Survey of Surface Water Quality Associated with Hurricane Florence, September 2018

April 1, 2019

North Carolina Department of Environmental Quality

Division of Water Resources

Water Sciences Section

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Executive Summary

In the aftermath of Hurricane Florence, the North Carolina Division of Water Resources (DWR) conducted supplemental monitoring of surface waters to help quantify and characterize potential impacts that a storm of Florence's size and intensity may have had on these resources. Due to the unprecedented precipitation across parts of eastern and central NC, flood conditions caused major issues for wastewater treatment facilities, as well as extensive flooding of urban and agricultural areas. When conditions were safe for travel, DWR staff began surface water monitoring to evaluate the effects of flooding and damage associated with the storm. Based on information reported to DWR from staff and public resources, a study plan was developed to evaluate Florence's impact on surface waters. This assessment effort spanned nine river basins across eastern and central North Carolina. Results of this monitoring activity were compared to historic five-year median (baseline) values established in the 2016 Integrated Report[1] and results from previous hurricane monitoring efforts.

A summary of the DWR Hurricane Florence survey is described below:

- Flood Conditions

  The Neuse and Cape Fear River basins experienced flood conditions similar to those observed during Hurricane Matthew; however, flood conditions persisted longer at nearly every gaging station evaluated for this report. Peak flood stages in the Neuse River were two to three feet lower than Matthew peaks, and Cape Fear peak stages were two to three feet higher. The Tar River felt little to no impacts from Florence, while the White Oak, Lumber and Roanoke Rivers all experienced higher peak stages and longer durations of flooding compared to Hurricane Matthew's impacts.
- Area Evaluated

  DWR's Hurricane Florence Response effort spanned nine river basins; covering about two thirds of the state. Staff collected samples across 31 counties for a period of up to 10 weeks to evaluate conditions at 55 sites across the Catawba, Cape Fear, Lumber, Chowan, White Oak, Roanoke, Yadkin, Tar and Neuse River basins.
- Monitoring Summary

  Over 13,800 individual data points were collected during two phases of physical and chemical monitoring. Phase 1 effort was completed October 19, 2018. Phase 2 effort was completed November 26, 2018.
- Short term effects – within four weeks of Hurricane Florence

  Levels of fecal coliform, total Kjeldahl nitrogen (TKN), and biological oxygen demand (BOD) had elevated concentrations when compared to baseline data, and dissolved oxygen (DO) concentrations fell below standard levels in over 25% of observed values. Specific conductivity values were lower when compared to baseline Ambient Monitoring System (AMS) data.
- Long term effects – four to eight weeks following Hurricane Florence

  Most parameters returned to normal baseline conditions after the initial round of sampling; however, nitrate + nitrite (NO_X) and fecal coliform bacteria concentrations were observed at levels much higher than what is considered baseline conditions.
- Coal Ash Sampling

  Reports of flooding and inundation at two coal ash storage facilities, Duke Energy's H.F. Lee Plant in Goldsboro and Sutton Steam Plant in Wilmington, prompted supplemental sampling for total and dissolved metals in and around these locations.

Routine ambient monitoring at the time of this writing may further indicate a return to historic levels for these lingering elevated constituent levels.

Introduction

This publication serves as a summary of surface water quality conditions following Hurricane Florence in through the coastal plain, sand hills and piedmont regions of North Carolina. In the aftermath of the storm, the NC Division of Water Resources (DWR) assessed surface water quality across the affected area to measure the impact of the storm. Initial environmental monitoring priorities were based on safety, accessibility, and emergency needs.

Once the storm had passed, DWR staff developed a strategy for evaluating the storm's impacts on surface waters. Part of this evaluation process combined incident reports collected through DWR's storm tracker application with historical data to provide staff with a calculated approach to response monitoring (Figure 8). Hurricane Matthew, which impacted the NC in October 2016, provided a recent reference point for values observed during Hurricane Florence and was used as a model for this response effort[2].

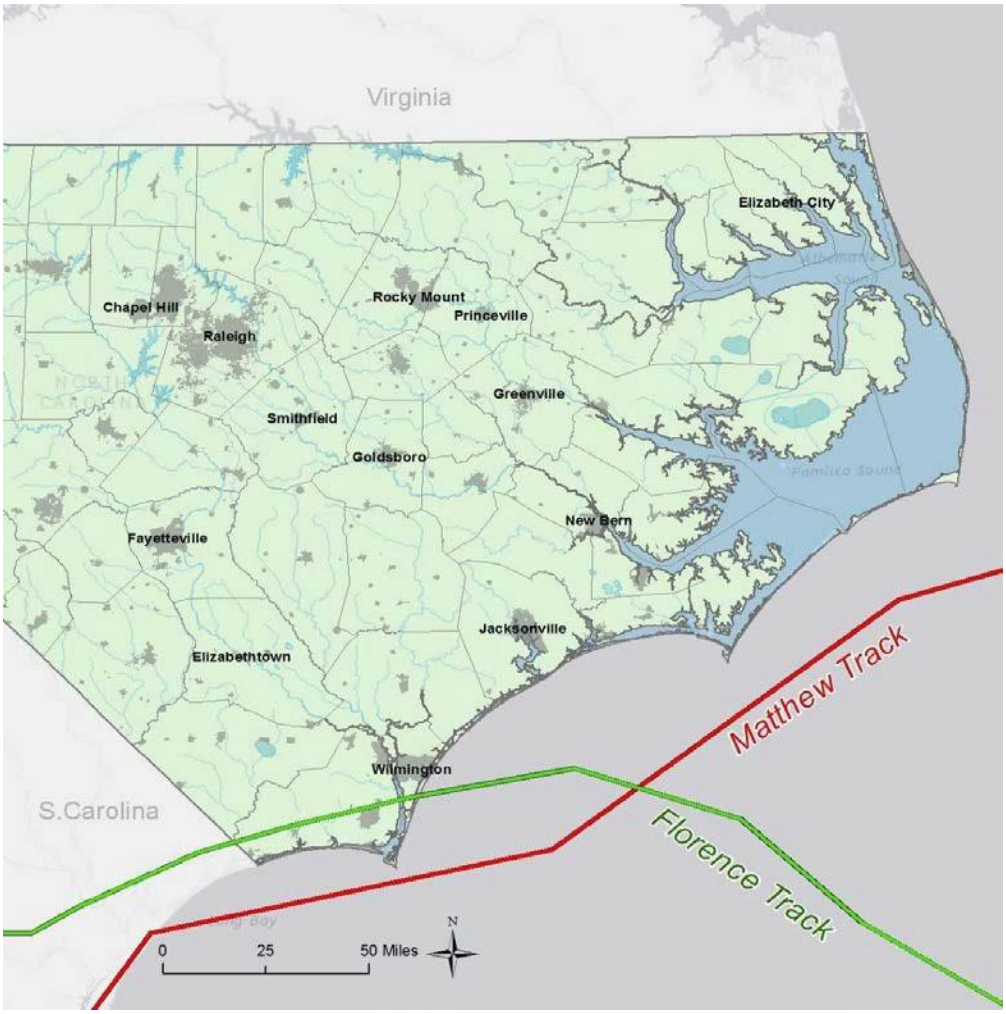
Florence impacted nine major river basins in North Carolina including: Tar-Pamlico, Neuse, Cape Fear, Lumber, Roanoke, Chowan, White Oak, Catawba, and Yadkin Pee-Dee. To give the best overall assessment of water quality, sampling locations for Florence and Matthew were picked based on the long-term Ambient Monitoring System (AMS) as well as areas of historic/special concern, such as coal ash storage facilities and agricultural waste retention ponds. Conditions at selected sites were evaluated for the standard physical water parameters of temperature, pH, conductivity and dissolved oxygen, as well as any chemical constituents that were considered relevant to potential upstream impacts. Parameters considered indicators of water quality associated with waste treatment facilities, livestock operations, chemical spills and nutrient loading to river systems were also evaluated.

Sampling was conducted west-to-east as floodwaters receded and roads became passable. The highest priority in conducting this response was the safety of Division personnel. Staff were instructed to follow all posted road closings and to closely monitor travel conditions prior to any sampling activity. Water quality conditions related to Florence were monitored over a two-month period beginning on September 22, 2018 and concluding on November 26, 2018. Through four rounds of sampling, and two separate evaluation phases, one sample was collected from each selected site once over a two-week period. Some sites were eliminated from Phase 2 sampling after Phase 1 data demonstrated minimal impacts to selected waterways, or where acute impacts had passed.

Hurricane Florence

Tropical storm systems are an annual threat to North Carolina. These storms often produce conditions that can move large amounts of sediment, damage infrastructure and reshape topography through processes of erosion, storm surge, and inundation. Hurricane Florence formed near the western Coast of Africa and followed a near-straight path across the Atlantic Ocean. After peaking as a Category 4 storm three days prior, Hurricane Florence weakened before making landfall at Wrightsville Beach, NC on the morning of September 14, 2018. As a Category 1 storm at the time of landfall, Florence delivered sustained winds of up to 90mph and dropped record amounts of rain as it moved west along the North and South Carolina border, resulting in widespread flooding. Storm surge from this hurricane ranged from two to nine feet above sea level[3]. For a recent comparison of a system with similar magnitude, Hurricane Matthew, which occurred on October 8- 9, 2016, is cited in this report as a reference point. Although Mathew had a more north-easterly trajectory along the coast, comparable areas of North Carolina were affected by both storms. Figure 1 depicts the paths of these two major storms across the state.

Figure 1. *Storm Tracks of Hurricane Florence and Hurricane Matthew*

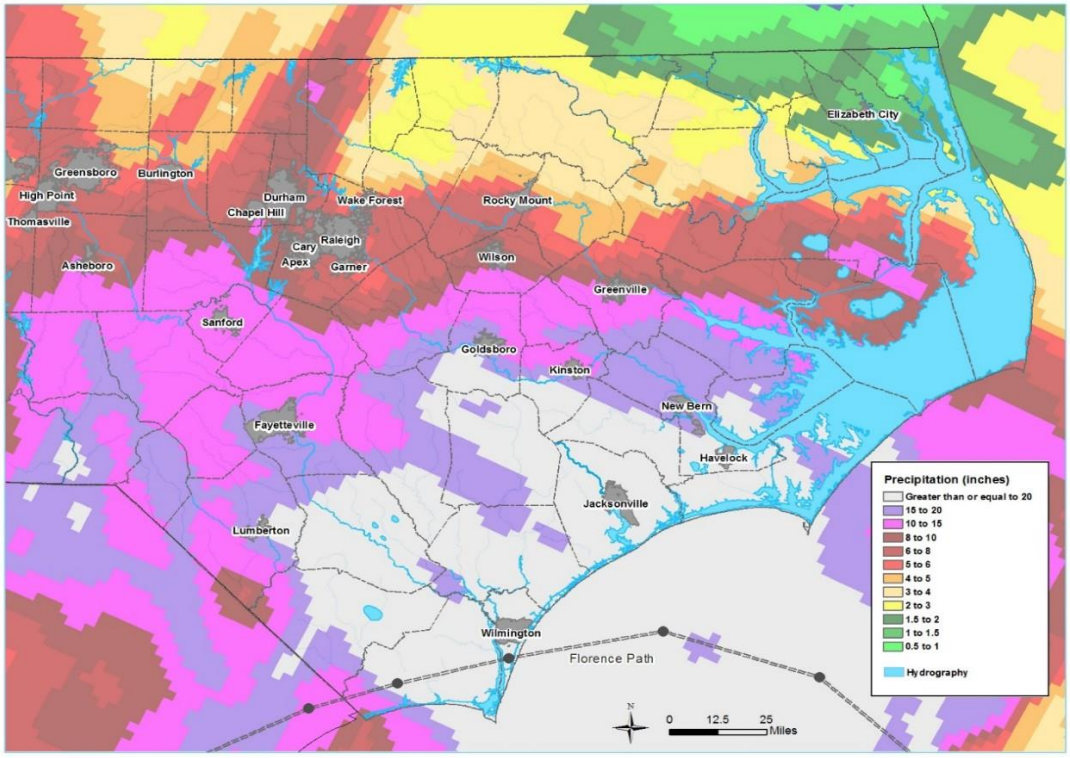


Rainfall

Hurricane Florence's historic rainfall accumulated over 30 inches in areas along the coast, breaking North Carolina's record for the most precipitation produced from a single storm[5]. Figure 2 shows the rainfall totals across the southern coast, Sandhills and Piedmont for the days bracketing the landfall of Florence. Rainfall totals averaged around 3 inches in the northern part of the coastal plain, 6-12 inches in the central piedmont, and historic rainfalls of 30+ inches along the southeastern coastal plain from Lumberton to Havelock. Storm surge from Wilmington to New Bern contributed up to nine feet of additional flooding. Some parts of the state were measuring one of the wettest years on record prior to the arrival of Florence, so surface and groundwater storage was already at near-capacity. Hurricane Michael, which is outside of the scope of this document, arrived two weeks after Florence and further exacerbated flood conditions.

Rainfall associated with Florence affected every watershed within the state, however sampling efforts for this study focused on the nine eastern-most basins which experienced the most intense rainfall. Although most of the precipitation associated with Florence occurred in a 48-hour window, the flushing and drainage effect of these basins shows peak flow several days after the storm had passed.

***Figure 2**: Observed rainfall from September 11-18, 2018*
Data layer courtesy of the National Weather Service



Flooding

USGS stream gauges located throughout North Carolina's river basins were examined to determine stage data = and to understand the progression and duration of flooding over time and location (i.e. upstream vs downstream). This comparison shows water levels during sampling compared to water levels during Hurricane Matthew flood stage. Due to the bands of the storm and variety in precipitation amounts, different areas of the state received varying amounts of rainfall. Combined with the geomorphological characteristics of each river basin, this explains differences in each river stage over time. Trends in stage data over the month of September 2018 followed expected patterns as flooding receded west to east, with the larger basins (Cape Fear and Neuse) remaining above flood stage for longer periods than the smaller catchments (Lumber and White Oak). The Neuse and Cape Fear River basins experienced flood conditions similar to those observed during Hurricane Matthew; however, flood conditions persisted longer at nearly every gaging station evaluated for this report.

Peak flood stages in the Neuse River were two to three feet lower than Hurricane Matthew peaks, and Cape Fear peak stages were two to three feet higher. The Tar River felt little to no impacts from Hurricane Florence, while the White Oak, Lumber and Roanoke Rivers all experienced higher peak stages and longer durations of flooding compared to Hurricane Matthew. Smaller basins peaked almost immediately after rainfall ceased, whereas the larger river basins crested up to a week after the storm (Figures 5 & 6).

Figure 3. *The City of Lumberton Water Plant on September 19, 2018*
Photo courtesy of NOAA

Figure 4. *Widespread flooding at the intersection of US70 and US258 in Kinston on September 21, 2018 Satellite imagery courtesy of Google Earth*

Table 1. *National Weather Service Flood Stage, Peak Stage During Hurricane Florence, and Peak Stage During Hurricane Matthew at USGS Stream Gage Locations in Eastern Portions of North Carolina River Basins*.

River Basin	USGS Station Number	Station Name	NWS Flood stage (ft)	Hurricane Florence (2018)			Hurricane Matthew (2016)		
				Peak Stage (feet)	Peak Stage Date	Days Above Flood Stage	Peak Stage (feet)	Peak Stage Date	Days Above Flood Stage
Roanoke	2081000	Scotland Neck	28	28.81	6-Oct-2018	9	26.89	22-Oct-2016	2
	2081054	Williamston	12	11.73	7-Oct-2018	0	11.46	25-Oct-2016	0
Tar	2082585	Rocky Mount	21	16.19	17-Sep-2018	0	28.14	10-Oct-2016	5
	2083500	Tarboro	19	14.9	20-Sep-2018	0	36.17	13-Oct-2016	10
Neuse	2089000	Goldsboro	18	27.58	19-Sep-2018	11*	29.63	12-Oct-2016	10
	2089500	Kinston	14	25.78	21-Sep-2018	15	28.22	14-Oct-2016	14
	2091814	Fort Barnwell	13	17.92	22-Sep-2018	15	20.43	15-Oct-2016	13
White Oak	2093000	Gum Branch	14	25.75	15-Sep-2018	6	18.59	9-Oct-2016	2
Cape Fear	2104000	Fayetteville	35	61.58	19-Sep-2018	8	57.3	10-Oct-2016	5
	2105500	Tarheel	42	38.66	20-Sep-2018	0	36.07	10-Oct-2016	0
	2105769	Lock #1 near Kelly	24	30.68	21-Sep-2018	10**	-	-	-
Lumber	2133500	Hoffman	8	11.49	17-Sep-2018	2	8.53	9-Oct-2016	1
	2133624	Maxton	-	17.74	19-Sep-2018	-	15.21	11-Oct-2016	-
	2134500	Boardman	-	14.37	18-Sep-2018	-	14.31	11-Oct-2016	-

*Stage data not reported from 9/17 to 9/18

**Stage data not reported from 9/18 to 9/19

Figure 5. *River Stage Data from Oct. 6 – 26, 2016 During Hurricane Florence at USGS Stream Gage Locations in Eastern Portions of Roanoke, Tar and Neuse River Basins*

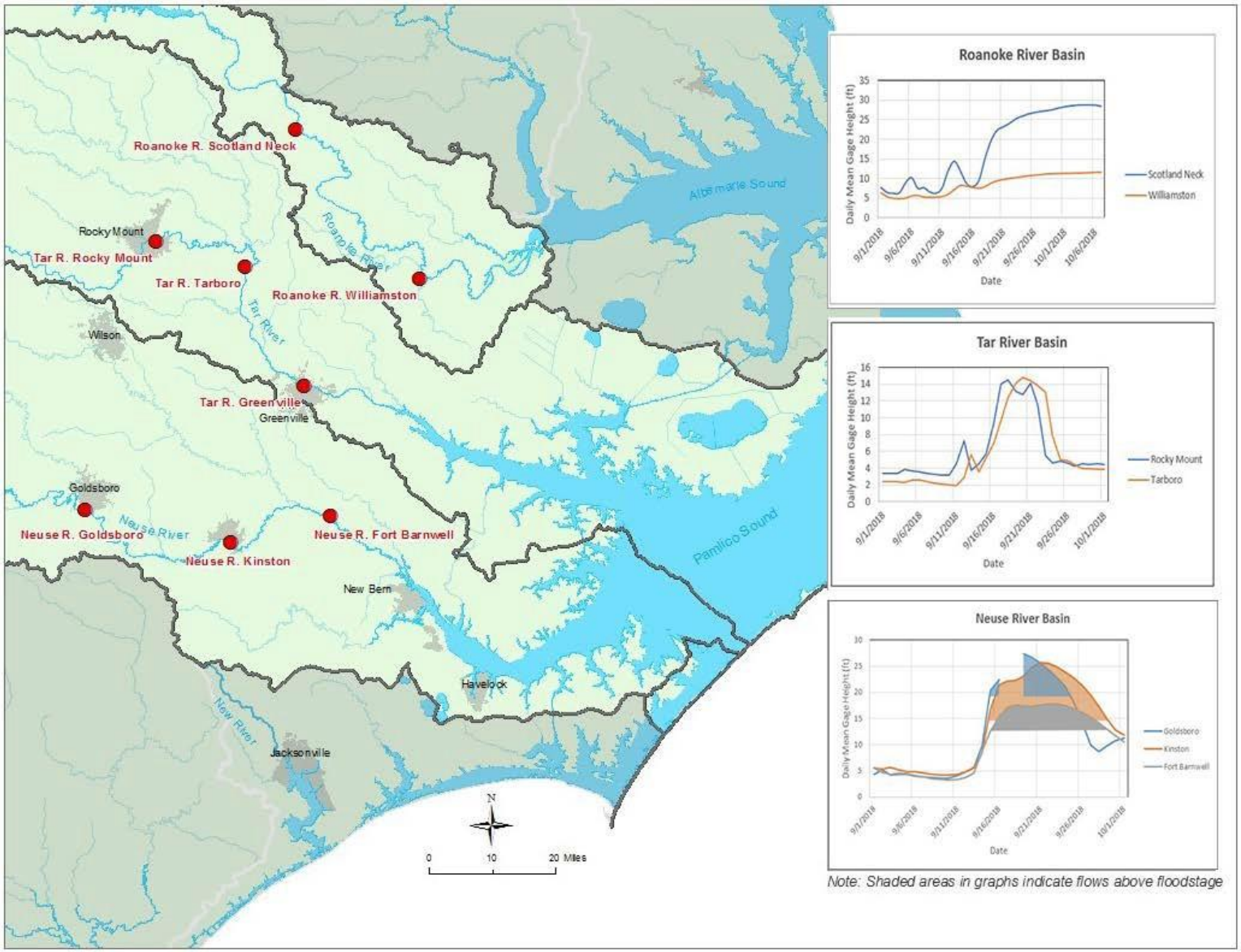
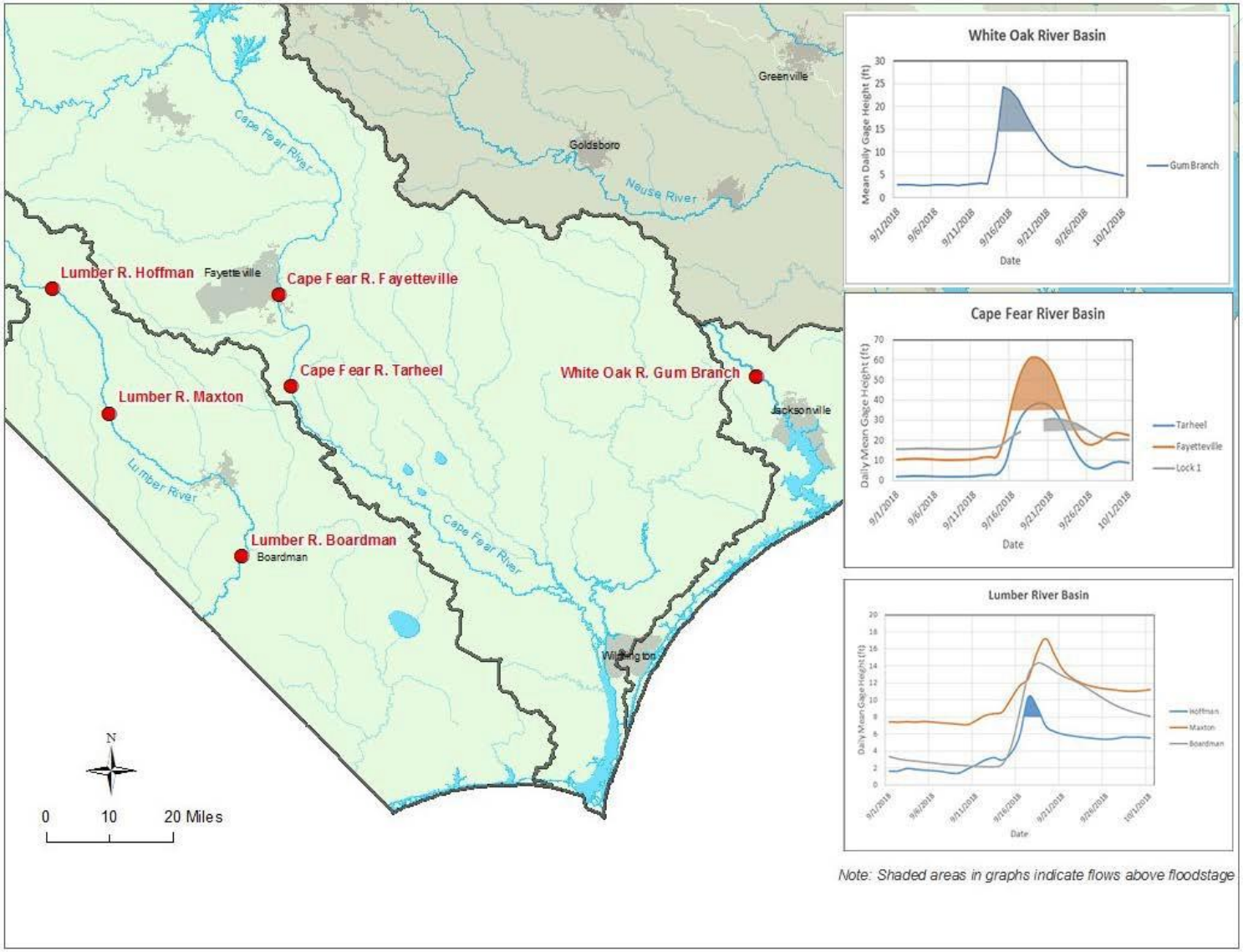


Figure 6. *River Stage Data from Oct. 6 – 26, 2016 During Hurricane Florence at USGS Stream Gage Locations in Eastern Portions of White Oak, Cape Fear and Lumber River Basins*



