name	Jordan Lake	
Season Average Trophic Status (NC TSI)	Eutrophic (4.7)	
Mean Depth (meters)	5.0	
Volume (10^6m^3)	929.6	
Watershed Area (m^2)	1689	
Classification	WS-IV B NSW CA	
Stations	CPF055C	CPF055D
Number of Times Sampled	5	5
Stations Cont'd	CPF055E	CPF081A1C
Number of Times Sampled	5	5
Stations Cont'd	CPF086C	CPF086F
Number of Times Sampled	5	5
Stations Cont'd	CPF087B3	CPF087D
Number of Times Sampled	5	5
Stations Cont'd	CPF0880A	--
Number of Times Sampled	5	--

Jordan Lake Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	4.8	Eutrophic
June	4.1	Eutrophic
July	5.2	Hyper-Eutrophic
August	5.2	Hyper-Eutrophic
September	4.5	Eutrophic

Buckhorn Dam Lake



Buckhorn Dam Lake is located on the Cape Fear River, approximately 5.9 miles downstream of the confluence of the Haw and Deep Rivers and has a surface area of 460 acres. The lake was used until 1962 by a regional power production facility to regulate flows. After 1962, the dam became a run-of-the-river structure and continued to provide a source of cooling water for the coal-burning power plant.

In 2023, DWR field staff sampled Buckhorn Dam Lake monthly from May through September. Secchi depths for this reservoir ranged from 0.2 to 0.8 meter, indicating fair water clarity. Surface dissolved oxygen ranged from 6.2 to 12.3 mg/L and surface water temperatures ranged from 16.2°C to 31.9 °C. Surface pH values ranged from 6.4 to 8.6 s.u.

Total phosphorus in Buckhorn Dam Lake ranged from 0.06 to 0.24 mg/L and total Kjeldahl nitrogen ranged from 0.4 to 1.20 mg/L. Ammonia concentrations varied from <0.05 to 0.14 mg/L and the concentrations of nitrite plus nitrate ranged from 0.07 to 0.66 mg/L. Chlorophyll a ranged from 5.3 to 67.0 ug/L with the highest readings occurring in August. Based on the calculated NCTSI scores, Buckhorn Dam Lake was determined to exhibit elevated biological conditions (eutrophic) each month it was sampled in 2023. In 2006, this lake was placed on the 303(d) List of Impaired Waters for chlorophyll a values that exceed the state water quality standard.

Ambient Lakes Program Name	Buckhorn Dam Lake	
Season Average Trophic Status (NC TSI)	Eutrophic (4.4)	
Mean Depth (meters)		
Volume (10⁶m³)	2.0	
Watershed Area (mi²)		
Classification	WS-IV CA	
Stations	CPFBDL1	CPFBDL2
Number of Times Sampled	5	5

Buckhorn Dam Lake Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	5.4	Eutrophic
June	4.1	Eutrophic
July	3.4	Eutrophic
August	4.7	Eutrophic
September	4.7	Eutrophic

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High Point Lake



High Point Lake (also known as City Lake), built in 1928 by the City of High Point, is used for recreation and as a water supply. Maximum depth of the lake is 33 feet (10 meters). Urban and residential areas as well as pasture and row crop farms dominate the watershed. The two arms of the lake are fed by the East Fork Deep River and the West Fork Deep River.

High Point Lake was sampled monthly from May through September 2023 by DWR field staff. Surface dissolved oxygen ranged from 5.1 to 10.4 mg/L and surface water temperature ranged from 22.2 °C to 29.0 °C (Appendix A). Surface pH values ranged from 7.1 to 8.5 s.u. Secchi depth measurements ranged from 0.4 to 1.0 meters.

Nutrient concentrations in High Point Lake were similar to those previously observed in this lake. Total phosphorus ranged from below detection at 0.03 to 0.06 mg/L and total Kjeldahl nitrogen ranged from 0.45 to 0.83 mg/L. Chlorophyll *a* values ranged from 24 to 48 ug/L. Past elevated chlorophyll *a* values placed High Point Lake on the 303(d) List of Impaired Waters. The dominant algae group in High Point Lake in 2023 was Cyanobacteria.

Based on the calculated NCTSI scores, High Point Lake was determined to exhibit elevated biological productivity or eutrophic conditions on each of the five sampling dates in 2023.

Ambient Lakes Program Name	High Point Lake	
Season Average Trophic Status (NC TSI)	Eutrophic (2.7)	
Mean Depth (meters)	5.0	
Volume (10⁶ m³)	4.8	
Watershed Area (mi²)	60	
Classification	WS- IV	
Stations	CPF089E2	CPF089E4
Number of Times Sampled	5	5

High Point Lake Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	2.4	Eutrophic
June	2.8	Eutrophic
July	2.9	Eutrophic
August	2.3	Eutrophic
September	3.2	Eutrophic

Oak Hollow Lake (High Point Reservoir)



The City of High Point constructed Oak Hollow Lake to serve as a water supply source. Boating, fishing, and swimming are common activities on the lake. The watershed is characterized by urban and residential development. An air injection aeration system operates in this lake to reduce stratification during the summer months and improve the quality of raw water removed for drinking water processing.

Oak Hollow Lake was sampled monthly from May through September 2023 by DWR field staff. Secchi depths, a measurement of water clarity, ranged from 0.7 to 1.0 meters. Surface dissolved oxygen ranged from 5.9 mg/L to 9.5 mg/L (Appendix A). Surface pH values ranged from 6.5 to 8.8 s.u.

Nutrient concentrations for Oak Hollow Lake were similar to those previously observed for this reservoir by DWR. Total phosphorus concentrations ranged from below detection at 0.03 to 0.06 mg/L and total Kjeldahl nitrogen ranged from below detection at 0.04 to 0.68 mg/L. Ammonia ranged from below detection at <0.05 to 0.08 mg/L and nitrite plus nitrate ranged from below detection at <0.03 to 0.06 mg/L. Chlorophyll *a* ranged from 18 to 33 $\mu\text{g/L}$. Based on the calculated NCTSI scores, Oak Hollow Lake was determined to exhibit elevated biological productivity (eutrophic conditions) throughout the 2023 sampling period.

Ambient Lakes Program Name	Oak Hollow Lake	
Season Average Trophic Status (NC TSI)	Eutrophic (2.0)	
Mean Depth (meters)	6.5	
Volume (10^6m^3)	11.0	
Watershed Area (mi^2)	55	
Classification	WS-IV CA	
Stations	CPF089D3	CPF089D4
Number of Times Sampled	5	5
Stations Cont'd	CPF089D5	--
Number of Times Sampled	5	--

Oak Hollow Lake Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	2.4	Eutrophic
June	1.8	Eutrophic
July	2.5	Eutrophic
August	2.0	Eutrophic
September	1.4	Eutrophic

Randleman Reservoir



Randleman Lake is located south of the city of High Point on the Deep River. This reservoir provides drinking water for North Carolina's Piedmont Triad Region and is used for recreation. Land use within the immediate watershed consists of dairy operations, forested areas, and a few residences. The High Point Eastside WWTP discharge is located downstream of the Groomtown Road bridge (CPFRD1).

Randleman Reservoir was sampled by DWR field staff monthly from May through September 2023. Secchi depths ranged from 0.7 to 1.2 meters (Appendix A). Surface dissolved oxygen ranged from 6.9 to 11.7 mg/L and surface water temperatures ranged from 18.1 °C to 31.4 °C. The pH ranged from 6.1 to 9.1 s.u.

Total phosphorus concentrations ranged from below detection <0.03 to 0.26 mg/L and total Kjeldahl nitrogen ranged from 0.44 to 1.10 mg/L. Nitrate plus nitrite ranged from below detection <0.03 to 0.49 mg/L, and ammonia ranged from below detection <0.03 to 0.10 mg/L. Chlorophyll *a* values for Randleman Reservoir ranged from 6.7 to 49 $\mu\text{g/L}$. The dominant algae in this reservoir was determined to be blue-greens with severe bloom magnitudes being noted during the June, July and September sampling rounds. Based on the calculated NCTSI scores, Randleman Reservoir was determined to exhibit elevated biological productivity (eutrophic conditions) in 2023.

<i>Ambient Lakes Program Name</i>	Randleman Reservoir	
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic (2.3)	
<i>Mean Depth (meters)</i>		
<i>Volume (10^6m^3)</i>	115.5	
<i>Watershed Area (m^2)</i>	174	
<i>Classification</i>	WS-IV CA	
<i>Stations</i>	CPFRD1	CPFRD2
<i>Number of Times Sampled</i>	5	5
<i>Stations Cont'd</i>	CPFRD3	CPFRD4
<i>Number of Times Sampled</i>	5	5
<i>Stations Cont'd</i>	CPFRD5	CPFRD6
<i>Number of Times Sampled</i>	5	5
<i>Stations Cont'd</i>	CPFRD7	CPFRD8
<i>Number of Times Sampled</i>	5	5
<i>Stations Cont'd</i>	CPFRD9	--
<i>Number of Times Sampled</i>	5	--

<i>Randleman Reservoir Monthly Snapshot</i>		
Sample Period	Monthly NC TSI Score	Trophic State
May	2.7	Eutrophic
June	2.2	Eutrophic
July	2.0	Eutrophic
August	2.7	Eutrophic
September	1.9	Eutrophic

Sandy Creek Reservoir



Sandy Creek Reservoir is the drinking water supply for the Town of Ramseur. Impounded in 1978, it is fed by Big Sandy Creek and Little Sandy Creek. The watershed is moderately developed, and land use is mostly characterized by forested and agricultural areas as well as urban development.

Sandy Creek Reservoir was monitored from May through September 2023. Secchi depths ranged from 0.7 to 1.3 meters (Appendix A). Surface dissolved oxygen ranged between 7.2 to 11.9 mg/L. Surface water temperatures in 2023 ranged from 18.1 °C in May to 29.1 °C in August. Surface pH values ranged from 6.4 to 9.2 s.u.

Total phosphorus ranged from 0.04 to 0.12 mg/L and total Kjeldahl nitrogen ranged from 0.49 to 1.00 mg/L. Ammonia ranged from below detection <0.05 to 0.09 mg/L and nitrite plus nitrate from below detection at <0.03 to 1.00 mg/L. Due to the availability of these nutrients, chlorophyll *a* values ranged from 13.0 to 120.0 $\mu\text{g/L}$. Six of the 15 chlorophyll *a* measurements for 2023 were greater than the state water quality standard of 40 $\mu\text{g/L}$. A turbidity value for a site in July (90 NTU) also exceeded the state water quality standard of 25 NTU for lakes not designated as Trout Waters. Sandy Creek Reservoir is listed on the 303(d) List of Impaired Waters for chlorophyll *a* values that exceed the state water quality standard of 40 $\mu\text{g/L}$ (listed in 2016 and 2018).

Sandy Creek Reservoir was determined to exhibit elevated biological productivity (eutrophic conditions) in 2023 based on the calculated NCTSI scores.

<i>Ambient Lakes Program Name</i>	Sandy Creek Reservoir	
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic (3.8)	
<i>Mean Depth (meters)</i>	6.5	
<i>Volume (10^6m^3)</i>	1.5	
<i>Watershed Area (m^2)</i>	55	
<i>Classification</i>	WS-III CA	
<i>Stations</i>	CPFSC1	CPFSC2
<i>Number of Times Sampled</i>	5	5
<i>Stations Cont'd</i>	CPFSC3	--
<i>Number of Times Sampled</i>	5	--

<i>Sandy Creek Reservoir Monthly Snapshot</i>		
Sample Period	Monthly NC TSI Score	Trophic State
May	3.1	Eutrophic
June	4.2	Eutrophic
July	4.5	Eutrophic
August	3.6	Eutrophic
September	3.7	Eutrophic

Rocky River Reservoir



The Rocky River Reservoir is an impoundment located on the Rocky River in Chatham County and serves as a drinking water supply for the Town of Siler City. It is located upstream of Charles L. Turner Reservoir. Public access to the lake is restricted. The watershed is primarily agricultural with some pasture immediately adjacent to the lake.

DWR staff monitored this reservoir monthly from May through September 2023. Secchi depths were less than a meter (range = 0.3 to 0.9 meter), indicating limited water clarity (Appendix A). Secchi depths of less than a meter were previously observed by DWR in 2013, 2008, and 2003. Surface dissolved oxygen in 2023 ranged from 8.1 to 11.6 mg/L and surface pH ranged from 7.1 to 9.2 s.u.

Total phosphorus ranged from below detection <0.03 to 0.07 mg/L and total Kjeldahl nitrogen ranged from 1.0 to 1.5 mg/L (Appendix A). Nitrite plus nitrate concentrations ranged from below detection <0.03 to 0.16 mg/L. Ammonia values remained below detection <0.05 mg/L. The availability of nutrients supported increased algal productivity, which resulted in chlorophyll *a* concentrations ranging from 23 to 150 $\mu\text{g/L}$. Seven of ten chlorophyll *a* values recorded for the 2023 sampling effort were greater than the state water quality standard of 40 $\mu\text{g/L}$.

Based on the 2023 growing season NCTSI scores, the Rocky River was determined to be hypereutrophic in July and September and eutrophic in May, June, and August. The overall status was Eutrophic. This reservoir was hypereutrophic in 2003, 2008, and 2013.

Ambient Lakes Program Name	Rocky River Reservoir	
Season Average Trophic Status (NC TSI)	Eutrophic (5.0)	
Mean Depth (meters)	5.5	
Volume (10^6m^3)	1.6	
Watershed Area (m^2)	23	
Classification	WS-III CA	
Stations	CPF1201A	CPF1201B
Number of Times Sampled	5	5

Rocky River Reservoir Lake Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	4.3	Eutrophic
June	4.0	Eutrophic
July	5.2	Hypereutrophic
August	**	**
September	6.7	Hypereutrophic

**NCTSI score could not be calculated due to qualified chl-a data (J2, P) and was excluded from the annual average. J2 qualifier: The reported value failed to meet the established quality control criteria for either precision or accuracy. P qualifier: sample dilution occurred due to either matrix interference or target analytes being present at concentrations greater than the calibration curve. Reported target analyte values are obtained from results which were bracketed by the calibration curve.

Charles L. Turner Reservoir

Ambient Lakes Program Name	Charles L. Turner Reservoir	
Season Average Trophic Status (NC TSI)	Hypereutrophic (5.6)	
Mean Depth (meters)	3.0	
Volume (10⁶m³)	1.4	
Watershed Area (mi²)	53	
Classification	WS-III CA	
Stations	CPFTR01	CPFTR02
Number of Times Sampled	5	5
Stations Cont'd	CPRTR03	CPFTR05
Number of Times Sampled	5	5
Stations Cont'd	CPFTR06	--
Number of Times Sampled	5	--

Charles L. Turner Reservoir Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	5.3	Hypereutrophic
June	4.5	Eutrophic
July	5.9	Hypereutrophic
August	6.3	Hypereutrophic
September	5.8	Hypereutrophic

Charles L. Turner Reservoir is an impoundment located on the Rocky River in Chatham County downstream of Rocky River Reservoir. It serves as a water supply for the Town of Siler City. The Charles L. Turner Reservoir encompasses 162 acres. The watershed is primarily agricultural with some pastureland immediately adjacent to the lake. DWR monitored this reservoir for the first time in 2013.

DWR field staff sampled this reservoir monthly from May through September 2023. Surface dissolved oxygen ranged from 4.9 mg/L to 11.5 mg/L (Appendix A). Surface water temperatures ranged from 23.4°C to 32.6 °C. Surface pH values in this reservoir ranged from 6.2 to 9.1 s.u. Secchi depths were less than a meter (range = 0.3 to 0.8 meter).

Total phosphorus concentrations ranged from below detection <0.03 to 0.13 mg/L and total Kjeldahl nitrogen ranged from 0.97 to 1.6 mg/L. Ammonia values ranged from below detection <0.05 to 0.25 mg/L and nitrite plus nitrate ranged from below detection <0.03 to 0.17 mg/L. Chlorophyll *a* values ranged from 20 to 75 μ g/L. Of the 20 chlorophyll *a* samples that were analyzed, 17 had values greater than the state water quality standard of 40 μ g/L. Based on the calculated NCTSI scores for 2023, Charles L. Turner was determined to exhibit exceptionally elevated biological productivity or hypereutrophic conditions. Turner Reservoir was previously determined to be hypereutrophic in 2013 and 2018 when it was previously sampled by DWR.

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Harris Lake



Harris Lake, constructed in 1983, provides cooling water for the Shearon Harris Nuclear Power Plant as well as public recreation. Harris Lake is located on Buckhorn Creek with other significant tributaries including White Oak Creek, Little White Oak Creek, Thomas Creek, and Tom Jack Creek. The lake is owned by Duke Energy.

Surface dissolved oxygen in Harris Lake ranged from 6.2 to 11.1 mg/L and surface pH ranged from 6.5 to 9.0 s.u (Appendix A). One surface pH reading in June was at the state water quality standard of 9.0 s.u. Secchi depths ranged from 0.3 to 1.1 meters. Total phosphorus ranged from 0.04 to 0.15 mg/L and total Kjeldahl nitrogen ranged from 0.78 to 1.40 mg/L. Ammonia concentrations were less than the DWR laboratory detection level of 0.05 mg/L and nitrite plus nitrate ranged from <0.03 to 0.04 mg/L. Chlorophyll *a* values ranged from 12.0 to 64.0 $\mu\text{g/L}$. All four sampling sites were at or exceeded the state water quality standard of 40 $\mu\text{g/L}$ for chlorophyll *a* in July (50% of all chlorophyll *a* measurements in 2023). Severe algal bloom magnitude was recorded on 6/1, 7/11, 8/01, 9/01, and 9/05. Algae were dominated by Cyanobacteria taxa including *Cylindrospermopsis*, *Chroococcus*, and *Psuedoanabaena*.

