LAKE & RESERVOIR ASSESSMENTS
CAPE FEAR RIVER BASIN

Carthage City Lake

Intensive Survey Unit
Environmental Sciences Section
Division of Water Resources
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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 = 10,000 to 20,000 units/ml
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 A measurement of oxygen 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 biological 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 biological 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 biological 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. DWR 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 Cape Fear River Basin is the largest river basin in the state, covering 9,149 square miles in 24 counties. There is an estimated 6,300 miles of streams and rivers in the basin confined to the Piedmont and Coastal Plain ecoregions. The Cape Fear River is formed by the confluence of the Deep and Haw Rivers at the Chatham/Lee County line. B. Everett Jordan Reservoir is the largest impoundment in the basin. Several large tributaries join the river as it flows towards the Atlantic Ocean near Southport: Upper and (Lower) Little Rivers, Rockfish Creek, Black River, South River and the Northeast Cape Fear River. The basin is characterized by urban and industrialized areas around the cities of Greensboro, High Point, Burlington, Chapel Hill, and Durham in the upper part of the watershed and around Fayetteville and Wilmington in the middle and lower part. Fort Bragg Military Reservation occupies a large area in the middle of the basin.

Thirty-three lakes were sampled in this river basin by DWR staff in 2013. Five of these lakes appear on the 2012 303(d) List of Impaired Waters (Table 1).

Table 1. Cape Fear River Basin Lakes on the 2012 303(d) List of Impaired Waters.

Lake	Location	Violation	303(d) Year
Graham-Mebane Reservoir	From 0.3 mile upstream of NC Hwy 119 at dam at Graham-Mebane Reservoir to SR 1917	Turbidity	2012
Graham-Mebane Reservoir	Quaker Creek Arm of Graham-Mebane Reservoir	Turbidity	2008
Jordan Lake	Morgan Creek from Chatham County SR 1726 to New Hope Creek Arm	Turbidity Elevated pH	2008
Jordan Lake	New Hope Creek Arm of Jordan Lake	Turbidity	2006
Jordan Lake	Haw River 1.0 mile below US 64 to dam	Turbidity Elevated pH	2006
Jordan Lake	Robeson Creek Arm of Jordan Lake	Turbidity Elevated pH	2006
Buckhorn Dam Lake (Cape Fear River)	From a point 0.5 mile upstream of NC Hwy 42 to NC Hwy 42 (Sanford water supply intake)	Chlorophyll *a*	2006
High Point Lake	From backwaters of High Point Lake to dam	Chlorophyll *a*	2006
Rocky River Reservoir	Siler City upper reservoir from 0.3 miles upstream of dam to the dam- (Turner Reservoir Critical Area).	Chlorophyll *a* *Low Dissolved Oxygen*	2010 *2012*

Following the description of the assessment methodology used for the Catawba River Basin, th ere are individual summaries for each of the lakes and a two-paged matrix that distills the information used to make the lakes use support assessments.

Assessment Methodology

For this report, data from January 1, 2009 through December 31, 2013 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 (http://portal.ncdenr.org/c/document_library/get_file?uuid=522a90a4-b593-426f-8c11-21a35569dfd8&groupId=38364) An interactive map of the state showing the locations of lake sites sampled by DWR may be found at http://portal.ncdenr.org/web/wq/ambient-lakes-map.

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. 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.

Additional data considered as part of the use support assessment include historic DWR water quality data, documented algal blooms and/or fish kills, problematic aquatic macrophytes, or listing on the EPA's 303(d) List of Impaired Waters.

For a more complete discussion of lake ecology and assessment, please go to http://portal.ncdenr.org/web/wq/ess/isu. The 1992 North Carolina Lake Assessment Report (downloadable from this website) contains a detailed chapter on ecological concepts that clarifies how the parameters discussed in this review relate to water quality and reservoir health.

Quality Assurance of Field and Laboratory Lakes Data

Data collected in the field via single or multiparameter water quality meters are entered into the Ambient Lakes Database within 24 hours of the sampling date. These data are then reviewed for accuracy and completeness within a week of entry. Data that have not been reviewed are given a ‘P’ code for ‘Provisional‘ (data has been entered but not been verified for accuracy and/or completeness). Data that have been verified are given an ‘A’ code for ‘Accepted’.

Chemistry data from the DWR Water Quality Laboratory are entered into the Lakes Database within 48 hours of receipt from the lab. As with the field data, laboratory results are coded 'P' until the entered data is verified for entry accuracy and completeness, after which, the code is changed to 'A'. Generally, laboratory data entered into the Lakes Database are verified within a week following the initial entry.

Data, either laboratory or field, which appear to be out of range for the lake sampled are double checked against field sheets or the laboratory results form by the Lakes Data Administrator for possible data entry error. If there are data entry mistakes, possible equipment, sampling, and/or analysis errors, these are investigated and corrected if possible. If the possible source of an error cannot be determined, the data remains in the database. If an error is determined, the data value is removed from the appropriate database parameter field and placed in the 'Notes' field along with a comment regarding the error. Chemistry results received from the laboratory that have been given an qualification code are also entered into the 'Notes' field along with the assigned laboratory code. Laboratory qualification coded data or data which may be in error due to sampling, handling, and/or equipment problems are only entered into the 'Notes' field and never in the data field(s) in the Ambient Lakes Database.

Additional information regarding the Quality Assurance Program is covered in the Ambient Lake Monitoring Program Quality Assurance Plan. Version 1.1 (July 2012) of this document is available on the ISU website (http://portal.ncdenr.org/web/wq/ess/isu).

Weather Overview for Summer 2013

May 2013 started off cool but became warmer the second half of the month. Storms during this month tracked to the west and brought substantial rainfall to western NC. In contrast, the eastern part of the state was drier and the southern coastal region received less than an inch of rain for the month. The upper Cape Fear River Basin received more rainfall in May that the lower portion of the river basin. This was particularly true for the part of the river basin located near the southern coastal region, which received less than an inch of rain for the month (Figure 1).

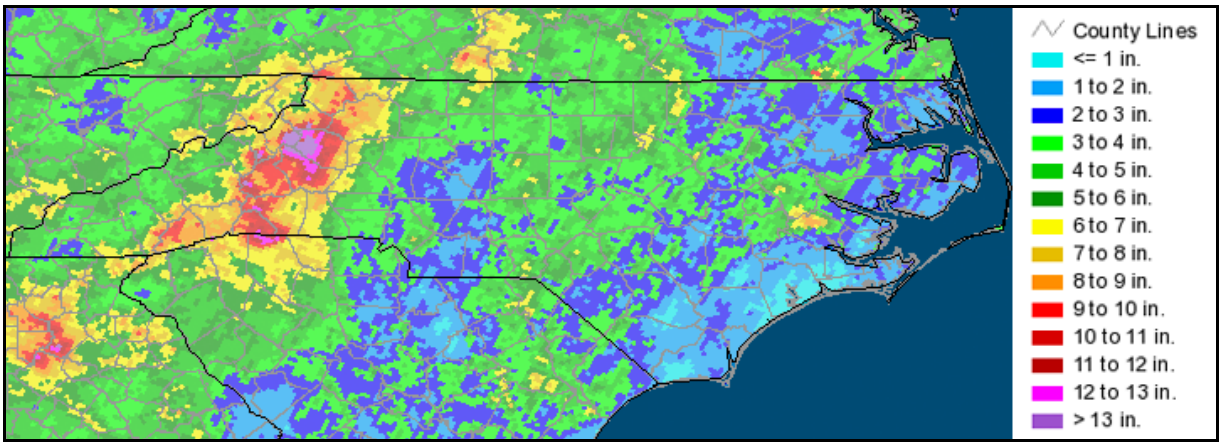

Figure 1. Precipitation for May 2013 based on estimates from NWS Radar. (Data courtesy NNWS/NCEP)

Statewide temperatures in June were closer to the historical mean for the month. Tropical storm Andrea passed through North Carolina on June 7, 2013, and brought rainfall that eliminated the abnormally dry conditions in the eastern part of the state (Figure 2). For the first time since April 2010, no part of NC was experiencing drought conditions.

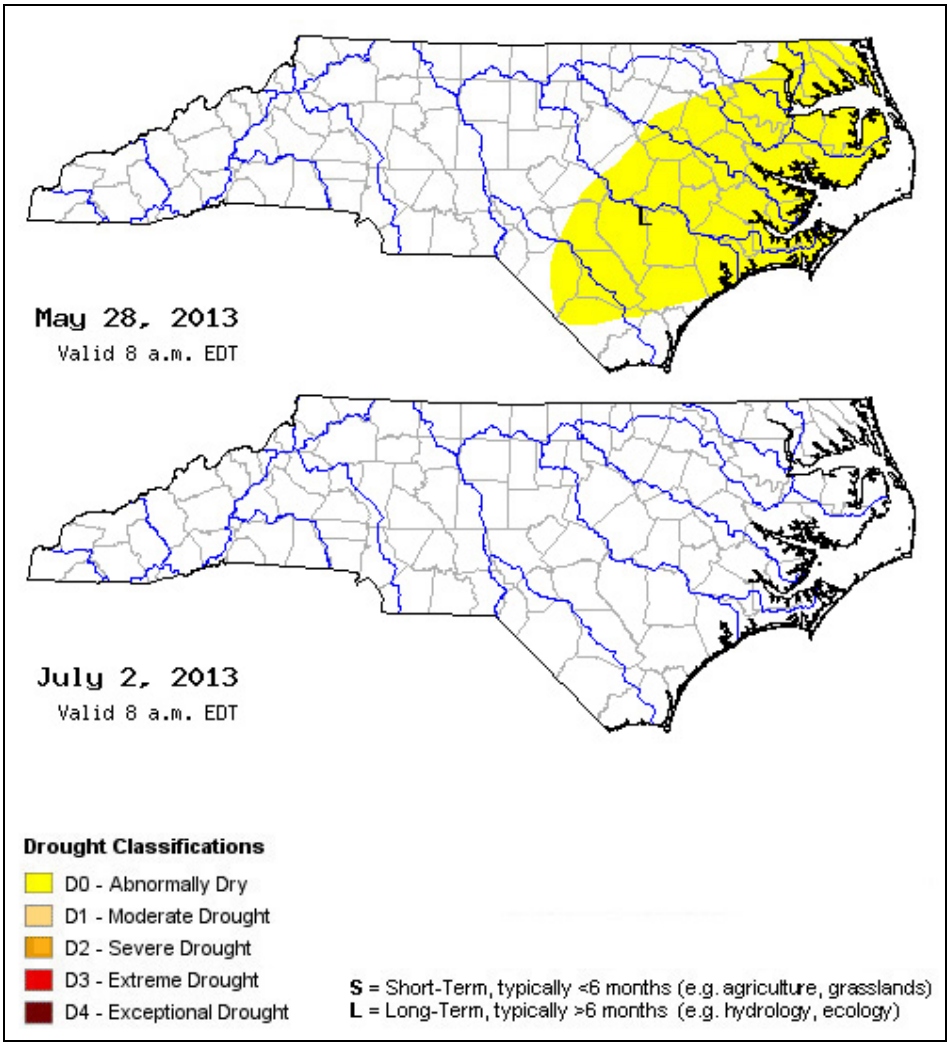

Figure 2. US Drought Monitor maps for North Carolina showing changes in abnormally dry conditions from the end of May to early July (Image courtesy NCDENR Water Resources).

The wet pattern continued through June, bringing several storms that brought substantial rainfall across the state (Figure 3). June 2013 ranked as the second wettest June on record since 1895. Most areas of the Cape Fear River Basin received between 125% to 400% of normal rainfall for the month of June.

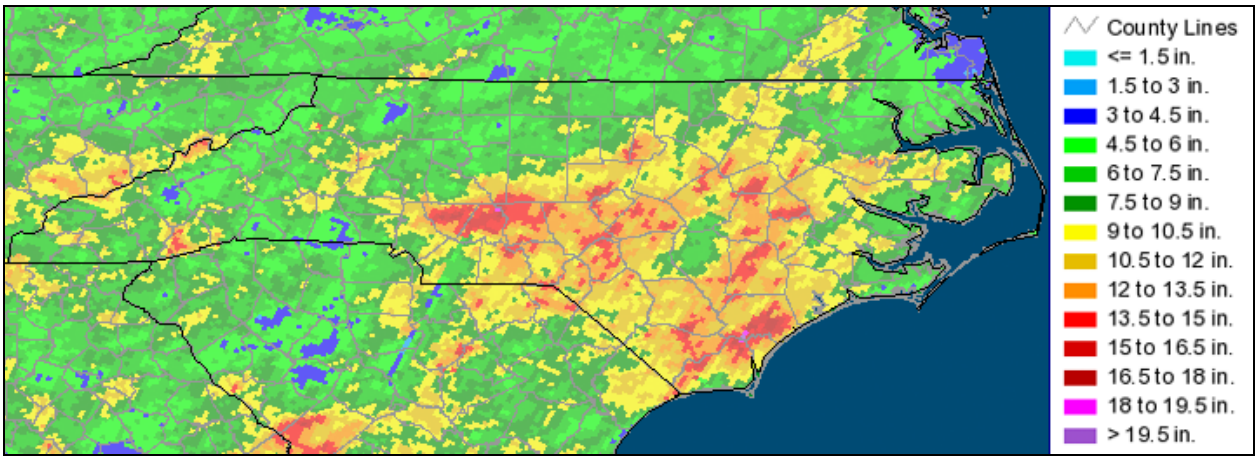

Figure 3. Precipitation for June 2013 based on estimates from NWS Radar. (Data courtesy NNWS/NCEP)

Daytime temperatures remained either normal or cooler than normal in July while the nightly low temperatures were actually warmer than usual. Excessive moisture and frequent cloud cover blocked sunlight from heating the air during the day and prevented the loss of heat at night. The wet pattern continued with most of the state receiving above normal rainfall. Statewide average rainfall for July 2013 ranked as the third wettest since 1895. Much of the Cape Fear River Basin received between six and ten inches of rain in July.

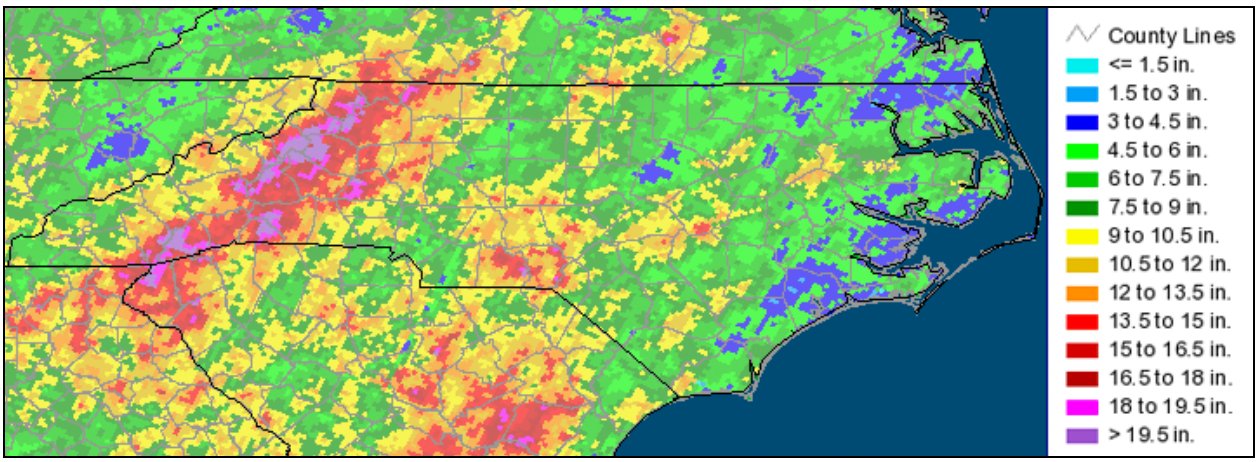

Figure 4. Precipitation for July 2013 based on estimates from NWS Radar. (Data courtesy NNWS/NCEP)

August 2013 continued with the cool, wet conditions of the previous months. Rainfall was more moderate with the statewide average only slightly above normal. Parts of the upper and lower Cape Fear River Basin received between 4.5 and 9.0 inches of rain while the headwaters and central portion of the basin received between 1.5 and 4.5 inches of rain in August (Figure X).

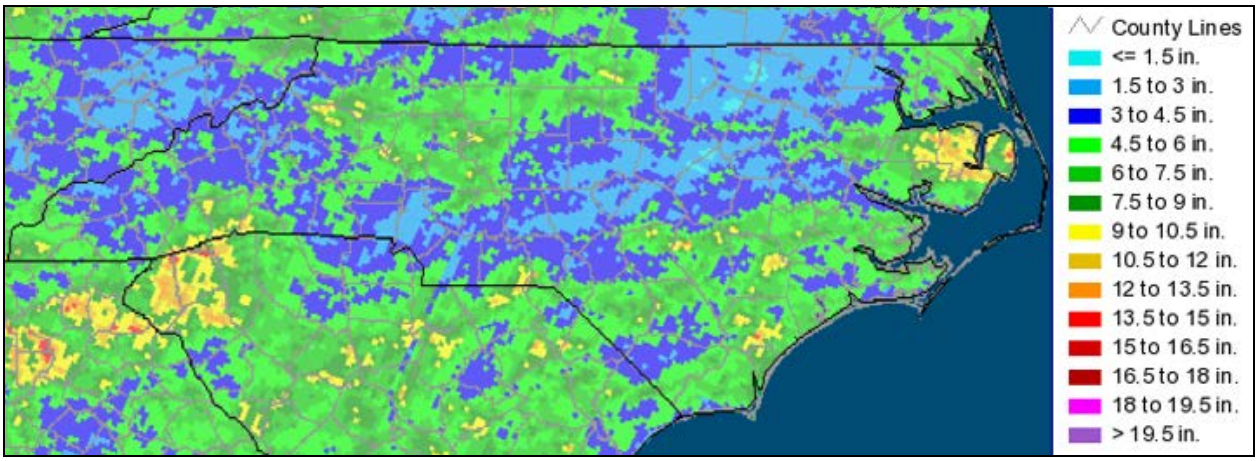

Figure 5. Precipitation for August 2013 based on estimates from NWS Radar. (Data courtesy NNWS/NCEP)

Temperatures in September remained cool while rainfall fell in parts of the state that were the driest in August (Figure 5). The lower Cape Fear River Basin received less rainfall in September as compared with August (Figure 6). After a summer of no drought in the state, the lack of precipitation in September, particularly along the southeastern coast, resulted in an "Abnormally Dry" drought classification (D0) (Figure 7).

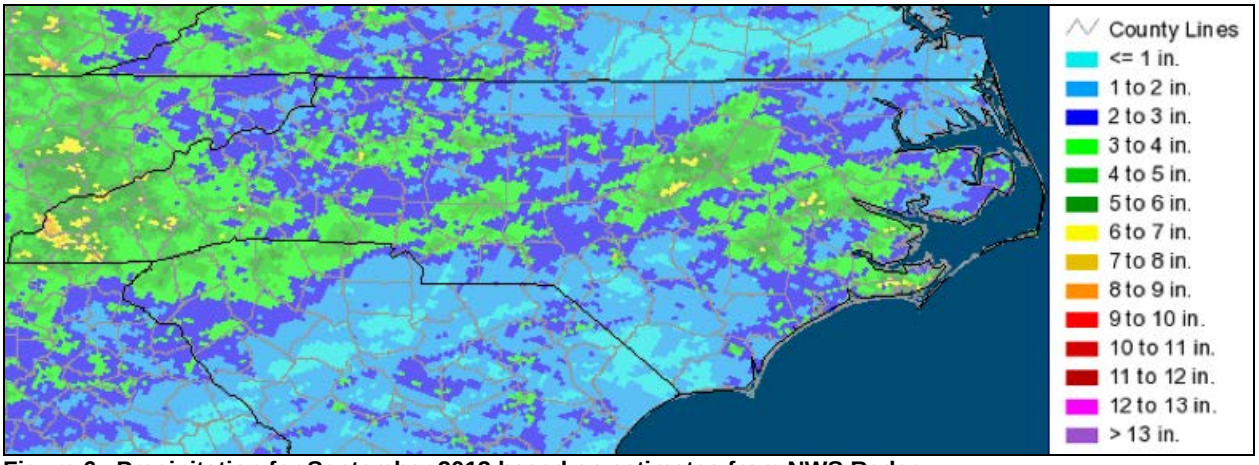

Figure 6. Precipitation for September 2013 based on estimates from NWS Radar. (Data courtesy NNWS/NCEP)

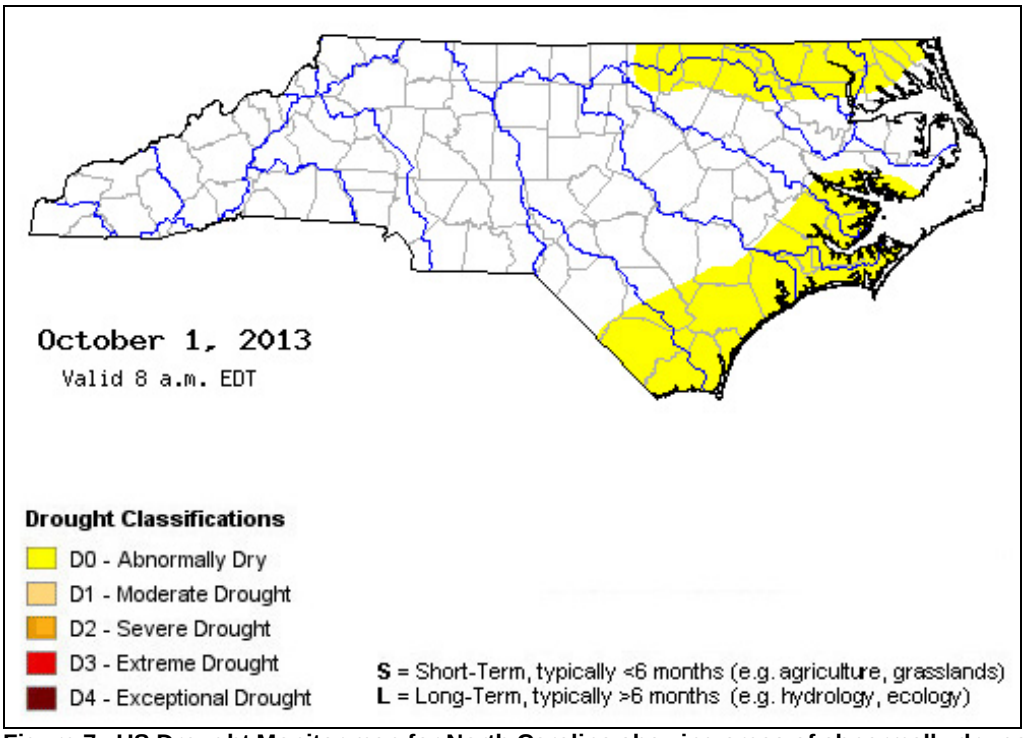

Figure 7. US Drought Monitor map for North Carolina showing areas of abnormally dry conditions. (Image courtesy NCDENR Water Resources).

LAKE & RESERVOIR ASSESSMENTS

HUC 03030002

Reidsville Lake

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

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

DWR field staff monitored Reidsville Lake monthly from May through September 2013. Surface dissolved oxygen in this lake ranged from 5.1 to 9.4 mg/L and surface pH ranged from 7.1 to 8.8 s.u. (Appendix A). Secchi depths, a measurement of water clarity, ranged from 0.8 t0 1.7 meters. The lowest Secchi depths were observed in September and field observations indicated that the lake water appeared dark brown to dark green on that day. On previous sampling visits, the lake water was described as appearing green in color and clear.

