LAKE & RESERVOIR ASSESSMENTS
YADKIN-PEE DEE RIVER BASIN

Winston Lake

Intensive Survey Branch
Water Sciences Section
Division of Environmental Quality
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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.
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 *a*	Chlorophyll *a* is an algal pigment that is used as an approximate measure of algal biomass. The concentration of chlorophyll *a* 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.
Coccoid	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 *a* 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.

Overview

The Yadkin-Pee Dee River Basin covers 7,213 square miles within 21 counties in North Carolina in the mountain and piedmont regions. It is the second largest basin in the state. The river basin originates on the eastern slope of the Blue Ridge Mountains in Caldwell and Wilkes counties. The Yadkin River flows northeast for approximately 100 miles before turning southeast and joining with the Uwharrie River to form the Pee Dee River. The Pee Dee River continues southeast across the North Carolina-South Carolina state line into South Carolina and to Winyah Bay.

Twenty-five reservoirs were sampled in the Yadkin-Pee Dee River Basin between January 2012 and December 2016.

Following the description of the assessment methodology used for the Yadkin-Pee Dee River Basin, there are individual summaries for each of the lakes and Appendix A, a matrix that presents the information used to make the lakes use support assessments.

Seven lakes in the Yadkin-Pee Dee River Basin are on the USEPA's 2014 303(d) List of Impaired Waters. Lake Monroe, Lake Lee and Lake Twitty (Lake Stewart) are listed for violations of the state's chlorophyll *a* water quality standard. High Rock Lake is listed for violations of the state chlorophyll *a*, turbidity and pH water quality standards. Falls Lake, Lake Tillery, Tuckertown Reservoir, High Rock Lake and Badin Lake are listed for a fish consumption advisory related to PCB present in catfish and carp taken from these lakes.

On April 2, 2008, a state-wide fish consumption advisory was placed on fish caught in the state which may be high in mercury. These include largemouth bass, blackfish (bowfin), catfish, and jackfish (chain pickerel) See http://www.epi.state.nc.us/epi/fish/current.html for additional information on fish consumption advisories in the state.

Assessment Methodology

For this report, data from January 1, 2013 through December 31, 2017 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://ncdenr.s3.amazonaws.com/s3fs-public/Water%20Quality/Environmental%20Sciences/ISU/ISB%20SOP%20Version2.1%20%20FINAL.pdf) An interactive map of the state showing the locations of lake sites sampled by DWR may be found at http://www.arcgis.com/home/webmap/viewer.html?webmap=9dbc8edafb7743a9b7ef3f6fed5c4db0&extent=-87.8069,29.9342,-71.5801,38.7611 .

All lakes were sampled during the growing season from May through September. Data were assessed for excursions of the state's Class C water quality standards for chlorophyll *a*, pH, dissolved oxygen, water temperature, turbidity, and surface metals. 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. 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.

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 (m^3/mm^3).

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 Lakes Data

Data collected in the field via multiparameter water quality meters are uploaded into the Labworks® Database within five days 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).

Weather Overview for Summer 2016

May 2016 saw temperatures in most locations of the state cooler than normal with the statewide average temperature at 65.14 °F. The cause for these lower temperatures was the abundance of cloud cover which brought some rain and storms resulting in a wet month, overall. The statewide precipitation was 5.99 inches, making this month the 12th wettest May in the past 122 years. The rain helped to reduce dry conditions in the state and confined much of the dryness to the western portion of the state (Figure 1).

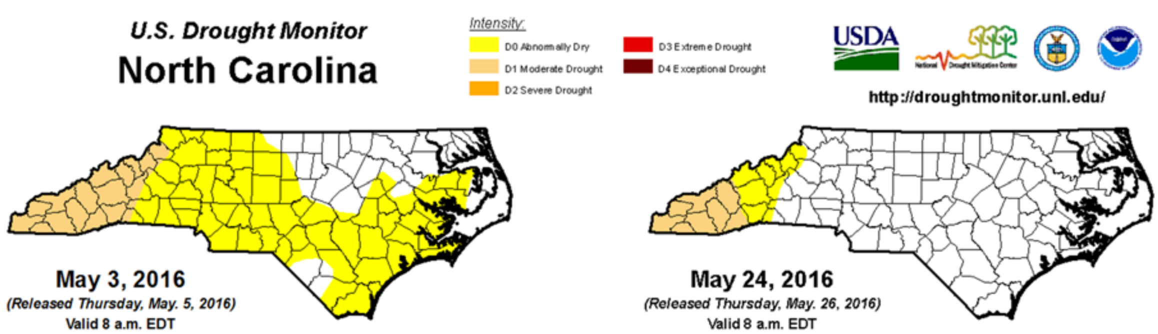

Figure 1. Changes in drought conditions in NC in May 2016 (Courtesy of NC DEQ Division of Water Resources)

June and July 2016 saw more summer-like temperatures as well as drier conditions statewide. Abnormally dry conditions spread eastward into the Upper Yadkin-Pee Dee River Basin in June and retreated westward in July (Figures 2 and 3).

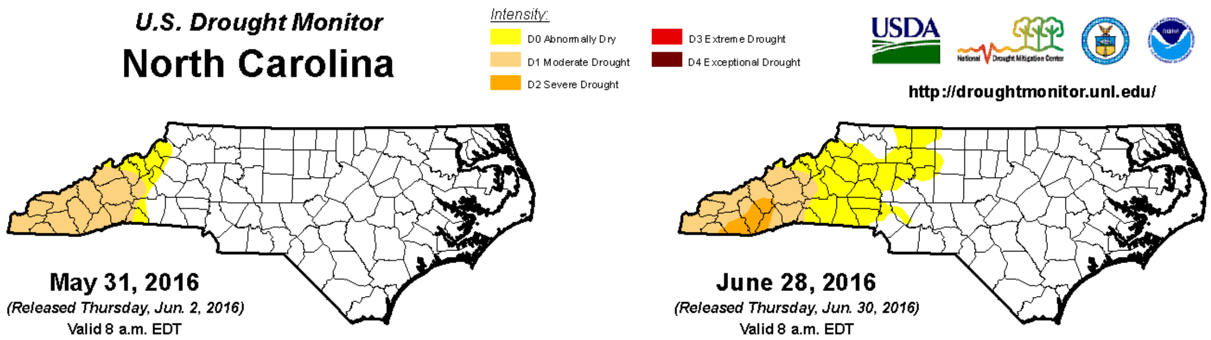

Figure 2. Changes in drought conditions in NC from May to June 2016 (Courtesy of NC DEQ Division of Water Resources)

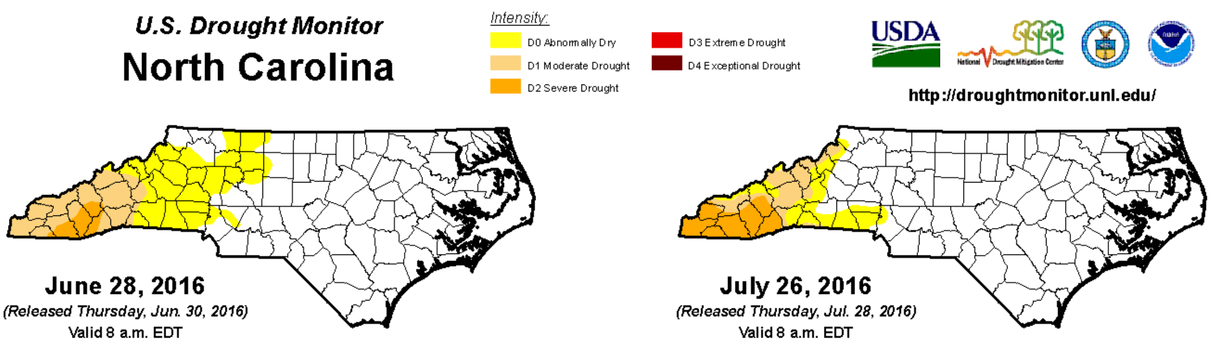

Figure 3. Changes in drought conditions in NC from June to July 2016 (Courtesy of NC DEQ Division of Water Resources)

The first part of August 2016 started out with a statewide average precipitation of 5.5 inches, more than half of which fell during the first nine days of the month. This was followed by a prolonged period of dry weather which resulted in a continuation of abnormally dry conditions in the Lower Yadkin-Pee Dee River Basin (Figure 4).

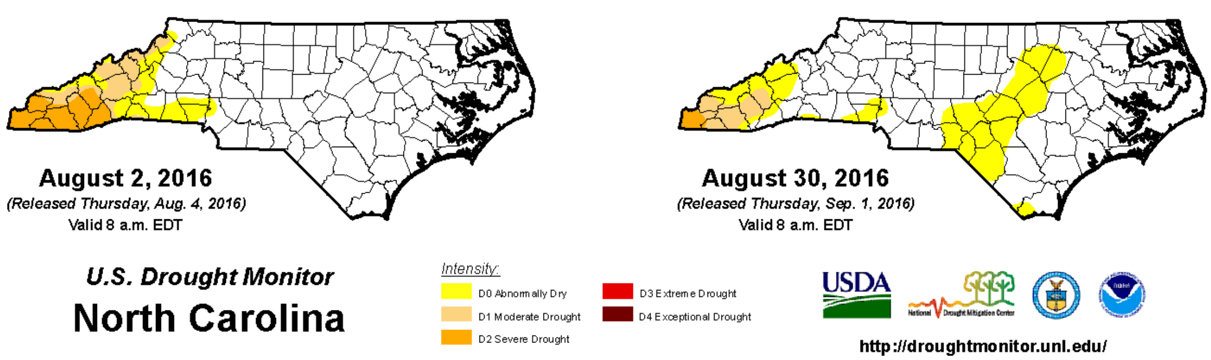

Figure 4. Changes in drought conditions in NC in August 2016 (Courtesy of NC DEQ Division of Water Resources)

While the central and eastern parts of the state saw an increase in rainfall in September 2016, the western regions, including much of the upper Yadkin Pee-Dee River Basin, experienced drier conditions. This resulted in a return of Abnormally Dry conditions to much of the Yadkin-Pee Dee River Basin by the end of September (Figure 5; NC State Climate Office, October 4, 2016).

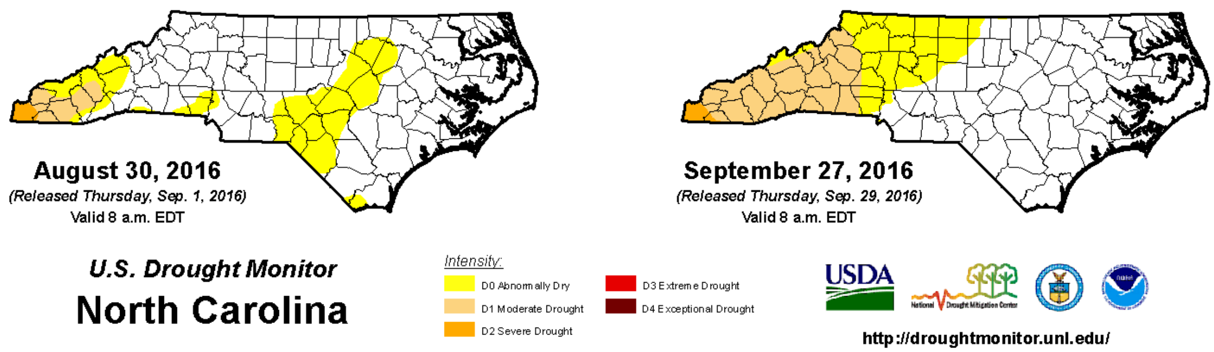

Figure 5. Changes in drought conditions in NC from August to September 2016 (Courtesy of NC DENR Division of Water Resources)

LAKE & RESERVOIR ASSESSMENTS

HUC 03040101

Kerr Scott Reservoir

Ambient Lakes Program Name	Kerr Scott Reservoir		
Trophic Status (NC TSI)	Mesotrophic		
Mean Depth (meters)	12.0		
Volume ($10^6 m^3$)	189.00		
Watershed Area (mi^2)	348.0		
Classification	WS-IV B Tr		
Stations	YAD007A	YAD008	YAD008A
Number of Times Sampled	15	15	15

Construction of W. Kerr Scott Reservoir (Kerr Scott Reservoir) took place between 1960 and 1962. The project was open for public use in 1963. Located in the foothills of the Blue Ridge Mountains, this reservoir is within the Mountain ecoregion of the state. The US Army Corps of Engineers manages the operation of the W. Kerr Scott Reservoir Dam.

DWR field staff sampled Kerr Scott Reservoir five times in 2012, 2013 and 2016 for a total of 15 sampling trips. Surface dissolved oxygen was greater than the state water quality standard of 4.0 mg/L for an instantaneous reading from 2012 to 2016 and ranged from 7.4 to 10.1 mg/L (Appendix A). Surface pH values exceeded the state water quality standard of 9.0 s.u. four times (9.0%). Secchi depths ranged from 0.8 to 2.5 meters with the predominant secchi reading greater than 1.0 meters, indicating that the water clarity of Kerr Scott Reservoir was good from 2012 through 2016.

Total phosphorous ranged from <0.02 to 0.04 mg/L and total organic nitrogen ranged from 0.25 to 0.53 mg/L. Chlorophyll *a* values ranged from 6.5 to 24.0 *u*g/L with no values greater than the state water quality standard of 40 *u*g/L. Based on the calculated NCTSI scores, Kerr Scott Reservoir was determined to be very productive in 2012 (eutrophic) and moderately productive in 2013 and 2016, with an overall trophic state of mesotrophic over the three sampling years. Historically, this reservoir has ranged from oligotrophic (low biological productivity) to eutrophic since monitoring began by DWR staff in 1981.

Winston Lake

Ambient Lakes Program Name	Winston Lake
Trophic Status (NC TSI)	Eutrophic
Mean Depth (meters)	2.0
Volume ($10^6 m^3$)	0.03
Watershed Area (mi^2)	7.0
Classification	C
Stations	YAD077D
Number of Times Sampled	5

Winston Lake is a small reservoir located in the City of Winston-Salem. Constructed in 1919 as a water supply source Winston Lake no longer serves this purpose. Instead, this lake currently provides non-contact recreation opportunities such as fishing.

DWR field staff from the Winston-Salem Regional Office sampled Winston Lake five times from May through September of 2016. Secchi depths, a measure of the clarity of the lake water, ranged from 0.6 to 1.3 meters. Surface dissolved oxygen ranged from 5.9 mg/L in September to 9.2 mg/L in August (Appendix A). Surface pH values ranged from 7.2 to 7.8 s.u. and surface conductivity ranged from 98 to 111 *u*mhos/cm.

Total phosphorus concentrations in Winston Lake ranged from 0.02 to 0.05 mg/L and total organic nitrogen ranged from 0.29 to 0.69 mg/L. These nutrient concentrations were similar to those previously observed for this lake. Chlorophyll *a* values in 2016 ranged from 7.3 to 27.0 *u*g/L. Based on the calculated NCTSI scores, Winston Lake was determined to exhibit elevated biological productivity (eutrophic conditions). The trophic state of this lake has ranged from mesotrophic to eutrophic since 1990 when monitoring by DWR staff first began.

Salem Lake

Ambient Lakes Program Name	Salem Lake		
Trophic Status (NC TSI)	Eutrophic		
Mean Depth (meters)	5.0		
Volume ($10^6 m^3$)	0.80		
Watershed Area (mi^2)	26.0		
Classification	WS-III CA		
Stations	YAD077A	YAD077B	YAD077C
Number of Times Sampled (2009)	10	10	10

Salem Lake is located in the municipality of Winston-Salem. Constructed in 1919, this small reservoir serves as the water supply source for the city. Salem Lake provides water to eastern and southeastern Winston-Salem in addition to serving as a reserve water basin for the Yadkin River.

Staff at the Winston-Salem Regional Office of DWR sampled Salem Lake five times during both the Summers of 2013 and 2016. Surface dissolved oxygen in 2013 ranged from 3.7 to 7.7 mg/L, with the lowest reading observed at the sampling site in the Lowery Mill Creek arm (YAD077B) in June (Appendix A). This value was lower than the state water quality standard of 4.0 mg/L for an instantaneous dissolved oxygen reading. Surface pH values in 2013 ranged from 6.8 to 7.2 s.u. and secchi depths ranged from 0.8 to 1.5 meters.

2013 total phosphorus concentrations ranged from 0.02 to 0.03 mg/L and total organic nitrogen ranged from 0.27 to 0.49 mg/L. Chlorophyll *a* values ranged from 6.5 to 24.0 *u*g/L. Based on the NCTSI scores calculated for Salem Lake in 2013, this reservoir was determined to exhibit elevated biological productivity (eutrophic conditions).

In 2016, surface dissolved oxygen ranged from 5.0 to 9.7 mg/L and surface pH ranged from 7.0 to 8.3 s.u. Secchi depths ranged from 0.7 to 1.4 meters. Total phosphorus concentrations in 2016 were similar to those observed in 2013, ranging from 0.02 to 0.03 mg/L. Total organic nitrogen ranged from 0.35 to 0.54 mg/L. Chlorophyll *a* values were slightly higher than those observed in 2013, ranging from 0.15 to 0.35 *u*g/L. The trophic state of Salem Lake was again determined to be eutrophic based on the calculated NCTSI scores for 2016.

LAKE & RESERVOIR ASSESSMENTS

HUC 03040102

High Rock Lake

Ambient Lakes Program Name	High Rock Lake							
Trophic Status (NC TSI)	Eutrophic							
Mean Depth (meters)	5.0							
Volume ($10^6 m^3$)	314.0							
Watershed Area (mi^2)	3929.0							
Classification	WS-IV B CA, B, WS-V							
Stations	YADHRL051	YAD152A	YAD152C	YAD156A	YAD169A	YAD169B	YAD169E	YAD169F
Number of Times Sampled	9	9	10	9	10	9	9	9

High Rock Lake, built in 1927, is in the Yadkin River chain of lakes located between W. Kerr Scott and Tuckertown Reservoirs. The lake's primary uses are hydroelectric power generation, water supply and public recreation. The surrounding watershed is composed of agricultural, forested, and urban areas. The lake receives drainage waters from nearby major urban areas including Winston-Salem, Salisbury, Lexington, and High Point. The immediate lakeside perimeter is highly developed with new homes under construction. Lake levels are highly variable in response to a nearly constant release rate needed for energy production and an inconsistent inflow. The soils in the watershed are described as reddish and brown in color, highly erodible, and have contributed to high sedimentation, which has filled in the upper section of the lake to the degree that some areas are no longer navigable by boat.

Ten sampling trips were made for sampling High Rock Lake in 2016. Of the eight sites sampled, two were sampled 10 times and six were sampled nine times. Surface dissolved oxygen ranged from 4.1 mg/L in October to 15.4 mg/L on July 13th (Appendix A). Surface pH ranged from 6.9 s.u. on May 25th to 9.6 s.u. on July 13th. Of 74 surface pH measurements recorded for High Rock Lake in 2016, 27 of these

(36.5%) were greater than the state water quality standard or 9.0 s.u. Secchi depths for High Rock Lake ranged from 0.2 to 1.3 meters, indicating that the clarity of the water was good to poor, with the lowest secchi depths observed at the most upstream sampling site (YADHRL051).

Total phosphorus concentrations ranged from 0.03 to 0.21 mg/L and total organic nitrogen ranged from 0.40 to 1.09 mg/L. Chlorophyll *a* values ranged from 6.5 to 73 *u*g/L. Of 70 chlorophyll *a* values recorded for High Rock Lake in 2016, 38 (54.3%) were greater than the state water quality standard of 40 *u*g/L. Turbidity values were greatest at YADHRL051 and exceeded the state water quality standard of 25 NTUs in eight out of nine observations.