Based on the calculated NCTSI scores for the growing season of 2023, Harris Lake was determined to exhibit elevated biological productivity or eutrophic conditions.

Based on the 2023 and historical results, DWR's Basin Planning Branch requested that Harris Lake be again sampled in 2024 to determine if the lake should be listed as impaired.

Ambient Lakes Program Name	Harris Lake	
Season Average Trophic Status (NC TSI)	Eutrophic (4.7)	
Mean Depth (meters)	6.0	
Volume (10^6m^3)	10.1	
Watershed Area (m^2)	70	
Classification	WS-V	
Stations	CPF126A2	CPF126A4
Number of Times Sampled	5	5
Stations Cont'd	CPF126A6	CPFWOC1
Number of Times Sampled	5	5

Harris Lake Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	4.2	Eutrophic
June	4.7	Eutrophic
July	5	Eutrophic
August	4.3	Eutrophic
September	5.1	Eutrophic

Old Town Reservoir



Located near Southern Pines in the Sandhills, Old Town Reservoir is an impoundment of Mill Creek. Built in 1925, this one-time water supply (discontinued in 1985) is currently open for public recreation. Maximum lake depth is 23 feet (seven meters). The lake's watershed is relatively undeveloped with the exception of a golf course.

Surface dissolved oxygen ranged from 7.4 to 9.2 mg/L. The higher dissolved oxygen values in May coincided with lower water temperatures in the lake (Appendix A). Surface pH values for Old Town Reservoir ranged from 5.9 to 6.4 s.u. Secchi depths in 2018 ranged from 1.9 to 2.5 meters, indicating good water clarity. Concentrations of total phosphorus and ammonia were below DWR laboratory detection levels in 2023. Total Kjeldahl nitrogen ranged from 0.40 to 0.54 mg/L and nitrite plus nitrate ranged from <0.03 to 0.19 mg/L. Chlorophyll *a* values ranged from 0.9 to 15 $\mu\text{g/L}$.

Old Town Reservoir was determined to exhibit moderate to elevated biological productivity in May through September with an average NC TSI score of 0.0. While this score is technically considered mesotrophic, the average is bordering on eutrophic. In fact, for three of the five sampling events the score would be considered eutrophic. These results represent an increase in productivity from the 2018 results.

Ambient Lakes Program Name	Old Town Reservoir	
Season Average Trophic Status (NC TSI)	Mesotrophic (0.0)	
Mean Depth (meters)	1.5	
Volume (10^6m^3)	2.6	
Watershed Area (m^2)	29	
Classification	WS-II HQW NSW CA	
Stations	CPFUL4	CPFUL6
Number of Times Sampled	5	5

Old Town Reservoir Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	-0.5	Mesotrophic
June	0.2	Eutrophic
July	0.1	Eutrophic
August	0.2	Eutrophic
September	0.0	Mesotrophic

Carthage City Lake



Carthage City Lake is a small water supply lake for the City of Carthage in Moore County. The deepest part of the lake, approximately eight to ten feet (three meters), is located at the intake structure. The lake was impounded around 1950 and is spring fed. In dry weather conditions, water is pumped a distance of six miles from Nicks Creek to maintain an adequate water level. The watershed is moderately developed.

Water quality monitoring of this small reservoir was conducted monthly from May through September 2023. Surface dissolved oxygen ranged from 6.7 to 8.5 mg/L and surface pH ranged from 5.5 to 6.5 s.u. Due to the location of this lake in the Sandhills region of the state, the combination of mineral soils and pine trees contribute to pH values that can be lower than that of lakes in the Piedmont region. Secchi depths for Carthage City Lake ranged from 1.1 to 2.0 meters in 2023.

Total phosphorus, ammonia values and nitrite plus nitrate were below laboratory detection levels. Total Kjeldahl nitrogen ranged from = 0.40 to 0.68 mg/L. Chlorophyll *a* ranged from 3.1 $\mu\text{g/L}$ in May to 18.0 $\mu\text{g/L}$ in September. Carthage City Lake was determined to be eutrophic (exhibiting elevated biological productivity) based on the calculated NCTSI scores in 2023. The lowest productivity was observed in May and the highest productivity was observed in September.

<i>Ambient Lakes Program Name</i>	Carthage City Lake
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic (0.3)
<i>Mean Depth (meters)</i>	2.5
<i>Volume (10^6m^3)</i>	0.1
<i>Watershed Area (m^2)</i>	27
<i>Classification</i>	WS-III CA
<i>Stations</i>	CPF113R
<i>Number of Times Sampled</i>	5

<i>Carthage City Lake Monthly Snapshot</i>		
Sample Period	Monthly NC TSI Score	Trophic State
May	-1.1	Mesotrophic
June	0.5	Eutrophic
July	-0.7	Mesotrophic
August	1.3	Eutrophic
September	1.5	Eutrophic

Glenville Lake



Glenville Lake is a small, backup water supply reservoir for the City of Fayetteville. The lake is the last in a series of four impoundments of Little Cross Creek. The immediate shoreline is forested with residential development located along the western side of the lake just beyond the forest buffer (approximately 50 feet). This lake is not open to the public for recreational use.

Glenville was sampled monthly from May through September by DWR field staff. Surface dissolved oxygen in this reservoir ranged from 3.7 to 9.4 mg/L. The low dissolved oxygen observed in June may have been due in part to a recent upstream treatment. No fish mortality was observed in relation to this low dissolved oxygen. Surface percent oxygen saturation in August was 125% and was suggestive of elevated algal photosynthesis. Surface water temperature ranged from 23.9 °C to 30.2 °C (Appendix A). Surface pH values ranged from 5.7 to 6.3 s.u.

Total phosphorus ranged from <0.03 to 0.08 mg/L and total Kjeldahl nitrogen ranged from 0.47 to 1.00 mg/L. Ammonia and nitrite plus nitrate values were at or below laboratory detection limits. Chlorophyll *a* values ranged from 17.0 $\mu\text{g/L}$ in June to 35.0 $\mu\text{g/L}$ in May.

Based on the calculated NCTSI scores for 2023, Glenville Lake was determined to exhibit elevated biological productivity or eutrophic conditions. The highest productivity was observed in June.

Ambient Lakes Program Name	Glenville Lake
Season Average Trophic Status (NC TSI)	Eutrophic (2.0)
Mean Depth (meters)	2.5
Volume (10^6m^3)	0.2
Watershed Area (m^2)	10
Classification	WS-IV CA
Stations	CPF128B
Number of Times Sampled	5

Glenville Lake Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	1.0	Eutrophic
June	3.2	Eutrophic
July	1.6	Eutrophic
August	**	**
September	2.0	Eutrophic

**NCTSI score could not be calculated due to qualified chl-a data (J2) and was excluded from the annual average. J2 qualifier: The reported value failed to meet the established quality control criteria for either precision or accuracy

Hope Mills Lake



<i>Ambient Lakes Program Name</i>	Hope Mills Lake	
<i>Season Average Trophic Status (NC TSI)</i>	Eutrophic (1.6)	
<i>Mean Depth (meters)</i>	2.5	
<i>Volume (10⁶m³)</i>	0.1	
<i>Watershed Area (m²)</i>	26	
<i>Classification</i>	B	
<i>Stations</i>	CPF151	CPF151A
<i>Number of Times Sampled</i>	5	5

<i>Hope Mills Lake Monthly Snapshot</i>		
Sample Period	Monthly NC TSI Score	Trophic State
May	2.1	Eutrophic
June	1.8	Eutrophic
July	0.7	Eutrophic
August	2.3	Eutrophic
September	1.1	Eutrophic

This small, shallow reservoir is located on Little Rockfish Creek in the Town of Hope Mills. Once used for hydroelectric power and for a textile mill, the reservoir is now used for recreation. Six to eight inches of rain fell in the Rockfish Creek on May 25, 2003, resulting in the catastrophic failure of the earthen dam on May 26, 2003. The dam was restored in 2008. In 2023 Hope Mills Lake was added back into the ALMP sampling rotation for the first time in 20 years.

Hope Mills Lake was sampled monthly from May through September by DWR field staff. Surface dissolved oxygen in this reservoir ranged from 4.6 to 8.7 mg/L and surface water temperature ranged from 23.3 °C in May to 32°C in August (Appendix A). Surface percent oxygen saturation stayed below 103.1% for all five visits and did not indicate algal bloom conditions. However, chl-a levels ranged from 3.2 to 46 ug/L and did exceed the state water quality standard of 40 ug/L in June at site CPF151. Surface pH values ranged from 5.7 to 6.3 s.u., indicating relatively stable pH.

Total phosphorus ranged from <0.03 to 0.23 mg/L and total Kjeldahl nitrogen ranged from 0.42 to 0.83 mg/L. Ammonia was below detectable levels (<0.05 mg/L) in each sampling round and nitrite plus nitrate values ranged from 0.07 to 0.32 mg/L.

Based on the calculated NCTSI scores for 2023, Hope Mills Lake was determined to exhibit elevated biological productivity or eutrophic conditions.

HUC 03030005

Salters Lake



Salters Lake is a Carolina Bay Lake located within Jones Lake State Park. This natural lake is undeveloped, and public access is controlled by Jones Lake State Park. The water of the lake is naturally colored by tannins, giving the lake a characteristic tea-coloration typical in dystrophic lakes. DWR staff sampled Salters Lake monthly from May through September in 2023.

Surface dissolved oxygen in Salters Lake ranged from 7.0 mg/L in to 8.8 mg/L. Surface temperatures ranged from 22.3 in June to 32.7 in July (Appendix A). Surface pH values ranged from 3.9 to 4.2, which is typical for Carolina Bay Lakes. Secchi depths were consistently less than one meter in Salters Lake and were similar to those observed in previous sampling years (range of 0.45 to 0.7).

Total phosphorus concentrations were consistently below detection <0.03 mg/L except for one site (CPF153C) in May which was reported at 1.90 mg/L. Total Kjeldahl nitrogen ranged from <0.4 to 1.1 mg/L. Ammonia and nitrate plus nitrite were both below detection (0.05 and 0.03 mg/L, respectively). Chlorophyll *a* values ranged from 7.6 to 22 $\mu\text{g/L}$, which was well below the state water quality standard of 40 $\mu\text{g/L}$. The phytoplankton community of this lake was dominated by Chrysophytes and Greens.

An NCTSI score was not generated due to the dystrophic nature of this lake.

Ambient Lakes Program Name	Salters Lake	
Season Average Trophic Status (NC TSI)	Dystrophic **	
Mean Depth (meters)	1.5	
Volume (10^6m^3)	0.3	
Watershed Area (mi^2)	3	
Classification	C	
Stations	CPF153C	CPF153D
Number of Times Sampled	5	5
<p>**The NC TSI score could not be accurately calculated for this waterbody due to its dystrophic nature. Dystrophic waterbodies typically have low acidity and high tannin levels. The tannins in the water reduce Secchi disk readings, but this does not reflect the actual trophic status of the waterbody. As a result, NC TSI scores cannot be calculated accurately in this case.</p>		

Jones Lake



Jones Lake is a small, shallow, natural lake situated in the flat swampy terrain of Jones Lake State Park. Like other Carolina Bay Lakes, Jones receives almost no overland inputs of water, relying instead on precipitation and groundwater for recharge. Jones Lake is classified as dystrophic due to naturally occurring acidic water which has a dark coloration due to dissolved organic material (tannin-stained). A public park with a swimming area is located on the southeastern shoreline of this lake. DWR field staff sampled Jones Lake five times in 2023 from May through September.

Surface dissolved oxygen in Jones Lake ranged from 6.7 mg/L to 8.6 mg/L (Appendix A). Surface water temperatures were lowest in June (23.0 °C) and greatest in August (31.7 °C). Jones lake is typically acidic, and pH values ranged from 4.0 to 4.3 s.u. Secchi depths were greatest in September and lowest in June (range = 0.35 to 0.9 meters)

Total phosphorus remained below detection at <0.03 mg/L. Total Kjeldahl nitrogen ranged from 0.42 to 0.74 mg/L. Chlorophyll *a* values remained low, ranging from 5.3 to 16 µg/L.

In 2023 Jones Lake continued to meet its designated uses. Due to the dystrophic nature of this lake, the NCTSI score could not be accurately calculated.

Ambient Lakes Program Name	Jones Lake	
Season Average Trophic Status (NC TSI)	Dystrophic**	
Mean Depth (meters)	1.0	
Volume (10⁶m³)	0.1	
Watershed Area (m²)	2	
Classification	B	
Stations	CPF1552A	CPF1553A
Number of Times Sampled	5	5
<p>**The NC TSI score could not be accurately calculated for this waterbody due to its dystrophic nature. Dystrophic waterbodies typically have low acidity and high tannin levels. The tannins in the water reduce Secchi disk readings, but this does not reflect the actual trophic status of the waterbody. As a result, NC TSI scores cannot be calculated accurately in this case.</p>		

White Lake



White Lake is an unusual Carolina Bay Lake in that the water of this lake is clear rather than tea-colored. The clarity of the lake water is attributed to numerous springs at the bottom of the lake that bring water into the lake such that water input is not as dominated by shallow (near surface and organic) groundwater inflow as is the case with other Carolina Bay Lakes. As part of the Singletary Lake State Park, White Lake provides recreational opportunities such as swimming and boating. The shoreline of the lake is developed for residential and some commercial uses.

DWR field staff monitored White Lake monthly from May through September 2023. Surface dissolved oxygen ranged from 7.9 to 8.5 mg/L and surface pH ranged from 5.8 to 7.8 s.u. (Appendix A). Secchi depths ranged from 0.9 to 2.0 meters. In 2018, the Town of White Lake applied alum to the lake to reduce the total phosphorous levels. Total phosphorus concentrations remained at or below the detection limit of 0.03 mg/L. Total Kjeldahl nitrogen ranged from under the detection limit <0.04 to 0.85 mg/L. Ammonia and nitrate plus nitrite were both less than the DWR laboratory detection levels of 0.05 and 0.03 mg/L respectively. Chlorophyll *a* values ranged from 5.0 to 16.0 $\mu\text{g/L}$

Routine phytoplankton monitoring in White Lake showed densities of the total phytoplankton population consistently exceeded the bloom threshold of 10,000 units/mL used by the NCDWR to indicate elevated algal productivity. The greatest densities (66,100 units/mL) were observed in August. Algal populations were primarily dominated by greens except for a mild bloom of primarily cyanobacteria noted in July.

Ambient Lakes Program Name	White Lake	
Season Average Trophic Status (NC TSI)	Dystrophic	
Mean Depth (meters)	2.9	
Volume (10^6m^3)	9.5	
Watershed Area (m^2)		
Classification	B	
Stations	CPF155A	CPF155B
Number of Times Sampled	5	5
Stations Cont'd	CPF155C	--
Number of Times Sampled	5	--
<p>**The NC TSI score could not be accurately calculated for this waterbody due to its dystrophic nature. Dystrophic waterbodies typically have low acidity and high tannin levels. The tannins in the water reduce Secchi disk readings, but this does not reflect the actual trophic status of the waterbody. As a result, NC TSI scores cannot be calculated accurately in this case.</p>		

Greenfield Lake



Originally a cypress swamp, Greenfield Lake was impounded in 1750 to provide water for milling and irrigation of the Greenfields Plantation, which surrounded it. Greenfield Lake is now owned by the City of Wilmington, which encompasses the lake and its watershed. This lake is swampy and cypress-filled, with a maximum depth of 12 feet (four meters). The lake is the central feature of Greenfield Lake Park, also managed by the city.

DWR field staff sampled monthly from May through September 2023. Secchi depths ranged from 0.3 to 1.6 meters (Appendix A). Surface dissolved oxygen ranged from 5.1 to 13.7 mg/L. Surface water temperature in Greenfield Lake ranged from 25.3 °C to 31.4 °C and surface pH values ranged from 6.4 to 9.3 s.u.

Total phosphorus concentrations ranged from 0.03 to 0.42 mg/L and total Kjeldahl nitrogen ranged from 0.67 to 4.50 mg/L (Appendix A). The concentrations of ammonia ranged from below detection <0.05 to 0.13 mg/L and nitrite plus nitrate remained from below detection at <0.03 mg/L. Chlorophyll *a* values June through September ranged from 13 to 60 µg/L, however, May returned results of 120 and 510 µg/L.

Based on calculated NCTSI scores, Greenfield Lake demonstrated elevated biological productivity (eutrophic conditions) in June through September. In May, biological productivity was exceptionally elevated (hypereutrophic conditions). Overall, the trophic status for Greenfield Lake in 2023 was eutrophic.

Ambient Lakes Program Name	Greenfield Lake	
Season Average Trophic Status (NC TSI)	Eutrophic (4.0)	
Mean Depth (meters)	1.5	
Volume (10⁶m³)	0.1	
Watershed Area (mi²)	3	
Classification	C SW	
Stations	CPF211B	CPF211C
Number of Times Sampled	5	5

Greenfield Lake Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	9.4*	Hypereutrophic
June	4.7	Eutrophic
July	2.2	Eutrophic
August	2.1	Eutrophic
September	1.8	Eutrophic

*The value for Chlorophyll *a* was qualified by the DWR lab (code P) stating that sample dilution occurred due to either matrix interference or target analytes being present at concentrations greater than the calibration curve. Reported target analyte values are obtained from results which were bracketed by the calibration curve.

Sutton Lake



Sutton Lake is a 1099-acre cooling reservoir constructed in 1972 to provide condenser cooling water to the coal-fired Sutton Steam Electric Plant. The lake consists of a 3.8 km central main dike that bisects the lake and six wing dikes that maximize water circulation and increase the power plant cooling efficiency. This lake is open to the public for recreational fishing. An NC Wildlife Boat ramp is located off of US 421 on Sutton Lake Road. Aquatic vegetation growth in Sutton Lake is controlled by introduced triploid grass carp.