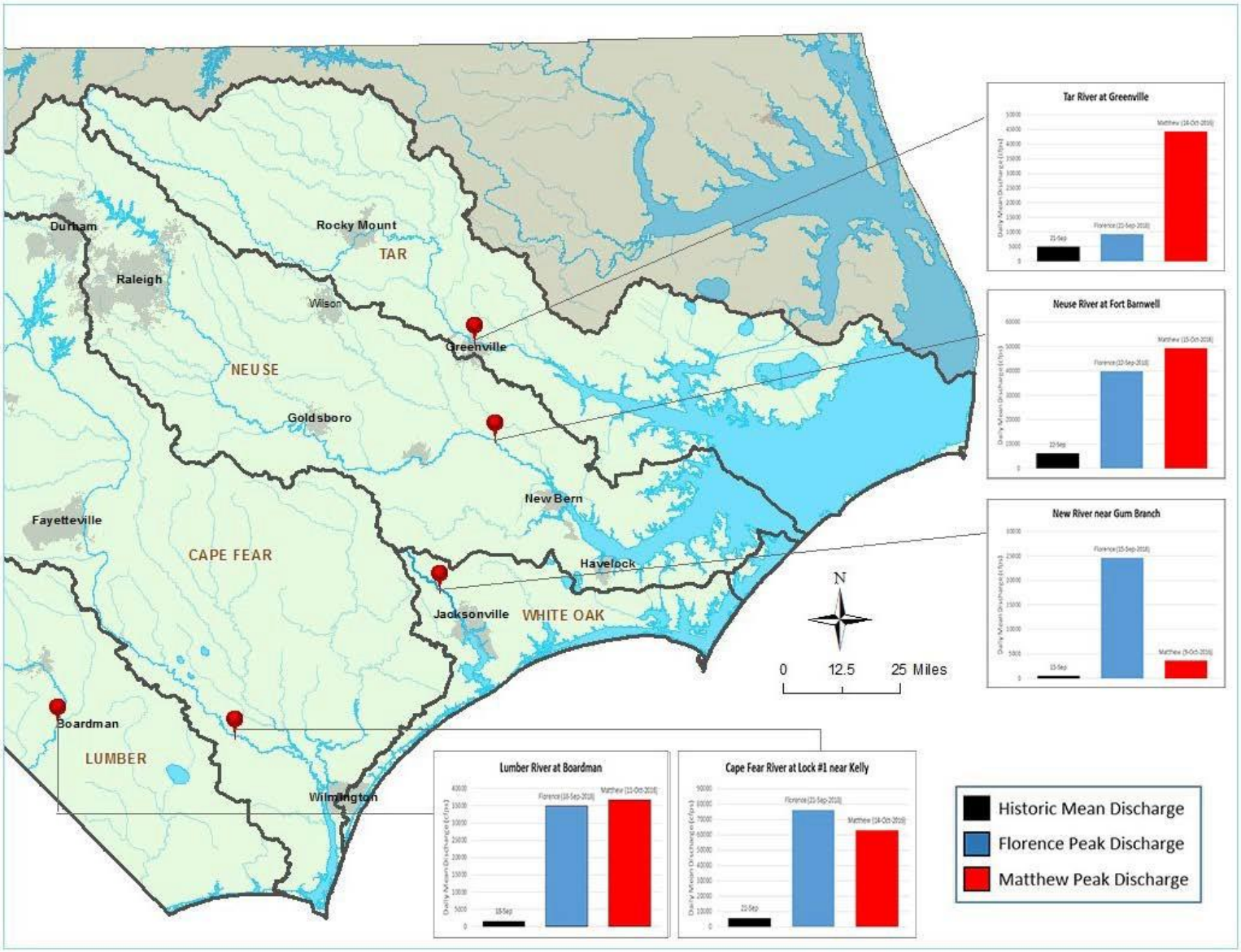
Discharge

Examination of river discharge data allows for accumulated rainfall flowing through a system to be measured. Sites used to investigate the flow associated with Hurricane Florence were chosen with the following criteria: watershed representation, rainfall area, absence of tidal influence, availability of USGS discharge data, and an analysis of Hurricane Matthew data as a reference of a storm of similar magnitude[2]. Discharge volumes for the river basins sampled during the Florence response are provided for comparison to flood conditions (Figure 7) of the flow and volume of water being transported downstream during the course of the flooding event. Analysis of USGS discharge data on the downstream sites of the Lumber, Neuse, and Cape Fear basins were very similar to data from Hurricane Matthew. The New River basin recorded far higher volume compared to Matthew, while the Tar Basin experienced discharge far lower than Hurricane Matthew. The differences in discharge are indicative of the varying levels of precipitation over the impacted area, duration of rainfall, and the amount of groundwater present in an affected area before both storms.

Table 2. *Historic Mean Discharge, Peak Discharge During Hurricane Florence and Peak Discharge During Hurricane Matthew at Five USGS Stream Gage Locations in Eastern Portions of North Carolina River Basins*

				Florence (2018)				**Matthew (2016)**	
River Basin	**USGS station number**	**Station name**	**Drainage area (mi²)**	**Peak discharge daily mean (cfs)**	**Peak Discharge Date**	**Historic Mean Discharge at Peak Date (cfs)**	**Duration of Historic average data**	**Peak Discharge daily mean (cfs)**	**Peak Discharge date**
Tar	2082585	Rocky Mount	925	-	-	-	-	-	-
	2083500	Tarboro	2183	-	-	-	-	-	-
	2084000	Greenville	2660	9210	21-Sep-18	4990	22 years	44300	14-Oct-16
Neuse	2089000	Goldsboro	2399	-	-	-	-	-	-
	2089500	Kinston	2692	-	-	-	-	-	-
	2091814	Fort Barnwell	3900	39800	22-Sep-18	2780	22 years	49300	15-Oct-16
White Oak	2093000	Gum Branch	94	24600	15-Sep-18	550	55 years	3620	9-Oct-16
Cape Fear	2104000	Fayetteville	4395	-	-	-	-	-	-
	2105500	Tarheel	4852	-	-	-	-	-	-
	2105769	Lock #1 near Kelly	5255	76300	21-Sep-18	5630	37 years	63000	14-Oct-16
Lumber	2133500	Hoffman	183	-	-	-	-	-	-
	2133624	Maxton	365	-	-	-	-	-	-
	2134500	Boardman	1228	34900	18-Sep-18	1540	88 years	36600	11-Oct-16

Figure 7. *Historic Mean Discharge, Peak Discharge During Hurricane Florence and Peak Discharge During Hurricane Matthew at Five USGS Stream Gage Locations in Eastern Portions of North Carolina River Basins*



Water Quality Sampling Design and Analysis Methods

Monitoring was conducted in two phases using select DWR Ambient Monitoring System (AMS) locations across the eastern half of North Carolina (Figure 9). Phase 1 sampling provided data to evaluate conditions immediately after unsafe flood conditions began to subside. This was composed of two rounds of sample collections. Round 1 of monitoring was conducted between Sep. 24-Oct. 5, 2018 and Round 2 occurred approximately two weeks afterwards (Oct. 8-Oct. 19, 2018).

Phase 2 monitoring captured water quality conditions as the systems returned to "normal baseline flow" or as waters returned to below flood stage. Phase 2 samples were collected over Round 3 (Oct. 22-Nov. 2, 2018) and Round 4 (Nov. 5- Nov. 26, 2018).

The overall purpose of physical and chemical water quality data collection was to evaluate the effect of flood-related impacts such as spills, untreated waste and large-scale wetland inundation, as well as to gather data on the amount of time needed for conditions to return to baseline levels. Once at a site, field crews recorded physical observations pertaining to the overall assessment of a site such as weather, site conditions, presence and/or type of debris and river stage, help evaluate water quality. Table 4 displays the chemical parameters collected and evaluated at each sampling location. All sampling procedures, safety protocols, and field operations followed the *Hurricane Response Standard Operating Procedure*[6], and the *Intensive Survey Branch Standard Operating Procedure Manual: Physical and Chemical Monitoring*[7]. Hurricane Florence sampling was a collaborative effort between field teams at DWR's Water Science Section in Raleigh and AMS staff from the regional offices in their respective territories.

Post-Florence monitoring data was compared alongside historic median values from the most recently published Integrated Report[1] reflecting the AMS assessment period of 2012 to 2016, and analysis of post- Hurricane Matthew data collected between October 19 and December 1, 2018.

Figure 8. *Almost 2000 incidents were reported to DEQ related to Hurricane Florence.*

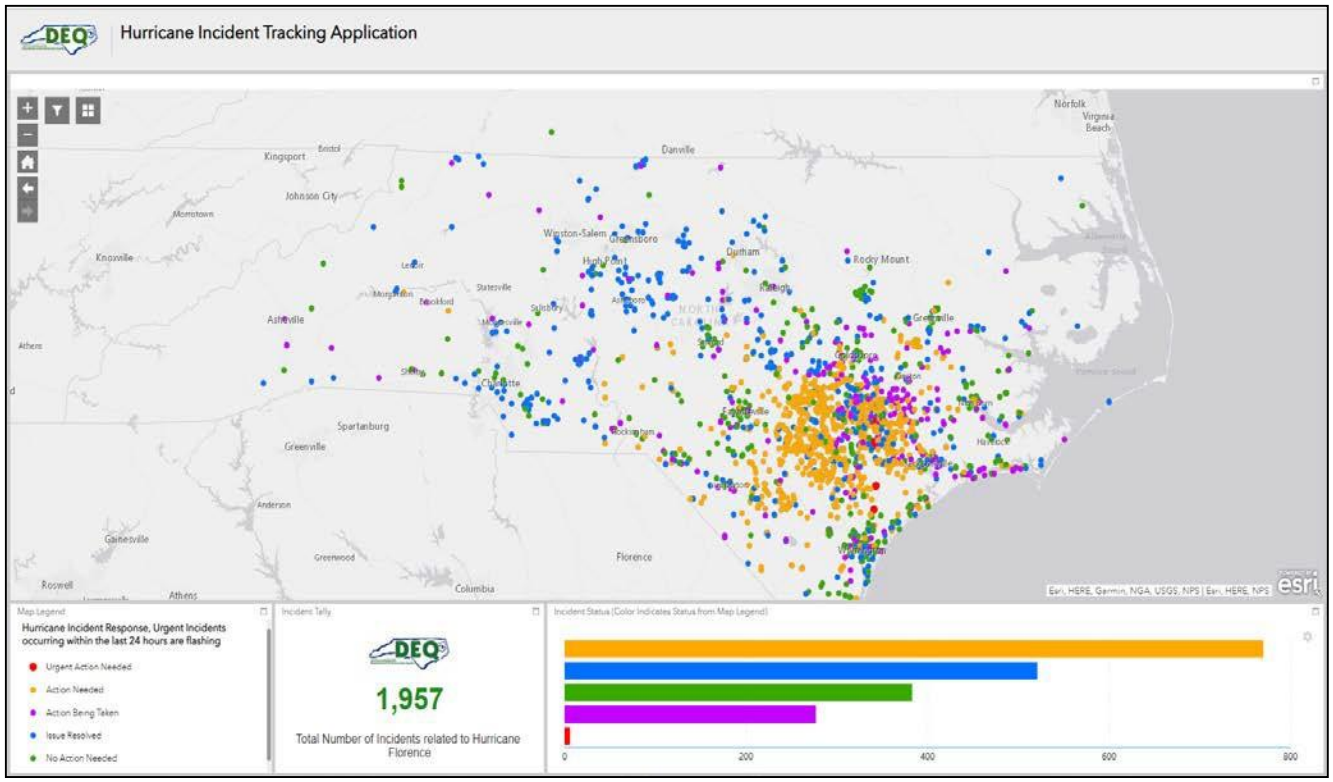


Figure 9. *NC DWR Statewide Sampling Locations for Hurricane Florence Response*

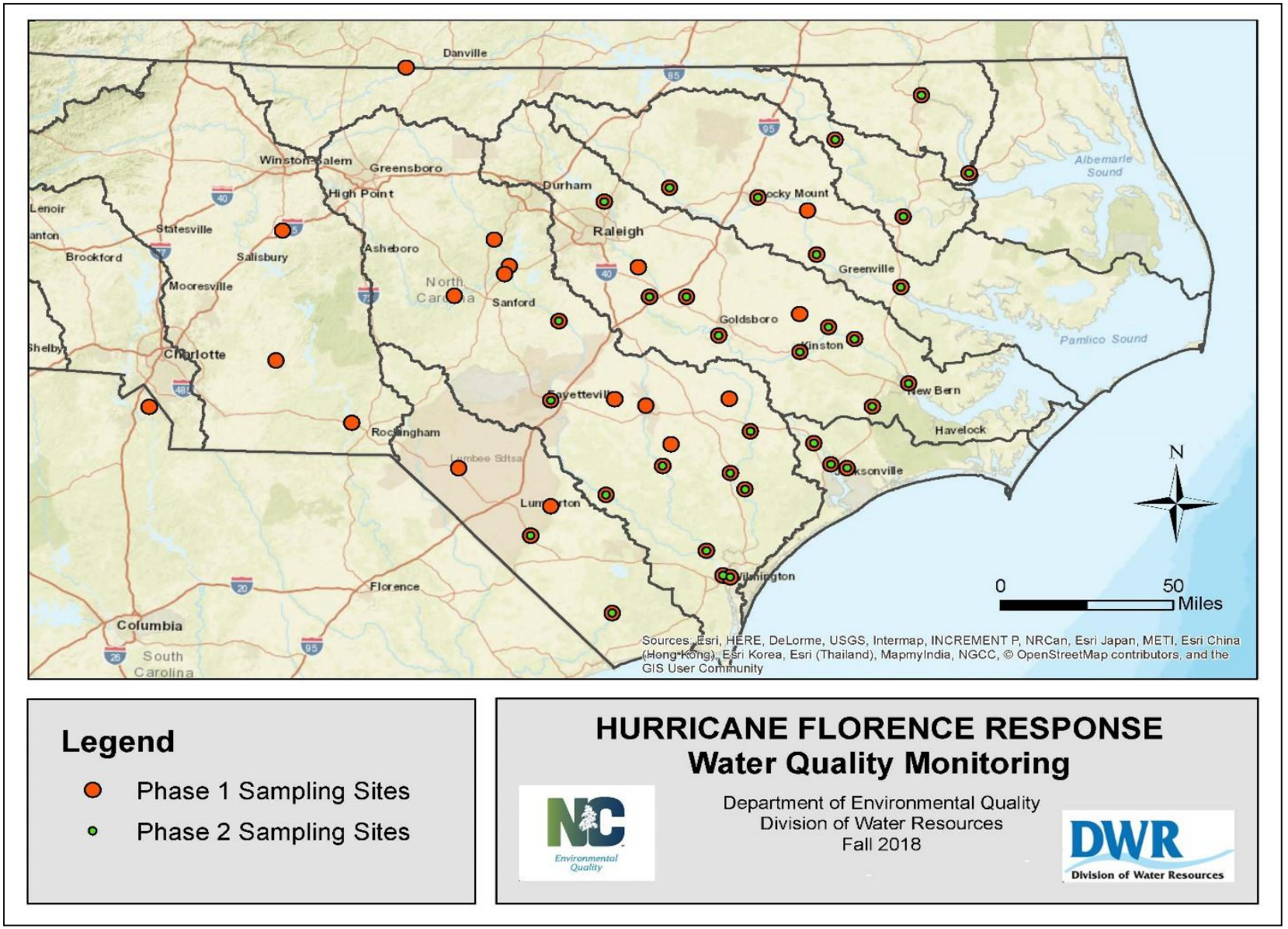


Figure 10. *Subset of Hurricane Florence Response Sampling Sites with Site IDs*

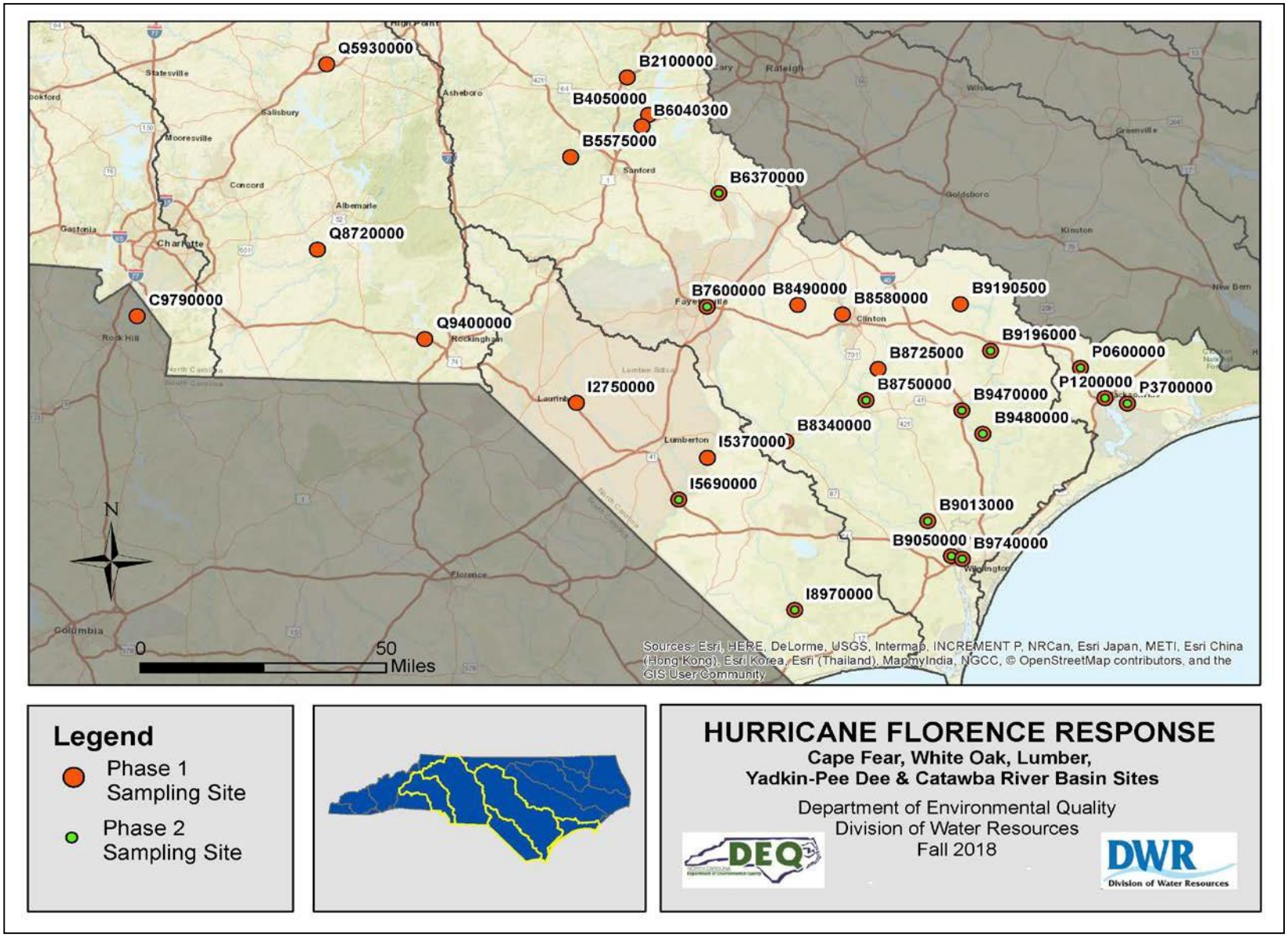


Figure 11. *Subset of Hurricane Florence Response Sampling Sites with Site IDs*

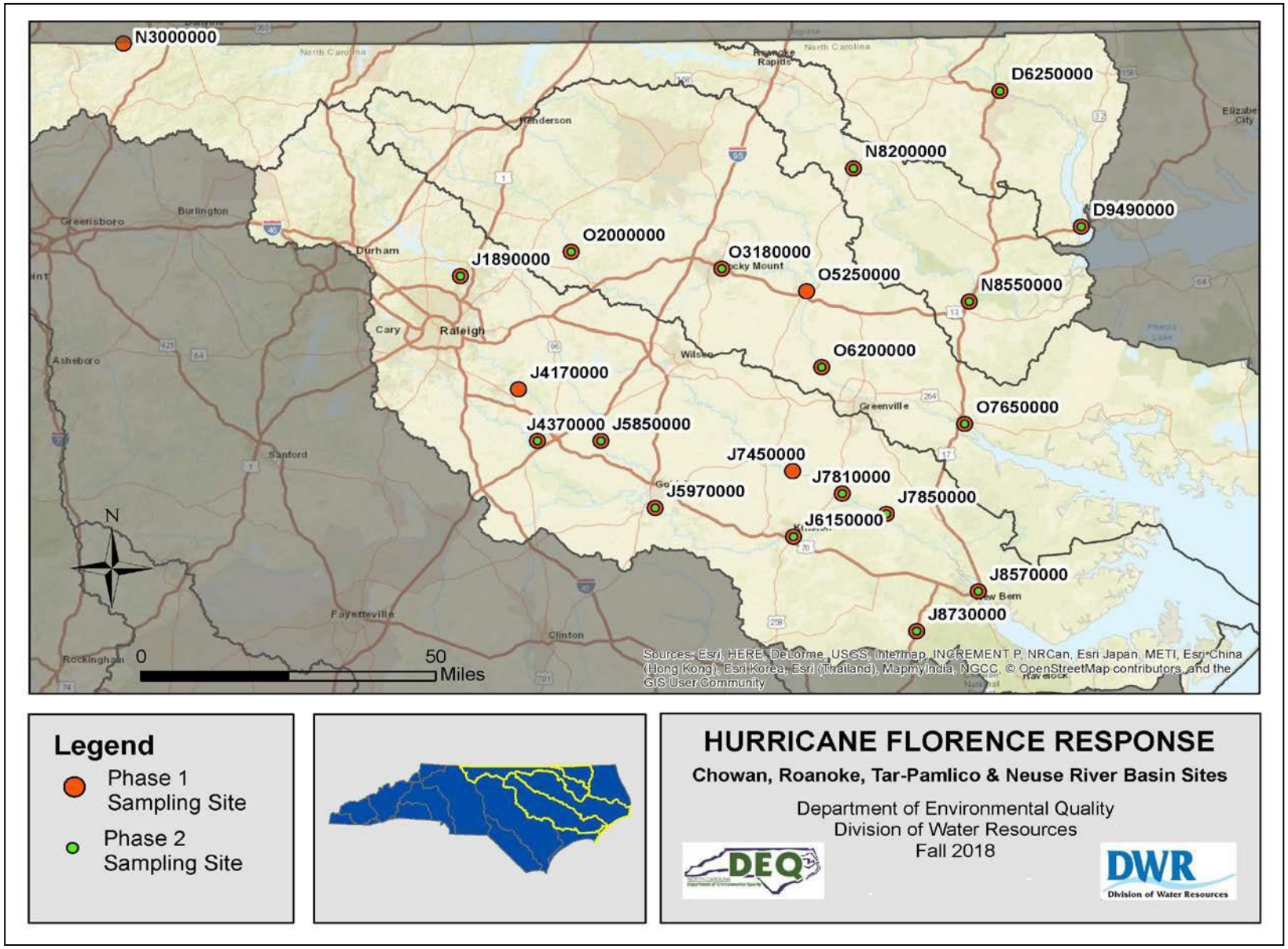


Table 4. *Hurricane Florence Response Monitoring Site Information and Sampled Chemical Parameters per Phase*

Site Information			Analysis								Lat	Long
Basin	AMS Site Number	Location Description	Fecal Coliform, BOD,TSS, Chloride, Turbidity, Nutrients		Semi-Volatiles (svoc), Volatiles (voc), Tph-gas, Tph-diesel		TOC		Metals Total/Diss			
			Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2		
Chowan	D6250000	CHOWAN RIV AT US 13 AT WINTON	X	X							36.4026	-76.9343
	D9490000	CHOWAN RIV AT US 17 AT EDENHOUSE	X	X	X	X	X	X			36.0476	-76.6961
Roanoke	N3000000	DAN RIV AT SR 1761 NR MAYFIELD	X								36.5414	-79.6052
	N8200000	ROANOKE RIV AT US 258 NR SCOTLAND NECK	X	X							36.2093	-77.3839
	N8550000	ROANOKE RIV AT US 13 AND US 17 AT WILLIAMSTON	X	X	X	X	X	X			35.8599	-77.0401
Tar	O2000000	TAR RIV AT SR 1001 NR BUNN	X	X							36.0023	-78.2433
	O3180000	TAR RIV AT NC 97 AT ROCKY MOUNT	X	X							35.9544	-77.7874
	O5250000	TAR RIV AT NC 33 AND US 64 BUS AT TARBORO	X								35.8935	-77.5323
	O6200000	TAR RIV AT NC 222 NR FALKLAND	X	X							35.6962	-77.4895
	O7650000	PAMLICO RIV AT US 17 AT WASHINGTON	X	X	X	X	X	X			35.5432	-77.0615
Neuse	J1890000	NEUSE RIV AT SR 2000 NR FALLS	X	X							35.9408	-78.5801
	J4170000	NEUSE RIV AT NC 42 NR CLAYTON	X								35.6473	-78.4057
	J4370000	NEUSE RIV AT US 70 BUS AT SMITHFIELD	X	X							35.5128	-78.3499
	J5850000	LITTLE RIV AT SR 2320 NR PRINCETON	X	X							35.5125	-78.1588
	J5970000	NEUSE RIV AT SR 1915 NR GOLDSBORO	X	X	X	X	X	X			35.3371	-77.9973
	J6150000	NEUSE RIV AT NC 11 AT KINSTON	X	X	X	X	X	X			35.2588	-77.5835
	J7450000	CONTENTNEA CRK AT NC 123 AT HOOKERTON	X								35.4286	-77.5826
	J7810000	CONTENTNEA CRK NR SR 1800 AT GRIFTON	X	X							35.3685	-77.4341
	J7850000	NEUSE RIV AT SR 1470 NR FORT BARNWELL	X	X							35.3139	-77.303
	J8570000	NEUSE RIV .5 MI UPS UNION POINT AT NEW BERN	X	X	X	X	X	X			35.1097	-77.0317
	J8730000	TRENT RIV AT US 17 AT POLLOCKSVILLE	X	X							35.0099	-77.2189
	Lee1A	Lee Plant Upstream near Goldsboro							X	X	35.3573	-78.1366
	Lee2A	Lee Plant Downstream near Goldsboro							X	X	35.3606	-78.0772

*Physical parameters including specific conductivity, dissolved oxygen and pH were collected during every site visit.