Water samples collected from High Rock Lake in July 2016 were shipped to the EPA Region IV Laboratory in Athens, GA for Algal Growth Potential Tests. Results of that analysis indicated that, at the time of sampling, High Rock Lake was nitrogen limited and that two of the sampled sites (YAD152A and YAD156A) had nutrient level sufficient to support nuisance algal blooms (Table 1)

Table 1. Algal Growth Potential Test Results for High Rock Lake, July 27, 2016.

	Maximum Standing Crop, Dry Weight (mg/L)			
Station	Control	C+N	C+P	Limiting Nutrient
YAD152A	6.35	25.74	6.78	Nitrogen
YAD156A	5.97	14.94	6.76	Nitrogen
YAD169A	1.34	3.33	1.27	Nitrogen
YAD169B	2.96	8.18	3.07	Nitrogen
YAD169E	1.87	6.35	2.15	Nitrogen
YAD169F	0.74	1.57	0.97	Nitrogen

Freshwater AGPT using *Selenastrum capricornutum* as test alga

C+N = Control + 1.0 mg/L Nitrate-N

C+P = Control + 0.05 mg/L Phosphate-P

Based on calculated NCTSI scores, High Rock Lake was determined to exhibit elevated biological productivity (eutrophic conditions) in 2016. This reservoir has been found to be eutrophic since monitoring by DWR began in 1981 with the exception of July, August and September 2011 when NCTSI scores indicted that the reservoir was exhibiting extremely elevated biological productivity (hypereutrophic conditions). High Rock Lake is currently on the 2014 303(d) List of Impaired Waters for elevated chlorophyll *a*, pH and turbidity values, which agrees with the monitoring results obtained for 2016 (https://ncdenr.s3.amazonaws.com/s3fs-public/Water%20Quality/Planning/TMDL/303d/2014v2/2014_NC_WQ_Asmnt2.16.15.pdf).

Lake Thom-A-Lex

Ambient Lakes Program Name	Lake Thom-A-Lex	
Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	8.0	
Volume ($10^6 m^3$)	7.80	
Watershed Area (mi^2)	39.0	
Classification	WS-III CA	
Stations	YAD160B	YAD1611A
Number of Times Sampled	10	10

Lake Thom-A-Lex is located near the Cities of Lexington and Thomasville and was built in 1957 as a drinking water supply for these two cities. The watershed draining to the lake is primarily composed of commercial and urban areas. An aeration unit in the lower end of the reservoir operates to reduce lake stratification and improve the quality of the raw drinking water.

In 2012 and 2016, DWR field staff from the Winston-Salem Regional Office monitored Lake Thom-A-Lex monthly from May through September. In 2012 and 2016, surface dissolved oxygen ranged from 3.8 mg/L on July 7, 2012 to 11.0 mg/L on June 21, 2012 (Appendix A). The low dissolved oxygen concentration observed in July 2012 was below the state water quality standard of 4.0 mg/L for an instantaneous reading. Surface pH values ranged from 7.0 to 8.6 s.u. in 2012 and 2016. Secchi depths for Lake Thom-A-Lex were generally less than a meter, ranging from 0.3 to 1.0 meter, indicating that the clarity of the water was fair on the days the lake was monitored.

Total phosphorus concentrations in 2012 and 2016 ranged from 0.04 to 0.10 mg/L and total organic nitrogen ranged from 0.54 to 0.91 mg/L. Chlorophyll *a* values for Lake Thom-A-Lex ranged from 24.0 to 48.0 *u*g/L. In 2012 and 2016, three of the 20 chlorophyll *a* samples analyzed (15.0%) were greater than the state water quality standard of 40 *u*g/L. The turbidity value for YAD1611A near the dam in May 2016 was greater than the state water quality standard of 25 NTU.

Lake Thom-A-Lex was determined to exhibit elevated biological productivity, or eutrophic conditions, in both 2012 and 2016 based on the calculated NCTSI scores. Lake Thom-A-Lex has been determined to be eutrophic since it was first monitored by DWR staff in 1981.

Tuckertown Reservoir

Ambient Lakes Program Name	Tuckertown Reservoir	
Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	10.0	
Volume ($10^6 m^3$)	289.00	
Watershed Area (mi^2)	4210.0	
Classification	WS-IV B CA	
Stations	YAD172C	YAD1780A
Number of Times Sampled	10	10

Tuckertown Reservoir is a run-of-the-river reservoir located between High Rock Lake and Badin Lake on the Yadkin River. This lake's primary uses are hydroelectric power generation and public recreation. The watershed surrounding this lake is composed of forested, agricultural and urban areas.

DWR staff from the Winston-Salem Regional Office sampled Tuckertown Reservoir five times (monthly from May through September) in 2012 and again in2016. Surface dissolved oxygen concentrations ranged from 3.8 mg/L to 12.8 mg/L. The values measured at the sampling site located at the upper end of the reservoir (YAD172C) in August 2012 and July 2016 were below the state water quality standard of 4.0 mg/L for an instantaneous dissolved oxygen reading (Appendix A). Surface pH values ranged from 6.9 to 9.4 s.u. with two values (10%) greater than the state water quality standard of 9.0 s.u. Secchi depths in Tuckertown Reservoir in 2012 and 2016 ranged from 0.4 to 1.5 meters. Seventeen of the 20 secchi depth measurements recorded were less than 1.0 meter in depth, suggesting that the clarity of the water in the reservoir was fair.

Total phosphorus concentrations in Tuckertown Reservoir ranged from 0.04 to 1.0 mg/L and total organic nitrogen ranged from 0.40 to 0.94 mg/L. Chlorophyll *a* values ranged from 12.0 to 48.0 *u*g/L. Out of 19 chlorophyll *a* values measured in 2012 and 2016, two were greater than the state water quality standard of 40.0 *u*g/L (Appendix A). A turbidity measurement at the upper end of the reservoir (YAD172C) in May was greater than the state water quality standard of 25 NTU.

Based on the NCTSI values calculated for 2012 and 2016, Tuckertown Reservoir was determined to exhibit elevated biological productivity (eutrophic conditions). This reservoir has been eutrophic since it was first monitored by DWR staff in 1982.

Badin Lake

Ambient Lakes Program Name	Badin Lake			
Trophic Status (NC TSI)	Eutrophic			
Mean Depth (meters)	14.0			
Volume ($10^6 m^3$)	344.00			
Watershed Area (mi^2)	4116.0			
Classification	WS-IV B CA			
Stations	YAD178E	YAD178E	YAD178F	YAD178F1
Number of Times Sampled	5	5	5	5

Badin Lake is located on the Yadkin River and is a chain lake downstream from Tuckertown Reservoir. The lake was filled in 1917 and is used for hydroelectric power generation, recreation and water supply. The watershed is primarily rural with some agricultural land use.

DWR field staff sampled Badin Lake monthly from May through September 2016. Surface dissolved oxygen ranged from 1.1 mg/L in May to 4.8 mg/L in August (Appendix A). Surface pH ranged from 7.2 to 9.1 s.u. Surface pH in Badin Lake exceeded the state water quality standard of 9.0 s.u. three times (15.0%). Secchi depths ranged from 1.0 to 1.9 meters, indicating that the water clarity in Badin Lake was good.

Total phosphorus concentrations ranged from 0.02 to 0.06 mg/L and total organic nitrogen ranged from 0.46 to 0.67 mg/L. Chlorophyll *a* values ranged from 11.0 to 35.0 *u*g/L. No chlorophyll *a* values were greater than the state water quality standard of 40 *u*g/L during the sampling effort in 2016. Badin Lake was determined to exhibit elevated biological productivity (eutrophic conditions) on each of the five sampling visits based on the calculated NCTSI scores. This reservoir has been predominantly eutrophic since it was first monitored by DWR staff in 1981.

Falls Lake

Ambient Lakes Program Name	Falls Lake	
Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	10.0	
Volume ($10^6 m^3$)	177.00	
Watershed Area (mi^2)	2552.0	
Classification	WS-IV B CA	
Stations	YAD178F3	YAD178F5
Number of Times Sampled	5	5

Falls Lake is a small run-of-the-river impoundment located between Badin Lake and Lake Tillery on the Yadkin River. Falls Lake has a drainage basin of 6,610 km^2 with the major inflow coming from the discharge of Badin Lake into the Yadkin River. The topography of the watershed is hilly with forests and some agriculture.

Falls Lake was sampled five times in 2016 by DWR field staff. Secchi depths in Falls Lake ranged from 0.9 meter at both sampling sites in May to 2.1 meters at both sites in September (Appendix A). Surface dissolved oxygen ranged from 6.1 to 11.1 mg/L and surface pH values ranged from 6.9 to 8.0 s.u.

Nutrient concentrations were similar to those previously observed by DWR for this reservoir. Total phosphorus ranged from 0.02 to 0.04 mg/L and total organic nitrogen ranged from 0.31 to 0.49 mg/L in June. Chlorophyll *a* values did not exceed the state water quality standard of 40 *u*g/L, ranging from 4.5 to 30.0 *u*g/L.

Based on the calculated NCTSI scores for each of the five sampling visits in 2016, Falls Lake was determined to exhibit moderate biological productivity (mesotrophic conditions) in July and September. In May, June and August, Falls Lake exhibited elevated biological productivity (eutrophic conditions). Overall, Falls Lake was determined to be eutrophic in 2016. Falls Lake has exhibited predominantly mesotrophic conditions since it was first monitored by DWR staff in 1981.

Lake Reese

Ambient Lakes Program Name	Lake Reese		
Trophic Status (NC TSI)	Eutrophic		
Mean Depth (meters)	5.0		
Volume ($10^6 m^3$)	0.90		
Watershed Area (mi^2)	100.0		
Classification	WS-III CA		
Stations	YAD077A	YAD077B	YAD077C
Number of Times Sampled	10	10	10

In 1983, the City of Asheboro impounded the Uwharrie River to form Lake Reese, a water supply that is also used for recreation. The lake is only used for drinking water after the water level of the primary water supply (Back Creek Lake) drops three feet below normal.

DWR staff sampled this lake in May, July, August and September 2012, then again from May through September, 2013. Secchi depths ranged from 0.3 meter on May 9, 2013 to 1.2 meters on May 10, 2012 (Appendix A). Surface dissolved oxygen ranged from 9.4 to 4.4 mg/L, with the lowest surface dissolved oxygen reading observed at the mid-lake sampling site (YAD179D) on September 20, 2012. This observation was not less than the state water quality standard of 4.0 mg/L for an instantaneous reading.

Total phosphorus concentrations for Lake Reese in 2012 and 2013 ranged from 0.02 to 0.08 mg/L. Total organic nitrogen ranged from 0.35 to 0.78 mg/L. Chlorophyll *a* values were not greater than the state water quality standard of 40 *u*g/L, ranging from 1.8 to 31.0 *u*g/L. A turbidity value for the sampling site at the upper end of the lake (YAD179B) was greater than the state water quality standard of 25 NTU on May 9, 2013.

Calculated NCTSI scores indicated that Lake Reese had elevated biological productivity (eutrophic conditions), each time it was sampled in both years. This reservoir has been predominantly eutrophic since it was first monitored by DWR in 1989.

Lake Bunch

Ambient Lakes Program Name	Lake Bunch
Trophic Status (NC TSI)	Mesotrophic
Mean Depth (meters)	3.0
Volume ($10^6 m^3$)	0.04
Watershed Area (mi^2)	2.0
Classification	WS-II HQW CA
Stations	YAD181G
Number of Times Sampled	5

Lake Bunch was built by the City of Asheboro for use as a water supply reservoir in 1932. The lake is located on the west side of Asheboro on an unnamed tributary to Cedar Fork, upstream of Back Creek Lake. Lake Bunch is closed to the public.

DWR field staff sampled Lake Bunch monthly from May through September, 2012. Surface dissolved oxygen ranged from 6.9 to 8.7 mg/L and surface pH values ranged from 7.4 to 8.7 s.u. (Appendix A). Surface conductivity was fairly stable, ranging between 86 and 89 *u*mhos/cm. Secchi depths for this small reservoir ranged from 2.6 to 4.6 meters, indicating very good water clarity.

Nutrient concentrations were similar to those previously observed from past sampling trips. Total phosphorus ranged from <0.02 to 0.03 mg/L and total organic nitrogen ranged from 0.34 to 0.42 mg/L. The values for chlorophyll *a* were below the state water quality standard of 40 *u*g/L with the exception of the August value of 60 *u*g/L, which was the highest concentration of chlorophyll *a* recorded for this lake since DWR began monitoring this lake in 1989. Based on the calculated NCTSI scores, Lake Bunch was determined to exhibit moderate biological productivity, or mesotrophic conditions, in 2012. Historically, the trophic state of Lake Bunch has ranged from oligotrophic to mesotrophic.

McCrary Lake

Ambient Lakes Program Name	Lake McCrary
Trophic Status (NC TSI)	Eutrophic
Mean Depth (meters)	3.0
Volume ($10^6 m^3$)	0.90
Watershed Area (mi^2)	1.0
Classification	WS-II HQW CA
Stations	YAD181E
Number of Times Sampled	4

McCrary Lake was built in 1924 by the City of Asheboro for use as a water supply. For safety reasons, the dam was rebuilt in 1984. The maximum depth of this small reservoir is approximately 15 feet (five meters). An unnamed tributary to Cedar Fork Creek is the primary inflow and the drainage area is almost completely wooded. McCrary Lake is primarily used to regulate flow upstream of Lake Bunch. A landfill is located on the west side of McCrary Lake and Lake Bunch.

McCrary Lake was sampled four times in 2012 by DWR field staff. Secchi depths ranged from 2.4 to 2.7 meters, indicating very good water clarity (Appendix A). Surface dissolved oxygen ranged from 5.8 to 8.4 mg/L and surface pH ranged from 7.5 to 8.4 s.u. Surface conductivity in 2012 ranged from 126 to 133 *u*mhos/cm.

Photic zone nutrient concentrations in McCrary Lake were similar to those previously observed by DWR. Total phosphorus was consistently 0.02 mg/L and both ammonia and nitrite plus nitrate were below DWR water quality laboratory detection levels. Total organic nitrogen ranged from 0.29 to 0.41 mg/L. Chlorophyll *a* concentration ranged from 5.9 to 19.0 *u*g/L. Based on the calculated NCTSI scores for each sampling trip to McCrary Lake in 2012, the biological productivity in this small reservoir was moderate (mesotrophic). The trophic status of this lake has ranged from oligotrophic to mesotrophic since monitoring by DWR staff began in 1989.

Back Creek Lake

Ambient Lakes Program Name	Back Creek Lake		
Trophic Status (NC TSI)	Eutrophic		
Mean Depth (meters)	4.0		
Volume ($10^6 m^3$)	5.00		
Watershed Area (mi^2)	16.0		
Classification	WS-II HQW CA		
Stations	YAD181J	YAD181K	YAD181L
Number of Times Sampled	9	9	9

Back Creek Lake (also called Lake Lucas) is the primary water supply for the City of Asheboro. The reservoir is part of a public park where fishing, boating, and swimming are permitted. The rolling, 15.7 square-mile watershed is drained by Back Creek and Greenes Branch. Approximately half of the drainage area is wooded and most of the remainder is agricultural. Hypolimnetic aerators have been installed near the water intake structure to improve the quality of the water before it is withdrawn for treatment.

Back Creek Lake was monitored four times in 2012 and five times in 2013 by DWR field staff. Secchi depths for both sampling years were generally below one meter (range = 0.5 to 1.0 meter), indicating moderate to poor water clarity (Appendix A). Surface dissolved oxygen ranged from 6.7 to 8.2 mg/L in 2012 and from 4.8 to 10.1 mg/L in 2013. Surface pH values were greatest on July 18, 2013, but did not exceed the state water quality standard of a value greater than 9.0 s.u.

Total phosphorus concentrations in Back Creek Lake in 2012 to 2013 ranged from 0.02 to 0.09 mg/L. Nitrite plus nitrate and ammonia concentrations were consistently below DWR water quality laboratory detection levels. Total organic nitrogen ranged from 0.55 to 1.19 mg/L. Chlorophyll *a* concentrations ranged from 6.2 to 119.0 *u*g/L with the greatest concentrations observed on July 18, 2013. Two of the 27 chlorophyll a values measured in 2012 and 2013 (7%) were greater than the state water quality standard of 40.0 *u*g/L.

Back Creek Lake exhibited elevated biological productivity (eutrophic conditions) in 2012 and 2013 based on calculated NCTSI scores. Historically, the trophic state of this lake has been determined to be eutrophic since monitoring by DWR began in 1989.

Lake Tillery

Ambient Lakes Program Name	Lake Tillery			
Trophic Status (NC TSI)	Eutrophic			
Mean Depth (meters)	10.0			
Volume ($10^6 m^3$)	207.00			
Watershed Area (mi^2)	4834.0			
Classification	WS-IV B CA			
Stations	YAD1815A	YAD189	YAD189B	YAD189C
Number of Times Sampled	5	5	5	5

Lake Tillery was constructed in 1928 and is currently used for hydroelectric power and recreational purposes. It is one of the lower lakes within the Yadkin River chain, located between Falls Lake and Blewett Falls Lake. The surrounding watershed is comprised of rolling hills with a combination of mostly forest and agriculture.

Lake Tillery was sampled by DWR once monthly from May and through September 2016 for a total of five sampling events. Secchi depths ranged from 1.1 to 1.8 meters, indicating that the clarity of the water in Lake Tillery on the days it was sampled was good (Appendix A). Surface dissolved oxygen ranged from 6.8 to 12.5 mg/L. Surface pH ranged from 7.8 to 9.2 s.u. Five of the twenty surface pH measurements taken at Lake Tillery in 2016 (25%) were greater than the state water quality standard of 9.0 s.u.

Total phosphorus concentrations ranged from 0.02 to 0.05 mg/L and total organic nitrogen ranged from 0.38 to 0.63 mg/L. Chlorophyll *a* values did not exceed the state water quality standard of 40 *u*g/L, and ranged from 8.6 to 36 *u*g/L. Total suspended solids in Lake Tillery were consistently <6.2 mg/L at each of the three sampling sites in 2016 (Appendix A).

Lake Tillery was determined to exhibit elevated biological productivity or eutrophic conditions in 2016 based on the calculated NCTSI scores for each of the five lake sampling trips. Historically, the trophic state of this reservoir has varied from very low biological productivity (oligotrophic conditions) to eutrophic conditions since 1981 when monitoring was first conducted by DWR staff.

Blewett Falls Lake

Ambient Lakes Program Name	**Blewett Falls Lake**
Trophic Status (NC TSI)	**Eutrophic**
Mean Depth (meters)	**12.0**
Volume ($10^6 m^3$)	**8.30**
Watershed Area (mi^2)	**6784.0**
Classification	**WS-IV B CA**
Stations	**YAD260B**
Number of Times Sampled	**5**

Blewett Falls Lake is a run-of-the-river reservoir located on the Yadkin River. It is the lowermost reservoir of the Yadkin-Pee Dee Chain of Lakes, a series of reservoirs constructed on the Yadkin River.

DWR field staff sampled this lake monthly from May through September 2016. Surface dissolved oxygen ranged from 10.2 to 13.0 mg/L and surface pH ranged from 8.4 to 9.2 s.u. (Appendix A). These readings were suggestive of elevated algal productivity occurring in this reservoir. Secchi depths, which ranged from 0.7 to 0.9 meter, indicated fair water clarity in this reservoir.

Total phosphorus in Blewett Falls Lake ranged from 0.06 to 0.10 mg/L and total organic nitrogen ranged from 0.52 to 78 mg/L. Chlorophyll *a* values ranged from 30 to 54 *u*g/L, with the values for July through September greater than the state water quality standard of 40 *u*g/L. Blewett Falls Lake was determined to exhibit elevated biological productivity (eutrophic conditions) on each of the five sampling days in 2016 based on the calculated NCTSI score for those days. Blewett Falls Lake has been predominantly eutrophic since it was first monitored by DWR staff in 1981.