DWR field staff sampled Sutton Lake May through September 2023. Secchi depths were greater than a meter, ranging from 1.9 to 3.1 meters (Appendix A). Surface dissolved oxygen ranged from 7.0 to 13.7 mg/L and surface water temperatures ranged from 26.3 °C to 34.7 °C (Appendix A). Surface pH values in Sutton Lake ranged from 6.4 to 7.3 s.u.

Total phosphorus concentrations in Sutton Lake remained at or below the detection limit of 0.03 mg/L and total Kjeldahl nitrogen ranged from 0.52 to 0.70 mg/L (Appendix A). Ammonia concentrations remained below the detection limit <0.05 mg/L. Nitrite plus nitrate ranged from below detection <0.03 to 0.04 mg/L. Chlorophyll *a* values were low, ranging from 2.3 to 9.15.6 $\mu\text{g/L}$.

Based on the calculated NCTSI scores, Sutton Lake showed low productivity. Overall, the trophic state of this lake was determined to be mesotrophic.

Ambient Lakes Program Name	Sutton Lake	
Season Average Trophic Status (NC TSI)	Mesotrophic (-0.8)	
Mean Depth (meters)	1.9	
Volume (10^6m^3)	8.6	
Watershed Area (m^2)	1099	
Classification	C SW	
Stations	CPFSL1	CPFSL2
Number of Times Sampled	5	5

Sutton Lake Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	-0.7	Mesotrophic
June	-0.7	Mesotrophic
July	-0.7	Mesotrophic
August	**	**
September	-1.0	Mesotrophic

**NCTSI score could not be calculated due to qualified chl-a data (J2) and was excluded from the annual average. J2 qualifier: The reported value failed to meet the established quality control criteria for either precision or accuracy

HUC 03030006

Bay Tree Lake



Bay Tree Lake (also called Black Lake) is a shallow, natural lake located near Elizabethtown, North Carolina. Typical of Carolina Bay Lakes, Bay Tree Lake receives no significant overland inflows. The surrounding land is flat and composed of wetlands, upland forests and a network of drainage canals built on its northern and eastern shores. A private gated residential community is located along the northern and northeastern shoreline of the lake and access to the lake is not open to the general public.

Bay Tree Lake was sampled monthly from May through September 2023 by DWR field staff. Secchi depths ranged from 0.5 to 1.5 meters (Appendix A). Surface dissolved oxygen ranged from 7.2 to 8.3 mg/L and surface pH ranged from 4.3 to 4.6 s.u. The low pH values of this lake are due to natural conditions and are a characteristic of Carolina Bay Lakes.

Total phosphorus ranged from below detection <0.03 to 0.04 mg/L. Ammonia for Bay Tree Lake remained below detection <0.05 mg/L. Total Kjeldahl nitrogen ranged from below detection <0.04 to 0.50 mg/L (Appendix A). Nitrite plus nitrate values in this lake ranged from below detection <0.03 to 0.50 mg/L. Chlorophyll *a* ranged from 3.4 to 12.0 $\mu\text{g/L}$.

Based on data collected in 2023, Bay Tree Lake appears to be meeting its designated uses. This lake is dystrophic and the NCTSI scores could not be accurately calculated due to the naturally dark, tannic waters.

Ambient Lakes Program Name	Bay Tree Lake	
Season Average Trophic Status (NC TSI)	Dystrophic**	
Mean Depth (meters)	1.0	
Volume (10^6 m^3)	0.6	
Watershed Area (mi^2)	4	
Classification	C SW	
Stations	CPF155G	CPF155I
Number of Times Sampled	5	5
<p>**The NC TSI score could not be accurately calculated for this waterbody due to its dystrophic nature. Dystrophic waterbodies typically have low acidity and high tannin levels. The tannins in the water reduce Secchi disk readings, but this does not reflect the actual trophic status of the waterbody. As a result, NC TSI scores cannot be calculated accurately in this case.</p>		

Singletary Lake



Singletary Lake is a large Carolina Bay Lake located within Singletary Lake Group Camp State Park and is used for public swimming, boating and fishing. This lake is a naturally acidic and dark colored shallow lake common within the southeastern part of North Carolina. The surrounding terrain is flat and swampy with almost no overland water inputs.

DWR field staff monitored Singletary Lake monthly from May through September 2023. Surface pH was low, ranging from 4.0 to 4.6 s.u., which is typical for this lake (Appendix A). Surface water temperatures ranged from 25.9 °C in May to 34.4 °C in July and surface dissolved oxygen ranged from 7.3 to 8.2 mg/L. Secchi depths were less than a meter (range = 0.4 to 0.9 meters). Staff field observations described the lake water as appearing tannic (i.e., brown or tea-colored).

Total phosphorus concentrations ranged from below detection <0.03 to 0.12 mg/L and total Kjeldahl nitrogen ranged from 0.47 to 0.91 mg/L. Ammonia nitrogen in Singletary Lake remained below detection <0.05 mg/L and nitrite plus nitrate ranged from below detection <0.03 to 0.08 mg/L. Chlorophyll *a* values in Singletary Lake ranged from 11.0 to 29.0 $\mu\text{g/L}$. One value in June was received at 42 $\mu\text{g/L}$ but was qualified by the DWR lab. Based on data collected in 2023, Singletary Lake appears to be meeting its designated uses. This lake is dystrophic and the NCTSI scores could not be accurately calculated due to the naturally dark, tannic waters.

Ambient Lakes Program Name	Singletary Lake	
Season Average Trophic Status (NC TSI)	Dystrophic**	
Mean Depth (meters)	1.5	
Volume (10^6m^3)	0.4	
Watershed Area (m^2)	1	
Classification	B SW	
Stations	CPF176D	CPF176E
Number of Times Sampled	5	5
Stations Cont'd	CPF176F	--
Number of Times Sampled	5	--
<p>**The NC TSI score could not be accurately calculated for this waterbody due to its dystrophic nature. Dystrophic waterbodies typically have low acidity and high tannin levels. The tannins in the water reduce Secchi disk readings, but this does not reflect the actual trophic status of the waterbody. As a result, NC TSI scores cannot be calculated accurately in this case.</p>		

HUC 03030007

Cabin Lake



Cabin Lake is a part of the Cabin Lake Recreational Park, which is owned by Duplin County. Land use within the watershed consists of farmlands forests and animal operations. Swimming and boating with electric motors are permitted at this lake.

Cabin Lake was monitored from May through September 2023. Surface dissolved oxygen ranged from 7.6 to 9.9 mg/L and surface water temperature ranged from 22.6 °C to 34.7 °C (Appendix A). Surface pH ranged from 5.3 to 7.2 s.u. Secchi depths were between 0.4 and 1.0 meter.

Total phosphorus in Cabin Lake ranged from 0.04 to 0.10 mg/L and total Kjeldahl nitrogen ranged from 0.52 to 1.60 mg/L. The concentration of ammonia remained below detection <0.05 mg/L and nitrite plus nitrate ranged from below detection <0.03 to 0.04 mg/L. In response to the availability of nutrients in Cabin Lake, chlorophyll *a*, an indicator of algal productivity, ranged from 21 to 180 $\mu\text{g/L}$. The highest chlorophyll *a* concentrations occurred during the September sampling period where an extreme magnitude algal bloom of primarily Chrysophytes was noted.

Based on calculated NCTSI scores for 2023, Cabin Lake was determined to have elevated biological productivity (eutrophic conditions) in May through August and exceptionally elevated biological productivity (hypereutrophic conditions) in September. Overall, the trophic status of Cabin Lake was found to be eutrophic.

Ambient Lakes Program Name	Cabin Lake	
Season Average Trophic Status (NC TSI)	Eutrophic (4.7)	
Mean Depth (meters)	4.0	
Volume (10^6m^3)		
Watershed Area (m^2)	2	
Classification	B SW	
Stations	CPFCL2	CPFCL4
Number of Times Sampled	5	5

Cabin Lake Monthly Snapshot		
Sample Period	Monthly NC TSI Score	Trophic State
May	3.4	Eutrophic
June	4.5	Eutrophic
July	3.3	Eutrophic
August	**	**
September	7.5	Hypereutrophic

**NCTSI score could not be calculated due to qualified chl-a data (J2) and was excluded from the annual average. J2 qualifier: The reported value failed to meet the established quality control criteria for either precision or accuracy.

Appendix A - Cape Fear River Basin Data

Appendix A – Cape Fear River Basin Data

January 1, 2023 Through December 31, 2023

Lake	SURFACE PHYSICAL DATA								PHOTIC ZONE DATA							Solids Total mg/L	Total Solids Suspended mg/L	Turbidity NTU	Total Hardness mg/L
	Date	Sampling Station	DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent DO SAT	TP mg/L	TKN mg/L	NH3 mg/L	NOx mg/L	Chla 2.0						
HUC 0303002																			
REIDSVILLE LAKE	September 6, 2023	CPF0025A	8.1	29.8	7.4	74	0.9	108.8%	0.03U	0.53	0.05U	0.03U	16.0	66	4.2	4.1			
	September 6, 2023	CPF002A1	7.8	29.5	6.8	79	1.1	104.0%	0.03U	0.55	0.05U	0.03U	16.0	63	3.0	3.0	25.0		
	August 21, 2023	CPF0025A	7.7	27.3	6.9	0	0.8	99.2%	0.03U	0.56	0.05U	0.03U	17.0	71	4.2	5.0			
	August 21, 2023	CPF002A1	8.2	24.4	5.9	3	1.1	99.3%	0.03U	0.52	0.05U	0.03U	14.0	70	2.8	2.7	25.0		
	July 24, 2023	CPF0025A	7.7	27.4	6.7	78	0.9	99.0%	0.03U	0.44	0.05U	0.03U	21.0	70	4.4	4.8			
	July 24, 2023	CPF002A1	6.7	28.6	6.9	75	0.9	88.5%	0.03U	0.46	0.05U	0.03U	14.0	71	3.1	3.0	24.0		
	June 27, 2023	CPF0025A	8.3	28.2	7.5	72	0.7	109.6%	0.03U	0.61	0.05U	0.03U	36.0	66	5.8	5.8			
	June 27, 2023	CPF002A1	7.3	28.4	6.8	70	0.7	96.9%	0.03U	0.50	0.05U	0.03U	18.0	66	4.5	4.2	23.0		
	May 16, 2023	CPF0025A	8.7	23.8	7.5	69	1.0	105.1%	0.03U	0.45	0.05U	0.03U	14.0	63	4.2	4.3			
	May 16, 2023	CPF002A1	9.4	23.2	7.8	70	1.3	112.7%	0.03U	0.51	0.05U	0.03U	25.0	59	5 UY	3.3	18.0		
LAKE HUNT	September 6, 2023	CPF0021A	8.8	25.5	6.7	72	1.2	109.8%	0.03U	0.57	0.05U	0.03U	17.0	61	2.8	3.1			
	September 6, 2023	CPF0022A	8.4	24.9	7.5	78	1.6	106.4%	0.03U	0.53	0.05U	0.03U	13.0	59	2.5	2.1			
	September 6, 2023	CPF0023A	7.7	28.9	6.9	65	1.5	102.9%	0.03U	0.47	0.05U	0.03U	12.0	56	2.5 UY	2.0	14.0		
	August 21, 2023	CPF0021A	8 J4	25.8 J4	6.8 J4	0 J4	0.9	100.2% J4	0.03U	0.63	0.05U	0.03U	15.0	66	3.7	3.9			
	August 21, 2023	CPF0022A	8.4	23.9	6.8	21	1.0	101.8%	0.03U	0.60	0.05U	0.03U	11.0	68	2.6	3.0			
	August 21, 2023	CPF0023A	7.5 J4	29.5 J4	5.9 J4	0 J4	1.2	99.7%	0.03U	0.58	0.05U	0.03U	9.7	65	2.7	3.0	36.0		
	July 24, 2023	CPF0021A	7.8	30.1	7.7	68	0.8	106.0%	0.03U	0.59	0.05U	0.03U	19.0	66	4.9	4.0			
	July 24, 2023	CPF0022A	8.4	29.2	7.9	69	1.0	111.4%	0.03U	0.59	0.05U	0.03U	18.0	65	4.5	3.8			
	July 24, 2023	CPF0023A	8.7	28.4	8.3	70	1.0	114.2%	0.03U	0.72	0.05U	0.03U	18.0	65	4.2	4.2	16.0		
	June 27, 2023	CPF0021A	8.9	26.4	7.6	67	0.8	113.7%	0.03U	0.55	0.05U	0.03U	19.0	62	5.4	4.8			
	June 27, 2023	CPF0022A	8.5	26.4	7.8	67	0.8	109.1%	0.03U	0.59	0.05U	0.03U	14.0	58	5.0	4.0			
	June 27, 2023	CPF0023A	9.0	25.2	7.5	68	0.8	112.8%	0.03U	0.57	0.05U	0.03U	13.0	59	4.3	3.6			
	May 16, 2023	CPF0021A	8.4	24.6	7.5	64	1.4	102.8%	0.03U	0.69	0.05U	0.03U	13.0	56	5 UY	2.5			
	May 16, 2023	CPF0022A	8.9	23.8	7.2	64	1.5	108.0%	0.03U	0.56	0.05U	0.03U	12.0	58	3.5	2.2			
	May 16, 2023	CPF0023A	8.9	23.6	7.2	65	1.7	108.0%	0.03U	0.59	0.05U	0.03U	14.0	61	2.9	2.2	17.0		
LAKE HIGGINS	September 7, 2023	CPFLH2	9.1	30.9	6.3	92	0.9	126.5%	0.04	0.72	0.05U	0.03U	39.0	75	5.6	6.5			
	September 7, 2023	CPFLH4	9.5	30.3	6.6	92	1.1	130.9%	0.03U	0.75	0.05U	0.03U	35.0	74	4.6	4.5	29.0		
	August 17, 2023	CPFLH2	9.3	29.9	8.3	88	0.7	126.7%	0.03U	0.80	0.05U	0.03U	43.0	81	4.9	8.9			
	August 17, 2023	CPFLH4	9.5	30.4	7.1	86	0.7	129.4%	0.03U	0.74	0.05U	0.03U	32.0	75	3.8	5.1	24.0		
	July 13, 2023	CPFLH2	9.2	30.4	7.9	90	0.6	126.6%	0.03	0.70	0.05U	0.03U	26.0	79	8.6	9.2			
	July 13, 2023	CPFLH4	8.9	30.4	8.9	88	1.0	122.5%	0.03U	0.72	0.05U	0.03U	22.0	71	4.7	4.8	26.0		
	June 8, 2023	CPFLH2	9.5	23.9	8.0	80	1.0	116.1%	0.03U	0.71	0.05U	0.03U	24.0	70	6.3	3.5			
	June 8, 2023	CPFLH4	9.8	23.7	8.5	79	1.3	120.1%	0.03U	0.55	0.05U	0.03U	23.0	63	3.8	2.8	22.0		
	May 11, 2023	CPFLH2	10.5	24.1	8.3	77	0.7	127.6%	0.04	0.59	0.05U	0.03U	26.0	64	10.0	8.0			
	May 11, 2023	CPFLH4	10.4	23.1	8.6	76	1.1	123.9%	0.03U	0.58	0.05U	0.03U	18.0	59	5.9	3.8	22.0		
LAKE BRANDT	September 14, 2023	CPF007A1A	6.3	26.8	6.7	106	0.8	80.7%	0.03U	0.68	0.05U	0.03U	36.0	88	7.2	7.8			
	September 14, 2023	CPF007A4	7.0	26.7	6.8	101	0.6	89.0%	0.03U	0.76	0.05U	0.03U	36.0	85	6.4	8.6			
	September 14, 2023	CPF007B	7.1	26.8	6.2	100	0.6	90.6%	0.05	0.72	0.05U	0.03U	51.0	83	5.4	8.3	32.0		
	August 17, 2023	CPF007A1A	8.4	30.6	8.0	102	0.8	115.2%	0.03U	0.59	0.05U	0.03U	25.0	81	5.8	5.0			
	August 17, 2023	CPF007A4	8.7	30.3	8.3	103	0.9	118.8%	0.04	0.63	0.05U	0.03U	35.0	84	6.3	6.1			
	August 17, 2023	CPF007B	8.3	30.2	8.1	103	1.0	113.4%	0.04	0.62	0.05U	0.03U	30.0	82	5.9	5.9	31.0		
	July 13, 2023	CPF007A1A	10.2	30.4	8.9	101	1.0	139.9%	0.03U	0.66	0.05U	0.03U	24.0	71	3.7	5.3			
	July 13, 2023	CPF007A4	9.5	29.8	8.9	99	0.8	128.2%	0.05	0.70	0.05U	0.03U	41.0	78	5.8	7.1			
	July 13, 2023	CPF007B	9.9	30.2	9.1	100	1.1	135.1%	0.03U	0.67	0.05U	0.03U	24.0	72	3.7	5.0	30.0		
	June 8, 2023	CPF007A1A	9.5	23.2	8.5	42	1.3	114.7%	0.03	0.57	0.05U	0.03U	21.0	67	5.1	4.3			
	June 8, 2023	CPF007A4	9.5	23.9	8.3	90	1.0	116.0%	0.04	0.54	0.05U	0.03U	18.0	70	5.7	4.4			
	June 8, 2023	CPF007B	9.5	23.6	8.4	89	1.3	115.9%	0.03U	0.54	0.05U	0.03U	20.0	69	4.8	3.5	30.0		
	May 11, 2023	CPF007A1A	10.4	23.6	8.7	83	0.8	124.8%	0.03U	0.57	0.05U	0.03U	15.0	66	6.6	5.5			
	May 11, 2023	CPF007A4	9.8	24.0	8.5	86	0.8	118.7%	0.04	0.60	0.05U	0.03U	16.0	66	7.0	5.8			
	May 11, 2023	CPF007B	10.3	23.0	8.7	83	1.0	121.9%	0.03	0.62	0.05U	0.03U	17.0	64	6.3	5.0	26.0		
LAKE TOWNSEND	September 14, 2023	CPFLT4	7.6	26.1	6.8	51	0.7	95.5%	0.03U	0.65	0.05U	0.03U	29.0	87	7.8	10.0			
	September 14, 2023	CPFLT6	6.6	26.9	6.7	96	0.8	83.9%	0.04	0.59	0.05U	0.03U	30.0	82	5.4	7.4			
	September 14, 2023	CPFLT8	5.5	26.6	6.3	94	1.4	70.2%	0.03U	0.50	0.05U	0.03U	23.0	75	2.9	2.7	27.0		
	August 17, 2023	CPFLT4	6.9	28.8	7.3	101	0.7	91.3%	0.05	0.74	0.05U	0.03U	41.0	87	10.0	11.0			
	August 17, 2023	CPFLT6	8.3	29.3	8.4	95	1.4	110.8%	0.03U	0.58	0.05U	0.03U	30.0	80	4.1	4.8			
	August 17, 2023	CPFLT8	8.3	28.8	8.5	94	2.0	110.7%	0.03U	0.42	0.05U	0.03U	15.0	69	2.5 UY	2.4	28.0		
	July 13, 2023	CPFLT4	8.5	29.6	8.1	96	0.8	114.8%	0.04	0.67	0.05U	0.03U	43.0	81	7.8	8.8			
	July 13, 2023	CPFLT6	9.2	29.2	8.8	96	0.9	122.6%	0.03U	0.60	0.05U	0.03U	28.0	70	4.0	4.8			
	July 13, 2023	CPFLT8	9.0	29.4	8.8	94	1.6	121.0%	0.03U	0.41	0.05U	0.03U	12.0	65	2.6	2.3	28.0		
	June 8, 2023	CPFLT4	7.7	22.9	7.3	89	0.7	91.8%	0.03U	0.60	0.05U	0.03U	28.0	76	9.8	4.2			
	June 8, 2023	CPFLT6	8.9	22.9	7.7	88	1.3	106.8%	0.03U	0.55	0.05U	0.03U	16.0	69	3.8	3.2			
	June 8, 2023	CPFLT8	9.1	23.0	8.0	87	1.8	109.7%	0.03U	0.49	0.05U	0.03U	12.0	68	2.5 UY	2.0	25.0		
	May 11, 2023	CPFLT4	8.7 J4	23.1 J4	7.1 J4	1 J4	0.8	103.4% J4	0.03U	0.53	0.05U	0.03U	13.0	63	7.0	5.4			
	May 11, 2023	CPFLT6	9.4	22.2	7.8	87	1.2	109.7%	0.03U	0.53	0.05U	0.03U	12.0	67	4.7	3.7			
	May 11, 2023	CPFLT8	9.3	21.2	8.1	78	1.5	106.0%	0.03U	0.46	0.05U	0.03U	10.0	59	3.6 UY	2.5	24.0		