Table 4 continued. *Hurricane Florence Response Monitoring Site Information and Sampled Chemical Parameters per Phase*

Site Information			Analysis								Lat	Long
Basin	AMS Site Number	Location Description	Fecal Coliform, BOD,TSS, Chloride, Turbidity, Nutrients		Semi-Volatiles (svoc), Volatiles (voc), Tph-gas, Tph-diesel		TOC		Metals Total/Diss			
			Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2		
Cape Fear	B2100000	HAW RIV AT SR 1713 NR BYNUM	X								35.7717	-79.145
	B4050000	HAW RIV BELOW JORDAN DAM NR MONCURE	X						X		35.0499	-78.8575
	B5575000	DEEP RIV AT NC 42 AT CARBONTON	X								35.52	-79.3485
	B6040300	DEEP RIV AT SR 1011 OLD US 1 NR MONCURE	X						X		35.6176	-79.0912
	B6370000	CAPE FEAR RIV AT US 401 AT LILLINGTON	X	X							35.4071	-78.8135
	B7600000	CAPE FEAR RIV AT NC 24 AT FAYETTEVILLE	X	X	X	X	X	X			35.0499	-78.8575
	B8340000	CAPE FEAR RIV AT LOCK 2 NR ELIZABETHTOWN	X	X	X	X	X	X			34.6272	-78.5787
	B8490000	LITTLE COHARIE CRK AT SR 1414 MINNIE HALL RD NR SALEMBURG	X								35.0555	-78.531
	B8580000	GREAT COHARIE CRK AT SR 1311 NR CLINTON	X								35.0248	-78.3717
	B8725000	SIX RUNS CRK AT SR 1960 NR TAYLORS BRIDGE	X								34.852	-78.2448
	B8750000	BLACK RIV AT NC 411 NR TOMAHAWK	X	X	X	X	X	X			34.7544	-78.2891
	B9013000	BLACK RIV AT RACCOON ISLAND NR HUGGINS	X	X							34.372	-78.0721
	B9050000	CAPE FEAR RIV AT NAVASSA	X	X	X	X	X	X	X	X	34.2612	-77.9891
	B9190500	GOSHEN SWAMP AT SR 1004 NR WESTBROOK CROSSROAD	X								35.0535	-77.9474
	B9196000	NORTHEAST CAPE FEAR RIV AT SR 1961 AT HALLSVILLE	X	X							34.9059	-77.8409
	B9470000	ROCKFISH CRK AT I 40 AT WALLACE	X	X							34.6459	-77.8725
	B9480000	NORTHEAST CAPE FEAR RIV AT SR 1318 NR WATHA	X	X	X	X	X	X			34.6463	-7.8E+07
	B9740000	NORTHEAST CAPE FEAR RIV AT I-140 AT WILMINGTON	X	X	X	X	X	X			34.2733	-78.0021
	SUTTON_UP	Cape Fear River upstream of Duke Sutton Plant							X	X	34.32	-78.01
	SUTTON_LK_BREACH	SUTTON LAKE AT BREACH DUE TO FLORENCE							X	X	34.29	-77.99
	SUTTON_DOWN	CAPE FEAR R DS OF DUKE SUTTON PLANT							X	X	34.27	-78
Lumber	I2750000	LUMBER RIV AT SR 1303 NR MAXTON	X								34.747	-79.3246
	I5370000	BIG SWAMP AT NC 211 NR RICHARDSON	X								34.5749	-78.8572
	I5690000	LUMBER RIV AT US 74 AT BOARDMAN	X	X	X	X	X	X			34.443	-78.9596
	I8970000	WACCAMAW RIV AT NC 130 AT FREELAND	X	X							34.0952	-78.5478
White Oak	P0600000	NEW RIV AT SR 1314 NR GUM BRANCH	X	X	X	X	X	X			34.849	-77.5196
	P1200000	NEW RIV AT US 17 AT JACKSONVILLE	X	X							34.753	-77.4343
	P3700000	NORTHEAST CRK AT NC 24 AT JACKSONVILLE (Marine Blvd.)	X	X							34.7348	-77.3536
Yadkin Pee-Dee	Q5930000	ABBOTTS CRK AT SR 1243 AT LEXINGTON	X								35.8063	-80.2349
	Q8720000	LONG CRK AT SR 1917 NR ROCKY RIVER SPRINGS	X								35.2239	-80.2586
	Q9400000	PEE DEE RIV AT US 74 NR ROCKINGHAM	X		X		X				34.9457	-79.8691
Catawba	C9790000	SUGAR CRK AT SC 160 NR FORT MILL SC	X		X		X				35.0059	-80.9022

*Physical parameters including specific conductivity, dissolved oxygen and pH were collected during every site visit.

Water Quality Results Overview

Physical and chemical data across 31 counties and nine river basins (Cape Fear, Neuse, Lumber, White Oak, Tar-Pamlico, Chowan, Catawba, Roanoke, and Yadkin Pee-Dee) from a total of 55 sampling sites resulted in over 13,800 unique data points. Water quality sampling was divided into two phases, each consisting of two rounds of site visits. Phase 1 was designed to measure any acute impacts immediately following the storm event. Phase 1 sampling commenced on September 22, eight days after landfall, and was completed on October 19, 2018. Phase 2 was intended to monitor surface water conditions as river stages returned to normal levels and baseline conditions resumed in these river systems. Phase 2 sampling began on October 22, and concluded November 26, 2018. Highlights from each phase are summarized below.

Phase 1 Summary

Immediate post-storm results from Phase 1, Round 1 indicated levels of fecal coliform bacteria, total Kjeldahl nitrogen (TKN) and biological oxygen demand (BOD) that were elevated when compared to the baseline AMS data, while specific conductivity was overall lower than baseline conditions. Total nitrogen and phosphorus concentrations, as well as biological oxygen demand (BOD) levels all demonstrated elevated levels in Phase 1, Round 1 analytical results. Measurements of pH were generally close to baseline medians. Dissolved oxygen levels were at their lowest during this initial round of sampling, with 37% of Phase 1 surface readings falling below their respective standards for surface waters. The flushing of swamps and low-lying wetlands during Florence contributed to significant depletion of dissolved oxygen at monitoring locations. Phase 1, Round 2 results show an overall slight improvement from Round 1 results; however, nitrate + nitrite (NO_X) levels increased over this second round. Most physical parameters in Round 2 were comparable to baseline levels, while the chemical data showed a mixture of levels below and above baseline data; loosely correlated with geographic location of the sampled site.

Phase 2 Summary

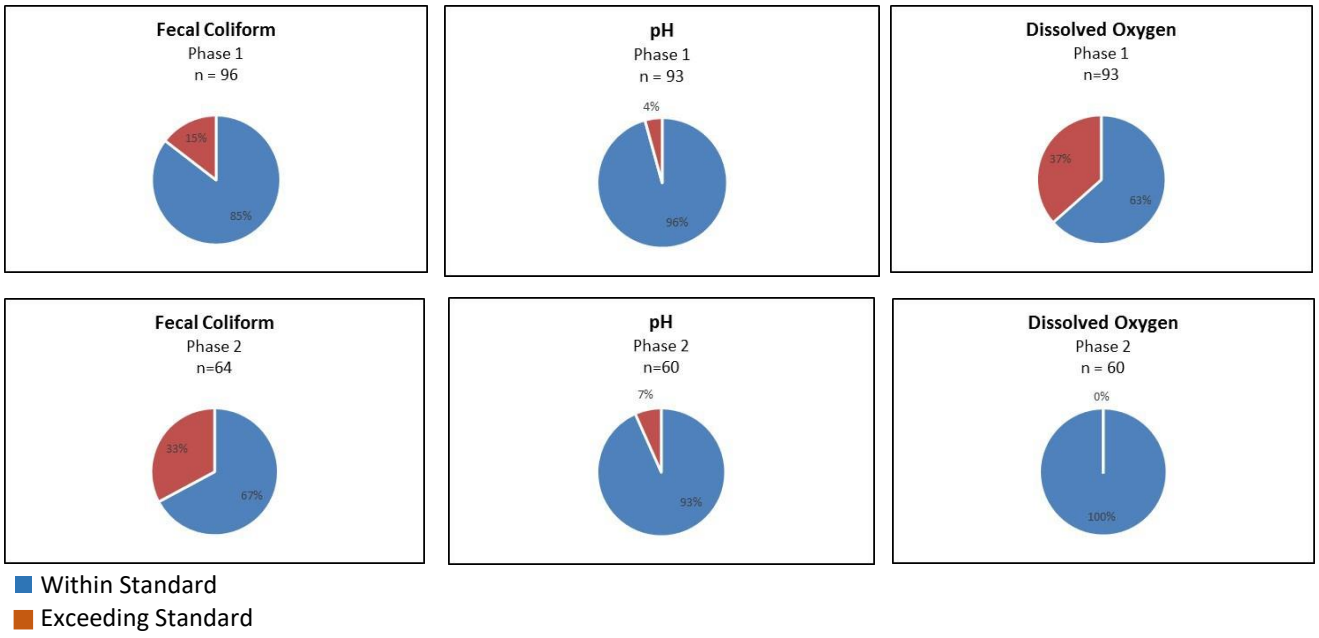
Monitoring results from Phase 2 indicated a return to baseline levels for most parameters, while a subset of analytes, including fecal coliform, exhibited a marked increase, similar to trends observed following Hurricane Matthew. Simple dilution likely minimized concentrations of fecal coliform bacteria at main stem sites during Phase 1, while Phase 2 sampling resulted in over 30% of samples exceeding the instantaneous standard of 400 colonies/100mL. Dissolved oxygen monitoring from Phase 2 resulted in no exceedances of surface water standards indicating a significant improvement of aquatic habitats from earlier post-storm monitoring. While the percentage of pH exceedances appears to have increased significantly during Phase 2 (Figure 12), this is simply the result of a reduced number of samples collected during this phase. Four exceedances of surface water standards for pH were observed during Phase 1, and four occurrences were observed in Phase 2. While total nutrient concentrations were trending downward during Phase 2, levels remained above the 2012-2016 median baseline level at most sampling stations. Suspended residue and turbidity exhibited sharp increases in Round 4 sampling. This observation coincided with significant releases from upstream reservoirs as receding floodwaters finally allowed for the lowering of water levels in Falls and Jordan Lakes.

Comparison to Water Quality Standards

Due to the immense volume of rainfall, precipitation rather than baseflow, became the primary source of surface water that passed through North Carolina's rivers during this study period. Headwater areas, wetlands and swamps in these basins were inundated and then drained off, resulting in a flushing effect that washed organic material downstream. Extreme precipitation from Hurricane Florence resulted in conditions that produced exceedances in a number of water quality standards. Although there are numerous observed exceedances, it must be noted that these are one-time instantaneous readings associated with an atypical storm event. NC Water Quality Standards for Surface Waters provide language allowing that exceedances of some standards are expected during significant rainfall events. During Phase 1, DO concentrations were below the standard value 37% of sampling events, while pH and fecal both exceeded standard value by 4% and 15% respectively. Phase 2 of sampling showed an increased percentage of samples that exceeded the standard for fecal and pH, however DO showed 0% of sampling events above the standard value (Figure 12).

The following tables and graphs show selected monitored sites along river basins of interest. Note that these graphs do not include all sites sampled during Hurricane monitoring. Spreadsheets of all data analyzed for this response can be viewed in Appendix 1 at the end of this document.

Figure 12. *Number and Percentage of Sampling Events Above Standard During Phase 1 and Phase 2 of Hurricane Florence Monitoring*



Nutrients

Elevated nutrient concentrations following Hurricane Florence were observed at the majority of monitoring sites, with total phosphorus, ammonia and total Kjeldahl nitrogen (TKN) levels showing sharp increases during the immediate aftermath of the storm. Nitrate + nitrite (NO_x) remained well below the AMS 5-year median in Round 1, but then demonstrated an inverse trend to other nutrient constituents by returning higher values in later rounds of sampling. Interestingly, results from the early rounds of sampling following Hurricane Matthew indicated early increases of TKN concentrations, often far exceeding the historic median. Figures 13 through 17 illustrate these trends.