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HUC 03040105

Kannapolis Lake

Ambient Lakes Program Name	Kannapolis Lake	
Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	5.0	
Volume ($10^6 m^3$)	5.20	
Watershed Area (mi^2)	11.0	
Classification	WS-III CA	
Stations	YAD207A	YAD207C
Number of Times Sampled	5	5

Kannapolis Lake is the water supply source for the City of Kannapolis and access to the lake is not available to the public. Kannapolis Lake was sampled monthly from May through September by DWR staff.

Surface dissolved oxygen ranged from 4.8 to 10.5 mg/L (Appendix A). Surface pH values for Kannapolis Lake ranged from 7.1 to 8.9 s.u. and secchi depths ranged from 0.8 to 1.4 meters. Nutrient concentrations in 2016 were similar to those previously observed for this reservoir. Total phosphorus ranged from 0.02 to 0.04 mg/L and total organic nitrogen ranged from 0.40 to 0.67 mg/L.

Chlorophyll *a* values did not exceed the state water quality standard of 40 *u*g/L and ranged from 9.0 to 33.0 *u*g/L. The overall trophic status was determined to be eutrophic (elevated biological productivity) based on the calculated NCTSI scores for 2016. Kannapolis Lake has historically been determined to have moderate (mesotrophic) to eutrophic productivity based on the NCTSI scores which were recorded beginning in 1989 when DWR staff began monitoring efforts for this lake.

Lake Fisher

Ambient Lakes Program Name	Lake Fisher		
Trophic Status (NC TSI)	Eutrophic		
Mean Depth (meters)	5.0		
Volume ($10^6 m^3$)	3.20		
Watershed Area (mi^2)	78.0		
Classification	WS-IV CA		
Stations	YAD215R	YAD215T	YAD216A
Number of Times Sampled	5	5	5

Located north of the City of Concord, Lake Fisher is the primary water supply source for the city. This lake is also part of a city park that is open to the public for fishing and boating (http://www.concordnc.gov/Departments/Parks-Recreation/Facilities/Lake-Fisher).

Lake Fisher was sampled monthly from May through September by DWR field staff in 2016. Surface dissolved oxygen in Lake Fisher ranged from 6.2 to 10.9 mg/L, with the highest dissolved oxygen readings observed in May (Appendix A). Surface pH values ranged from 7.5 to 9.1 s.u. Two surface pH values in June (both at 9.1 s.u.) exceeded the state water quality standard for a pH value not greater than 9.0 s.u. Secchi depths in Lake Fisher ranged from 0.3 to 1.2 meters. The highest Secchi depths were recorded at the sampling site located near the dam (YAD216A).

Total phosphorus concentrations ranged from 0.02 to 0.10 mg/L, with the greatest concentrations observed at the upper end of the reservoir (YAD215R) and decreasing toward the dam. This is a typical nutrient concentration gradient that occurs in most riverine reservoirs. Total organic nitrogen concentrations ranged from 0.60 to 0.93 mg/L. Chlorophyll *a* values during the summer of 2016 ranged from 20 to 54 *u*g/L (only one measurement exceeded the state water quality standard of 40 ug/L). Based on the calculated NCTSI scores, Lake Fisher was determined to exhibit elevated biological productivity (eutrophic conditions) in 2016. This reservoir has been consistently eutrophic since it was first monitored by DWR staff in 1989.

Lake Concord

Ambient Lakes Program Name	Lake Concord		
Trophic Status (NC TSI)	Eutrophic		
Mean Depth (meters)	4.0		
Volume ($10^6 m^3$)	1.30		
Watershed Area (mi^2)	4.0		
Classification	WS-IV CA		
Stations	YAD216C	YAD216E	YAD216G
Number of Times Sampled	5	5	5

Lake Concord is a secondary water supply reservoir for the City of Concord. This lake was constructed in the 1930s and public access is prohibited. The drainage area surrounding this lake consists of the urban area associated with the City of Concord. There are also many houses along the immediate shoreline.

DWR field staff sampled Lake Concord from May through September in 2016 for a total of five sampling events. Secchi depths, a measurement of water clarity, were less than a meter in Lake Concord, ranging from 0.4 to 0.9 meter (Appendix A). Surface dissolved oxygen ranged from 6.0 to 9.0 mg/L and surface pH ranged from 7.4 to 8.8 s.u.

Total phosphorus concentrations in Lake Concord ranged from 0.03 to 0.08 mg/L. The highest total phosphorus concentration on each sampling trip was observed at YAD216E, in the southwestern arm of the reservoir. Total organic nitrogen concentrations ranged from 0.47 to 1.09 mg/L. Chlorophyll *a* values for Lake Concord ranged from 14 to 48 *u*g/L. Three of the 12 recorded chlorophyll *a* values (25%) were greater than the state water quality standard of 40 *u*g/L and were observed in August and September 2016. Lake Concord was determined to exhibit elevated biological productivity or eutrophic conditions during the summer of 2016 based on the calculated NCTSI scores for each sampling trip. This reservoir has consistently demonstrated eutrophic conditions since it was first monitored by DWR staff in 1989.

Lake Monroe

Ambient Lakes Program Name	Lake Monroe	
Trophic Status (NC TSI)	Hypereutrophic	
Mean Depth (meters)	5.0	
Volume ($10^6 m^3$)	1.80	
Watershed Area (mi^2)	9.0	
Classification	WS-IV CA	
Stations	YAD232F	YAD232D
Number of Times Sampled	5	5

Lake Monroe, a secondary water supply reservoir built in 1955 for the City of Monroe, provides opportunities for public fishing and boating. The drainage area surrounding this lake consists of a mixture of urban and residential areas, with many houses and a cow pasture located on the immediate shoreline. Poultry operations are also located within the lake's watershed.

Lake Monroe was sampled by DWR field staff from May through September in 2016 for a total of five sampling trips. Surface dissolved oxygen ranged from 2.8 mg/L in September at the sampling site near the dam (YAD232F) to 11.1 mg/L at the same sampling site in August 2016 (Appendix A). The measurement near the dam in September was below the state water quality standard of 4.0 mg/L for an instantaneous dissolved oxygen reading. Surface pH values for Lake Monroe ranged from 7.0 to 9.4 s.u. Four of the ten surface pH measurements made in 2016 (40%) were greater than the state water quality standard of 9.0 s.u. Secchi depths, a measure of water clarity, ranged from 0.4 to 0.9 meter, indicating poor to fair water clarity conditions.

Total phosphorus for Lake Monroe ranged from 0.11 to 0.24 mg/L and total organic nitrogen ranged from 1.22 to 1.96 mg/L. Chlorophyll *a* values at the two lake sampling sites ranged from 25.0 to 83.0 *u*g/L. Nine of the ten chlorophyll *a* samples collected in 2016 had values greater than the state water quality standard of 40 *u*g/L. Lake Monroe is on the 2014 303(d) List of Impaired Waters for elevated chlorophyll *a* values.

A water sample collected on July 25, 2016 was sent to the EPA Region IV chemistry laboratory in Athens, GA for an Algal Growth Potential Test. The results of that test determined that algal growth in Lake Monroe was limited by the nutrient, nitrogen (Table 2).

Table 2. Algal Growth Potential Test Results for Lake Monroe, July 25, 2016

Station	Maximum Standing Crop, Dry Weight (mg/L)			Limiting Nutrient
	Control	C+N	C+P	
YAD232D	4.02	34.74	4.05	Nitrogen
YAD232F	3.16	31.38	3.11	Nitrogen

Freshwater AGPT using *Selenastrum capricornutum* as test alga

C+N = Control + 1.0 mg/L Nitrate-N

C+P = Control + 0.05 mg/L Phosphate-P

Based on the calculated NCTSI scores in 2016, Lake Monroe was determined to exhibit excessive biological productivity (hypereutrophic conditions). Lake Monroe is listed in the 2014 303(d) List of Impaired Waters for chlorophyll *a* (https://ncdenr.s3.amazonaws.com/s3fs-public/Water%20Quality/Planning/TMDL/303d/2014v2/2014_NC_WQ_Asmnt2.16.15.pdf). Historically, this lake's NCTSI scores have indicated that the trophic state has alternated between eutrophic and hypereutrophic since DWR monitoring began in 1989.

Lake Lee

Ambient Lakes Program Name	Lake Lee		
Trophic Status (NC TSI)	Hypereutrophic		
Mean Depth (meters)	2.0		
Volume ($10^6 m^3$)	9.50		
Watershed Area (mi^2)	51.0		
Classification	WS-IV CA		
Stations	YAD232C	YAD232H	YAD233
Number of Times Sampled	5	5	5

Lake Lee is a small reservoir located within the municipality of Monroe. Constructed in 1927, this lake serves as an emergency or back-up water supply source for Monroe. Water from Lake Monroe flows into Lake Lee, and water from Lake Lee is pumped into a tributary of Lake Twitty (Lake Stewart) during periods of low flow.

Lake Lee was monitored five times in 2016 by DWR field staff. Surface dissolved oxygen ranged from 3.2 to 11.6 mg/L, with the lowest value observed at the sampling site near the dam (YAD233) in September (Appendix A). This measurement was lower than the state water quality standard of 4.0 mg/L for an instantaneous dissolved oxygen reading. Surface pH values ranged from 6.8 to 9.5 s.u., with the highest measurement observed in June at YAD233. This pH measurement was greater than the state water quality standard of 9.0 s.u. Surface conductivity measurements ranged from 128 to 161 *u*mhos/cm and secchi depths, which were consistently less than a meter, ranged from 0.4 to 0.8 meter. These secchi depths suggest that the water clarity of Lake Lee was somewhat limited.

Total phosphorus concentrations in 2016 ranged from 0.15 to 0.49 mg/L and total organic nitrogen ranged from 1.50 to 2.31 mg/L. Chlorophyll *a* values for Lake Lee ranged from 6.1 *u*g/L in May to 140 *u*g/L in July and August (Appendix A). The chlorophyll *a* concentrations from June through September 2016 were greater than the state water quality standard of 40 *u*g/L at each of the three lake sampling sites (80% of the 2016 chlorophyll *a* values measured in 2016). Lake Lee is on the 2014 303(d) List of Impaired Waters for elevated chlorophyll *a* values. Five of 15 turbidity measurements for Lake Lee (33.3%) were greater than the state water quality standard of 25 NTU.

A water sample collected on July 25, 2016 was sent to the EPA Region IV chemistry laboratory in Athens, GA for an Algal Growth Potential Test. The results of that test (Table 3) determined that algal growth in Lake Lee was limited by the nutrient, nitrogen.

Table 3. Algal Growth Potential Test Results for Lake Lee, July 25, 2016.

Station	Maximum Standing Crop, Dry Weight (mg/L)			Limiting Nutrient
	Control	C+N	C+P	
YAD233	4.69	35.91	5.23	Nitrogen
YAD232C	4.50	35.23	4.02	Nitrogen
YAD232H	5.60	38.59	5.55	Nitrogen

Freshwater AGPT using *Selenastrum capricornutum* as test alga

C+N = Control + 1.0 mg/L Nitrate-N

C+P = Control + 0.05 mg/L Phosphate-P

Based on the calculated NCTSI scores for 2016, Lake Lee was determined to exhibit excessive biological productivity or hypereutrophic conditions. Lake Lee is listed in the 2014 303(d) List of Impaired Waters for chlorophyll *a* (https://ncdenr.s3.amazonaws.com/s3fs-public/Water%20Quality/Planning/TMDL/303d/2014v2/2014_NC_WQ_Asmnt2.16.15.pdf). Historically, Lake Lee's NCTSI scores have indicated that the trophic state of this reservoir has alternated between eutrophic and hypereutrophic since DWR monitoring began in 1989.

Lake Twitty (Lake Stewart)

Ambient Lakes Program Name	Lake Twitty (Stewart)		
Trophic Status (NC TSI)	Hypereutrophic		
Mean Depth (meters)	5.0		
Volume ($10^6 m^3$)	7.6		
Watershed Area (mi^2)	36.0		
Classification	WS-III CA		
Stations	YAD235F	YAD235D	YAD236
Number of Times Sampled	5	5	5

Lake Twitty (also called Lake Stewart) was impounded in 1972. Owned and operated by the City of Monroe, this reservoir is a water supply source for Monroe and is open to the public for recreation. Stewart Creek and Chinkapin Creek are the main tributaries to Lake Twitty. Land in the mainly flat upstream drainage area is forested and agricultural. A hypolimnetic aeration system is in operation at the lower end near the dam to improve the quality of raw drinking water drawn from this lake.

DWR field staff sampled Lake Twitty monthly from May through September in 2016. Surface dissolved oxygen ranged from 4.2 to 10.8 mg/L and surface pH values ranged from 7.0 to 9.3 s.u. (Appendix A). Of 15 surface pH values observed in 2016, only one was greater than the state water quality standard of 9.0 mg/L. Secchi depths for Lake Twitty were less than a meter, ranging from 0.4 to 0.9 meter.

Total phosphorus concentrations ranged from 0.11 to 0.24 mg/L and total organic nitrogen ranged from 0.82 to 1.29 mg/L. Chlorophyll *a* values ranged from 24.0 to 78.0 *u*g/L. Eleven of the 15 chlorophyll *a* samples analyzed in 2016 (73%) exceeded the state water quality standard of 40 *u*g/L. Lake Twitty is on the 2014 303(d) List of Impaired Waters for violations of the state chlorophyll *a* standard (https://ncdenr.s3.amazonaws.com/s3fs-public/Water%20Quality/Planning/TMDL/303d/2014v2/2014_NC_WQ_Asmnt2.16.15.pdf).

Lake Twitty was determined to exhibit excessive biological productivity in 2016 based on the calculated NCTSI scores. Historically, the trophic state of Lake Twitty has varied between eutrophic and hypereutrophic since 1989 when monitoring by DWR began.

Coddle Creek Reservoir (Lake Howell)

Ambient Lakes Program Name	Coddle Creek Reservoir		
Trophic Status (NC TSI)	Eutrophic		
Mean Depth (meters)			
Volume ($10^6 m^3$)	18.90		
Watershed Area (mi^2)	47.0		
Classification	WS-II HQW		
Stations	YADCCR03	YADCCR02	YADCCR01
Number of Times Sampled	5	5	5

This reservoir, constructed in 1993 as a water supply source for the Cities of Concord and Kannapolis, does not have public access. Coddle Creek Reservoir (Lake Howell) is owned, operated and maintained by the Water and Sewer Authority of Cabarrus County.

Coddle Creek Reservoir was sampled monthly from May through September 2016 by DWR field staff. Surface dissolved oxygen concentrations ranged from 3.8 to 9.7 mg/L, with the lowest surface measurement observed in September at the upper end of the reservoir (YADCCR03; Appendix A). Surface pH values ranged from 7.2 to 9.1 s.u. The pH measurements at the upper end of the reservoir and at the mid-reservoir sampling site (YADCCR02) in June were greater than the state water quality standard of 9.0 s.u. Secchi depths for Coddle Creek Reservoir ranged from 0.8 to 1.6 meters, indicating that the clarity of the water in the reservoir was good.

Total phosphorus concentrations in 2016 ranged from 0.02 to 0.04 mg/L and total organic nitrogen ranged from 0.55 to 0.95 mg/L. Chlorophyll *a* values ranged from 16.0 to 31.0 *u*g/L and did not exceed the state water quality standard of 40 *u*g/L. Coddle Creek Reservoir was determined to exhibit elevated biological activity or eutrophic conditions based on the calculated NCTSI scores. This reservoir has been predominantly eutrophic since monitoring by DWR staff began in 2006.

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HUC 03040201

Roberdel Lake

Ambient Lakes Program Name	Roberdel Lake	
Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	3.0	
Volume ($10^6 m^3$)	10.00	
Watershed Area (mi^2)	140.0	
Classification	WS-III CA	
Stations	YAD262E	YAD263
Number of Times Sampled	5	5

Roberdel Lake, located near the City of Rockingham, is a water supply reservoir originally built as a millpond in the 1930's. Hitchcock Creek is the main tributary to this lake. The watershed has a mixture of forested and urban areas, which includes houses along the shore.

DWR field staff monitored Roberdel Lake monthly from May through September 2016. Surface dissolved oxygen ranged from 5.9 mg/L in June to 7.5 mg/L in August (Appendix A). Surface pH values ranged from 5.4 to 6.8 s.u., which were values previously observed in this reservoir. Secchi depths ranged from 0.4 to 1.2 meters.

Total phosphorus concentrations ranged from 0.02 to 0.10 mg/L and total organic nitrogen ranged from 0.49 to 0.68 mg/L. Values for chlorophyll *a* were similar to those previously recorded and ranged from 2.2 to 26.0 *u*g/L. A turbidity value at the mid-lake sampling site (YAD262E) was greater than the state water quality standard of 25 NTU in September. Based on the calculated NCTSI scores, Roberdel Lake exhibited elevated biological productivity or eutrophic conditions in 2016. Historically, the NCTSI scores for Roberdel Lake have ranged from mesotrophic to eutrophic since monitoring by DWR staff began in 1989.

Wadesboro City Pond

Ambient Lakes Program Name	Wadesboro City Pond	
Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	2.0	
Volume ($10^6 m^3$)	0.1	
Watershed Area (mi^2)	9.0	
Classification	WS-II HQW CA	
Stations	YAD275H	YAD275J
Number of Times Sampled	5	5

Wadesboro City Pond, built in 1938, is a water supply source and recreational lake for the City of Wadesboro. The watershed consists of a mixture of forested and agricultural areas. Wadesboro City Pond was monitored monthly between May and September, totaling five sampling events in 2016.

Secchi depths ranged from 0.7 to 1.8 meters, indicating fair water clarity in this lake. Surface dissolved oxygen ranged from 8.0 to 10.0 mg/L and surface pH values ranged from 7.2 to 9.2 s.u. (Appendix A). The surface pH values in July were greater than the state water quality standard of not greater than 9.0 s.u.

Total phosphorus concentrations in Wadesboro City Pond ranged from 0.02 to 0.04 mg/L and total organic nitrogen ranged from 0.02 to 0.05 mg/L. Chlorophyll *a* values ranged from 10 to 37 *u*g/L. Based on the calculated NCTSI scores for 2016, Wadesboro City Pond was determined to exhibit elevated biological productivity or eutrophic conditions. This small reservoir has been determined to be eutrophic based on NCTSI scores since it was first monitored by DWR staff in 1989.

Hamlet City Lake

Ambient Lakes Program Name	Hamlet City Lake	
Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	1.0	
Volume ($10^6 m^3$)	0.04	
Watershed Area (mi^2)	10.0	
Classification	C	
Stations	YAD282A	YAD283
Number of Times Sampled	5	5

Hamlet City Lake is a small, shallow lake located in the Town of Hamlet. This lake is used for recreational fishing and boating and is part of a town park. DWR field staff sampled Hamlet City Lake monthly from May through September 2016. Water lilies were observed along the shoreline and the upper end of the lake along with submerged macrophytes.

Surface dissolved oxygen in Hamlet City Lake ranged from 2.5 to 6.0 mg/L, with values in July, August and September below the state water quality standard of 4.0 mg/L for an instantaneous reading (Appendix A). The sampling site at the upper end of the lake (YAD282A) is where the most frequent low dissolved oxygen readings were observed. This site is shallow and has a significant amount of emergent and submerged macrophyte growth. Surface pH values for Hamlet City Lake ranged from 5.9 to 6.4 s.u., which is not unusual for a lake in the Sandhills Region of the state. Secchi depths ranged from 0.8 to 1.7 meters, suggesting fair to good water clarity.