Appendix A - Cape Fear River Basin Data

Lake	SURFACE PHYSICAL DATA										PHOTIC ZONE DATA						
	Date	Sampling Station	DO mg/L	Temp water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent DO Sat	IP mg/L	IKN mg/L	NH3 mg/L	NOx mg/L	Chla µg	Solids total mg/L	Total Solids Suspended mg/L	Turbidity NTU	Total Hardness mg/L
LAKE BURLINGTON (STONY CREEK RESERVOIR)	September 6, 2023	CPFSCR2	9.6	30	8.3	93	0.5	128.9%	0.04	0.87	0.05 U	0.03 U	38	88	9.1	10	
	September 6, 2023	CPFSCR4	9.8	30.4	8.3	94	0.5	132.5%	0.04	0.87	0.05 U	0.03 U	35	91	9.9	9.9	33.0
	August 23, 2023	CPFSCR2	8.9	28.5	8.2	90	0.6	116.4%	0.05	0.89	0.05 U	0.03 U	30 J2	90	10	8.5	
	August 23, 2023	CPFSCR4	9.1	29	8.5	90	0.8	120.3%	0.04	0.79	0.05 U	0.03 U	42 J2	86	6	4.9	31.0
	July 20, 2023	CPFSCR2	8.3	31.3	7.9	91	0.6	114.2%	0.03 U	0.92	0.05 U	0.03 U	26	88	8	8.6	
	July 20, 2023	CPFSCR4	8.3	31	7.9	87	0.8	113.5%	0.05	0.77	0.05 U	0.03 U	29	83	6.9	7.2	30.0
	June 14, 2023	CPFSCR2	8.7	29	7.4	111	0.8	108.1%	0.03 U	0.74	0.05 U	0.03 U	24	100	9.1	7.5	
	June 14, 2023	CPFSCR4	8.9	24.9	7.5	110	0.9	110.7%	0.04	0.6	0.05 U	0.03 U	18	92	4.4	3.6	41.0
	May 23, 2023	CPFSCR2	8.8	23.1	6.6	98	0.75	103.4%	0.05	0.71	0.05 U	0.03 U	30	82	9.4	7.3	
	May 23, 2023	CPFSCR4	8.9	23.6	6.9	100	1.1	105.6%	0.03	0.61	0.05 U	0.03 U	14.0	75	4.5	3.9	34.0
LAKE CAMMACK (BURLINGTON RESERVOIR)	September 6, 2023	CPF0251A	9.4	29.1	8.7	89	0.8	124.3%	0.03 U	0.82	0.05 U	0.03 U	28.0	81	3.8	3.9	
	September 6, 2023	CPF025A	9.4	29.5	8.8	89	0.8	125.1%	0.03 U	0.78	0.05 U	0.03 U	29.0	80	4.2	3.9	32.0
	August 23, 2023	CPF0251A	8.2	28.6	8.6	83	0.7	106.8%	0.03 U	0.85	0.05 U	0.03 U	34 J2	81	4.2	4.6	
	August 23, 2023	CPF025A	8.7	29.5	8.8	84	0.6	115.6%	0.03 U	0.89	0.05 U	0.03 U	33 J2	80	3.6	4.5	29.0
	July 20, 2023	CPF0251A	9.2	30.2	8.6	90	0.6	123.8%	0.03 U	0.92	0.05 U	0.03 U	27.0	84	4.0	4.0	
	July 20, 2023	CPF025A	9.3	30.3	8.3	89	0.6	125.7%	0.03 U	0.93	0.05 U	0.03 U	29.0	75	4.0	3.8	29.0
	June 14, 2023	CPF0251A	8.6	24.8	7.5	93	1.0	106.2%	0.03 U	0.69	0.05 U	0.03 U	12.0	79	3.6	2.6	
	June 14, 2023	CPF025A	8.2	24.0	7.5	92	0.3	100.8%	0.03 U	0.60	0.05 U	0.03 U	12.0	80	3.6	2.5	35.0
	May 23, 2023	CPF0251A	8.7	23.0	6.7	88	1.0	103.0%	0.03 U	0.64	0.05 U	0.03 U	16.0	68	4.6	3.0	
	May 23, 2023	CPF025A	8.8	23.4	6.5	88	0.3	104.5%	0.03 U	0.62	0.05 U	0.03 U	14.0	70	4.6	2.8	30.0
GRAHAM-MEBANE RESERVOIR	September 11, 2023	CPFGMR1	5.7	26.9	7.2	83	0.7	72.3%	0.03 U	0.75	0.05 U	0.03 U	36.0	76	4.9	4.9	
	September 11, 2023	CPFGMR2	6.7	27.6	7.4	87	0.4	86.5%	0.03	1.30	0.05 U	0.03 U	66.0	94	14.0	17.0	
	September 11, 2023	CPFGMR3	7.1	27.6	7.6	85	0.6	91.5%	0.05	0.85	0.05 U	0.03 U	59.0	83	8.8	7.2	
	September 11, 2023	CPFGMR4	6.3	27.0	7.4	82	0.7	79.8%	0.03 U	0.78	0.05 U	0.03 U	29.0	73	5.0	4.4	
	September 11, 2023	CPFGMROA	6.3	27.7	7.2	83	0.3	81.2%	0.08	1.20	0.05 U	0.03 U	65.0	98	19.0	19.0	27.0
	August 17, 2023	CPFGMR1	7.8	29.5	8.0	79	1.0	104.5%	0.03	0.72	0.05 U	0.03 U	20.0	74	4.1	4.3	
	August 17, 2023	CPFGMR2	7.8	29.6	8.3	89	0.4	108.5%	0.04	1.10	0.05 U	0.03 U	47.0	93	9.0	14.0	
	August 17, 2023	CPFGMR3	7.4	29.4	7.9	82	0.8	98.6%	0.04	0.93	0.05 U	0.03 U	45.0	76	7.6	6.2	
	August 17, 2023	CPFGMR4	7.7	29.3	8.0	79	1.2	103.0%	0.03 U	0.76	0.05 U	0.03 U	17.0	72	3.9	3.3	
	August 17, 2023	CPFGMROA	5.2	29.3	7.1	83	0.4	69.7%	0.06	1.20	0.05 U	0.03 U	58.0	95	15.0	16.0	27.0
	July 19, 2023	CPFGMR1	7.8	29.7	7.0	79	1.0	104.1%	0.03 U	0.66	0.05 U	0.03 U	22.0	72	4.9	4.0	
	July 19, 2023	CPFGMR2	9.6	29.9	8.0	86	0.5	128.8%	0.03	1.40	0.05 U	0.03 U	54.0	83	8.7	9.9	
	July 19, 2023	CPFGMR3	8.1	30.2	7.7	81	0.7	108.8%	0.06	0.92	0.05 U	0.03 U	68.0	77	6.8	5.8	
	July 19, 2023	CPFGMR4	7.5	29.6	7.8	79	1.0	100.5%	X2	X2	X2	X2	16.0	74	4.1	4.3	
	July 19, 2023	CPFGMROA	7.1	30.2	7.0	44	0.5	96.0%	0.08	1.00	0.05 U	0.03 U	43.0	88	16.0	15.0	27.0
	June 26, 2023	CPFGMR1	8.9	26.4	6.7	85	0.9	113.4%	0.03 U	0.65	0.05 U	0.03 U	17.0	72	5.6	5.7	
	June 26, 2023	CPFGMR2	8.5	26.6	6.5	88	0.5	108.0%	0.08	1.00	0.05 U	0.03 U	45.0	84	12.0	14.0	
	June 26, 2023	CPFGMR3	9.3	26.8	6.0	88	0.8	119.1%	0.03 U	0.77	0.05 U	0.03 U	26.0	75	7.4	7.6	
	June 26, 2023	CPFGMR4	8.7	26.0	6.1	86	0.9	109.6%	0.03 U	0.60	0.05 U	0.03 U	16.0	69	4.5	5.0	
	June 26, 2023	CPFGMROA	8.5	27.1	6.9	83	0.4	109.6%	0.05	0.95	0.05 U	0.03 U	47.0	89	19.0	20.0	28.0
May 11, 2023	CPFGMR1	8.8	23.1	7.1	80	1.0	104.0%	0.03 U	0.57	0.05 U	0.03 U	6.0	80	3.6	3.7		
May 11, 2023	CPFGMR2	9.0	23.6	6.8	90	0.7	107.3%	0.05	0.74	0.05 U	0.03 U	22.0	91	9.4	7.2		
May 11, 2023	CPFGMR3	9.4	23.0	6.8	82	1.0	110.8%	0.03	0.60	0.05 U	0.03 U	13.0	80	5.5	4.0		
May 11, 2023	CPFGMR4	8.9	23.0	6.9	80	1.0	104.8%	0.03	1.00	0.05 U	0.03 U	6.4	79	4.8	3.7		
May 11, 2023	CPFGMROA	7.1	21.7	7.1	102	0.5	81.1%	0.07	0.89	0.05 U	0.03 U	28.0	93	13.0	10.0	24.0	
LAKE MACKINTOSH	September 7, 2023	CPF038F	8.8	30.2	6.5	123	1.1	118.9%	0.03 U	0.63	0.05 U	0.03 U	21.0	91	4.0	4.0	
	September 7, 2023	CPF038G	8.7	30.0	6.3	122	1.2	117.2%	0.03 U	0.66	0.05 U	0.03 U	22.0	90	3.0	3.0	
	September 7, 2023	CPF038H	7.9	31.3	6.1	121	1.4	109.6%	0.03 U	0.51	0.05 U	0.03 U	22.0	88	2.5 UY	1.9	
	September 7, 2023	CPF038J	8.0	29.8	6.2	114	1.7	108.3%	0.03 U	0.44	0.05 U	0.03 U	12.0	81	2.5 UY	3.4	
	September 7, 2023	CPF038L	8.4	29.7	6.8	113	2.1	113.0%	0.03 U	0.47	0.05 U	0.03 U	13.0	75	2.5 UY	1.7	
	September 7, 2023	CPF038N	8.2	29.6	6.5	113	2.1	110.1%	0.03 U	0.52	0.05 U	0.03 U	10.0	78	2.5 UY	1.6	33.0
	August 10, 2023	CPF038F	7.9 J4	28.4 J4	7.8 J4	0 J4	0.9	103.6 J4	0.03	0.74	0.05 U	0.03 U	30 J2	89	4.6	3.7	
	August 10, 2023	CPF038G	7.8	28.3	7.7	113	1.2	102.6%	0.03 U	0.75	0.05 U	0.03 U	26.2	89	4.0	3.4	
	August 10, 2023	CPF038H	7.9	28.0	7.6	114	1.3	104.0%	0.03 U	0.70	0.05 U	0.03 U	18.2	90	2.7	3.0	
	August 10, 2023	CPF038J	7.6	27.9	7.7	109	2.1	99.1%	0.03 U	0.61	0.05 U	0.03 U	22.2	86	2.5 UY	1.8	
	August 10, 2023	CPF038L	8.1	27.8	8.2	109	2.3	105.5%	0.03 U	0.60	0.05 U	0.03 U	11.2	83	2.5 UY	1.7	
	August 10, 2023	CPF038N	7.3	27.8	7.9	109	2.3	95.4%	0.03 U	0.61	0.05 U	0.03 U	7.5 J2	84	2.5 UY	1.7	34.0
	July 19, 2023	CPF038F	9.1	27.9	8.0	104	0.8	117.9%	0.03	0.82	0.05 U	0.03 U	45.0	91	4.6	4.2	
	July 19, 2023	CPF038G	9.3	28.2	7.9	116	1.0	121.7%	0.03 U	0.73	0.05 U	0.03 U	25.0	84	3.9	3.3	
	July 19, 2023	CPF038H	9.1	28.3	8.2	119	1.1	118.0%	0.03 U	0.73	0.05 U	0.03 U	13.0	84	3.4	3.2	
	July 19, 2023	CPF038J	8.6	27.8	7.6	114	1.3	111.2%	0.03 U	0.58	0.05 U	0.03 U	9.1	79	2.6	2.2	
	July 19, 2023	CPF038L	8.7	28.8	8.5	111	1.2	113.9%	0.03 U	0.57	0.05 U	0.03 U	9.8	79	2.6	2.2	
	July 19, 2023	CPF038N	8.5	28.2	7.9	113	1.4	110.8%	0.03 U	0.66	0.05 U	0.03 U	8.8	84	2.5 UY	2.4	36.0
	June 15, 2023	CPF038F	10.4	25.5	8.7	129	0.8	129.6%	0.06 J6	0.67	0.05 U J6	0.03 U J6	27.0	97	7.1	5.5	
	June 15, 2023	CPF038G	9.8	25.0	8.6	120	0.9	121.2%	0.03	0.54	0.05 U	0.03 U	18.0	89	5.9	4.1	
June 15, 2023	CPF038H	9.3	24.1	8.2	124	0.9	113.0%	0.03	0.60	0.05 U	0.03 U	18.0	90	5.3	4.6		
June 15, 2023	CPF038J	9.0	24.5	7.4	114	1.3	110.0%	0.03 U	0.66	0.05 U	0.03 U	9.5	85	3.1	2.7		
June 15, 2023	CPF038L	8.9	25.2	8.5	112	1.2	110.8%	0.03 U	0.54	0.05 U	0.03 U	11.0	85	3.1	2.5		
June 15, 2023	CPF038N	9.0	24.2	8.3	114	1.2	109.8%	0.03 U	0.54								