Total phosphorus ranged from 0.02 to 0.04 mg/L and total Kjeldahl nitrogen ranged from 0.46 to 0.67 mg/L. Ammonia and nitrite plus nitrate concentrations in 2013 were at or below the water quality detection level of 0.02 mg/L. Chlorophyll *a* values ranged from 12 to 28 *u*g/L, which was well below the state water quality standard of 40 *u*g/L. Reidsville Lake was determined to exhibit elevated biological productivity (eutrophic conditions) during the growing season of 2013.

Lake Hunt

Ambient Lakes Program Name	Lake Hunt		
Trophic Status (NC TSI)	Eutrophic		
Mean Depth (meters)	10.0		
Volume ($10^6 m^3$)	2.8		
Watershed Area (mi^2)	5		
Classification	WS-III B NSW		
Stations	CPF021A	CPF0022A	CPF0023A
Number of Times Sampled	5	5	5

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

This reservoir was sampled monthly from May through September 2013. Surface dissolved oxygen ranged from 5.3 mg/L in September to 9.0 mg/L in May (Appendix A). Surface pH values were greatest in July (8.9 to 9.1 s.u.) and lowest in September (7.2 to 7.4 s.u.) Secchi depths for Lake Hunt ranged from 0.6 meter to 1.7 meters.

Total phosphorus concentrations ranged from 0.02 to 0.04 mg/L and total Kjeldahl nitrogen ranged from 0.55 to 0.85 mg/L. Ammonia and nitrite plus nitrate values were consistently below the DWR water quality laboratory detection level (Appendix A). Chlorophyll *a* values were less than the state water quality standard of 40 ug/L and ranged from 6.7 to 37.0 ug/L. Based on the calculated NCTSI scores, Lake Hunt was determined to exhibit elevated biological productivity or eutrophic conditions. This lake also demonstrated eutrophic conditions when it was previously sampled by DWR in 2008 and 2011.

Lake Higgins

Ambient Lakes Program Name	Lake Higgins	
Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	3.5	
Volume ($10^6 m^3$)	3.0	
Watershed Area (mi^2)	11	
Classification	WS-III NSW CA	
Stations	CPFLH2	CPFLH4
Number of Times Sampled	5	5

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

Surface dissolved oxygen in Lake Higgins ranged from 6.5 to 9.0 mg/L, with the greatest dissolved oxygen value observed at the upstream lake sampling site (CPFLH2) on September 5th (Appendix A). The percent dissolved oxygen saturation at this site was 113.8% and surface pH was 7.4 s.u. These values coincided with a chlorophyll *a* value of 81 *u*g/L, which was greater than the state water quality standard of 40 ug/L. Secchi depths in Lake Higgins ranged from 0.7 to 1.2 meters

Total phosphorus concentrations were consistently greatest at the upstream lake sampling site as were total Kjeldahl nitrogen values. Ammonia and nitrite plus nitrate values were less than the DWR laboratory detection level of 0.02 mg/L (Appendix A). Chlorophyll *a* values ranged from 26 to 81 *u*g/L with three chlorophyll a values at the upper lake sampling site greater than the state water quality standard of 40 *u*g/L. Field observations by staff indicated that the water in Lake Higgins appeared green in color on each of the five sampling dates.

Based on the calculated NCTSI scores, Lake Higgins exhibited elevated biological productivity or eutrophic conditions from May through September 2013.

Lake Brandt

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

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

Secchi depths during the summer sampling period of 2013 ranged from 0.5 to 1.0 meter. Turbidity values were greatest in May, which was a period of frequent rainfall in the region of this lake (Appendix A). Surface dissolved oxygen ranged from 6.0 to 8.4 mg/L and surface pH values ranged from 7.1 to 8.3 s.u.

Total phosphorus concentrations in Lake Brandt ranged from 0.02 to 0.05 mg/L. Both ammonia and nitrite plus nitrate values were consistently below the DWR laboratory detection level of 0.02 mg/L at each of the three lake sampling sites (Appendix A). Chlorophyll *a* values were less than the state water quality standard of 40 *u*g/L. Based on the calculated NCTSI scores in 2013, Lake Brandt was determined to exhibit elevated biological productivity from May through September.

Lake Townsend

Ambient Lakes Program Name	Lake Townsend		
Trophic Status (NC TSI)	Eutrophic		
Mean Depth (meters)	3.0		
Volume ($10^6 m^3$)	25.0		
Watershed Area (mi^2)	105		
Classification	WS-III NSW CA		
Stations	CPFLT4	CPFLT6	CPFLT8
Number of Times Sampled	5	5	5

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

DWR field staff sampled Lake Townsend monthly from May through September 2013. Surface dissolved oxygen ranged from 5.6 to 8.5 mg/L and surface pH values ranged from 7.1 to 8.3 s.u. (Appendix A). The Secchi depth measurements at the dam sampling site (CPFLT8) were consistently greater than the measurements at the mid-lake (CPFLT6) and upstream (CPFLT4) sampling sites. This agreed with turbidity values, which were also lowest near the dam and greatest at the upstream sampling site.

Total phosphorus in Lake Townsend ranged from <0.02 mg/L to 0.05 mg/L. Total Kjeldahl nitrogen concentrations exhibited a general upstream to downstream concentration gradient with the greatest concentrations observed at CPFLT4 and lowest near (CPFLT8). Nitrite plus nitrate values were consistently less than the DWR laboratory detection level while ammonia ranged from <0.02 mg/L to 0.03 mg/L. Chlorophyll *a* values ranged from 4.7 to 30.0 *u*g/L. Field observations of the lake indicated that the water ranged from greenish-brown to clear green in color in 2013. Based on the calculated NCTSI scores for Lake Townsend in 2013, this lake was determined to exhibit elevated biological productivity (eutrophic conditions).

Lake Burlington (Stony Creek Reservoir)

Ambient Lakes Program Name	Lake Burlington (Stony Creek Res.)	
Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	2.0	
Volume ($10^6 m^3$)	1.5	
Watershed Area (mi^2)	110	
Classification	WS-II HWQ NSW CA	
Stations	CPFSCR2	CPFSCR4
Number of Times Sampled	5	5

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

This reservoir was monitored monthly from May through September 2013. Surface dissolved oxygen ranged from 4.4 mg/L in September to 7.8 mg/L in May (Appendix A). Surface pH values ranged from 7.1 to 7.9 s.u. Secchi depths were less than a meter at both of the lake sampling sites, ranging from 0.4 to 0.8 meter. Field notes taken by the DWR monitoring staff describe the lake water appearing green-brown in color and the upper lake sampling site (CPFSCR2) appearing muddy or turbid in May and August 2013.

Total phosphorus concentrations in Lake Burlington ranged from 0.04 to 0.14 mg/L and total Kjeldahl nitrogen ranged from 0.69 to 0.99 mg/L (Appendix A). Ammonia ranged from <0.02 to 0.02 mg/L and nitrite plus nitrate ranged from <0.02 mg/L to 0.08 mg/L. Nutrient concentrations, with the exception of ammonia, were greatest in August. The turbidity value in August at the sampling site, CPFSC2, was 75 NTU. This value was greater than the state water quality standard of 25 NTU for lakes and reservoirs not designated as Trout Waters (Tr). Rainfall in the lake's watershed within 48 hours of sampling was greater than 0.25 inch and the lake level was described as 'slightly high'. Chlorophyll *a* values for Lake Burlington in 2013 ranged from 14 to 41 *u*g/L.

Based on the calculated NCTSI scores, Lake Burlington was determined to exhibit elevated biological productivity (eutrophic conditions) in 2013. This reservoir has exhibited eutrophic conditions since it was first monitored by DWR in 1990.

Lake Cammack (Burlington Reservoir)

Ambient Lakes Program Name	Lake Cammack (Burlington Reservoir)	
Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	4.0	
Volume ($10^6 m^3$)	12.2	
Watershed Area (mi^2)	28	
Classification	WS-II HWQ NSW CA	
Stations	CPF0251	CPF025A
Number of Times Sampled	5	5

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

DWR field staff monitored Lake Cammack monthly from May through September 2013. The lowest surface dissolved oxygen value was observed at the sampling site downstream of the SR1002 bridge (CPF0251A) in May (5.1 mg/L) and the highest values were observed at the same sampling site in May and July (8.1 mg/L; Appendix A). Surface pH values ranged from 7.5 to 8.1 s.u. Secchi depths, an indicator of water clarity, ranged from 0.7 meter in July to 1.0 meter in August. Field notes taken by the sampling staff describe the lake water as appearing green in color but no observations of algae flecks or mats in the water were made.

Total phosphorus ranged from 0.02 to 0.04 mg/L and total Kjeldahl nitrogen ranged from 0.52 to 0.81 mg/L (Appendix A). Ammonia ranged from <0.02 to 0.02 mg/L and nitrite plus nitrate concentrations were <0.02 mg/L. Chlorophyll *a* values in 2013 ranged from 11 t0 24 ug/L. Lake Cammack was determined to exhibit elevated biological productivity, or eutrophic conditions, in 2013. This trophic status has not changed from 1981 when Lake Cammack was first monitored by DWR staff.

Graham-Mebane Reservoir

Ambient Lakes Program Name	Graham-Mebane Reservoir				
Trophic Status (NC TSI)	Eutrophic				
Mean Depth (meters)	3.0				
Volume (10^6 m^3)	8.7				
Watershed Area (mi^2)	66				
Classification	WS-II HQW NSW CA				
Stations	CPFGMR01	CPFGMR1	CPFGMR2	CPFGMR3	CPFGMR4
Number of Times Sampled	5	5	5	5	5

Graham-Mebane Reservoir is a water supply for the Towns of Graham and Mebane. The lake also serves as a drinking water source for the Towns of Green Level and Haw River. Construction of the dam was started in May of 1989 and full pool elevation was reached in the fall of 1992. The lake is located on Quaker and Back Creeks and encompasses the old Quaker Creek Reservoir, which had been previously monitored by DWR. The immediate shoreline is forested except for a few houses, a public school with an athletic field, and some farmland.

Graham-Mebane Reservoir was monitored by DWR field staff monthly from May through September 2013. Surface dissolved oxygen ranged from 4.9 to 9.2 mg/L and surface pH values ranged from 6.6 to 7.9 s.u. (Appendix A). Surface water temperatures ranged from 21.7°C to 28.8 °C. Secchi depths were predominantly less than a meter and field observations by DWR staff indicated that the water in the reservoir appeared brown or greenish-brown in color and turbid. Frequent rainfall, especially in the early part of the summer may have contributed to the increased turbidity of Graham-Mebane Reservoir in 2013.

Total phosphorus concentrations ranged from 0.02 to 0.10 mg/L and total Kjeldahl nitrogen ranged from 0.48 to 1.10 mg/L. Ammonia and nitrite plus nitrate concentrations were consistently less than the DWR laboratory detection level of 0.02 mg/L. Nutrient concentrations in Graham-Mebane Reservoir were similar to those concentrations recorded from previous DWR monitoring efforts. Chlorophyll *a* values in 2013 ranged from 11 to 57 *u*g/L. Six of the 25 chlorophyll *a* observations were greater than the state water quality standard of 40 *u*g/L (or 24% of the chlorophyll *a* values for 2013).

Graham-Mebane Reservoir in on the 303(d) List of Impaired Waters for turbidity values greater than the state water quality standard of 25 NTU in the Quaker Creek arm (listed in 2008) and 0.3 mile upstream of the NC HWY 119 at the dam to SR 1917 (listed in 2012). In 2013, turbidity values ranged from 4.8 to 20.0 NTU. Based on the calculated NCTSI scores, Graham-Mebane Reservoir was determined to have elevated biological productivity (eutrophic conditions) from May through September 2013.

Lake Mackintosh

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

Lake Mackintosh is a water supply reservoir for the City of Burlington. The lake is used for recreational purposes (fishing and boating). Located on Big Alamance Creek, Lake Mackintosh was filled in 1993. The surrounding land is comprised of pastures and farmland with a few houses. A public park and marina operated by Alamance County is located off SR 1149 (Huffman Mill Road) and Guilford County operates a small marina located on the Little Alamance Creek arm of Mackintosh Lake. Guilford County has established a no wake zone for the Little Alamance arm and boats entering this arm are restricted to electric motors.

Field staff sampled five lake sites in 2013; sampling was conducted monthly from May through September. The site located in the Little Alamance Creek arm was not monitored this year due to a prohibition on gasoline-powered boats in that part of the lake.

Surface dissolved oxygen in Lake Mackintosh ranged from 5.6 to 10.8 mg/L. Both of these values were observed at the sampling site in the Big Alamance Creek arm (CPF038G; Appendix A). Surface water temperatures ranged from 22.9 °C to 29.3 °C and surface pH values varied from 6.9 to 8.7 s.u. Secchi

depths for Lake Mackintosh ranged from 0.7 to 1.3 meters. Field observations made of the lake described the lake water as appearing green or brown tinted during the sampling visits by DWR field staff.

Total phosphorus concentrations ranged from 0.02 to 0.04 mg/L and total Kjeldahl nitrogen ranged from 0.50 to 0.85 mg/L (Appendix A). These nutrient concentrations along with those for total organic nitrogen, ammonia and nitrite plus nitrate, were similar to those previously observed in this reservoir since it was first monitored in 1993. Chlorophyll *a* values from May through September 2013 ranged from 2.2 to 31.0 *u*g/L.

Based on the calculated NCTSI scores for 2013, Lake Mackintosh was determined to exhibit elevated biological productivity, or eutrophic conditions. This reservoir has been consistently eutrophic since it was first monitored by DWR field staff in 1993.

Cane Creek Reservoir

Ambient Lakes Program Name	Cane Creek Reservoir		
Trophic Status (NC TSI)	Eutrophic		
Mean Depth (meters)	2.5		
Volume ($10^6 m^3$)	11.0		
Watershed Area (mi^2)	32		
Classification	WS-II HQW NSW CA		
Stations	CPFCCR2	CPFCCR4	CPFCCR6
Number of Times Sampled	5	5	5

Cane Creek Reservoir was built in 1989 by Orange Water and Sewer Authority (OWASA) as a water supply for the City of Chapel Hill. The majority of the watershed is forested with some agriculture. Two main tributaries entering the lake are Cane Creek and Turkey Hill Creek. A public park is located at the lake.

Cane Creek Reservoir was sampled five times from May through September 2013. Surface dissolved oxygen ranged from 5.8 to 10.5 mg/L. The greatest surface dissolved oxygen values were observed in May with all three lake sampling sites exhibiting values greater than 10.0 mg/L (Appendix A). The June surface dissolved oxygen value of 5.8 mg/L at the sampling site near the dam (CPFCCR6) may have been the result of the mixing of the lake's low oxygen bottom water with that of the surface by elevated wind and wave activity from tropical storm Andrea. In 2013, surface pH values ranged from 6.5 to 9.2 s.u. As with dissolved oxygen, surface pH values in this reservoir were greatest in May. The greatest percent dissolved oxygen value (119.9%) occurred at the most upstream lake sampling site (CPFCCR2) in May. Secchi depths for Cane Creek Reservoir ranged from 0.8 to 1.5 meters.

Total phosphorus ranged from 0.02 to 0.05 mg/L and total Kjeldahl nitrogen ranged from 0.69 to 1.00 mg/L (Appendix A). With the exceptions of June observations, concentrations of ammonia and nitrite plus

nitrate were below the DWR laboratory detection level of 0.02 mg/L. Chlorophyll *a* values for Cane Creek Reservoir ranged from 16 to 39 *u*g/L. The greatest chlorophyll *a* values were observed in June (27 to 39 ug/L). Chlorophyll *a* values for May were lower (16 to 25 *u*g/L) despite elevated dissolved oxygen and pH values which were suggestive of increased photosynthetic activity.

Cane Creek Reservoir was determined to exhibit elevated biological productivity (eutrophic conditions) based on the calculated NCTSI scores for 2013.

University Lake

Ambient Lakes Program Name	University Lake	
Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	1.5	
Volume ($10^6 m^3$)	2.6	
Watershed Area (mi^2)	29	
Classification	WS-II HQW NSW CA	
Stations	CPFUL4	CPFUL6
Number of Times Sampled	5	5

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

In 2013, University Lake was monitored monthly from May through September. Surface dissolved oxygen in this reservoir ranged from 8.8 mg/L to 10.6 mg/L and percent dissolved oxygen saturation ranged from 105.8% to 130.9% (Appendix A). Surface pH values ranged from 7.2 to 8.8 s.u. Secchi depths, a measure of water clarity, were one meter in May and less than a meter at the two lake sampling sites from June through September.

Total phosphorus values ranged from 0.04 to 0.10 mg/L and total Kjeldahl nitrogen ranged from 0.60 to 0.97 mg/L (Appendix A). These values were similar to nutrient concentrations previously observed in this reservoir. Chlorophyll *a* ranged from 17 to 84 *u*g/L, with values at both lake sampling sites in June, July and September greater than the state water quality standard of 40 *u*g/L. The chlorophyll *a* value at the sampling site near the dam (CPFUL6) in August was also greater than the state water quality standard. Field observations described the water of University Lake as appearing green on each sampling trip.

An Algal Growth Potential Test (AGPT) run by the Region 4 EPA Laboratory from water samples collected by DWR field staff on July 8, 2013 determined that algal growth in University Lake was limited by the concentration of the nutrient, nitrogen in the lake water(Table 2).

Table 2. Algal Growth Potential Test Results for University Lake.

July 8, 2013

Station	Maximum Standing Crop, Dry Weight (mg/L)			Limiting Nutrient
	Control	C+N	C+P	
CPFUL4	2.23	22.07	1.65	Nitrogen
CPFUL6	1.84	18.51	1.21	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, University Lake was determined to have exceptional biological productivity (hypereutrophic conditions) in June and July and elevated productivity or eutrophic conditions in May, August and September.

B. Everett Jordan Lake

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

B. Everett Jordan Reservoir (Jordan Lake) is a multipurpose reservoir constructed in Chatham County and filled in the late 1981. Major tributaries to the lake include the Haw River, New Hope Creek, and Morgan Creek. Constructed by U.S. Army Corps of Engineers for flood control, this lake is used extensively for primary and secondary recreational activities and as a water supply for several municipalities. Ninety percent of the annual inflow to the lake comes from the Haw River. This arm of the lake has an average hydraulic retention time of five days. The average hydraulic retention time of the New Hope Creek arm is 418 days. Land uses in the watershed include the municipalities of Cary, Apex, Durham and Chapel Hill. Other land uses in the watershed include forest and agricultural areas. Most of the shoreline is undeveloped and forested. Numerous NPDES permitted facilities discharge into the watershed. Nutrient enrichment, algal blooms and eutrophic conditions have been present in the lake since impoundment. The Division of Water Resources (DWR), as well as other organizations have performed extensive historical water quality sampling on Jordan Lake.

DWR field staff monitored Jordan Lake monthly from May through September 2013. Dissolved oxygen measurements for May were not used in this assessment due to the post-calibration failure of the meter for this parameter. Surface dissolved oxygen from June through September ranged from 4.4 to 12.1 mg/L and surface water temperatures from May through September ranged from 20.4 °C to 31.2 °C (Appendix A). Surface pH ranged from 7.0 to 9.4 s.u. Secchi depths, a measurement of water clarity, were frequently less than a meter, ranging from 0.04 to 1.1 meters.

Total phosphorus in Jordan Lake ranged from 0.03 to 0.11 mg/L and total Kjeldahl nitrogen concentrations ranged from 0.58 to 1.20 mg/L (Appendix A). Ammonia nitrogen ranged from <0.02 to 0.09 mg/L and nitrite plus nitrate ranged from <0.02 to 0.45 mg/L. Total organic nitrogen in Jordan Lake ranged from 0.57 to 1.19 mg/L. The greatest concentrations of total organic nitrogen, total Kjeldahl nitrogen and total phosphorus were observed at the upper lake sampling sites, CPF081A1C, CPF086C

and CPF086F in September. Chlorophyll *a* values ranged from 0.09 *u*g/L at the sampling site in the lower end of the lake, downstream of the US 64 bridge (CPF0880A) in May to 93 *u*g/L at the sampling site located in the lower New Hope Creek arm (CPF081A1C) in September. Twelve of the 44 chlorophyll a samples collected from Jordan Lake in 2013 (27.3%) had values greater than the state water quality standard of 40 *u*g/L (Appendix A).

The EPA Region 4 Laboratory conducted an Algal Growth Potential Test (AGPT) from water samples collected in September 2013. All five of the lake sites sampled were determined to be limited for the nutrient, nitrogen (Table 3). The control mean standing crop dry weight at site CPF055C was greater than 5.00 mg/L, indicating that the existing level of nutrients in the lake water were sufficient to support a nuisance algal bloom

Table 3. Algal Growth Potential Test Results for Jordan Lake.

September 18, 2013

Station	Maximum Standing Crop, Dry Weight (mg/L)			Limiting Nutrient
	Control	C+N	C+P	
CPF086C	1.18	12.69	1.04	Nitrogen
CPF081A1B	1.03	21.28	0.88	Nitrogen
CPF087D	1.40	3.09	1.42	Nitrogen
CPF055C	6.22	8.88	6.23	Nitrogen
CPF055E	2.88	4.76	3.09	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

Jordan Lake was placed on the 303(d) List of Impaired Waters in 2006 for turbidity values greater than the state water quality standard of 25 NTU and for pH values greater than the state standard of 9.0 s.u. During the sampling effort in 2013, three of the 45 turbidity observations were greater than 25 NTU and were located in areas of Jordan Lake currently on the 303(d) List. Seven of 45 surface pH values were greater than 9.0 s.u. in 2014 and occurred in segments of the lake currently on the 303(d) List. Based on the calculated NCTSI scores. Jordan Lake was determined to exhibit elevated biological productivity or eutrophic conditions in 2014. This reservoir has been eutrophic since it was first monitored by DWR in 1982.

Buckhorn Dam Lake

Ambient Lakes Program Name	Buckhorn Dam Lake
Trophic Status (NC TSI)	Eutrophic
Mean Depth (meters)	
Volume ($10^6 m^3$)	2.0
Watershed Area (mi^2)	
Classification	WS-IV CA
Stations	CPFBD1
Number of Times Sampled	5

Buckhorn Dam Lake is located on the Cape Fear River, approximately 5.9 miles downstream of the confluence of the Haw and Deep Rivers and has a surface area of 460 acres. The dam, which is 1,100 feet in length between the edges of the river, was completed and the reservoir filled, in 1908. The dam was used until 1962 by a regional power production facility to regulate flows for power production. After 1962, the dam became a run-of-the-river structure and continued to provide a source of cooling water for the coal-burning power plant. Buckhorn Dam is approximately 5.8 miles downstream of the intake for the power plant. The depth of this reservoir is influenced by both precipitation runoff and water release volumes from Jordan Lake.

In 2013, DWR field staff sampled Buckhorn Dam Lake monthly from May through September. Secchi depths for this run-of–the- river reservoir ranged from 0.3 to 0.8 meter. Notes from field observations by staff describe the lake water as brown, muddy and turbid. Surface dissolved oxygen ranged from 4.1 to 7.2 mg/L and surface water temperatures ranged from 20.8°C to 28.6 °C. Low dissolved oxygen concentrations occurred in July at the two lake sampling sites, but remained above the state water quality standard of 5.0 mg/L for an instantaneous reading. Surface pH values were somewhat steady, ranging from 7.2 to 7.6 s.u.