Figure 13. *Nitrate + Nitrite Results*

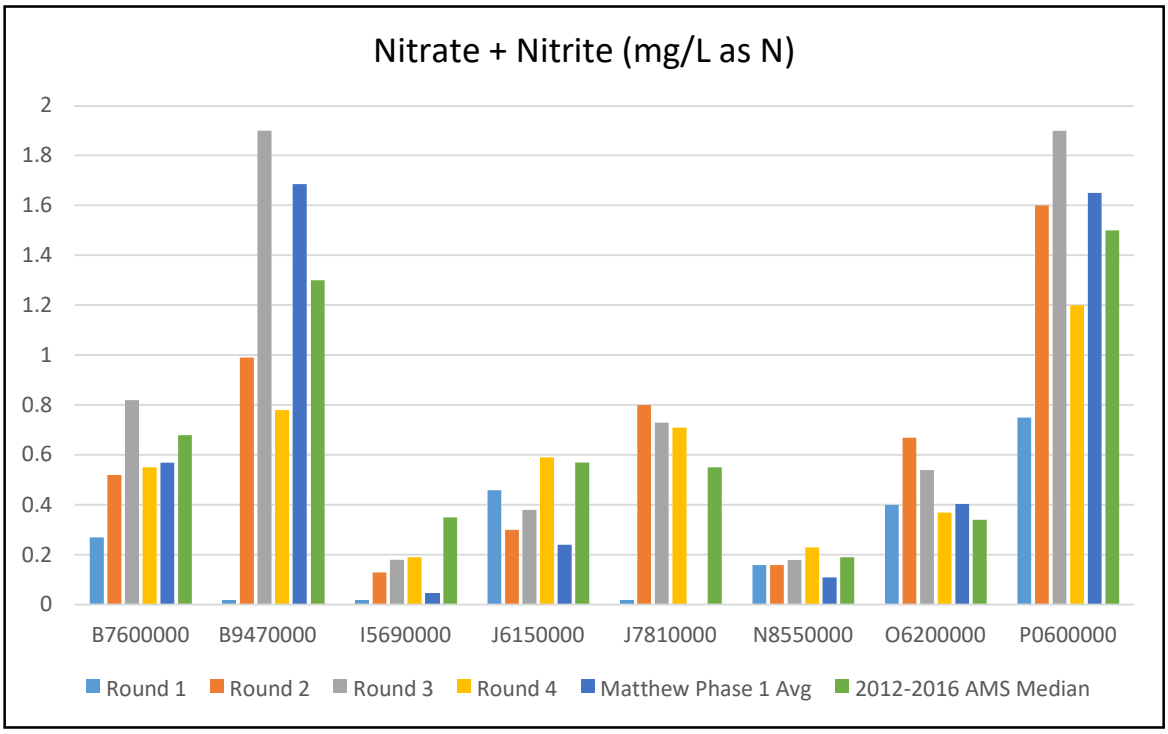


Figure 14. *Total Kjeldahl Nitrogen Results*

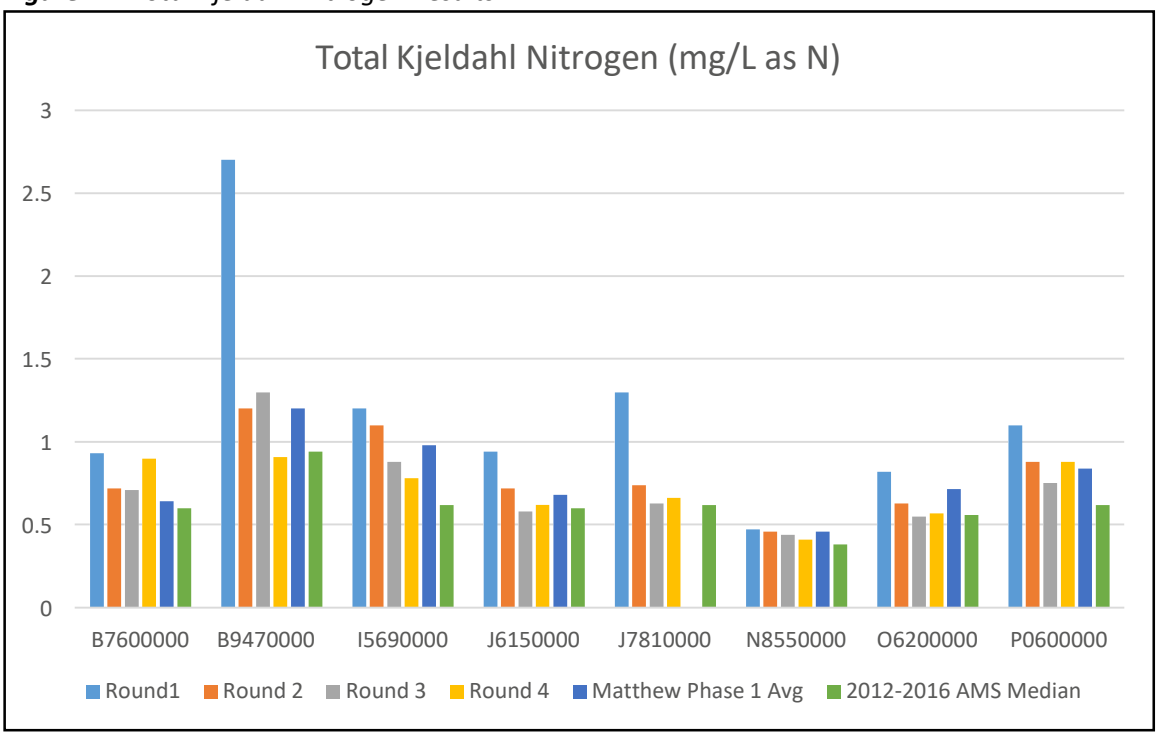


Figure 15. *Ammonia results*

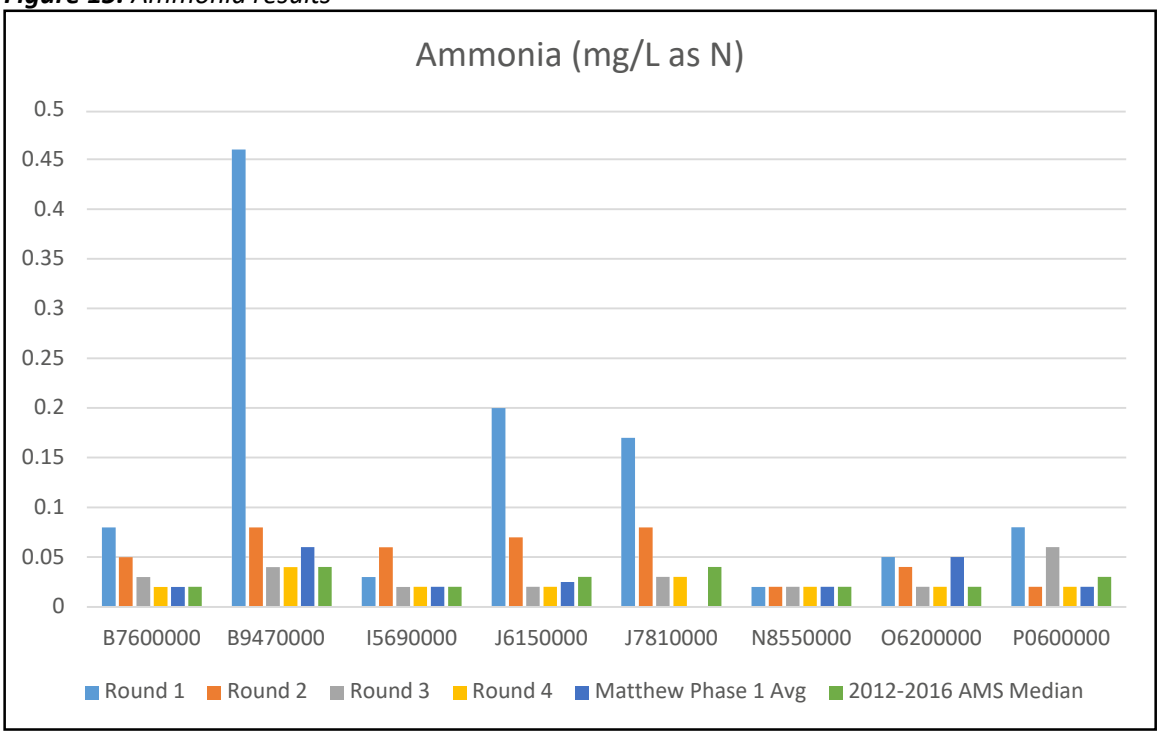


Figure 16. *Total Nitrogen Results*

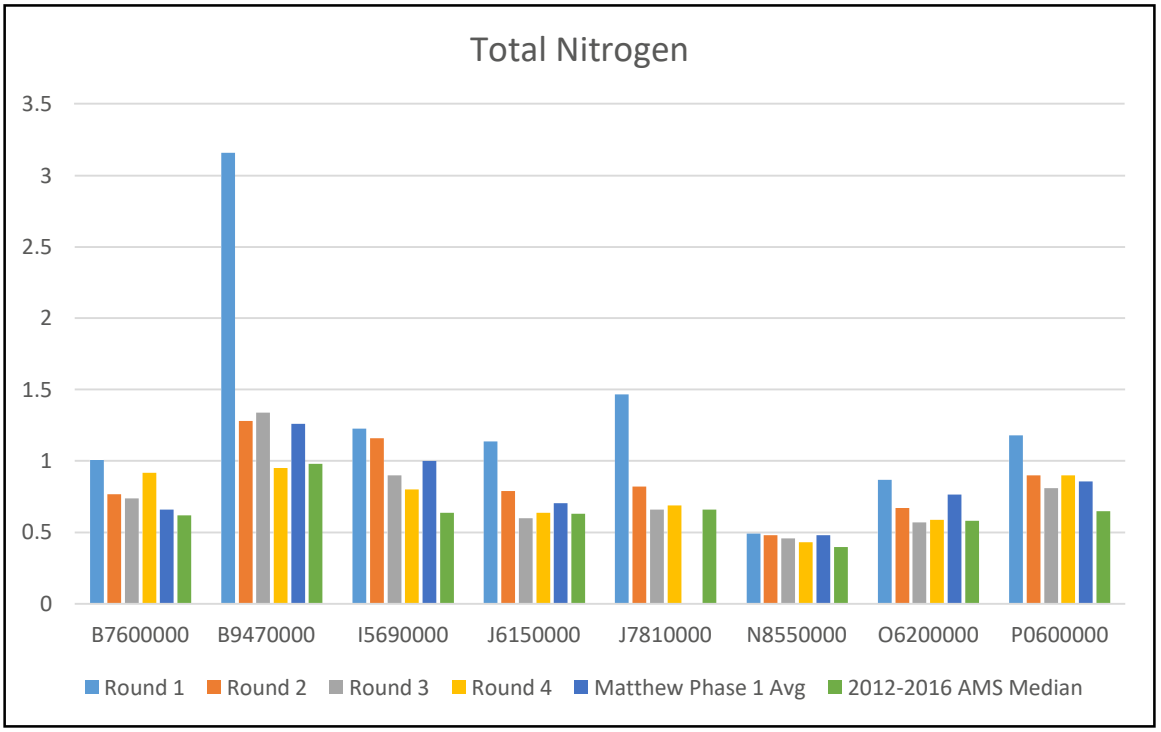


Figure 17. *Total Phosphorus Results*

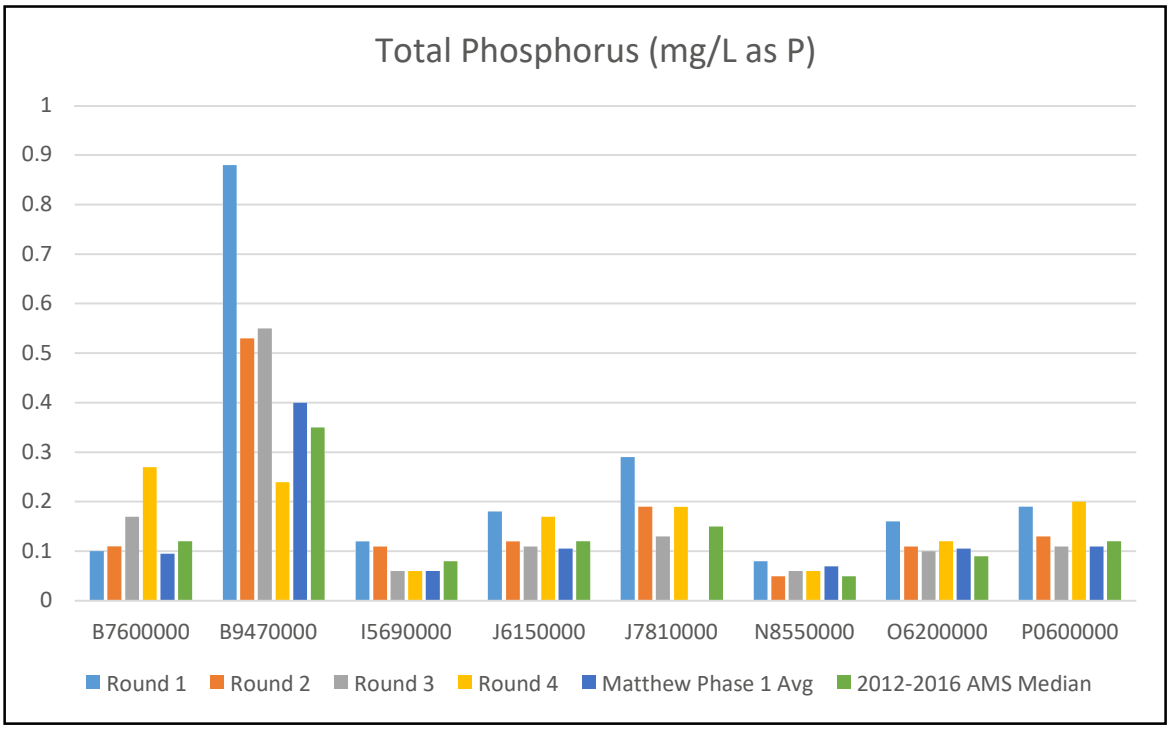
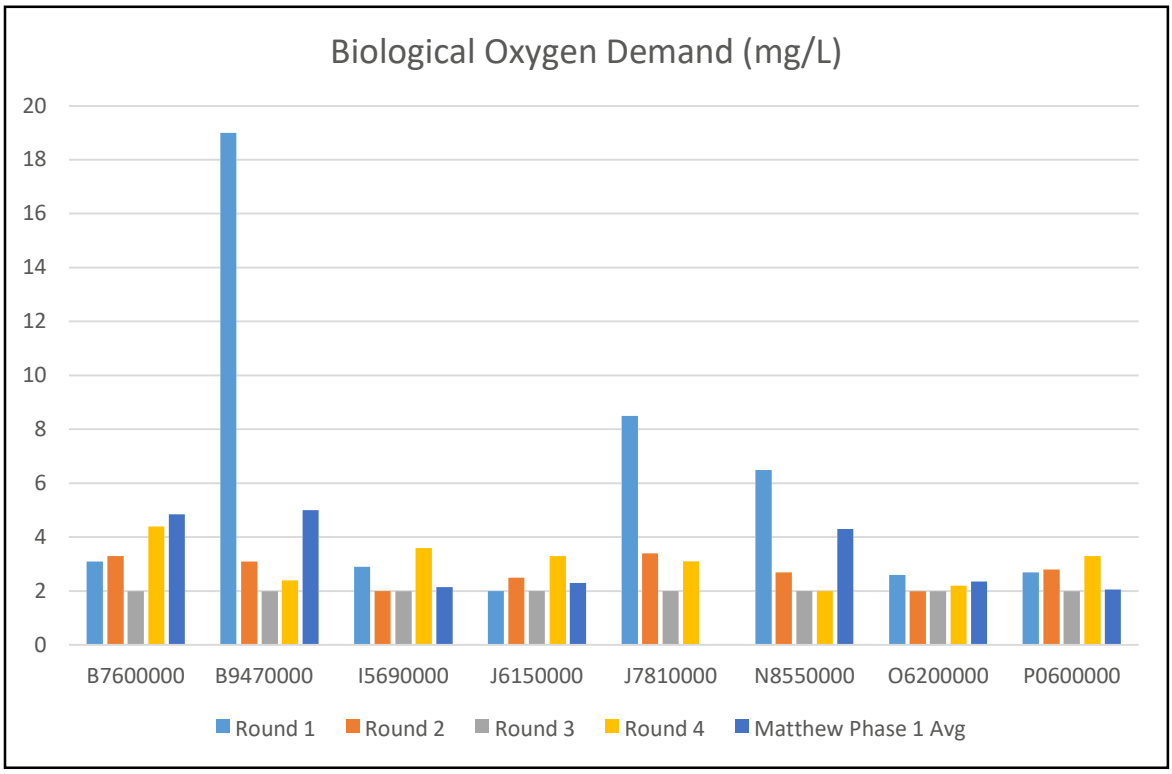


Figure 18. *Biological Oxygen Demand Results*

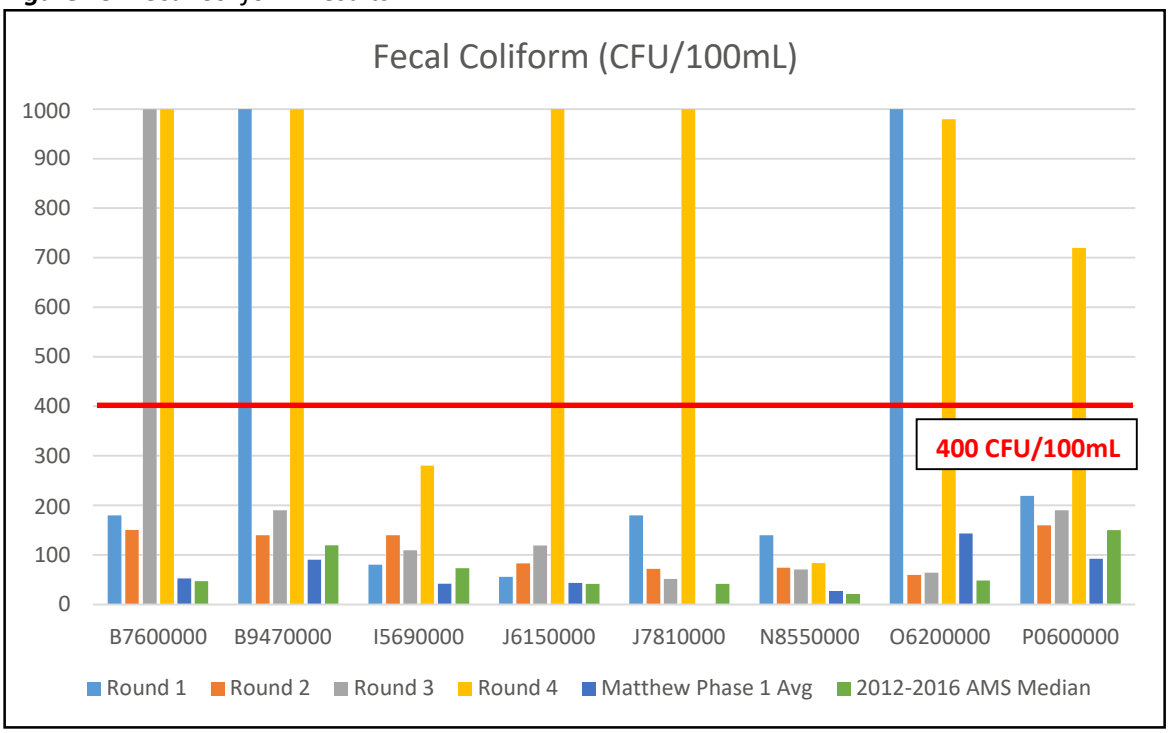


Bacteria

Fecal coliform concentrations in Phase 1 of Florence sampling were below state surface water standards at most sites sampled due to dilution caused by severe flooding. One exception is site B9470000 which was selected for its proximity to a number of concentrated animal feeding operations and is presented to illustrate potential worst-case conditions. Other sites that had fecal coliform exceedances in this phase are possibly due to outside influences such as flood control and reduced outfall releases from major reservoirs, resulting in a higher contribution of waste from municipal treatment and storm water facilities. Most sites showed a decrease in fecal coliform levels from Round 1 to 2, which were collected two weeks apart.

During Phase 2 (Oct. 22-Nov. 16) there was an increasing trend in fecal coliform values. Especially noted in Round 4 was a large increase of fecal coliform among most sites analyzed, with several sites showing levels well above the state surface water standard instantaneous value of 400 colonies/100 mL. Increased concentrations of fecal coliform bacteria are not abnormal during increased runoff and flooding events such as hurricanes.

Figure 19. *Fecal Coliform Results*



Solids

Analysis of suspended solids in Hurricane Florence samples showed similar results to that of Hurricane Matthew. Solids results were close to historical median values, which is most likely due to the heavy influx of water to the affected river systems. A high increase in the concentration of suspended solids was observed at site B760000 (Cape Fear River), in Round 4 of sampling. This increase coincides with the release of water from Jordan Lake, as flood management began in the weeks after the storm. Turbidity values over all rounds of sampling for most other sites depict the expected flushing effects as flood waters receded and are only slightly elevated from baseline historic levels.

Figure 20. *Suspended Residue (Total Suspended Solids) Results*

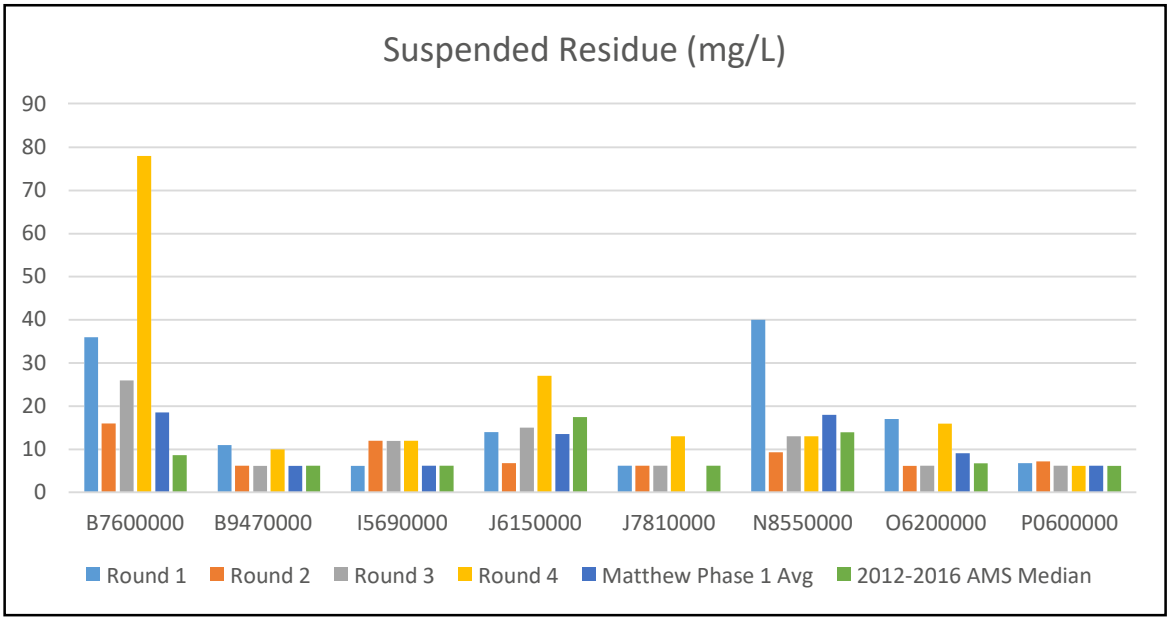
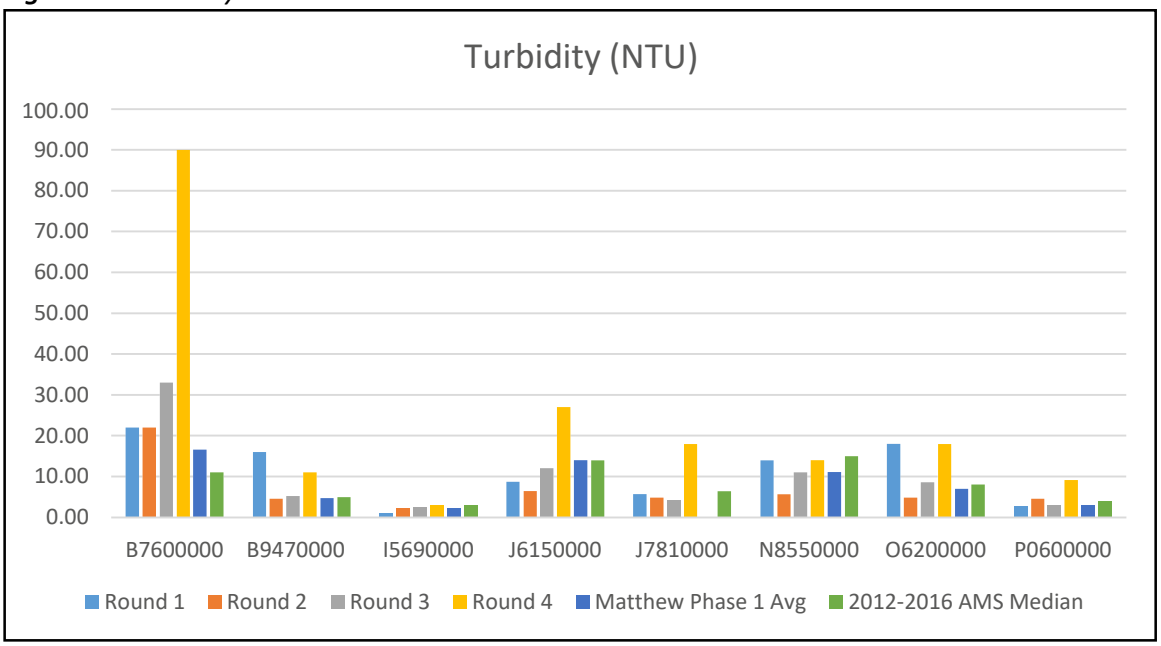


Figure 21. *Turbidity Results*



Physical conditions

Swamps and wetlands flushed into main waterways during Hurricane Florence causing an overall slight decrease in pH when compared to the historic median values, particularly in the more downstream sites to the east. Very few exceedances of surface water standards for pH were observed following this event, closely resembling conditions observed following Hurricane Matthew. Differences in pH standards illustrated in Figure 22 are representative of standards established for streams classified as Swamp (Sw) which allow for a lower threshold of pH 4.3, where all other Class C freshwaters are held to the higher pH 6 threshold.

Conductivity values observed during early post-storm monitoring efforts reflected surface water dilution of s. Conductivity measurements were typically lower than normal values when compared with historic medians; however, as flood waters receded, and the relative concentration of dissolved materials increased, a corresponding increase in conductivity readings was noted. Conductivity measurements following Hurricane Florence were comparable to those following Hurricane Matthew and followed a similar trend as river levels decreased.

Several locations exhibited decreased dissolved oxygen (DO) concentrations during the earliest rounds of sampling but demonstrated full recovery from hypoxic conditions throughout Phase 2 efforts (Figure 24). Low dissolved oxygen is characteristic of a major flooding event where waters containing low DO are pushed out of swamps and wetlands, and depress main channel DO concentrations. Likewise, high organic inputs that are typically observed following flood events, can also reduce DO availability in surface waters as a result of biological processes where oxygen-consuming bacteria decompose organic materials. NC Water Quality Standards for Surface Waters provide a narrative standard for DO of a daily average of 5.0 mg/L with a minimum instantaneous value of not less than 4.0 mg/L. Figure 24 illustrates recorded DO concentrations in comparison to the instantaneous value.

Figure 22. *pH Results*

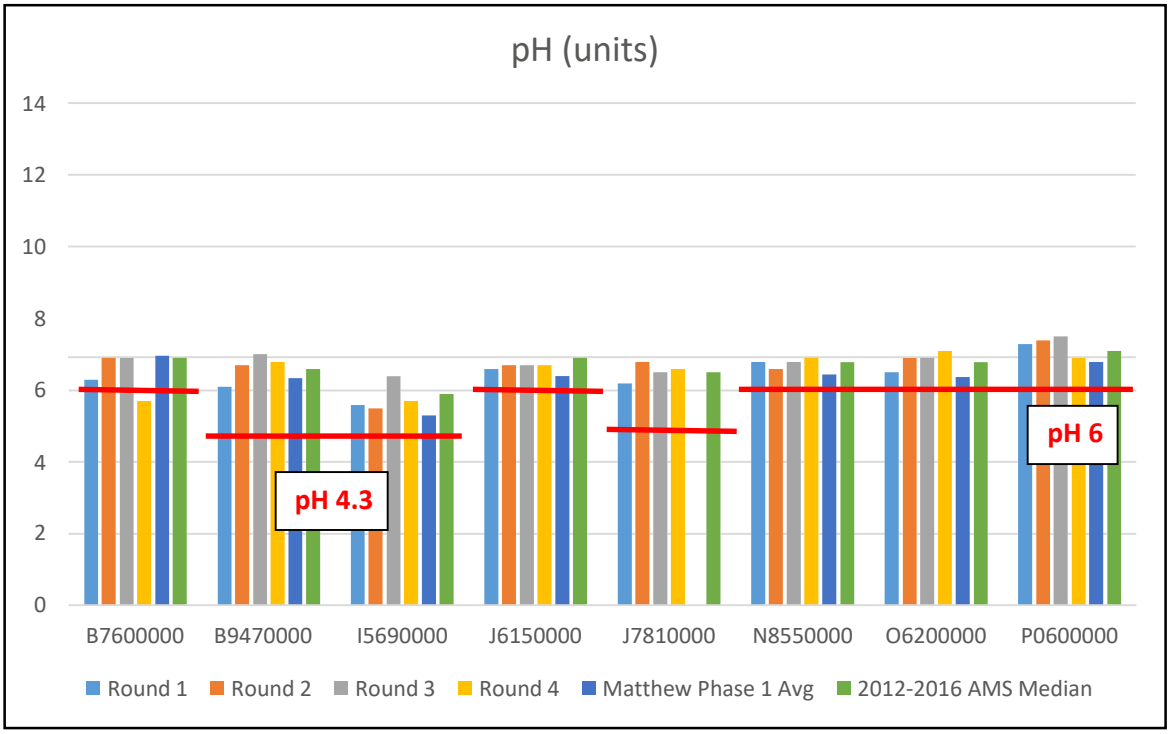


Figure 23. *Conductivity Results*

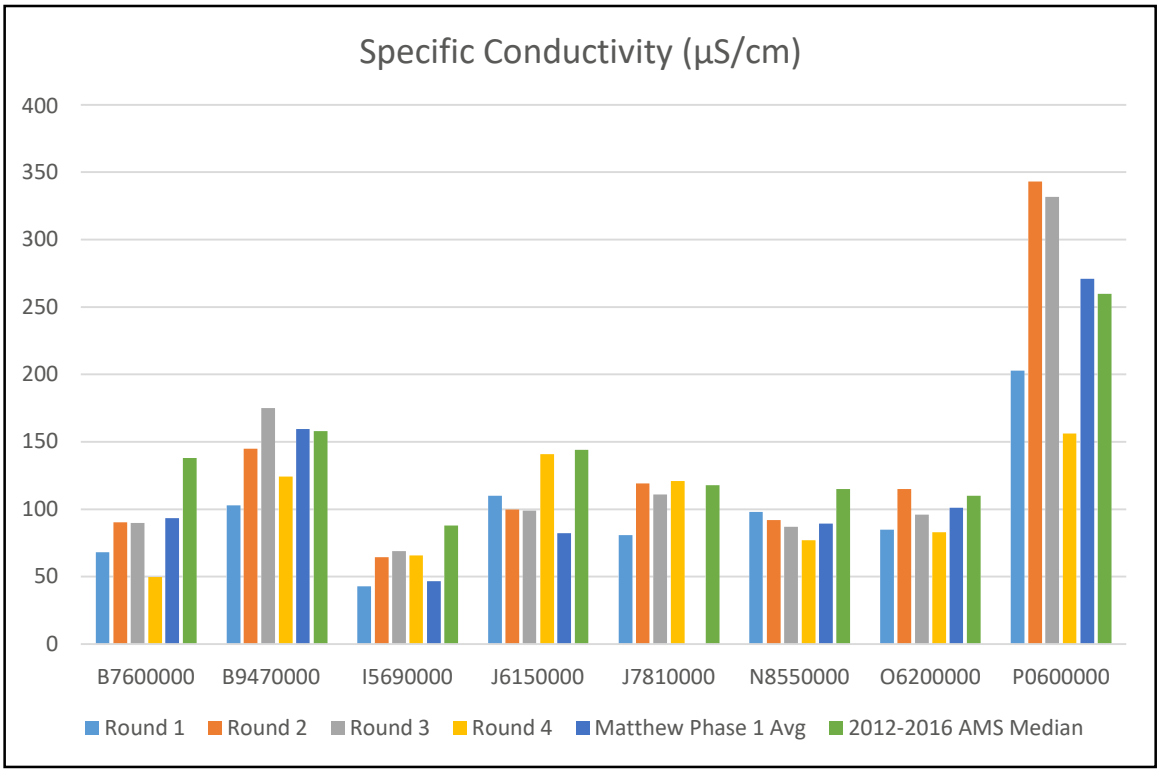
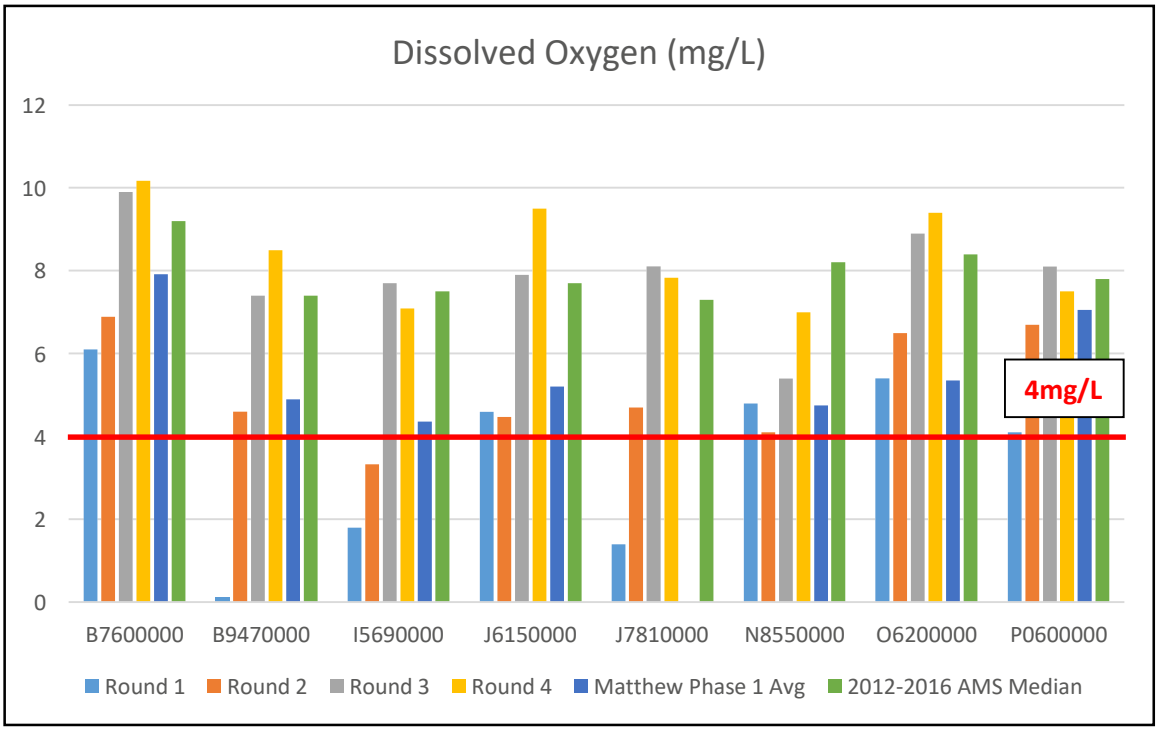


Figure 24. *Dissolved Oxygen Results*



Volatile and Semi-Volatile Organics, Total Petroleum Hydrocarbons

A subset of sampling locations was selected for screening for the presence of volatile and semi-volatile organic compounds (VOC/SVOC), and total petroleum hydrocarbons (TPH) for both gas and diesel constituents. Sites were selected based on either location in their respective watersheds, or in response to reported upstream incidents. While some low-level concentrations of VOC and SVOC were detected at two sites, there is little historic information for comparison regarding the presence and concentration of these compounds in the surface waters of North Carolina. Site B9740000 returned positive results for three different VOC and one SVOC, while site C9790000 returned a single positive result for VOC. These two sampling sites are both major drainages for heavily industrialized areas in Wilmington and Charlotte, respectively. Table 5 details the locations and concentrations of positive returns. A detailed list of compounds included in this analysis can be found in Appendix 2.

