LAKE & RESERVOIR ASSESSMENTS
BROAD RIVER BASIN

Lake Adger

Intensive Survey Branch
Water Sciences Section
Division of Environmental Quality
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GLOSSARY

Algae Small aquatic plants that occur as single cells, colonies, or filaments. May also be referred to as phytoplankton, although phytoplankton are a subset of algae.

Algal biovolume The volume of all living algae in a unit area at a given point in time. To determine biovolume, individual cells in a known amount of sample are counted. Cells are measured to obtain their cell volume, which is used in calculating biovolume.

Algal density The density of algae based on the number of units (single cells, filaments and/or colonies) present in a milliliter of water. The severity of an algae bloom is determined by the algal density as follows:

Mild bloom = 10,000 to 20,000 units/ml

Moderate 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) and are found in
almost every aquatic environment including fresh and marine waters, soils, in fact almost anywhere moist. 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 concentration 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.

Dissolved oxygen The range of surface concentrations found at the sampling locations.

Dissolved oxygen saturation The capacity of water to absorb oxygen gas. Often expressed as a percentage, the amount of oxygen that can dissolved 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 elevated biological productivity and low water transparency.

Eutrophication	The process of physical, chemical, and biological changes in a lake associated with the presence of one or more of the following: excessive nutrients, organic matter, silt enrichment and sedimentation.
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 north 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). Values for total organic nitrogen, total phosphorus, chlorophyll *a* and Secchi depth are used to calculate a numeric score representing the lake's degree of 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. DWQ 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 Broad River Basin encompasses a 1,506 square mile watershed drained by 1,452 miles of streams. The three major tributaries to the Broad River are the Green, the Second Broad, and the First Broad Rivers. The headwaters of the Broad River and its major tributaries are located within the Mountains and flow towards the Foothills before entering the Piedmont ecoregion southeast and east of Lake Lure. From there, the Broad River flows through Rutherford and Cleveland counties, then into South Carolina. The basin encompasses most of Cleveland, Polk and Rutherford counties, and small portions of Buncombe, Henderson, Lincoln, and Gaston counties. Larger municipalities include the towns and cities of Forest City, Kings Mountain, Lake Lure, Rutherfordton, Shelby and Spindale. Many of these municipalities are concentrated along the US 74 corridor between the cities of Lake Lure and King's Mountain. Approximately one-half of the basin consists of forests and widespread agriculture while the other half is urbanized.

The Broad River (Rocky Broad River) originates upstream of Lake Lure. Flat, Hickory, and Reedypatch Creeks are the largest tributaries above the lake. Buffalo Creek forms a major arm of the lake and Cove Creek is a large tributary to the Broad River below the lake. Land use within the lake's watershed is predominantly forested with some urban and agricultural uses. The headwater reaches of the Green River are in Henderson County. The Green has been impounded at two locations to form Lakes Summit and Adger. Both reservoirs are used to produce hydroelectric power. Tributary streams are often high gradient and are capable of supporting trout populations. Apple orchards are a significant land use in upper reaches of many tributary catchments, including the Hungry River. As the topography flattens, the lower reaches of many catchments are farmed. The First Broad River originates in Rutherford County and flows into the Broad River in Cleveland County, just above the South Carolina border. This geographic area is a transitional zone between ecoregions, with some streams exhibiting Mountain characteristics while other streams are more Piedmont in nature.

A statewide fish consumption advisory from the North Carolina Department of Health and Human Resources, Division of Public Health is in place due to mercury contamination (http://epi.publichealth.nc.gov/oee/programs/fish.html) Fish such as blackfish (bowfin), largemouth bass and chained pickerel (jack fish) have been found to have high mercury levels.

Assessment Methodology

For this report, data from January 1, 2011 through December 31, 2015 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.

Quality Assurance of Field and Laboratory Lakes Data

Data collected in the field via multiparameter water quality meters are uploaded 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 uploaded into the Lakes Database. 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 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 are given a qualification code are entered along with the assigned laboratory code.

Additional information regarding the Quality Assurance Program is covered in the Ambient Lake Monitoring Program Quality Assurance Plan. Version 2.0 (March 28, 2014) of this document is available on the ISU website (http://portal.ncdenr.org/web/wq/ess/isu).