Total phosphorus in Buckhorn Dam Lake ranged from 0.09 to 0.30 mg/L and total Kjeldahl nitrogen ranged from 0.59 to 1.10 mg/L. Ammonia concentrations varied from <0.02 to 0.12 mg/L and the concentrations of nitrite plus nitrate ranged from 0.31 to 0.54 mg/L. Chlorophyll a ranged from 3.7 to 48.0 *u*g/L with the greatest value observed in September at the sampling site near the dam (CPFBDL2). This value was greater than the state water quality standard for chlorophyll *a* of 40 *u*g/L. In 2006, this lake was placed on the 303(d) List of Impaired Waters for chlorophyll a values that exceed the state water quality standard.

An Algal Growth Potential Test (AGPT) was conducted by the EPA Region 4 Laboratory from a water sample collected in August at the near dam sampling site. The control dry weight value of 12.64 mg/L was greater than 5.0 mg/L Dry Weight, indicating that the concentrations of nutrients present in the sample water prior to the addition of nitrogen or phosphorus were at levels sufficient to support a nuisance growth of algae (Table 4). The result of this test determined that the limiting nutrient for algal growth was nitrogen.

Table 4. Algal Growth Potential Test Result for Buckhorn Dam Lake.

August 27, 2013

Station	Maximum Standing Crop, Dry Weight (mg/L)			Limiting Nutrient
	Control	C+N	C+P	
CPFBDL2	12.64	32.53	12.67	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

Buckhorn Dam Lake was determined to exhibit excessive biological productivity (hypereutrophic conditions) in May and elevated productivity or eutrophic conditions in June through September.

High Point Lake

Ambient Lakes Program Name	High Point Lake	
Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	5.0	
Volume ($10^6 m^3$)	4.8	
Watershed Area (mi^2)	60	
Classification	WS-IV CA	
Stations	CPF089E2	CPF089E4
Number of Times Sampled	5	5

High Point Lake (also known as City Lake), built in 1928 by the City of High Point, is used as a water supply and for recreation. Maximum depth of the lake is 33 feet (10 meters). Urban and residential areas as well as pasture and row crop farms dominate the watershed. The two arms of the lake are fed by the East Fork Deep River and the West Fork Deep River. An air injection aeration system operates in both the Deep River and West Fork Deep River arms of this lake to reduce stratification during the summer months and improve the quality of raw water removed for drinking water processing.

High Point Lake was sampled monthly from May through September in 2013 by DWR field staff. Surface dissolved oxygen in this reservoir ranged from 5.2 to 8.9 mg/L and surface water temperature ranged from 16.5 °C in May near the dam (CPF089E4) to 28.7 °C downstream of the SR 1545 bridge over the Deep River arm (CPF089E2) in August (Appendix A). The lowest surface pH values were observed in May and the greatest values were measured in August. Surface conductivities were greatest in May (110 to 120 *u*mhos/cm) and may have been associated with recent heavy rainfall in and around the lake the evening prior to lake sampling. Field notes by staff indicated that the lake water appeared brown and turbid. The majority of Secchi depth measurements during the field sampling of this lake in 2013 were less than a meter in depth.

Nutrient concentrations in High Point Lake were similar to those previously observed in this lake. Surface total phosphorus in 2013 ranged from 0.04 to 0.08 mg/L and total Kjeldahl nitrogen ranged from 0.50 to 0.83 mg/L (Appendix A). Chlorophyll a values ranged from 11 to 64 ug/L. The chlorophyll *a* values in the Deep River arm (CPF089E2) in June and July (57 and 64 *u*g/L, respectively) were greater than the state water quality standard of 40 *u*g/L. Elevated chlorophyll *a* values have placed High Point Lake on the 303(d) List of Impaired Waters in 2006.

Based on the calculated NCTSI scores, High Point Lake was determined to exhibit elevated biological productivity or eutrophic conditions on each of the five sampling dates in 2013.

Oak Hollow Lake (High Point Reservoir)

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

The City of High Point constructed Oak Hollow Lake (also known as High Point Reservoir) to serve as a water supply source. Boating, fishing and swimming are common activities on the lake. The lake has a maximum depth of 36 feet (11 meters). The rolling watershed is characterized by urban and residential development. Two 18-hole golf courses adjoin the lake. An air injection aeration system operates in this lake to reduce stratification during the summer months and improve the quality of raw water removed for drinking water processing.

Oak Hollow Lake was sampled monthly from May through September 2013 by DWR field staff. Secchi depths, a measurement of water clarity, ranged from 0.5 to 1.3 meters. Surface dissolved oxygen ranged from 6.1 mg/L near the dam (CPF089D5) in September to 9.9 mg/L in the Hiatt Branch arm in May (Appendix A). The high dissolved oxygen values observed in May coincided with low surface water temperatures also recorded for that month (16.6 to 17.8 °C). The greatest surface water temperature (30.1 °C) was recorded in August at the sampling site located in the West Fork Deep River arm (CPF089D3). Surface pH values ranged from 6.6 to 9.0 s.u. The surface pH value in the West Fork Deep River arm in July was at, but not greater than, the state water quality standard of 9.0 s.u.

Nutrient concentrations for Oak Hollow Lake were similar to those previously observed for this reservoir by DWR. Total phosphorus concentrations ranged from 0.03 to 0.06 mg/L and total Kjeldahl nitrogen ranged from 0.45 to 0.74 mg/L. Both ammonia and nitrite plus nitrate values were greatest in May (Appendix A). Chlorophyll *a* ranged from 11 to 34 *u*g/L. Based on the calculated NCTSI scores, Oak Hollow Lake was determined to exhibit elevated biological productivity (eutrophic conditions) on each of the five days it was sampled in 2013.

Randleman Reservoir

Ambient Lakes Program Name	Randleman Lake								
Trophic Status (NC TSI)	Eutrophic								
Mean Depth (meters)									
Volume ($10^6 m^3$)	115.5								
Watershed Area (mi^2)	174								
Classification	WS-IV CA								
Stations	CPFRD1	CPFRD2	CPFRD3	CPFRD4	CPFRD5	CPFRD6	CPFRD7	CPFRD8	CPFRD9
Number of Times Sampled	5	5	5	5	5	5	5	5	5

Randleman Lake is located to the south of the City of High Point on the Deep River. Construction of the dam began in 2001 and the reservoir filled in 2007. Located in Randolph and Guilford counties, this reservoir provides drinking water for North Carolina's Piedmont Triad Region and is managed by the Piedmont Triad Regional Water Authority (PTRWA). Randleman Lake will also provide public recreation for boating and fishing. Land use within the immediate watershed consists of dairy operations, forested areas and a few residences. The High Point Eastside WWTP discharge is located downstream of the Groomtown Road bridge (CPFRD1).

Six sites on Randleman Reservoir were sampled by DWR field staff monthly from May through September 2013. Surface dissolved oxygen concentrations ranged from 6.2 to 9.5 mg/L and surface pH values ranged from 6.9 to 8.8 s.u.(Appendix A). Secchi depths, a measure of water clarity, ranged from 0.2 to 1.2 meters, with the lowest measurement recorded at the most upstream sampling site in the Deep River arm (CPFRD1) in May.

Total phosphorus concentrations in Randleman Lake ranged from 0.02 to 0.11 mg/L and total Kjeldahl nitrogen ranged from 0.51 to 0.94 mg/L. Concentrations of ammonia and nitrite plus nitrate were generally below the DWR laboratory detection level of 0.02 mg/L. The greatest concentrations of both of these nutrients were observed at sampling site CPFRD1 in May (Appendix A). Chlorophyll *a* values ranged from 6.2 to 39.0 *u*g/L. A turbidity value of 50 NTU, which was greater than the state water quality standard of 25 NTU for lakes and reservoirs, was recorded at CPFRD1 in May. Randleman Lake was

determined to exhibit elevated biological (eutrophic conditions) based on the calculated NCTSI scores for 2013.

Sandy Creek Reservoir

Ambient Lakes Program Name	Sandy Creek Reservoir		
Trophic Status (NC TSI)	Eutrophic		
Mean Depth (meters)	6.5		
Volume ($10^6 m^3$)	1.5		
Watershed Area (mi^2)	55.0		
Classification	WS-III CA		
Stations	CPFSC1	CPFSC2	CPFSC3
Number of Times Sampled	5	5	5

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

Sandy Creek Reservoir was monitored five times from May through September 2013. Secchi depths ranged from 0.7 to 1.5 meters. Surface dissolved oxygen was generally elevated at the mid-lake sampling site (CPFSC2) and upper lake site (CPFSC3) (Appendix A). Surface water temperatures in 2013 ranged from 15.1 °C in May to 29.5 °C in July.

Nutrient concentrations in Sandy Creek Reservoir, while being similar to those levels previously measured in this reservoir, were elevated in 2013 (Appendix A). Total phosphorus ranged from 0.06 to 0.16 mg/L and total Kjeldahl nitrogen ranged from 0.68 to 1.40 mg/L. Ammonia ranged from <0.02 to 0.12 mg/L and nitrite plus nitrate from <0.02 to 1.00 mg/L. Due to the ready availability of these nutrients, chlorophyll *a* values were greater than the state water quality standard of 40 *u*g/L at the upper lake sampling site in June and July and at the mid-lake sampling site in July and September (Appendix A). In response to these elevated chlorophyll *a* values (which were indicative of elevated algal productivity), surface percent dissolved oxygen values were frequently elevated (i.e., greater than 120%).

Sandy Creek Reservoir was determined to exhibit elevated biological productivity in 2013 based on calculated NCTSI scores for May through September.

Rocky River Reservoir

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

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

DWR staff monitored this reservoir monthly from May through September 2013. Secchi depths were less than a meter (range = 0.4 to 0.9 meter), indicating limited water clarity (Appendix A). Secchi depths of less than a meter were previously observed by DWR in 2008 and 2003. Observations by field staff describe the water in 2013 as appearing brown and turbid at both lake sampling sites in May through August, and dark green in September. Surface dissolved oxygen in 2013 ranged from 6.0 to 10.9 mg/L and surface pH ranged from 7.1 to 8.2 s.u. The percent dissolved oxygen saturation at the sampling site located in the upper end of the mainstem of this lake (CPF1201A) on July 15th was greater than 120.0 % and coincided with the greatest surface dissolved oxygen and pH measurements. The combination of these values were suggestive of increased algal productivity at this sampling site.

Total phosphorus ranged from 0.07 to 0.26 mg/L and total Kjeldahl nitrogen ranged from 1.0 to 1.8 mg/L (Appendix A). Nitrite plus nitrate concentrations in 2013 ranged from <0.02 to 2.60 mg/L. Ammonia values ranged from <0.02 to 0.07 mg/L. The availability of nutrients supported increased algal productivity, which resulted in chlorophyll *a* concentrations ranging from 33.0 to 105 *u*g/L. Seven of the ten chlorophyll *a* values recorded for the 2013 sampling effort (70%) were greater than the state water quality standard 0f 40 *u*g/L.

Based on the 2013 growing season NCTSI scores, the lake trophic status for Rocky River was determined to be hypereutrophic (or exhibiting exceptionally elevated biological productivity). This reservoir was also hypereutrophic in 2008 and 2003.

Charles L. Turner Reservoir

Ambient Lakes Program Name	**Charles L. Turner Reservoir**					
Trophic Status (NC TSI)	**Hypereutrophic**					
Mean Depth (meters)	**3.0**					
Volume ($10^6 m^3$)	**1.4**					
Watershed Area (mi^2)	**53**					
Classification	**WS-III CA**					
Stations	**CPFTR01**	**CPFTR02**	**CPFTR03**	**CPFTR04**	**CPFTR05**	**CPFTR06**
Number of Times Sampled	**5**	**5**	**5**	**5**	**5**	**5**

Charles L. Turner Reservoir is an impoundment located on the Rocky River in Chatham County downstream of Rocky River Reservoir. This reservoir, which serves as a water supply for the Town of Siler City, was created in 2009 by the construction of a new dam downstream of an existing 24 acre reservoir. The Charles L. Turner Reservoir encompasses 162 acres and increases available drinking water for Siler City. The watershed is primarily agricultural with some pasture land immediately adjacent to the lake. DWR monitored this reservoir for the first time in 2013.

DWR field staff sampled this reservoir monthly from May through September 2013. Surface dissolved oxygen ranged from 4.0 mg/L at the sampling site located near the dam (CPFTR1) in June to 9.9 mg/L at the sampling site in the lower end of the Greenbrier Creek arm (CPFTR5) of the reservoir in July. Surface water temperatures ranged from 23.4°C to 29.6 °C. The highest observed surface water temperature was observed in July at sampling site CPFTR5. Surface percent dissolved oxygen saturation at this site in July was 130.1%, which is suggestive of increased algal photosynthesis. Surface pH values in this reservoir ranged from 7.1 to 8.3 s.u. Secchi depths were less than a meter (range = 0.4 to 0.7 meter), indicating that the clarity of the water was poor to moderate. Observations by the field monitoring staff describe the lake water as appearing brown in color and turbid.

Total phosphorus concentrations ranged from 0.08 to 0.31 mg/L and total Kjeldahl nitrogen ranged from 1.1 to 2.0 mg/L. Ammonia values ranged from <0.02 to 0.17 mg/L and nitrite plus nitrate ranged from, <0.02 to 0.25 mg/L. Total organic nitrogen ranged from 0.99 to 1.97 mg/L. In response to available nutrients in the reservoir, chlorophyll *a* values ranged from 15 to 180 *u*g/L. Of the 30 chlorophyll *a* samples from Charles L. Turner Reservoir that were analyzed, 27 samples (90%) had values greater than the state water quality standard of 40 *u*g/L.

The Region 4, EPA Laboratory on water samples collected by DWR field staff on July 15, 2013 (Table 5), conducted an Algal Growth Potential Test (AGPT). The control maximum standing crop dry weight values for water samples collected at each of the six lake sampling sites were greater than 5.00 mg/L. At this level, nutrients present in the sample lake water were great enough to support the growth of nuisance levels of algae without the introduction of either additional nitrogen or phosphorus.

Table. 5. Algal Growth Potential Test Results for Turner Reservoir.

July 15, 2013

Station	Maximum Standing Crop, Dry Weight (mg/L)			Limiting Nutrient
	Control	C+N	C+P	
CPFTR1	5.44	19.00	4.99	Nitrogen
CPFTR2	5.57	28.56	5.74	Nitrogen
CPFTR3	8.65	35.39	8.22	Nitrogen
CPFTR4	8.94	35.07	8.48	Nitrogen
CPFTR5	10.12	35.46	9.82	Nitrogen
CPFTR6	12.68	33.48	13.72	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 2013, Charles L. Turner was determined to exhibit exceptionally elevated biological productivity or hypereutrophic conditions. Low Secchi depths, along with elevated chlorophyll a, total phosphorus and total organic nitrogen concentrations in the lake contributed to this trophic state determination.

LAKE & RESERVOIR ASSESSMENTS

HUC 03030004

Harris Lake

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

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

Surface dissolved oxygen in Harris Lake ranged from 5.2 to 8.5 mg/L and surface pH ranged from 6.9 to 7.6 s.u (Appendix A). Secchi depths were at or greater than a meter at all three lake sampling sites (range = 1.0 to 1.6 meters), indicating that the water clarity was good. Total phosphorus ranged from 0.02 to 0.05 mg/L and total Kjeldahl nitrogen ranged from 0.62 to 0.77 mg/L. Nitrite plus nitrate concentrations were less than the DWR laboratory detection level of 0.02 mg/L and ammonia ranged from <0.02 to 0.05 mg/L. Chlorophyll *a* values ranged from 9.3 to 41.0 *u*g/L, the latter of which was the single value that was greater than the state water quality standard of 40.0 *u*g/L for chlorophyll *a*.

Based on the calculated NCTSI scores for the growing season of 2013, Harris Lake was determined to exhibit elevated biological productivity or eutrophic conditions. This reservoir was also determined to be eutrophic in 2008 and 2003 when it was last monitored by DWR.

Duke Energy Progress conducted an environmental monitoring program in 2012 at Harris Lake to assess the reservoir's overall water quality, identify potential introduction and expansion of invasive plant and animal species to the reservoir and to demonstrate the existence of a recreational fishery in the lake. In this study, Harris Lake was found to have high biological productivity with chlorophyll *a* values ranging from 3 to 37 *u*g/L. Biological surveys identified the presence of Asiatic clams (*Corbicula fluminea*) as well as the invasive plant s hydrilla (*Hydrilla verticillata)* and creeping water primrose (*Ludwigia uruguayensis*). Grass carp were introduced to Harris Lake in 2011 and re-stocked in 2013 to control the spread of hydrilla in this reservoir (Duke Energy Progress, September 2013).

Reference:

Duke Energy Progress. September 2013. Harris Nuclear Plant 2012 Environmental Monitoring Report. Water and Natural Resources Section, Environmental Services Department. Raleigh, NC.

Old Town Reservoir

Ambient Lakes Program Name	Old Town Reservoir	
Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	4.0	
Volume ($10^6 m^3$)	0.2	
Watershed Area (mi^2)	0.4	
Classification	WS-III HQW	
Stations	CPF135B	CPF135D
Number of Times Sampled	5	5

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

Surface dissolved oxygen ranged from 6.2 to 9.2 mg/L. The higher dissolved oxygen values in May coincided with lower water temperatures in the lake (Appendix A). Surface pH values for Old Town Reservoir ranged from 5.6 to 8.2. The values recorded in May were lower than the state water quality standard of 6.0 s.u., however, a low pH is frequently observed in lakes in the Sandhills region of the state and pH values below 6.0 s.u. have been observed in this reservoir on previous sampling trips by DWR. Secchi depths in 2013 ranged from 1.1 to 2.8 meters, indicating good water clarity. Observations by field staff indicated that the lake water was clear with a brown coloration.

Concentrations of total phosphorus, ammonia and nitrite plus nitrate were generally at or below DWR laboratory detection levels with the exception of the May concentration of nitrite plus nitrate (0.11 mg/L) at the sampling site near the dam (CPF135D). Chlorophyll *a* values ranged from 6.9 to 69 ug/L. Two chlorophyll values, one at the upper end of the reservoir (CPF135B) in August and the other near the dam in September, were greater that the state water quality standard of 40 ug/L.

Old Town Reservoir was determined to exhibit moderate biological productivity (mesotrophic conditions) in May and June and elevated biological productivity (eutrophic conditions) in July, August and September.

Carthage City Lake

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

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

Water quality monitoring of this small reservoir was conducted monthly from May through September 2013. Surface dissolved oxygen ranged from 5.3 to 7.3 mg/L and surface pH ranged from 5.8 to 7.5 s.u. Due to the location of this lake in the Sandhills region of the state, the combination of mineral soils and pine trees contribute to pH values that can be lower than the state water quality standard of 6.0 s.u. Secchi depths for Carthage City Lake were greater than a meter in 2013 (Appendix A).

Total phosphorus values were lowest in May (0.02 mg/L) and greatest in September (0.04 mg/L). Total Kjeldahl nitrogen followed a similar concentration pattern (range = 0.54 to 0.71 mg/L). Both ammonia and nitrite plus nitrate values were below the DWR laboratory detection level of 0.02 mg/L. Chlorophyll a ranged from 13 ug/L in May to 33 ug/L in September. Field observations by staff noted the presence of watermilfoil (*Myriophllum sp*.) and elodea (*Egeria sp.*) along the shoreline of the lake. Carthage City Lake was determined to be eutrophic (i.e., exhibiting elevated biological productivity) based on the calculated NCTSI scores in 2013.

Bonnie Doone Lake

Ambient Lakes Program Name	Bonnie Doone Lake
Trophic Status (NC TSI)	Eutrophic
Mean Depth (meters)	0.6
Volume ($10^6 m^3$)	0.1
Watershed Area (mi^2)	3.0
Classification	WS-IV
Stations	CPF138A4
Number of Times Sampled	5

Bonnie Doone Lake, constructed in the early 1900's, is the first in a series of four lakes formed as impoundments of Little Cross Creek. The four lakes (Bonnie Doone, Kornbow, Mintz Pond and Glenville Lake) serve as a backup water supply for the City of Fayetteville. Access to this lake restricted for the public. Fort Bragg Military Base is located in close proximity to Bonnie Doone Lake; firebreaks located on the base along with the soil types of the area contribute large amounts of sediments through stormwater runoff. The shoreline of Bonnie Doone is forested and the western side of the lake beyond the forested buffer is urbanized.

DWR field staff sampled Bonnie Doone Lake monthly from May through September 2013. Surface dissolved oxygen ranged from 4.8 to 7.0 mg/L and surface water temperatures ranged from 20.8°C to 27.6 °C (Appendix A). Surface pH values were slightly greater than those previously observed in this lake and ranged from 6.1 to 7.3 s.u. Secchi depths varied from 0.6 to 1.0 meter.

Ammonia ranged from <0.02 to 0.10 mg/L and nitrite plus nitrate values were below the DWR laboratory detection level of 0.02 mg/L. Total phosphorus concentrations ranged from 0.02 to 0.04 mg/L and total Kjeldahl nitrogen ranged from 0.42 to 0.53 mg/L. Values for chlorophyll *a* ranged from 6.9 to 16 *u*g/L.

Based on the calculated NCTSI scores for 2013, Bonnie Doone Lake was determined to exhibit elevated biological productivity or eutrophic conditions.

Mintz Pond

Ambient Lakes Program Name	Mintz Pond
Trophic Status (NC TSI)	Eutrophic
Mean Depth (meters)	0.5
Volume ($10^6 m^3$)	0.3
Watershed Area (mi^2)	6
Classification	WS-IV
Stations	CPF138A8
Number of Times Sampled	5

Mintz Pond is a small auxiliary water supply reservoir for the City of Fayetteville located in Cumberland County. The lake is the third in a series of four impoundments located on Little Cross Creek and is not open to the public. The immediate shoreline is forested and surrounded by residential and urban development. The impoundment is shallow with a depth of only five feet (two meters) at the dam. .

This small reservoir was sampled by DWR field staff monthly from May through September 2013. Secchi depths ranged from 1.0 to 1.4 meters and surface pH values ranged from 6.2 to 7.6 s.u. (Appendix A). Surface dissolved oxygen in Mintz Pond ranged from 4.0 to 6.0 mg/L. The surface dissolved oxygen concentration for June was not less than the state water quality standard of 4.0 mg/L for an instantaneous reading.

Total phosphorus in this lake ranged from 0.02 to 0.05 mg/L while total Kjeldahl nitrogen ranged from 0.37 to 1.20 mg/L. Ammonia concentrations ranged from <0.02 to 0.05 mg/L and nitrite plus nitrate ranged from <0.02 to 0.09 mg/L. Chlorophyll *a* values ranged from 5.2 *u*g/L in September to 67.0 *u*g/L in May. This latter value was greater than the state water quality standard of 40 *u*g/L.

Mintz Pond was determined to have elevated biological productivity or eutrophic conditions in 2013 based on the calculated NCTSI scores for May through September.

Glenville Lake

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

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

Glenville was sampled monthly from May through September by DWR field staff. Surface dissolved oxygen in this reservoir ranged from 4.8 to 10.6 mg/L and surface water temperature ranged from 21.1 °C in September to 27.8°C in July (Appendix A). Surface percent oxygen saturation in May was 127.6% and was suggestive of elevated algal photosynthesis. Surface pH values ranged from 6.2 to 7.6 s.u., with the highest value recorded in May. Surface dissolved oxygen, surface percent oxygen saturation and surface pH values in May were the highest values for these three parameters recorded for Glenville Lake since it was first monitored by DWR in 1991.