Table 5. *VOC/SVOC and TPH-Gas/Diesel Results*

Site ID	Location Description	Phase		Volatile Organics	Semi-volatile Organics	TPH-Gas	TPH-Diesel
		1	2				
B7600000	CAPE FEAR RIV AT NC 24 AT FAYETTEVILLE	X	X	ND	ND	ND	ND
B8340000	CAPE FEAR RIV AT LOCK 2 NR ELIZABETHTOWN	X	X	ND	ND	ND	ND
B8750000	BLACK RIV AT NC 411 NR TOMAHAWK	X	X	ND	ND	ND	ND
B9050000	CAPE FEAR RIV AT NAVASSA	X	X	ND	ND	ND	ND
B9480000	NORTHEAST CAPE FEAR RIV AT SR 1318 NR WATHA	X	X	ND	ND	ND	ND
B9740000	NORTHEAST CAPE FEAR RIV AT I-140 AT WILMINGTON	X	X	Ethylbenzene (2.2 µg/L) Toluene (14 µg/L) p-Isopropyltoluene (2.1 µg/L)	Methylphenol, 4- (92 µg/L)	ND	ND
C9790000	SUGAR CRK AT SC 160 NR FORT MILL SC	X		Chloroform (2.2 µg/L)	ND	ND	ND
D9490000	CHOWAN RIV AT US 17 AT EDENHOUSE	X	X	ND	ND	ND	ND
I5690000	LUMBER RIV AT US 74 AT BOARDMAN	X	X	ND	ND	ND	ND
J5970000	NEUSE RIV AT SR 1915 NR GOLDSBORO	X	X	ND	ND	ND	ND
J6150000	NEUSE RIV AT NC 11 AT KINSTON	X	X	ND	ND	ND	ND
J8570000	NEUSE RIV .5 MI UPS UNION POINT AT NEW BERN	X	X	ND	ND	ND	ND
N8550000	ROANOKE RIV AT US 13 AND US 17 AT WILLIAMSTON	X	X	ND	ND	ND	ND
O7650000	PAMLICO RIV AT US 17 AT WASHINGTON	X	X	ND	ND	ND	ND
P0600000	NEW RIV AT SR 1314 NR GUM BRANCH	X	X	ND	ND	ND	ND
Q9400000	PEE DEE RIV AT US 74 NR ROCKINGHAM	X	X	ND	ND	ND	ND

Metals

Reports of flooding in and around coal ash storage ponds prompted surface water monitoring for total and dissolved metals at Duke Energy's H.F. Lee Plant in Goldsboro and Sutton Steam Plant in Wilmington. Sampling began at coal ash facilities on September 22, 2018. Visual inspections showed no loss of coal ash or over-lying soils in or near ash storage basins seen at the Dan River Plant in Eden and the Cape Fear Plant in Moncure.

Sutton Steam Plant

Provided below are metals concentrations measured at the Sutton Lake breach site and surface waters upstream and downstream during DWR's post-hurricane monitoring from September 22 through November 26, 2018. Several metals were below laboratory detection levels in all samples collected during this timeframe, including total and dissolved antimony, beryllium, boron, cadmium, chromium, cobalt, lead, molybdenum, nickel, silver, thallium, and vanadium. Figure 25 provides a map of the study area and the total and dissolved metals results from the first round of sampling. Subsequent sampling results can be found in Appendix 3.

Total arsenic was detected in 15 out of 48 samples at the Sutton Lake breach, with a maximum concentration of 7.1 µg/L. Dissolved arsenic was detected in 26 out of 96 samples, with a maximum of 6.1 µg/L. None of the detected arsenic values were over the NC Water Quality Standard for Surface Waters of 10 µg/L total arsenic for the protection of human health (thresholds for dissolved arsenic are higher).

Total selenium was detected in 1 out of 48 samples at the Sutton lake breach at a concentration of 1.2 µg/L. Dissolved selenium was detected in 2 out of 96 samples, also at a concentration of 1.2 µg/L. None of the detected selenium values were over the NC Water Quality Standard for Surface Waters of 5 µg/L total selenium.

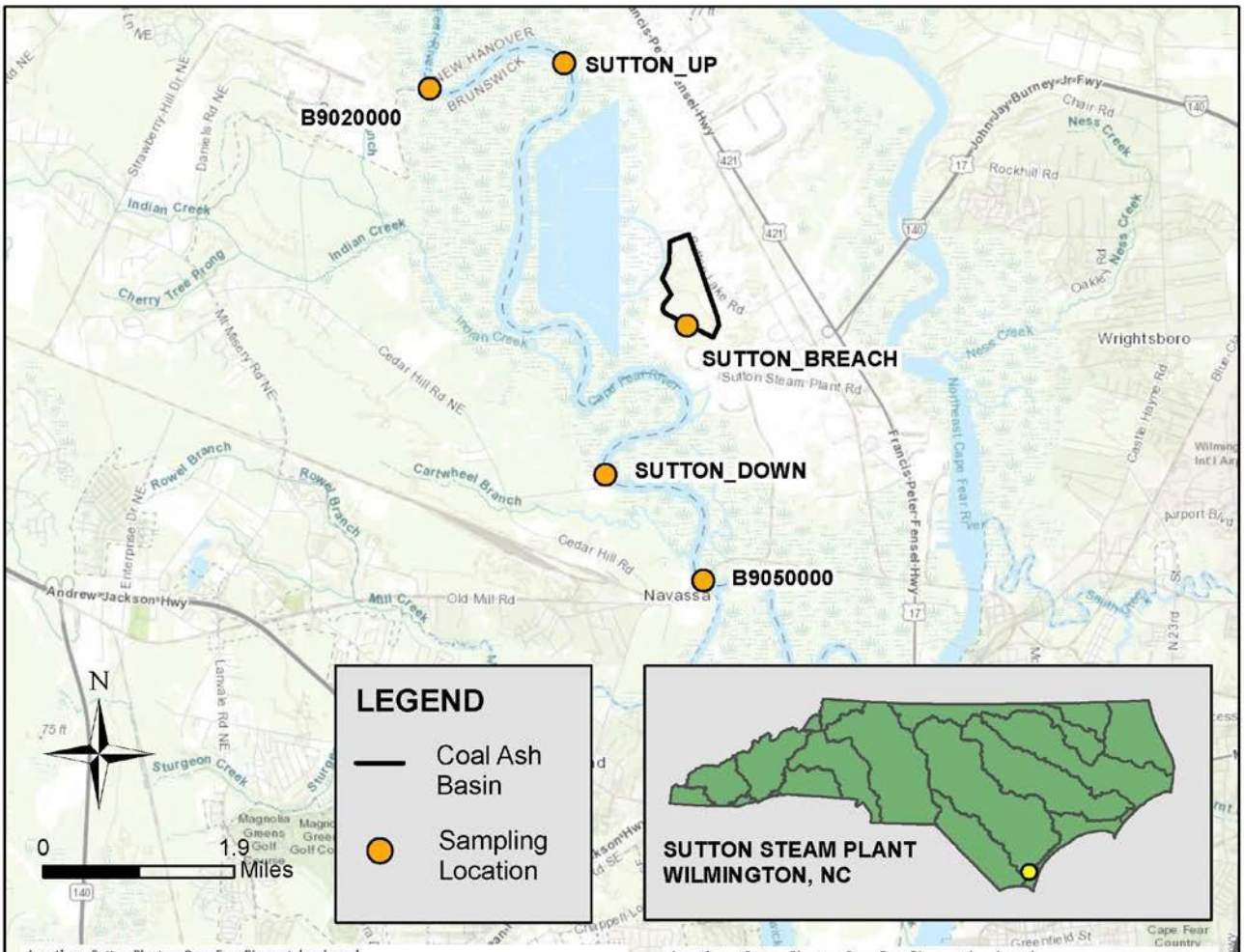
Arsenic and selenium were not detected at the monitoring stations upstream and downstream of Sutton.

None of the detected zinc values were over NC WQS for zinc, which are based on the concentration of the dissolved fraction of the metal. Total zinc was detected once at the Sutton Lake breach site at a concentration of 15 µg/L on September 30, 2018. Calculated hardness-based dissolved zinc standards at the breach site were 22 µg/L (acute) and 29 µg/L (chronic) on that date, and dissolved zinc was not detected above the analytical reporting level of 10 µg/L. Both total and dissolved zinc were detected once at B9050000, at 12 and 13 µg/L, respectively, on September 26, 2018. Applicable WQS at B9050000 (stream classification SC) were 81 µg/L (chronic) and 90 µg/L (acute) dissolved zinc. Zinc was not detected in any other samples during the monitoring period.

Copper was the only metal measured at concentrations greater than the NC Water Quality Standards for Surface Waters. This occurred at the upstream site (max total = 2.8 µg/L, max dissolved = 2.9 µg/L), breach site (max total = 6.7 µg/L, max dissolved = 6.4 µg/L), and downstream site (max total = 3.2 µg/L, max dissolved = 2.7 µg/L) monitoring locations. The NC Water Quality Standard for Surface Waters for dissolved copper varies depending on surface water hardness (see Appendix 3 for WQS calculated for each date of sampling).

Commonly-occurring metals at all stations included aluminum, barium, iron, manganese, and strontium, none of which have an applicable NC Water Quality Standards for Surface Waters in the waters around the plant.

Figure 25. *Sutton Steam Plant Sampling Locations and Initial Metals Results*



Location: Sutton Plant on Cape Fear River, at dam breach
Date: 9/22/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	WQS	SUTTON_ BREACH
Total	Hardness (calculated)	mg/L	100	11
Total	Silver (Ag)	µg/L	NA	1.0 U
Total	Aluminum (Al)	µg/L	NA	1100
Total	Arsenic (As)	µg/L	10	2.0 U
Total	Boron (B)	µg/L	NA	50 U
Total	Beryllium (Be)	µg/L	NA	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U
Total	Copper (Cu)	µg/L	NA	3.2
Total	Iron (Fe)	µg/L	NA	1500
Total	Potassium (K)	mg/L	NA	3.4
Total	Manganese (Mn)	µg/L	NA	100
Total	Sodium (Na)	mg/L	NA	2.1
Total	Nickel (Ni)	µg/L	25	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U
Total	Strontium (Sr)	µg/L	NA	18
Total	Zinc (Zn)	µg/L	NA	10 U

Notes:
- Water Quality Standards (WQS) are provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.
- Results below DWR laboratory detection limits (non-detects) are shown with the practical quantitation limit (PQL) and a U qualifier.

Location: Sutton Plant on Cape Fear River, at dam breach
Date: 9/22/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Acute WQS	Chronic WQS	Rep-1	Rep-2
Dissolved	Silver (Ag)	µg/L	0.07	0.06	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	480	580
Dissolved	Arsenic (As)	µg/L	340	150	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	50 U	50 U
Dissolved	Beryllium (Be)	µg/L	65	6.5	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.40	0.08	0.50 U	0.50 U
Dissolved	Chromium (Cr)	µg/L	16	11	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	1.7	1.4	2.5	2.6
Dissolved	Iron (Fe)	µg/L	NA	NA	740	750
Dissolved	Potassium (K)	mg/L	NA	NA	3.3	3.8
Dissolved	Manganese (Mn)	µg/L	NA	NA	95	82
Dissolved	Sodium (Na)	mg/L	NA	NA	2.1	2.1
Dissolved	Nickel (Ni)	µg/L	NA	NA	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	5.5	0.2	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	15	16
Dissolved	Zinc (Zn)	µg/L	18	18	10 U	10 U

Notes:
- Water Quality Standards (WQS) are provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.
- Results below DWR laboratory detection limits (non-detects) are shown with the practical quantitation limit (PQL) and a U qualifier.
- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI. Future monitoring events will include analysis of both dissolved total Cr and Cr VI.

H.F. Lee Plant

Provided below are metals concentrations measured at the Lee site and surface waters upstream and downstream from it during DWR's intensive monitoring from September 23 through November 2, 2018. Several metals were below laboratory detection levels in all samples collected during this timeframe, including total and dissolved antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, molybdenum, nickel, selenium, silver, thallium, and vanadium. Figure 26 provides a map of the study area and the total and dissolved metals results from the first round of sampling. Subsequent sampling results can be found in Appendix 4.

Total copper was detected in most samples at LEE1A, LEE_MID, and LEE2A, with a maximum result of 2.6 µg/L at Lee2A (downstream site). Dissolved copper was detected once at LEE_MID and LEE2A at 2.0 and 2.1 µg/L. respectively, on September 23, 2018.

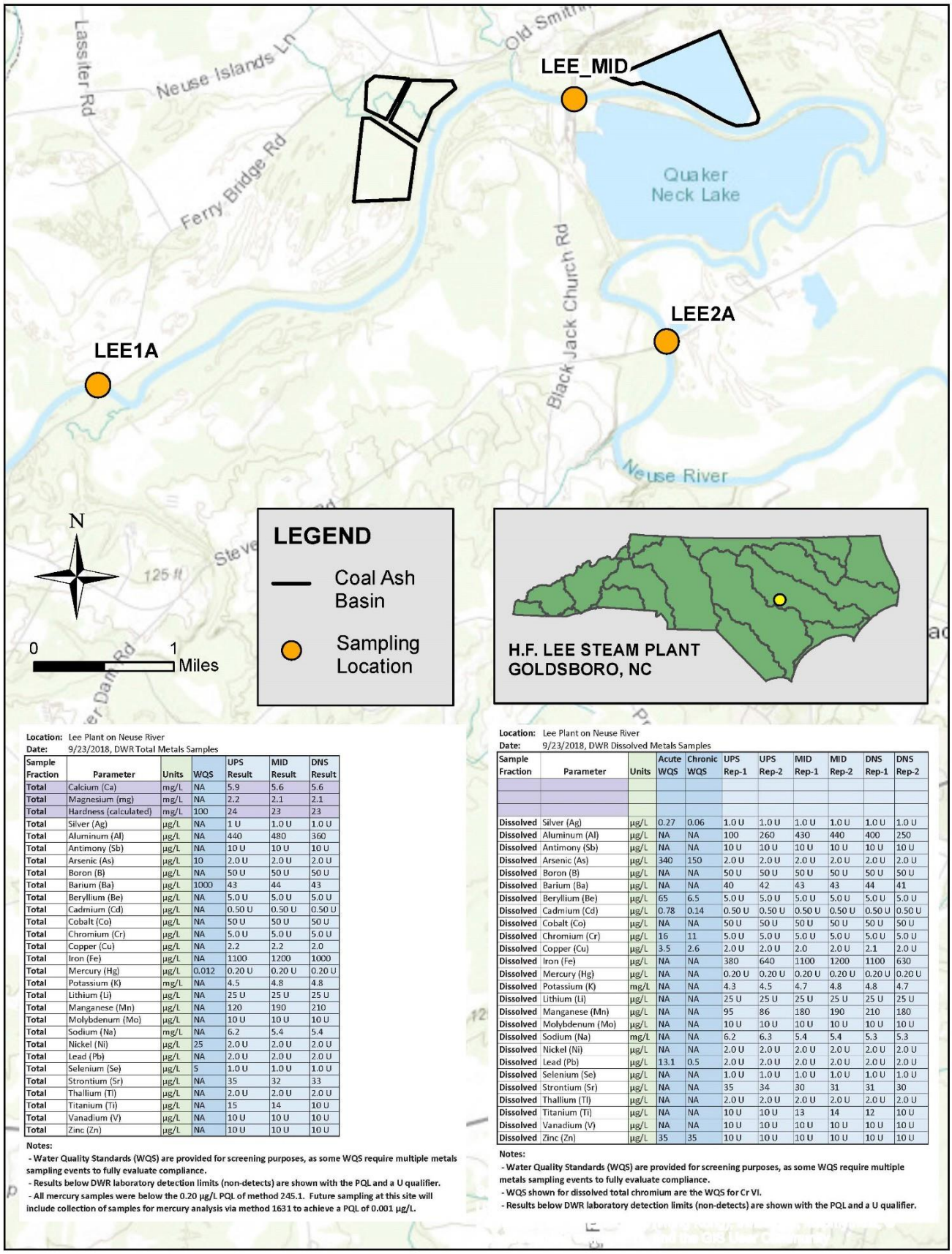
Total lead was detected in one sample at LEE2A (downstream from the Lee plant) at a concentration of 2.3 µg/L. Total lead was not detected in any sample at LEE1A or LEE_MID, and dissolved lead was not detected at any Lee station during the monitoring timeframe.

Total zinc was detected in one sample at LEE2A at a concentration of 10 µg/L. Total zinc was not detected in any sample at LEE1A or LEE_MID and dissolved zinc was not detected at any Lee station during the monitoring timeframe.

All copper, lead, and zinc results were less than their respective NC Water Quality Standards for Surface Waters.

Commonly-occurring metals at all stations included aluminum, iron, manganese, and strontium, none of which have an applicable NC Water Quality Standard for Surface Waters in the waters around the plant.

Figure 26. *H.F Lee Steam Plant Sampling Locations and Initial Metals Results*



Location: Lee Plant on Neuse River
Date: 9/23/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	WQS	UPS Result	MID Result	DNS Result
Total	Calcium (Ca)	mg/L	NA	5.9	5.6	5.6
Total	Magnesium (mg)	mg/L	NA	2.2	2.1	2.1
Total	Hardness (calculated)	mg/L	100	24	23	23
Total	Silver (Ag)	µg/L	NA	1 U	1.0 U	1.0 U
Total	Aluminum (Al)	µg/L	NA	440	480	360
Total	Antimony (Sb)	µg/L	NA	10 U	10 U	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	2.0 U	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U	50 U
Total	Barium (Ba)	µg/L	1000	43	44	43
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Copper (Cu)	µg/L	NA	2.2	2.2	2.0
Total	Iron (Fe)	µg/L	NA	1100	1200	1000
Total	Mercury (Hg)	µg/L	0.012	0.20 U	0.20 U	0.20 U
Total	Potassium (K)	mg/L	NA	4.5	4.8	4.8
Total	Lithium (Li)	µg/L	NA	25 U	25 U	25 U
Total	Manganese (Mn)	µg/L	NA	120	190	210
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U	10 U
Total	Sodium (Na)	mg/L	NA	6.2	5.4	5.4
Total	Nickel (Ni)	µg/L	25	2.0 U	2.0 U	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U	1.0 U
Total	Strontium (Sr)	µg/L	NA	35	32	33
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Titanium (Ti)	µg/L	NA	15	14	10 U
Total	Vanadium (V)	µg/L	NA	10 U	10 U	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	10 U	10 U

Notes:
- Water Quality Standards (WQS) are provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.
- Results below DWR laboratory detection limits (non-detects) are shown with the PQL and a U qualifier.
- All mercury samples were below the 0.20 µg/L PQL of method 245.1. Future sampling at this site will include collection of samples for mercury analysis via method 1631 to achieve a PQL of 0.001 µg/L.

Location: Lee Plant on Neuse River
Date: 9/23/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Acute WQS	Chronic WQS	UPS Rep-1	UPS Rep-2	MID Rep-1	MID Rep-2	DNS Rep-1	DNS Rep-2
Dissolved	Silver (Ag)	µg/L	0.27	0.06	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	100	260	430	440	400	250
Dissolved	Antimony (Sb)	µg/L	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	150	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	40	42	43	43	44	41
Dissolved	Beryllium (Be)	µg/L	65	6.5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.78	0.14	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	11	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	3.5	2.6	2.0 U	2.0 U	2.0	2.0 U	2.1	2.0 U
Dissolved	Iron (Fe)	µg/L	NA	NA	380	640	1100	1200	1100	630
Dissolved	Mercury (Hg)	µg/L	NA	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dissolved	Potassium (K)	mg/L	NA	NA	4.3	4.5	4.7	4.8	4.8	4.7
Dissolved	Lithium (Li)	µg/L	NA	NA	25 U	25 U	25 U	25 U	25 U	25 U
Dissolved	Manganese (Mn)	µg/L	NA	NA	95	86	180	190	210	180
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	6.2	6.3	5.4	5.4	5.3	5.3
Dissolved	Nickel (Ni)	µg/L	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	13.1	0.5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	35	34	30	31	31	30
Dissolved	Thallium (Tl)	µg/L	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	10 U	10 U	13	14	12	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	35	35	10 U	10 U	10 U	10 U	10 U	10 U

Notes:
- Water Quality Standards (WQS) are provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.
- WQS shown for dissolved total chromium are the WQS for Cr VI.
- Results below DWR laboratory detection limits (non-detects) are shown with the PQL and a U qualifier.

Summary

The North Carolina Division of Water Resources conducted extensive surface water quality monitoring to quantify the effects of extensive flooding in the wake of Hurricane Florence. Division staff responded to reported incidents of sanitary sewer overflows, wastewater plant by-passes, coal ash releases, hog lagoon inundations and breaches, and numerous other threats to the surface waters of the State. Unprecedented precipitation amounts already recorded in NC prior to Florence's landfall exacerbated flood conditions.

Dilution caused by record-setting rainfall amounts served to minimize initial pollutant impacts on surface waters, although early nutrient and fecal bacteria levels demonstrated elevated levels when compared to historic median values. Dissolved oxygen concentrations were depleted as low DO waters from swamps and low-lying wetlands were flushed out of backwaters and into main river channels. The massive influx of organic materials that accompanied this flushing also contributed to low DO and slightly lowered pH values as oxygen-consuming bacteria busied themselves, breaking down this nutrient-rich influent.

As flood waters subsided and river levels returned to near baseline conditions, most physical parameters and chemical constituents returned to levels consistent with historic median values. Notable exceptions to this trend include solids, turbidity and fecal coliform, all of which increased in concentration as baseflow conditions returned and accounted for a greater percentage of surface flow. Widespread high-magnitude precipitation events dominated Phase 1 sampling conditions and served to dilute the concentrations of most target analytes. Routine ambient monitoring being conducted at the time of this writing may further indicate a return to historic levels for these lingering elevated constituent levels.

References

[1]North Carolina Division of Water Resources. 2018. Integrated Report Files.
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[2]North Carolina Division of Water Resources. 2017. Survey of Surface Water Quality Associated With Hurricane Matthew, October 2016.
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[3]National Hurricane Center. National Oceanic and Atmospheric administration: NWS Internet Services Team [Page Last Modified 2019-03-26 15:37:26, date accessed 2-19-2019].
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[5]USGS Current Conditions for North Carolina. Ed. 5.21. U.S. Geological Survey: North Carolina Water Data Maintainer; [Page Last Modified: 2019-03-26 11:33:44 EST, date accessed 2/20/19].
Notes. https://waterdata.usgs.gov/nc/nwis/current/?type=flow

[6]North Carolina Division of Water Resources. 2016. Hurricane Response Standard Operating Plan: Internal Document, Sec D. p. 7

[7]North Carolina Division of Water Resources. 2013. Intensive Survey Branch Standard Operating Procedures Manual: Physical and Chemical Monitoring, Version 2.1
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Appendices

Appendix I

Summary Data Tables for Supplemental Monitoring at AMS Stations Following Hurricane Florence