Total phosphorus concentrations ranged from 0.02 to 0.04 mg/L and total organic nitrogen ranged from 0.48 to 0.77 mg/L. Chlorophyll *a* values were less than the state water quality standard of 40 *u*g/L, ranging from 7 to 23 *u*g/L. Based on the calculated NCTSI scores, Hamlet City Lake was found to be moderately productive in May (mesotrophic conditions) and have elevated productivity (eutrophic conditions) from June through September for an overall rating of eutrophic. This reservoir has ranged from mesotrophic to eutrophic since 1981 when it was first monitored by DWR staff.

Water Lake

Ambient Lakes Program Name	Water Lake	
Trophic Status (NC TSI)	Mesotrophic	
Mean Depth (meters)	3.0	
Volume ($10^6 m^3$)	0.06	
Watershed Area (mi^2)	3.0	
Classification	WS-II HQW CA	
Stations	YAD280C	YAD280E
Number of Times Sampled	6	6

Water Lake is the main water supply reservoir for the City of Hamlet with Marks Creek as its primary tributary. There is no public access to the lake and its watershed is primarily undisturbed forest. Water Lake was monitored monthly during the months of May through October, totaling six sampling events for 2016. The submerged aquatic macrophyte Water Bulrush (*Scirpus subterminalis*) was observed by DWR staff throughout the upper end of the lake along with fragrant water lily (*Nuphar odorata*).

Surface dissolved oxygen for Water Lake ranged from 5.7 to 7.9 mg/L and surface pH ranged from 5.9 to 6.9 s.u. Sandhills lakes frequently have lower pH values than typical Piedmont lakes due to sandy soils and tannin producing vegetation such as pines and oaks. These tannins readily leach through the soil and into the water, reducing the pH and producing a light, tea-like coloration of the water. Unlike dystrophic lakes, the pH values in Sandhills lakes rarely drop below 5.0 s.u. and the lake water does not take on the darker coloration commonly found in dystrophic lakes. This is due to Sandhills soils which have a high mineral content as opposed to the high organic matter (peat) in soils which contribute elevated levels of tannins typical of dystrophic lakes. Secchi depths for Water Lake in 2016 ranged from 1.0 to 1.9 meters, indicating good water clarity.

Total phosphorus concentrations were consistently less than the DWR laboratory detection level of 0.02 mg/L and total organic nitrogen ranged from 0.35 to 0.66 mg/L. Chlorophyll *a* values were well below the state water quality standard of 40 *u*g/L and ranged from 2.7 to 23.0 *u*g/L. Water Lake was determined to exhibit moderate biological productivity (mesotrophic conditions) in 2016. This lake has varied between low productivity (oligotrophic conditions) and elevated productivity (eutrophic conditions) since water quality monitoring by DWR staff began in 1989.

Appendix A - Yadkin-Pee Dee River Basin Lakes Data

January 1, 2012 through December 31, 2016

Lake	Date	Sampling Station	DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent SAT	TP mg/L	TKN mg/L	NH3 mg/L	NOx mg/L	TN mg/L	TON mg/L	TIN mg/L	Chla µg/L	Solids Total mg/L	Total Solids Suspended mg/L	Turbidity NTU	Total Hardnes mg/L
	SURFACE PHYSICAL DATA								PHOTIC ZONE DATA											
KERR SCOTT RESERVOIR	September 7, 2016	YAD007A		27.7	7.9	43	1.7		0.02	0.35	<0.02	<0.02	0.36	0.34	0.02	24.0	53	<6.2	2.4	
	September 7, 2016	YAD008		27.9	8.1	44	2.0		0.02	0.40	<0.02	<0.02	0.41	0.39	0.02	17.0	42	<6.2	2.1	
	September 7, 2016	YAD008A		27.6	7.8	43	1.7		<0.02	0.33	<0.02	<0.02	0.34	0.32	0.02	15.0	38	<6.2	2.4	11.0
	August 3, 2016	YAD007A	7.7	29.7	8.3	42	1.5	101.4%	0.02	0.31	<0.02	<0.02	0.32	0.30	0.02	12.0	38	<6.2	2.9	
	August 3, 2016	YAD008	8.4	29.8	8.0	42	1.4	110.8%	<0.02	0.37	<0.02	<0.02	0.38	0.36	0.02	13.0	34	<6.2	2.9	
	August 3, 2016	YAD008A	7.9	30.0	7.7	42	1.6	104.5%	<0.02	0.28	<0.02	<0.02	0.29	0.27	0.02	12.0	39	<6.2	3.0	12.0
	July 20, 2016	YAD007A	8.8	29.7	8.2	43	1.6	115.9%	0.02	0.29	<0.02	<0.02	0.30	0.28	0.02	13.0	39	<6.2	2.8	
	July 20, 2016	YAD008	8.3	29.5	8.1	42	1.7	108.9%	<0.02	0.28	<0.02	<0.02	0.29	0.27	0.02	9.5	40	<12.0	3.2	
	July 20, 2016	YAD008A	8.0	29.9	8.0	42	2.5	105.7%	<0.02	0.29	<0.02	<0.02	0.30	0.28	0.02	12.0	34	<6.2	3.1	12.0
	June 20, 2016	YAD007A	8.7	28.4	8.5	42	1.5	112.0%	0.02	0.31	<0.02	<0.02	0.32	0.30	0.02	9.2	37	<6.2	4.3	
	June 20, 2016	YAD008	8.4	28.3	8.6	41	1.4	107.9%	0.02	0.32	<0.02	<0.02	0.33	0.31	0.02	11.0	36	<6.2	3.8	
	June 20, 2016	YAD008A	9.1	27.3	8.4	40	1.3	114.9%	0.02	0.35	<0.02	<0.02	0.36	0.34	0.02	16.0	38	<6.2	29.0	12.0
	May 9, 2016	YAD007A	8.6	20.7	7.2	37	0.8	95.9%	0.03	0.31	<0.02	0.12	0.43	0.30	0.13	17.0	38	7.2	11.0	
	May 9, 2016	YAD008	8.8	20.8	7.4	38	1.1	98.4%	0.02	0.32	<0.02	0.11	0.43	0.31	0.12	19.0	36	<6.2	8.6	
	May 9, 2016	YAD008A	8.8	21.0	7.7	38	1.3	98.7%	0.02	0.28	<0.02	0.09	0.37	0.27	0.10	13.0	37	<6.2	4.2	11.0
	September 5, 2013	YAD007A	9.2	26.3	9.0	39	1.4	114.0%	0.02	0.32	<0.02	<0.02	0.33	0.31	0.02	14.0	38	<6.2	3.6	
	September 5, 2013	YAD008	8.9	26.4	9.2	38	1.4	110.5%	0.02	0.29	<0.02	<0.02	0.30	0.28	0.02	15.0	38	<6.2	3.3	
	September 5, 2013	YAD008A	8.2	26.8	8.9	38	1.7	102.6%	0.02	0.28	<0.02	<0.02	0.29	0.27	0.02	14.0	34	<6.2	3.2	9.9
	August 20, 2013	YAD007A	8.9	24.0	8.8	38	1.5	105.8%	0.03	0.33	<0.02	<0.02	0.34	0.32	0.02	14.0	25	<6.2	3.6	
	August 20, 2013	YAD008	9.1	24.2	9.0	37	1.4	108.5%	0.02	0.42	<0.02	<0.02	0.43	0.41	0.02	17.0	26	<6.2	3.3	
	August 20, 2013	YAD008A	9.4	24.2	9.1	35	1.2	112.1%	0.02	0.36	<0.02	<0.02	0.37	0.35	0.02	13.0	18	<6.2	4.5	7.9
	July 23, 2013	YAD007A	9.6	28.0	9.0	41	1.3	122.7%	0.03	0.36	<0.02	0.03	0.39	0.35	0.04	19.0	62	<6.2	5.8	
	July 23, 2013	YAD008	9.6	27.3	9.2	38	1.4	121.2%	0.03	0.42	<0.02	0.02	0.44	0.41	0.03	23.0	31	<12 P	5.1	
	July 23, 2013	YAD008A	9.0	28.0	9.2	38	1.5	115.0%	0.02	0.41	<0.02	<0.02	0.42	0.40	0.02	18.0	36	<6.2	4.0	9.9
	June 24, 2013	YAD007A	8.7	28.0	9.0	40	1.2	111.2%	0.02	0.33	<0.02	<0.02	0.34	0.32	0.02	8.9	34	<6.2	3.8	
	June 24, 2013	YAD008	8.3	28.0	8.9	38	1.5	106.1%	0.02	0.34	<0.02	<0.02	0.35	0.33	0.02	9.9	34	<12.0	3.6	
	June 24, 2013	YAD008A	8.0	27.9	8.8	38	1.8	102.1%	0.02	0.28	<0.02	<0.02	0.29	0.27	0.02	6.8	35	<6.2	2.9	9.9
	May 22, 2013	YAD007A	9.0	23.7	8.5	38	1.7	106.3%	0.03	0.26	<0.02	0.09	0.35	0.25	0.10	6.5	40	<6.2	5.1	
	May 22, 2013	YAD008	8.6	24.0	8.5	38	1.8	102.2%	0.02	0.31	<0.02	0.04	0.35	0.30	0.05	11.0	36	<6.2	5.8	
	May 22, 2013	YAD008A	8.5	24.3	8.4	38	2.0	101.6%	<0.02	0.26	<0.02	<0.02	0.27	0.25	0.02	7.8	34	<6.2	3.2	9.9
	September 10, 2012	YAD007A	7.4	26.4	7.2	43	1.5	91.9%	0.02	0.26	<0.02	<0.02	0.27	0.25	0.02	15.0	42	<6.2	2.5	
	September 10, 2012	YAD008	7.4	26.5	7.2	43	1.6	92.1%	0.02	0.30	<0.02	<0.02	0.31	0.29	0.02	16.0	39	<6.2	2.1	
	September 10, 2012	YAD008A	6.6	26.7	6.8	43	1.8	82.4%	<0.02	0.26	<0.02	<0.02	0.27	0.25	0.02	10.0	42	<6.2	2.0	11.0
	August 14, 2012	YAD007A	8.3	28.3	8.3	42	1.3	106.6%	0.02	0.32	<0.02	<0.02	0.33	0.31	0.02	12.0	41	<6.2	2.7	
	August 14, 2012	YAD008	8.3	28.5	8.3	42	1.3	107.0%	0.02	0.32	<0.02	<0.02	0.33	0.31	0.02	10.0	40	<6.2	3.2	
	August 14, 2012	YAD008A	8.0	28.5	8.3	41	1.3	103.1%	<0.02	0.28	<0.02	<0.02	0.29	0.27	0.02	8.5	40	<6.2	2.3	12.0
	July 5, 2012	YAD007A	10.1	29.5	8.6	45	1.1	132.5%	0.02	0.37	<0.02	<0.02	0.38	0.36	0.02	15.0	46	<6.2	4.3	
	July 5, 2012	YAD008	9.6	30.2	8.7	45	1.1	127.5%	0.02	0.30	0.02	<0.02	0.31	0.28	0.03	13.0	43	<6.2	3.9	
	July 5, 2012	YAD008A	9.9	30.5	8.9	46	1.1	132.1%	0.02	0.42	<0.02	<0.02	0.43	0.41	0.02	17.0	44	<6.2	3.9	8.8
	June 5, 2012	YAD007A	9.5	24.4	9.1	43	0.9	113.7%	0.02	0.40	<0.02	<0.02	0.41	0.39	0.02	19.0	44	<6.2	4.6	
	June 5, 2012	YAD008	9.6	24.4	9.2	43	1.0	114.9%	0.03	0.54	<0.02	<0.02	0.55	0.53	0.02	20.0	48	<6.2	4.2	
	June 5, 2012	YAD008A	9.6	24.8	9.3	43	1.1	115.8%	0.03	0.49	<0.02	<0.02	0.50	0.48	0.02	19.0	48	<6.2	4.1	11.0
	May 16, 2012	YAD007A	8.8	21.9	8.7	40	1.0	100.5%	0.04	0.34	<0.02	0.03	0.37	0.33	0.04	14.0	50	<6.2	4.1	
	May 16, 2012	YAD008	8.9	22.1	8.8	40	1.0	102.0%	0.03	0.35	<0.02	0.02	0.37	0.34	0.03	12.0	46	<6.2	4.4	
	May 16, 2012	YAD008A	8.8	23.2	8.8	39	1.2	103.0%	0.03	0.38	<0.02	<0.02	0.39	0.37	0.02	11.0	48	<6.2	3.8	10.0
WINSTON LAKE	September 28, 2016	YAD077D	5.9	23.8	7.2	111	0.7	69.8%	0.03	0.55	0.08	0.13	0.68	0.47	0.21	27.0	86	14.0	12.0	
	August 31, 2016	YAD077D	9.2	29.4	7.8	103	0.8	120.5%	0.05	0.70	<0.02	0.08	0.78	0.69	0.09	17.0	86	15.0	14.0	
	July 27, 2016	YAD077D	8.9	31.7	7.8	108	1.3	121.3%	0.02	0.40	<0.02	0.14	0.54	0.39	0.15	9.7	98	<12.0	4.8	
	June 29, 2016	YAD077D	7.8	27.9	7.3	107	0.6	99.5%	0.03	0.47	0.04	0.20	0.67	0.43	0.24	13.0	87	8.5	11.0	
	May 11, 2016	YAD077D	7.4	22.7	7.8	98	0.9	85.8%	0.03	0.42	0.13	0.40	0.82	0.29	0.53	7.3	82	<6.2	11.0	
SALEM LAKE	September 28, 2016	YAD077A	6.5	25.0	7.1	93	0.9	78.7%	0.03	0.54	<0.02	<0.02	0.55	0.53	0.02	33.0	66	<6.2	4.9	
	September 28, 2016	YAD077B	6.8	24.7	7.1	91	1.0	81.9%	0.02	0.55	<0.02	<0.02	0.56	0.54	0.02	30.0	66	<6.2	4.3	
	September 28, 2016	YAD077C	5.0	25.2	7.0	93	0.8	60.8%	0.03	0.58	0.10	0.02	0.60	0.48	0.12	20.0	68	<6.2	6.1	27.0
	August 31, 2016	YAD077A	7.7	29.6	7.3	85	1.0	101.2%	0.02	0.40	<0.02	<0.02	0.41	0.39	0.02	19.0	61	<6.2	3.7	
	August 31, 2016	YAD077B	8.1	30.0	7.9	88	1.1	107.2%	0.02	0.45	<0.02	<0.02	0.46	0.44	0.02	17.0	64	<6.2	3.6	
	August 31, 2016	YAD077C	6.1	29.5	7.2	88	1.0	80.0%	0.02	0.47	0.05	<0.02	0.48	0.42	0.06	16.0	59	<6.2	5.4	26.0
	July 27, 2016	YAD077A	7.9	31.8	7.6	94	1.4	107.8%	0.02	0.43	<0.02	<0.02	0.44	0.42	0.02	15.0	84	<12.0	3.5	
	July 27, 2016	YAD077B	7.8	31.6	7.6	95	1.2	106.1%	0.02	0.42	<0.02	<0.02	0.43	0.41	0.02	18.0	88	<6.2	5.1	
	July 27, 2016	YAD077C	5.6	31.1	7.3	94	0.7	75.5%	0.02	0.48	<0.02	<0.02	0.49	0.47	0.02	22.0	68	<6.2	4.7	29.0
	June 29, 2016	YAD077A	8.8	29.3	7.6	94	1.1	115.1%	0.02	0.44	<0.02	<0.02	0.45	0.43	0.02	22.0	70	<6.2	4.2	
	June 29, 2016	YAD077B	7.8	28.9	7.6	92	1.0	101.3%	0.03	0.45	<0.02	<0.02	0.46	0.44	0.02	29.0	72	<6.2	5.4	
	June 29, 2016	YAD077C	6.3	28.5	7.4	92	1.0	81.2%	0.02	0.45	0.03	<0.02	0.46	0.42	0.04	22.0	74	<6.2	5.4	31.0
	May 11, 2016	YAD077A	9.7	23.4	8.1	97	0.9	114.0%	0.03	0.48	<0.02	0.12	0.60	0.47	0.13	30.0	70	<6.2	5.4	
	May 11, 2016	YAD077B	9.0	22.9	8.3	92	1.1	104.8%	0.02	0.41	<0.02	0.16	0.57	0.40	0.17	23.0	68	<6.2	5.4	
	May 11, 2016	YAD077C	8.6	21.9	8.1	94	0.9	98.2%	0.02	0.36	<0.02	0.19	0.55	0.35	0.20	21.0	68	<6.2	5.6	28.0
	September 9, 2013	YAD077A	5.8	26.5	7.1	97	1.4	72.2%	0.02	0.48	0.01	0.01	0.49	0.47	0.02		68		3.7	
	September 9, 2013	YAD077B	6.4	26.4	7.1	96	1.3	79.5%	0.02	0.38	0.01	0.01	0.39	0.37	0.02		71	<6.2	3.0	
	September 9, 2013	YAD077C	5.5	26.5	7.1	97	1.1	68.4%	0.02	0.42	0.01	0.01	0.43	0.41	0.02		113	<6.2	4.3	30.0