The greatest concentrations of total phosphorus, total Kjeldahl nitrogen, total nitrogen and total organic nitrogen were observed in May (Appendix A). Total phosphorus ranged from 0.03 to 0.06 mg/L and total Kjeldahl nitrogen ranged from 0.42 to 0.81 mg/L. Ammonia and nitrite plus nitrate values ranged from <0.02 to 0.02 mg/L and total nitrogen ranged from 0.43 to 0.82 mg/L. The concentrations of total organic nitrogen were similar to those of total nitrogen and ranged from 0.41 to 0.80 mg/L. Concentrations of total Kjeldahl nitrogen, total nitrogen and total organic nitrogen for May 2013 were the highest values recorded for these three nutrients in Glenville Lake by DWR since monitoring began in 1991. Chlorophyll *a* values ranged from 7.4 *u*g/L in July to 50.0 *u*g/L in May, and the May value for chlorophyll *a* was also the highest value of this parameter observed for Glenville Lake by DWR.

Based on the calculated NCTSI scores for 2013, Glenville Lake was determined to exhibit elevated biological productivity or eutrophic conditions.

LAKE & RESERVOIR ASSESSMENTS

HUC 03030005

Salters Lake

Ambient Lakes Program Name	Salters Lake	
Trophic Status (NC TSI)	Dystrophic	
Mean Depth (meters)	1.5	
Volume ($10^6 m^3$)	0.3	
Watershed Area (mi^2)	3	
Classification	C	
Stations	CPF153C	CPF153D
Number of Times Sampled	5	5

Salters Lake is a Carolina Bay Lake located within Jones Lake State Park. This natural lake is undeveloped and public access is controlled by Jones Lake State Park. The water of the lake is naturally colored by tannins, giving the lake a characteristic tea-coloration typical in dystrophic lakes. DWR staff sampled Salters Lake five times in 2013.

Surface dissolved oxygen in Salters Lake ranged from 5.9 mg/L in August to 8.6 mg/L in May. The highest surface dissolved oxygen values coincided with the lowest surface water temperatures (19.5 to 19.7 C) in May. Surface pH values ranged from 3.8 to 4.0, which were typical for Carolina Bay Lakes. Secchi depths in 2013 were consistently less than one meter in Salters Lake (Appendix A) and were generally lower than those observed in previous sampling years. Due to frequent rainfall in the early part of the summer, the lake water was frequently described as' turbid' or 'very dark' by the field sampling team.

Wind and wave action related to the summer storms kept this shallow lake well mixed and contributed to the suspension of lake-bottom organic materials (peat particles) into the water column. In addition to reducing water clarity, the combination of storm runoff from the surrounding watershed and suspension of the bottom materials contributed to an increase in nutrient concentrations in Salters Lake as compared with previous sampling year's levels. Total phosphorus concentrations in 2013 ranged from 0.02 mg/L in September to 0.04 mg/L in May as compared with a range of <0.02 to 0.02 mg/L in 2008. Total Kjeldahl nitrogen in 2013 ranged from 0.48 to 0.81 mg/L as compared with the range of 0.10 to 0.43 mg/L in 2008 for this nutrient. The highest chlorophyll *a* values in 2013 were observed in May (Appendix A) but did not exceed the state water quality standard of 40 *u*g/L. Turbidity as well as the values for total solids were greater in 2013 as compared with values in 2008.

No violations of state water quality standards were observed in 2013 and Salters Lake continued to support its designated uses. An NCTSI score was not generated due to the dystrophic nature of this lake.

Jones Lake

Ambient Lakes Program Name	Jones Lake	
Trophic Status (NC TSI)	Dystrophic	
Mean Depth (meters)	1.0	
Volume ($10^6 m^3$)	0.1	
Watershed Area (mi^2)	2	
Classification	B	
Stations	CPF1552A	CPF1553A
Number of Times Sampled	5	5

Jones Lake is a small, shallow, natural lake situated in the flat swampy terrain of Jones Lake State Park. Like other Carolina Bay Lakes, Jones receives almost no overland inputs of water, relying instead on precipitation and groundwater for recharge. Jones Lake is classified as dystrophic due to naturally occurring acidic water, which has a dark coloration due to dissolved organic material (tannin-stained). A public park with a swimming area is located on the southeastern shoreline of this lake. DWR field staff sampled Jones Lake five times in 2013.

Surface dissolved oxygen in Jones Lake ranged from 5.1 mg/L in August to 8.4 mg/L in May (Appendix A). Surface water temperatures were lowest in May (19.3 mg/L) and greatest in July (29.5 mg/L). Jones lake is typically acidic, and pH values for 2013 ranged from 3.8 to 4.4. Secchi depths were greatest in June and lowest in September. The lower Secchi depths in September coincided with an increase in total solids and turbidity (Appendix A).

Total phosphorus and total Kjeldahl nitrogen concentration in 2013 were greater than those observed in the previous sampling year, 2008. In 2013, total phosphorus ranged from <0.02 to 0.08 mg/L and total Kjeldahl nitrogen ranged from 0.20 to 0.86 mg/L. The greater values of these two nutrients were observed in May at the sampling site located at the southern end of the lake (Appendix A). Chlorophyll *a* values were greatest in September, but did not exceed the state water quality standard of 40 *u*g/L.

In 2013, Jones Lake continued to meet its designated uses. Due to the dystrophic nature of this lake, the NCTSI score could not be accurately calculated.

White Lake

Ambient Lakes Program Name	White Lake		
Trophic Status (NC TSI)	Mesotrophic		
Mean Depth (meters)	2.9		
Volume ($10^6 m^3$)	9.5		
Watershed Area (mi^2)			
Classification	B		
Stations	CPF155A	CPF155B	CPF155C
Number of Times Sampled	5	5	5

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

DWR field staff monitored White Lake monthly from May through September 2013. Surface dissolved oxygen ranged from 6.0 to 8.3 mg/L and surface pH ranged from 5.6 to 8.3 s.u. (Appendix A). The pH values for July, August and September 2013 were the highest values observed for this lake since it was first monitored by DWR in 1981. Historically, White Lake has exhibited the low pH values typical of Carolina Bay Lakes. Secchi depths ranged from 1.2 to 3.0 meters with measurements frequently reaching the bottom of the lake.

Total phosphorus concentrations in White Lake ranged from <0.02 to 0.02 mg/L and total Kjeldahl nitrogen ranged from 0.26 to 0.62 mg/L. Ammonia and nitrite plus nitrate values were less than the DWR laboratory detection level of 0.02 mg/L. Chlorophyll *a* values ranged from 1.7 to 30.0 *u*g/L with the values observed at the three lake sampling sites on July 15, 2013 the greatest lake-wide values recorded since the lake was first monitored in 1981. Field notes from July 15th note the presence of pieces of aquatic plants from the lake bottom floating on the surface of the lake and the water appearing clear and green in color. Submerged aquatic weeds were also noted at each of the three lake sampling sites.

The calculated NCTSI scores for White Lake in May and June 2013 indicated that the lake at that time was exhibiting low biological productivity or oligotrophic conditions. In July, the NCTSI score increased and the lake trophic state was eutrophic or exhibiting elevated biological productivity. Increases in total phosphorus and chlorophyll *a*, along with a decrease in Secchi depth contributed to this change in trophic status. The September trophic state indicated moderate biological productivity (mesotrophic conditions). No score was calculated for August due to issues with the reliability of chlorophyll *a* readings from the laboratory. Overall, White Lake was classified as mesotrophic for 2013.

Greenfield Lake

Ambient Lakes Program Name	Greenfield Lake	
Trophic Status (NC TSI)	Eutrophic	
Mean Depth (meters)	1.5	
Volume ($10^6 m^3$)	0.1	
Watershed Area (mi^2)	3	
Classification	C SW	
Stations	CPF211B	CPF211C
Number of Times Sampled	5	5

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

DWR field staff sampled Greenfield Lake monthly from May through September 2013. Secchi depths in May and June were greater than one meter, then decreased to less than a meter in July through September (Appendix A).. Field notes for May described the lake water as clear and tea-colored (tannic) and that fewer aquatic weeds were observed in the lake as compared with previous years' observations. Surface dissolved oxygen ranged from 6.8 to 10.9 mg/L, with the highest reading observed for both sampling sites in August. Surface percent dissolved oxygen in August ranged from 125.9% to 148.3%. Surface water temperature in Greenfield Lake ranged from 24.6 °C to 31.6 °C and surface pH values ranged from 6.7 to 8.1 s.u. Surface conductivity measurements in Greenfield Lake ranged from 154 to 210 *u*mhos/cm.

Total phosphorus concentrations in 2013 ranged from 0.09 to 0.13 mg/L and total Kjeldahl nitrogen ranged from 0.46 to 1.50 mg/L (Appendix A). The concentrations of ammonia and nitrite plus nitrate were consistently below the DWR laboratory detection level of 0.02 mg/L from May through September 2013. In response to the availability of phosphorus and nitrogen, algal productivity in Greenfield Lake was elevated as suggested by the chlorophyll *a* values in July, August and September, which were greater than the state water quality standard of 40 *u*g/L.

Based on calculated NCTSI scores, Greenfield Lake demonstrated elevated biological productivity (eutrophic conditions) in May, June and July. In August and September, biological productivity was exceptionally elevated (hypereutrophic conditions were present). Overall, the trophic status for Greenfield Lake in 2013 was eutrophic.

Boiling Springs Lake

Ambient Lakes Program Name	Boiling Springs Lake		
Trophic Status (NC TSI)	Dystrophic		
Mean Depth (meters)	3.0		
Volume ($10^6 m^3$)	3.8		
Watershed Area (mi^2)	10		
Classification	B SW		
Stations	CPFBSL2	CPFBSL4	CPFBSL6
Number of Times Sampled	5	5	5

Boiling Springs Lake, a coastal black water man-made lake located in eastern Brunswick County, is owned by the Town of Boiling Springs. This lake was impounded in 1961. Land use upstream of the lake is mostly forested and residential. The lake is used for fishing and boating and is fed by several springs.

DWR field staff sampled Boiling Springs Lake monthly from May through September 2013. Surface dissolved oxygen ranged from 4.9 to 6.6 mg/L and surface water temperature ranged from 22.0 °C to 31.5 °C (Appendix A). Field observations by staff indicated that the water of this lake was tea-colored or tannic but clear. Secchi depths ranged from 0.2 to 0.4 meters and were the lowest Secchi measurements recorded for this lake. Surface pH values for Boiling Springs Lake ranged from, 6.0 to 7.4 s.u., which was similar to values measured during the previous sampling effort in 2008.

Total phosphorus ranged from <0.02 to 0.02 mg/L and total Kjeldahl nitrogen ranged from 0.68 to 0.78 mg/L. Ammonia concentrations ranged from <0.02 to 0.03 mg/L while nitrite plus nitrate ranged from 0.04 to 0.06 mg/L. Chlorophyll *a* values were low and ranged from <1.0 to 3.9 *u*g/L. Based on data collected in 2013 Boiling Springs Lake appears to be meeting its designated uses. This lake is dystrophic and the NCTSI scores could not be accurately calculated due to the naturally dark, tannic waters.

LAKE & RESERVOIR ASSESSMENTS

HUC 03030006

Bay Tree Lake

Ambient Lakes Program Name	Bay Tree Lake	
Trophic Status (NC TSI)	Dystrophic	
Mean Depth (meters)	1.0	
Volume ($10^6 m^3$)	0.6	
Watershed Area (mi^2)	4	
Classification	C SW	
Stations	CPF155G	CPF155I
Number of Times Sampled	5	5

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

Bay Tree Lake was sampled monthly from May through September 2013 by DWR field staff. Secchi depths ranged from 0.5 to 1.8 meters. The measurements made in May, June and July at the two lake sampling sites were less than a meter (Appendix A). Secchi depths in August were to the bottom of the lake at bottom sampling sites. Surface dissolved oxygen ranged from 7.2 to 8.0 mg/L and surface pH ranged from 4.3 to 4.7 s.u. The low pH values of this lake are due to natural conditions and are a characteristic of Carolina Bay Lakes.

Total phosphorus for Bay Tree Lake ranged from <0.02 to 0.03 mg/L and total Kjeldahl nitrogen ranged from 0.20 to 0.30 mg/L (Appendix A). Concentrations of ammonia were consistently below the DWR water quality laboratory detection level of 0.02 mg/L from June through September and 0.03 mg/L at both sampling sites in May. Nitrite plus nitrate values in this lake ranged from 0.02 to 0.42 mg/L. Chlorophyll *a* ranged from 2.5 to 16.0 *u*g/L, and the values for June 17th were the highest observed for this lake since 1981 when it was first sampled by DWR.

Based on data collected in 2013, Bay Tree Lake appears to be meeting its designated uses. This lake is dystrophic and the NCTSI scores could not be accurately calculated due to the naturally dark, tannic waters.

Singletary Lake

Ambient Lakes Program Name	Singletary Lake		
Trophic Status (NC TSI)	Dystrophic		
Mean Depth (meters)	1.5		
Volume ($10^6 m^3$)	0.4		
Watershed Area (mi^2)	1		
Classification	B SW		
Stations	CPF176D	CPF176E	CPF176F
Number of Times Sampled	5	5	5

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

DWR field staff monitored Singletary Lake monthly from May through September 2013. Surface pH was low, ranging from 3.8 to 5.6 s.u., which is typical for this lake (Appendix A). Surface water temperatures ranged from 23.9 °C in May to 31.5 °C in July and surface dissolved oxygen ranged from 6.1 to 8.8 mg/L. Secchi depths were less than a meter (range = 0.4 to 0.7 meters). Staff field observations described the lake water as appearing tannic (i.e., brown or tea-colored).

Total phosphorus concentrations ranged from 0.02 to 0.04 mg/L and total Kjeldahl nitrogen ranged from 0.40 to 0.62 mg/L. Ammonia nitrogen in Singletary Lake ranged from <0.02 to 0.05 mg/L and nitrite plus nitrate ranged from <0.02 to 0.07 mg/L. Chlorophyll *a* values in Singletary Lake ranged from 3.8 to 16.0 *u*g/L. Based on data collected in 2013, Singletary Lake appears to be meeting its designated uses. This lake is dystrophic and the NCTSI scores could not be accurately calculated due to the naturally dark, tannic waters.

Cabin Lake

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

Cabin Lake is a part of the Cabin Lake Recreational Park, which is owned by Duplin County. Located between the towns of Kenansville and Beulaville, the lake was formed from the damming of Cabin Creek in 1993. Land use within the watershed consists of farmlands forests and animal operations. Swimming and boating with electric motors is permitted at this lake.

This lake was monitored five times from May through September 2003. Two sites were sampled on each monitoring visit; one site located near the dam (CPFCL4) and the other near the middle of the lake (CPFCL2). Surface dissolved oxygen ranged from 5.2 to 9.1 mg/L and surface water temperature ranged from 21.2 °C to 31.7 °C (Appendix A). Surface pH ranged from 5.4 to 7.1 s.u. Secchi depths were less than a meter at both sampling sites in 2013 and field observations of the lake water described it as appearing dark in color.

In 2013, total phosphorus in Cabin Lake ranged from 0.07 to 0.25 mg/L and total Kjeldahl nitrogen ranged from 0.84 to 2.60 mg/L. The concentration of ammonia ranged from <0.02 to 0.04 mg/L and nitrite plus nitrate ranged from <0.02 to 0.29 mg/L. In response to the availability of nutrients in Cabin Lake, chlorophyll *a*, an indicator of algal productivity, ranged from 9.2 to 129 *u*g/L. Chlorophyll *a* values at one

of the two sites sampled in July, August and September were greater than the state water quality standard of 40 *u*g/L.

Duckweed (*Lemna sp*.), a small floating aquatic macrophyte, appears to have accumulated near parts of the shoreline because of wind and wave action.

The Region 4, EPA Laboratory on water samples collected by DWR field staff on September 12, 2013 (Table 6), conducted an Algal Growth Potential Test (AGPT). Algal growth at the two lake sites that were sampled were both limited for nitrogen.

Table 6. Algal Growth Potential Test Results for Cabin Lake.

September 12, 2013

Station	Maximum Standing Crop, Dry Weight (mg/L)			Limiting Nutrient
	Control	C+N	C+P	
CPFCL2	0.25	16.88	0.25	Nitrogen
CPFCL4	0.28	2.34	0.22	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 for 2013, Cabin Lake was determined to have elevated biological productivity (eutrophic conditions) in May and June and exceptionally elevated biological productivity (hypereutrophic conditions) in July, August and September. Overall, the trophic status of Cabin Lake was found to be hypereutrophic.

Appendix A - Cape Fear River Basin Data
January 1, 2009 Through December 31, 2013