Weather Overview for Summer 2015

The weather in Western North Carolina in May, 2015 was warm and dry. The average state-wide temperature of 67.8° F was 1.4° F above the long-term average for May. An upper level ridge over the southeast was responsible for these warmer than usual temperatures as well as dryer than normal conditions. Near the end of May, the western portion of the state became abnormally dry (Figure 1).

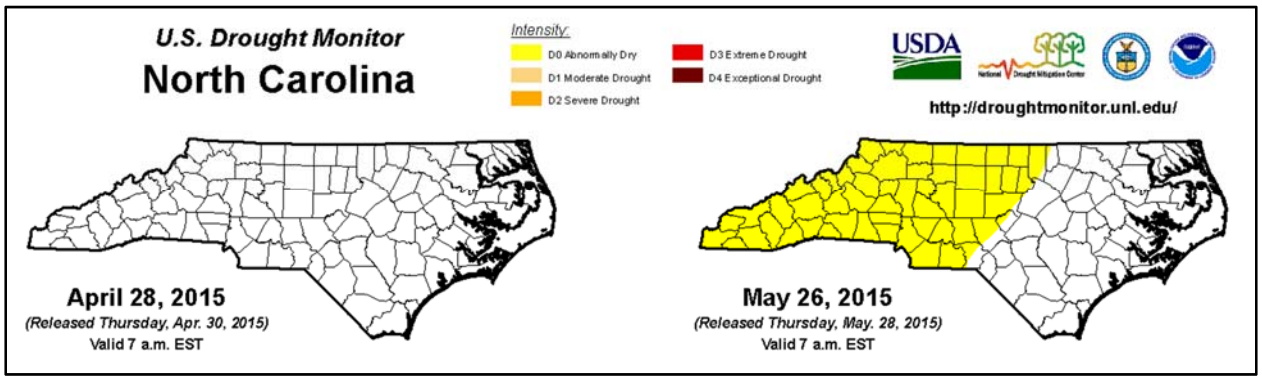

Figure 1. Increasing dryness in the western half of North Carolina in May 2015.

June 2015 was the 10th-wamest June in the past 121 years with a statewide average temperature of 76.5° F. A mid-level ridge in June brought hot, dry air into the state from the west and southwest, making this month the 8th warmest June for the Broad River Basin in 121 years of records. Precipitation in the western part of the state was below normal with the western Piedmont receiving less than three inches for the month. Most of the Broad River Basin was designated D1 (moderate drought) by the end of June (Figure 2).