Appendix A - Yadkin-Pee Dee River Basin Lakes Data

January 1, 2012 through December 31, 2016

Lake	Date	Sampling Station	SURFACE PHYSICAL DATA DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent SAT	PHOTIC ZONE DATA TP mg/L	TKN mg/L	NH3 mg/L	NOx mg/L	TN mg/L	TON mg/L	TIN mg/L	Chla µg/L	Solids Total mg/L	Total Solids Suspended mg/L	Turbidity NTU	Total Hardness mg/L
	August 13, 2013	YAD077A	5.0	28.6	7.0	99	1.1	64.6%	0.02	0.39	0.01	0.01	0.40	0.38	0.02		68	<6.2	3.4	
	August 13, 2013	YAD077B	5.1	28.0	7.0	97	1.1	65.2%	0.03	0.39	0.01	0.01	0.40	0.38	0.02		66	<6.2	5.4	
	August 13, 2013	YAD077C	4.9	27.9	7.0	100	1.0	62.5%	0.02	0.44	0.10	0.02	0.46	0.34	0.12		65	<6.2	4.2	31.0
	July 1, 2013	YAD077A	4.5	28.2	6.9	96	1.5	57.7%	0.02	0.44	0.02	0.01	0.45	0.42	0.03	9.6	64		3.4	
	July 1, 2013	YAD077B	4.3	28.2	6.9	96	1.2	55.1%	0.03	0.45	0.01	0.01	0.46	0.44	0.02	12.0	68	<6.2	3.3	
	July 1, 2013	YAD077C	4.1	27.4	6.8	98	0.8	51.8%	0.02	0.50	0.14	0.04	0.54	0.36	0.18	6.5	68	<6.2	5.6	31.0
	June 4, 2013	YAD077A	7.0	25.5	7.1	96	1.4	85.5%	0.03	0.40	0.03	0.02	0.42	0.37	0.05	13.0	68	<6.2	2.6	
	June 4, 2013	YAD077B	3.7	25.7	6.9	87	1.1	45.4%	0.03	0.36	0.02	0.01	0.37	0.34	0.03	15.0		<6.2	4.5	
	June 4, 2013	YAD077C	5.4	24.4	7.1	98	1.1	64.6%	0.02	0.36	0.09	0.05	0.41	0.27	0.14	6.9	62	<6.2	5.4	31.0
	May 14, 2013	YAD077A	7.7	20.6	7.2	93	0.9	85.7%	0.03	0.50	0.01	0.13	0.63	0.49	0.14	17.0	77	<12	4.5	
	May 14, 2013	YAD077B	7.0	19.8	7.0	87	1.0	76.7%	0.03	0.48	0.01	0.10	0.58	0.47	0.11	24.0	80		7.0	
	May 14, 2013	YAD077C	7.3	18.7	7.1	93	1.0	78.2%	0.02	0.39	0.01	0.17	0.56	0.38	0.18	15.0	74	<6.2	5.9	29.0
HIGH ROCK LAKE	October 5, 2016	YADHRL051	7.2	21.8	7.1	96	0.3	82.1%	0.21	0.62	0.12	0.98	1.60	0.50	1.10	11.0	120	48.0	65.0	
	October 5, 2016	YAD152A	9.5	24.0	8.5	102	0.5	112.9%	0.11	0.82	<0.02	0.44	1.26	0.81	0.45	64.0	82	18.0	21.0	
	October 5, 2016	YAD152C	9.4	24.5	8.5	104	0.6	112.7%	0.08	0.80	<0.02	0.35	1.15	0.79	0.36	70.0	78	8.8	11.0	
	October 5, 2016	YAD156A	7.1	24.2	7.5	105	0.6	84.7%	0.08	0.80	0.03	0.38	1.18	0.77	0.41	47.0	82	12.0	13.0	
	October 5, 2016	YAD169A	6.2	24.6	7.4	107	0.8	74.5%	0.05	0.60	<0.02	0.14	0.74	0.59	0.15	37.0	84	<12.0	10.0	
	October 5, 2016	YAD169B	7.0	24.5	7.4	105	0.8	84.0%	0.07	0.67	0.03	0.42	1.09	0.64	0.45	46.0	76	9.5	11.0	
	October 5, 2016	YAD169E	4.6	24.6	7.1	101	0.9	55.3%	0.05	0.58	0.08	0.44	1.02	0.50	0.52	20.0	74	6.5	8.4	
	October 5, 2016	YAD169F	4.1	24.5	7.0	106	0.9	49.2%	0.05	0.60	0.09	0.54	1.14	0.51	0.63	19.0	76	<6.2	7.7	25.0
	September 15, 2016	YADHRL051	7.8	28.0	7.4	116	0.3	99.7%	0.21	0.72	0.02	1.00	1.72	0.71	1.01	30.0	120	41.0	50.0	
	September 15, 2016	YAD152A	12.4	29.0	9.2	112	0.5	161.3%	0.11	1.10	<0.02	0.33	1.43	1.09	0.34	73.0	90	13.0	14.0	
	September 15, 2016	YAD152C	11.7	29.7	9.3	106	0.7	154.0%	0.07	0.97	<0.02	0.07	1.04	0.96	0.08	60.0	84	8.2	8.4	
	September 15, 2016	YAD156A	12.2	29.2	9.3	105	0.6	159.2%	0.07	1.00	<0.02	0.02	1.02	0.99	0.03	69.0	83	9.2	6.9	
	September 15, 2016	YAD169A	8.6	28.4	8.7	102	0.8	110.7%	0.05	0.76	<0.02	0.03	0.79	0.75	0.04	52.0	80	6.8	5.8	
	September 15, 2016	YAD169B	8.7	28.2	8.7	100	0.9	111.6%	0.05	0.76	<0.02	0.12	0.88	0.75	0.13	44.0	78	6.2	5.7	
	September 15, 2016	YAD169E	9.1	29.2	8.5	83	1.0	118.8%	0.03	0.58	<0.02	0.02	0.60	0.57	0.03	26.0	72	6.2	6.6	
	September 15, 2016	YAD169F	8.1	28.6	8.2	93	1.0	104.6%	0.04	0.64	<0.02	0.12	0.76	0.63	0.13	33.0	78	<6.2	5.1	24.0
	August 31, 2016	YADHRL051	8.1	29.6	7.4	106	0.3	106.5%	0.18	0.73	0.02	0.84	1.57	0.71	0.86	33.0	118	34.0	50.0	
	August 31, 2016	YAD152A	11.9	32.1	9.4	102	0.8	163.2%	0.09	0.96	<0.02	0.28	1.24	0.95	0.29	61.0	76	9.0	10.0	
	August 31, 2016	YAD152C	12.8	31.1	9.4	100	0.7	172.6%	0.08	0.99	<0.02	0.03	1.02	0.98	0.04	69.0	76	<12.0	6.3	
	August 31, 2016	YAD156A	10.4	31.6	9.2	96	0.7	141.5%	0.06	0.88	<0.02	<0.02	0.89	0.87	0.02	61.0	78	6.2	7.2	
	August 31, 2016	YAD169A	7.7	30.7	8.3	114	1.1	103.1%	0.05	0.67	<0.02	<0.02	0.68	0.66	0.02	38.0	82	<6.2	4.7	
	August 31, 2016	YAD169B	10.6	30.8	9.2	97	0.7	142.2%	0.07	0.85	<0.02	<0.02	0.86	0.84	0.02	55.0	75	7.0	6.3	
	August 31, 2016	YAD169E	8.5	30.9	8.6	84	1.0	114.2%	0.04	0.60	<0.02	<0.02	0.61	0.59	0.02	31.0	64	<6.2	5.1	
	August 31, 2016	YAD169F	9.6	31.0	9.0	93	0.8	129.2%	0.04	0.77	<0.02	<0.02	0.78	0.76	0.02	39.0	68	<6.2	5.1	24.0
	August 24, 2016	YADHRL051	9.6	29.3	8.1	99	0.4	125.5%	0.17	0.75	<0.02	0.82	1.57	0.74	0.83	47.0	102	28.0	29.0	
	August 24, 2016	YAD152A	12.4	31.3	9.3	99	0.7	167.8%	0.08	0.92	<0.02	0.26	1.18	0.91	0.27	56.0	82	9.5	8.9	
	August 24, 2016	YAD152C	10.8	30.7	9.3	96	0.8	144.7%	0.06	0.79	<0.02	0.08	0.87	0.78	0.09	60.0	80	<6.2	5.9	
	August 24, 2016	YAD156A	10.4	30.9	9.1	94	0.8	139.8%	0.06	0.83	<0.02	0.16	0.99	0.82	0.17	58.0	80	8.2	8.7	
	August 24, 2016	YAD169A	9.1	31.6	8.9	116	0.9	123.8%	0.04	0.68	<0.02	0.04	0.72	0.67	0.05	35.0	88	<6.2	5.1	
	August 24, 2016	YAD169B	6.5	30.0	7.9	94	1.0	86.0%	0.05	0.70	0.07	0.24	0.94	0.63	0.31	31.0	75	<6.2	5.8	
	August 24, 2016	YAD169E	7.2	31.0	7.2	88	1.0	96.9%	0.03	0.60	<0.02	0.03	0.63	0.59	0.04	26.0	68	<6.2	5.6	
	August 24, 2016	YAD169F	7.3	30.7	8.7	93	1.0	97.8%	0.04	0.68	<0.02	0.11	0.79	0.67	0.12	34.0	72	<6.2	6.3	26.0
	July 27, 2016	YADHRL051																		
	July 27, 2016	YAD152A																		
	July 27, 2016	YAD152C	12.0	33.2	9.2	105	0.6	167.7%	0.09	0.94	<0.02	0.20	1.14	0.93	0.21	58.0	94	8.2	9.4	
	July 27, 2016	YAD156A	10.5	34.1	9.3	103	0.7	148.9%	0.07	0.80	<0.02	0.18	0.98	0.79	0.19	52.0	89	6.2	7.2	
	July 27, 2016	YAD169A	6.9	31.6	8.5	115	0.8	93.8%	0.04	0.69	<0.02	0.02	0.71	0.68	0.03	31.0	96	<6.2	4.7	
	July 27, 2016	YAD169B	9.9	33.9	9.3	103	0.7	139.9%	0.07	0.92	<0.02	0.08	1.00	0.91	0.09	56.0	120	7.2	6.6	
	July 27, 2016	YAD169E	11.0	33.5	9.4	103	0.7	154.5%	0.05	0.80	<0.02	0.03	0.83	0.79	0.04	48.0	120	8.5	6.5	
	July 27, 2016	YAD169F	11.0	34.1	9.4	103	0.7	156.0%	0.06	0.81	<0.02	<0.02	0.82	0.80	0.02	55.0	132	<6.2	5.5	20.0
	July 13, 2016	YADHRL051	12.3	31.0	8.9	98	0.5	165.6%	0.13	0.79	<0.02	0.63	1.42	0.78	0.64		80	17.0	26.0	
	July 13, 2016	YAD152A	15.0	32.5	9.5	100	0.5	207.1%	0.10	1.00	<0.02	0.12	1.12	0.99	0.13		80	<12.0	12.0	
	July 13, 2016	YAD152C	15.4	32.0	9.6	101	0.5	210.9%	0.11	1.00	<0.02	0.12	1.12	0.99	0.13		82	9.0	11.0	
	July 13, 2016	YAD156A																		
	July 13, 2016	YAD169A	8.9	30.7	9.0	109	0.8	119.2%	0.04	0.69	<0.02	0.02	0.71	0.68	0.03		82	<6.2	5.3	
	July 13, 2016	YAD169B																		
	July 13, 2016	YAD169E																		
	July 13, 2016	YAD169F																		
	June 22, 2016	YADHRL051	12.8	30.3	9.1	94	0.4	170.3%	0.14	0.77	<0.02	0.85	1.62	0.76	0.86	64.0	110	21.0	29.0	
	June 22, 2016	YAD152A	12.9	31.1	9.6	97	0.7	174.0%	0.07	0.83	<0.02	0.26	1.09	0.82	0.27	45.0	90	<6.2	8.1	
	June 22, 2016	YAD152C	12.8	30.4	9.6	97	0.8	170.6%	0.07	0.92	<0.02	0.20	1.12	0.91	0.21	56.0	92	6.2	6.2	
	June 22, 2016	YAD156A	10.1	30.5	9.2	97	0.8	134.8%	0.06	0.78	<0.02	0.26	1.04	0.77	0.27	56.0	89	8.8	8.2	
	June 22, 2016	YAD169A	9.7	28.2	8.7	101	0.9	124.4%	0.05	0.79	<0.02	<0.02	0.80	0.78	0.02	49.0	97	8.2	7.9	
	June 22, 2016	YAD169B	12.7	30.4	9.6	96	0.8	169.2%	0.06	0.78	<0.02	0.13	0.91	0.77	0.14	57.0	86	7.2	5.7	
	June 22, 2016	YAD169E	10.1	31.4	9.3	89	0.8	136.9%	0.04	0.73	<0.02	0.06	0.79	0.72	0.07	42.0	84	7.5	7.6	
	June 22, 2016	YAD169F	11.3	30.7	9.5	93	0.7	151.4%	0.05	0.80	<0.02	0.06	0.86	0.79	0.07	55.0	86	7.2	7.1	26.0

Appendix A - Yadkin-Pee Dee River Basin Lakes Data

January 1, 2012 through December 31, 2016

Lake	Date	Sampling Station	DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent SAT	TP mg/L	TKN mg/L	NH3 mg/L	NOx mg/L	TN mg/L	TON mg/L	TIN mg/L	Chla µg/L	Solids Total mg/L	Total Solids Suspended mg/L	Turbidity NTU	Total Hardnes mg/L
	SURFACE PHYSICAL DATA								PHOTIC ZONE DATA											
HIGH ROCK LAKE	June 8, 2016	YADHRL051	6.0	25.9	7.0	83	0.3	73.8%	0.17	0.57	0.13	0.88	1.45	0.44	1.01	6.5	110	40.0	55.0	
	June 8, 2016	YAD152A	6.8	26.3	7.2	87	0.4	84.3%	0.11	0.66	0.06	0.85	1.51	0.60	0.91	20.0	90	21.0	25.0	
	June 8, 2016	YAD152C	7.0	26.2	7.2	90	0.5	86.6%	0.10	0.72	0.06	0.75	1.47	0.66	0.81	33.0	84	17.0	20.0	
	June 8, 2016	YAD156A	9.2	26.8	8.6	90	1.0	115.1%	0.05	0.65	<0.02	0.49	1.14	0.64	0.50	36.0	70	<12.0	6.8	
	June 8, 2016	YAD169A	9.3	27.3	9.0	106	1.0	117.4%	0.05	0.70	<0.02	0.05	0.75	0.69	0.06	35.0	81	<6.2	4.9	
	June 8, 2016	YAD169B	7.4	26.3	7.7	90	1.1	91.7%	0.04	0.56	0.03	0.51	1.07	0.53	0.54	24.0	72	<6.2	6.3	
	June 8, 2016	YAD169E	8.9	27.4	8.9	88	0.9	112.5%	0.04	0.62	<0.02	0.34	0.96	0.61	0.35	30.0	70	<6.2	6.0	
	June 8, 2016	YAD169F	8.4	26.8	8.8	89	1.3	105.1%	0.04	0.59	<0.02	0.37	0.96	0.58	0.38	28.0	72	<6.2	5.5	25.0
	May 25, 2016	YADHRL051	7.5	19.7	6.9	81	0.2	82.0%	0.14	0.62	0.06	0.91	1.53	0.56	0.97	10.0	100	32.0	50.0	
	May 25, 2016	YAD152A	11.1	21.0	8.2	85	0.4	124.6%	0.13	0.79	<0.02	0.86	1.65	0.78	0.87	43.0	99	17.0	45.0	
	May 25, 2016	YAD152C	9.7	22.9	7.5	82	0.3	112.9%	0.10	0.83	<0.02	0.67	1.50	0.82	0.68	44.0	84	12.0	30.0	
	May 25, 2016	YAD156A	11.7	23.4	8.9	84	0.6	137.5%	0.06	0.73	<0.02	0.40	1.13	0.72	0.41	42.0	72	7.5	9.6	
	May 25, 2016	YAD169A	11.3	24.0	8.7	125	0.9	134.3%	0.04	0.70	<0.02	<0.02	0.71	0.69	0.02	32.0	91	<6.2	5.0	
	May 25, 2016	YAD169B	13.1	23.0	9.2	90	0.6	152.8%	0.06	0.64	<0.02	0.42	1.06	0.63	0.43	49.0	72	<12.0	6.7	
	May 25, 2016	YAD169E	12.4	23.2	9.1	83	1.0	145.1%	0.04	0.56	<0.02	0.34	0.90	0.55	0.35	31.0	66	<6.2	5.8	
	May 25, 2016	YAD169F	13.0	23.2	9.2	88	0.8	152.2%	0.06	0.69	<0.02	0.41	1.10	0.68	0.42	47.0	72	<6.2	5.6	26.0
	May 11, 2016	YADHRL051	7.5	20.8	7.3	84	0.3	83.8%	0.10	0.50	0.10	0.90	1.40	0.40	1.00	6.6	80	16.0	23.0	
	May 11, 2016	YAD152A	11.6	22.9	8.7	82	0.3	135.0%	0.09	0.68	<0.02	0.60	1.28	0.67	0.61	54.0	76	<12.0	20.0	
	May 11, 2016	YAD152C	11.4	22.9	8.7	83	0.3	132.7%	0.10	0.86	<0.02	0.57	1.43	0.85	0.58	71.0	82	14.0	22.0	
	May 11, 2016	YAD156A	9.6	21.7	7.6	81	0.3	109.2%	0.08	0.61	<0.02	0.62	1.23	0.60	0.63	34.0	80	10.0	22.0	
	May 11, 2016	YAD169A	9.2	22.8	8.1	124	0.6	106.9%	0.06	0.66	<0.02	0.11	0.77	0.65	0.12	38.0	92	7.5	9.3	
	May 11, 2016	YAD169B	10.8	22.1	8.1	81	0.7	123.8%	0.09	0.76	<0.02	0.65	1.41	0.75	0.66	43.0	81	10.0	25.0	
	May 11, 2016	YAD169E	9.7	22.3	8.2	82	0.6	111.6%	0.06	0.66	<0.02	0.36	1.02	0.65	0.37	34.0	70	7.0	9.4	
	May 11, 2016	YAD169F	7.3	21.0	7.3	80	0.4	81.9%	0.08	0.74	0.09	0.66	1.40	0.65	0.75	22.0	73	8.8	23.0	24.0
LAKE THOM-A-LEX	September 21, 2016	YAD160B	5.7	25.8	7.3	122	0.7	70.0%	0.07	0.66	<0.02	<0.02	0.67	0.65	0.02	38.0	110	17.0	21.0	
	September 21, 2016	YAD1611A	4.6	26.2	7.1	122	0.7	56.9%	0.05	0.76	0.06	<0.02	0.77	0.70	0.07	27.0	98	7.5	8.8	42.0
	August 17, 2016	YAD160B	7.9	32.4	8.5	114	0.6	108.9%	0.06	0.81	<0.02	0.03	0.84	0.80	0.04	28.0	93	<12.0	10.0	
	August 17, 2016	YAD1611A	7.8	29.0	8.2	112	0.5	101.4%	0.06	0.85	<0.02	<0.02	0.86	0.84	0.02	44.0	89	9.2	8.6	39.0
	July 6, 2016	YAD160B	9.3	29.7	8.6	118	0.4	122.4%	0.06	0.73	<0.02	<0.02	0.74	0.72	0.02	39.0	99	11.0	15.0	
	July 6, 2016	YAD1611A	8.1	30.3	8.4	117	0.7	107.8%	0.05	0.72	<0.02	<0.02	0.73	0.71	0.02	34.0	90	6.5	7.2	40.0
	June 8, 2016	YAD160B	9.2	28.1	8.2	109	0.6	117.8%	0.06	0.72	<0.02	<0.02	0.73	0.71	0.02	30.0	91	10.0	11.0	
	June 8, 2016	YAD1611A	8.7	26.9	7.6	102	0.6	109.0%	0.05	0.68	<0.02	<0.02	0.69	0.67	0.02	27.0	87	7.8	9.0	35.0
	May 10, 2016	YAD160B	10.4	23.6	7.8	105	0.4	122.7%	0.07	0.68	<0.02	0.07	0.75	0.67	0.08	37.0	106	12.0	24.0	
	May 10, 2016	YAD1611A	9.5	21.6	7.6	104	0.3	107.9%	0.10	0.84	0.02	0.18	1.02	0.82	0.20	48.0	118	18.0	45.0	36.0
	September 13, 2012	YAD160B	7.7	26.1	7.6	119	0.4	95.1%	0.06	0.72	<0.02	<0.02	0.73	0.71	0.02	38.0	103	10.0	12.0	
	September 13, 2012	YAD1611A	6.0	26.4	7.2	121	0.6	74.5%	0.04	0.62	0.04	<0.02	0.63	0.58	0.05	31.0	96	<6.2	4.8	42.0
	August 23, 2012	YAD160B	6.0	26.4	8.0	119	0.4	74.5%	0.07	0.77	<0.02	<0.02	0.78	0.76	0.02	34.0	109	14.0	16.0	
	August 23, 2012	YAD1611A	5.1	26.5	7.6	117	0.5	63.5%	0.05	0.81	<0.02	<0.02	0.82	0.80	0.02	32.0	102	7.0	9.5	41.0
	July 7, 2012	YAD160B	7.3	28.2	7.7	127	0.5	93.6%	0.08	0.92	<0.02	<0.02	0.93	0.91	0.02	49.0	110	11.0	15.0	
	July 7, 2012	YAD1611A	3.8	28.8	7.0	128	0.5	49.3%	0.05	0.64	<0.02	<0.02	0.65	0.63	0.02	33.0	100	6.5	9.9	43.0
	June 21, 2012	YAD160B	11.0	30.2	8.7	128	0.5	146.1%	0.05	0.73	<0.02	<0.02	0.74	0.72	0.02	30.0	100	<12	7.4	
	June 21, 2012	YAD1611A	7.7	28.6	7.8	127	0.7	99.4%	0.04	0.63	0.02	<0.02	0.64	0.61	0.03	30.0	99	<6.2	5.8	43.0
	May 3, 2012	YAD160B	9.1	25.7	8.5	119	1.0	111.6%	0.05	0.55	<0.02	<0.02	0.56	0.54	0.02	29.0	99	9.0	8.7	
	May 3, 2012	YAD1611A	8.8	23.9	8.4	116	0.9	104.4%	0.04	0.55	<0.02	<0.02	0.56	0.54	0.02	24.0	94	7.8	6.3	37.0
TUCKERTOWN RESERVOIR	September 21, 2016	YAD172C	4.6	26.6	7.2	86	1.0	57.3%	0.04	0.59	0.06	0.26	0.85	0.53	0.32	17.0	75	<6.2	5.5	
	September 21, 2016	YAD1780A	4.4	27.3	6.9	98	0.8	55.5%	0.04	0.56	0.02	0.28	0.84	0.54	0.30	22.0	72	<6.2	5.2	26.0
	August 17, 2016	YAD172C	6.7	31.2	7.9	86	0.4	90.5%	0.06	0.70	0.02	0.38	1.08	0.68	0.40	25.0	63	<6.2	7.6	
	August 17, 2016	YAD1780A	9.7	31.8	8.8	89	0.5	132.4%	0.05	0.85	<0.02	0.11	0.96	0.84	0.12	48.0	64	<6.2	5.2	22.0
	July 6, 2016	YAD172C	3.8	28.3	7.3	99	0.7	48.8%	0.06	0.69	0.20	0.21	0.90	0.49	0.41	18.0	70	<12.0	5.4	
	July 6, 2016	YAD1780A	7.8	29.8	7.6	94	0.8	102.9%	0.05	0.70	<0.02	0.07	0.77	0.69	0.08	40.0	66	<6.2		28.0
	June 8, 2016	YAD172C	5.2	23.9	7.3	92	0.9	61.7%	0.05	0.53	0.10	0.44	0.97	0.43	0.54	12.0	71	<6.2	7.3	
	June 8, 2016	YAD1780A	9.5	26.7	8.6	86	0.8	118.6%	0.05	0.66	<0.02	0.22	0.88	0.65	0.23	33.0	66	<6.2	4.4	25.0
	May 10, 2016	YAD172C	8.1	21.3	7.4	79	0.4	91.4%	0.08	0.70	0.07	0.70	1.40	0.63	0.77	24.0	82	11.0	29.0	
	May 10, 2016	YAD1780A	9.8	23.1	7.4	80	0.4	114.5%	0.10	0.81	0.03	0.70	1.51	0.78	0.73	48.0	78	10.0	25.0	26.0
	September 13, 2012	YAD172C	5.7	26.2	7.0	100	0.8	70.5%	0.05	0.52	0.09	0.34	0.86	0.43	0.43	21.0	74	<6.2	5.8	
	September 13, 2012	YAD1780A	6.2	26.6	7.0	102	0.8	77.3%	0.05	0.54	0.03	0.26	0.80	0.51	0.29	30.0	76	<12	4.3	27.0
	August 23, 2012	YAD172C	3.8	27.3	7.8	100	0.7	48.0%	0.06	0.68	0.21	0.25	0.93	0.47	0.46	14.0	80	6.5	7.5	
	August 23, 2012	YAD1780A	5.3	28.1	7.5	95	0.8	67.8%	0.05	0.67	0.04	0.21	0.88	0.63	0.25	32.0	32		3.8	
	July 12, 2012	YAD172C	5.7	28.2	7.3	97	0.7	93.5%	0.07	0.70	<0.02	0.06	0.76	0.60	0.16	28.0	75	6.2	6.9	
	July 12, 2012	YAD1780A	7.3	29.7	8.5	93	0.8	96.1%	0.05	0.70	<0.02	<0.02	0.71	0.69	0.02	37.0	75	<6.2	4.3	24.0
	June 21, 2012	YAD172C	7.5	26.6	7.4	90	0.6	93.5%	0.05	0.63	0.09	0.37	1.00	0.54	0.46		76	<6.2	11.0	
	June 21, 2012	YAD1780A	12.8	29.8	9.4	97	0.9	168.8%	0.05	0.73	<0.02	0.09	0.82	0.72	0.10	30.0	74	<6.2	4.0	25.0
	May 3, 2012	YAD172C	9.9	22.8	8.4	83	1.0	115.0%	0.05	0.55	<0.02	0.46	1.01	0.54	0.47	30.0	69	<6.2	7.2	
	May 3, 2012	YAD1780A	10.8	23.1	9.2	86	1.5	126.2%	0.05	0.41	<0.02	0.37	0.78	0.40	0.38	34.0	68	<6.2	3.6	24.0