Appendix A - Cape Fear River Basin Data

Lake	SURFACE PHYSICAL DATA									PHOTIC ZONE DATA					Solids Total mg/L	Total Solids Suspended mg/L	Turbidity NTU	Total Hardness mg/L
	Date	Sampling Station	DO mg/l	Temp Water C	pH s.u.	Cond. umhos/cm	Depth Secchi meters	Percent DO SAT	TP mg/l	TKN mg/l	NH3 mg/l	NOx mg/l	Chla 2.0					
CANE CREEK RESERVOIR	September 7, 2023	CPFCR2	9.4	31.8	8.6	80	1.2	130.9%	0.03U	0.88	0.05U	0.03U	20.0	70	3.2	3.8		
	September 7, 2023	CPFCR4	8.6	31.2	8.2	79	1.2	118.9%	0.03U	0.83	0.05U	0.03U	15.0	69	3.3	3.0		
	September 7, 2023	CPFCR6	8.8	30.8	7.8	79	1.3	126.6%	0.03U	0.82	0.05U	0.03U	12.0	70	3.3	2.6	24.0	
	August 3, 2023	CPFCR2	8.8	28.1	8.3	76	0.9	114.1%	0.03U	1.20	0.05U	0.03U	26.0	73	12.0	6.6		
	August 3, 2023	CPFCR4	8.9	27.7	8.0	77	0.9	114.5%	0.03U	1.00	0.05U	0.03U	14.0	74	6.5	6.0		
	August 3, 2023	CPFCR6	8.6	28.7	8.2	76	0.9	113.0%	0.03U	1.00	0.05U	0.03U	16.0	73	4.3	5.7	24.0	
	July 13, 2023	CPFCR2	8.7	30.9	7.4	76	1.2	119.1%	0.03U	0.82	0.05U	0.03U	23.0	70	4.2	5.6		
	July 13, 2023	CPFCR4	8.4	30.7	8.3	77	1.4	113.8%	0.03U	0.91	0.05U	0.03U	19.0	69	3.9	4.7		
	July 13, 2023	CPFCR6	8.9	29.9	8.5	78	1.1	119.7%	0.03U	1.10	0.05U	0.03U	24.0	70	4.3	5.5	23.0	
	June 15, 2023	CPFCR2	9.0	26.6	7.6	78	1.1	114.5%	0.03U	0.86	0.05U	0.03U	20.0	70	4.3	6.0		
	June 15, 2023	CPFCR4	8.6	26.5	7.6	77	1.2	109.9%	0.03U	0.91	0.05U	0.03U	18.0	72	5.0	5.6		
	June 15, 2023	CPFCR6	8.6	26.4	7.6	77	1.2	109.4%	0.03U	0.90	0.05U	0.03U	17.0	74	4.3	5.1	26.0	
	May 4, 2023	CPFCR2	9.5	20.9	7.7	71	0.8	108.1%	0.05	1.20	0.13	0.21	42.0	82	6.8	10.0		
	May 4, 2023	CPFCR4	8.0	18.5	6.8	71	1.2	86.6%	0.04	0.95	0.15	0.17	25.0	78	6.2	6.7		
	May 4, 2023	CPFCR6	6.7	17.2	6.3	70	1.4	71.0%	0.04	0.83	0.13	0.26	17.0	68	3.5	5.4	21.0	
UNIVERSITY LAKE	September 7, 2023	CPFUL4	9.3	29.5	6.6	97	0.5	123.3%	0.03U	1.00	0.05U	0.03U	50.0	83	10.0	12.0		
	September 7, 2023	CPFUL6	9.4	29.5	8.2	98	0.8	125.4%	0.03U	0.88	0.05U	0.03U	50.0	83	5.6	5.0	28.0	
	August 3, 2023	CPFUL4	6.6	28.1	6.8	89	0.5	84.3%	0.04	1.10	0.05U	0.03U	41.0	92	4.5	10.0		
	August 3, 2023	CPFUL6	6.9	28.3	6.5	87	0.8	89.7%	0.04	0.94	0.05U	0.03U	26.0	82	4.4	5.6	27.0	
	July 13, 2023	CPFUL4	10.1	29.8	7.7	93	0.4	131.9%	0.03	1.20	0.05U	0.03U	60.0	84	17.0	12.0		
	July 13, 2023	CPFUL6	9.9	29.6	8.3	89	0.6	133.7%	0.04	0.79	0.05U	0.03U	37.0	74	5.8	6.4	31.0	
	June 15, 2023	CPFUL4	8.9	26.3	7.7	102	0.7	112.5%	0.04	0.62	0.05U	0.03U	36.0	84	9.4	7.9		
	June 15, 2023	CPFUL6	8.9	26.1	7.8	102	0.8	111.4%	0.04	0.64	0.05U	0.03U	26.0	83	5.1	4.8	38.0	
	May 4, 2023	CPFUL4	7.0	16.7	6.4	82	0.4	73.0%	0.06	0.65	0.05U	0.12	21.0	87	13.0	16.0		
	May 4, 2023	CPFUL6	7.8	16.9	6.6	80	0.4	80.9%	0.06	0.65	0.05U	0.10	32.0	88	12.0	16.0	25.0	
JORDAN LAKE	September 12, 2023	CPF055C	9.9	30.1	8.7	252	0.8	131.5%	0.06	0.69	0.05U	0.03U	34.0	153	8.7	2.3		
	September 12, 2023	CPF055D	10.6	30.1	8.8	243	0.8	140.5%	0.03U	0.70	0.05U	0.03U	36.0	148	5.7	5.4		
	September 12, 2023	CPF055E	10.1	30.3	8.8	212	0.9	134.6%	0.03U	0.67	0.05U	0.03U	38.0	136	5.0	4.0		
	September 12, 2023	CPF081A1C	10.3	28.8	8.7	186	0.5	134.3%	0.09	1.40	0.05U	0.03U	75.0	136	12.0	3.9		
	September 12, 2023	CPF086C	9.1	28.4	8.6	189	0.4	116.8%	0.13	1.50	0.05U	0.03U	49.0	147	19.0	12.0		
	September 12, 2023	CPF086F	7	29.2	8	162	0.7	91.8%	0.06	1.20	0.05U	0.03U	62.0	122	8.7	8.0		
	September 12, 2023	CPF087B3	10.1	28.9	8.9	154	0.7	132.0%	0.06	1.10	0.05	0.03U	67.0	112	4.4	5.7		
	September 12, 2023	CPF087D	10.6	30	9	151	0.7	139.8%	0.03U	0.89	0.05U	0.03U	51.0	104	5.5	4.5		
	August 9, 2023	CPF055C	7.7	29.4	7.6	159	0.8	101.8%	0.05	0.98	0.05U	0.03U	37.0	125	6.6	5.0		
	August 9, 2023	CPF055D	8.0	29.7	7.9	173	0.9	105.5%	0.06	0.94	0.05U	0.03U	43j2	132	7.0	6.2		
	August 9, 2023	CPF055E	9.0	29.7	8.6	134	1.0	118.9%	0.04	0.99	0.05U	0.03U	46j2	109	5.2	4.5		
	August 9, 2023	CPF081A1C	9.4	28.9	8.8	131	0.3	123.4%	0.10	1.80	0.05U	0.03U	140j2P	131	16.0	18.0		
	August 9, 2023	CPF086C	7.1	28.5	8.0	146	0.3	92.7%	0.04	1.90	0.05U	0.03U	120.0	145	19.0	22.0		
	August 9, 2023	CPF086F	7.6	28.6	8.0	120	0.5	98.1%	0.03U	1.50	0.05U	0.03U	79.0	118	11.0	10.0		
	August 9, 2023	CPF087B3	7.1	28.3	7.8	117	0.6	91.6%	0.06	1.40	0.05U	0.03U	62.0	110.0	8.5	7.4		
	August 9, 2023	CPF087D	6.6	28.5	7.6	116	0.7	85.0%	0.04	1.20	0.05U	0.03U	43.0	107	5.4	5.6		
	July 24, 2023	CPF055C	11.3	31.1	9.1	140	0.6	152.6%	0.07	0.93	0.05U	0.03U	56.0	110	7.8	6.2		
	July 24, 2023	CPF055D	10.1	30.4	8.9	136	0.6	135.1%	0.06	0.89	0.05U	0.03U	49.0	103	6.9	5.5		
	July 24, 2023	CPF055E	9.5	30.0	8.9	138	0.7	126.2%	0.05	0.84	0.05U	0.3U	46.0	97	5.9	4.8		
	July 24, 2023	CPF081A1C	5.8	29.4	7.2	142	0.4	75.8%	0.11	1.30	0.05U	0.03U	88.0	121	15.0	15.0		
	July 24, 2023	CPF086F	8.0	29.6	8.2	145	0.4	105.1%	0.10	1.30	0.05U	0.03U	87.0	119	15.0	13.0		
	July 24, 2023	CPF087B3	5.6	29.4	7.2	140	0.5	74.0%	0.08	1.30	0.05U	0.03U	86.0	116	11.0	9.5		
	July 24, 2023	CPF087D	8.6	29.8	8.8	142	0.6	113.6%	0.10	1.10	0.05U	0.03U	79.0	110	7.3	6.4		
	July 24, 2023	CPF0880A	8.3	30.1	8.7	143	0.6	110.6%	0.04	1.10	0.05U	0.03U	62.0	106	6.7	5.9		
	June 8, 2023	CPF055C	10.8	24.4	8.9	219	0.9	131.3%	0.03U	0.86	0.05U	0.04	34.0	146	6.3	4.7		
	June 8, 2023	CPF055D	11.3	24.3	9.2	214	0.9	136.5%	0.07	0.85	0.05U	0.03U	50.0	142	6.0	3.0		
	June 8, 2023	CPF055E	11.4	24.6	9.1	171	0.9	139.0%	0.06	1.00	0.05U	0.03U	48.0	132	7.4	3.1		
	June 8, 2023	CPF081A1C	9.6	23.8	8.9	159	0.4	115.2%	0.03	1.50	0.05U	0.03U	85.0	127	15.0	14.0		
	June 8, 2023	CPF086C	8.3	23.2	8.4	156	0.4	98.8%	0.04	1.20	0.05U	0.03U	58.0	132	16.0	9.1		
	June 8, 2023	CPF086F	8.5	23.1	8.4	154	0.5	100.9%	0.03U	1.20	0.05U	0.03U	73.0	118	11.0	9.8		
	June 8, 2023	CPF087B3	9.6	22.9	8.7	142	0.9	112.8%	0.03	1.00	0.05U	0.03U	42.0	106	5.2	4.3		
	June 8, 2023	CPF087D	9.6	23.2	8.6	142	1.0	113.3%	0.03U	0.82	0.05U	0.03U	34.0	104	4.9	5.6		
	May 24, 2023	CPF055C	7.6	22.6	7.6	188	0.7	87.6%	0.06	0.80	0.06	0.11	29.0	125	8.7	8.5		
	May 24, 2023	CPF055D	9.2	23.0	7.4	213	0.8	107.1%	0.05	0.76	0.05U	0.03U	34.0	120	6.9	6.1		
	May 24, 2023	CPF055E	9.0	23.3	7.9	160	1.0	106.2%	0.05	0.75	0.05U	0.03U	33.0	109	6.2	5.4		
	May 24, 2023	CPF081A1C	9.5	22.9	8.2	147	0.4	111.5%	0.09	1.40	0.05U	0.03U	91.0	121	22.0	20.0		
May 24, 2023	CPF086C	9.9	23.1	8.3	147	0.5	116.5%	0.12	1.50	0.05U	0.03U	100.0	119	22.0	18.0			
May 24, 2023	CPF086F	8.2	22.4	7.6	144	0.6	95.3%	0.09	1.40	0.05U	0.03U	79.0	113	20.0	16.0			
May 24, 2023	CPF087B3	8.4	22.7	7.8	141	0.6	97.2%	0.06	0.91	0.05U	0.03U	41.0	99	8.0	6.1			
May 24, 2023	CPF087D	9.0	23.1	8.1	142	0.7	105.7%	0.04	1.20	0.05U	0.03U	46.0	102	9.8	7.4			

Appendix A - Cape Fear River Basin Data

Lake	SURFACE PHYSICAL DATA								PHOTIC ZONE DATA						Solids Total mg/L	Total Solids Suspended mg/L	Turbidity NTU	Total Hardness mg/L
	Date	Sampling Station	DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent DO SAT	TP mg/L	TKN mg/L	NH3 mg/L	NOx mg/L	Chla 2.0					
BUCKHORN DAM LAKE	September 5, 2023	CPFBDL1	10.3	31.2	8.0	191	0.6	139.0%	0.10	0.84	0.05U	0.25	26.0	128	6.8	9.3	32.0	
	September 5, 2023	CPFBDL2	12.3	30.2	8.6	180	0.6	162.7%	0.12	0.92	0.05U	0.29	35.0	126	7.1	11.0		
	August 7, 2023	CPFBDL1	6.2	28.5	6.4	167	0.8	79.8%	0.06	1.10	0.13	0.24	34.0	113	6.8	6.3	34.0	
	August 7, 2023	CPFBDL2	7.9	28.9	6.8	155	0.7	103.2%	0.10	1.00	0.11	0.21	32.0	114	6.6	6.9		
	August 1, 2023	CPFBDL1	8.7	30.8	7.3	144	0.7	115.8%	0.10	0.85	0.08	0.15	40.0	108	7.0	7.6	34.0	
	August 1, 2023	CPFBDL2	10.5	31.9	8.3	143	0.7	143.9%	0.08	0.88	0.05U	0.07	67.0	102	5.9	6.5		
	July 11, 2023	CPFBDL1	7.1	26.3	6.6	111	0.4	88.3%	0.16	0.91	0.13	0.47	5.8	119	18.0	37.0	27.0	
July 11, 2023	CPFBDL2	6.9	26.1	6.8	116	0.4	85.0%	0.14	0.40	0.14	0.45	6.8	115	16.0	31.0			
June 6, 2023	CPFBDL1	10.2	25.6	8.3	177	0.7	125.3%	0.10	0.74	0.05U	0.66	30.0	116	8.0	7.0	35.0		
June 6, 2023	CPFBDL2	10.2	24.8	8.2	169	0.8	123.5%	0.09	0.79	0.05U	0.52	30.0	111	7.9	7.2			
May 2, 2023	CPFBDL1	8.7	16.2	6.8	41	0.2	90.0%	0.24	1.10	0.12	0.45	5.3	145	38.0	45.0	29.0		
May 2, 2023	CPFBDL2	8.6	17.2	6.7	74	0.3	90.7%	0.23	1.20	0.10	0.47	5.4	150	38.0	55.0			
HUC 03030003																		
HIGH POINT CITY LAKE	September 12, 2023	CPF089E2	8.7	27.9	8.1	98	0.8	113.6%	0.04	0.45	0.05 U	0.03 U	42.0	79	7.7	5.8	31.0	
	September 12, 2023	CPF089E4	6.8	26.9	7.2	87	0.4	86.7%	0.06	0.59	0.05 U	0.03 U	48.0	80	12.0	14.0		
	August 22, 2023	CPF089E2	9.2	29.0	8.5	106	1.0	121.9%	0.03 U	0.60	0.05 U	0.03 U	29.0	80	4.5	3.8	34.0	
	August 22, 2023	CPF089E4	5.1	28.6	7.1	104	0.7	66.8%	0.04	0.57	0.05 U	0.03 U	27.0	81	4.8	5.8		
	July 17, 2023	CPF089E2	7.9	28.4	7.2	109	1.0	104.2%	0.04	0.58	0.05 U	0.03 U	39.0	85	4.6	3.9	38.0	
	July 17, 2023	CPF089E4	7.2	28.8	7.4	93	0.7	95.9%	0.03 U	0.83	0.05 U	0.03 U	43.0	86	6.3	5.5		
	June 24, 2023	CPF089E2	10.4	26.6	8.5	105	0.9	134.2%	0.03 U	0.61	0.05 U	0.03 U	32.0	71	5.7	4.3	32.0	
June 24, 2023	CPF089E4	8.5	26.5	7.4	101	0.6	109.0%	0.05	0.65	0.05 U	0.03 U	30.0	75	6.2	6.5			
May 10, 2023	CPF089E2	8.1	25.7	7.4	98	0.8	100.4%	0.04	0.61	0.05 U	0.04	32.0	80	6.1	4.5	31.0		
May 10, 2023	CPF089E4	8.6	22.2	7.4	94	0.9	100.3%	0.04	0.55	0.05 U	0.06	24.0	80	6.1	4.7			
OAK HOLLOW LAKE	September 12, 2023	CPF089D3	8.0	27.9	7.9	94	1.0	105.1%	0.03	0.40	0.05 U	0.03 U	31.0	70	5.1	4.1	28.0	
	September 12, 2023	CPF089D4	8.1	27.9	8.0	94	1.0	105.9%	0.03 U	0.43	0.05 U	0.03 U	28.0	70	5.0	4.1		
	September 12, 2023	CPF089D5	5.9	27.5	7.2	94	0.7	76.5%	0.03 U	0.44	0.08	0.03 U	24.0	74	6.7	6.9		
	August 22, 2023	CPF089D3	8.4	29.1	8.1	95	0.9	112.1%	0.03 U	0.59	0.05 U	0.03 U	26.0	76	4.3	4.0	29.0	
	August 22, 2023	CPF089D4	9.5	30.1	8.8	95	1.0	128.4%	0.03 U	0.55	0.05 U	0.03 U	18.0	76	4.4	3.0		
	August 22, 2023	CPF089D5	7.7	29.2	7.8	94	0.9	102.7%	0.03	0.68	0.05 U	0.03 U	31.0	78	4.8	4.9		
	July 17, 2023	CPF089D3	7.9	28.7	7.2	98	0.9	104.5%	0.06	0.66	0.05 U	0.03 U	26.0	68	4.8	3.6	30.0	
	July 17, 2023	CPF089D4	8.2	26.7	6.5	101	1.0	104.8%	0.03 U	0.60	0.05 U	0.03 U	23.0	69	4.5	3.6		
	July 17, 2023	CPF089D5	6.2	28.6	7.3	98	0.8	81.7%	0.03 U	0.65	0.05 U	0.03 U	31.0	74	6.0	4.9		
	June 26, 2023	CPF089D3	9.5	25.8	8.3	96	1.0	120.4%	0.03 U	0.51	0.05 U	0.03 U	23.0	64	5.2	3.9	30.0	
June 26, 2023	CPF089D4	8.7	24.3	6.9	95	1.0	107.1%	0.03	0.55	0.05 U	0.03 U	30.0	63	4.9	4.1			
June 26, 2023	CPF089D5	8.3	25.1	7.7	93	0.8	103.7%	0.03	0.59	0.05 U	0.03 U	24.0	64	4.9	3.9			
May 10, 2023	CPF089D3	9.0	20.3	7.6	91	0.7	102.0%	0.04	0.54	0.05 U	0.06	33.0	76	8.1	7.1	28.0		
May 10, 2023	CPF089D4	9.5	20.6	7.3	90	0.8	108.0%	0.03	0.54	0.05 U	0.05	23.0	76	7.0	6.0			
May 10, 2023	CPF089D5	9.1	20.0	7.6	86	0.7	101.5%	0.04	0.59	0.05 U	0.06	27.0	78	7.0	7.2			
RANDLEMAN LAKE	September 5, 2023	CPFRD1	9.7	28.0	8.8	180	0.8	125.9%	0.06	0.82	0.05 U	0.03 U	36.0	124	5.5	4.4	39.0	
	September 5, 2023	CPFRD2	9.3	28.5	8.7	181	1.0	122.3%	0.04	0.66	0.05 U	0.03 U	24.0	122	3.7	3.0		
	September 5, 2023	CPFRD3	10.7	29.1	9.1	183	0.8	141.6%	0.04	0.76	0.05 U	0.03 U	37.0	125	4.5	3.9		
	September 5, 2023	CPFRD4	8.3	28.8	8.5	154	0.9	109.3%	0.03 U	0.50	0.05 U	0.03 U	13.0	101	3.8	4.8		
	September 5, 2023	CPFRD5	8.8	29.6	8.7	135	1.0	117.7%	0.03 U	0.70	0.05 U	0.03 U	25.0	94	4.3	4.2		
	September 5, 2023	CPFRD6	8.2	29.4	8.5	143	1.0	109.4%	0.03 U	0.55	0.05 U	0.03 U	13.0	96	2.8	3.4		
	September 5, 2023	CPFRD7	8.1	30.3	8.4	146	1.0	109.3%	0.03 U	0.48	0.05 U	0.03 U	9.1	97	3.0	3.5		
	September 5, 2023	CPFRD8	7.7	30.5	8.3	145	1.1	105.2%	0.03 U	0.45	0.05 U	0.03 U	6.7	96	2.8	4.1		
	September 5, 2023	CPFRD9	7.7	30.4	8.3	144	1.0	105.3%	0.03 U	0.46	0.05 U	0.03 U	7.0	96	2.5 U	3.1		
	August 8, 2023	CPFRD1	8.5	28.4	7.9	170	0.8	111.8%	0.07	1.10	0.05 U	0.03 U	48.0	118	5.8	6.1	38.0	
	August 8, 2023	CPFRD2	8.6	28.5	8.4	159	0.9	113.9%	0.03	0.84	0.05 U	0.03 U	33.0	121	4.2	3.4		
	August 8, 2023	CPFRD3	8.0	28.0	8.2	169	0.9	104.3%	0.03 U	0.89	0.05 U	0.03 U	33.0	111	3.9	4.6		
	August 8, 2023	CPFRD4	7.4	28.0	8.0	137	0.9	96.9%	0.03 U	0.64	0.05 U	0.03 U	16.0	99	3.7	4.1		
	August 8, 2023	CPFRD5	8.2	28.6	8.5	128	0.8	108.1%	0.03 U	0.78	0.05 U	0.03 U	23.0	92	6.4	4.6		
	August 8, 2023	CPFRD6	7.9	28.1	8.4	139	0.8	103.8%	0.03 U	0.68	0.05 U	0.03 U	19.0	93	4.2	3.8		
	August 8, 2023	CPFRD7	7.8	27.8	8.2	140	0.8	101.7%	0.03 U	0.69	0.05 U	0.03 U	16.0	97	3.8	3.8		
	August 8, 2023	CPFRD8	7.6	27.8	8.0	140	0.9	98.7%	0.03 U	0.67	0.05 U	0.03 U	13.0	97	3.4	4.3		
	August 8, 2023	CPFRD9	7.8	28.3	8.2	140	0.7	102.3%	0.03 U	0.66	0.05 U	0.03 U	35.0	96	5.4	6.9		
	July 18, 2023	CPFRD1	7.9	30.4	7.5	161	0.8	107.1%	0.05	0.90	0.05 U	0.03 U	32.0	112	5.3	5.3	40.0	
	July 18, 2023	CPFRD2	8.4	30.2	8.0	97	1.0	114.0%	0.04	0.68	0.05 U	0.03 U	27.0	110	3.4	3.6		
	July 18, 2023	CPFRD3	7.6	30.0	7.7	76	1.0	103.0%	0.03 U	0.70	0.05 U	0.03 U	26.0	103	2.9	3.2		
	July 18, 2023	CPFRD4	7.6	29.4	7.4	152	1.1	101.8%	0.03 U	0.55	0.05 U	0.03 U	11.0	96	3.0	3.2		
	July 18, 2023	CPFRD5	8.5	30.3	8.3	137	1.1	116.0%	0.03 U	0.85	0.05 U	0.03 U	35.0	90	4.0	3.9		
	July 18, 2023	CPFRD6	8.0	30.7	8.3	142	1.1	108.9%	0.03 U	0.64	0.05 U	0.03 U	13.0	91	4.3	3.6		
	July 18, 2023	CPFRD7	7.9	31.0	8.4	148	1.1	108.3%	0.03 U	0.61	0.05 U	0.03 U	12.0	93	3.4	3.2		
	July 18, 2023	CPFRD8	8.1	30.9	8.2	143	1.2	111.6%	0.03 U	0.56	0.05 U	0.03 U	12.0	89	3.5	3.5		
	July 18, 2023	CPFRD9	7.9	31.4	8.2	143	1.0	109.8%	0.03 U	0.62	0.05 U	0.03 U	10.0	92	3.6	4.0		
June 6, 2023	CPFRD1	11.4	23.8	7.9	134	0.8	138.9%	0.03	1.10	0.05 U	0.03 U	49.0	92	6.7	5.0	37.0		
June 6, 2023	CPFRD2	11.7	23.9	8.6	157	1.0	142.1%	0.07	0.89	0.05 U	0.03 U	44.0	101	5.4	4.7			
June 6, 2023	CPFRD3	10.8	24.1	8.2	157	1.0	131.8%	0.03	0.69	0.05 U	0.03 U	30.0	105	5.4	3.6			
June 6, 2023	CPFRD4	9.6	23.6	7.4	141	1.0	116.6%	0.03 U	0.44	0.05 U	0.03 U	13.0	91	4.8	3.7			
June 6, 2023	CPFRD5	8.9	25.0	8.7	149	0.8	111.1%	0.03 U	0.62	0.05 U	0.03 U	21.0	88	4.0	5.1			
June 6, 2023	CPFRD6	10.0	24.5	8.3	140													