Lake	Date	Sampling Station	SURFACE PHYSICAL DATA DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent DO 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
HUC 03030002																				
REIDSVILLE LAKE	September 23, 2013	CPF0025A	6.2	23.8	7.3	70	0.8	73.4%	0.04	0.66	<0.02	<0.02	0.67	0.65	0.02	26.0	52		7.5	
	September 23, 2013	CPF002A1	5.1	23.9	7.1	69	0.9	60.5%	0.02	0.67	0.020	<0.02	0.68	0.65	0.03	18.0	52	<6.2	4.8	25.0
	August 28, 2013	CPF0025A	9.4	26.3	8.8	68	1.0	116.5%	0.03	0.66	<0.02	<0.02	0.67	0.65	0.02	24.0	7.3	6.2	4.9	
	August 28, 2013	CPF002A1	9.0	26.6	8.7	68	1.3	112.2%	0.03	0.58	<0.02	<0.02	0.59	0.57	0.02	23.0	64		3.8	20.0
	July 25, 2013	CPF0025A	7.6	29.4	7.8	69	1.0	99.5%	0.03	0.63	<0.02	<0.02	0.64	0.62	0.02	22.0	59	<6.2	6.9	
	July 25, 2013	CPF002A1	7.2	29.6	7.8	70	1.7	94.6%	0.02	0.46	<0.02	<0.02	0.47	0.45	0.02	16.0	54	<6.2	4.5	22.0
	June 25, 2013	CPF0025A	7.5	28.3	7.8	70	1.0	96.4%	0.03	0.63	<0.02	<0.02	0.64	0.62	0.02	28.0	68	<6.2	7.2	
	June 25, 2013	CPF002A1	7.0	28.1	7.6	70	1.3	89.6%	0.02	0.51	<0.02	<0.02	0.52	0.50	0.02	13.0	61	<6.2	4.4	23.0
	May 21, 2013	CPF0025A	8.2	25.4	7.5	61	1.0	100.0%	0.03	0.58	0.02	0.02	0.60	0.56	0.04	12.0	62	<12	7.8	
	May 21, 2013	CPF002A1	8.5	25.3	7.6	62	1.5	103.5%	0.03	0.61	<0.02	<0.02	0.62	0.60	0.02	27.0	65	<6.2	6.1	21.0
LAKE HUNT	September 23, 2013	CPF0021A	6.7	23.2	7.3	59	0.6	78.4%	0.04	0.75	<0.02	<0.02	0.76	0.74	0.02	26.0	59	8.0	9.8	
	September 23, 2013	CPF0022A	6.0	23.3	7.4	59	0.8	70.4%	0.03	0.75	<0.02	<0.02	0.76	0.74	0.02	26.0	54	<6.2	6.8	
	September 23, 2013	CPF0023A	5.3	23.3	7.2	60	0.8	62.2%	0.03	0.75	<0.02	<0.02	0.76	0.74	0.02	23.0	53	<6.2	5.9	16.0
	August 28, 2013	CPF0021A	8.2	27.0	8.1	59	1.1	102.9%	0.04	0.85	<0.02	<0.02	0.86	0.84	0.02	37.0	68	7.2	5.5	
	August 28, 2013	CPF0022A	8.0	27.0	8.0	59	1.1	100.4%	0.03	0.74	<0.02	<0.02	0.75	0.73	0.02	22.0	64	<6.2	4.7	
	August 28, 2013	CPF0023A	7.8	26.8	7.8	59	1.1	97.6%	0.03	0.76	<0.02	<0.02	0.77	0.75	0.02	21.0	64	<6.2	4.2	17.0
	July 25, 2013	CPF0021A	8.0	29.2	8.9	60	0.8	104.4%	0.04	0.82	<0.02	<0.02	0.83	0.81	0.02	12.0	64	<6.2	8.1	
	July 25, 2013	CPF0022A	7.9	29.7	9.0	61	0.9	104.0%	0.04	0.82	<0.02	<0.02	0.83	0.81	0.02	6.7	68	<6.2	6.8	
	July 25, 2013	CPF0023A	8.1	29.7	9.1	61	1.0	106.6%	0.03	0.83	<0.02	<0.02	0.84	0.82	0.02	7.2	61	<6.2	6.2	15.0
	June 25, 2016	CPF0021A	8.2	29.6	8.7	60	1.0	107.8%	0.03	0.70	<0.02	<0.02	0.71	0.69	0.02	14.0	57	<6.2	7.2	
	June 25, 2016	CPF0022A	8.5	29.5	8.6	61	1.1	111.5%	0.03	0.65	<0.02	<0.02	0.66	0.64	0.02	13.0	54	<6.2	6.8	
	June 25, 2016	CPF0023A	8.4	28.6	8.5	61	1.1	108.5%	0.02	0.67	<0.02	<0.02	0.68	0.66	0.02	15.0	54	<6.2	5.4	16.0
	May 21, 2013	CPF0021A	8.6	27.0	7.8	55	1.5	108.0%	0.03	0.55	<0.02	<0.02	0.56	0.54	0.02	13.0	62	9.5	6.5	
	May 21, 2013	CPF0022A	9.0	24.7	7.7	55	1.7	108.3%	0.03	0.55	<0.02	<0.02	0.56	0.54	0.02	10.0	64	<6.2	4.7	
	May 21, 2013	CPF0023A	9.0	24.8	8.0	54	1.7	108.5%	0.03	0.67	<0.02	<0.02	0.68	0.66	0.02	22.0	64	<6.2	4.9	15.0
LAKE HIGGINS	September 5, 2013	CPFLH2	9.0	27.4	7.4	76	0.8	113.8%	0.08	0.90	<0.02	<0.02	0.91	0.89	0.02	81.0	77	12.0	11.0	
	September 5, 2013	CPFLH4	8.9	27.0	8.2	72	0.9	111.7%	0.03	0.54	<0.02	<0.02	0.55	0.53	0.02	27.0	64	27.0	5.6	22.0
	August 1, 2013	CPFLH2	7.6	27.3	7.6	80	0.9	95.9%	0.04	0.65	<0.02	<0.02	0.66	0.64	0.02	33.0	62	6.5	8.7	
	August 1, 2013	CPFLH4	6.8	27.4	7.9	76	0.9	86.0%	0.03	0.55	<0.02	<0.02	0.56	0.54	0.02	34.0	129	<6.2	5.4	23.0
	July 11, 2013	CPFLH2	6.5	28.2	8.1	78	0.7	83.4%	0.06	0.64	<0.02	<0.02	0.65	0.63	0.02	44.0	65	9.5	11.0	
	July 11, 2013	CPFLH4	6.6	28.7	8.4	81	0.9	85.4%	0.03	0.56	<0.02	<0.02	0.57	0.55	0.02	26.0	60	<6.2	5.3	24.0
	June 5, 2013	CPFLH2	7.4	25.1	7.3	90	0.9	89.7%	0.05	0.60	<0.02	<0.02	0.61	0.59	0.02	49.0	72	9.0	9.0	
	June 5, 2013	CPFLH4	7.1	25.2	7.5	88	1.2	86.3%	0.04	0.52	<0.02	<0.02	0.53	0.51	0.02	28.0	60	<6.2	3.8	27.0
	May 2, 2013	CPFLH2	8.1	17.5	7.4	90	0.9	84.7%	0.04	0.46	<0.02	<0.02	0.47	0.45	0.02	15.0	62	7.5	9.1	
	May 2, 2013	CPFLH4	6.9	17.4	7.2	90	0.9	72.0%	0.03	0.50	<0.02	<0.02	0.51	0.49	0.02	15.0	62	<6.2	5.8	25.0
LAKE BRANDT	September 5, 2013	CPF007A1A	8.4	28.3	7.6	81	0.7	107.9%	0.04	0.53	<0.02	<0.02	0.54	0.52	0.02	23.0	69	<6.2	6.0	
	September 5, 2013	CPF007A4	8.4	28.4	7.5	81	0.7	108.1%	0.04	0.57	<0.02	<0.02	0.58	0.56	0.02	22.0	66		6.1	
	September 5, 2013	CPF007B	8.4	27.8	8.2	81	0.9	107.0%	0.04	0.55	<0.02	<0.02	0.56	0.54	0.02	<1.0	68	<6.2	5.8	26.0
	August 1, 2013	CPF007A1A	7.4	27.8	7.9	88	0.9	94.2%	0.05	0.74	<0.02	<0.02	0.75	0.73	0.02	31.0	71		7.5	
	August 1, 2013	CPF007A4	6.1	27.7	7.8	85	1.0	77.5%	0.04	0.61	<0.02	<0.02	0.62	0.60	0.02	26.0	74	<6.2	5.4	
	August 1, 2013	CPF007B	6.0	27.6	7.6	86	1.0	76.1%	0.02	0.46	<0.02	<0.02	0.47	0.45	0.02	8.6	71	<6.2	4.4	27.0
	July 11, 2013	CPF007A1A	6.9	29.4	8.2	91	0.9	90.4%	0.03	0.42	<0.02	<0.02	0.43	0.41	0.02	15.0	66	<6.2	5.3	
	July 11, 2013	CPF007A4	6.6	28.8	8.3	91	0.9	85.5%	0.03	0.51	<0.02	<0.02	0.52	0.50	0.02	16.0	59	<6.2	5.8	
	July 11, 2013	CPF007B	6.2	29.0	8.1	91	0.9	80.6%	0.03	0.44	<0.02	<0.02	0.45	0.43	0.02	17.0	71	<6.2	5.9	29.0
	June 5, 2013	CPF007A1A	6.7	25.6	7.1	97	0.6	82.0%	0.03	0.49	<0.02	<0.02	0.50	0.48	0.02	15.0	67		6.2	
	June 5, 2013	CPF007A4	6.9	25.6	7.2	98	0.9	84.5%	0.04	0.46	<0.02	<0.02	0.47	0.45	0.02	16.0	67	<6.2	5.4	
	June 5, 2013	CPF007B	6.6	25.5	7.4	98	0.8	80.6%	0.04	0.43	<0.02	<0.02	0.44	0.42	0.02	17.0	69	<6.2	6.2	32.0
	May 2, 2013	CPF007A1A	8.4	17.7	7.2	93	0.6	88.2%	0.04	0.54	<0.02	<0.02	0.55	0.53	0.02	26.0	68	8.8	9.3	
	May 2, 2013	CPF007A4	8.1	17.8	7.3	98	0.5	85.2%	0.05	0.57	<0.02	<0.02	0.58	0.56	0.02	24.0	76	64.0	16.0	
	May 2, 2013	CPF007B	7.0	17.5	7.7	98	0.6	73.2%	0.04	0.52	<0.02	<0.02	0.53	0.51	0.02	16.0	40	7.0	9.3	31.0
LAKE TOWNSEND	September 5, 2013	CPFLT4	8.0	28.5	7.7	84	1.0	103.1%	0.04	0.60	<0.02	<0.02	0.61	0.59	0.02	32.0	74		12.0	
	September 5, 2013	CPFLT6	8.5	28.5	7.7	88	1.0	109.6%	0.04	0.58	<0.02	<0.02	0.59	0.57	0.02	26.0	68	<6.2	5.6	
	September 5, 2013	CPFLT8	8.4	28.1	7.8	80	1.2	107.5%	0.02	0.48	0.03	<0.02	0.49	0.47	0.02	13.0	68	<6.2	3.6	29.0
	August 1, 2013	CPFLT4	7.2	27.9	7.7	85	0.8	91.8%	0.03	0.64	<0.02	<0.02	0.65	0.63	0.02	26.0	74	13.0	14.0	
	August 1, 2013	CPFLT6	7.4	28.5	7.9	85	0.8	95.4%	0.03	0.56	0.02	<0.02	0.57	0.54	0.03	18.0	69		8.6	
	August 1, 2013	CPFLT8	7.4	28.5	7.4	86	1.1	95.4%	0.03	0.52	0.03	<0.02	0.53	0.49	0.04	23.0	69	<6.2	6.0	28.0
	July 11, 2013	CPFLT4	6.5	28.6	8.3	91	0.6	83.9%	0.04	0.51	<0.02	<0.02	0.52	0.50	0.02	20.0	76	12.0	12.0	
	July 11, 2013	CPFLT6	5.6	28.4	8.1	88	0.8	72.1%	0.03	0.49	<0.02	<0.02	0.50	0.48	0.02	17.0	66	<6.2	6.4	
	July 11, 2013	CPFLT8	7.0	29.2	8.1	87	1.4	91.4%	<0.02	0.36	<0.02	<0.02	0.37	0.35	0.02	7.0	57	<6.2	3.0	28.0
	June 5, 2013	CPFLT4	6.8	25.0	7.3	96	0.8	82.3%	0.04	0.56	<0.02	<0.02	0.57	0.55	0.02	20.0	72	9.3	11.0	
	June 5, 2013	CPFLT6	6.9	24.9	7.1	89	1.5	83.4%	0.02	0.42	0.02	<0.02	0.43	0.40	0.03	8.8	64	<6.2	4.6	
	June 5, 2013	CPFLT8	6.7	24.9	7.1	87	1.9	81.0%	0.02	0.36	0.02	<0.02	0.37	0.34	0.03	4.7	69	<12.0	2.8	27.0
	May 2, 2013	CPFLT4	8.3	17.5	7.5	94	0.5	86.8%	0.05	0.54	<0.02	<0.02	0.55	0.53	0.02	30.0	70		12.0	
	May 2, 2013	CPFLT6	7.7	17.7	7.4	88	0.6	80.9%	0.04	0.56	<0.02	<0.02	0.57	0.55	0.02	28.0	62	12.0	11.0	
	May 2, 2013	CPFLT8	7.0	17.2	7.5	83	1.1	72.8%	0.03	0.45	<0.02	<0.02	0.46	0.44	0.02	18.0	56	<6.2	4.5	23.0
LAKE BURLINGTON	September 26, 2013	CPFSCR2	5.2	21.7	7.7	104	0.7	59.1%	0.05	0.77	<0.02	<0.02	0.78	0.76	0.02	32.0	88	8.5	9.5	
	September 26, 2013	CPFSCR4	4.4	21.7	7.8	105	0.6	50.0%	0.04	0.69	<0.02	<0.02	0.70	0.68	0.02	26.0	106	6.2	8.7	40.0
(STONY CREEK RESERVOIR)	August 22, 2013	CPFSCR2	6.6	24.3	7.3	77	0.6	78.9%	0.14	0.99	<0.02	0.08	1.07	0.98	0.09	14.0	125	37.0	75.0	
	August 22, 2013	CPFSCR4	7.5	25.3	7.2	84	0.6	91.3%	0.05	0.74	<0.02	0.03	0.77	0.73	0.04	16.0	92	7.5	13.0	31.0

Appendix A - Cape Fear River Basin Data
January 1, 2009 Through December 31, 2013

Lake	Date	Sampling Station	SURFACE PHYSICAL DATA DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent DO 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
LAKE BURLINGTON	July 30, 2013	CPFSCR2	6.3	27.2	7.5	90	0.6	79.4%	0.06	0.80	<0.02	<0.02	0.81	0.79	0.02	30.0	85	10.5	13.0	
	July 30, 2013	CPFSCR4	7.3	27.4	7.9	92	0.7	92.3%	0.05	0.74	<0.02	<0.02	0.75	0.73	0.02	22.0	88	<6.2	6.6	35.0
(STONY CREEK RESERVOIR)	June 26, 2013	CPFSCR2	7.1	27.1	7.6	96	0.6	89.3%	0.06	0.78	0.02	<0.02	0.79	0.76	0.03	23.0	90	12.0	15.0	
	June 26, 2013	CPFSCR4	7.2	27.0	7.7	96	0.8	90.4%	0.05	0.76	0.02	<0.02	0.77	0.74	0.03	21.0	84	<12	7.7	36.0
	May 23, 2013	CPFSCR2	7.0	24.6	7.2	83	0.4	92.5%	0.09	0.81	<0.02	<0.02	0.82	0.80	0.02	41.0	111	16.0	19.0	
	May 23, 2013	CPFSCR4	7.8	23.9	7.1	83	0.5	92.5%	0.07	0.77	<0.02	<0.02	0.78	0.76	0.02	33.0	92	12.0	17.0	31.0
LAKE CAMMACK	October 1, 2013	CPF0251A	7.8	22.0	7.7	88	0.8	89.2%	0.03	0.60	<0.02	<0.02	0.61	0.59	0.02	23.0	84	<6.2	4.9	
	October 1, 2013	CPF025A	6.2	22.0	7.5	87	0.8	70.9%	0.02	0.59	<0.02	<0.02	0.60	0.58	0.02	24.0	83	<6.2	5.2	35.0
(BURLINGTON RESERVOIR)	September 26, 2013	CPF0251A	5.1	22.4	7.6	92	1.0	58.8%	0.02	0.63	<0.02	<0.02	0.64	0.62	0.02	22.0	78	<6.2	5.1	
	September 26, 2013	CPF025A	5.7	22.5	8.0	90	1.0	65.8%	0.03	0.64	<0.02	<0.02	0.65	0.63	0.02	24.0	80	<6.2	5.0	35.0
	July 31, 2013	CPF0251A	8.1	28.5	7.9	83	0.7	104.4%	0.03	0.79	<0.02	<0.02	0.80	0.78	0.02	23.0	80	<6.2	5.0	
	July 31, 2013	CPF025A	7.6	28.6	8.1	81	0.7	98.2%	0.03	0.81	<0.02	<0.02	0.82	0.80	0.02	23.0	113	<6.2	6.2	31.0
	June 26, 2013	CPF0251A	7.7	28.4	7.8	93	0.8	99.1%	0.04	0.65	0.02	<0.02	0.66	0.63	0.03	20.0	80	<6.2	6.8	
	June 26, 2013	CPF025A	6.8	27.1	7.6	93	0.8	85.5%	0.04	0.70	0.02	<0.02	0.71	0.68	0.03	17.0	77	<6.2	5.3	34.0
	May 30, 2013	CPF0251A	8.1	26.2	7.7	95	1.0	100.2%	0.03	0.52	<0.02	<0.02	0.53	0.51	0.02	11.0	83	<6.2	4.7	
	May 30, 2013	CPF025A	7.9	24.8	7.6	95	0.9	95.3%	0.03	0.58	<0.02	<0.02	0.59	0.57	0.02	14.0	80	<6.2	4.8	35.0
GRAHAM-MEBANE RESERVOIR	September 19, 2013	CPFGMR1	5.6	24.0	7.2	77	0.8	66.5%	0.03	0.85	<0.02	<0.02	0.86	0.84	0.02	37.0	79	6.2	7.7	
	September 19, 2013	CPFGMR2	5.3	23.8	7.3	90	0.5	62.7%	0.07	0.94	<0.02	<0.02	0.95	0.93	0.02	43.0	92	19.0	20.0	
	September 19, 2013	CPFGMR3	4.9	23.8	7.1	83	0.7	58.0%	0.03	0.87	<0.02	<0.02	0.88	0.86	0.02	34.0	80	7.5	9.5	
	September 19, 2013	CPFGMR4	5.8	24.2	7.2	79	0.7	69.2%	0.03	0.85	<0.02	<0.02	0.86	0.84	0.02	38.0	80	<6.2	8.2	29.0
	September 19, 2013	CPFGMROA	7.3	23.2	7.3	83	0.5	85.5%	0.06	1.00	<0.02	<0.02	1.01	0.99	0.02	51.0	88	14.0	15.0	
	August 15, 2013	CPFGMR1	6.2	26.5	7.4	72	0.6	77.1%	0.05	0.92	<0.02	<0.02	0.93	0.91	0.02	37.0	142	8.5	12.0	
	August 15, 2013	CPFGMR2	5.6	26.2	7.2	85	0.4	69.3%	0.08	0.93	<0.02	<0.02	0.94	0.92	0.02	32.0	96	14.0	20.0	
	August 15, 2013	CPFGMR3	5.9	26.2	7.3	75	0.5	73.0%	0.06	0.92	<0.02	<0.02	0.93	0.91	0.02	29.0	80	12.0	16.0	
	August 15, 2013	CPFGMR4	6.3	26.3	7.3	72	0.5	78.1%	0.05	0.90	<0.02	<0.02	0.91	0.89	0.02	41.0	76	8.5	12.0	25.0
	August 15, 2013	CPFGMROA	6.4	26.0	7.3	75	0.5	78.9%	0.08	1.00	<0.02	<0.02	1.01	0.99	0.02	28.0	94	18.0	18.0	
	July 29, 2013	CPFGMR1	6.9	27.6	7.4	69	0.4	87.6%	0.05	1.00	<0.02	<0.02	1.01	0.99	0.02	38.0	74	8.8	11.0	
	July 29, 2013	CPFGMR2	6.8	27.7	7.4	82	0.4	86.4%	0.06	0.92	<0.02	<0.02	0.93	0.91	0.02	28.0	91	14.0	16.0	
	July 29, 2013	CPFGMR3	7.5	28.1	7.8	71	0.4	96.0%	0.05	0.95	<0.02	<0.02	0.96	0.94	0.02	36.0	80	10.0	13.0	
	July 29, 2013	CPFGMR4	6.6	27.1	7.3	68	0.5	83.0%	0.04	0.92	<0.02	<0.02	0.93	0.91	0.02	28.0	74	74.0	9.6	24.0
	July 29, 2013	CPFGMROA	7.5	28.8	7.4	78	0.3	97.2%	0.10	1.10	<0.02	<0.02	1.11	1.09	0.02	43.0	120	54.0	23.0	
	June 19, 2013	CPFGMR1	6.6	26.1	7.4	83	0.8	81.5%	0.04	0.67	<0.02	<0.02	0.68	0.66	0.02	24.0	76	<6.2	7.4	
	June 19, 2013	CPFGMR2	8.1	27.4	7.9	83	0.6	102.4%	0.08	0.91	<0.02	<0.02	0.92	0.90	0.02	42.0	88	14.0	16.0	
	June 19, 2013	CPFGMR3	7.1	26.7	7.6	84	0.7	88.7%	0.06	0.77	<0.02	<0.02	0.78	0.76	0.02	32.0	82	8.8	9.5	
	June 19, 2013	CPFGMR4	6.7	26.1	7.4	82	0.8	82.8%	0.04	0.67	<0.02	<0.02	0.68	0.66	0.02	20.0	78	6.2	7.5	29.0
	June 19, 2013	CPFGMROA	9.0	28.4	8.2	81	0.5	115.8%	0.10	1.00	<0.02	<0.02	1.01	0.99	0.02	57.0	94	24.0	19.0	
	May 16, 2013	CPFGMR1	8.9	22.1	6.6	81	1.0	102.0%	0.02	0.49	<0.02	<0.02	0.50	0.48	0.02	12.0	76	<6.2	4.4	
	May 16, 2013	CPFGMR2	9.2	23.0	7.9	89	0.7	107.3%	0.04	0.60	<0.02	<0.02	0.61	0.59	0.02	25.0	88	7.2	9.1	
	May 16, 2013	CPFGMR3	9.1	22.7	7.8	84	1.0	105.5%	0.03	0.49	<0.02	<0.02	0.50	0.48	0.02	15.0	76	<6.2	5.7	
	May 16, 2013	CPFGMR4	9.1	21.7	7.8	81	1.1	103.5%	0.02	0.48	<0.02	<0.02	0.49	0.47	0.02	11.0	74	<6.2	4.8	29.0
	May 16, 2013	CPFGMROA	8.6	23.2	7.6	83	0.7	100.7%	0.07	0.75	<0.02	<0.02	0.76	0.74	0.02	22.0	107	36.0	19.0	
LAKE MACKINTOSH	September 25, 2013	CPF038G	6.9	22.9	7.8	107	0.8	80.3%	0.04	0.73	<0.02	<0.02	0.74	0.72	0.02	31.0	85		5.5	
	September 25, 2013	CPF038H	7.5	22.9	7.7	108	1.0	87.3%	0.03	0.69	<0.02	<0.02	0.70	0.68	0.02	25.0	86	<6.2	6.1	
	September 25, 2013	CPF038J	7.1	23.0	7.5	103	1.0	82.8%	0.02	0.56	<0.02	<0.02	0.57	0.55	0.02	14.0	83	<6.2	5.0	
	September 25, 2013	CPF038L	6.8	23.0	7.5	103	1.1	79.3%	0.02	0.62	<0.02	<0.02	0.63	0.61	0.02		83	<6.2	5.5	
	September 25, 2013	CPF038N	6.4	22.9	7.3	102	1.0	74.5%	0.02	0.59	<0.02	<0.02	0.60	0.58	0.02		80	<6.2	3.5	34.0
	August 28, 2013	CPF038G	10.6	26.7	7.8	105	0.7	132.4%	0.04	0.85	<0.02	<0.02	0.86	0.84	0.02	28.0	98	<6.2	6.3	
	August 28, 2013	CPF038H	9.7	26.7	7.2	105	0.6	121.1%	0.04	0.82	<0.02	<0.02	0.83	0.81	0.02	26.0	132	6.8	5.5	
	August 28, 2013	CPF038J	9.0	26.4	7.2	103	0.8	111.8%	0.02	0.74	<0.02	<0.02	0.75	0.73	0.02	22.0	210	<6.2	5.1	
	August 28, 2013	CPF038L	8.6	26.7	7.1	99	0.8	107.4%	0.02	0.74	<0.02	<0.02	0.75	0.73	0.02	18.0	80	<6.2	4.6	
	August 28, 2013	CPF038N	8.1	27.0	6.9	99	0.7	101.7%	0.02	0.65	<0.02	<0.02	0.66	0.64	0.02	16.0	120	<6.2	4.6	34.0
	July 25, 2013	CPF038G	8.7	29.3	8.1	97	0.7	113.7%	0.04	0.79	<0.02	<0.02	0.80	0.78	0.02	23.0	88	6.8	7.2	
	July 25, 2013	CPF038H	8.3	28.6	7.8	97	0.7	107.2%	0.03	0.81	<0.02	<0.02	0.82	0.80	0.02	26.0	94	6.8	7.2	
	July 25, 2013	CPF038J	8.3	28.8	8.1	93	0.7	107.6%	0.04	0.84	<0.02	<0.02	0.85	0.83	0.02	19.0	88		6.8	
	July 25, 2013	CPF038L	7.3	28.7	7.8	91	0.7	94.4%	0.03	0.77	<0.02	<0.02	0.78	0.76	0.02	13.0	89	<6.2	6.0	
	July 25, 2013	CPF038N	7.7	28.4	7.7	90	0.8	99.1%	0.03	0.70	<0.02	<0.02	0.71	0.69	0.02	14.0	81	<6.2	6.2	32.0
	June 27, 2013	CPF038G	5.6	27.7	7.3	102	0.7	71.2%	0.04	0.61	0.04	<0.02	0.62	0.57	0.05	4.1	80	<6.2	7.8	
	June 27, 2013	CPF038H	7.2	27.8	7.4	105	0.6	91.7%	0.04	0.69	0.02	0.02	0.71	0.67	0.04	5.7	104	7.0	11.0	
	June 27, 2013	CPF038J	6.4	28.1	7.5	106	1.2	81.9%	0.03	0.53	0.02	<0.02	0.54	0.51	0.03	2.2	84	<6.2	3.5	
	June 27, 2013	CPF038L	6.5	27.3	7.4	108	1.0	82.0%	0.03	0.56	0.02	<0.02	0.57	0.54	0.03	2.5	84	<6.2	3.7	
	June 27, 2013	CPF038N	6.5	27.7	7.5	108	1.3	82.6%	0.02	0.50	0.02	<0.02	0.51	0.48	0.03	2.7	82	<6.2	4.0	36.0
	May 30, 2013	CPF038G	10.8	25.4	8.7	106	0.9	131.7%	0.04	0.63	<0.02	<0.02	0.64	0.62	0.02	22.0	90	<12.0	6.4	
	May 30, 2013	CPF038H	10.3	25.3	7.9	107	0.7	125.4%	0.04	0.65	<0.02	<0.02	0.66	0.64	0.02	19.0	88	8.0	6.4	
	May 30, 2013	CPF038J	8.8	25.3	7.8	113	1.1	107.1%	0.03	0.54	<0.02	<0.02	0.55	0.53	0.02	13.0	86	<6.2	3.8	
	May 30, 2013	CPF038L	8.9	24.7	7.7	113	1.0	107.1%	0.03	0.58	<0.02	<0.02	0.59	0.57	0.02	11.0	83	<6.2	4.1	
	May 30, 2013	CPF038N	8.7	24.4	7.8	113	1.3	104.2%	0.02	0.51	<0.02	<0.02	0.52	0.50	0.02	9.0	83	<6.2	3.9	37.0
CANE CREEK RESERVOIR	September 9, 2013	CPFCCR2	8.3	27.4	8.2	76	1.1	104.9%	0.02	0.90	<0.02	<0.02	0.91	0.89	0.02	26.0	76	<6.2	5.8	
	September 9, 2013	CPFCCR4	7.9	27.5	8.1	76	1.5	100.1%	0.02	0.82	<0.02	<0.02	0.83	0.81	0.02	22.0	77	<6.2	5.8	
	September 9, 2013	CPFCCR6	7.8	27.5	7.9	76	1.4	98.8%	0.02	0.69	<0.02	<0.02	0.70	0.68	0.02	16.0	72	<6.2	4.6	25.0
	August 5, 2013	CPFCCR2	8.5	28.2	8.6	74	0.8	109.0%	0.03	0.96	<0.02	<0.02	0.97	0.95	0.02	33.0	79	<6.2	12.0	
	August 5, 2013	CPFCCR4	7.8	28.2	8.1	74	0.8	100.0%	0.03	0.89	<0.02	<0.02	0.90	0.88	0.02	27.0	75	<6.2	9.6	
	August 5, 2013	CPFCCR6	7.8	28.2	7.9	75	0.9	100.0%	0.03	0.95	<0.02	<0.02	0.96	0.94	0.02	31.0	75	<6.2	10.0	26.0
	July 8, 2013	CPFCCR2	8.0	29.3	8.0	72	0.9	104.6%	0.04	0.78	<0.02	<0.02	0.79	0.77	0.02	25.0	73		8.8	
	July 8, 2013	CPFCCR4	8.3	28.6	8.1	72	0.9	107.2%	0.04	0.98	<0.02	<0.02	0.99	0.97	0.02	27.0	72	6.2	9.9	
	July 8, 2013	CPFCCR6	7.4	27.7	7.6	75	0.9	94.1%	0.05	1.00	<0.02	<0.02	1.01	0.99	0.02	28.0	76	6.2	9.5	25.0
	June 10, 2013	CPFCCR2	9.1	26.3	7.7	76	1.0	112.8%	0.04	0.92	0.02	0.02	0.94	0.90	0.04	39.0	73	<12	9.8	
	June 10, 2013	CPFCCR4	8.2	25.6	7.7	77	1.0	100.4%	0.05	0.91	0.03	0.04	0.95	0.88	0.07	32.0	74	<6.2	8.9	
	June 10, 2013	CPFCCR6	5.8	23.6	6.5	81	0.9	68.4%	0.06	0.96	0.07	0.25	1.21	0.89	0.32	27.0	82	<6.2	12.0	27.0