Appendix A - Yadkin-Pee Dee River Basin Lakes Data
January 1, 2012 through December 31, 2016

Lake	Date	Sampling Station	DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent SAT	TP mg/L	TKN mg/L	NH3 mg/L	NOx mg/L	TN mg/L	TON mg/L	TIN mg/L	Chla µg/L	Solids Total mg/L	Total Solids Suspended mg/L	Turbidity NTU	Total Hardness mg/L
		SURFACE PHYSICAL DATA							PHOTIC ZONE DATA											
BADIN LAKE	September 14, 2016	YAD178B	8.6	29.1	8.6	90	1.1	112.0%	0.03	0.62	<0.02	0.07	0.69	0.61	0.08	32.0	66	<6.2	3.2	
	September 14, 2016	YAD178E	7.9	29.2	8.5	89	1.2	103.1%	0.02	0.68	<0.02	<0.02	0.69	0.67	0.02	27.0	64	<6.2	2.9	
	September 14, 2016	YAD178F	6.2	29.5	7.8	89	1.3	81.3%	0.02	0.51	<0.02	0.10	0.61	0.50	0.11	23.0	63	<6.2	2.8	
	September 14, 2016	YAD178F1	6.2	29.1	7.6	89	1.1	80.8%	0.02	0.52	<0.02	0.11	0.63	0.51	0.12	21.0	67	<6.2	2.5	25.0
	August 17, 2016	YAD178B	7.9	31.2	8.6	96	1.0	106.7%	0.03	0.56	<0.02	<0.02	0.57	0.55	0.02	21.0	71	<6.2	2.9	
	August 17, 2016	YAD178E	7.1	31.5	8.1	93	1.3	96.4%	0.02	0.48	<0.02	<0.02	0.49	0.47	0.02	12.0	65	<6.2	2.2	
	August 17, 2016	YAD178F	4.8	30.4	7.2	94	1.3	64.0%	0.03	0.69	<0.02	0.03	0.72	0.68	0.04	35.0	70	<6.2	3.2	
	August 17, 2016	YAD178F1	6.8	30.7	7.9	95	1.4	91.1%	0.02	0.52	<0.02	0.14	0.66	0.51	0.15	22.0	66	<6.2	2.6	28.0
	July 14, 2016	YAD178B	8.0	32.5	8.7	97	1.3	110.5%	0.03	0.56	<0.02	0.10	0.66	0.55	0.11	18.0	72	<6.2	3.4	
	July 14, 2016	YAD178E	7.9	32.3	8.9	92	1.9	108.7%	0.02	0.51	<0.02	<0.02	0.52	0.50	0.02	11.0	65	<6.2	2.8	
	July 14, 2016	YAD178F	7.6	32.1	8.6	94	1.7	104.2%	0.02	0.47	<0.02	0.08	0.55	0.46	0.09	11.0	66	<6.2	2.4	
	July 14, 2016	YAD178F1	8.1	31.2	8.1	93	1.8	109.4%	0.02	0.54	<0.02	0.08	0.62	0.53	0.09	14.0	68	<7.4	2.6	25.0
	June 21, 2016	YAD178B	10.4	28.8	9.1	88	1.0	134.8%	0.04	0.61	<0.02	0.13	0.74	0.60	0.14	32.0	71	<12.0	4.8	
	June 21, 2016	YAD178E	9.5	28.2	9.1	85	1.0	121.8%	0.03	0.56	<0.02	0.09	0.65	0.55	0.10	28.0	66	<6.2	3.9	
	June 21, 2016	YAD178F	7.6	27.6	8.7	85	1.2	96.4%	0.04	0.63	0.02	0.15	0.78	0.61	0.17	24.0	64	<6.2	4.1	
	June 21, 2016	YAD178F1	6.7	27.5	8.1	85	1.3	84.9%	0.03	0.55	0.04	0.17	0.72	0.51	0.21	20.0	62	<6.2	4.0	25.0
	May 9, 2016	YAD178B	9.9	22.6	8.0	83	0.9	114.6%	0.04	0.56	0.02	0.59	1.15	0.54	0.61	26.0	66	7.8	14.0	
	May 9, 2016	YAD178E	10.9	23.1	9.1	84	1.1	127.3%	0.03	0.52	0.01	0.30	0.82	0.51	0.31	32.0	60	<6.8	3.6	
	May 9, 2016	YAD178F	10.9	21.9	8.6	84	0.9	124.5%	0.06	0.62	0.03	0.57	1.19	0.59	0.60	31.0	62	6.5	11.0	
	May 9, 2016	YAD178F1	11.1	22.3	8.8	85	0.9	127.7%	0.04	0.56	0.02	0.59	1.15	0.54	0.61	26.0	66	7.8	14.0	23.0
FALLS LAKE	September 19, 2016	YAD178F3	6.6	28.1	6.9	93	2.1	84.5%	0.02	0.42	0.04	0.21	0.63	0.38	0.25	4.5	64	<12.0	2.9	
	September 19, 2016	YAD178F5	7.3	28.3	7.2	92	2.1	93.8%	0.02	0.48	<0.02	0.16	0.64	0.47	0.17	12.0	66	<6.2	2.7	25.0
	August 1, 2016	YAD178F3	7.8	28.9	7.1	93	1.4	101.3%	0.02	0.51	0.09	0.13	0.64	0.42	0.22	7.2	70	<6.2	3.4	
	August 1, 2016	YAD178F5	8.0	28.7	7.1	92	1.2	103.5%	0.02	0.48	0.02	0.13	0.61	0.46	0.15	21.0	65	<6.2	3.4	25.0
	July 11, 2016	YAD178F3	6.1	29.2	7.1	91	1.7	79.6%	0.02	0.46	0.04	0.26	0.72	0.42	0.30	7.3	61	<10.6	3.2	
	July 11, 2016	YAD178F5	6.6	28.8	7.1	90	1.7	85.5%	0.02	0.45	0.04	0.26	0.71	0.41	0.30	11.0	70	<6.2	3.3	26.0
	June 6, 2016	YAD178F3	7.6	21.6	7.0	83	1.7	86.3%	0.03	0.34	0.03	0.70	1.04	0.31	0.73	9.3	58	<6.2	4.3	
	June 6, 2016	YAD178F5	11.1	23.9	8.0	82	1.1	131.7%	0.04	0.50	<0.02	0.62	1.12	0.49	0.63	30.0	60	<12.0	4.2	24.0
	May 12, 2016	YAD178F3	9.1	20.6	7.3	83	0.9	101.3%	0.04	0.47	0.04	0.60	1.07	0.43	0.64	10.0	61	<6.2	9.8	
	May 12, 2016	YAD178F5	8.8	22.3	7.1	83	0.9	101.3%	0.04	0.47	0.06	0.64	1.11	0.41	0.70	12.0	61	<6.2	11.0	24.0
LAKE REESE	September 19, 2013	YAD179B	4.9	24.3	7.3	122	0.5	58.6%	0.04	0.66	0.01	0.01	0.67	0.65	0.02	25.0	99	7.5	10.0	
	September 19, 2013	YAD179D	5.2	24.7	7.3	114	0.8	62.6%	0.02	0.50	0.01	0.01	0.51	0.49	0.02	18.0	92	<6.2	6.4	
	September 19, 2013	YAD179F	6.3	25.1	7.6	110	0.9	76.4%	0.02	0.50	0.01	0.01	0.51	0.49	0.02	15.0	68		5.1	
	August 15, 2013	YAD179B	6.4	27.4	7.6	112	0.6	80.9%	0.05	0.54	0.01	0.01	0.55	0.53	0.02	27.0	84	7.5	10.0	
	August 15, 2013	YAD179D	6.8	27.5	7.5	104	0.8	86.1%	0.02	0.48	0.01	0.01	0.49	0.47	0.02	19.0	88	<6.2	5.6	
	August 15, 2013	YAD179F	7.6	28.0	7.3	101	0.9	97.1%	0.03	0.52	0.01	0.01	0.53	0.51	0.02	4.1	77	<6.2	4.1	34.0
	July 18, 2013	YAD179B	8.7	30.9	8.5	104	0.7	116.9%	0.04	0.70	0.01	0.02	0.72	0.69	0.03	19.0	90	<6.2	7.8	
	July 18, 2013	YAD179D	8.4	30.6	8.5	99	1.0	112.3%	0.03	0.62	0.01	0.01	0.63	0.61	0.02	16.0	78	<6.2	7.7	
	July 18, 2013	YAD179F	7.9	30.6	8.2	101	1.0	105.6%	0.03	0.56	0.01	0.01	0.57	0.55	0.02	9.4	88		6.3	39.0
	June 20, 2013	YAD179B	7.5	26.8	7.8	99	0.7	93.8%	0.06	0.72	0.01	0.01	0.73	0.71	0.02		88	6.8		
	June 20, 2013	YAD179D	7.8	27.2	8.0	94	0.7	98.3%	0.04	0.59	0.01	0.01	0.60	0.58	0.02		83	<6.2		
	June 20, 2013	YAD179F	8.1	27.0	8.0	91	0.7	101.7%	0.04	0.59	0.01	0.01	0.60	0.58	0.02		85	<6.2		37.0
	May 9, 2013	YAD179B	8.5	19.2	7.6	91	0.3	92.0%	0.08	0.75	0.01	0.22	0.97	0.74	0.23	30.0	96	14.0	26.0	
	May 9, 2013	YAD179D	9.1	20.4	7.9	92	0.5	100.9%	0.05	0.60	0.01	0.17	0.77	0.59	0.18	27.0	86	8.5	18.0	
	May 9, 2013	YAD179F	9.4	19.7	8.2	95	0.6	102.8%	0.04	0.55	0.01	0.08	0.63	0.54	0.09	24.0	95	<6.2	11.0	33.0
	September 20, 2012	YAD179B	5.9	23.6	7.0	95	0.5	69.6%	0.05	0.74	0.07	0.01	0.75	0.67	0.08	31.0	86	10.0	11.0	
	September 20, 2012	YAD179D	4.4	24.1	6.8	83	0.8	52.4%	0.03	0.74	0.12	0.01	0.75	0.62	0.13	16.0	72	<6.2	6.2	
	September 20, 2012	YAD179F	5.3	24.3	6.9	75	0.7	63.3%	0.03	0.65	0.06	0.01	0.66	0.59	0.07	29.0	72	<6.2	6.0	27.0
	August 27, 2012	YAD179B	7.5	26.8	7.8	98	0.5	93.8%	0.05	0.79	0.01	0.01	0.80	0.78	0.02	25.0	82	9.2	11.0	
	August 27, 2012	YAD179D	8.0	27.8	7.8	75	0.7	101.9%	0.04	0.70	0.01	0.01	0.71	0.69	0.02	20.0	71	<12	6.8	
	August 27, 2012	YAD179F	7.9	28.3	7.9	74	0.7	101.5%	0.04	0.76	0.01	0.01	0.77	0.75	0.02	28.0	67	<6.2	6.9	26.0
	July 26, 2012	YAD179B	7.6	30.4	8.4	111	0.7	101.3%	0.04	0.67	0.01	0.01	0.68	0.66	0.02	1.8	87	<6.2	7.4	
	July 26, 2012	YAD179D	7.5	30.1	8.5	113	0.7	99.4%	0.03	0.47	0.01	0.01	0.48	0.46	0.02	20.0	87	<6.2	5.4	
	July 26, 2012	YAD179F	7.9	30.4	8.5	115	1.0	105.3%	0.02	0.60	0.01	0.01	0.61	0.59	0.02	24.0	86	<6.2	3.6	41.0
	May 10, 2012	YAD179B	6.7	23.4	7.8	130	0.6	78.7%	0.04	0.43	0.01	0.01	0.44	0.42	0.02	18.0	99	6.8	8.3	
	May 10, 2012	YAD179D	7.7	23.4	7.9	119	0.9	90.5%	0.02	0.44	0.01	0.01	0.45	0.43	0.02	11.0	86	<6.2	4.6	
	May 10, 2012	YAD179F	7.8	23.6	7.8	117	1.2	92.0%	0.02	0.36	0.01	0.01	0.37	0.35	0.02	7.4	88	<6.2	5.3	42.0
BUNCH LAKE	September 11, 2012	YAD181G	8.0	27.0	8.0	89	3.5	100.4%	<0.02	0.36	0.01	0.01	0.37	0.35	0.02	28.0	72		4.1	28.0
	August 8, 2012	YAD181G	6.9	29.6	7.4	86	3.2	90.7%	0.03	0.42	0.01	0.01	0.43	0.41	0.02	60.0	70	<6.2	3.7	31.0
	July 24, 2012	YAD181G	6.9	31.1	8.7	86	2.6	93.1%	0.02	0.35	0.01	0.01	0.36	0.34	0.02	21.0	68	<6.2	3.8	27.0
	June 19, 2012	YAD181G	8.7	26.9	8.4	89	2.7	109.0%	<0.02	0.39	0.01	0.01	0.40	0.38	0.02		59	<6.2	2.0	29.0
	May 14, 2012	YAD181G	8.3	22.6	8.3	86	4.6	96.1%	0.02	0.43	0.01	0.01	0.44	0.42	0.02	16.0	63	<6.2	3.0	28.0
LAKE MCCRARY	September 11, 2012	YAD181E	6.6	26.5	7.5	133	2.5	82.1%	0.02	0.42	0.01	0.01	0.43	0.41	0.02	18.0	98	<6.2	3.3	51.0
	August 8, 2012	YAD181E	5.8	29.1	8.2	127	2.4	75.6%	0.02	0.35	0.01	0.01	0.36	0.34	0.02	12.0	80	<6.2	3.1	51.0
	July 24, 2012	YAD181E	6.3	30.6	8.4	126	2.4	84.2%	0.02	0.40	0.01	0.01	0.41	0.39	0.02	19.0	89	<6.2	3.2	48.0
	June 19, 2012	YAD181E	8.4	26.8	8.2	126	2.7	105.1%	0.02	0.30	0.01	0.01	0.31	0.29	0.02	5.9	84	<6.2	2.4	49.0

Appendix A - Yadkin-Pee Dee River Basin Lakes Data
January 1, 2012 through December 31, 2016