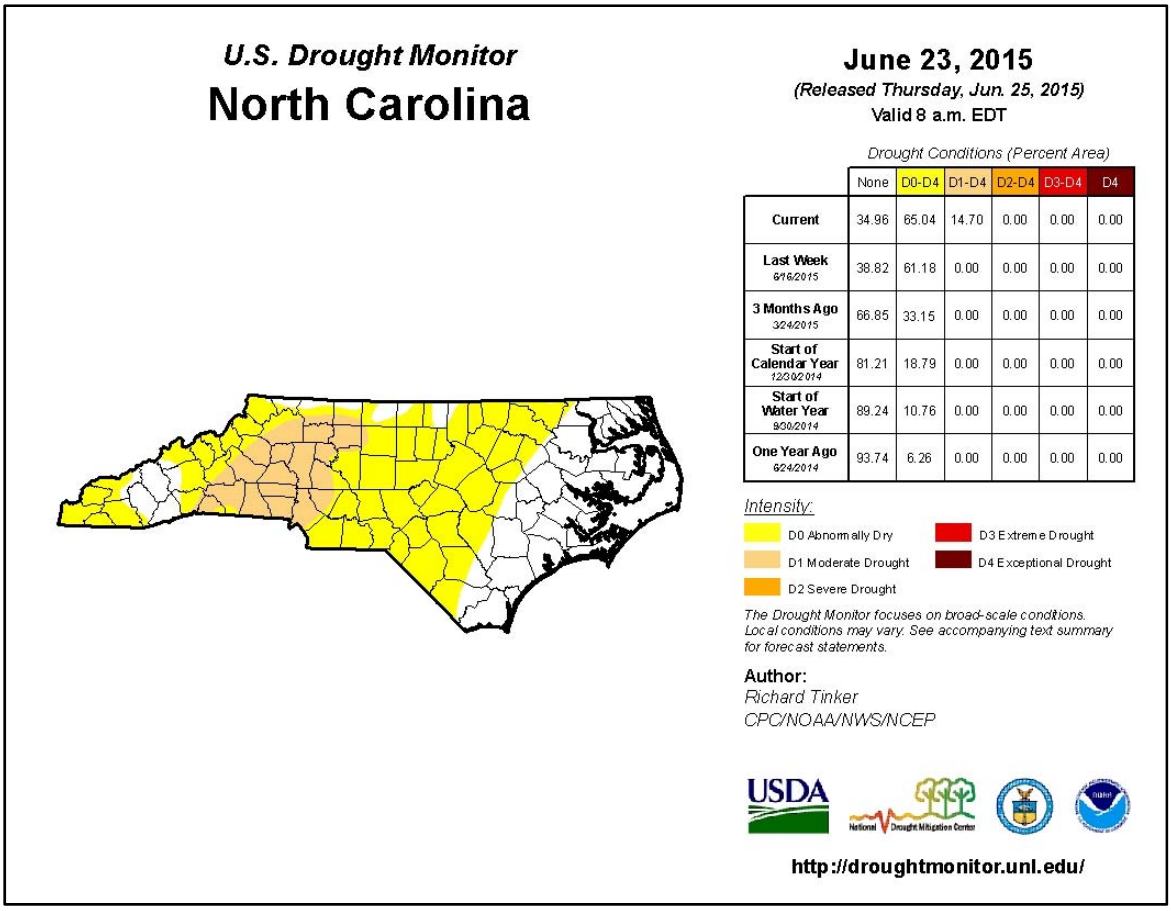

Figure 2. Drought conditions in NC, June 23, 2015.

Above normal temperatures continued through July along with dry weather due to the mid-level ridging over the southern US (Figure 3). By August 2015, drought conditions in the majority of the Broad River Basin had increased to Severe (Figure 4).

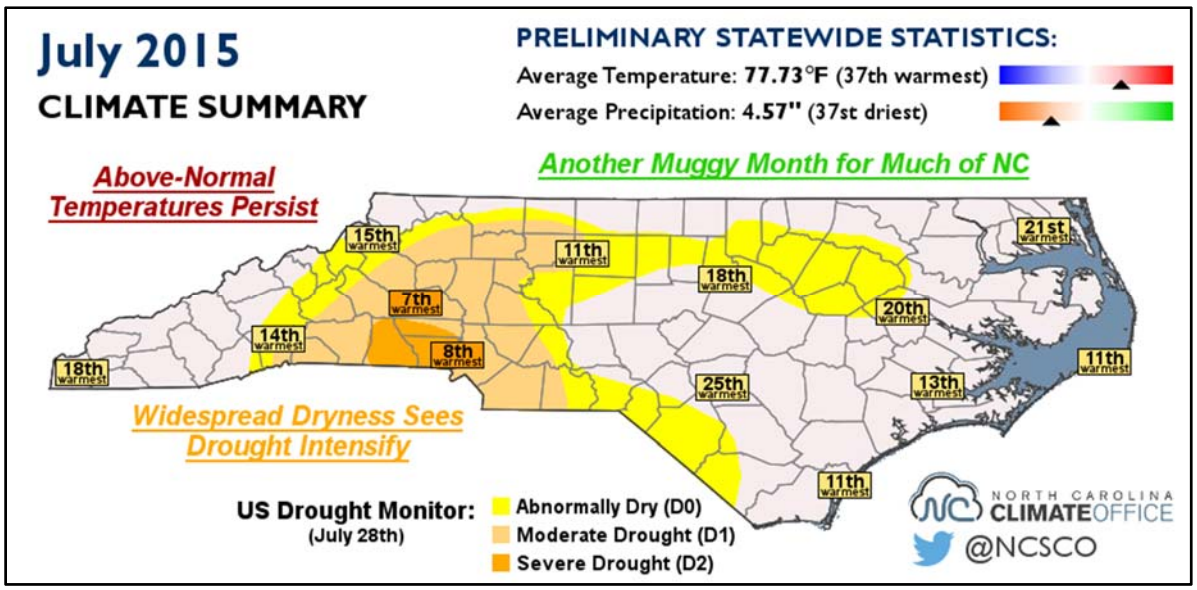

Figure 3. Increasing dryness in the state, July 2015.