Appendix A - Cape Fear River Basin Data
January 1, 2009 Through December 31, 2013

Lake	Date	Sampling Station	SURFACE PHYSICAL DATA DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent DO 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
CANE CREEK RESERVOIR	May 13, 2013	CPFCCR2	10.5	21.9	9.2	74	1.0	119.9%	0.03	0.78	<0.02	<0.02	0.79	0.77	0.02	25.0	65	<12.0	7.4	
	May 13, 2013	CPFCCR4	10.3	21.2	8.9	73	1.1	116.0%	0.02	0.69	<0.02	<0.02	0.70	0.68	0.02	23.0	62	<6.2	6.3	
	May 13, 2013	CPFCCR6	10.1	20.2	9.0	74	1.2	111.6%	0.02	0.71	<0.02	<0.02	0.72	0.70	0.02	16.0	60	<6.2	7.0	25.0
UNIVERSITY LAKE	September 9, 2013	CPFUL4	9.5	27.9	8.6	103	0.6	121.2%	0.06	0.83	<0.02	<0.02	0.84	0.82	0.02	46.0	96	10.0	10.0	
	September 9, 2013	CPFUL6	8.8	27.4	8.4	101	0.9	111.3%	0.04	0.78	<0.02	<0.02	0.79	0.77	0.02	48.0	90		7.0	32.0
	August 5, 2013	CPFUL4	9.2	28.0	8.4	105	0.7	117.6%	0.06	0.88	<0.02	<0.02	0.89	0.87	0.02	38.0	99	8.8	11.0	
	August 5, 2013	CPFUL6	8.9	27.8	8.3	99	0.8	113.3%	0.06	0.86	<0.02	<0.02	0.87	0.85	0.02	53.0	91	7.0	7.5	33.0
	July 8, 2013	CPFUL4	10.1	28.3	8.5	90	0.6	129.8%	0.10	0.96	0.02	<0.02	0.97	0.94	0.03	72.0	107	12.0	14.0	
	July 8, 2013	CPFUL6	10.1	28.6	8.8	84	0.7	130.4%	0.09	0.97	0.02	<0.02	0.98	0.95	0.03	69.0	101	9.5	11.0	30.0
	June 10, 2013	CPFUL4	9.6	26.1	7.2	97	0.6	118.6%	0.10	0.92	0.02	0.05	0.97	0.90	0.07	62.0	104	14.0	18.0	
	June 10, 2013	CPFUL6	10.6	26.1	8.3	93	0.7	130.9%	0.08	0.94	0.02	0.02	0.96	0.92	0.04	84.0	95	10.0	12.0	34.0
	May 13, 2013	CPFUL4	9.3	21.7	8.1	107	1.0	105.8%	0.05	0.66	<0.02	<0.02	0.67	0.65	0.02	17.0	96	12.0	10.0	
	May 13, 2013	CPFUL6	9.5	21.5	8.0	104	1.0	107.6%	0.04	0.60	<0.02	<0.02	0.61	0.59	0.02	18.0	90	<6.2	6.0	36.0
JORDAN LAKE	September 18, 2013	CPF055C	8.3	26.3	8.3	164	0.6	102.9%	0.06	0.81	<0.02	0.22	1.03	0.80	0.23	46.0	118	9.8	10.0	
	September 18, 2013	CPF055D	7.1	26.8	7.9	155	0.9	88.8%	0.05	0.76	0.03	0.17	0.93	0.73	0.20	38.0	113	<6.2	5.7	
	September 18, 2013	CPF055E	6.7	26.1	7.7	147	1.0	82.8%	0.05	0.80	0.02	0.08	0.88	0.78	0.10	39.0	106	<6.2	6.4	34.0
	September 18, 2013	CPF081A1C	7.2	24.7	7.8	166	0.4	86.7%	0.11	1.20	<0.02	<0.02	1.21	1.19	0.02	93.0	141	29.0	28.0	
	September 18, 2013	CPF086C	7.5	24.6	7.9	163	0.4	90.1%	0.09	1.20	<0.02	<0.02	1.21	1.19	0.02	67.0	131	21.0	20.0	
	September 18, 2013	CPF086F	7.0	24.9	7.8	162	0.4	84.6%	0.11	1.20	<0.02	<0.02	1.21	1.19	0.02	47.0	126	18.0	18.0	
	September 18, 2013	CPF087B3	5.5	25.2	7.4	141	0.6	66.8%	0.04	0.86	0.08	<0.02	0.87	0.78	0.09	32.0	102	6.8	7.2	
	September 18, 2013	CPF087D	5.7	25.3	7.4	140	0.5	69.4%	0.04	0.82	0.05	<0.02	0.83	0.77	0.06	34.0	102	<6.2	6.1	
	September 18, 2013	CPF0880A	5.6	26.0	7.4	138	0.5	69.0%	0.04	0.91	0.08	<0.02	0.92	0.83	0.09	35.0	98	<6.2	5.2	
	August 21, 2013	CPF055C	9.6	27.5	8.7	145	0.8	121.6%	0.06	0.82	<0.02	0.16	0.98	0.81	0.17	48.0	98	<6.2	4.8	
	August 21, 2013	CPF055D	9.4	27.7	8.6	144	0.8	119.5%	0.07	0.79	<0.02	0.21	1.00	0.78	0.22	39.0	106	<6.2	4.2	
	August 21, 2013	CPF055E	10.2	27.9	8.9	144	1.1	130.1%	0.06	0.72	<0.02	0.12	0.84	0.71	0.13	11.0	93	<6.2	3.8	34.0
	August 21, 2013	CPF081A1C	10.2	27.4	9.1	142	0.6	129.0%	0.09	1.00	<0.02	<0.02	1.01	0.99	0.02	69.0	101	14.0	12.0	
	August 21, 2013	CPF086C	12.1	27.8	9.4	143	0.5	154.1%	0.07	0.96	<0.02	<0.02	0.97	0.95	0.02	54.0	98		10.0	
	August 21, 2013	CPF086F	8.9	27.2	8.7	131	0.7	112.1%	0.07	0.93	0.09	<0.02	0.94	0.84	0.10	43.0	90	11.0	10.0	
	August 21, 2013	CPF087B3	6.3	26.6	7.5	131	1.0	78.5%	0.04	0.75	0.05	<0.02	0.76	0.70	0.06	28.0	94	<6.2	4.1	
	August 21, 2013	CPF087D	7.3	27.3	7.8	134	1.0	92.1%	0.04	0.75	0.09	<0.02	0.76	0.66	0.10	19.0	92	<6.2	4.9	
	August 21, 2013	CPF0880A	5.4	27.1	7.3	135	1.0	67.9%	0.03	0.69	0.09	0.02	0.71	0.60	0.11	17.0	244	<6.2	4.5	
	July 30, 2013	CPF055C	11.4	31.2	9.2	158	0.9	154.0%	0.07	0.90	<0.02	0.23	1.13	0.89	0.24	30.0	110	7.2	6.4	
	July 30, 2013	CPF055D	11.0	30.5	9.2	158	0.9	146.8%	0.06	0.88	<0.02	0.19	1.07	0.87	0.20	42.0	122	6.8	5.2	
	July 30, 2013	CPF055E	8.4	31.1	8.7	142	1.0	113.3%	0.04	0.82	<0.02	0.02	0.84	0.81	0.03	36.0	100	6.2	36.0	25.0
	July 30, 2013	CPF081A1C	7.7	30.5	8.4	129	0.4	102.8%	0.10	1.00	<0.02	<0.02	1.01	0.99	0.02	42.0	102	12.5	14.0	
	July 30, 2013	CPF086C	6.3	29.0	7.5	122	0.4	81.9%	0.09	1.10	<0.02	<0.02	1.11	1.09	0.02	54.0	102	15.0	15.0	
	July 30, 2013	CPF086F	7.8	29.2	8.5	123	0.6	101.8%	0.07	0.86	<0.02	<0.02	0.87	0.85	0.02	23.0	97.0		10.0	
	July 30, 2013	CPF087B3	4.4	28.0	7.2	125	0.9	56.2%	0.04	0.72	<0.02	<0.02	0.73	0.71	0.02	20.0	114	<6.2	4.9	
	July 30, 2013	CPF087D	7.0	29.0	7.7	125	1.0	91.0%	0.04	0.78	<0.02	<0.02	0.79	0.77	0.02	24.0	91	<6.2	4.9	
	July 30, 2013	CPF0880A	7.2	30.4	8.0	133	1.0	95.9%	0.03	0.71	<0.02	<0.02	0.72	0.70	0.02	15.0		<6.2	3.7	
	June 27, 2013	CPF055C	7.3	28.6	8.1	177	0.9	94.3%	0.08	0.61	<0.02	0.45	1.06	0.60	0.46	15.0	118	<6.2	6.4	
	June 27, 2013	CPF055D	8.3	28.1	8.6	149	0.9	106.3%	0.07	0.71	<0.02	0.20	0.91	0.70	0.21	27.0	110	<12.0	5.2	
	June 27, 2013	CPF055E	7.7	27.3	7.8	151	1.0	97.2%	0.06	0.65	0.02	0.25	0.90	0.63	0.27	30.0	108	<6.2	4.8	38.0
	June 27, 2013	CPF081A1C	6.0	28.0	7.5	142	0.4	76.7%	0.10	0.96	<0.02	<0.02	0.97	0.95	0.02	34.0	111	22.0	27.0	
	June 27, 2013	CPF086C	7.1	28.1	8.0	146	0.4	90.9%	0.09	0.99	<0.02	<0.02	1.00	0.98	0.02	35.0	111	22.0	23.0	
	June 27, 2013	CPF086F	4.9	27.4	7.3	146	0.5	62.0%	0.07	0.77	<0.02	<0.02	0.78	0.76	0.02	35.0	99	13.0	13.0	
	June 27, 2013	CPF087B3	6.3	27.2	7.4	155	0.7	79.4%	0.05	0.70	<0.02	<0.02	0.71	0.69	0.02	22.0	96	7.2	9.0	
	June 27, 2013	CPF087D	6.5	27.4	7.7	162	0.9	82.2%	0.04	0.58	<0.02	<0.02	0.59	0.57	0.02	16.0	102	<6.2	7.5	
	June 27, 2013	CPF0880A	7.5	27.0	8.1	157	1.1	94.2%	0.03	0.68	<0.02	<0.02	0.69	0.67	0.02	9.1	102	<6.2	4.1	
	May 15, 2013	CPF055C		22.4	9.4	132	1.0		0.08	0.74	<0.02	0.26	1.00	0.73	0.27	43.0	102	9.0	5.0	
	May 15, 2013	CPF055D		21.7	9.1	142	1.0		0.07	0.66	<0.02	0.31	0.97	0.65	0.32	38.0	104	8.2	7.7	
	May 15, 2013	CPF055E		21.3	8.8	146	0.9		0.06	0.74	0.02	0.28	1.02	0.72	0.30	24.0	98	8.2	6.8	23.0
	May 15, 2013	CPF081A1C		22.8	8.5	182	0.4		0.10	0.99	<0.02	<0.02	1.00	0.98	0.02	31.0	146	24.0	24.0	
	May 15, 2013	CPF086C		21.6	9.1	195	0.4		0.09	1.10	<0.02	<0.02	1.11	1.09	0.02		145	23.0	25.0	
	May 15, 2013	CPF086F		21.9	7.9	191	0.5		0.06	0.90	<0.02	<0.02	0.91	0.89	0.02	35.0	130	14.0	12.0	
	May 15, 2013	CPF087B3		20.6	7.6	192	1.0		0.04	0.79	0.06	0.04	0.83	0.73	0.10	23.0	128	6.5	5.9	
	May 15, 2013	CPF087D		20.4	7.0	188	1.1		0.04	0.75	0.07	0.06	0.81	0.68	0.13	10.0	114	<6.2	4.5	
	May 15, 2013	CPF0880A		21.3	8.3	178	1.0		0.04	0.68	0.06	0.08	0.76	0.62	0.14	17.0	115	<6.2	6.0	
BUCKHORN DAM LAKE	September 30, 2013	CPFBDL1	5.7	21.9	7.6	158	0.6	65.1%	0.09	0.70	0.04	0.31	1.01	0.66	0.35	19.0	114	7.5	9.3	35.0
	September 30, 2013	CPFBDL2	6.4	21.7	7.6	157	0.6	72.8%	0.12	0.81	<0.02	0.33	1.14	0.80	0.34	48.0	108	9.5	9.9	
	August 27, 2013	CPFBDL1	6.6	25.7	7.5	127	0.6	80.9%	0.10	0.59	0.02	0.38	0.97	0.57	0.40	15.0	113	7.8	12.0	34.0
	August 27, 2013	CPFBDL2	6.7	25.7	7.4	126	0.6	82.2%	0.09	0.64	0.02	0.33	0.97	0.62	0.35	14.0	100	9.0	14.0	
	July 22, 2013	CPFBDL1	4.2	28.6	7.4	132	0.8	54.2%	0.13	0.82	0.09	0.50	1.32	0.73	0.59	6.9	128	6.5	8.9	34.0
	July 22, 2013	CPFBDL2	4.1	28.6	7.4	133	0.8	53.0%	0.12	0.82	0.10	0.40	1.22	0.72	0.50	11.0	96	7.0	9.7	
	June 24, 2013	CPFBDL1	5.6	27.2	7.4	121	0.6	70.6%	0.15	0.78	0.07	0.49	1.27	0.71	0.56	20.0	104	9.0	16.0	31.0
	June 24, 2013	CPFBDL2	6.8	27.6	7.5	125	0.8	86.3%	0.13	0.75	0.04	0.42	1.17	0.71	0.46	22.0	102	8.2	14.0	
	May 22, 2013	CPFBDL1	7.2	20.8	7.3	87	0.3	80.5%	0.28	1.10	0.12	0.54	1.64	0.98	0.66	3.7	124	23.0	36.0	25.0
	May 22, 2013	CPFBDL2	7.0	20.9	7.2	84	0.3	78.4%	0.30	1.10	0.12	0.53	1.63	0.98	0.65	4.1	112	24.0	33.0	
HUC 03030003																				
HIGH POINT CITY LAKE	September 17, 2013	CPF089E2	6.4	25.5	7.3	99	0.7	78.2%	0.04	0.60	<0.02	<0.02	0.61	0.59	0.02	33.0	76	7.8	7.8	
	September 17, 2013	CPF089E4	5.2	25.6	7.1	99	0.7	63.6%	0.06	0.68	0.050	<0.02	0.69	0.63	0.06	28.0	80	11.0	11.0	32.0
	August 12, 2013	CPF089E2	8.5	28.7	8.4	105	1.0	110.0%	0.04	0.50	<0.02	<0.02	0.51	0.49	0.02	40.0	78	<6.2	4.8	
	August 12, 2013	CPF089E4	5.5	27.9	7.2	106	0.7	70.2%	0.04	0.60	0.02	<0.02	0.61	0.58	0.03	35.0	86	6.5	6.9	33.0
	July 9, 2013	CPF089E2	8.5	28.6	8.6	100	0.8	109.8%	0.05	0.73	<0.02	<0.02	0.74	0.72	0.02	64.0	76	6.8	5.3	
	July 9, 2013	CPF089E4	5.4	27.6	7.4	100	0.9	68.5%	0.04	0.60	0.04	<0.02	0.61	0.56	0.05	32.0	75	7.2	7.9	84.0
	June 11, 2013	CPF089E2	8.9	26.0	8.4	108	0.7	109.7%	0.08	0.83	<0.02	<0.02	0.84	0.82	0.02	57.0	88	14.0	17.0	
	June 11, 2013	CPF089E4	5.8	24.5	7.5	105	0.7	69.6%	0.06	0.56	0.03	0.03	0.59	0.53	0.06	29.0	83	10.0	14.0	35.0

Appendix A - Cape Fear River Basin Data
January 1, 2009 Through December 31, 2013