Lake	Date	Sampling Station	DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent SAT	TP mg/L	TKN mg/L	NH3 mg/L	NOx mg/L	TN mg/L	TON mg/L	TIN mg/L	Chla µg/L	Solids Total mg/L	Total Solids Suspended mg/L	Turbidity NTU	Total Hardness mg/L
		SURFACE PHYSICAL DATA							PHOTIC ZONE DATA											
BACK CREEK LAKE	September 19, 2013	YAD181J	5.2	24.2	7.2	103	0.7	62.0%	0.05	0.67	0.01	0.01	0.68	0.66	0.02	28.0	75	7.0	8.8	
	September 19, 2013	YAD181K	5.6	24.5	7.3	101	0.8	67.2%	0.04	0.60	0.01	0.01	0.61	0.59	0.02	26.0	64	<6.2	5.5	
	September 19, 2013	YAD181L	5.9	24.6	7.4	102	0.9	70.9%	0.02	0.63	0.01	0.01	0.64	0.62	0.02	16.0	66	<6.2	5.5	
	August 15, 2013	YAD181J	4.8	27.2	7.4	100	0.6	60.5%	0.07	0.86	0.01	0.01	0.87	0.85	0.02	6.2	80	6.8	9.2	
	August 15, 2013	YAD181K	6.4	27.4	7.3	96	0.7	80.9%	0.04	0.72	0.01	0.01	0.73	0.71	0.02	8.0	74	<6.2	4.8	
	August 15, 2013	YAD181L	7.0	27.3	7.6	94	0.7	88.3%	0.04	0.68	0.01	0.01	0.69	0.67	0.02	7.2	77	<6.2	4.9	31.0
	July 18, 2013	YAD181J	10.1	30.2	9.0	94	0.5	134.1%	0.07	1.20	0.01	0.01	1.21	1.19	0.02	44.0	86	6.5	6.2	
	July 18, 2013	YAD181K	9.6	30.2	9.0	92	0.6	127.5%	0.08	1.20	0.01	0.01	1.21	1.19	0.02	119.0	87	8.0	5.7	
	July 18, 2013	YAD181L	9.5	30.1	8.9	91	0.7	125.9%	0.05	1.00	0.01	0.01	1.01	0.99	0.02	33.0	78	<6.2	5.8	30.0
	June 20, 2013	YAD181J	7.8	27.2	8.3	93	0.5	98.3%	0.09	0.98	0.01	0.01	0.99	0.97	0.02	31.0	87	11.0	10.0	
	June 20, 2013	YAD181K	8.4	27.6	8.6	91	0.5	106.6%	0.08	0.94	0.01	0.01	0.95	0.93	0.02	25.0	86	8.0	8.6	
	June 20, 2013	YAD181L	7.8	27.8	8.3	90	0.5	99.3%	0.08	0.93	0.01	0.01	0.94	0.92	0.02	28.0	88	8.5	8.1	29.0
	May 9, 2013	YAD181J	9.6	19.3	8.1	101	0.5	104.2%	0.07	0.88	0.01	0.01	0.89	0.87	0.02	26.0	102	9.2	8.8	
	May 9, 2013	YAD181K	8.9	19.2	7.9	100	0.9	96.4%	0.04	0.64	0.01	0.01	0.65	0.63	0.02	13.0	84	<12	4.9	
	May 9, 2013	YAD181L	8.3	18.5	7.8	100	0.8	88.6%	0.04	0.73	0.01	0.01	0.74	0.72	0.02	13.0	94	<6.2	5.8	31.0
	September 20, 2012	YAD181J	7.3	24.5	7.1	100	0.5	87.6%	0.05	0.68	0.01	0.01	0.69	0.67	0.02	32.0	83	6.8	8.0	
	September 20, 2012	YAD181K	6.9	25.3	7.1	101	0.6	84.0%	0.03	0.56	0.01	0.01	0.57	0.55	0.02	18.0	78	<6.2	4.2	
	September 20, 2012	YAD181L	6.7	24.7	7.2	99	0.6	80.7%	0.03	0.59	0.01	0.01	0.60	0.58	0.02	23.0	80	<6.2	5.0	31.0
	August 27, 2012	YAD181J	7.6	26.7	7.7	100	0.7	94.9%	0.04	0.68	0.01	0.01	0.69	0.67	0.02	21.0	76	<6.2	5.4	
	August 27, 2012	YAD181K	7.2	26.8	7.7	97	0.8	90.1%	0.03	0.59	0.01	0.01	0.60	0.58	0.02	15.0	74	<6.2	3.4	
	August 27, 2012	YAD181L	6.8	26.8	8.2	97	1.0	85.1%	0.03	0.60	0.01	0.01	0.61	0.59	0.02	14.0	70	<6.2	3.9	31.0
	July 26, 2012	YAD181J	7.4	31.0	8.4	98	0.8	99.6%	0.05	0.76	0.01	0.01	0.77	0.75	0.02	32.0	84	<6.2	4.6	
	July 26, 2012	YAD181K	7.8	31.0	8.5	98	1.0	105.0%	0.03	0.71	0.01	0.01	0.72	0.70	0.02	16.0	80	<12	3.3	
	July 26, 2012	YAD181L	7.7	31.0	8.4	99	1.0	103.7%	0.03	0.65	0.01	0.01	0.66	0.64	0.02	18.0	82	<6.2	3.2	32.0
	May 10, 2012	YAD181J	7.9	23.4	7.6	98	0.7	92.8%	0.05	0.68	0.01	0.01	0.69	0.67	0.02	28.0	88	6.8	5.9	
	May 10, 2012	YAD181K	8.2	23.2	7.6	97	0.9	96.0%	0.04	0.68	0.01	0.01	0.69	0.67	0.02	17.0	80	<6.2	5.9	
	May 10, 2012	YAD181L	8.0	23.7	7.5	97	0.9	94.5%	0.03	0.58	0.01	0.01	0.59	0.57	0.02	14.0	80	<6.2	4.7	32.0
LAKE TILLERY	September 19, 2016	YAD185A	7.5	28.8	7.3	92	1.4	97.2%	0.03	0.44	<0.02	0.15	0.59	0.43	0.16	15.0	68	<6.2	3.3	
	September 19, 2016	YAD189	6.8	28.6	7.2	92	1.8	87.8%	0.02	0.47	<0.02	0.15	0.62	0.46	0.16	15.0	66	<6.2	2.8	
	September 19, 2016	YAD189B	8.9	28.9	8.3	92	1.6	115.6%	0.02	0.49	<0.02	<0.02	0.50	0.48	0.02	21.0	68	<6.2	2.1	
	September 19, 2016	YAD189C	9.3	28.7	8.6	93	1.6	120.3%	0.02	0.53	<0.02	<0.02	0.54	0.52	0.02	25.0	69	<6.2	2.5	26.0
	August 1, 2016	YAD185A	9.5	31.1	8.4	92	1.2	128.1%	0.03	0.54	<0.02	<0.02	0.55	0.53	0.02	22.0	65	<6.2	3.8	
	August 1, 2016	YAD189	8.9	31.1	8.4	92	1.3	120.0%	0.03	0.53	<0.02	<0.02	0.54	0.52	0.02	24.0	68	<6.2	3.1	
	August 1, 2016	YAD189B	7.7	30.6	7.8	92	1.6	103.0%	0.02	0.54	<0.02	0.02	0.56	0.53	0.03	16.0	71	<6.2	3.1	
	August 1, 2016	YAD189C	8.2	30.5	8.1	92	1.5	109.5%	0.02	0.54	<0.02	0.02	0.56	0.53	0.03	18.0	74	<6.2	2.8	27.0
	July 11, 2016	YAD185A	8.2	31.6	8.4	90	1.2	111.5%	0.03	0.54	<0.02	0.16	0.70	0.53	0.17	22.0	62	<6.2	4.7	
	July 11, 2016	YAD189	9.3	31.3	8.6	90	1.3	125.8%	0.03	0.56	<0.02	0.12	0.68	0.55	0.13	27.0	65	<6.2	3.7	
	July 11, 2016	YAD189B	9.9	30.8	9.0	90	1.2	132.8%	0.03	0.53	<0.02	0.05	0.58	0.52	0.06	21.0	66	<6.2	3.5	
	July 11, 2016	YAD189C	10.2	31.1	9.1	91	1.2	137.6%	0.02	0.53	<0.02	<0.02	0.54	0.52	0.02	24.0	64	<6.2	4.6	26.0
	June 6, 2016	YAD185A	9.7	27.7	8.8	83	1.1	123.3%	0.04	0.50	<0.02	0.34	0.84	0.49	0.35	25.0	60	<6.2	5.1	
	June 6, 2016	YAD189	10.6	27.6	9.2	85	1.1	134.5%	0.05	0.64	<0.02	0.29	0.93	0.63	0.30	36.0	62	<6.2	5.4	
	June 6, 2016	YAD189B	9.8	26.0	8.9	83	1.2	120.8%	0.03	0.52	<0.02	0.28	0.80	0.51	0.29	32.0	57	<6.2	4.4	
	June 6, 2016	YAD189C	9.7	26.4	8.9	83	1.2	120.5%	0.03	0.54	<0.02	0.32	0.86	0.53	0.33	30.0	62	<6.2	4.5	24.0
	May 12, 2016	YAD185A	9.4	24.2	8.6	86	1.2	112.1%	0.04	0.44	0.06	0.67	1.11	0.38	0.73	8.6	62	<6.2	12.0	
	May 12, 2016	YAD189	12.3	24.6	9.1	87	1.3	147.8%	0.04	0.55	<0.02	0.44	0.99	0.54	0.45	28.0	63	<6.2	6.4	
	May 12, 2016	YAD189B	12.5	24.2	9.2	88	1.3	149.1%	0.04	0.58	<0.02	0.33	0.91	0.57	0.34	33.0	61	<6.2	4.7	
	May 12, 2016	YAD189C	12.0	25.0	9.1	88	1.4	145.3%	0.03	0.48	<0.02	0.32	0.80	0.47	0.33	25.0	50	<6.2	3.8	24.0
BLEWETT FALLS LAKE	September 7, 2016	YAD260B	13.0	28.7	9.2	105	0.8	168.2%	0.06	0.74	<0.02	<0.02	0.75	0.73	0.02	54.0	80	<12	6.5	28.0
	August 11, 2016	YAD260B	10.2	32.3	8.7	111	0.8	140.4%	0.10	0.79	<0.02	0.39	1.18	0.78	0.40	43.0	85	7.5	10.0	31.0
	July 18, 2016	YAD260B	12.1	30.6	9.0	113	0.9	161.8%	0.07	0.75	<0.02	0.39	1.14	0.74	0.40	45.0	81	7.0	6.1	29.0
	June 1, 2016	YAD260B	10.3	25.7	8.5	93	0.7	126.3%	0.07	0.57	<0.02	0.58	1.15	0.56	0.59	30.0	82	10.0	12.0	28.0
	May 17, 2016	YAD260B	10.7	22.1	8.4	95	0.8	122.7%	0.06	0.53	<0.02	0.49	1.02	0.52	0.50	32.0	72	10.0	12.0	25.0
KANNAPOLIS LAKE	September 22, 2016	YAD207A	4.8	25.6	7.1	107	0.8	58.7%	0.04	0.73	0.09	<0.02	0.74	0.64	0.10	33.0	88	6.8	7.1	
	September 22, 2016	YAD207C	6.3	26.0	7.5	105	0.8	77.7%	0.03	0.63	<0.02	<0.02	0.64	0.62	0.02	26.0	86	<6.2	5.0	32.0
	August 24, 2016	YAD207A	7.9	31.0	8.5	98	0.8	106.4%	0.03	0.68	<0.02	<0.02	0.69	0.67	0.02	24.0	81	<6.2	6.3	
	August 24, 2016	YAD207C	7.8	31.2	8.5	98	0.9	105.4%	0.03	0.64	<0.02	<0.02	0.65	0.63	0.02	19.0	80	6.2	6.1	28.0
	July 13, 2016	YAD207A	8.7	33.0	8.8	100	0.9	121.2%	0.03	0.66	<0.02	<0.02	0.67	0.65	0.02		75	<6.2	6.4	
	July 13, 2016	YAD207C	8.9	32.7	8.9	100	1.1	123.3%	0.04	0.68	<0.02	<0.02	0.69	0.67	0.02		76	<6.2	7.2	28.0
	June 23, 2016	YAD207A	8.3	29.1	8.3	97	1.4	108.1%	0.02	0.43	<0.02	<0.02	0.44	0.42	0.02	10.0	67	<6.2	4.2	
	June 23, 2016	YAD207C	7.8	28.9	8.0	96	1.4	101.3%	0.02	0.41	<0.02	<0.02	0.42	0.40	0.02	9.0	64	<6.2	3.5	28.0
	May 26, 2016	YAD207A	10.2	24.7	8.8	93	0.9	122.8%	0.03	0.58	<0.02	<0.02	0.59	0.57	0.02	22.0	69	<12.0	6.1	
	May 26, 2016	YAD207C	10.5	24.3	8.8	92	1.1	125.5%	0.03	0.63	<0.02	<0.02	0.64	0.62	0.02	21.0	71	8.8	5.9	26.0
LAKE FISHER	September 15, 2016	YAD215R	6.3	27.6	7.5	138	0.4	79.9%	0.08	0.90	<0.02	0.02	0.92	0.89	0.03	28.0	122	18.0	21.0	
	September 15, 2016	YAD215T	6.6	27.7	7.7	131	0.7	83.9%	0.04	0.70	<0.02	0.02	0.72	0.69	0.03	20.0	107	<12.0	8.7	
	September 15, 2016	YAD216A	7.3	28.0	8.1	130	0.9	93.3%	0.03	0.84	<0.02	<0.02	0.85	0.83	0.02	21.0	104	<6.2	4.1	47.0