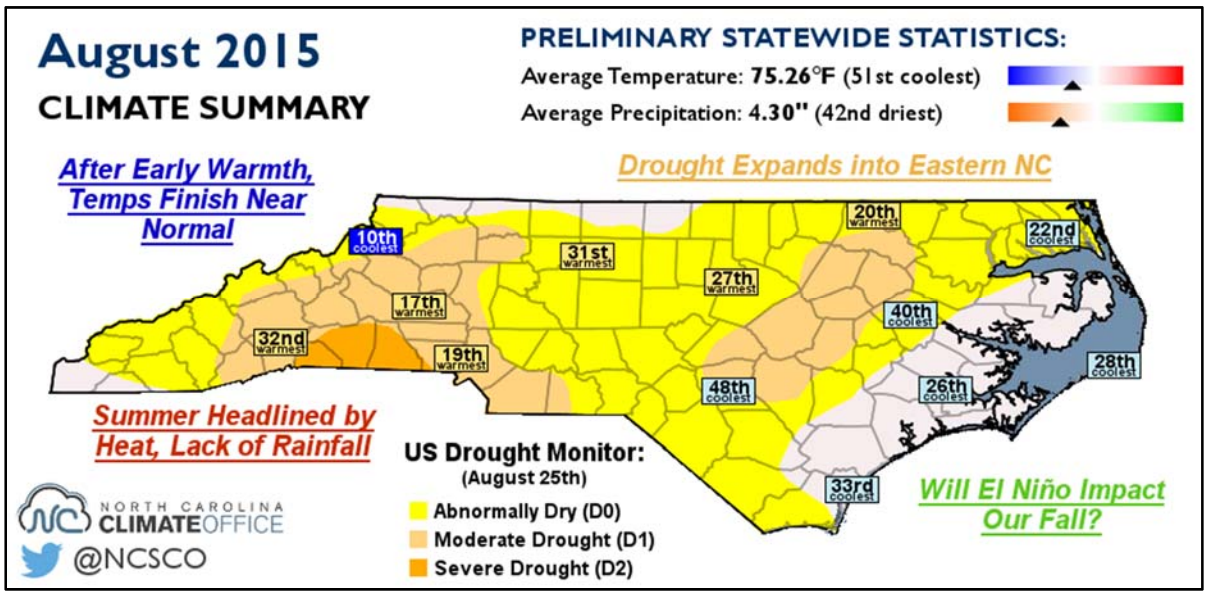

Figure 4. Expansion of drought conditions through the central and eastern Piedmont of the state, August 2015

Warm, dry conditions, which had expanded the drought throughout most of the state in the first part of September was reduced by the end of the month by much needed rainfall over some parts of the state (Figure 5). A stationary low-pressure system just off the coast that pulled moister off the Atlantic across the state. Severe drought conditions in the Broad River Basin were eased back to moderate and abnormally dry by the end of September.