Appendix A - Cape Fear River Basin Data

Lake	Date	SURFACE PHYSICAL DATA							PHOTIC ZONE DATA							Total Solids Suspended mg/L	Turbidity NTU	Total Hardness mg/L
		Sampling Station	DO mg/L	Temp water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent DO SAT	IP mg/L	IKN mg/L	NH3 mg/L	NOx mg/L	Chla 2.0	Solids Total mg/L				
RANDLEMAN LAKE	May 2, 2023	CPFRD1	6.9	18.7	6.2	140	0.55	76.7%	0.26	0.64	0.10	0.49	130	118	10.0	13.0	38.0	
	May 2, 2023	CPFRD2	8.4	19.5	6.1	111	0.7	94.5%	0.05	0.62	0.05U	0.19	33.0	97	8.3	10.0		
	May 2, 2023	CPFRD3	7.9	18.1	6.2	141	0.8	88.4%	0.05	0.65	0.05U	0.06	28.0	105	6.1	5.6		
	May 2, 2023	CPFRD4	8.1	18.5	7.5	96	0.7	88.9%	0.05	0.72	0.05U	0.03U	20.0	99	6.4	6.3		
	May 2, 2023	CPFRD5	8.7	18.8	6.1	43	0.8	97.2%	0.05	0.71	0.05U	0.03U	28.0	100	8.6	6.7		
	May 2, 2023	CPFRD6	8.2	18.3	6.2	140	0.8	90.0%	0.04	0.67	0.05U	0.03U	23.0	102	7.7	5.7		
	May 2, 2023	CPFRD7	8.2	18.3	6.7	144	0.8	90.9%	0.03	0.64	0.05U	0.03U	20.0	104	6.5	5.3		
	May 2, 2023	CPFRD8	8.4	18.7	6.9	145	0.75	93.5%	0.05Q2	0.65	0.05U	0.03U	21	100	6.7	5.2		
	May 2, 2023	CPFRD9	8.4	18.4	7.0	145	0.8	93.0%	0.04	0.57	0.05U	0.03U	18.0	104	5.5	5.9		
SANDY CREEK RESERVOIR	September 21, 2023	CPFSC1	7.3	23.9	6.4	122	0.8	86.9%	0.04	0.71	0.05U	0.03U	50.0	97	4.8	4.1	44.0	
	September 21, 2023	CPFSC2	7.2	23.6	6.4	121	0.7	85.2%	0.06	0.90	0.05U	0.03U	120 P	100	5.1	4.4		
	September 21, 2023	CPFSC3	8.5	20.8	6.8	129	0.8	95.5%	0.08	0.59	0.05U	0.16	28.0	110	4.4	7.9		
	August 16, 2023	CPFSC1	9.2	28.6	8.3	122	0.8	120.1%	0.07	0.99	0.05U	0.03U	76 J2 P	97	4.3	4.9	40.0	
	August 16, 2023	CPFSC2	9.6	29.1	8.8	123	1.0	127.2%	0.06	0.86	0.05U	0.03U	44.0	98	5.2	4.8		
	August 16, 2023	CPFSC3	5.9	26.1	7.6	138	0.8	74.1%	0.07	0.66	0.05U	0.40	15.0	110	5.2	7.9		
	July 20, 2023	CPFSC1	12.7	28.9	8.6	108	0.80	167.3%	0.07	1.00	0.05U	0.06	56.0	87	5.5	4.1	36.0	
	July 20, 2023	CPFSC2	11.4	28.9	7.4	112	0.90	149.5%	0.08	0.88	0.05U	0.08	39.0	96	4.6	5.2		
	July 20, 2023	CPFSC3	6.0	25.2	6.5	135	0.20	73.8%	0.10	0.49	0.07	0.80	2.5 U,Y	174	17.0	90.0		
	June 15, 2023	CPFSC1	11.9	24.9	9.2	123	0.8	146.8%	0.04	0.84	0.05U	0.03U	29.0	93	5.9	4.2	44.0	
	June 15, 2023	CPFSC2	11.5	25.7	9.2	123	0.8	143.8%	0.06	0.90	0.05U	0.03U	38.0	96	5.7	5.3		
	June 15, 2023	CPFSC3	7.0	21.6	8.2	133	0.6	81.8%	0.12	1.00	0.05U	0.62	110 P	110	9.0	10.0		
	May 31, 2023	CPFSC1	8.8	21.1	7.4	118	1.3	99.5%	0.04	0.73	0.05U	0.41	40.0	98	4.6	2.9	39.0	
	May 31, 2023	CPFSC2	8.2	20.5	7.4	118	1.2	91.5%	0.05	0.60	0.05U	0.45	27.0	101	4.6	3.4		
	May 31, 2023	CPFSC3	7.2	18.1	7.1	132	0.8	76.7%	0.12	0.87	0.09	1.00	13.0	117	9.0	12.0		
ROCKY RIVER RESERVOIR	September 21, 2023	CPF1201A	11.3	25.5	8.2	110	0.3	139.9%	0.07	1.20	0.05U	0.03U	150.0	104	12.0	11.0	35.0	
	September 21, 2023	CPF1201B	10.6	25.9	8.4	109	0.5	132.1%	0.12	1.50	0.05U	0.03U	64.0	99	12.0	9.8		
	August 16, 2023	CPF1201A	11.2	31.9	9.1	107	0.5	155.8%	0.03U	1.50	0.05U	0.03U	54 J2 P	96	9.0	7.4	31.0	
	August 16, 2023	CPF1201B	11.1	32.1	9.0	109	0.6	155.3%	0.07	1.50	0.05U	0.03U	57 J2 P	96	11.0	9.5		
	July 20, 2023	CPF1201A	11.3	31.6	9.2	106	0.6	155.8%	0.07	1.40	0.05U	0.03U	52.0	92	6.2	7.3	32.0	
	July 20, 2023	CPF1201B	11.6	31.6	8.9	107	0.7	161.0%	0.03U	1.50	0.05U	0.03U	70.0	93	10.0	9.1		
	June 15, 2023	CPF1201A	11.3	28.6	9.0	101	0.8	149.6%	0.04	1.30	0.05U	0.03U	42.0	91	7.9	10.0	37.0	
	June 15, 2023	CPF1201B	11.2	28.1	8.6	103	0.7	146.7%	0.03	1.20	0.05U	0.03U	37.0	96	9.0	10.0		
	May 22, 2023	CPF1201A	8.5	24.3	7.2	91	0.9	103.1%	0.08	1.00	0.05U	0.12	34.0	86	5.6	6.2	30.0	
	May 22, 2023	CPF1201B	8.1	24.5	7.1	94	0.7	98.6%	0.09	1.00	0.05U	0.16	23.0	89	6.1	6.9		
CHARLES L. TURNER RES.	September 21, 2023	CPFTR01	4.9	25.0	6.2	104	0.5	59.6%	0.08	1.50	0.25	0.03U	75.0	96	10.0	11.0	36.0	
	September 21, 2023	CPFTR02	8.0	25.0	6.5	101	0.4	97.8%	0.08	1.40	0.08	0.03U	59.0	95	11.0	12.0		
	September 21, 2023	CPFTR03	8.9	24.8	6.8	104	0.4	109.4%	0.06	1.50	0.05U	0.04	75.0	98	12.0	10.0		
	September 21, 2023	CPFTR05	11.5	25.0	7.6	107	0.4	139.7%	0.03U	1.50	0.06	0.07	68.0	103	14.0	17.0		
	September 21, 2023	CPFTR06	11.0	24.8	7.0	109	0.3	133.2%	0.03	1.50	0.10	0.17	58.0	100	15.0	16.0		
	August 16, 2023	CPFTR01	9.3	30.3	7.8	87	0.5	126.3%	0.08	1.30	0.05U	0.03U	61.0	83	8.4	7.8	26.0	
	August 16, 2023	CPFTR02	10.4	31.6	8.5	90	0.5	143.1%	0.07	1.40	0.05U	0.03U	58.0	87	9.4	10.0		
	August 16, 2023	CPFTR03	8.7	31.0	9.1	81	0.5	119.6%	0.08	1.50	0.05U	0.03U	59.0	91	11.0	14.0		
	August 16, 2023	CPFTR05	10.5	32.6	8.6	92	0.4	147.3%	0.13	1.50	0.05U	0.03U	56.0	99	13.0	20.0		
	August 16, 2023	CPFTR06	7.0	32.0	8.9	91	0.4	96.8%	0.18	1.60	0.16	0.03U	60.0	96	12.0	16.0		
	July 20, 2023	CPFTR01	9.9	31.4	6.8	84	0.6	136.7%	0.03U	1.40	0.05U	0.03U	59.0	79	7.8	9.0	26.0	
	July 20, 2023	CPFTR02	10.1	31.8	7.1	87	0.5	139.5%	0.08	1.40	0.05U	0.03U	74.0	84	9.0	12.0		
	July 20, 2023	CPFTR03	10.9	31.5	7.6	93	0.5	150.4%	0.03U	1.50	0.05U	0.03U	70.0	87	9.0	13.0		
	July 20, 2023	CPFTR05	10.1	29.9	6.6	45	0.4	135.8%	0.13	1.50	0.05U	0.03U	76.0	102	23.0	21.0		
	July 20, 2023	CPFTR06	10.5	31.4	6.7	97	0.5	145.2%	0.06	1.40	0.05U	0.03U	75.0	90	7.0	13.0		
	June 15, 2023	CPFTR01	8.7	27.7	8.0	88	0.7	114.1%	0.03U	1.10	0.05U	0.03U	22.0	78	7.1	5.3	34.0	
	June 15, 2023	CPFTR02	9.1	28.5	7.9	88	0.7	121.0%	0.04	0.97	0.05U	0.03U	31.0	80	8.8	7.2		
	June 15, 2023	CPFTR03	9.1	29.0	8.0	91	0.6	121.3%	0.04	1.30	0.05U	0.03U	42.0	80	12.0	9.2		
	June 15, 2023	CPFTR05	9.7	28.4	8.0	92	0.5	128.6%	0.08	1.20	0.05U	0.03U	34.0	84	14.0	11.0		
	June 15, 2023	CPFTR06	9.1	26.8	8.0	91	0.6	117.3%	0.09	1.20	0.05U	0.03U	45.0	85	8.1	10.0		
May 22, 2023	CPFTR01	7.6	22.7	7.3	82	0.6	89.6%	0.08	1.60	0.19	0.03U	28.0	88	8.6	11.0	31.0		
May 22, 2023	CPFTR02	7.3	23.7	7.1	84	0.8	87.5%	0.09	1.60	0.20	0.03U	20.0	90	9.3	9.6			
May 22, 2023	CPFTR03	9.6	23.4	7.6	85	0.6	113.4%	0.10	1.60	0.06	0.03U	47.0	92	9.8	13.0			
May 22, 2023	CPFTR05	8.5	23.5	7.2	89	0.6	101.1%	0.13	1.40	0.05U	0.08	41.0	120	24.0	26.0			
May 22, 2023	CPFTR06	7.4	23.8	7.0	89	0.7	88.1%	0.10	1.10	0.05U	0.16	23.0	89	8.6	8.6			