			SURFACE PHYSICAL DATA						PHOTIC ZONE DATA											
Lake	Date	Sampling Station	DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent DO SAT	TP mg/L	TKN mg/L	NH3 mg/L	NOx mg/L	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
HIGH POINT	May 7, 2013	CPF089E2	8.8	17.9	6.2	120	0.8	92.8%	0.05	0.60	0.04	0.05	0.65	0.56	0.09	20.0	92	7.8	8.9	
CITY LAKE	May 7, 2013	CPF089E4	7.8	16.5	6.3	110	0.6	79.9%	0.06	0.70	0.08	0.08	0.78	0.62	0.16	11.0	102	12.0	18.0	36.0
OAK HOLLOW	September 17, 2013	CPF089D3	7.4	25.8	7.6	95	1.0	90.9%	0.04	0.59	<0.02	<0.02	0.60	0.58	0.02	34.0	72	7.0	5.9	
LAKE	September 17, 2013	CPF089D4	7.7	25.8	7.9	95	0.9	94.6%	0.04	0.56	<0.02	<0.02	0.57	0.55	0.02	29.0	70		6.7	
	September 17, 2013	CPF089D5	6.1	25.7	7.3	95	0.9	74.8%	0.04	0.62	0.04	<0.02	0.63	0.58	0.05	27.0	66	8.2	8.2	28.0
	August 12, 2013	CPF089D3	8.2	30.1	8.4	104	1.3	108.7%	0.03	0.51	<0.02	<0.02	0.52	0.50	0.02	17.0	71	<6.2	4.2	
	August 12, 2013	CPF089D4	7.8	29.0	8.1	104	1.3	101.4%	0.03	0.52	<0.02	<0.02	0.53	0.51	0.02	16.0	72	<6.2	3.6	
	August 12, 2013	CPF089D5	7.0	28.9	7.6	105	1.1	90.9%	0.03	0.49	0.03	<0.02	0.50	0.46	0.04	20.0	70	<6.2	4.8	32.0
	July 9, 2013	CPF089D3	8.9	30.0	9.0	100	1.1	117.8%	0.03	0.50	<0.02	<0.02	0.51	0.49	0.02	28.0	72	<6.2	4.7	
	July 9, 2013	CPF089D4	8.4	28.8	8.5	100	1.1	108.9%	0.03	0.45	<0.02	<0.02	0.46	0.44	0.02	24.0	68	<6.2	3.7	
	July 9, 2013	CPF089D5	6.7	28.2	7.3	99	0.8	85.9%	0.03	0.54	<0.02	<0.02	0.55	0.53	0.02	24.0	71	<6.2	5.9	33.0
	June 11, 2013	CPF089D3	8.7	26.7	8.6	100	0.6	108.6%	0.06	0.61	0.02	<0.02	0.62	0.59	0.03	32.0	79	11.0	15.0	
	June 11, 2013	CPF089D4	7.6	25.0	7.6	103	1.0	92.0%	0.04	0.52	0.02	<0.02	0.53	0.50	0.03	31.0	77	6.2	6.6	
	June 11, 2013	CPF089D5	7.6	25.2	7.8	103	0.9	92.3%	0.04	0.55	0.02	<0.02	0.56	0.53	0.03	27.0	74	7.2	7.7	32.0
	May 7, 2013	CPF089D3	9.0	17.7	7.1	104	0.6	94.5%	0.04	0.58	0.05	0.03	0.61	0.53	0.08	11.0		8.8	11.0	
	May 7, 2013	CPF089D4	9.9	17.8	6.6	103	0.5	104.2%	0.06	0.74	0.03	0.03	0.77	0.71	0.06	22.0	102	10.0	14.0	
	May 7, 2013	CPF089D5	8.3	16.6	7.0	103	0.6	85.2%	0.05	0.57	0.09	0.03	0.60	0.48	0.12	11.0	92	8.8	15.0	34.0
RANDLEMAN	September 9, 2013	CPFRD1	9.2	27.6	7.8	149	1.0	116.7%	0.06	0.64	<0.02	<0.02	0.65	0.63	0.02	30.0	102	<6.2	5.3	
LAKE	September 9, 2013	CPFRD2	8.4	27.8	7.7	158	1.1	107.0%	0.04	0.67	<0.02	<0.02	0.68	0.66	0.02	25.0	110	<6.2	4.8	
	September 9, 2013	CPFRD3	8.1	27.4	7.9	167	0.9	102.4%	0.03	0.56	<0.02	<0.02	0.57	0.55	0.02	23.0	116	<6.2	7.2	
	September 9, 2013	CPFRD4	7.4	27.4	7.7	171	0.9	93.6%	0.02	0.51	<0.02	<0.02	0.52	0.50	0.02	19.0	117	<6.2	7.5	
	September 9, 2013	CPFRD5	7.9	28.1	7.9	153	0.9	101.1%	0.03	0.66	<0.02	<0.02	0.67	0.65	0.02	25.0	107	<6.2	6.2	
	September 9, 2013	CPFRD6	7.6	28.2	7.8	168	1.0	97.5%	0.03	0.57	<0.02	<0.02	0.58	0.56	0.02	16.0	113		6.3	
	September 9, 2013	CPFRD7	7.5	27.7	7.7	171	1.2	95.3%	0.02	0.59	<0.02	<0.02	0.60	0.58	0.02	11.0	113	<6.2	4.6	
	September 9, 2013	CPFRD8	7.3	27.6	7.6	168	1.2	92.6%	0.02	0.51	<0.02	<0.02	0.52	0.50	0.02		112	<6.2	6.1	40.0
	September 9, 2013	CPFRD9	7.3	27.6	7.8	170	1.2	92.6%	0.02	0.56	<0.02	<0.02	0.57	0.55	0.02	11.0	112	<6.2	6.3	
	August 5, 2013	CPFRD1	9.1	28.6	8.3	148	0.7	117.5%	0.07	0.73	<0.02	<0.02	0.74	0.72	0.02	32.0	103	<6.2	5.5	
	August 5, 2013	CPFRD2	8.5	28.7	8.2	159	0.8	110.0%	0.04	0.68	<0.02	<0.02	0.69	0.67	0.02	20.0	108	<6.2	4.4	
	August 5, 2013	CPFRD3	7.9	28.8	8.2	165	0.7	102.4%	0.03	0.65	<0.02	<0.02	0.66	0.64	0.02	15.0	110	6.2	6.7	
	August 5, 2013	CPFRD4	6.2	28.3	7.8	163	0.9	79.7%	0.02	0.55	<0.02	<0.02	0.56	0.54	0.02	10.0	108	<6.2	5.6	
	August 5, 2013	CPFRD5	7.6	28.6	8.2	138	0.8	98.2%	0.04	0.64	<0.02	<0.02	0.65	0.63	0.02	20.0	96		6.6	
	August 5, 2013	CPFRD6	6.8	28.3	7.6	157	1.0	87.4%	0.03	0.62	<0.02	<0.02	0.63	0.61	0.02	11.0	102	<6.2	4.0	
	August 5, 2013	CPFRD7	6.6	28.3	7.7	160	1.0	84.8%	0.02	0.59	<0.02	<0.02	0.60	0.58	0.02	11.0	119	<6.2	5.3	
	August 5, 2013	CPFRD8	6.7	28.5	7.9	159	1.1	86.4%	0.02	0.56	<0.02	<0.02	0.57	0.55	0.02	8.5	109	<6.2	5.0	37.0
	August 5, 2013	CPFRD9	6.6	28.3	7.7	160	1.0	84.8%	0.02	0.59	<0.02	<0.02	0.60	0.58	0.02	7.6	101	<6.2	5.6	
	July 8, 2013	CPFRD1	9.0	30.4	8.7	127	1.0	119.9%	0.05	0.75	<0.02	<0.02	0.76	0.74	0.02	39.0	87	<6.2	5.9	
	July 8, 2013	CPFRD2	9.4	29.9	8.5	150	1.0	124.2%	0.05	0.75	<0.02	<0.02	0.76	0.74	0.02	37.0	100		5.3	
	July 8, 2013	CPFRD3	9.0	29.8	8.6	166	0.9	118.7%	0.06	0.83	<0.02	<0.02	0.84	0.82	0.02	32.0	114	<6.2	6.4	
	July 8, 2013	CPFRD4	8.2	29.4	8.2	170	0.8	107.4%	0.04	0.67	<0.02	<0.02	0.68	0.66	0.02	36.0	114	7.5	9.1	
	July 8, 2013	CPFRD5	8.7	29.3	8.8	142	0.7	113.7%	0.06	0.94	0.02	<0.02	0.95	0.92	0.03	36.0	109	8.2	12.0	
	July 8, 2013	CPFRD6	8.9	29.5	8.4	156	0.7	116.8%	0.05	0.84	<0.02	<0.02	0.85	0.83	0.02	39.0	112	7.2	9.4	
	July 8, 2013	CPFRD7	8.4	28.4	8.2	163	0.7	108.1%	0.04	0.72	<0.02	<0.02	0.73	0.71	0.02	31.0	110	6.9	8.0	
	July 8, 2013	CPFRD8	7.4	28.2	7.9	167	0.8	94.9%	0.04	0.73	<0.02	<0.02	0.74	0.72	0.02	9.6	114	6.5	9.5	37.0
	July 8, 2013	CPFRD9	7.4	28.5	7.4	166	0.7	95.4%	0.04	0.74	<0.02	<0.02	0.75	0.73	0.02	31.0	118	8.0	14.0	
	June 4, 2013	CPFRD1	6.8	27.2	7.3	196	0.7	85.7%	0.05	0.72	<0.02	<0.02	0.73	0.71	0.02	17.0	128	<12	8.1	
	June 4, 2013	CPFRD2	7.3	27.3	7.8	188	0.8	92.1%	0.05	0.69	<0.02	<0.02	0.70	0.68	0.02	18.0	120	6.5	6.5	
	June 4, 2013	CPFRD3	7.6	26.8	7.3	185	0.7	95.1%	0.04	0.65	<0.02	<0.02	0.66	0.64	0.02	17.0	120	7.5	8.8	
	June 4, 2013	CPFRD4	6.8	25.9	7.2	185	0.6	83.7%	0.04	0.70	0.03	<0.02	0.71	0.67	0.04	13.0	120	7.8	10.0	
	June 4, 2013	CPFRD5	7.4	26.7	7.3	168	0.8	92.4%	0.04	0.62	<0.02	<0.02	0.63	0.61	0.02	17.0	113	7.8	8.8	
	June 4, 2013	CPFRD6	7.1	25.9	7.2	178	0.7	87.4%	0.04	0.66	<0.02	<0.02	0.67	0.65	0.02		110	7.0	11.0	
	June 4, 2013	CPFRD7	7.1	25.4	7.1	182	0.8	86.6%	0.04	0.58	<0.02	<0.02	0.59	0.57	0.02	14.0	112	7.0	8.8	
	June 4, 2013	CPFRD8	6.7	25.3	6.9	178	0.7	81.6%	0.04	0.66	<0.02	<0.02	0.67	0.65	0.02	13.0	114	7.8	9.5	41.0
	June 4, 2013	CPFRD9	6.8	25.5	7.0	178	0.7	83.1%	0.04	0.61	<0.02	<0.02	0.62	0.60	0.02	14.0	116	9.2	12.0	
	May 7, 2013	CPFRD1	8.4	17.2	7.3	167	0.2	87.3%	0.11	0.80	0.07	0.32	1.12	0.73	0.39	7.6		31.0	50.0	
	May 7, 2013	CPFRD2	8.8	17.9	7.4	180	0.6	92.8%	0.08	0.73	0.04	0.16	0.89	0.69	0.20	17.0		12.0	14.0	
	May 7, 2013	CPFRD3	8.9	18.1	7.3	189	0.8	94.2%	0.06	0.78	<0.02	0.03	0.81	0.77	0.04	24.0		8.8	8.8	
	May 7, 2013	CPFRD4	9.5	17.2	7.2	198	1.0	98.7%	0.04	0.68	<0.02	<0.02	0.69	0.67	0.02	19.0		12.0	5.5	
	May 7, 2013	CPFRD5	8.7	17.6	7.2	154	0.7	91.2%	0.06	0.69	0.02	<0.02	0.70	0.67	0.03	18.0		18.0	11.0	
	May 7, 2013	CPFRD6	8.4	17.0	7.3	165	1.0	86.9%	0.05	0.69	0.02	<0.02	0.70	0.67	0.03	9.7		13.0	8.3	
	May 7, 2013	CPFRD7	8.7	17.1	7.2	185	0.9	90.2%	0.05	0.67	0.02	<0.02	0.68	0.65	0.03	14.0		<12.0	8.3	
	May 7, 2013	CPFRD8	9.1	16.9	7.1	187	1.0	94.0%	0.03	0.60	0.02	<0.02	0.61	0.58	0.03			<6.2	7.2	40.0
	May 7, 2013	CPFRD9	8.8	16.8	7.2	188	1.0	90.7%	0.03	0.61	0.02	<0.02	0.62	0.59	0.03	6.2		<6.2	7.1	
SANDY CREEK	September 12, 2013	CPFSC1	9.5	26.1	8.5	106	1.5	117.3%	0.06	1.00	0.120	<0.02	1.01	0.88	0.13	30.0	92	<6.2	4.0	37.0
RESERVOIR	September 12, 2013	CPFSC2	10.5	26.9	9.1	106	1.0	131.6%	0.07	0.92	<0.02	0.040	0.96	0.91	0.05	56.0	97	8.0	13.0	
	September 12, 2013	CPFSC3	7.5	25.5	7.7	109	0.8	91.6%	0.09	0.80	0.020	0.330	1.13	0.78	0.35	31.0	106	6.8	12.0	
	August 8, 2013	CPFSC1	11.0	26.2	8.7	89	0.7	136.1%	0.09	1.10	<0.02	0.27	1.37	1.09	0.28	25.0	95	9.0	15.0	31.0
	August 8, 2013	CPFSC2	13.5	26.8	9.4	91	0.7	168.9%	0.11	1.40	<0.02	0.16	1.56	1.39	0.17	38.0	89	10.0	18.0	
	August 8, 2013	CPFSC3	6.2	22.2	7.2	123	1.0	71.2%	0.11	0.57	0.02	0.86	1.43	0.55	0.88	<1.0	110	<6.2	13.0	
	July 18, 2013	CPFSC1	10.7	29.5	9.2	86	0.7	140.4%	0.15	1.30		0.10	1.40			61.0	94	8.5	14.0	29.0
	July 18, 2013	CPFSC2	12.3	29.4	9.3	88	0.7	161.1%	0.13	1.30	<0.02	0.11	1.41	1.29	0.12	46.0	100	8.8	14.0	
	July 18, 2013	CPFSC3	5.6	24.0	7.2	130	1.0	66.5%	0.12		0.03	1.00			1.03	<1.0	110	<6.2	12.0	
	June 20, 2013	CPFSC1	10.9	18.5	7.5	102	0.80	116.4%	0.08	0.88	0.03	0.09	0.97	0.85	0.12	43.0	91	6.8	8.1	33.0
	June 20, 2013	CPFSC2	11.1	19.6	7.5	102	0.80	121.2%	0.09	0.87	0.07	0.22	1.09	0.80	0.29	24.0	91	<12.0	10.0	
	June 20, 2013	CPFSC3	8.7	15.1	6.3	98	0.90	86.5%	0.16	0.68	0.05	0.78	1.46	0.63	0.83	<1.0	106	7.0	19.0	
	May 9, 2013	CPFSC1	10.9	18.5	7.5	102	0.8	116.4%	0.06	0.80	<0.02	0.38	1.18	0.79	0.39	20.0	83	12.0	17.0	36.0
	May 9, 2013	CPFSC2	11.1	19.6	7.5	102	0.8	121.2%	0.07	0.73	<0.02	0.30	1.03	0.72	0.31	25.0	92	11.0	15.0	
	May 9, 2013	CPFSC3	8.7	15.1	6.3	98	0.9	86.5%	0.08	0.69	0.08	0.56	1.25	0.61	0.64	3.7	96	7.5	17.0	

Appendix A - Cape Fear River Basin Data
January 1, 2009 Through December 31, 2013

Lake	Date	Sampling Station	SURFACE PHYSICAL DATA DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent DO 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
ROCKY RIVER RESERVOIR	September 24, 2013	CPF1201A	6.8	23.1	7.6	103	0.5	79.4%	0.08	1.30	<0.02	2.60	3.90	1.29	2.61	83.0	92	9.5	7.3	36.0
	September 24, 2013	CPF1201B	7.8	23.7	7.1	105	0.6	92.2%	0.07	1.00	<0.02	<0.02	1.01	0.99	0.02	66.0	88	8.2	7.9	
	August 20, 2013	CPF1201A	7.0	25.0	7.3	97	0.6	84.7%	0.09	1.10	<0.02	<0.02	1.11	1.09	0.02	73.0	98	8.2	9.3	35.0
	August 20, 2013	CPF1201B	7.1	24.8	7.2	98	0.6	85.6%	0.08	1.10	<0.02	<0.02	1.11	1.09	0.02	34.0	92	9.8	9.5	
	July 15, 2013	CPF1201A	8.7	28.4	7.6	79	0.6	112.0%	0.21	1.40	0.03	0.18	1.58	1.37	0.21	62.0	112	9.2	13.0	31.0
	July 15, 2013	CPF1201B	10.9	29.7	8.2	77	0.5	143.5%	0.20	1.50	0.03	0.10	1.60	1.47	0.13	58.0	111	9.5	14.0	
	June 17, 2013	CPF1201A	6.0	25.6	7.2	77	0.5	73.4%	0.25	1.50	0.07	<0.02	1.60	1.43	0.17	33.0	108	<6.2	10.0	34.0
	June 17, 2013	CPF1201B	9.8	27.7	7.6	77	0.4	124.6%	0.26	1.80	<0.02	<0.02	1.81	1.79	0.02	105.0	108	8.8	12.0	
	May 22, 2013	CPF1201A	6.1	23.7	7.3	93	0.9	72.1%	0.08	1.10	<0.02	<0.02	1.11	1.09	0.02	40.0	90	6.8	6.6	33.0
	May 22, 2013	CPF1201B	9.0	25.4	8.0	92	0.8	109.8%	0.10	1.10	<0.02	<0.02	1.11	1.09	0.02	57.0	45	8.5	8.2	
CHARLES L. TURNER RES.	September 24, 2013	CPFTR1	4.8	23.2	7.2	98	0.7	56.2%	0.10	1.60	<0.02	<0.02	1.61	1.59	0.02	180.0	83	13.0	9.6	36.0
	September 24, 2013	CPFTR2	7.3	23.1	7.1	96	0.6	85.3%	0.08	1.20	<0.02	<0.02	1.21	1.19	0.02	100.0	82	11.0	9.9	
	September 24, 2013	CPRTR3	7.5	22.8	7.1	96	0.5	87.1%	0.10	1.50	<0.02	<0.02	1.60	1.49	0.11	140.0	104	17.0	13.0	
	September 24, 2013	CPFTR4	5.8	23.5	7.1	98	0.6	68.3%	0.09	1.30	0.06	<0.02	1.31	1.24	0.07	88.0	99	13.0	13.0	
	September 24, 2013	CPFTR5	5.8	22.7	7.3	99	0.5	67.3%	0.09	1.20	0.05	<0.02	1.21	1.15	0.06	52.0	98	16.0	14.0	
	September 24, 2013	CPFTR6	8.0	22.9	7.5	99	0.5	93.1%	0.11	1.40	<0.02	<0.02	1.41	1.39	0.02	130.0	98	17.0	13.0	
	August 20, 2013	CPFTR1	5.1	24.8	7.1	96	0.6	61.5%	0.10	1.40	<0.02	<0.02	1.41	1.39	0.02	68.0	92	8.8	8.3	35.0
	August 20, 2013	CPFTR2	5.4	24.7	7.1	96	0.6	65.0%	0.09	1.20	<0.02	<0.02	1.21	1.19	0.02	64.0	86		9.7	
	August 20, 2013	CPRTR3	6.4	24.8	7.2	97	0.6	77.2%	0.10	1.20	0.02	<0.02	1.21	1.18	0.03	54.0		12.0	11.0	
	August 20, 2013	CPFTR4	5.8	24.5	7.1	99	0.6	69.6%	0.10	1.20	<0.02	<0.02	1.21	1.19	0.02	52.0	97	12.0	12.0	
	August 20, 2013	CPFTR5	5.7	24.3	7.1	97	0.6	68.1%	0.11	1.20	<0.02	0.04	1.24	1.19	0.05	33.0	99	13.0	13.0	
	August 20, 2013	CPFTR6	5.3	24.3	7.1	99	0.7	63.3%	0.09	1.00	<0.02	0.04	1.04	0.99	0.05	43.0	88	8.2	9.1	
	July 15, 2013	CPFTR1	7.2	26.1	7.2	85	0.7	88.9%	0.17	1.30	0.02	0.14	1.44	1.28	0.16	79.0	108	6.5	8.0	32.0
	July 15, 2013	CPFTR2	8.7	27.3	7.6	86	0.4	109.8%	0.19	1.50	0.02	0.10	1.60	1.48	0.12	99.0	214	9.0	11.0	
	July 15, 2013	CPRTR3	9.4	28.5	8.3	86	0.4	121.2%	0.20	1.50	0.02	0.10	1.60	1.48	0.12	83.0	109	8.0	11.0	
	July 15, 2013	CPFTR4	9.4	27.8	8.1	86	0.4	119.7%	0.21	1.60	0.02	0.09	1.69	1.58	0.11	80.0	114	12.0	15.0	
	July 15, 2013	CPFTR5	9.9	29.6	8.3	85	0.5	130.1%	0.24	1.70	0.04	0.10	1.80	1.66	0.14	92.0	245	17.0	16.0	
	July 15, 2013	CPFTR6	7.2	27.7	8.1	87	0.5	91.5%	0.23	1.50	0.05	0.25	1.75	1.45	0.30	53.0	212	7.5	13.0	
	June 17, 2013	CPFTR1	4.0	25.0	7.2	81	0.7	48.4%	0.17	1.50	0.17	0.15	1.65	1.33	0.32	15.0	98	<6.2	8.2	32.0
	June 17, 2013	CPFTR2	7.0	26.3	7.0	78	0.7	86.8%	0.17	1.50	0.06	0.05	1.55	1.44	0.11	47.0	106	6.8	9.4	
	June 17, 2013	CPRTR3	8.1	26.9	7.2	81	0.5	101.5%	0.21	1.90	0.03	<0.02	1.91	1.87	0.04	101.0	112	<12.0	13.0	
	June 17, 2013	CPFTR4	6.2	27.0	7.0	83	0.5	77.8%	0.19	1.50	0.04	0.02	1.52	1.46	0.06	49.0	117	10.0	15.0	
	June 17, 2013	CPFTR5	7.1	24.7	7.1	84	0.4	85.5%	0.31	2.00	0.03	<0.02	2.01	1.97	0.04	119.0	130	35.0	24.0	
	June 17, 2013	CPFTR6	8.4	27.8	7.3	81	0.5	107.0%	0.25	1.70	0.04	<0.02	1.71	1.66	0.05	85.0	112	9.8	13.0	
	May 22, 2013	CPFTR1	4.4	23.4	7.3	93	0.5	51.7%	0.08	1.10	0.03	<0.02	1.11	1.07	0.04	31.0	87	6.5	8.0	32.0
	May 22, 2013	CPFTR2	6.6	24.6	7.7	85	0.6	79.3%	0.09	1.10	<0.02	<0.02	1.11	1.09	0.02	66.0	83	<6.2	8.1	
	May 22, 2013	CPRTR3	8.2	25.3	7.3	94	0.5	99.8%	0.11	1.20	<0.02	<0.02	1.21	1.19	0.02	85.0	112	<12.0	10.0	
	May 22, 2013	CPFTR4	6.9	25.0	7.2	94	0.5	83.5%	0.12	1.30	<0.02	<0.02	1.31	1.29	0.02	86.0	97	11.0	1.2	
	May 22, 2013	CPFTR5	7.7	25.6	7.2	91	0.4	94.2%	0.21	1.50	<0.02	<0.02	1.51	1.49	0.02	130.0	139	71.0	11.0	
	May 22, 2013	CPFTR6	8.4	25.6	7.4	92	0.4	102.8%	0.15	1.50	<0.02	<0.02	1.51	1.49	0.02	110.0	88	11.0	10.0	
HUC 03030004																				
HARRIS LAKE	September 30, 2013	CPF126A2	5.3	22.9	7.4	188	1.3	61.7%	0.03	0.62	<0.02	<0.02	0.63	0.61	0.02	18.0	128	<6.2	3.0	
	September 30, 2013	CPF126A4	5.2	22.8	7.6	198	1.3	60.4%	0.03	0.67	0.05	<0.02	0.68	0.62	0.06	13.0	129	<6.2	3.2	
	September 30, 2013	CPF126A6	5.9	23.4	7.6	199	1.0	69.3%	0.05	0.73	<0.02	<0.02	0.74	0.72	0.02	41.0	136	<6.2	3.2	
	August 27, 2013	CPF126A2	7.9	26.6	6.9	174	1.2	98.5%	0.03	0.65	<0.02	<0.02	0.66	0.64	0.02	20.0	128	<6.2	2.6	
	August 27, 2013	CPF126A4	7.0	26.2	7.1	181	1.0	86.6%	0.03	0.77	<0.02	<0.02	0.78	0.76	0.02	20.0	135	<6.2	3.4	
	August 27, 2013	CPF126A6	6.8	26.1	7.4	176	1.0	84.0%	0.04	0.77	<0.02	<0.02	0.78	0.76	0.02	31.0	118	<6.2	2.9	
	July 22, 2013	CPF126A2	7.2	29.9	7.5	165	1.4	95.1%	0.03	0.72	<0.02	<0.02	0.73	0.71	0.02	19.0	114	<6.2	3.1	
	July 22, 2013	CPF126A4	7.3	29.5	7.4	176	1.4	95.8%	0.02	0.66	<0.02	<0.02	0.67	0.65	0.02	12.0	138	<6.2	3.1	
	July 22, 2013	CPF126A6	6.0	28.2	7.4	174	1.4	76.9%	0.03	0.72	<0.02	<0.02	0.73	0.71	0.02	13.0	154	<6.2	2.6	
	June 24, 2013	CPF126A2	8.3	27.7	7.2	184	1.4	105.5%	0.03	0.66	0.02	<0.02	0.67	0.64	0.03		127	<12	3.7	
	June 24, 2013	CPF126A4	8.1	27.7	7.6	188	1.5	103.0%	0.03	0.67	0.02	<0.02	0.68	0.65	0.03	19.0	124	<6.2	2.4	
	June 24, 2013	CPF126A6	7.7	27.3	7.5	186	1.5	97.2%	0.04	0.70	0.02	<0.02	0.71	0.68	0.03	23.0	128	<6.2	4.2	
	May 22, 2013	CPF126A2	8.5	25.1	7.5	201	1.3	103.1%	0.03	0.68	<0.02	<0.02	0.69	0.67	0.02	9.3	131	<6.2	2.8	
	May 22, 2013	CPF126A4	8.5	24.5	7.7	207	1.4	102.0%	0.03	0.70	<0.02	<0.02	0.71	0.69	0.02		130	<6.2	2.9	
	May 22, 2013	CPF126A6	8.5	22.8	7.1	210	1.6	98.7%	0.03	0.74	<0.02	<0.02	0.75	0.73	0.02	17.0	134	<6.2	3.5	
OLD TOWN RESERVOIR	September 5, 2013	CPF135B	7.2	28.8	6.7	30	2.4	93.3%	<0.02	0.36	<0.02	<0.02	0.37	0.35	0.02	13.0	36	<6.2	2.4	
	September 5, 2013	CPF135D	7.2	28.6	6.9	29	2.3	93.0%	0.02	0.55	<0.02	<0.02	0.56	0.54	0.02	69.0	34	<6.2	3.0	7.9
	August 1, 2013	CPF135B	6.2	28.3	6.3	29	1.8	79.7%	0.02	0.60	<0.02	<0.02	0.61	0.59	0.02	48.0	34	<6.2	2.8	
	August 1, 2013	CPF135D	6.6	28.3	6.5	30	1.8	84.8%	<0.02	0.43	<0.02	<0.02	0.44	0.42	0.02	11.0	37	<6.2	1.9	7.9
	July 11, 2013	CPF135B	7.0	28.7	8.2	27	1.1	90.6%	0.02	0.49	0.02	<0.02	0.50	0.47	0.03	24.0	28		3.0	
	July 11, 2013	CPF135D	6.8	28.6	7.8	26	1.3	87.8%	<0.02	0.41	<0.02	<0.02	0.42	0.40	0.02	16.0	24	<6.2	2.1	7.9
	June 6, 2013	CPF135B	7.1	26.8	8.1	29	2.5	88.8%	<0.02	0.44	<0.02	<0.02	0.45	0.43	0.02	6.9	24	<6.2	2.3	
	June 6, 2013	CPF135D	7.6	26.7	8.1	29	2.3	94.9%	<0.02	0.46	<0.02	<0.02	0.47	0.45	0.02	14.0	24	<6.2	3.6	9.9
	May 2, 2013	CPF135B	9.2	19.1	5.6	30	2.8	99.4%	<0.02	0.48	<0.02	<0.02	0.49	0.47	0.02	9.6	16	<6.2	3.1	
	May 2, 2013	CPF135D	9.0	19.2	5.6	30	2.6	97.4%	<0.02	0.42	0.02	0.11	0.53	0.40	0.13	8.2	18	<6.2	1.4	8.0
CARTHAGE CITY LAKE	September 5, 2013	CPF113R	6.7	28.1	6.6	34	1.3	85.8%	0.04	0.71	<0.02	<0.02	0.72	0.70	0.02	33.0	54	7.2	4.8	7.9
	August 1, 2013	CPF113R	5.4	27.7	6.0	32	1.2	68.6%	0.03	0.62	<0.02	<0.02	0.63	0.61	0.02	28.0	50	6.8	5.2	7.9
	July 11, 2013	CPF113R	5.3	28.2	6.5	31	1.3	68.0%	0.03	0.59	<0.02	<0.02	0.60	0.58	0.02	11.0	42	<6.2	3.7	8.9
	June 6, 2013	CPF113R	6.4	25.7	7.5	33	1.3	78.5%	0.03	0.57	<0.02	<0.02	0.58	0.56	0.02	17.0	41	<6.2	48.0	9.9
	May 2, 2013	CPF113R	7.3	18.4	5.8	36	1.1	77.8%	0.02	0.54	<0.02	<0.02	0.55	0.53	0.02	13.0	27	<6.2	4.7	9.0