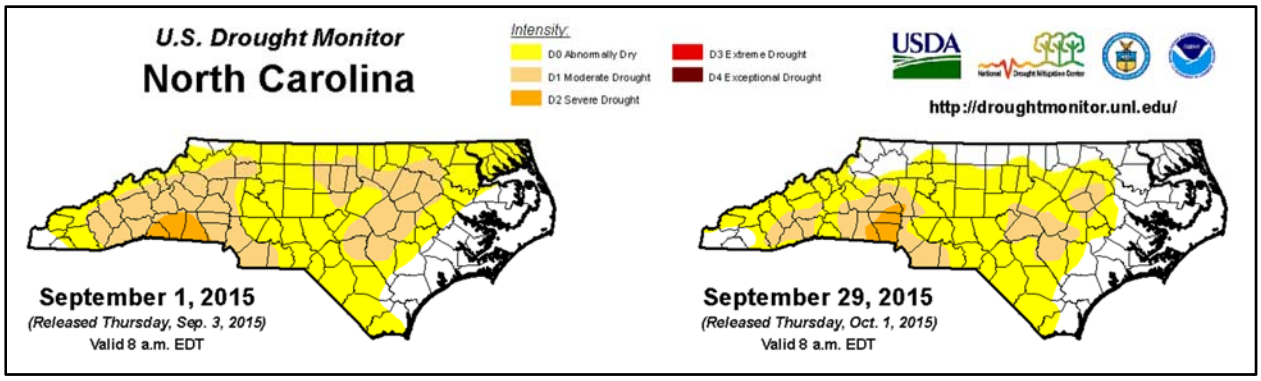

Figure 4. Decrease in drought conditions due to end of month rainfall, September 2015.

LAKE & RESERVOIR ASSESSMENTS

HUC 03050105

Lake Lure

Ambient Lakes Program Name	Lake Lure		
Trophic Status (NC TSI)	Oligotrophic		
Mean Depth (meters)	20.0		
Volume ($10^6 m^3$)	12.10		
Watershed Area (mi^2)	90.0		
Classification	B; Tr		
Stations	BRD001C	BRD001D1	BRD001F
Number of Times Sampled	5	5	5

Lake Lure is a large impoundment located in the mountains of southwestern North Carolina, adjacent to the Town of Lake Lure. The lake has a maximum depth of 34 meters. Major tributaries to the lake are the Broad River, Buffalo Creek, and Pool Creek. The watershed is predominantly forested with some urban and agricultural uses. Shoreline development consists of houses and vacation lodges. Lake Lure is owned and managed by the Town of Lake Lure.

DEQ field staff monitored Lake Lure five times in 2015. Nutrient concentrations and chlorophyll *a* values continued to be similar to those observed for this lake by DEQ since 1981 (Table 1). The calculated NCTSI scores for 2015 indicated that Lake Lure continues to exhibit oligotrophic conditions (low biological productivity) as was originally determined by DEQ monitoring efforts in 1981.

Table 1. Water Quality Data for Lake Lure, Broad River Basin.

	SURFACE PHYSICAL DATA							PHOTIC ZONE DATA									Total		
			Temp			Secchi											Total	Suspended	
Date	Sampling	DO	Water	pH	Cond.	Depth	Percent	TP	TKN	NH3	NOx	TN	TON	TIN	Chla	Solids	Solids	Turbidity
	Station	mg/L	C	s.u.	µmhos/cm	meters	SAT	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	NTU
May 12, 2015	BRD001C	9.8	23.8	7.9	35	2.0	116.0%	0.02	0.27	0.02	0.03	0.30	0.25	0.05		40	<6.2	7.4
May 12, 2015	BRD001D1	9.3	24.4	7.7	35	3.3	111.3%	<0.02	0.27	0.02	<0.02	0.28	0.25	0.03		36	<6.2	3.3
May 12, 2015	BRD001F	9.1	24.7	7.7	34	2.4	109.6%	<0.02	0.24	0.02	<0.02	0.25	0.22	0.03		34	<6.2	2.2
June 16, 2015	BRD001C	8.3	26.9	7.2	38	2.0	104.0%	0.02	0.26	0.02	<0.02	0.27	0.24	0.03	7.2	50	<6.2	2.5
June 16, 2015	BRD001D1	8.1	27.7	7.5	37	3.0	103.0%	<0.02	0.20	<0.02	<0.02	0.21	0.19	0.02	5.5	49	<6.2	1.6
June 16, 2015	BRD001F	7.7	28.3	7.4	37	3.0	98.9%	<0.02	0.20	0.02	<0.02	0.21	0.18	0.03	4.4	51	<6.2	1.2
July 21, 2015	BRD001C	7.8	28.3	7.5	39	1.9	100.2%	0.02	0.20	<0.02	<0.02	0.21	0.19	0.02	9.8	52	<6.2	1.3
July 21, 2015	BRD001D1	7.8	28.4	7.3	38	3.1	100.4%	<0.02	<0.20	<0.02	<0.02	0.11	0.09	0.02	5.2	50	<6.2	1.2
July 21, 2015	BRD001F	7.7	28.5	7.3	38	3.0	99.3%	0.02	<0.20	0.02	<0.02	0.11	0.08	0.03	4.8	49	<6.2	<1.0
August 19, 2015	BRD001C	8.1	27.1	7.4	40	2.0	101.9%	0.02	0.20	<0.02	<0.02	0.21	0.19	0.02	11.0	36	<6.2	1.9
August 19, 2015	BRD001D1					2.4		<0.02	0.20	<0.02	<0.02	0.21	0.19	0.02	6.2	34	<6.2	1.9
August 19, 2015	BRD001F	8.0	27.2	7.7	39	2.2	100.8%	<0.02	0.20	<0.02	<0.02	0.21	0.19	0.02	5.7	33	<6.2	1.7
September 16, 2015	BRD001C	8.6	23.2	7.7	39	1.9	100.7%	0.01	0.31	<0.02	<0.02	0.32	0.30	0.02	10.0	46	<6.2	1.1
September 16, 2015	BRD001D1	8.4	23.5	7.7	39	1.9	98.9%	0.02	0.28	<0.02	<0.02	0.29	0.27	0.02	9.1	45	<6.2	<1.0
September 16, 2015	BRD001F	8.6	23.5	7.9	40	1.9	101.2%	0.02	0.27	<0.02	<0.02	0.28	0.26	0.02	8.6	40	<6.2	1.1