		Total P (mg/L as P)					TOC (mg/L)					BOD_5 (mg/L)				
Site ID	Location Description	Round 1	Round 2	Round 3	Round 4	2012-2016 Median	Round 1	Round 2	Round 3	Round 4	2012-2016 Median	Round 1	Round 2	Round 3	Round 4	2012-2016 Median
B2100000	HAW RIV AT SR 1713 NR BYNUM	0.1	0.11	NA	NA	NA	NA	NA	NA	NA	NA	2	2.1	NA	NA	NA
B4050000	HAW RIV BELOW JORDAN DAM NR MONCURE	0.13	0.12	NA	NA	NA	NA	NA	NA	NA	NA	3.4	3	NA	NA	NA
B5575000	DEEP RIV AT NC 42 AT CARBONTON	0.13	NA	NA	NA	0.08	NA	NA	NA	NA	NA	2	NA	NA	NA	NA
B6040300	DEEP RIV AT SR 1011 OLD US 1 NR MONCURE	0.14	0.13	NA	NA	0.22	NA	NA	NA	NA	NA	2.2	2.6	NA	NA	NA
B6370000	CAPE FEAR RIV AT US 401 AT LILLINGTON	0.13	0.12	0.16	0.27	0.09	NA	NA	NA	NA	NA	4.5	3.7	2.5	3.9	NA
B7600000	CAPE FEAR RIV AT NC 24 AT FAYETTEVILLE	0.1	0.11	0.17	0.27	0.12	17	10	8.4	14	NA	3.1	3.3	2	4.4	NA
B8340000	CAPE FEAR RIV AT LOCK 2 NR ELIZABETHTOWN	0.13	0.1	0.26	0.12	NA	20	8.9	8.7	7.6	NA	4.4	2.8	2	2.2	NA
B8490000	LITTLE COHARIE CRK AT SR 1414 MINNIE HALL RD NR SALEMBURG	0.26	0.08	NA	NA	0.04	NA	NA	NA	NA	NA	4.8	2.3	NA	NA	NA
B8580000	GREAT COHARIE CRK AT SR 1311 NR CLINTON	0.47	0.07	NA	NA	0.05	NA	NA	NA	NA	NA	9.2	2.5	NA	NA	NA
B8725000	SIX RUNS CRK AT SR 1960 NR TAYLORS BRIDGE	0.49	0.23	NA	NA	0.12	NA	NA	NA	NA	NA	3	2.9	NA	NA	NA
B8750000	BLACK RIV AT NC 411 NR TOMAHAWK	0.3	0.17	0.15	0.14	0.08	30	13	11	16	NA	3	2.5	2	3.1	NA
B9013000	BLACK RIV AT RACCOON ISLAND NR HUGGINS	0.27	0.18	0.11	0.05	0.16	NA	NA	NA	NA	NA	7.5	3.1	2.3	2	NA
B9050000	CAPE FEAR RIV AT NAVASSA	0.2	0.16	0.1	0.08	0.09	25	18	10	10	NA	4.4	3.1	2	2	NA
B9190500	GOSHEN SWAMP AT SR 1004 NR WESTBROOK CROSSROAD	0.51	0.32	NA	NA	0.12	NA	NA	NA	NA	NA	2.1	2.6	NA	NA	NA
B9196000	NORTHEAST CAPE FEAR RIV AT SR 1961 AT HALLSVILLE	0.38	0.32	0.18	0.33	0.13	NA	NA	NA	NA	NA	2.1	3	2	2.6	NA
B9470000	ROCKFISH CRK AT I 40 AT WALLACE	0.88	0.53	0.55	0.24	0.35	NA	NA	NA	NA	NA	19	3.1	2	2.4	NA
B9480000	NORTHEAST CAPE FEAR RIV AT SR 1318 NR WATHA	NA	0.32	0.22	0.14	0.16	NA	19	19	21	NA	NA	2.9	2	2.1	NA
B9740000	NORTHEAST CAPE FEAR RIV AT I-140 AT WILMINGTON	0.48	0.18	0.11	0.12	0.09	40	29	13	14	NA	15	3.4	2	2.2	NA
C9790000	SUGAR CRK AT SC 160 NR FORT MILL SC	0.39	0.39	NA	NA	0.51	6.1	5.3	NA	NA	NA	8.8	2.9	NA	NA	NA
D6250000	CHOWAN RIV AT US 13 AT WINTON	0.11	0.12	0.09	0.06	NA	NA	NA	NA	NA	NA	6.5	3.1	2	2.4	NA
D9490000	CHOWAN RIV AT US 17 AT EDENHOUSE	0.04	0.04	0.09	0.09	NA	11	9	13	13	NA	3	2.8	2	2.4	NA
I2750000	LUMBER RIV AT SR 1303 NR MAXTON	0.05	0.08	NA	NA	0.09	NA	NA	NA	NA	NA	2	2.4	NA	NA	NA
I5370000	BIG SWAMP AT NC 211 NR RICHARDSON	0.09	0.07	NA	NA	NA	NA	NA	NA	NA	NA	2.4	2	NA	NA	NA
I5690000	LUMBER RIV AT US 74 AT BOARDMAN	0.12	0.11	0.06	0.06	0.08	33	21	16	14	NA	2.9	2	2	3.6	NA
I8970000	WACCAMAW RIV AT NC 130 AT FREELAND	0.13	0.05	0.04	0.05	0.03	NA	NA	NA	NA	NA	7.4	2.4	2.2	2	NA
J1890000	NEUSE RIV AT SR 2000 NR FALLS	0.02	0.03	0.04	0.04	0.03	NA	NA	NA	NA	NA	2	2	2.4	2.1	NA
J4170000	NEUSE RIV AT NC 42 NR CLAYTON	0.52	0.12	NA	NA	0.16	NA	NA	NA	NA	NA	2	2.8	NA	NA	NA
J4370000	NEUSE RIV AT US 70 BUS AT SMITHFIELD	0.45	0.16	0.15	0.2	0.22	NA	NA	NA	NA	NA	2	2.9	2.2	4	NA
J5850000	LITTLE RIV AT SR 2320 NR PRINCETON	0.1	0.09	0.06	0.15	NA	NA	NA	NA	NA	NA	2	2	2	4	NA
J5970000	NEUSE RIV AT SR 1915 NR GOLDSBORO	0.14	0.15	0.13	0.17	0.14	7.7	8.1	7.6	8.4	NA	2.2	2.4	2	2.8	NA
J6150000	NEUSE RIV AT NC 11 AT KINSTON	0.18	0.12	0.11	0.17	0.12	10	9.5	7.6	7.6	NA	2	2.5	2	3.3	NA
J7450000	CONTENTNEA CRK AT NC 123 AT HOOKERTON	0.18	0.15	NA	NA	0.13	NA	NA	NA	NA	NA	6.7	2	NA	NA	NA
J7810000	CONTENTNEA CRK NR SR 1800 AT GRIFTON	0.29	0.19	0.13	0.19	0.15	NA	NA	NA	NA	NA	8.5	3.4	2	3.1	NA
J7850000	NEUSE RIV AT SR 1470 NR FORT BARNWELL	NA	NA	0.11	0.13	0.13	NA	NA	NA	NA	NA	NA	NA	2	3.2	NA
J8570000	NEUSE RIV .5 MI UPS UNION POINT AT NEW BERN	0.28	0.2	0.11	0.1	NA	17	11	8.6	9.2	NA	3.1	2.5	2	2.8	NA
J8730000	TRENT RIV AT US 17 AT POLLOCKSVILLE	0.43	0.18	0.13	0.15	0.12	NA	NA	NA	NA	NA	12	2.6	2	3.1	NA
N3000000	DAN RIV AT SR 1761 NR MAYFIELD	0.07	0.08	NA	NA	0.14	NA	NA	NA	NA	NA	5.9	2	NA	NA	NA
N8200000	ROANOKE RIV AT US 258 NR SCOTLAND NECK	0.03	0.05	0.04	0.04	0.04	NA	NA	NA	NA	NA	2	2	2.2	2	NA
N8550000	ROANOKE RIV AT US 13 AND US 17 AT WILLIAMSTON	0.08	0.05	0.06	0.06	0.05	5.8	5.4	5.5	5.7	NA	6.5	2.7	2	2	NA
O2000000	TAR RIV AT SR 1001 NR BUNN	0.08	0.07	0.09	0.3	0.06	NA	NA	NA	NA	NA	2.1	2	2	4.8	NA
O3180000	TAR RIV AT NC 97 AT ROCKY MOUNT	0.09	0.06	0.07	0.21	NA	NA	NA	NA	NA	NA	2	2	2	4	NA
O5250000	TAR RIV AT NC 33 AND US 64 BUS AT TARBORO	0.13	0.1	NA	NA	0.09	NA	NA	NA	NA	NA	2	2	NA	NA	NA
O6200000	TAR RIV AT NC 222 NR FALKLAND	0.16	0.11	0.1	0.12	0.09	NA	NA	NA	NA	NA	2.6	2	2	2.2	NA
O7650000	PAMLICO RIV AT US 17 AT WASHINGTON	0.17	0.18	0.14	0.11	0.11	11	11	9.9	7.8	NA	2	2	2	2	NA
P0600000	NEW RIV AT SR 1314 NR GUM BRANCH	0.19	0.13	0.11	0.2	0.12	27	14	12	18	NA	2.7	2.8	2	3.3	NA
P1200000	NEW RIV AT US 17 AT JACKSONVILLE	0.42	0.16	0.13	0.15	NA	NA	NA	NA	NA	NA	11	3.2	3.7	3.4	NA
P3700000	NORTHEAST CRK AT NC 24 AT JACKSONVILLE (Marine Blvd.)	0.27	0.16	0.19	0.15	0.1	NA	NA	NA	NA	NA	7.7	3.7	3.6	3.1	NA
Q5930000	ABBOTTS CRK AT SR 1243 AT LEXINGTON	0.15	0.19	NA	NA	0.08	NA	NA	NA	NA	NA	2	2.2	NA	NA	NA
Q8720000	LONG CRK AT SR 1917 NR ROCKY RIVER SPRINGS	0.1	0.09	NA	NA	0.18	NA	NA	NA	NA	NA	5.6	2.3	NA	NA	NA
Q9400000	PEE DEE RIV AT US 74 NR ROCKINGHAM	0.06	0.09	NA	NA	0.08	5.6	5.1	NA	NA	NA	5.8	2.5	NA	NA	NA

Note: Yellow highlight- Exceeds NC standard. Green highlight- result was not detected above PQL. NA- result not available.

Site ID	Location Description	NO_2+NO_3 (mg/L as N)					TKN (mg/L as N)					NH_3 (mg/L as N)				
		Round 1	Round 2	Round 3	Round 4	2012-2016 Median	Round 1	Round 2	Round 3	Round 4	2012-2016 Median	Round 1	Round 2	Round 3	Round 4	2012-2016 Median
B2100000	HAW RIV AT SR 1713 NR BYNUM	1.40	0.51	NA	NA	0.96	0.68	0.68	NA	NA	0.65	0.02	0.02	NA	NA	0.02
B4050000	HAW RIV BELOW JORDAN DAM NR MONCURE	0.28	0.42	NA	NA	NA	0.84	0.86	NA	NA	NA	0.20	0.12	NA	NA	NA
B5575000	DEEP RIV AT NC 42 AT CARBONTON	0.54	NA	NA	NA	0.42	0.68	NA	NA	NA	0.50	0.04	NA	NA	NA	0.02
B6040300	DEEP RIV AT SR 1011 OLD US 1 NR MONCURE	0.67	0.74	NA	NA	0.82	0.69	0.78	NA	NA	0.60	0.11	0.10	NA	NA	0.02
B6370000	CAPE FEAR RIV AT US 401 AT LILLINGTON	0.61	0.48	0.76	0.61	0.56	0.94	0.71	0.79	0.92	0.66	0.19	0.07	0.04	0.02	0.02
B7600000	CAPE FEAR RIV AT NC 24 AT FAYETTEVILLE	0.27	0.52	0.82	0.55	0.68	0.93	0.72	0.71	0.90	0.60	0.08	0.05	0.03	0.02	0.02
B8340000	CAPE FEAR RIV AT LOCK 2 NR ELIZABETHTOWN	0.26	0.46	0.97	0.64	NA	1.00	0.66	0.91	0.61	NA	0.10	0.04	0.05	0.02	NA
B8490000	LITTLE COHARIE CRK AT SR 1414 MINNIE HALL RD NR SALEMBURG	0.02	0.12	NA	NA	0.02	1.40	0.86	NA	0.60	0.72	0.02	0.04	NA	NA	0.02
B8580000	GREAT COHARIE CRK AT SR 1311 NR CLINTON	0.02	0.02	NA	NA	0.02	2.20	0.83	NA	0.52	0.84	0.10	0.02	NA	NA	0.02
B8725000	SIX RUNS CRK AT SR 1960 NR TAYLORS BRIDGE	0.32	1.00	NA	NA	0.81	1.80	1.00	NA	0.81	0.74	0.34	0.05	NA	NA	0.04
B8750000	BLACK RIV AT NC 411 NR TOMAHAWK	0.07	0.84	0.90	0.99	0.85	1.50	0.90	0.73	0.84	0.74	0.16	0.04	0.03	0.02	0.03
B9013000	BLACK RIV AT RACCOON ISLAND NR HUGGINS	0.02	0.18	0.39	0.32	0.35	1.80	1.10	0.71	0.64	0.78	0.14	0.10	0.02	0.02	0.04
B9050000	CAPE FEAR RIV AT NAVASSA	0.12	0.45	0.45	0.43	0.42	1.20	0.86	0.61	0.58	0.44	0.04	0.07	0.02	0.04	0.02
B9190500	GOSHEN SWAMP AT SR 1004 NR WESTBROOK CROSSROAD	0.02	0.25	0.41	NA	0.04	1.40	0.93	0.74	1.20	0.81	0.22	0.09	0.03	NA	0.02
B9196000	NORTHEAST CAPE FEAR RIV AT SR 1961 AT HALLSVILLE	0.03	0.38	0.68	0.82	0.33	1.50	1.10	0.80	1.20	0.80	0.16	0.08	0.03	0.09	0.02
B9470000	ROCKFISH CRK AT I 40 AT WALLACE	0.02	0.99	1.90	0.78	1.30	2.70	1.20	1.30	0.91	0.94	0.46	0.08	0.04	0.04	0.04
B9480000	NORTHEAST CAPE FEAR RIV AT SR 1318 NR WATHA	NA	0.43	0.58	0.38	0.48	NA	1.10	0.92	0.88	0.77	NA	0.10	0.03	0.03	0.04
B9740000	NORTHEAST CAPE FEAR RIV AT I-140 AT WILMINGTON	0.02	0.24	0.42	0.36	0.45	2.10	1.30	0.73	0.74	0.64	0.26	0.28	0.09	0.02	0.06
C9790000	SUGAR CRK AT SC 160 NR FORT MILL SC	6.10	9.40	15.00	NA	11.00	1.00	0.90	1.00	NA	0.83	0.02	0.04	0.09	NA	0.03
D6250000	CHOWAN RIV AT US 13 AT WINTON	0.09	0.12	0.08	0.05	NA	0.85	0.88	0.75	0.57	NA	0.05	0.05	0.02	0.02	NA
D9490000	CHOWAN RIV AT US 17 AT EDENHOUSE	0.02	0.03	0.17	0.12	NA	0.73	0.68	0.76	0.66	NA	0.02	0.02	0.02	0.02	NA
I2750000	LUMBER RIV AT SR 1303 NR MAXTON	0.02	0.12	NA	NA	0.63	0.93	1.00	NA	0.57	0.50	0.02	0.08	NA	NA	0.02
I5370000	BIG SWAMP AT NC 211 NR RICHARDSON	0.02	0.02	NA	NA	NA	1.50	1.50	NA	NA	NA	0.05	0.12	NA	NA	NA
I5690000	LUMBER RIV AT US 74 AT BOARDMAN	0.02	0.13	0.18	0.19	0.35	1.20	1.10	0.88	0.78	0.62	0.03	0.06	0.02	0.02	0.02
I8970000	WACCAMAW RIV AT NC 130 AT FREELAND	0.02	0.02	0.04	0.17	0.02	1.90	1.80	1.80	1.80	1.20	0.02	0.32	0.30	0.34	0.02
J1890000	NEUSE RIV AT SR 2000 NR FALLS	0.05	0.12	0.10	0.05	0.02	0.65	0.71	0.64	0.68	0.63	0.13	0.16	0.02	0.08	0.07
J4170000	NEUSE RIV AT NC 42 NR CLAYTON	0.51	0.19	NA	NA	0.44	0.65	0.72	NA	NA	0.71	0.03	0.02	NA	NA	0.08
J4370000	NEUSE RIV AT US 70 BUS AT SMITHFIELD	0.45	0.20	0.18	0.45	0.46	0.64	0.71	0.71	0.76	0.56	0.02	0.02	0.02	0.02	0.02
J5850000	LITTLE RIV AT SR 2320 NR PRINCETON	0.30	0.16	0.14	0.43	NA	0.77	0.65	0.53	0.85	NA	0.02	0.02	0.02	0.02	NA
J5970000	NEUSE RIV AT SR 1915 NR GOLDSBORO	0.23	0.29	0.34	0.47	0.48	0.72	0.78	0.58	0.70	0.59	0.05	0.04	0.02	0.02	0.04
J6150000	NEUSE RIV AT NC 11 AT KINSTON	0.46	0.30	0.38	0.59	0.57	0.94	0.72	0.58	0.62	0.60	0.20	0.07	0.02	0.02	0.03
J7450000	CONTENTNEA CRK AT NC 123 AT HOOKERTON	0.26	0.90	NA	NA	0.59	1.20	0.79	NA	NA	0.66	0.20	0.08	NA	NA	0.04
J7810000	CONTENTNEA CRK NR SR 1800 AT GRIFTON	0.02	0.80	0.73	0.71	0.55	1.30	0.74	0.63	0.66	0.62	0.17	0.08	0.03	0.03	0.04
J7850000	NEUSE RIV AT SR 1470 NR FORT BARNWELL	NA	NA	0.39	0.50	0.54	NA	NA	0.56	0.55	0.64	NA	NA	0.02	0.02	0.04
J8570000	NEUSE RIV .5 MI UPS UNION POINT AT NEW BERN	0.02	0.30	0.40	0.40	NA	1.50	0.84	0.66	0.49	NA	0.27	0.16	0.04	0.04	NA
J8730000	TRENT RIV AT US 17 AT POLLOCKSVILLE	0.02	0.55	0.79	0.62	0.59	1.80	0.99	0.61	0.66	0.60	0.12	0.14	0.03	0.02	0.02
N3000000	DAN RIV AT SR 1761 NR MAYFIELD	0.27	0.31	NA	NA	0.40	0.30	0.37	NA	NA	0.44	0.02	0.02	NA	NA	0.02
N8200000	ROANOKE RIV AT US 258 NR SCOTLAND NECK	0.15	0.22	0.27	0.32	0.14	0.35	0.43	0.38	0.34	0.34	0.03	0.02	0.02	0.02	0.02
N8550000	ROANOKE RIV AT US 13 AND US 17 AT WILLIAMSTON	0.16	0.16	0.18	0.23	0.19	0.47	0.46	0.44	0.41	0.38	0.02	0.02	0.02	0.02	0.02
O2000000	TAR RIV AT SR 1001 NR BUNN	0.25	0.21	0.43	0.32	0.17	0.55	0.41	0.57	1.00	0.68	0.03	0.02	0.02	0.02	0.07
O3180000	TAR RIV AT NC 97 AT ROCKY MOUNT	0.23	0.29	0.29	0.30	NA	0.77	0.59	0.51	0.93	NA	0.06	0.04	0.02	0.02	NA
O5250000	TAR RIV AT NC 33 AND US 64 BUS AT TARBORO	0.31	0.68	NA	NA	0.32	0.80	0.56	NA	0.75	0.66	0.04	0.02	NA	NA	0.04
O6200000	TAR RIV AT NC 222 NR FALKLAND	0.40	0.67	0.54	0.37	0.34	0.82	0.63	0.55	0.57	0.56	0.05	0.04	0.02	0.02	0.02
O7650000	PAMLICO RIV AT US 17 AT WASHINGTON	0.38	0.35	0.43	0.35	0.38	0.84	1.00	0.78	0.54	0.69	0.13	0.20	0.09	0.05	0.02
P0600000	NEW RIV AT SR 1314 NR GUM BRANCH	0.75	1.60	1.90	1.20	1.50	1.10	0.88	0.75	0.88	0.62	0.08	0.02	0.06	0.02	0.03
P1200000	NEW RIV AT US 17 AT JACKSONVILLE	0.02	0.27	0.70	0.44	0.18	1.50	0.95	0.97	0.66	0.94	0.02	0.13	0.08	0.02	0.02
P3700000	NORTHEAST CRK AT NC 24 AT JACKSONVILLE (Marine Blvd.)	0.02	0.04	0.11	0.19	NA	1.30	1.30	1.10	0.72	NA	0.08	0.28	0.23	0.02	NA
Q5930000	ABBOTTS CRK AT SR 1243 AT LEXINGTON	0.44	0.53	NA	NA	0.70	0.54	0.82	NA	NA	0.59	0.03	0.05	NA	NA	0.05
Q8720000	LONG CRK AT SR 1917 NR ROCKY RIVER SPRINGS	1.80	2.50	2.30	NA	6.60	0.56	0.59	0.47	NA	0.95	0.02	0.02	0.03	NA	0.03
Q9400000	PEE DEE RIV AT US 74 NR ROCKINGHAM	0.55	0.62	NA	NA	0.64	0.50	0.63	NA	NA	0.64	0.02	0.05	NA	NA	0.09

Note: Yellow highlight- Exceeds NC standard. Green highlight- result was not detected above PQL. NA- result not available.

		Fecal Coliform (CFU/100mL)					Suspended Residue (mg/L)					Turbidity (NTU)				
Site ID	Location Description	Round 1	Round 2	Round 3	Round 4	2012-2016 Median	Round 1	Round 2	Round 3	Round 4	2012-2016 Median	Round 1	Round 2	Round 3	Round 4	2012-2016 Median
B2100000	HAW RIV AT SR 1713 NR BYNUM	40	520	NA	8600	38	12	16	NA	110	6.2	4.2	33	NA	85	9.8
B4050000	HAW RIV BELOW JORDAN DAM NR MONCURE	84	110	NA	NA	6	14	16	NA	NA	7.2	28	29	NA	NA	7.1
B5575000	DEEP RIV AT NC 42 AT CARBONTON	74	NA	NA	NA	36	13	NA	NA	NA	6.2	13	NA	NA	NA	7.6
B6040300	DEEP RIV AT SR 1011 OLD US 1 NR MONCURE	180	80	NA	NA	38	6.2	6.8	NA	NA	6.2	8.3	10	NA	NA	7.6
B6370000	CAPE FEAR RIV AT US 401 AT LILLINGTON	190	120	920	7500	52	18	30	28	70	9	17	28	37	55	9.6
B7600000	CAPE FEAR RIV AT NC 24 AT FAYETTEVILLE	180	150	1200	7700	47	36	16	26	78	8.6	22	22	33	90	11
B8340000	CAPE FEAR RIV AT LOCK 2 NR ELIZABETHTOWN	120	53	1600	110	NA	14	22	31	29	15.5	8.7	11	40	21	NA
B8490000	LITTLE COHARIE CRK AT SR 1414 MINNIE HALL RD NR SALEMBURG	140	100	NA	NA	88	11	6.2	NA	NA	6.2	17	1.7	NA	NA	1.9
B8580000	GREAT COHARIE CRK AT SR 1311 NR CLINTON	500	81	NA	NA	69	29	6.2	NA	NA	6.2	3.9	2.7	NA	NA	3.3
B8725000	SIX RUNS CRK AT SR 1960 NR TAYLORS BRIDGE	100	320	NA	NA	150	9	6.8	NA	NA	6.2	8	4.5	NA	NA	5.2
B8750000	BLACK RIV AT NC 411 NR TOMAHAWK	120	270	160	1100	96	6.2	6.2	9	7	6.2	1.6	3.5	4.5	7.1	3.9
B9013000	BLACK RIV AT RACCOON ISLAND NR HUGGINS	84	55	43	52	44	8.2	6.2	6.2	6.2	6.2	7.4	2	6.8	2.6	4.5
B9050000	CAPE FEAR RIV AT NAVASSA	80	63	45	56	32	7.8	14	6.2	14	12	8	13	8.5	14	13
B9190500	GOSHEN SWAMP AT SR 1004 NR WESTBROOK CROSSROAD	66	120	410	NA	87	6.5	6.2	6.2	NA	6.2	3.6	4.6	3.7	NA	4.7
B9196000	NORTHEAST CAPE FEAR RIV AT SR 1961 AT HALLSVILLE	120	69	130	3300	100	6.2	12	6.2	44	6.2	2	4.3	4.1	45	4.2
B9470000	ROCKFISH CRK AT I 40 AT WALLACE	3100	140	190	1800	120	11	6.2	6.2	10	6.2	16	4.6	5.2	11	5
B9480000	NORTHEAST CAPE FEAR RIV AT SR 1318 NR WATHA	NA	33	60	240	42	NA	6.2	12	6.2	6.2	NA	2.8	3.4	3.9	4.8
B9740000	NORTHEAST CAPE FEAR RIV AT I-140 AT WILMINGTON	250	30	33	93	28	14	12	9	22	12	6.9	5.8	9.2	17	8.2
C9790000	SUGAR CRK AT SC 160 NR FORT MILL SC	60000	3100	160	120	240	74	24	9.5	NA	12	80	12	7.1	NA	12
D6250000	CHOWAN RIV AT US 13 AT WINTON	54	310	68	150	8	6.2	6.2	6.2	12	6.2	11	5.4	22	10	5.9
D9490000	CHOWAN RIV AT US 17 AT EDENHOUSE	5	7	2	300	1	6.2	7.5	7.5	8.2	6.2	4.4	5.4	7.6	6.6	5.1
I2750000	LUMBER RIV AT SR 1303 NR MAXTON	54	270	NA	NA	66	6.2	6.2	NA	NA	6.2	1	2	NA	NA	3.3
I5370000	BIG SWAMP AT NC 211 NR RICHARDSON	65	58	NA	NA	82	6.2	6.2	NA	NA	6.2	1	1	NA	NA	4.2
I5690000	LUMBER RIV AT US 74 AT BOARDMAN	81	140	110	280	73	6.2	12	12	12	6.2	1	2.3	2.5	3	2.9
I8970000	WACCAMAW RIV AT NC 130 AT FREELAND	1000	45	110	180	55	8.5	6.2	6.2	6.2	6.2	4.5	1.2	2.7	2.6	2.9
J1890000	NEUSE RIV AT SR 2000 NR FALLS	21	1	4	22	4	6.2	6.2	7.2	6.2	6.2	2.6	3.3	6.8	4.7	4.4
J4170000	NEUSE RIV AT NC 42 NR CLAYTON	80	290	NA	NA	86	10	59	NA	NA	12	11	21	NA	NA	13
J4370000	NEUSE RIV AT US 70 BUS AT SMITHFIELD	140	300	180	7100	135	22	86	20	54	19.5	23	39	20	75	16.5
J5850000	LITTLE RIV AT SR 2320 NR PRINCETON	75	180	92	6600	100	7.2	6.2	5.3	29	6.2	6.2	29	5.3	40	6.1
J5970000	NEUSE RIV AT SR 1915 NR GOLDSBORO	240	520	120	2100	60	38	36	18	32	15.5	27	7.1	18	30	14.5
J6150000	NEUSE RIV AT NC 11 AT KINSTON	56	83	120	1300	42	14	6.8	15	27	17.5	8.7	6.5	12	27	14
J7450000	CONTENTNEA CRK AT NC 123 AT HOOKERTON	510	98	96	96	59	6.2	6.2	NA	NA	6.2	2.9	4.9	NA	NA	6.6
J7810000	CONTENTNEA CRK NR SR 1800 AT GRIFTON	180	72	52	2000	42	6.2	6.2	6.2	13	6.2	5.7	4.8	4.3	18	6.4
J7850000	NEUSE RIV AT SR 1470 NR FORT BARNWELL	NA	NA	71	680	49	NA	NA	16	16	9.8	NA	NA	15	16	11
J8570000	NEUSE RIV .5 MI UPS UNION POINT AT NEW BERN	55	40	13	140	29	6.2	6.2	12	6.2	6.2	3.5	4.9	6.5	4.9	6.1
J8730000	TRENT RIV AT US 17 AT POLLOCKSVILLE	1300	250	45	650	NA	10	6.2	6.2	6.2	6.2	9.5	1.6	1.7	7.7	NA
N3000000	DAN RIV AT SR 1761 NR MAYFIELD	320	220	NA	NA	80	40	53	29	NA	12	24	38	NA	NA	8.1
N8200000	ROANOKE RIV AT US 258 NR SCOTLAND NECK	88	42	35	75	37	9	12	9.2	10	14	3.5	11	23	15	10
N8550000	ROANOKE RIV AT US 13 AND US 17 AT WILLIAMSTON	140	74	71	84	21	40	9.3	13	13	14	14	5.7	11	14	15
O2000000	TAR RIV AT SR 1001 NR BUNN	120	220	1300	6800	80	17	6.5	24	192	8.8	26	13	34	130	14
O3180000	TAR RIV AT NC 97 AT ROCKY MOUNT	520	92	220	3800	42	13	6.2	14	70	6.2	13	3.3	16	100	8.6
O5250000	TAR RIV AT NC 33 AND US 64 BUS AT TARBORO	37	52	NA	NA	56	14	6.2	NA	NA	7.9	15	5.7	NA	NA	12
O6200000	TAR RIV AT NC 222 NR FALKLAND	1600	60	64	980	49	17	6.2	6.2	16	6.8	18	4.8	8.6	18	8
O7650000	PAMLICO RIV AT US 17 AT WASHINGTON	56	73	140	130	24	6.2	6.5	6.2	6.2	6.2	5.6	6.9	12	8.5	7.4
P0600000	NEW RIV AT SR 1314 NR GUM BRANCH	220	160	190	720	150	6.8	7.2	6.2	6.2	6.2	2.8	4.6	3	9.1	3.9
P1200000	NEW RIV AT US 17 AT JACKSONVILLE	6000	98	79	2200	59	37	6.2	6.2	7.5	7	23	2.4	3.9	11	5.6
P3700000	NORTHEAST CRK AT NC 24 AT JACKSONVILLE (Marine Blvd.)	180	82	40	2400	56	6.2	11	11	12	7.8	4.2	7.8	13	19	6.2
Q5930000	ABBOTTS CRK AT SR 1243 AT LEXINGTON	140	800	NA	NA	185	11	56	NA	NA	14	13	100	NA	NA	20
Q8720000	LONG CRK AT SR 1917 NR ROCKY RIVER SPRINGS	280	220	NA	NA	110	6.2	12	6.2	NA	6.2	1.8	1	1.3	NA	2.8
Q9400000	PEE DEE RIV AT US 74 NR ROCKINGHAM	84	520	110	NA	43	11	15	NA	NA	8.6	12	12	NA	NA	11

Note: Yellow highlight- Exceeds NC standard. Green highlight- result was not detected above PQL. NA- result not available.