Appendix A - Cape Fear River Basin Data
January 1, 2009 Through December 31, 2013

Lake	Date	Sampling Station	SURFACE PHYSICAL DATA DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent DO 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
BONNIE DOONE LAKE	September 30, 2013	CPF138A4	5.1	20.8	7.2	32	1.0	57.0%	0.02	0.44	0.10	<0.02	0.45	0.34	0.11	6.8	42	<6.2	10.0	13.0
	August 26, 2013	CPF138A4	5.5	24.7	7.1	26	0.6	66.2%	0.03	0.42	<0.02	<0.02	0.43	0.41	0.02	9.8		9.5	21.0	9.9
	July 23, 2013	CPF138A4	4.8	27.6	6.1	29	0.7	60.9%	0.04	0.53		<0.02	0.54			13.0	40	9.0	24.0	11.0
	June 26, 2013	CPF138A4	5.5	26.7	7.2	27	0.8	68.7%	0.03	0.44	0.02	<0.02	0.45	0.42	0.03	16.0	40	8.8	17.0	9.9
	May 30, 2013	CPF138A4	7.0	25.2	7.3	28	1.0	85.1%	0.02	0.45	<0.02	<0.02	0.46	0.44	0.02	9.8	37	<6.2	11.0	11.0
MINTZ POND	September 30, 2013	CPF138A8	6.0	20.4	7.4	39	1.4	66.5%	0.02	0.37	<0.02	<0.02	0.38	0.36	0.02	5.2	38	<6.2	2.6	10.0
	August 26, 2013	CPF138A8	5.7	24.9	7.2	36	1.3	68.9%	0.03	0.39	<0.02	<0.02	0.40	0.38	0.02	7.4	66	<6.2	3.6	11.0
	July 23, 2013	CPF138A8	4.7	28.2	6.2	34	1.0	60.3%	0.05	0.65	<0.02	0.05	0.70	0.64	0.06	8.8	67	13.0	7.6	9.9
	June 26, 2013	CPF138A8	4.0	26.1	7.6	34	1.0	49.4%	0.03	0.47	0.05	0.09	0.56	0.42	0.14	6.9	40	<6.2	6.0	9.9
	May 30, 2013	CPF138A8	5.8	24.5	6.8	35	1.0	69.6%	0.05	1.20	0.02	<0.02	1.21	1.18	0.03	67.0	44	13.0	4.1	9.9
GLENVILLE LAKE	September 30, 2013	CPF138B	6.7	21.1	7.5	48	1.2	75.3%	0.03	0.42	<0.02	<0.02	0.43	0.41	0.02	15.0	48		3.1	13.0
	August 26, 2013	CPF138B	5.8	25.1	6.9	40	1.0	70.3%	0.03	0.50	<0.02	<0.02	0.51	0.49	0.02	21.0	56	<6.2	4.0	13.0
	July 23, 2013	CPF138B	4.8	27.8	6.2	40	1.0	61.1%	0.04	0.56	<0.02	<0.02	0.57	0.55	0.02	7.4	41	<6.2	5.5	13.0
	June 26, 2013	CPF138B	6.3	26.4	7.3	40	1.1	78.2%	0.05	0.60	0.02	0.02	0.62	0.58	0.04	28.0	48	6.2	4.9	12.0
	May 30, 2013	CPF138B	10.6	24.7	7.6	44	0.4	127.6%	0.06	0.81	<0.02	<0.02	0.82	0.80	0.02	50.0	52	8.2	6.6	11.0
HUC 03030005																				
SALTERS LAKE	September 3, 2013	CPF153C	6.2	29.1	3.9	83	0.4	80.8%	0.02	0.54	0.09	0.18	0.72	0.45	0.27	13.0	68	<6.2	11.0	
	September 3, 2013	CPF153D	6.3	29.3	3.9	83	0.4	82.4%	0.02	0.51	0.08	0.18	0.69	0.43	0.26	12.0	50	<6.2	11.0	
	August 6, 2013	CPF153C	5.9	28.7	3.8	81	0.3	76.3%	0.03	0.81	0.19	0.14	0.95	0.62	0.33	7.3	59	<6.2	14.0	
	August 6, 2013	CPF153D	6.0	28.9	3.8	81	0.3	77.9%	0.03	0.72	0.24	0.12	0.84	0.48	0.36	8.8	59	<6.2	13.0	
	July 10, 2013	CPF153C	6.3	29.0	3.9	82	0.3	81.9%	0.03	0.65	0.19	0.13	0.78	0.46	0.32	8.3	46	<6.2	17.0	
	July 10, 2013	CPF153D	6.4	28.9	4.0	82	0.3	83.1%	0.03	0.73	0.19	0.13	0.86	0.54	0.32	8.4	46		16.0	
	June 6, 2013	CPF153C	6.8	26.1	3.9	81	0.4	84.0%	0.04	0.60	0.19	0.09	0.69	0.41	0.28	6.0	40	<6.2	16.0	
	June 6, 2013	CPF153D	6.8	26.0	3.9	80	0.4	83.8%	0.03	0.55	0.18	0.09	0.64	0.37	0.27	6.2	31	<6.2	16.0	
	May 8, 2013	CPF153C	8.6	19.7	3.9	78	0.5	94.1%	0.04	0.48	0.02	0.05	0.53	0.46	0.07	28.0	62	10.0	15.0	
	May 8, 2013	CPF153D	8.5	19.5	4.0	80	0.5	92.6%	0.04	0.48	0.02	0.05	0.53	0.46	0.07	32.0	66	8.5	15.0	
JONES LAKE	September 3, 2013	CPF1552A	5.9	28.7	4.4	78	0.3	76.3%	0.03	0.81	0.17	0.07	0.88	0.64	0.24	23.0	64	<6.2	7.6	
	September 3, 2013	CPF1553A	6.1	29.1	4.1	78	0.4	79.5%	0.03	0.81	0.17	0.07	0.88	0.64	0.24	28.0	66	<12.0	7.5	
	August 6, 2013	CPF1552A	5.1	28.6	3.8	75	0.4	65.9%	0.02	0.84	0.38	0.03	0.87	0.46	0.41	1.5	56	<6.2	5.2	
	August 6, 2013	CPF1553A	5.1	28.3	3.8	75	0.4	65.5%	0.02	0.85	0.37	0.03	0.88	0.48	0.40	1.5	62	<6.2	5.3	
	July 10, 2013	CPF1552A	5.7	29.5	4.0	75	0.6	74.8%	0.02	0.71	0.28	0.03	0.74	0.43	0.31	1.6	35		4.3	
	July 10, 2013	CPF1553A	5.8	29.5	4.1	75	0.6	76.1%	0.02	0.72	0.28	0.03	0.75	0.44	0.31	1.9	42	<6.2	4.1	
	June 6, 2013	CPF1552A	7.2	26.5	3.9	77	1.9	89.6%	<0.02	0.20	0.03	<0.02	0.21	0.17	0.04	4.0	24	<6.2	1.6	
	June 6, 2013	CPF1553A	7.2	26.6	3.9	77	1.9	89.7%	<0.02	0.20	0.04	<0.02	0.21	0.16	0.05	2.4	22	<12.0	1.4	
	May 8, 2013	CPF1552A	8.4	19.3	4.0	76	1.0	91.1%	<0.02	0.36	<0.02	0.05	0.41	0.35	0.06		55	<12	4.2	
	May 8, 2013	CPF1553A	8.4	19.4	4.1	76	1.1	91.3%	0.08	0.86	0.07	0.05	0.91	0.79	0.12	1.9	46	<6.2	4.8	
WHITE LAKE	September 23, 2013	CPF155A	7.8	23.7	7.2	63	2.4	92.2%	<0.02	0.35	<0.02	<0.02	0.36	0.34	0.02	11.0	40	6.5	3.6	
	September 23, 2013	CPF155B	7.9	23.6	7.2	63	2.4	93.2%	<0.02	0.37	<0.02	<0.02	0.38	0.36	0.02	11.0	38	<6.2	1.7	
	September 23, 2013	CPF155C	8.1	23.6	7.2	63	2.4	95.5%	<0.02	0.36	<0.02	<0.02	0.37	0.35	0.02	11.0	46	<6.2	2.5	
	August 26, 2013	CPF155A	6.4	26.8	7.4	62	3.0	80.1%	<0.02	0.32	<0.02	<0.02	0.33	0.31	0.02		50		1.5	
	August 26, 2013	CPF155B	6.3	26.7	7.3	61	3.0	78.7%	<0.02	0.34	<0.02	<0.02	0.35	0.33	0.02		72	<6.2	<1.0	
	August 26, 2013	CPF155C	6.0	26.8	7.3	61	3.0	75.1%	<0.02	0.32	<0.02	<0.02	0.33	0.31	0.02		43		1.2	
	July 15, 2013	CPF155A	7.9	28.4	8.2	61	1.3	101.7%	0.02	0.44	<0.02	<0.02	0.45	0.43	0.02	27.0	122	10.0	5.5	
	July 15, 2013	CPF155B	8.0	28.4	8.0	62	1.3	103.0%	<0.02	0.37	<0.02	<0.02	0.38	0.36	0.02	30.0	110	<6.2	3.8	
	July 15, 2013	CPF155C	8.0	28.9	8.3	60	1.2	103.9%	0.02	0.40	<0.02	<0.02	0.41	0.39	0.02	26.0	51	<6.2	3.6	
	June 17, 2013	CPF155A	7.0	27.7	6.8	67	2.8	88.7%	<0.02	0.62	<0.02	<0.02	0.63	0.61	0.02	2.2	43	<6.2	1.1	
	June 17, 2013	CPF155B	7.2	27.5	6.0	67	2.8	88.7%	<0.02	0.26	<0.02	<0.02	0.27	0.25	0.02	2.0	36	<6.2	<1.0	
	June 17, 2013	CPF155C	7.0	27.5	6.1	67	1.2	88.7%	<0.02	0.27	<0.02	<0.02	0.28	0.26	0.02	3.3	38	<6.2	1.5	
	May 21, 2013	CPF155A	8.2	25.2	5.6	71	2.6	99.6%	<0.02	0.28	<0.02	<0.02	0.29	0.27	0.02	1.7	49	<6.2	1.1	
	May 21, 2013	CPF155B	8.3	25.0	5.8	71	2.5	100.5%	<0.02	0.26	<0.02	<0.02	0.27	0.25	0.02	2.3	48	<6.2	1.5	
	May 21, 2013	CPF155C	7.9	25.0	5.9	72	2.4	95.6%	<0.02	0.44	<0.02	<0.02	0.45	0.43	0.02	3.4	42	<6.2	1.3	
GREENFIELD LAKE	September 16, 2013	CPF211B	7.9	28.0	7.6	210	0.7	101.0%	0.09	1.10	<0.02	<0.02	1.11	1.09	0.02	67.0	142	10.0	8.0	
	September 16, 2013	CPF211C	7.4	27.1	7.7	203	0.6	93.1%	0.10	1.20	<0.02	<0.02	1.21	1.19	0.02	84.0	152	10.0	6.8	
	August 12, 2013	CPF211B	10.9	31.6	8.1	189	0.4	148.3%	0.12	1.20	<0.02	<0.02	1.21	1.19	0.02	69.0	128	12.0	8.4	
	August 12, 2013	CPF211C	9.4	30.7	7.9	185	0.4	125.9%	0.13	1.50	<0.02	<0.02	1.51	1.49	0.02	71.0	130	13.0	8.8	
	July 17, 2013	CPF211B	7.5	29.9	7.1	154	0.8	99.1%	0.11	0.63	<0.02	<0.02	0.64	0.62	0.02	32.0	110	7.0	4.2	
	July 17, 2013	CPF211C	7.7	30.4	7.4	157	0.9	102.6%	0.11	0.60	<0.02	<0.02	0.61	0.59	0.02	43.0	113	6.5	3.9	
	June 13, 2013	CPF211B	8.0	30.6	7.2	198	1.6	107.0%	0.10	0.46	<0.02	<0.02	0.47	0.45	0.02	6.4	118		2.9	
	June 13, 2013	CPF211C	6.8	29.1	7.1	208	1.8	238.6%	0.12	0.50	<0.02	<0.02	0.51	0.49	0.02	14.0	129	<6.2	4.4	
	May 13, 2013	CPF211B	6.7	24.9	6.9	208	1.6	81.0%	0.12	0.57	<0.02	<0.02	0.58	0.56	0.02	7.6	130	<6.2	3.4	
	May 13, 2013	CPF211C	7.8	24.6	6.7	202	1.9	93.7%	0.12	0.65	<0.02	<0.02	0.66	0.64	0.02	8.9	131	<6.2	3.8	

Appendix A - Cape Fear River Basin Data
January 1, 2009 Through December 31, 2013

Lake	Date	Sampling Station	SURFACE PHYSICAL DATA DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Depth Secchi meters	Percent DO 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
BOILING SPRINGS LAKE	September 16, 2003	CPFBSL2	5.2	27.5	6.8	65	0.3	65.9%	0.02	0.72	<0.02	0.050	0.77	0.71	0.06	3.2	111	<6.2	3.4	
	September 16, 2003	CPFBSL4	5.6	28.1	6.8	66	0.4	71.7%	0.02	0.68	0.020	0.050	0.73	0.66	0.07	3.9	105	<6.2	2.8	
	September 16, 2003	CPFBSL6	5.0	27.5	6.9	65	0.4	63.3%	0.02	0.75	0.020	0.050	0.80	0.73	0.07	1.2	98		2.6	
	August 12, 2013	CPFBSL2	4.9	30.6	7.2	64	0.2	65.5%	0.02	0.75	0.02	0.04	0.79	0.73	0.06	1.3	102	<6.2	3.4	
	August 12, 2013	CPFBSL4	5.6	31.1	6.9	65	0.2	75.5%	0.02	0.72	0.02	0.04	0.76	0.70	0.06	1.6	96		3.4	
	August 12, 2013	CPFBSL6	5.7	31.5	7.1	64	0.2	77.4%	0.02	0.78	<0.02	0.05	0.83	0.77	0.06	2.6	100		3.2	
	July 17, 2013	CPFBSL2	5.4	29.5	7.4	62	0.3	70.8%	0.02	0.77	0.03	0.04	0.81	0.74	0.07	3.6	117	<6.2	4.3	
	July 17, 2013	CPFBSL4	5.8	30.4	7.6	65	0.4	77.3%	0.02	0.71	0.02	0.06	0.77	0.69	0.08	2.0	109		3.6	
	July 17, 2013	CPFBSL6	5.6	30.7	6.9	64	0.3	75.0%	0.02	0.73	0.02	0.06	0.79	0.71	0.08	1.7	108		3.9	
	June 10, 2013	CPFBSL2	6.6	27.4	6.8	68	0.3	83.4%	0.02	0.69	0.03	0.06	0.75	0.66	0.09	1.9	104	<6.2	4.6	
	June 10, 2013	CPFBSL4	6.5	27.2	7.0	70	0.3	81.9%	0.02	0.72	0.03	0.05	0.77	0.69	0.08	1.4	102	<6.2	4.5	
	June 10, 2013	CPFBSL6	6.6	27.4	7.0	69	0.4	83.4%	0.02	0.69	0.03	0.06	0.75	0.66	0.09	1.7	104	<6.2	4.4	
	May 13, 2013	CPFBSL2	6.1	22.0	6.0	69	0.3	69.8%	0.02	0.73	0.02	0.06	0.79	0.71	0.08	<1.0	99	<6.2	5.6	
	May 13, 2013	CPFBSL4	6.4	22.8	6.1	70	0.3	74.3%	<0.02	0.74	0.02	0.06	0.80	0.72	0.08	<1.0	98	<6.2	3.9	
	May 13, 2013	CPFBSL6	6.1	22.4	6.7	70	0.4	70.3%	0.02	0.72	0.02	0.06	0.78	0.70	0.08	1.5	102	<6.2	4.9	
HUC 03030006																				
BAY TREE LAKE	September 23, 2013	CPF155G	7.7	22.3	4.4	99	1.0	88.6%	0.02	0.30	<0.02	0.02	0.32	0.29	0.03	7.6	12	8.5	7.6	
	September 23, 2013	CPF155I	8.0	22.4	4.4	100	0.9	92.2%	0.03	0.31	<0.02	0.03	0.34	0.30	0.04	9.1	44	13.0	12.0	
	August 19, 2013	CPF155G	7.7	25.5	4.5	97	1.6	94.1%	<0.02	0.20	<0.02	0.04	0.24	0.19	0.05	4.0	48	<6.2	3.0	
	August 19, 2013	CPF155I	7.8	26.3	4.7	97	1.8	96.7%	<0.02	0.20	<0.02	0.04	0.24	0.19	0.05	2.5	48	<6.2	2.6	
	July 15, 2013	CPF155G	7.2	27.9	4.7	90	0.6	91.8%	0.02	0.25	<0.02	0.15	0.40	0.24	0.16	9.0	52	<6.2	10.0	
	July 15, 2013	CPF155I	7.3	27.9	4.6	92	0.6	93.1%	0.02	0.20	<0.02	0.16	0.36	0.19	0.17	8.8	50	<6.2	7.5	
	June 17, 2013	CPF155G	7.4	26.6	4.6	100	0.5	92.2%	0.02	0.29	<0.02	0.27	0.56	0.28	0.28	16.0	51	<6.2	8.5	
	June 17, 2013	CPF155I	7.4	26.6	4.5	101	0.5	92.2%	0.02	0.30	<0.02	0.27	0.57	0.29	0.28	15.0	50		9.2	
	May 21, 2013	CPF155G	7.6	24.5	4.5	111	0.5	91.2%	0.03	0.30	0.03	0.42	0.72	0.27	0.45	2.6	56	<6.2	12.0	
	May 21, 2013	CPF155I	7.5	24.6	4.3	111	0.5	90.1%	0.03	0.35	0.03	0.42	0.77	0.32	0.45	2.5	63	<6.2	12.0	
LAKE SINGLETARY	September 19, 2013	CPF176D	7.3	25.0	4.1	73	0.4	88.4%	0.02	0.62	<0.02	0.07	0.69	0.61	0.08	10.0	<6.2	55.0	7.9	
	September 19, 2013	CPF176E	7.6	25.3	4.2	73	0.4	92.5%	0.02	0.55	<0.02	0.03	0.58	0.54	0.04	8.0	53	<6.2	6.9	
	September 19, 2013	CPF176F	7.6	25.5	4.1	74	0.4	92.9%	0.02	0.55	<0.02	0.02	0.57	0.54	0.03	12.0	54		8.4	
	August 20, 2013	CPF176D	6.9	26.9	4.4	71	0.5	86.5%	0.03	0.44	0.05	0.05	0.49	0.39	0.10	3.8		<6.2	7.1	
	August 20, 2013	CPF176E	7.2	26.5	4.3	71	0.5	89.6%	0.02	0.47	0.05	0.05	0.52	0.42	0.10	5.8	34	<6.2	8.6	
	August 20, 2013	CPF176F	7.1	26.3	4.1	71	0.5	88.0%	0.03	0.51	0.05	0.05	0.56	0.46	0.10	5.7	22		7.5	
	July 29, 2013	CPF176D	6.1	31.1	3.8	71	0.4	82.3%	0.04	0.62	0.03	<0.02	0.63	0.59	0.04	16.0	51	<6.2	9.4	
	July 29, 2013	CPF176E	6.4	31.5	4.2	70	0.4	86.9%	0.02	0.53	0.05	<0.02	0.54	0.48	0.06	6.2	52	<6.2	9.6	
	July 29, 2013	CPF176F	6.5	31.5	3.9	71	0.4	88.3%	0.03	0.57	0.03	<0.02	0.58	0.54	0.04	11.0	41	<6.2	9.5	
	June 19, 2013	CPF176D	8.7	27.6	5.6	72	0.7	110.4%	0.02	0.41	0.02	<0.02	0.42	0.39	0.03	8.5	40	<6.2	8.9	
	June 19, 2013	CPF176E	8.8	27.9	5.6	72	0.7	112.3%	0.02	0.40	0.02	<0.02	0.41	0.38	0.03	10.0	45	<12.0	9.2	
	June 19, 2013	CPF176F	8.7	27.9	5.4	73	0.7	111.0%	0.03	0.44	0.02	<0.02	0.45	0.42	0.03	10.0	43	<6.2	9.3	
	May 28, 2013	CPF176D	7.6	24.4	4.3	77	0.6	91.0%	0.02	0.42	<0.02	0.06	0.48	0.41	0.07	16.0	45	<12.0	9.4	
	May 28, 2013	CPF176E	7.6	24.3	4.4	77	0.6	90.8%	0.02	0.40	<0.02	0.06	0.46	0.39	0.07	13.0	44	<6.2	9.4	
	May 28, 2013	CPF176F	7.6	23.9	4.3	77	0.6	90.1%	0.02	0.46	<0.02	0.06	0.52	0.45	0.07	12.0	46	<6.2	9.4	
HUC 03030007																				
CABIN LAKE	September 12, 2013	CPFCL2	5.2	27.9	6.2	58	0.4	66.3%	0.23	1.20	<0.02	<0.02	1.21	1.19	0.02	62.0	113		4.0	
	September 12, 2013	CPFCL4	5.5	26.3	6.3	57	0.4	68.2%	0.17	1.20	<0.02	<0.02	1.21	1.19	0.02	28.0	108		2.4	
	August 8, 2013	CPFCL2	6.4	28.9	5.9	57	0.4	83.1%	0.20	1.20	<0.02	0.03	1.23	1.19	0.04	20.0	109		4.1	
	August 8, 2013	CPFCL4	6.9	28.2	6.2	56	0.3	88.5%	0.25	2.60	<0.02	0.02	2.62	2.59	0.03	116.0	110	7.8	5.9	
	July 18, 2013	CPFCL2	7.2	31.7	5.4	58	0.4	98.1%	0.21	1.60	<0.02	<0.02	1.61	1.59	0.02	129.0	100	8.0	6.3	
	July 18, 2013	CPFCL4	5.5	30.7	7.0	58	0.3	73.7%	0.16	1.10	0.04	<0.02	1.11	1.06	0.05	9.4	100	<6.2	2.7	
	June 12, 2013	CPFCL2	6.2	27.1	6.9	70	0.4	78.0%	0.10	0.89	0.04	0.19	1.08	0.85	0.23	9.5	82	<6.2	2.6	
	June 12, 2013	CPFCL4	6.0	26.7	6.3	70	0.5	74.9%	0.10	0.84	0.04	0.19	1.03	0.80	0.23	9.2	80	<6.2	2.4	
	May 9, 2013	CPFCL2	8.8	21.6	7.0	73	0.5	99.9%	0.07	0.87	<0.02	0.29	1.16	0.86	0.30	26.0	92	<6.2	5.5	
	May 9, 2013	CPFCL4	9.1	21.2	7.1	73	0.5	102.5%	0.07	0.88	<0.02	0.28	1.16	0.87	0.29	32.0	68	<6.2	4.4	