Lake Adger

Ambient Lakes Program Name	Lake Adger		
Trophic Status (NC TSI)	Mesotrophic		
Mean Depth (meters)	8.0		
Volume ($10^6 m^3$)	14.40		
Watershed Area (mi^2)	134.0		
Classification	C		
Stations	BRD007J	BRD007L	BRD007P
Number of Times Sampled	5	5	5

Lake Adger dam constructed in 1925 created a 460-acre impoundment located in the mountains of southwestern North Carolina. The maximum depth of Lake Adger is 22 meters and the average retention time is 21 days. The Green River is the primary tributary to this reservoir. Fishing and boating are common recreational activities at Lake Adger. In June 2008, Polk County agreed to purchase the reservoir, water and dam from Duke Energy, the previous owner. Northbrook Power Management will continue to operate the hydropower facility as a part of this purchase agreement.

Lake Adger was sampled five times from May through September 2015 by DEQ field staff. Chlorophyll *a* values at BRD007J in July and September were the highest observed for this lake by DEQ (Table 2). Values for total phosphorus and total organic nitrogen in 2015 were also generally greater than those values previously observed from past monitoring visits. Based on the calculated NCTSI scores, Lake Adger was determined to exhibit moderate biological productivity (mesotrophic conditions) in 2010. Historically, this lake has been oligotrophic since it was first monitored by DEQ in 1989.

Table 2. Water Quality Data for Lake Adger, Broad River Basin.