Appendix A - Cape Fear River Basin Data

Lake	Date	SURFACE PHYSICAL DATA							PHOTIC ZONE DATA							Total Solids mg/L	Turbidity NTU	Total Phosphorus mg/L
		Sampling Station	DO mg/L	Temp water C	pH s.u.	Conc. µmhos/cm	Depth sec/meters	Percent DO SAT	IP mg/L	IKN mg/L	INP3 mg/L	INUX mg/L	Ln1a 2.0	Solids total mg/L				
HUC 03030004																		
HARRIS LAKE	September 5, 2023	CPF126A2	9.0	28.9	8.4	174	0.8	117.6%	0.10	0.88	0.05U	0.03U	30.0	120	6.4	6.2		
	September 5, 2023	CPF126A4	10.2	29.6	8.9	183	0.8	135.0%	0.12	1.00	0.05U	0.03U	49.0	122	5.4	4.8		
	September 5, 2023	CPF126A6	7.5	27.9	6.8	179	0.8	95.8%	0.14	1.10	0.05U	0.03U	61.0	123	4.6	4.4		
	September 5, 2023	CPFWOC1	11.1	30.0	8.9	203	0.6	146.9%	0.09	0.98	0.05U	0.03U	39.0	135	8.7	7.9		
	August 1, 2023	CPF126A2	7.2	30.2	7.7	158	0.9	95.1%	0.04	0.85	0.05U	0.03U	31.0	112	6.4	4.9		
	August 1, 2023	CPF126A4	7.5	30.4	8.1	170	0.9	99.3%	0.06	0.86	0.05U	0.03U	38.0	114	4.8	4.0		
	August 1, 2023	CPF126A6	8.5	30.5	8.4	168	1.1	112.8%	0.09	1.00	0.05U	0.03U	64.0	115	4.8	3.4		
	August 1, 2023	CPFWOC1	7.1	30.6	7.6	185	0.4	95.6%	0.08	1.00	0.05U	0.03U	40.0	137	16.0	17.0		
	July 11, 2023	CPF126A2	6.6	29.3	7.6	165	0.8	86.8%	0.06	0.98	0.05U	0.03U	43.0	116	6.4	6.0		
	July 11, 2023	CPF126A4	7.7	30.3	8.7	171	0.8	103.2%	0.09	1.00	0.05U	0.03U	48.0	116	5.7	5.6		
	July 11, 2023	CPF126A6	7.4	28.9	8.2	169	0.8	96.2%	0.10	1.30	0.05U	0.03U	60.0	117	6.3	6.5		
	July 11, 2023	CPFWOC1	8.6	31.2	8.2	191	0.4	116.4%	0.06	1.10	0.05U	0.03U	43.0	134	10.0	17.0		
	June 6, 2023	CPF126A2	10.9	24.6	9.0	165	0.9	131.6%	0.13	1.40	0.05U	0.03U	33.0	106	5.8	4.0		
	June 6, 2023	CPF126A4	10.6	24.0	8.9	166	1.0	127.3%	0.12	1.00	0.05U	0.03U	12.0	111	6.0	4.1		
	June 6, 2023	CPF126A6	8.9	23.4	6.5	163	0.9	105.7%	0.12	0.97	0.05U	0.03U	50.0	109	6.6	4.2		
	June 6, 2023	CPFWOC1	9.9	24.4	8.4	177	0.6	119.4%	0.06	1.00	0.05U	0.03U	31.0	118	6.4	8.2		
	May 2, 2023	CPF126A2	8.2	19.7	7.1	136	0.7	90.9%	0.09	0.776	0.05U	0.03U	38.0	109	10.0	10.0		
	May 2, 2023	CPF126A4	9.9	18.2	6.9	164	0.8	107.0%	0.09	0.78	0.05U	0.03U	37.0	110	7.2	5.5		
	May 2, 2023	CPF126A6	6.2	18.4	6.7	151	0.8	67.1%	0.15	0.80	0.05U	0.04	26.0	111	5.3	6.1		
	May 2, 2023	CPFWOC1	8.1	19.2	7.1	131	0.3	89.2%	0.06	1.10	0.05U	0.03U	59.0	138	24.0	37.0		
OLD TOWN RESERVOIR	September 14, 2023	CPF135B	7.7	28.0	5.9	32	2.0	99.7%	0.03U	0.40	0.05U	0.03U	12.0	34	6.6	1.7		
	September 14, 2023	CPF135D	7.6	28.0	6.0	32	2.1	97.8%	0.03U	0.43	0.05U	0.03U	15.0	36	5.0U,Y	2.0	9.0	
	August 8, 2023	CPF135B	7.5	28.5	6.0	32	2.2	98.0%	0.03U	0.51	0.05U	0.03U	15.0	27	2.5U,Y	1.3		
	August 8, 2023	CPF135D	7.4	28.6	6.4	32	2.5	96.5%	0.03U	0.52	0.05U	0.03U	12.0	29	2.7U,Y	1.4	7.1	
	July 7, 2023	CPF135B	7.7	30.2	6.0	32	2.1	102.8%	0.03U	0.54	0.05U	0.03U	11.0	31	2.5U,Y	1.6		
	July 7, 2023	CPF135D	7.6	30.0	6.2	32	2.3	102.0%	0.03U	0.44	0.05U	0.03U	14.0	28	5.0U,Y	2.0	7.9	
	June 20, 2023	CPF135B	7.8	26.6	6.1	33	1.9	98.4%	0.03U	0.51	0.05U	0.03U	9.5	31	2.5U,Y	1.8		
	June 20, 2023	CPF135D	7.7	26.7	6.2	33	2.0	97.4%	0.03U	0.54	0.05U	0.03U	9.8	31	2.5U,Y	1.9	5.0	
	May 8, 2023	CPF135B	9.2	21.5	6.2	32	2	105.2%	0.03U	0.40	0.05U	0.19	9.0	28	2.5U,Y	1.5		
	May 8, 2023	CPF135D	9.1	21.6	6.3	32	2.4	104.6%	0.03U	0.40	0.05U	0.19	10.0	28	2.8	1.5	9.1	
CARTHAGE CITY LAKE	September 14, 2023	CPF113R	7.3	27.9	5.9	40	1.1	94.3%	0.03U	0.59	0.05U	0.03U	18.0	50	5.0	2.7	13.0	
	August 8, 2023	CPF113R	7.0	30.3	6.5	43	1.5	94.2%	0.03U	0.68	0.05U	0.03U	16.0	43	4.7	2.4	11.0	
	July 17, 2023	CPF113R	6.7	30.8	6.0	39	2.0	90.4%	0.03U	0.44	0.05U	0.03U	5.0	33	2.5U,Y	2.0	6.7	
	June 20, 2023	CPF113R	8.0	26.8	6.1	38	1.5	102.1%	0.03U	0.46	0.05U	0.03U	15.0	37	5.0	2.4	10.0	
	May 8, 2023	CPF113R	8.5	23.5	5.5	37	1.6	101.5%	0.03U	0.4	0.05U	0.03U	3.1	34	2.5	2.5	8.1	
GLENVILLE LAKE	September 21, 2023	CPF138B	7.7	23.9	5.9	39	0.9	91.0%	0.03	0.51	0.05U	0.03U	35.0	38	2.1	4.6	25.0	
	August 15, 2023	CPF138B	9.4	30.2	6.3	40	0.8	125.0%	0.08	1.00	0.05U	0.03	54.2	48	4.0	7.4	9.1	
	July 20, 2023	CPF138B	8.3	29.8	6.1	32	1.0	109.0%	0.03U	0.57	0.05U	0.03U	21.0	40	5.0	4.5	9.9	
	June 21, 2023	CPF138B	3.7	25.0	5.7	45	1.1	45.1%	0.06	0.80	0.05U	0.03U	30.0	44	5.2	3.9	10.0	
	May 10, 2023	CPF138B	8.1	24.6	6.2	38	1.5	97.3%	0.04	0.47	0.05U	0.03U	17.0	48	4.3	3.0	9.1	
HOPE MILLS LAKE	September 21, 2023	CPF151	8.7	24.6	6.0	40	1	103.1%	0.03U	0.42	0.05U	0.07	25.0	41	4.1	3.8		
	September 21, 2023	CPF151A	8.1	23.5	6.0	41	1	94.2%	0.03U	0.42	0.05U	0.12	18.0	40	6	4		
	August 15, 2023	CPF151	6.7	29.3	6.0	43	1	87.8%	0.03U	0.78	0.05U	0.17	12.0	44	3.3	4.9		
	August 15, 2023	CPF151A	4.6	32	5.7	42	0.45	63.5%	0.05	0.83	0.05U	0.32	7.6	57	12	18		
	July 20, 2023	CPF151	7.2	30.9	6.0	37	0.9	96.6%	0.03	0.53	0.05U	0.12	11.0	49	5.9	7.3		
	July 20, 2023	CPF151A	6.4	31.1	6.2	36	1	86.3%	0.03U	0.48	0.05U	0.16	5.3	46	3.4	5.6		
	June 21, 2023	CPF151	6.5	24.6	5.8	42	1.2	78.5%	0.03U	0.53	0.05U	0.17	46.0	46	2.5	3.7		
	June 21, 2023	CPF151A	6.5	23.9	6.0	45	0.8	77.1%	0.03U	0.62	0.05U	0.17	4.3	37	5.4	8.6		
May 10, 2023	CPF151	8.5	24	6.2	35	0.9	100.0%	0.04	0.46	0.05U	0.16	13.0	48	5.4	4.8			
May 10, 2023	CPF151A	6.6	23.3	6.3	15	1.1	76.5%	0.23	0.43	0.05U	0.24	3.2	49	2.5	4.3			
HUC 03030005																		
SALTERS LAKE	September 18, 2023	CPF153C	7.4	25.6	4.2	43	0.6	91.3%	0.03U	0.4U	0.05U	0.03U	9.9	46	5.6	8.5		
	September 18, 2023	CPF153D	7.1	25	4.2	43	0.6	86.7%	0.03U	0.4U	0.05U	0.03U	7.6	47	5.2	8.5		
	August 24, 2023	CPF153C	7	29.6	4.2	44	0.5	91.5%	0.03U	0.5	0.05U	0.03U	12.2	41	4.3	7.8		
	August 24, 2023	CPF153D	7.2	30	4.2	40	0.6	94.5%	0.03U	1.1	0.05U	0.03U	9.6	42	6.6	10		
	July 26, 2023	CPF153C	7.1	32.6	4.1	47	0.55	97.1%	0.03U	0.54	0.05U	0.03U	13	47	2.9	7.2		
	July 26, 2023	CPF153D	7	32.7	4.1	47	0.5	96.5%	0.03U	0.53	0.05U	0.03U	11	42	2.7	7		
	June 1, 2023	CPF153C	8.8	22.3	3.9	22	0.45	100.5%	0.03U	0.59	0.05U	0.03U	22	52	2.9	6.7		
	June 1, 2023	CPF153D	8.8	22.4	4	45	0.45	101.2%	0.03U	0.55	0.05U	0.03U	17	54	3.8	6.9		
	May 10, 2023	CPF153C	8.1	24.5	4.0	44	0.7	97.1%	1.90	0.59	0.05U	0.03U	10.0	53	3.3	6.1		
	May 10, 2023	CPF153D	8.1	25.2	4.1	43	0.65	97.8%	0.03U	0.57	0.05U	0.03U	11	58	11	6.5		

Appendix A - Cape Fear River Basin Data

Lake	SURFACE PHYSICAL DATA									PHOTIC ZONE DATA					Solids Total mg/L	Total Solids Suspended mg/L	Turbidity NTU	Total Hardness mg/L
	Date	Sampling Station	DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent DO SAT	TP mg/L	TKN mg/L	NH3 mg/L	NOx mg/L	Chla 2.0					
JONES LAKE	September 18, 2023	CPF1552A	7.6	25.4	4.2	44	0.9	93.1%		0.42			5.3	44	2.6	2.5		
	September 18, 2023	CPF1553A	7.3	24.9	4.2	44	0.7	88.3%		0.44			5.3	42	2.5	2.8		
	August 24, 2023	CPF1552A	6.7	29.4	4.2	44	0.8	87.2%		0.47	0.05 U	0.03 U		45	2.6	3		
	August 24, 2023	CPF1553A	6.9	29.7	4.2	44	0.7	90.1%		0.45	0.05 U	0.03 U		48	2.5	2.9		
	July 26, 2023	CPF1552A	7.2	31.7	4.3	47	0.5	97.5%		0.57				12	50	3.7		
	July 26, 2023	CPF1553A	7	31.6	4.3	47	0.55	95.1%		0.54		0.03 U		14	52	3.8		
WHITE LAKE	June 1, 2023	CPF1552A	8.4	22.7	4	48	0.45	97.2%	0.03 U	0.74	0.05 U	0.03 U	14	64	4.3	7.6		
	June 1, 2023	CPF1553A	8.4	23	4	49	0.35	100.4%	0.03 U	0.69	0.05 U	0.03 U	16	68	5	7.7		
	May 10, 2023	CPF1552A	8.4	23.9	4.2	49	0.5	98.7%	0.03 U	0.71	0.05 U	0.03 U	11	63	3.6 UY	6.8		
	May 10, 2023	CPF1553A	7.9	23.8	4	48	0.5	93.6%	0.03 U	0.65	0.05 U	0.03 U	9.8	69	5	7.1		
	September 18, 2023	CPF155A	8.4	25.7	5.8	46	1.0	103.2%		0.70			11.0	62	5.0 UY	3.9		
	September 18, 2023	CPF155B	8.4	25.6	5.9	46	1.3	102.9%					10.0	58	5.0 UY	3.8		
GREENFIELD LAKE	September 18, 2023	CPF155C	8.5	25.9	6.0	46	1.2	105.5%		0.70			11.0	61	7.5	3.7		
	August 15, 2023	CPF155A	7.9	31.3	6.3	47	1.0	106.6%		0.73	0.05 U	0.03 U	12J2	60	6.0	3.7		
	August 15, 2023	CPF155B	7.9	31.0	6.6	42	0.9	107.0%		0.70	0.05 U	0.03 U	14J2	56	6.2	3.6		
	August 15, 2023	CPF155C	7.9	31.0	6.8	47	1.0	107.1%		0.70	0.05 U	0.03 U	13J2	58	6.4	3.6		
	July 17, 2023	CPF155A	8.5	31.3	7.6	44	1.2	114.3%		0.74			16.0	49	6.2	3.5		
	July 17, 2023	CPF155B	8.4	31.1	7.7	44	1.0	112.7%		0.60			14.0	48	6.0	3.4		
	July 17, 2023	CPF155C	8.4	30.8	7.8	44	1.3	113.0%		0.78			14.0	48	5 UY	3.8		
	June 19, 2023	CPF155A	7.9	28.8	5.6	45	1.6	102.3%		0.70	0.05 U	0.03 U	9.5	49	4.4	2.6		
	June 19, 2023	CPF155B	7.9	28.2	5.8	45	1.6	101.6%		0.85	0.05 U	0.03 U	5.8	42	3.7	3.3		
	June 19, 2023	CPF155C	8.0	28.1	6.2	48	2.0	102.3%		0.73	0.05 U	0.03 U	5.0	50	4.2	2.3		
	May 15, 2023	CPF155A	8.1	23.9	6.3	45	1.4	95.5%	0.03	0.85	0.05 U	0.03 U	5.4	49	7.2	3.3		
	May 15, 2023	CPF155B	8.3	23.9	6.4	45	1.0	97.7%	0.03 U	0.83	0.05 U	0.03 U	6.7	52	5 UY	3.3		
May 15, 2023	CPF155C	8.1	24.0	6.9	47	1.3	95.6%	0.03 U	0.84	0.05 U	0.03 U	6.7	50	6.0	3.0			
SUTTON LAKE	September 5, 2023	CPF211B	8.9	27.2	6.6	143	1.5	111.4%	0.07	0.67	0.05 U	0.03 U	20.0	102	3.5	1.7		
	September 5, 2023	CPF211C	5.8	27.1	6.6	145	1.4	72.7%	0.03	0.55	0.05 U	0.03 U	13.0	97	2.7	1.4		
	August 7, 2023	CPF211B	7.5	28.6	6.4	169	1.5	97.2%	0.04	0.68	0.05 U	0.03 U	29.0	115	4.0	1.5		
	August 7, 2023	CPF211C	5.1	29.7	6.6	173	1.6	66.8%	0.04	0.85	0.05 U	0.03 U	15.0	113	3.4	3.0		
	July 18, 2023	CPF211B	7.6	31.4	7.3	192	1.6	102.7%	0.06	0.67	0.05 U	0.03 U	19.0	118	2.5 UY	1.9		
	July 18, 2023	CPF211C	6.2	31.3	7.1	177	1.1	83.1%	0.05	0.59	0.05 U	0.03 U	21.0	109	2.6	2.6		
June 14, 2023	CPF211B	9.4	27.6	7.7	194	1.0	119.8%	0.10	0.88	0.05 U	0.03 U	34.0	139	9.7	3.6			
June 14, 2023	CPF211C	5.5	27.0	7.0	185	0.8	69.3%	0.06	1.30	0.05 U	0.03 U	60.0	135	7.6	3.6			
May 17, 2023	CPF211B	13.7	25.3	9.3	209	0.3	167.8%	0.42	4.50	0.05 U	0.03 U	510 P	187	30.0	45.0			
May 17, 2023	CPF211C	8.7	25.9	8.2	216	0.8	107.8%	0.23	2.00	0.13	0.03 U	120.0	152	9.6	10.0			
SUTTON LAKE	September 18, 2023	CPFSL1	7.2	29.0	6.4	411	2.2	94.3%	0.03 U	0.52	0.05 U	0.03 U	5.6	233	2.5 UY	1.0 U		
	September 18, 2023	CPFSL2	6.5	27.6	5.4	412	3.7	82.8%	0.03	0.54	0.05 U	0.03 U	2.3	231	2.5 UY	1.0 U		
	August 15, 2023	CPFSL1	7.5	34.7	7.3	456	2.1	107.0%	0.03 U	0.65	0.05 U	0.03 U	16J2	202	2.7	1.4		
	August 15, 2023	CPFSL2	7.5	33.2	6.6	358	1.9	105.1%	0.03	0.69	0.05 U	0.03 U	13J2	210	3.0	1.0 U		
	July 17, 2023	CPFSL1	7.0	36.3	7.3	363	2.0	103.4%	0.03 U	0.70	0.05 U	0.03 U	3.5	201	2.5 UY	1.0 U		
	July 17, 2023	CPFSL2	7.0	34.6	7.4	370	3.1	99.4%	0.03 U	0.57	0.05 U	0.03 U	3.2	206	2.5 UY	1.0 U		
June 19, 2023	CPFSL1	7.6	31.0	6.9	372	2.0	102.5%	0.03 U	0.65	0.05 U	0.03 U	4.0	211	2.5 UY	1.0			
June 19, 2023	CPFSL2	7.6	29.7	7.1	366	3.0	99.7%	0.03 U	0.56	0.05 U	0.03 U	3.1	211	2.5 UY	1.0 U			
May 15, 2023	CPFSL1	7.0	27.2	7.1	34	2.2	87.0%	0.03 U	0.57	0.05 U	0.04	3.2	212	2.5 UY	1.2			
May 15, 2023	CPFSL2	7.4	26.3	7.3	377	2.3	90.0%	0.03 U	0.61	0.05 U	0.03 U	2.9	216	2.5 UY	1.0 U			
HUC 03030006																		
BAY TREE LAKE	September 18, 2023	CPF155G	7.6	24.8	4.6	57	1.0	92.4%	0.03 U	0.40	0.05 U	0.03 U	3.4	40	2.5 UY	4.6		
	September 18, 2023	CPF155I	7.7	24.2	4.6	57	0.6	91.9%	0.03	0.40	0.05 U	0.03 U	5.7	46	12.0	9.8		
	August 15, 2023	CPF155G	7.2	30.3	4.6	59	1.5	95.6%	0.03 U	0.40	0.05 U	0.03	1.8 J2	35	4.7	2.2		
	August 15, 2023	CPF155I	7.3	30.6	4.6	59	0.7	97.9%	0.03 U	0.41	0.05 U	0.03 U	8.9 J2	40	9.3	8.3		
	July 17, 2023	CPF155G	7.2	30.6	4.6	58	1.0	96.3%	0.03 U	0.50	0.05 U	0.24	8.6	37	4.2 UY	4.8		
	July 17, 2023	CPF155I	7.6	30.7	4.4	58	0.8	102.2%	0.03 U	0.40	0.05 U	0.24	12.0	37	4.2 UY	5.8		
June 19, 2023	CPF155G	7.6	27.5	4.3	66	0.5	96.8%	0.03 U	0.42	0.05 U	0.49	9.7	48	6.1	9.6			
June 19, 2023	CPF155I	7.8	26.1	4.3	66	0.5	96.6%	0.04	0.44	0.05 U	0.50	11.0	46	6.6	9.4			
May 15, 2023	CPF155G	8.2	25.5	4.5	61	0.6	99.2%	0.04	0.46	0.05 U	0.47	8.2	49	6.0	7.4			
May 15, 2023	CPF155I	8.3	25.2	4.5	62	0.7	99.8%	0.04	0.45	0.05 U	0.48	6.9	50	5 UY	7.7			