Site ID	Location Description	Bromide (mg/L)					Chloride (mg/L)					Fluoride (mg/L)				
		Round 1	Round 2	Round 3	Round 4	2012-2016 Median	Round 1	Round 2	Round 3	Round 4	2012-2016 Median	Round 1	Round 2	Round 3	Round 4	2012-2016 Median
B2100000	HAW RIV AT SR 1713 NR BYNUM	0.51	0.4	NA	NA	NA	22	6	NA	NA	24	0.4	0.4	NA	NA	0.4
B4050000	HAW RIV BELOW JORDAN DAM NR MONCURE	0.4	0.4	NA	NA	NA	5	7.2	NA	NA	27	0.4	0.4	NA	NA	0.4
B5575000	DEEP RIV AT NC 42 AT CARBONTON	0.4	NA	NA	NA	NA	9.1	NA	NA	NA	NA	0.4	NA	NA	NA	NA
B6040300	DEEP RIV AT SR 1011 OLD US 1 NR MONCURE	0.4	0.4	NA	NA	NA	9.5	10	NA	NA	NA	0.4	0.4	NA	NA	NA
B6370000	CAPE FEAR RIV AT US 401 AT LILLINGTON	0.4	0.4	0.4	0.4	NA	8.8	8.1	8.7	4.8	28	0.4	0.4	0.4	0.4	0.4
B7600000	CAPE FEAR RIV AT NC 24 AT FAYETTEVILLE	0.4	0.4	0.4	0.4	NA	6.8	7.4	8.6	3.8	NA	0.4	0.4	0.4	0.4	NA
B8340000	CAPE FEAR RIV AT LOCK 2 NR ELIZABETHTOWN	0.4	0.4	0.4	0.4	NA	5.6	10	8.8	9.6	NA	0.4	0.4	0.4	0.4	NA
B8490000	LITTLE COHARIE CRK AT SR 1414 MINNIE HALL RD NR SALEMBURG	0.4	0.4	NA	NA	NA	11	14	NA	NA	NA	0.4	0.4	NA	NA	NA
B8580000	GREAT COHARIE CRK AT SR 1311 NR CLINTON	0.4	0.4	NA	NA	NA	11	16	NA	NA	NA	0.4	0.4	NA	NA	NA
B8725000	SIX RUNS CRK AT SR 1960 NR TAYLORS BRIDGE	0.4	0.4	NA	NA	NA	14	19	NA	NA	NA	0.4	0.4	NA	NA	NA
B8750000	BLACK RIV AT NC 411 NR TOMAHAWK	0.4	0.4	0.4	0.4	NA	9.4	17	19	16	NA	0.4	0.4	0.4	0.4	NA
B9013000	BLACK RIV AT RACCOON ISLAND NR HUGGINS	0.4	0.4	0.4	0.4	NA	7.1	11	11	12	NA	0.4	0.4	0.4	0.4	NA
B9050000	CAPE FEAR RIV AT NAVASSA	0.4	0.4	0.4	0.4	NA	7.5	11	11	8.6	NA	0.4	0.4	0.4	0.4	NA
B9190500	GOSHEN SWAMP AT SR 1004 NR WESTBROOK CROSSROAD	0.4	0.4	0.4	NA	NA	16	25	NA	NA	NA	0.4	0.4	0.4	NA	NA
B9196000	NORTHEAST CAPE FEAR RIV AT SR 1961 AT HALLSVILLE	0.4	0.4	0.4	0.4	NA	12	24	28	20	NA	0.4	0.4	0.4	0.4	NA
B9470000	ROCKFISH CRK AT I 40 AT WALLACE	0.4	0.4	0.4	0.4	NA	8.8	16	21	16	NA	0.4	0.4	0.4	0.4	NA
B9480000	NORTHEAST CAPE FEAR RIV AT SR 1318 NR WATHA	NA	0.4	0.4	0.4	NA	NA	18	20	14	NA	NA	0.4	0.4	0.4	NA
B9740000	NORTHEAST CAPE FEAR RIV AT I-140 AT WILMINGTON	0.4	1.6	5.4	0.4	NA	12	380	1400	14	NA	0.4	0.4	0.4	0.4	NA
C9790000	SUGAR CRK AT SC 160 NR FORT MILL SC	0.4	0.4	NA	NA	NA	23	33	NA	NA	NA	0.4	0.4	0.44	NA	NA
D6250000	CHOWAN RIV AT US 13 AT WINTON	0.4	0.4	0.4	0.4	NA	7.3	8.8	4.6	9.4	NA	0.4	0.4	0.4	0.4	NA
D9490000	CHOWAN RIV AT US 17 AT EDENHOUSE	2.4	2.0	0.4	0.4	NA	600	490	210	100	NA	0.4	0.4	0.4	0.4	NA
I2750000	LUMBER RIV AT SR 1303 NR MAXTON	0.4	0.4	NA	NA	NA	4.3	5	NA	NA	NA	0.4	0.4	NA	NA	NA
I5370000	BIG SWAMP AT NC 211 NR RICHARDSON	0.4	0.4	NA	NA	NA	7.2	12	NA	NA	NA	0.4	0.4	NA	NA	NA
I5690000	LUMBER RIV AT US 74 AT BOARDMAN	0.4	0.4	0.4	0.4	NA	5.4	9.3	13	11	NA	0.4	0.4	0.4	0.4	NA
I8970000	WACCAMAW RIV AT NC 130 AT FREELAND	0.4	0.4	0.4	0.4	NA	4.4	6.3	7.3	8.4	NA	0.4	0.4	0.4	0.4	NA
J1890000	NEUSE RIV AT SR 2000 NR FALLS	0.4	0.4	0.4	0.4	NA	7.3	6.2	5.3	5.1	NA	0.4	0.4	0.4	0.4	NA
J4170000	NEUSE RIV AT NC 42 NR CLAYTON	0.4	0.4	NA	NA	NA	18	7.6	NA	NA	NA	0.4	0.4	NA	NA	NA
J4370000	NEUSE RIV AT US 70 BUS AT SMITHFIELD	0.4	0.4	0.4	0.4	NA	16	7.8	7.2	4.9	NA	0.4	0.4	0.4	0.4	NA
J5850000	LITTLE RIV AT SR 2320 NR PRINCETON	0.4	0.4	0.4	0.4	NA	6.7	6.8	7.6	7.6	NA	0.4	0.4	0.4	0.4	NA
J5970000	NEUSE RIV AT SR 1915 NR GOLDSBORO	0.4	0.4	0.4	0.4	NA	8.9	10	12	11	NA	0.4	0.4	0.4	0.4	NA
J6150000	NEUSE RIV AT NC 11 AT KINSTON	0.4	0.4	0.4	0.4	NA	11	9.2	10	10	NA	0.4	0.4	0.4	0.4	NA
J7450000	CONTENTNEA CRK AT NC 123 AT HOOKERTON	0.4	0.4	NA	NA	NA	9.5	13	NA	NA	NA	0.4	0.4	NA	NA	NA
J7810000	CONTENTNEA CRK NR SR 1800 AT GRIFTON	0.4	0.4	0.4	0.4	NA	7.5	12	12	13	NA	0.4	0.4	0.4	0.4	NA
J7850000	NEUSE RIV AT SR 1470 NR FORT BARNWELL	NA	NA	0.4	0.4	NA	NA	NA	9.8	11	NA	NA	NA	0.4	0.4	NA
J8570000	NEUSE RIV .5 MI UPS UNION POINT AT NEW BERN	0.4	0.4	0.4	0.4	NA	11	19	17	29	NA	0.4	0.4	0.4	0.4	NA
J8730000	TRENT RIV AT US 17 AT POLLOCKSVILLE	0.4	0.4	0.4	0.4	NA	8	9.5	11	10	NA	0.4	0.4	0.4	0.4	NA
N3000000	DAN RIV AT SR 1761 NR MAYFIELD	0.4	0.4	NA	NA	NA	4.5	4	NA	NA	NA	0.4	0.4	0.4		NA
N8200000	ROANOKE RIV AT US 258 NR SCOTLAND NECK	0.4	0.4	0.4	0.4	NA	7.2	6.3	5.5	5.6	NA	0.4	0.4	0.4	0.4	NA
N8550000	ROANOKE RIV AT US 13 AND US 17 AT WILLIAMSTON	0.4	0.4	0.4	0.4	NA	7.2	6.6	6.2	6	NA	0.4	0.4	0.4	0.4	NA
O2000000	TAR RIV AT SR 1001 NR BUNN	0.4	0.4	0.4	0.4	NA	6.9	9.7	6	5.6	NA	0.4	0.4	0.4	0.4	NA
O3180000	TAR RIV AT NC 97 AT ROCKY MOUNT	0.4	0.4	0.4	0.4	NA	3.7	6	7.3	5.4	NA	0.4	0.4	0.4	0.4	NA
O5250000	TAR RIV AT NC 33 AND US 64 BUS AT TARBORO	0.4	0.4	NA	NA	NA	6.5	9.2	NA	NA	NA	0.4	0.4	NA	NA	NA
O6200000	TAR RIV AT NC 222 NR FALKLAND	0.4	0.4	0.4	0.4	NA	8.5	11	9.8	11	NA	0.4	0.4	0.4	0.4	NA
O7650000	PAMLICO RIV AT US 17 AT WASHINGTON	0.4	2.0	0.4	0.4	NA	28	430	30	23	NA	0.4	0.4	0.4	0.4	NA
P0600000	NEW RIV AT SR 1314 NR GUM BRANCH	0.4	0.4	0.4	0.4	NA	6.7	9.6	10	9.4	NA	0.4	0.4	0.4	0.4	NA
P1200000	NEW RIV AT US 17 AT JACKSONVILLE	0.4	2.0	0.4	0.4	NA	20	320	1500	36	NA	0.4	0.4	0.4	0.4	NA
P3700000	NORTHEAST CRK AT NC 24 AT JACKSONVILLE (Marine Blvd.)	0.4	6.7	6.4	2.3	NA	15	1700	2400	560	NA	0.4	0.4	0.4	0.4	NA
Q5930000	ABBOTTS CRK AT SR 1243 AT LEXINGTON	0.4	0.4	NA	NA	NA	13	6.8	NA	NA	NA	0.4	0.4	NA	NA	NA
Q8720000	LONG CRK AT SR 1917 NR ROCKY RIVER SPRINGS	0.4	0.4	NA	NA	NA	11	15	NA	NA	NA	0.4	0.4	NA	NA	NA
Q9400000	PEE DEE RIV AT US 74 NR ROCKINGHAM	0.4	0.4	NA	NA	NA	4.9	5.2	NA	NA	NA	0.4	0.4	NA	NA	NA

Note: Yellow highlight- Exceeds NC standard. Green highlight- result was not detected above PQL. NA- result not available.

Site ID	Location Description	Sulfate (mg/L)					Specific Conductivity (µS/cm)				
		Round 1	Round 2	Round 3	Round 4	2012-2016 Median	Round 1	Round 2	Round 3	Round 4	2012-2016 Median
B2100000	HAW RIV AT SR 1713 NR BYNUM	18	5.8	NA	NA	21	101	90	NA	NA	217
B4050000	HAW RIV BELOW JORDAN DAM NR MONCURE	4.8	5.9	NA	NA	19	71	89	NA	NA	172
B5575000	DEEP RIV AT NC 42 AT CARBONTON	5.8	NA	NA	NA	NA	101	NA	NA	NA	149
B6040300	DEEP RIV AT SR 1011 OLD US 1 NR MONCURE	7.2	7	NA	NA	NA	101	109	NA	NA	166
B6370000	CAPE FEAR RIV AT US 401 AT LILLINGTON	7.8	6.6	7.4	5.2	20	100	97.4	108	65.8	164
B7600000	CAPE FEAR RIV AT NC 24 AT FAYETTEVILLE	5.1	6.2	6.6	3.4	NA	68	90.3	90	49.7	138
B8340000	CAPE FEAR RIV AT LOCK 2 NR ELIZABETHTOWN	5.8	7.6	7.6	7.7	NA	68	107	91	100	141
B8490000	LITTLE COHARIE CRK AT SR 1414 MINNIE HALL RD NR SALEMBURG	2	3.1	NA	NA	NA	91	102.2	NA	NA	93
B8580000	GREAT COHARIE CRK AT SR 1311 NR CLINTON	2	4	NA	NA	NA	100	110.9	NA	NA	108
B8725000	SIX RUNS CRK AT SR 1960 NR TAYLORS BRIDGE	5.2	7.5	NA	NA	NA	129	152.5	NA	NA	146
B8750000	BLACK RIV AT NC 411 NR TOMAHAWK	4.4	6.9	12	11	NA	84.4	128.2	131	118.8	124
B9013000	BLACK RIV AT RACCOON ISLAND NR HUGGINS	2.1	3.5	6.6	6.8	NA	63	78.7	NA	73.4	104
B9050000	CAPE FEAR RIV AT NAVASSA	5.4	6.1	7.9	7.2	NA	74.8	88.7	NA	73.8	281
B9190500	GOSHEN SWAMP AT SR 1004 NR WESTBROOK CROSSROAD	2.3	4	NA	NA	NA	139	153.6	NA	NA	198
B9196000	NORTHEAST CAPE FEAR RIV AT SR 1961 AT HALLSVILLE	2.7	4.2	6.3	8	NA	105	154.4	164.9	139.4	165
B9470000	ROCKFISH CRK AT I 40 AT WALLACE	2	6.1	5.7	9.4	NA	103	145.1	175.1	124.4	158
B9480000	NORTHEAST CAPE FEAR RIV AT SR 1318 NR WATHA	NA	5.2	5.8	7.2	NA	NA	124.2	135.7	101.9	152
B9740000	NORTHEAST CAPE FEAR RIV AT I-140 AT WILMINGTON	2	54	190	7.6	NA	82	1198	NA	95.2	10521
C9790000	SUGAR CRK AT SC 160 NR FORT MILL SC	18	24	NA	NA	NA	269	NA	NA	NA	403
D6250000	CHOWAN RIV AT US 13 AT WINTON	4	4.5	3.4	4.4	NA	85	93	52	86	89
D9490000	CHOWAN RIV AT US 17 AT EDENHOUSE	85	69	30	13	NA	2141	1657	822	416	213
I2750000	LUMBER RIV AT SR 1303 NR MAXTON	2	2	NA	NA	NA	36	39.7	NA	NA	44
I5370000	BIG SWAMP AT NC 211 NR RICHARDSON	2	2	NA	NA	NA	51	70.6	NA	NA	81
I5690000	LUMBER RIV AT US 74 AT BOARDMAN	2	2.2	2.8	2.7	NA	43	64.5	69	65.6	88
I8970000	WACCAMAW RIV AT NC 130 AT FREELAND	2	2	2	2	NA	41	49.6	NA	58.5	76
J1890000	NEUSE RIV AT SR 2000 NR FALLS	3.8	4.4	4.3	4.7	NA	93	90.4	77.2	73.5	96
J4170000	NEUSE RIV AT NC 42 NR CLAYTON	16	5.8	NA	NA	NA	173	96	NA	NA	177
J4370000	NEUSE RIV AT US 70 BUS AT SMITHFIELD	13	5.8	6.1	4.8	NA	159	96.4	90.87	63.7	150
J5850000	LITTLE RIV AT SR 2320 NR PRINCETON	2.8	2.5	3.1	3.2	NA	69	65.7	66	62.8	79
J5970000	NEUSE RIV AT SR 1915 NR GOLDSBORO	5.7	6.9	7.5	6.5	NA	NA	102.1	101.1	96.5	134
J6150000	NEUSE RIV AT NC 11 AT KINSTON	7.6	6.1	7	8.4	NA	110	100	99	141	144
J7450000	CONTENTNEA CRK AT NC 123 AT HOOKERTON	6.5	9.3	NA	NA	NA	94	114	NA	NA	114
J7810000	CONTENTNEA CRK NR SR 1800 AT GRIFTON	4.8	9.2	9	11	NA	81	119	111	121	118
J7850000	NEUSE RIV AT SR 1470 NR FORT BARNWELL	NA	NA	6.8	8.7	NA	NA	NA	97	106	138
J8570000	NEUSE RIV .5 MI UPS UNION POINT AT NEW BERN	6	8.8	12	18	NA	112	149	149	277	2652
J8730000	TRENT RIV AT US 17 AT POLLOCKSVILLE	2.8	8.8	12	10	NA	99	160	203	157	182
N3000000	DAN RIV AT SR 1761 NR MAYFIELD	4.8	4.7	NA	NA	NA	74	69.4	NA	NA	97
N8200000	ROANOKE RIV AT US 258 NR SCOTLAND NECK	5.6	5.7	5.3	5.4	NA	101	100.7	85.5	89.8	119
N8550000	ROANOKE RIV AT US 13 AND US 17 AT WILLIAMSTON	5.5	5.4	5.6	5.5	NA	98	92	87	77	115
O2000000	TAR RIV AT SR 1001 NR BUNN	5.4	4.1	5.2	3.6	NA	96	125.5	76.4	65.1	116
O3180000	TAR RIV AT NC 97 AT ROCKY MOUNT	3.7	3.8	4.2	3.4	NA	60	87.2	93.6	61.2	94
O5250000	TAR RIV AT NC 33 AND US 64 BUS AT TARBORO	5.6	8	NA	NA	NA	83	120.8	NA	NA	105
O6200000	TAR RIV AT NC 222 NR FALKLAND	7.9	9.2	7.7	6.5	NA	85	115	96	83	110
O7650000	PAMLICO RIV AT US 17 AT WASHINGTON	9.7	64	8.7	8.1	NA	163	2134	169	148	194
P0600000	NEW RIV AT SR 1314 NR GUM BRANCH	23	39	36	15	NA	203	343.3	331.8	156.2	260
P1200000	NEW RIV AT US 17 AT JACKSONVILLE	20	63	230	13	NA	221	1904	6108	224	7605
P3700000	NORTHEAST CRK AT NC 24 AT JACKSONVILLE (Marine Blvd.)	3.1	230	350	84	NA	107	6292	9834	2320	17331
Q5930000	ABBOTTS CRK AT SR 1243 AT LEXINGTON	14	9	NA	NA	NA	194	77.3	NA	NA	163
Q8720000	LONG CRK AT SR 1917 NR ROCKY RIVER SPRINGS	18	29	NA	NA	NA	152	NA	NA	NA	171
Q9400000	PEE DEE RIV AT US 74 NR ROCKINGHAM	4.9	5.3	NA	NA	NA	76	84.5	NA	NA	104

Note: Yellow highlight- Exceeds NC standard. Green highlight- result was not detected above PQL. NA- result not available.