	SURFACE PHYSICAL DATA							PHOTIC ZONE DATA									Total	
Date	Sampling Station	DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Secchi Depth meters	Percent SAT	TP mg/L	TKN mg/L	NH3 mg/L	NOx mg/L	TN mg/L	TON mg/L	TIN mg/L	Chla µg/L	Total Solids mg/L	Suspended Solids mg/L	Turbidity NTU
May 12, 2015	BRD007J	9.8	24.8	7.7	35	1.2	118.2%	<0.02	0.22	0.03	0.09	0.31	0.19	0.12		39	<6.2	6.2
May 12, 2015	BRD007L	9.4	25.5	7.6	34	2.0	114.8%	<0.02	0.20	0.02	0.09	0.29	0.18	0.11		32	<6.2	4.2
May 12, 2015	BRD007P	8.7	24.6	7.5	34	2.8	104.5%	<0.02	0.20	0.02	0.08	0.28	0.18	0.10		28	<6.2	2.0
June 16, 2015	BRD007J	8.4	27.2	7.3	36	1.2	105.8%	<0.02	0.26	0.02	0.09	0.35	0.24	0.11	4.2	53	6.3	4.2
June 16, 2015	BRD007L	8.6	29.2	8.2	37	1.8	112.2%	0.02	0.21	0.02	0.05	0.26	0.19	0.07	6.5	50	<6.2	1.1
June 16, 2015	BRD007P	8.3	30.0	8.1	38	2.4	109.8%	<0.02	0.20	0.02	0.04	0.24	0.18	0.06	5.3	50	<6.2	1.5
July 21, 2015	BRD007J	8.2	27.8	7.5	40	0.8	104.4%	0.04	0.29	0.02	<0.02	0.30	0.27	0.03	12.0	54	<6.2	3.2
July 21, 2015	BRD007L	8.8	29.4	8.7	39	1.4	115.3%	0.02	0.27	<0.02	<0.02	0.28	0.26	0.02	9.3	54	<6.2	2.7
July 21, 2015	BRD007P	8.5	29.5	8.6	38	1.6	111.5%	0.02	0.25	<0.02	<0.02	0.26	0.24	0.02	6.9	52	<6.2	1.8
August 19, 2015	BRD007J	7.1	27.5	7.0	40	1.3	89.9%	0.03	0.32	0.02	<0.02	0.33	0.31	0.02	8.0	44	<6.2	5.1
August 19, 2015	BRD007L	6.9	27.7	7.1	40	1.8	87.7%	0.02	0.27	<0.02	<0.02	0.28	0.26	0.02	8.8	35	<6.2	2.4
August 19, 2015	BRD007P	6.6	27.7	7.0	40	1.9	83.9%	<0.02	0.20	<0.02	<0.02	0.21	0.19	0.02	7.9	33	<6.2	1.8
September 16, 2015	BRD007J	8.2	24.0	7.0	41	0.9	97.4%	0.03	0.31	0.01	0.01	0.32	0.30	0.02	13.0	50	8.0	2.7
September 16, 2015	BRD007L	7.2	24.1	6.8	41	1.5	85.7%	0.02	0.29	0.01	0.01	0.30	0.28	0.02	9.3	43	<6.2	2.2
September 16, 2015	BRD007P	5.9	24.3	6.6	41	1.5	70.5%	<0.02	0.30	0.04	0.01	0.31	0.26	0.05	8.5	39	<6.2	1.3

Kings Mountain Reservoir

Ambient Lakes Program Name	Kings Mountain Reservoir			
Trophic Status (NC TSI)	Mesotrophic			
Mean Depth (meters)	14.0			
Volume (10^6 m^3)	7.50			
Watershed Area (mi^2)	65.0			
Classification	WS-III; CA			
Stations	BRD056C	BRD056E	BRD056G	BRD056J
Number of Times Sampled	5	5	5	5

Kings Mountain Reservoir (also known as Moss Lake) is the water supply for the City of Kings Mountain. The reservoir, built in 1963, has a maximum depth of 24 meters. Major tributaries include Buffalo Creek and White Oak Creek. The watershed consists of rolling hills and rural land with approximately 50 to 70 percent of the shoreline developed.

This reservoir was monitored by DEQ staff monthly from May through September, 2015 Chlorophyll *a* values were greatest in May (Table 3) and surface pH values were slightly greater than the state water quality standard of 9.0 s.u. Surface pH values exceeded the state water quality standard again in July. Kings Mountain Reservoir was determined to be eutrophic in May, oligotrophic in June and mesotrophic in July through September, with an overall trophic status of mesotrophic. Previous NCTSI scores for Kings Mountain Reservoir indicated that the lake ranged from oligotrophic to eutrophic (elevated biological productivity) since monitoring began in 1981.

Table 3. Water Quality Data for Kings Mountain Reservoir, Broad River Basin.