Appendix A - Cape Fear River Basin Data

Lake	SURFACE PHYSICAL DATA									PHOTIC ZONE DATA						Total Solids Suspended mg/L	Turbidity NTU	Total Hardness mg/L
	Date	Sampling Station	DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent DO SAI	TP mg/L	TKN mg/L	NH3 mg/L	NOx mg/L	Chla µg/L	Solids Total mg/L				
LAKE SINGLETARY	September 5, 2023	CPF176D	8.0	30.2	4.0	49	0.9	105.5%	0.03U	0.47	0.05U	0.03	110	44	2.5 U,Y	5.4		
	September 5, 2023	CPF176E	8.0	31.5	4.0	49	0.7	108.8%	0.03U	0.58	0.05U	0.03U	150	50	2.6 U,Y	5.5		
	September 5, 2023	CPF176F	7.9	32.2	4.0	49	0.8	108.7%	0.03U	0.50	0.05U	0.03U	8.3	48	2.5 U,Y	5.2		
	August 7, 2023	CPF176D	6.2	29.4	4.2	50	0.6	81.2%	0.03U	0.66	0.05U	0.03U	15.0	46	3.0	6.3		
	August 7, 2023	CPF176E	7.3	30.6	4.2	50	0.6	97.9%	0.03U	0.91	0.05U	0.03U	17.0	54	2.5 U,Y	5.4		
	August 7, 2023	CPF176F	7.4	31.4	4.3	50	0.6	100.4%	0.03U	0.73	0.05U	0.03U	15.0	46	2.5 U,Y	5.4		
	July 18, 2023	CPF176D	8.2	32.8	4.1	48	0.5	113.3%	0.03U	0.63	0.05U	0.03U	18.0	45	2.5 U,Y	6.4		
	July 18, 2023	CPF176E	8.2	34.3	4.1	48	0.6	115.9%	0.03U	0.66	0.05U	0.03U	22.0	48	3.6 U,Y	6.5		
	July 18, 2023	CPF176F	8.1	34.4	4.1	48	0.5	115.5%	0.03U	0.62	0.05U	0.03U	20.0	48	3.6 U,Y	6.5		
	June 14, 2023	CPF176D	8.1	26.3	4.1	48	0.5	101.2%	0.03	0.70	0.05U	0.06	29.0	57	4.1	7.8		
	June 14, 2023	CPF176E	7.8	26.3	4.1	49	0.5	97.8%	0.03U	0.76	0.05U	0.07	28.0	61	4.6	8.6		
	June 14, 2023	CPF176F	8.4	27.7	4.1	48	0.4	107.9%	0.12	0.78	0.05U	0.04	42 P	62	11.0	11.0		
	May 17, 2023	CPF176D	7.7	25.9	4.5	50	0.5	95.9%	0.04	0.64	0.05U	0.08	15.0	49	3.3	8.5		
	May 17, 2023	CPF176E	7.9	25.9	4.6	50	0.5	98.4%	0.04	0.70	0.05U	0.08	17.0	49	2.6	8.1		
	May 17, 2023	CPF176F	7.9	26.4	4.5	50	0.5	99.2%	0.04	0.62	0.05U	0.08	13.0	52	3.2	8.5		
HUC 03030007																		
CABIN LAKE	September 18, 2023	CPFCL2	7.6	25.7	5.7	60	0.4	93.6%	0.1	1.6	0.05U	0.03U	180	116	5 U,Y	4.2		
	September 18, 2023	CPFCL4	8.3	25.8	5.8	59	0.4	102.2%	0.1	1.6	0.05U	0.03U	170	121	5.2	3.6		
	August 24, 2023	CPFCL2	8.7	31.3	7.1	115.7	0.8	115.7%	0.04	0.52	0.05U	0.03U	63 J2	84	5	4.8		
	August 24, 2023	CPFCL4	8.5	30.9	7.2	74	0.7	114.9%	0.05	0.97	0.05U	0.03U	46 J2	85	5 U,Y	4.1		
	July 26, 2023	CPFCL2	8.2	34.7	5.6	78	0.9	117.3%	0.05	0.89	0.05U	0.03U	39	84	4.4	3.7		
	July 26, 2023	CPFCL4	8.3	33.4	6.1	75	1	115.7%	0.04	0.87	0.05U	0.03U	32	85	4.1	2.7		
	June 1, 2023	CPFCL2	8.3	22.6	5.5	78	0.7	95.8%	0.04	0.98	0.05U	0.04	25	90	4.4	6.9		
	June 1, 2023	CPFCL4	9.9	22.9	6.2	77	0.5	114.7%	0.05	1.3	0.05U	0.03U	73	97	9.2	15		
	May 10, 2023	CPFCL2	8.8	24.5	5.3	78	1.0	104.6%	0.04	0.9	0.05U	0.03U	21	91	3.6	4.2		
	May 10, 2023	CPFCL4	9.6	25.9	6.1	76	0.9	117.6%	0.05	1.2	0.05U	0.03U	34	94	5.6	7.2		

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Symbol	Definition
A	<p>Value reported is the mean (average) of two or more determinations. This code is to be used if the results of two or more discrete and separate samples are averaged. These samples shall have been processed and analyzed independently (e.g. field duplicates, different dilutions of the same sample). This code is not required for BOD, coliform or acute/chronic metals reporting since averaging multiple results for these parameters is fundamental to those methods or manner of reporting.</p> <p>1 The reported value is an average, where at least one result is qualified with a "U". The PQL is used for the qualified result(s) to calculate the average.</p>
B	<p>Results based upon colony counts outside the acceptable range and should be used with caution. This code applies to microbiological tests and specifically to membrane filter (MF) colony counts. It is to be used if less than 100% sample was analyzed and the colony count is generated from a plate in which the number of colonies exceeds the ideal ranges indicated by the method. These ideal ranges are defined in the method as:</p> <p><i>Fecal coliform or Enterococcus bacteria: 20-60 colonies Total coliform bacteria: 20-80 colonies</i></p> <p>1 Countable membranes with less than 20 colonies. Reported value is estimated or is a total of the counts on all filters reported per 100 ml.</p> <p>2 Counts from all filters were zero.</p> <p>3 Countable membranes with more than 60 or 80 colonies. The value reported is calculated using the count from the smallest volume filtered and reported as a greater than ">" value.</p> <p>4 Filters have counts of both >60 or 80 and <20. Reported value is estimated or is a total of the counts on all filters reported per 100 ml.</p> <p>5 Too many colonies were present; too numerous to count (TNTC). TNTC is generally defined as >150 colonies. The numeric value represents the maximum number of counts typically accepted on a filter membrane (60 for fecal or enterococcus and 80 for total), multiplied by 100 and then divided by the smallest filtration volume analyzed. This number is reported as a greater than value.</p> <p>6 Estimated Value. Blank contamination evident.</p> <p>7 Many non-coliform or non-enterococcus colonies or interfering non-coliform or non-enterococcus growth present. In this competitive situation, the reported value may under-represent actual density.</p> <p><u>Note:</u> A "B" value shall be accompanied by justification for its use denoted by the numbers listed above (e.g., B1, B2, etc.). Note: A "J2" should be used for spiking failures.</p>
C	<p>Total residual chlorine was present in sample upon receipt in the laboratory; value is estimated. Generally applies to cyanide, phenol, NH3, TKN, coliform, and organics.</p>
G	<p>A <u>single</u> quality control failure occurred during biochemical oxygen demand (BOD) analysis. The sample results should be used with caution.</p> <p>1 The dissolved oxygen (DO) depletion of the dilution water blank exceeded 0.2 mg/L.</p> <p>2 The bacterial seed controls did not meet the requirement of a DO depletion of at least 2.0 mg/L and/or a DO residual of at least 1.0 mg/L.</p> <p>3 No sample dilution met the requirement of a DO depletion of at least 2.0 mg/L and/or a DO residual of at least 1.0 mg/L.</p> <p>4 Evidence of toxicity was present. This is generally characterized by a significant increase in the BOD value as the sample concentration decreases. The reported value is calculated from the highest dilution representing the maximum loading potential and should be considered an estimated value.</p> <p>5 The glucose/ glutamic acid standard exceeded the range of 198 ± 30.5 mg/L.</p> <p>7 Less than 1 mg/L DO remained for all dilutions set. The reported value is an estimated greater than value and is calculated for the dilution using the least amount of sample.</p> <p>8 Oxygen usage is less than 2 mg/L for all dilutions set. The reported value is an estimated less than value and is calculated for the dilution using the most amount of sample.</p> <p>9 The DO depletion of the dilution water blank produced a negative value.</p> <p>10 The cBOD value is greater than the BOD value.</p> <p><u>Note:</u> A "G" value shall be accompanied by justification for its use denoted by the numbers listed above (e.g., G1, G2, etc.).</p>

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J	Estimated value; value may not be accurate. This code is to be used in the following instances:
	1 Surrogate recovery limits have been exceeded.
	2 The reported value failed to meet the established quality control criteria for either precision or accuracy.
	3 The sample matrix interfered with the ability to make any accurate determination.
	4 The data is questionable because of improper laboratory or field protocols (e.g., composite sample was collected instead of grab, plastic instead of glass container, the sample's extraction batch did not include a LCS/MS/MSD, etc.).
	5 Temperature limits exceeded (samples frozen or >6°C) during transport or not verifiable (e.g., no temperature blank provided): non-reportable for NPDES compliance monitoring.
	6 The laboratory analysis was from an unpreserved or improperly chemically preserved sample. The data may not be accurate.
	7 This qualifier is used to identify analyte concentration exceeding the upper calibration range of the analytical instrument/method. The reported value should be considered estimated.
	8 Temperature limits exceeded (samples frozen or >6°C) during storage, the data may not be accurate.
	9 The reported value is determined by a one-point estimation rather than against a regression equation. The estimated concentration is less than the laboratory PQL and greater than the laboratory method detection limit.
	10 Unidentified peak; estimated value.
	11 The reported value is determined by a one-point estimation rather than against a regression equation. The estimated concentration is less than the laboratory PQL and greater than the instrument noise level. This code is used when an MDL has not been established for the analyte in question.
	12 The calibration verification did not meet the calibration acceptance criterion for field parameters.
	13 Standards used for this analyte are from an uncertified source. These are the only standards currently available for the analyte.
	14 Blank surrogate(s) percent recovery failed low. Potential contamination cannot be ruled out. This means associated sample results may be biased high. This qualifier is only to be used for samples which have target analyte results ≥PQL.
15 This result has no supporting QA/QC data.	
<u>Note:</u> A "J" value shall be accompanied by justification for its use denoted by the numbers listed above (e.g., J1, J2, etc.).	
M	Sample and duplicate results are "out of control". The sample is non-homogenous (e.g., VOA soil). The reported value is the lower value of duplicate analyses of a sample.
N	Presumptive evidence of presence of material; estimated value. This code is to be used if:
	1 The component has been tentatively identified based on mass spectral library search.
	3 This code shall be used if the level is too low to permit accurate quantification, but the estimated concentration is less than the laboratory PQL and greater than the laboratory method detection limit. This code is not routinely used for most analyses.
p	Sample dilution occurred due to either matrix interference or target analytes being present at concentrations greater than the calibration curve. Reported target analyte values are obtained from results which were bracketed by the calibration curve. For example, "P10" in sample comments would indicate that a 10x dilution was performed to obtain the reported result.
Q	Holding time exceeded. These codes shall be used if the value is derived from a sample that was received, prepared and/or analyzed after the approved holding time restrictions for sample preparation and analysis. The value does not meet NPDES requirements.
	1 Holding time exceeded prior to receipt by lab.
	2 Holding time exceeded following receipt by lab.
S	Not enough sample provided to prepare and/or analyze a method-required matrix spike (MS) and/or matrix spike duplicate (MSD).
U	Indicates that the analyte was analyzed for, but not detected above the reported PQL. The number value reported with the "U" qualifier is equal to the laboratory's PQL*. If the "P" qualifier is reported with this "U" qualifier, then the reported PQL is elevated.
UU	Indicates that the analyte result was generated from a screen analysis (i.e., does not have supporting QA/QC data). The value reported with the "UU" qualifier is equal to the laboratory's PQL. The number value was determined by a one-point estimation at the PQL, rather than against a regression equation.

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V	Indicates the analyte was detected in both the sample and the associated blank. Note: The value in the blank shall not be subtracted from the associated samples.
	1 The analyte was detected in both the sample and the method blank.
	2 The analyte was detected in both the sample and the field blank.
X	Sample not analyzed for this constituent. This code is to be used if:
	1 Sample not screened for this compound.
	2 Sampled, but analysis lost or not performed-field error.
	3 Sampled, but analysis lost or not performed-lab error.
	Note: an "X" value shall be accompanied by justification for its use by the numbers listed.
Y	Elevated PQL due to insufficient sample size.
Z	The sample analysis/results are not reported due to:
	1 Inability to analyze the sample.
	2 Questions concerning data reliability.
	Note: The presence or absence of the analyte cannot be verified.

Supporting Definitions listed below

MDL	A Method Detection Limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the true value is greater than zero and is determined in accordance with 40 CFR Part 136, Appendix B.
ML	Minimum Levels are used in some EPA methods. A Minimum Level (ML) is the lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that all method - specified sample weights, volumes, and cleanup procedures have been employed. The ML is calculated by multiplying the MDL by 3.18 and rounding the result to the nearest factor of 10 multiple (i.e., 1, 2, or 5). For example, MDL = 1.4 mg/L; ML = 1.4 mg/L x 3.18 = 4.45 rounded to the nearest factor of 10 multiple (i.e., 5) = 5.0 mg/L
PQL	The Practical Quantitation Limit (PQL) is defined as the lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. PQLs are subjectively set at some multiple of typical MDLs for reagent water (generally 3 to 10 times the MDL depending upon the parameter or analyte and based on the analyst's best professional judgement, the quality and age of the instrument and the nature of the samples) rather than explicitly determined. PQLs may be nominally chosen within these guidelines to simplify data reporting and, where applicable, are generally equal to the concentration of the lowest non-zero standard in the calibration curve. PQLs are adjusted for sample size, dilution and % moisture. For parameters that are not amenable to MDL studies, the PQL may be defined by the sample volume and buret graduations for titrations or by minimum measurement values set by the method for method-defined parameters (e.g., BOD requires a minimum DO depletion of 2.0 mg/L, fecal coliform requires a minimum plate count of 20 cfu, total suspended residue requires a minimum weight gain of 2.5 mg, etc.). Additionally, some EPA methods prescribe Minimum Levels (MLs) and the lab may set the PQL equal to this method-stated ML. Determination of PQL is fully described in the laboratory's analytical Standard Operating Procedure (SOP) document.