Appendix A - Yadkin-Pee Dee River Basin Lakes Data

January 1, 2012 through December 31, 2016

Lake	Date	Sampling Station	DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent SAT	TP mg/L	TKN mg/L	NH3 mg/L	NOx mg/L	TN mg/L	TON mg/L	TIN mg/L	Chla µg/L	Solids Total mg/L	Total Solids Suspended mg/L	Turbidity NTU	Total Hardnes mg/L
	SURFACE PHYSICAL DATA								PHOTIC ZONE DATA											
LAKE FISHER	August 24, 2016	YAD215R	7.3	29.3	7.9	130	0.4	95.4%	0.07	0.76	<0.02	<0.02	0.77	0.75	0.02	35.0	114	13.0	16.0	
	August 24, 2016	YAD215T	6.2	29.6	7.7	127	0.8	81.5%	0.04	0.64	<0.02	<0.02	0.65	0.63	0.02	23.0	102	7.0	6.1	
	August 24, 2016	YAD216A	6.3	29.7	7.9	127	1.0	82.9%	0.03	0.61	<0.02	<0.02	0.62	0.60	0.02	22.0	99	<12.0	5.6	44.0
	July 13, 2016	YAD215R	9.3	33.2	8.5	133	0.7	129.9%	0.06	0.91	<0.02	<0.02	0.92	0.90	0.02		110	9.5	11.0	
	July 13, 2016	YAD215T	8.7	32.0	8.5	127	0.9	119.1%	0.03	0.68	<0.02	<0.02	0.69	0.67	0.02		98	6.2	6.9	
	July 13, 2016	YAD216A	8.1	32.4	8.5	124	1.2	111.7%	0.02	0.64	<0.02	<0.02	0.65	0.63	0.02		94	<6.2	5.1	41.0
	June 23, 2016	YAD215R	7.6	29.8	7.6	136	0.3	100.2%	0.10	0.94	<0.02	0.04	0.98	0.93	0.05	54.0	134	18.0	23.0	
	June 23, 2016	YAD215T	9.9	29.5	9.1	127	0.8	129.9%	0.04	0.79	<0.02	0.05	0.84	0.78	0.06	32.0	110	<6.2	6.8	
	June 23, 2016	YAD216A	10.0	29.2	9.1	126	1.2	130.5%	0.03	0.83	<0.02	0.12	0.95	0.82	0.13	31.0	132	<6.2	6.7	42.0
	May 27, 2016	YAD215R	9.3	26.0	7.7	119	0.5	114.7%	0.06	0.82	<0.02	0.05	0.87	0.81	0.06	31.0	102	10.0	15.0	
	May 27, 2016	YAD215T	10.9	24.1	8.7	118	0.9	129.8%	0.04	0.61	<0.02	<0.02	0.62	0.60	0.02	22.0	91	<6.2	6.8	
	May 27, 2016	YAD216A	10.3	24.5	8.1	121	1.1	123.5%	0.04	0.67	<0.02	0.04	0.71	0.66	0.05	38.0	99	6.5	7.0	41.0
LAKE CONCORD	September 15, 2016	YAD216C	6.5	27.5	7.7	100	0.5	82.3%	0.05	1.10	<0.02	0.03	1.13	1.09	0.04	36.0	92	7.4	12.0	
	September 15, 2016	YAD216E	7.1	28.2	7.6	104	0.5	91.1%	0.07	1.10	<0.02	0.02	1.12	1.09	0.03	42.0	98	18.0	14.0	
	September 15, 2016	YAD216G	7.7	27.4	8.0	103	0.4	97.4%	0.04	1.00	<0.02	0.03	1.03	0.99	0.04	37.0	93	<12.0	11.0	30.0
	August 24, 2016	YAD216C	6.0	28.9	7.5	99	0.5	77.9%	0.05	1.00	<0.02	0.03	1.03	0.99	0.04	41.0	92	<12.0	12.0	
	August 24, 2016	YAD216E	7.0	28.9	7.6	101	0.4	90.9%	0.08	1.00	<0.02	0.03	1.03	0.99	0.04	48.0	104	19.0	20.0	
	August 24, 2016	YAD216G	6.0	29.2	7.5	98	0.6	78.3%	0.04	0.88	<0.02	0.02	0.90	0.87	0.03	36.0	90	7.0	9.2	28.0
	July 13, 2016	YAD216C	8.8	31.3	8.7	102	0.7	119.1%	0.04	0.66	<0.02	<0.02	0.67	0.65	0.02		78	9.5	9.4	
	July 13, 2016	YAD216E	8.9	31.4	8.7	103	0.7	120.6%	0.05	0.73	<0.02	<0.02	0.74	0.72	0.02		88	18.0	12.0	
	July 13, 2016	YAD216G	9.0	31.4	8.8	103	0.7	122.0%	0.03	0.62	<0.02	<0.02	0.63	0.61	0.02		78	7.0	7.1	28.0
	June 14, 2016	YAD216C	8.4	29.3	8.2	99	0.6	109.8%	0.04	0.66	<0.02	<0.02	0.67	0.65	0.02	20.0	82	8.5	9.0	
	June 14, 2016	YAD216E	8.1	29.6	7.6	108	0.4	106.5%	0.06	0.75	<0.02	0.04	0.79	0.74	0.05	30.0	100	18.0	19.0	
	June 14, 2016	YAD216G	8.2	29.2	8.2	99	0.7	107.0%	0.04	0.70	<0.02	<0.02	0.71	0.69	0.02	17.0	82	8.0	8.6	28.0
	May 18, 2016	YAD216C	8.3	22.2	7.6	107	0.9	95.3%	0.04	0.56	0.02	0.16	0.72	0.54	0.18	23.0	86	<12.0	10.0	
	May 18, 2016	YAD216E	8.0	21.9	7.4	107	0.5	91.3%	0.05	0.48	<0.02	0.21	0.69	0.47	0.22	14.0	88	8.5	12.0	
	May 18, 2016	YAD216G	8.6	22.1	7.7	107	0.9	98.6%	0.03	0.54	<0.02	0.15	0.69	0.53	0.16	21.0	84	<6.2	7.5	29.0
LAKE LEE	September 22, 2016	YAD232C	4.1	25.4	7.0	131	0.4	50.0%	0.19	1.90	0.20	0.01	1.91	1.70	0.21	88.0	125	21.0	20.0	
	September 22, 2016	YAD232H	6.1	24.9	7.2	129	0.4	73.7%	0.22	2.00	0.17	0.01	2.01	1.83	0.18	99.0	144	50.0	34.0	
	September 22, 2016	YAD233	3.2	25.5	7.0	131	0.6	39.1%	0.15	1.80	0.29	0.01	1.81	1.51	0.30	62.0	110	14.0	14.0	41.0
	August 16, 2016	YAD232C	10.7	33.7	8.3	145	0.4	150.8%	0.18	1.80	<0.02	0.02	1.82	1.79	0.03	78.0	119	18.0	20.0	
	August 16, 2016	YAD232H	10.3	32.1	8.3	141	0.4	141.3%	0.23	2.00	<0.02	0.02	2.02	1.99	0.03	100.0	132	33.0	23.0	
	August 16, 2016	YAD233	12.4	33.3	8.9	143	0.4	173.5%	0.18	2.20	<0.02	0.02	2.22	2.19	0.03	140.0	118	16.0	15.0	48.0
	July 25, 2016	YAD232C	9.5	31.9	7.6	140	0.4	129.9%	0.30	2.10	<0.02	<0.02	2.11	2.09	0.02	140.0	167	29.0	31.0	
	July 25, 2016	YAD232H	8.0	31.8	7.6	140	0.4	109.2%	0.24	2.10	<0.02	0.02	2.12	2.09	0.03	120.0	166	28.0	25.0	
	July 25, 2016	YAD233	10.2	32.7	8.7	141	0.4	141.3%	0.19	2.10	<0.02	<0.02	2.11	2.09	0.02	120.0	158	16.0	16.0	45.0
	June 15, 2016	YAD232C	10.3	29.1	9.0	129	0.4	134.2%	0.28	2.10	0.03	0.41	2.51	2.07	0.44	91.0	144	60.0	36.0	
	June 15, 2016	YAD232H	8.4	28.3	8.2	128	0.4	107.9%	0.34	2.40	0.09	0.30	2.70	2.31	0.39	110.0	169	87.0	34.0	
	June 15, 2016	YAD233	11.6	28.7	9.5	130	0.4	150.1%	0.22	2.20	0.02	0.46	2.66	2.18	0.48	110.0	98	14.0	25.0	42.0
	May 16, 2016	YAD232C	2.6	21.9	6.8	161	0.4	29.7%	0.49	3.30	1.80	0.91	4.21	1.50	2.71	6.7	155	28.0	35.0	
	May 16, 2016	YAD232H	3.7	23.1	6.9	155	0.4	43.2%	0.47	3.10	1.60	0.92	4.02	1.50	2.52	16.0	136	17.0	25.0	
	May 16, 2016	YAD233	2.4	22.6	6.8	157	0.4	27.8%	0.45	3.40	1.60	1.00	4.40	1.80	2.60	6.1	130	<12.0	24.0	47.0
LAKE MONROE	September 22, 2016	YAD232D	4.8	26.5	7.1	138	0.6	59.7%	0.19	1.60	0.17	<0.02	1.61	1.43	0.18	47.0	106	12.0	12.0	
	September 22, 2016	YAD232F	2.8	26.3	7.0	138	0.9	34.7%	0.14	1.40	0.18	<0.02	1.41	1.22	0.19	25.0	100	<6.2	6.7	40.0
	August 16, 2016	YAD232D	10.2	32.1	9.0	139	0.5	139.9%	0.19	1.80	<0.02	0.02	1.82	1.79	0.03	79.0	113	16.0	16.0	
	August 16, 2016	YAD232F	11.1	33.4	9.3	141	0.5	155.6%	0.11	1.60	<0.02	0.02	1.62	1.59	0.03	69.0	104	11.0	10.0	38.0
	July 25, 2016	YAD232D	8.0	31.7	8.9	139	0.4	109.0%	0.19	1.70	<0.02	0.02	1.72	1.69	0.03	70.0	162	14.0	16.0	
	July 25, 2016	YAD232F	8.8	32.9	9.2	140	0.6	122.3%	0.13	1.60	<0.02	0.03	1.63	1.59	0.04	50.0	156	22.0	12.0	39.0
	June 15, 2016	YAD232D	10.0	31.2	9.1	141	0.4	135.1%	0.31	1.90	<0.02	<0.02	1.91	1.89	0.02	83.0	106	16.0	18.0	
	June 15, 2016	YAD232F	10.5	31.2	9.4	140	0.5	141.8%	0.21	1.70	<0.02	0.03	1.73	1.69	0.04	62.0	114	13.0	13.0	42.0
	May 16, 2016	YAD232D	9.4	23.1	8.2	128	0.4	109.8%	0.24	2.00	0.04	0.98	2.98	1.96	1.02	72.0	116	19.0	15.0	
	May 16, 2016	YAD232F	8.6	23.2	8.0	128	0.4	100.7%	0.22	2.00	0.11	1.20	3.20	1.89	1.31	68.0	108	12.0	10.0	41.0
LAKE TWITTY (STEWART)	September 22, 2016	YAD235D	5.1	27.0	7.2	140	0.7	64.0%	0.08	0.98	0.04	0.04	1.02	0.94	0.08	50.0	96	8.8	8.9	
	September 22, 2016	YAD235F	5.2	27.1	7.3	141	0.6	65.4%	0.09	0.99	0.04	<0.02	1.00	0.95	0.05	48.0	99	12.0	12.0	
	September 22, 2016	YAD236	4.5	27.1	7.1	141	0.9	56.6%	0.07	0.89	0.07	0.08	0.97	0.82	0.15	36.0	96	<12.0	7.0	44.0
	August 16, 2016	YAD235D	8.1	31.8	8.2	141	0.6	110.5%	0.10	1.30	<0.02	0.03	1.33	1.29	0.04	74.0	100	9.7	9.5	
	August 16, 2016	YAD235F	8.7	31.5	8.5	142	0.7	118.1%	0.08	1.20	<0.02	0.03	1.23	1.19	0.04	61.0	96	8.2	6.1	
	August 16, 2016	YAD236	4.2	30.6	7.2	143	0.9	56.2%	0.08	1.10	<0.02	0.04	1.14	1.00	0.14	39.0	95	<6.2	7.3	46.0
	July 25, 2016	YAD235D	10.8	33.8	9.1	147	0.7	152.4%	0.08	1.00	<0.02	0.02	1.02	0.99	0.03	50.0	150	9.5	8.3	
	July 25, 2016	YAD235F	9.5	32.7	8.9	145	0.7	131.6%	0.07	0.97	<0.02	0.03	1.00	0.96	0.04	44.0	151	<12.0	7.0	
	July 25, 2016	YAD236	8.5	33.0	8.6	145	0.7	118.4%	0.09	1.00	<0.02	0.04	1.04	0.99	0.05	41.0	152	8.0	7.4	44.0
	June 15, 2016	YAD235D	9.1	29.2	8.3	137	0.7	118.8%	0.11	1.20	<0.02	0.02	1.22	1.19	0.03	78.0	89	9.0	8.7	
	June 15, 2016	YAD235F	9.1	29.2	8.7	138	0.8	118.8%	0.10	1.10	0.02	0.07	1.17	1.08	0.09	51.0	85	7.0	7.0	
	June 15, 2016	YAD236	7.1	28.6	7.5	138	0.8	91.7%	0.10	1.10	0.07	0.14	1.24	1.03	0.21	36.0	87	7.5	8.6	44.0
	May 16, 2016	YAD235D	9.4	23.1	8.2	128	0.4	109.8%	0.10	1.10	<0.02	0.31	1.41	1.09	0.32	50.0	94	7.8	8.9	
	May 16, 2016	YAD235F	9.0	24.3	8.0	137	0.7	107.5%	0.10	1.10	<0.02	0.34	1.44	1.09	0.35	49.0	97	7.2	8.4	
	May 16, 2016	YAD236	5.1	23.6	7.0	138	0.7	60.2%	0.12	1.00	0.10	0.44	1.44	0.90	0.54	24.0	100	9.5	13.0	13.0

Appendix A - Yadkin-Pee Dee River Basin Lakes Data

January 1, 2012 through December 31, 2016

Lake	Date	Sampling Station	DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent SAT	TP mg/L	TKN mg/L	NH3 mg/L	NOx mg/L	TN mg/L	TON mg/L	TIN mg/L	Chla µg/L	Solids Total mg/L	Total Solids Suspended mg/L	Turbidity NTU	**Total Hardnes mg/L**
		SURFACE PHYSICAL DATA							PHOTIC ZONE DATA											
CODDLE CREEK RESERVOIR	September 22, 2016	YADCCR01	7.1	25.7	8.0	102	0.8	87.1%	0.02	0.99	0.04	<0.02	1.00	0.95	0.05	31.0	83	<6.2	10.0	34.0
	September 22, 2016	YADCCR02	6.1	25.5	7.5	102	0.8	74.5%	0.03	0.88	0.10	<0.02	0.89	0.78	0.11	24.0	76	<6.2	9.1	
	September 22, 2016	YADCCR03	3.8	24.5	7.2	109	0.8	45.6%	0.04	1.00	0.36	<0.02	1.01	0.64	0.37	18.0	87	<12.0	12.0	
	August 24, 2016	YADCCR01	7.9	30.6	8.9	101	1.2	105.6%	0.02	0.83	<0.02	<0.02	0.84	0.82	0.02	19.0	80	<6.2	6.9	34.0
	August 24, 2016	YADCCR02	7.9	30.8	8.9	101	1.1	106.0%	0.02	0.78	<0.02	<0.02	0.79	0.77	0.02	18.0	77	6.2	7.1	
	August 24, 2016	YADCCR03	8.2	30.8	8.8	101	0.9	110.0%	0.02	0.89	<0.02	<0.02	0.90	0.88	0.02	30.0	84	7.2	11.0	
	July 13, 2016	YADCCR01	8.5	31.0	9.0	101	0.9	114.4%	0.02	0.76	<0.02	<0.02	0.77	0.75	0.02		69	<6.2	9.0	31.0
	July 13, 2016	YADCCR02	8.6	30.8	9.0	101	0.9	115.4%	0.02	0.74	<0.02	<0.02	0.75	0.73	0.02		70	<6.2	9.1	
	July 13, 2016	YADCCR03	8.7	30.7	9.0	101	0.8	116.5%	0.02	0.86	<0.02	<0.02	0.87	0.85	0.02		74	6.5	11.0	
	June 23, 2016	YADCCR01	8.6	29.6	9.1	99	1.3	113.0%	0.02	0.86	<0.02	0.06	0.92	0.85	0.07	18.0	88	<6.2	8.4	34.0
	June 23, 2016	YADCCR02	8.4	30.1	9.1	99	1.3	111.4%	0.02	0.91	<0.02	<0.02	0.92	0.90	0.02	18.0	89	<6.2	8.3	
	June 23, 2016	YADCCR03	8.2	30.8	7.3	99	1.2	110.0%	0.02	0.73	<0.02	<0.02	0.74	0.72	0.02	17.0	61	<6.2	8.9	
	May 19, 2016	YADCCR01	9.6	21.3	9.1	94	1.6	108.4%	0.02		<0.02	0.16	0.16		0.17	16.0	72	<6.2	6.2	29.0
	May 19, 2016	YADCCR02	9.7	21.6	9.1	95	1.5	110.1%	0.02	0.56	<0.02	0.15	0.71	0.55	0.16	17.0	70	<12.0	6.1	
	May 19, 2016	YADCCR03	8.9	21.8	8.6	97	1.0	101.4%	0.03	0.57	<0.02	0.15	0.72	0.56	0.16	17.0	75	7.2	11.0	
ROBERDEL LAKE	September 29, 2016	YAD262E	7.0	22.6	5.7	32	0.4	81.0%	0.10	0.69	<0.02	0.33	1.02	0.68	0.34	2.8	78	19.0	28.0	
	September 29, 2016	YAD263	6.5	24.1	5.8	29	0.6	77.4%	0.03	0.50	<0.02	0.22	0.72	0.49	0.23	3.6	60	<12.0	8.4	47.0
	September 26, 2016	YAD262E	6.2	24.0	5.4	29	0.7	73.7%	0.03	0.64	<0.02	0.14	0.78	0.63	0.15	2.2	70	7.5	6.1	
	September 26, 2016	YAD263	6.1	24.7	5.5	30	0.8	73.4%	0.03	0.64	<0.02	0.11	0.75	0.63	0.12	3.0	66	<12.0	4.2	7.5
	August 30, 2016	YAD262E	7.5	28.6	6.7	26	0.7	96.9%	0.03	0.51	<0.02	0.06	0.57	0.50	0.07	25.0	35	7.0	5.2	
	August 30, 2016	YAD263	7.3	29.2	6.8	26	1.2	95.3%	0.03	0.53	<0.02	0.08	0.61	0.52	0.09	23.0	34	<6.2	3.5	7.8
	July 28, 2016	YAD262E	7.3	31.8	6.4	24	0.7	99.6%	0.04	0.62	<0.02	0.04	0.66	0.61	0.05	26.0	70	11.0	7.2	
	July 28, 2016	YAD263	6.6	30.4	6.4		0.9	88.3%	0.02	0.69	<0.02	0.13	0.82	0.68	0.14	8.3	70	<6.2	7.6	5.9
	June 29, 2016	YAD262E	6.3	25.5	6.0	26	0.4	77.0%	0.06	0.64	0.02	0.31	0.95	0.62	0.33	6.3	72	25.0	24.0	
	June 29, 2016	YAD263	5.9	28.0	6.6	25	0.5	75.4%	0.04	0.54	0.03	0.30	0.84	0.51	0.33	6.7	47	8.8	15.0	5.9
	May 5, 2016	YAD262E					0.6		0.03	0.70	0.02	0.25	0.95	0.68	0.27	3.5	71	24.0	15.0	
	May 5, 2016	YAD263					0.6		0.03	0.68	<0.02	0.26	0.94	0.67	0.27	2.2	48	<6.2	11.0	12.0
WADESBORO CITY POND	September 7, 2016	YAD275H	8.2	28.1	7.6	61	1.1	105.0%	0.04	0.63	<0.02	<0.02	0.64	0.62	0.02	15.0	50	<6.2	2.4	
	September 7, 2016	YAD275J	8.0	27.7	7.7	62	1.6	101.7%	0.04	0.69	<0.02	<0.02	0.70	0.68	0.02	20.0	46	<6.2	4.2	19.0
	August 11, 2016	YAD275H	8.9	30.8	8.9	61	0.7	119.4%	0.03	0.73	<0.02	<0.02	0.74	0.72	0.02	16.0	52	<6.2	3.9	
	August 11, 2016	YAD275J	8.3	30.8	8.7	61	1.4	111.4%	0.03	0.72	<0.02	<0.02	0.73	0.71	0.02	28.0	50	<12.0	5.4	20.0
	July 18, 2016	YAD275H	10.0	31.1	9.2	68	1.0	134.9%	0.03	0.77	<0.02	0.02	0.79	0.76	0.03	23.0	56	<6.2	6.6	
	July 18, 2016	YAD275J	9.8	31.6	9.2	68	1.0	133.3%	0.03	0.69	<0.02	0.03	0.72	0.68	0.04	27.0	52	<6.2	5.8	18.0
	June 1, 2016	YAD275H	8.7	27.7	7.9	62	1.2	110.6%	0.02	0.50	<0.02	0.04	0.54	0.49	0.05	12.0	49	<6.2	5.0	
	June 1, 2016	YAD275J	8.5	27.1	7.9	62	1.8	106.9%	0.04	0.52	<0.02	0.03	0.55	0.51	0.04	37.0	56	7.0	5.1	20.0
	May 17, 2016	YAD275H	8.1	23.5	7.2	61	0.9	95.4%	0.03	0.53	<0.02	<0.02	0.54	0.52	0.02	10.0	53	<6.2	10.0	
	May 17, 2016	YAD275J	8.4	23.7	7.4	61	1.1	99.3%	0.03	0.54	<0.02	<0.02	0.55	0.53	0.02	17.0	49	<12.0	7.7	21.0
HAMLET CITY LAKE	September 12, 2016	YAD282A	2.5	29.2	5.9	41	0.8	32.6%	0.03	0.56	<0.02	0.03	0.59	0.55	0.04	10.0	53	<9.4	3.7	
	September 12, 2016	YAD283	5.3	28.7	6.2	42	0.8	68.6%	0.02	0.51	<0.02	<0.02	0.52	0.50	0.02	20.0	50	<6.2	2.3	
	August 18, 2016	YAD282A	3.8	31.8	6.4	39	1.4	51.9%	0.02	0.52	<0.02	0.03	0.55	0.51	0.04	11.0	46	<12.0	2.5	
	August 18, 2016	YAD283	3.9	30.8	6.4	39	1.7	52.3%	0.02	0.49	<0.02	0.03	0.52	0.48	0.04	22.0	44	<6.2	4.5	
	July 20, 2016	YAD282A	3.6	32.1	6.1	36	0.8	49.4%	0.02	0.64	<0.02	<0.02	0.65	0.63	0.02	7.0	48	<6.2	2.4	
	July 20, 2016	YAD283	4.8	32.0	6.1	36	1.0	65.7%	0.03	0.55	<0.02	<0.02	0.56	0.54	0.02	14.0	47	6.2	3,7	
	June 16, 2016	YAD282A	5.1	30.4	6.3	42	1.0	68.0%	0.04	0.78	<0.02	0.02	0.80	0.77	0.03	23.0	63	12.0	6.8	
	June 16, 2016	YAD283	4.9	29.9	6.3	43	1.6	64.7%	0.04	0.65	<0.02			0.64		18.0	50	<6.2	2.9	
	May 24, 2016	YAD282A	6.0	23.7	6.2	44	1.0	70.9%	0.02	0.48	0.02	0.04	0.52	0.46	0.06	6.1	45	<6.2	2.2	
	May 24, 2016	YAD283	5.7	23.4	6.3	44	1.5	67.0%	0.02	0.54	0.05	0.05	0.59	0.49	0.10	4.1	48	<6.2	3.2	
WATER LAKE	October 4, 2016	YAD280C	5.7	23.4	5.9	57	1.2	67.0%	<0.02	0.48	<0.02	0.32	0.80	0.47	0.33	6.6	46	<6.2	<1.0	
	October 4, 2016	YAD280E	6.2	24.8	6.3	52	1.3	74.8%	<0.02	0.44	<0.02	0.07	0.51	0.43	0.08	8.2	39	<6.2	<1.0	4.0
	September 12, 2016	YAD280C	6.1	28.5	6.2	58	1.0	78.6%	<0.02	0.67	<0.02	0.19	0.86	0.66	0.20	23.0	66	6.2	3.6	
	September 12, 2016	YAD280E	7.9	28.3	6.9	53	1.0	101.5%	<0.02	0.51	<0.02	<0.02	0.52	0.50	0.02	13.0	53	<6.4	1.3	4.9
	August 18, 2016	YAD280C	6.3	31.2	6.6	50	1.0	85.1%	<0.02	0.58	<0.02	0.10	0.68	0.57	0.11	20.0	54	7.5	2.4	
	August 18, 2016	YAD280E	6.9	31.4	6.9	47	1.2	93.5%	<0.02	0.52	<0.02	0.04	0.56	0.51	0.05	19.0	50	<11.0	2.5	5.9
	July 20, 2016	YAD280C	7.0	31.7	6.4	49	1.2	95.4%	<0.02	0.57	<0.02	0.08	0.65	0.56	0.09	13.0	46	<12.0	1.9	
	July 20, 2016	YAD280E	7.9	31.6	6.9	48	1.2	107.5%	<0.02	0.45	<0.02	0.04	0.49	0.44	0.05	16.0	47	<6.2	1.8	6.9
	June 16, 2016	YAD280C	6.7	31.7	6.6	53	1.0	91.3%	<0.02	0.36	<0.02	0.25	0.61	0.35	0.26	3.5	44	<6.2	<1.0	
	June 16, 2016	YAD280E	6.9	30.1	6.7	51	1.4	91.5%	<0.02	0.37	<0.02	0.26	0.63	0.36	0.27	6.5	46	<6.2	1.8	5.9
	May 17, 2016	YAD280C					1.3		<0.02	0.46	<0.02	0.60	1.06	0.45	0.61	10.0	48	<6.2	1.5	
	May 17, 2016	YAD280E					1.9		<0.02	0.38	<0.02	0.55	0.93	0.37	0.56	2.7	45	<6.2	1.1	4.9