	SURFACE PHYSICAL DATA							PHOTIC ZONE DATA									Total			
Date	Sampling Station	DO mg/L	Temp Water C	pH s.u.	Cond. µmhos/cm	Secchi Depth meters	Percent SAT	TP mg/L	TKN mg/L	NH3 mg/L	NOx mg/L	TN mg/L	TON mg/L	TIN mg/L	Chla µg/L	Total Solids mg/L	Suspended Solids mg/L	Turbidity NTU	Hardness mg/L
May 13, 2015	BRD056C	10.7	25.3	9.2	64	1.1	130.2%	0.02	0.45	0.02	0.44	0.89	0.43	0.46	19.0	54	<6.2	5.5	
May 13, 2015	BRD056E	10.1	25.3	9.1	63	1.0	122.9%	0.02	0.44	0.02	0.41	0.85	0.42	0.43	14.0	48	<6.2	5.8	
May 13, 2015	BRD056G	10.1	25.0	9.1	62	1.1	122.3%	0.02	0.43	0.02	0.41	0.84	0.41	0.43	15.0	53		5.4	
May 13, 2015	BRD056J	10.2	24.5	9.1	62	1.1	122.3%	0.02	0.62	0.02	0.40	1.02	0.60	0.42	15.0	47	<6.2	5.2	38.0
June 15, 2015	BRD056C	8.1	30.4	8.5	63	1.7	107.9%	<0.02	0.30	0.02	0.33	0.63	0.28	0.35	3.9	69	<6.2	2.5	
June 15, 2015	BRD056E	7.7	31.1	8.3	63	1.2	103.8%	0.02	0.36	0.02	0.29	0.65	0.34	0.31	4.1	65	<6.2	2.0	
June 15, 2015	BRD056G	7.7	30.2	8.1	63	1.6	102.3%	<0.02	0.28	0.02	0.34	0.62	0.26	0.36	3.1	61	<6.2	2.4	
June 15, 2015	BRD056J	7.9	30.2	8.1	62	1.8	104.9%	<0.02	0.32	0.02	0.36	0.68	0.30	0.38	2.1	67	<6.2	<1.0	17.0
July 20, 2015	BRD056C	8.6	30.9	9.2	65	1.2	115.6%	0.02	0.40	<0.02	<0.02	0.41	0.39	0.02	13.0	68	<6.2	1.6	
July 20, 2015	BRD056E	8.6	31.3	9.2	65	1.1	116.4%	0.02	0.40	0.02	<0.02	0.41	0.38	0.03	13.0	69	<6.2	1.8	
July 20, 2015	BRD056G					1.3		0.02	0.40	<0.02	<0.02	0.41	0.39	0.02	11.0	67	<6.2	2.3	
July 20, 2015	BRD056J					1.4		0.02	0.42	0.02	<0.02	0.45	0.40	0.05	9.6	67	<6.2	1.6	20.0
August 18, 2015	BRD056C	7.9	29.0	8.4	66	1.5	102.7%	<0.02	0.35	<0.02	<0.02	0.36	0.34	0.02	9.4	46	<6.2	3.0	
August 18, 2015	BRD056E	7.4	29.2	8.1	65	1.5	96.6%	0.02	0.37	<0.02	<0.02	0.38	0.36	0.02	9.9	50	<6.2	3.7	
August 18, 2015	BRD056G	7.5	28.8	8.1	65	1.5	97.2%	<0.02	0.33	<0.02	<0.02	0.34	0.32	0.02	12.0	46	<6.2	3.1	
August 18, 2015	BRD056J	7.5	28.5	8.2	65	1.5	96.7%	0.02	0.35	<0.02	<0.02	0.36	0.34	0.02	9.2	50	<6.2	3.0	19.0
September 15, 2015	BRD056C	6.7	25.8	7.3	65	1.7	82.3%	0.02	0.34	0.01	0.03	0.37	0.33	0.04	9.6	53	<6.2	2.0	
September 15, 2015	BRD056E	7.2	25.5	7.4	64	1.4	88.0%	0.02	0.39	0.01	0.01	0.40	0.38	0.02	5.8	53	<6.2	2.3	
September 15, 2015	BRD056G	7.4	25.5	7.6	64	1.7	90.4%	0.02	0.40	0.01	0.01	0.41	0.39	0.02	6.8	55	<6.2	1.3	
September 15, 2015	BRD056J	7.2	25.6	7.4	64	1.8	88.1%	0.02	0.43	0.01	0.01	0.44	0.42	0.02	7.8	56	<6.2	<1.0	20.0