Site ID	Location Description	pH (s.u.)					Dissolved Oxygen (mg/L)				
		Round 1	Round 2	Round 3	Round 4	2012-2016 Median	Round 1	Round 2	Round 3	Round 4	2012-2016 Median
B2100000	HAW RIV AT SR 1713 NR BYNUM	6.9	7.4	NA	NA	7.8	6.8	9.1	NA	NA	9.7
B4050000	HAW RIV BELOW JORDAN DAM NR MONCURE	6.8	6.7	NA	NA	7.2	8.6	8.9	NA	NA	8.2
B5575000	DEEP RIV AT NC 42 AT CARBONTON	6.9	NA	NA	NA	7.3	6.8	NA	NA	NA	8.8
B6040300	DEEP RIV AT SR 1011 OLD US 1 NR MONCURE	7.0	7.1	NA	NA	7.2	7.8	8.7	NA	NA	8.3
B6370000	CAPE FEAR RIV AT US 401 AT LILLINGTON	6.9	6.9	7.5	6.1	6.9	7.0	7.3	10.3	10.3	7.4
B7600000	CAPE FEAR RIV AT NC 24 AT FAYETTEVILLE	6.3	6.9	6.9	5.7	6.9	6.1	6.9	9.9	10.2	9.2
B8340000	CAPE FEAR RIV AT LOCK 2 NR ELIZABETHTOWN	6.0	6.7	6.6	6.5	6.5	2.5	6.5	9.3	9.1	8.8
B8490000	LITTLE COHARIE CRK AT SR 1414 MINNIE HALL RD NR SALEMBURG	6.2	6.2	NA	NA	6.0	0.8	3.0	NA	NA	5.6
B8580000	GREAT COHARIE CRK AT SR 1311 NR CLINTON	6.2	6.2	NA	NA	6.2	0.4	3.2	NA	NA	5.1
B8725000	SIX RUNS CRK AT SR 1960 NR TAYLORS BRIDGE	6.4	6.7	NA	NA	6.7	2.4	6.9	NA	NA	8.7
B8750000	BLACK RIV AT NC 411 NR TOMAHAWK	6.2	6.4	6.3	6.1	6.6	1.8	6.3	9.1	7.8	8.8
B9013000	BLACK RIV AT RACCOON ISLAND NR HUGGINS	5.4	5.9	NA	5.8	6.2	0.1	1.9	NA	7.6	5.1
B9050000	CAPE FEAR RIV AT NAVASSA	6.2	6.3	NA	6.1	6.8	0.1	4.7	NA	8.6	5.8
B9190500	GOSHEN SWAMP AT SR 1004 NR WESTBROOK CROSSROAD	7.8	6.7	NA	NA	6.3	1.4	2.9	6.6	NA	5.2
B9196000	NORTHEAST CAPE FEAR RIV AT SR 1961 AT HALLSVILLE	7.2	6.7	6.8	6.7	6.4	1.6	5.3	8.2	8.4	7.9
B9470000	ROCKFISH CRK AT I 40 AT WALLACE	6.1	6.7	7.0	6.8	6.6	0.1	4.6	7.4	8.5	7.4
B9480000	NORTHEAST CAPE FEAR RIV AT SR 1318 NR WATHA	NA	6.2	6.6	6.4	6.3	NA	4.5	7.2	7.8	7.2
B9740000	NORTHEAST CAPE FEAR RIV AT I-140 AT WILMINGTON	5.7	6.2	NA	6.5	6.9	0.0	2.5	NA	8.2	6.1
C9790000	SUGAR CRK AT SC 160 NR FORT MILL SC	7.2	NA	NA	NA	7.5	5.8	NA	NA	NA	8.0
D6250000	CHOWAN RIV AT US 13 AT WINTON	6.2	6.5	6.2	6.7	6.4	1.8	4.6	5.9	6.5	6.0
D9490000	CHOWAN RIV AT US 17 AT EDENHOUSE	7.3	7.0	7.1	6.3	7.5	7.5	6.9	8.6	8.2	8.9
I2750000	LUMBER RIV AT SR 1303 NR MAXTON	5.3	5.4	NA	NA	5.9	4.0	3.1	NA	NA	7.5
I5370000	BIG SWAMP AT NC 211 NR RICHARDSON	5.5	5.0	NA	NA	5.3	1.8	2.2	NA	NA	6.4
I5690000	LUMBER RIV AT US 74 AT BOARDMAN	5.6	5.5	6.4	5.7	5.9	1.8	3.3	7.7	7.1	7.5
I8970000	WACCAMAW RIV AT NC 130 AT FREELAND	4.9	5.4	NA	4.9	5.1	0.1	2.8	NA	5.2	6.1
J1890000	NEUSE RIV AT SR 2000 NR FALLS	7.1	6.9	7.1	6.8	7.2	7.6	7.0	9.3	9.8	8.6
J4170000	NEUSE RIV AT NC 42 NR CLAYTON	7.4	7.0	NA	NA	7.1	6.8	6.8	NA	NA	7.6
J4370000	NEUSE RIV AT US 70 BUS AT SMITHFIELD	7.3	6.9	7.4	6.4	7.2	7.0	7.0	8.7	8.5	8.1
J5850000	LITTLE RIV AT SR 2320 NR PRINCETON	7.2	6.6	7.4	6.1	6.8	6.8	7.5	10.0	8.5	8.9
J5970000	NEUSE RIV AT SR 1915 NR GOLDSBORO	NA	6.6	7.3	6.7	6.9	NA	6.9	9.1	8.6	7.9
J6150000	NEUSE RIV AT NC 11 AT KINSTON	6.6	6.7	6.7	6.7	6.9	4.6	4.5	7.9	9.5	7.7
J7450000	CONTENTNEA CRK AT NC 123 AT HOOKERTON	6.2	7.0	NA	NA	6.3	2.3	5.2	NA	NA	7.3
J7810000	CONTENTNEA CRK NR SR 1800 AT GRIFTON	6.2	6.8	6.5	6.6	6.5	1.4	4.7	8.1	7.8	7.3
J7850000	NEUSE RIV AT SR 1470 NR FORT BARNWELL	NA	NA	6.9	6.6	6.8	NA	NA	7.7	8.2	7.3
J8570000	NEUSE RIV .5 MI UPS UNION POINT AT NEW BERN	6.4	6.9	6.5	6.7	7.1	12.4	5.3	6.7	9.3	8.0
J8730000	TRENT RIV AT US 17 AT POLLOCKSVILLE	6.2	6.9	7.1	7.0	6.9	0.1	3.0	5.9	6.5	5.6
N3000000	DAN RIV AT SR 1761 NR MAYFIELD	6.9	7.3	NA	NA	7.5	8.6	8.7	NA	NA	9.2
N8200000	ROANOKE RIV AT US 258 NR SCOTLAND NECK	7.5	6.8	7.0	7.0	7.2	6.5	4.6	7.9	9.0	9.2
N8550000	ROANOKE RIV AT US 13 AND US 17 AT WILLIAMSTON	6.8	6.6	6.8	6.9	6.8	4.8	4.1	5.4	7.0	8.2
O2000000	TAR RIV AT SR 1001 NR BUNN	6.8	7.2	6.9	6.5	7	6.8	6.8	9.4	9.6	6.9
O3180000	TAR RIV AT NC 97 AT ROCKY MOUNT	7.3	7.2	7.2	6.6	7.1	8.0	7.0	10.8	11.2	9.2
O5250000	TAR RIV AT NC 33 AND US 64 BUS AT TARBORO	7.0	7.1	NA	NA	6.9	6.0	6.6	NA	NA	7.6
O6200000	TAR RIV AT NC 222 NR FALKLAND	6.5	6.9	6.9	7.1	6.8	5.4	6.5	8.9	9.4	8.4
O7650000	PAMLICO RIV AT US 17 AT WASHINGTON	6.5	6.7	6.9	6.5	7	4.3	4.3	7.1	7.6	8.1
P0600000	NEW RIV AT SR 1314 NR GUM BRANCH	7.3	7.4	7.5	6.9	7.1	4.1	6.7	8.1	7.5	7.8
P1200000	NEW RIV AT US 17 AT JACKSONVILLE	7.4	7.1	7.4	7.0	7.6	2.2	3.7	7.2	6.6	9.4
P3700000	NORTHEAST CRK AT NC 24 AT JACKSONVILLE (Marine Blvd.)	7.0	6.8	7.1	6.6	7.5	2.2	5.8	6.5	6.6	7.5
Q5930000	ABBOTTS CRK AT SR 1243 AT LEXINGTON	7.1	6.8	NA	NA	7.3	5.6	8.1	NA	NA	7.8
Q8720000	LONG CRK AT SR 1917 NR ROCKY RIVER SPRINGS	7.6	NA	NA	NA	7.6	8.0	NA	NA	NA	9.3
Q9400000	PEE DEE RIV AT US 74 NR ROCKINGHAM	6.9	7.1	NA	NA	7.1	7.8	7.7	NA	NA	7.6

Note: Yellow highlight- Exceeds NC standard. Green highlight- result was not detected above PQL. NA- result not available.

Appendix II

List of Target Analytes for Volatile and Semi-volatile Organic Compounds Following Hurricane Florence

Volatile Organics		Semi-Volatile Organics		
Dichlorodifluoromethane	Tetrachloroethene	Acenaphthene	Dibenzo(a,h)anthracene	Indeno(1,2,3-cd)pyrene
Chloromethane	Chlorobenzene	Acenaphthylene	Dibenzofuran	Isophorone
Vinyl Chloride	Ethylbenzene	Aniline	2,4-Dichlorophenol	2-Methylnaphthalene
Bromomethane	Bromoform	Anthracene	1,2-Dichlorobenzene	2-Methylphenol
Chloroethane	m,p-Xylene	Benzo(a)anthracene	1,3-Dichlorobenzene	4-Methylphenol
Trichlorofluoromethane	Styrene	Benzo(a)pyrene	1,4-Dichlorobenzene	Naphthalene(SV)
1,1-Dichloroethene	1,1,2,2-Tetrachloroethane	Benzo(b)fluoranthene	3,3'-Dichlorobenzidine	2-Nitrophenol-
Methylene Chloride	1,1,1,2-Tetrachloroethane	Benzo(g,h,i)perylene	Diethyl phthalate	4-Nitrophenol
trans-1,2-Dichloroethene	o-Xylene	Benzo(k)fluoranthene	2,4-Dimethylphenol	2-Nitroaniline
Methyl Tert-Butyl Ether	1,2,3-Trichloropropane	Benzoic acid	Dimethyl phthalate	3-Nitroaniline
1,1-Dichloroethane	Isopropylbenzene	Benzyl alcohol Bis(2-chloroethoxy)methane	Di-n-butyl phthalate	4-Nitroaniline
cis-1,2-Dichloroethene	Bromobenzene	Bis(2-chloroethyl)ether	2,4-Dinitrophenol	Nitrobenzene
Bromochloromethane	n-Propylbenzene	Bis(2-chloroisopropyl)ether	4,6-Dinitro-2-methyl phenol	N-nitrosodi-n-propylamine
Chloroform	2-Chlorotoluene	Bis(2-ethylhexyl)phthalate 4-Bromophenyl phenyl ether	2,4-Dinitrotoluene	N-nitrosodiphenylamine
2,2-Dichloropropane	4-Chlorotoluene	Butylbenzyl phthalate 2-Chloronaphthalene 4-Chloro-3-methyl phenol 4-Chloroaniline 2-Chlorophenol 4-Chlorophenyl phenyl ether Chrysene	2,6-Dinitrotoluene	Pentachlorophenol
1,2-Dichloroethane	1,3,5-Trimethylbenzene		Di-n-octyl phthalate	Phenanthrene
1,1,1-Trichloroethane	tert-Butylbenzene		Fluoranthene	Phenol
1,1-Dichloropropene	1,2,4-Trimethylbenzene		Fluorene	Pyrene
Carbon Tetrachloride	sec-Butylbenzene		Hexachlorobenzene	2,4,5-Trichlorophenol
Benzene	m-Dichlorobenzene (1,3)		Hexachlorobutadiene(SV)	2,4,6-Trichlorophenol
Dibromomethane	p-Dichlorobenzene (1,4)		Hexachlorocyclopentadiene	1,2,4-Trichlorobenzene
1,2-Dichloropropane	o-Dichlorobenzene (1,2)		Hexachloroethane	TPH Diesel Range Organics
Trichloroethene	p-Isopropyltoluene			
Bromodichloromethane	n-Butylbenzene			
cis-1,3-Dichloropropene	1,2-Dibromo-3-Chloropropane			
trans-1,3-Dichloropropene	1,2,4-Trichlorobenzene			
1,1,2-Trichloroethane	Naphthalene			
Toluene	Hexachlorobutadiene			
1,3-Dichloropropane	1,2,3-Trichlorobenzene			
Dibromochloromethane	TPH-Gas in Liquid			
(EDB)1,2-Dibromoethane				

Appendix III

Metals Results Summary for Samples Collected at Duke Energy's Sutton Steam Plant Following Hurricane Florence

Location: Sutton Plant on Cape Fear River, at dam breach
Date: 9/22/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	WQS	SUTTON_ BREACH
Total	Hardness (calculated)	mg/L	100	11
Total	Silver (Ag)	µg/L	NA	1.0 U
Total	Aluminum (Al)	µg/L	NA	1100
Total	Arsenic (As)	µg/L	10	2.0 U
Total	Boron (B)	µg/L	NA	50 U
Total	Beryllium (Be)	µg/L	NA	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U
Total	Copper (Cu)	µg/L	NA	3.2
Total	Iron (Fe)	µg/L	NA	1500
Total	Potassium (K)	mg/L	NA	3.4
Total	Manganese (Mn)	µg/L	NA	100
Total	Sodium (Na)	mg/L	NA	2.1
Total	Nickel (Ni)	µg/L	25	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U
Total	Strontium (Sr)	µg/L	NA	18
Total	Zinc (Zn)	µg/L	NA	10 U

Notes:

- Water Quality Standards (WQS) are provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Results below DWR laboratory detection limits (non-detects) are shown with the practical quantitation limit (PQL) and a U qualifier.

Location: Sutton Plant on Cape Fear River, at dam breach
Date: 9/22/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Acute WQS	Chronic WQS	Rep-1	Rep-2
Dissolved	Silver (Ag)	µg/L	0.07	0.06	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	480	580
Dissolved	Arsenic (As)	µg/L	340	150	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	50 U	50 U
Dissolved	Beryllium (Be)	µg/L	65	6.5	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.40	0.08	0.50 U	0.50 U
Dissolved	Chromium (Cr)	µg/L	16	11	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	1.7	1.4	2.5	2.6
Dissolved	Iron (Fe)	µg/L	NA	NA	740	750
Dissolved	Potassium (K)	mg/L	NA	NA	3.3	3.8
Dissolved	Manganese (Mn)	µg/L	NA	NA	95	82
Dissolved	Sodium (Na)	mg/L	NA	NA	2.1	2.1
Dissolved	Nickel (Ni)	µg/L	NA	NA	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	5.5	0.2	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	15	16
Dissolved	Zinc (Zn)	µg/L	18	18	10 U	10 U

Notes:

- Water Quality Standards (WQS) are provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Results below DWR laboratory detection limits (non-detects) are shown with the practical quantitation limit (PQL) and a U qualifier.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI. Future monitoring events will include analysis of both dissolved total Cr and Cr VI.

Location: Sutton Plant on Cape Fear River

Date: 9/25/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	Fresh WQS	B9020000	SUTTON_LK_BREACH	SUTTON_BREACH		Salt WQS	B9050000
Total	Hardness (calculated)	mg/L	NA	12	12	12			NA
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U	1.0 U		NA	1.0 U
Total	Aluminum (Al)	µg/L	NA	1100	860	1200		NA	1400
Total	Antimony (Sb)	µg/L	NA	10 U	10 U	10 U		NA	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	2.1	2.0 U		10	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U	50 U		NA	50 U
Total	Barium (Ba)	µg/L	NA	23	20	24		NA	26
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U	5.0 U		NA	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U	0.50 U		NA	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U	50 U		NA	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U	5.0 U		NA	5.0 U
Total	Copper (Cu)	µg/L	NA	2.8	3.1	2.9		NA	3.2
Total	Iron (Fe)	µg/L	NA	1400	1200	1500		NA	1700
Total	Potassium (K)	mg/L	NA	3.5	3.9	3.6		NA	3.5
Total	Manganese (Mn)	µg/L	NA	87	100	100		NA	110
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U	10 U		NA	10 U
Total	Sodium (Na)	mg/L	NA	2.3	2.1	2.4		NA	2.5
Total	Nickel (Ni)	µg/L	NA	2.0 U	2.0 U	2.0 U		NA	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U	2.0 U		NA	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U	1.0 U		71	1.0 U
Total	Strontium (Sr)	µg/L	NA	17	19	18		NA	19
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U	2.0 U		NA	2.0 U
Total	Titanium (Ti)	µg/L	NA	40	26	43		NA	51
Total	Vanadium (V)	µg/L	NA	10 U	10 U	10 U		NA	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	10 U	10 U		NA	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- B9050000 is classified as salt water (SC). Other sampling locations are classified as fresh water.

Location: Sutton Plant on Cape Fear River

Date: 9/25/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Fresh Acute WQS	Fresh Chronic WQS	B9020000 Rep-1	B9020000 Rep-2	SUTTON_ LK_BREACH Rep-1	SUTTON_ LK_BREACH Rep-2	SUTTON_ BREACH Rep-1	SUTTON_ BREACH Rep-2		Salt Acute WQS	Salt Chronic WQS	B9050000 Rep-1	B9050000 Rep-2
Dissolved	Silver (Ag)	µg/L	0.08	0.06	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1.9	0.1	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	350	600	320	460	650	670		NA	NA	640	720
Dissolved	Antimony (Sb)	µg/L	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	150	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U		69	36	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U		NA	NA	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	19	20	17	18	22	22		NA	NA	22	22
Dissolved	Beryllium (Be)	µg/L	65	6.5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U		NA	NA	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.43	0.09	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U		40	8.8	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U		NA	NA	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	11	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U		1100	50	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	1.8	1.5	2.5	2.3	2.4	2.7	2.4	2.5		4.8	3.1	2.7	2.5
Dissolved	Iron (Fe)	µg/L	NA	NA	640	840	570	680	960	1000		NA	NA	1000	1000
Dissolved	Potassium (K)	mg/L	NA	NA	3.3	3.4	3.8	3.8	3.3	3.3		NA	NA	3.4	3.4
Dissolved	Manganese (Mn)	µg/L	NA	NA	77	81	92	94	94	93		NA	NA	95	95
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	2.2	2.2	2.0	2.1	2.4	2.4		NA	NA	2.4	2.4
Dissolved	Nickel (Ni)	µg/L	78	8.7	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U		74	8.2	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	6.0	0.2	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U		210	8.1	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		NA	NA	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	17	16	19	18	17	17		NA	NA	18	18
Dissolved	Thallium (Tl)	µg/L	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U		NA	NA	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	10 U	15	10 U	10 U	19	20		NA	NA	18	21
Dissolved	Vanadium (V)	µg/L	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	19	20	10 U	10 U	10 U	10 U	10 U	10 U		90	81	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI. Future monitoring events will include analysis of both dissolved total Cr and Cr VI.

Location: Sutton Plant on Cape Fear River

Date: 9/26/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	Fresh WQS	SUTTON_LK_BREACH		Salt WQS	B9050000
Total	Hardness (calculated)	mg/L	NA	12			NA
Total	Silver (Ag)	µg/L	NA	1.0 U		NA	1.0 U
Total	Aluminum (Al)	µg/L	NA	680		NA	730
Total	Antimony (Sb)	µg/L	NA	10 U		NA	10 U
Total	Arsenic (As)	µg/L	10	2.0		10	2.0 U
Total	Boron (B)	µg/L	NA	50 U		NA	50 U
Total	Barium (Ba)	µg/L	NA	19		NA	22
Total	Beryllium (Be)	µg/L	NA	5.0 U		NA	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U		NA	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U		NA	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U		NA	5.0 U
Total	Copper (Cu)	µg/L	NA	2.7		NA	2.2
Total	Iron (Fe)	µg/L	NA	1100		NA	1500
Total	Potassium (K)	mg/L	NA	3.9		NA	2.7
Total	Manganese (Mn)	µg/L	NA	100		NA	180
Total	Molybdenum (Mo)	µg/L	NA	10 U		NA	10 U
Total	Sodium (Na)	mg/L	NA	2.1		NA	2.8
Total	Nickel (Ni)	µg/L	NA	2.0 U		NA	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U		NA	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U		71	1.0 U
Total	Strontium (Sr)	µg/L	NA	18		NA	22
Total	Thallium (Tl)	µg/L	NA	2.0 U		NA	2.0 U
Total	Titanium (Ti)	µg/L	NA	17		NA	20
Total	Vanadium (V)	µg/L	NA	10 U		NA	10 U
Total	Zinc (Zn)	µg/L	NA	10 U		NA	12

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- B9050000 is classified as salt water (SC). Other sampling locations are classified as fresh water.

Location: Sutton Plant on Cape Fear River

Date: 9/26/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Fresh Acute WQS	Fresh Chronic WQS	SUTTON_LK_BREACH Rep-1	SUTTON_LK_BREACH Rep-2		Salt Acute WQS	Salt Chronic WQS	B9050000 Rep-1	B9050000 Rep-2
Dissolved	Silver (Ag)	µg/L	0.08	0.06	1.0 U	1.0 U		1.9	0.1	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	340	380		NA	NA	380	470
Dissolved	Antimony (Sb)	µg/L	NA	NA	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	150	2.5	2.0 U		69	36	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	50 U	50 U		NA	NA	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	17	17		NA	NA	20	20
Dissolved	Beryllium (Be)	µg/L	65	6.5	5.0 U	5.0 U		NA	NA	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.43	0.09	0.50 U	0.50 U		40	8.8	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	50 U	50 U		NA	NA	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	11	5.0 U	5.0 U		1100	50	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	1.8	1.5	2.6	2.3		4.8	3.1	2.0 U	2.0 U
Dissolved	Iron (Fe)	µg/L	NA	NA	570	640		NA	NA	1200	1200
Dissolved	Potassium (K)	mg/L	NA	NA	3.8	3.8		NA	NA	2.6	2.7
Dissolved	Manganese (Mn)	µg/L	NA	NA	100	97		NA	NA	170	170
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	2.0	2.0		NA	NA	2.8	2.7
Dissolved	Nickel (Ni)	µg/L	78	8.7	2.0 U	2.0 U		74	8.2	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	6.0	0.2	2.0 U	2.0 U		210	8.1	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	1.0 U	1.0 U		NA	NA	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	18	17		NA	NA	22	21
Dissolved	Thallium (Tl)	µg/L	NA	NA	2.0 U	2.0 U		NA	NA	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	19	20	10 U	10 U		90	81	13	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI. Future monitoring events will include analysis of both dissolved total Cr and Cr VI.

Location: Sutton Plant on Cape Fear River

Date: 9/27/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	Fresh WQS	SUTTON_ UP	SUTTON_ LK_BREACH	SUTTON_ DOWN
Total	Hardness (calculated)	mg/L	NA	15	12	15
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U	1.0 U
Total	Aluminum (Al)	µg/L	NA	730	600	850
Total	Antimony (Sb)	µg/L	NA	10 U	10 U	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	2.3	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U	50 U
Total	Barium (Ba)	µg/L	NA	28	19	27
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Copper (Cu)	µg/L	NA	2.4	2.4	2.6
Total	Iron (Fe)	µg/L	NA	1600	1100	1700
Total	Potassium (K)	mg/L	NA	3.7	4.1	3.8
Total	Manganese (Mn)	µg/L	NA	330	110	290
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U	10 U
Total	Sodium (Na)	mg/L	NA	2.7	2.1	2.8
Total	Nickel (Ni)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U	1.0 U
Total	Strontium (Sr)	µg/L	NA	21	18	21
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Titanium (Ti)	µg/L	NA	10 U	10 U	12
Total	Vanadium (V)	µg/L	NA	10 U	10 U	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- All sampling locations are classified as fresh water.

Location: Sutton Plant on Cape Fear River

Date: 9/27/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Acute WQS (hardness=12)	Acute WQS (hardness=15)	Chronic WQS (hardness=12)	Chronic WQS (hardness=15)	SUTTON_ UP Rep-1	SUTTON_ UP Rep-2	SUTTON_ LK_BREACH Rep-1	SUTTON_ LK_BREACH Rep-2	SUTTON_ DOWN Rep-1	SUTTON_ DOWN Rep-2
Dissolved	Silver (Ag)	µg/L	0.08	0.12	0.06	0.06	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	NA	NA	320	470	310	300	310	510
Dissolved	Antimony (Sb)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	340	150	150	2.0 U	2.0 U	2.1	2.0 U	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	NA	NA	24	25	17	16	23	25
Dissolved	Beryllium (Be)	µg/L	65	65	6.5	6.5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.43	0.52	0.10	0.10	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	16	11	11	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	1.8	2.2	1.5	1.8	2.0 U	2.0	2.3	2.2	2.0 U	2.0 U
Dissolved	Iron (Fe)	µg/L	NA	NA	NA	NA	1000	1300	620	430	820	1100
Dissolved	Potassium (K)	mg/L	NA	NA	NA	NA	3.7	3.6	3.9	3.8	3.8	3.8
Dissolved	Manganese (Mn)	µg/L	NA	NA	NA	NA	300	320	99	94	270	290
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	NA	NA	2.7	2.7	2.0	2.0	2.7	2.8
Dissolved	Nickel (Ni)	µg/L	78	94	8.7	10.4	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	6.0	7.8	0.2	0.3	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	NA	NA	21	21	17	17	20	21
Dissolved	Thallium (Tl)	µg/L	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	19	23	20	24	10 U	10 U	10 U	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Some metals WQS vary based on water hardness. See total metals results table for hardness values at each sampling location.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI. Future monitoring events will include analysis of both dissolved total Cr and Cr VI.

Location: Sutton Plant on Cape Fear River

Date: 9/28/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	Freshwater WQS	SUTTON_ UP	SUTTON_ LK_BREACH	SUTTON_ DOWN
Total	Hardness (calculated)	mg/L	NA	17	12	16
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U	1.0 U
Total	Aluminum (Al)	µg/L	NA	640	380	700
Total	Antimony (Sb)	µg/L	NA	10 U	10 U	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	2.4	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U	50 U
Total	Barium (Ba)	µg/L	NA	32	18	31
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Copper (Cu)	µg/L	NA	2.0	2.3	2.3
Total	Iron (Fe)	µg/L	NA	2000	730	2000
Total	Potassium (K)	mg/L	NA	4.1	4.0	3.9
Total	Manganese (Mn)	µg/L	NA	480	100	no data
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U	10 U
Total	Sodium (Na)	mg/L	NA	2.9	2.1	2.9
Total	Nickel (Ni)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U	1.0 U
Total	Strontium (Sr)	µg/L	NA	22	18	23
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Titanium (Ti)	µg/L	NA	10 U	10 U	10 U
Total	Vanadium (V)	µg/L	NA	10 U	10 U	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- All sampling locations are classified as fresh water.

Location: Sutton Plant on Cape Fear River

Date: 9/28/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Acute WQS (hardness=12)	Acute WQS (hardness=16)	Acute WQS (hardness=17)	Chronic WQS (hardness=12)	Chronic WQS (hardness=16)	Chronic WQS (hardness=17)	SUTTON_ UP Rep-1	SUTTON_ UP Rep-2	SUTTON_ LK_BREACH Rep-1	SUTTON_ LK_BREACH Rep-2	SUTTON_ DOWN Rep-1	SUTTON_ DOWN Rep-2
Total	Hardness	mg/L	12	16	17	12	16	17						
Dissolved	Silver (Ag)	µg/L	0.08	0.14	0.15	0.06	0.06	0.06	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	NA	NA	NA	NA	400	470	270	270	390	410
Dissolved	Antimony (Sb)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	340	340	150	150	150	2.0 U	2.0 U	2.3	2.4	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	NA	NA	NA	NA	29	29	17	17	27	27
Dissolved	Beryllium (Be)	µg/L	65	65	65	6.5	6.5	6.5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.43	0.55	0.58	0.09	0.11	0.11	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	16	16	11	11	11	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	1.8	2.4	2.5	1.5	1.9	2.0	2.0 U	2.0 U	2.1	2.1	2.0 U	2.0 U
Dissolved	Iron (Fe)	µg/L	NA	NA	NA	NA	NA	NA	1600	1600	430	430	1500	1500
Dissolved	Potassium (K)	mg/L	NA	NA	NA	NA	NA	NA	3.9	3.9	3.9	4.0	4.0	3.8
Dissolved	Manganese (Mn)	µg/L	NA	NA	NA	NA	NA	NA	460	480	97	98	420	430
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	NA	NA	NA	NA	2.9	2.9	2.1	2.1	2.9	2.9
Dissolved	Nickel (Ni)	µg/L	78	99	105	8.7	11.0	11.6	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	6.0	8.4	9.0	0.2	0.3	0.3	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	NA	NA	NA	NA	23	22	17	17	23	22
Dissolved	Thallium (Tl)	µg/L	NA	NA	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	19	25	26	20	25	26	10 U	10 U	10 U	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Some metals WQS vary based on water hardness. See total metals results table for hardness at each sampling location.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI.

Location: Sutton Plant on Cape Fear River

Date: 9/29/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	Freshwater WQS	SUTTON_ UP	SUTTON_ LK_BREACH	SUTTON_ DOWN
Total	Hardness (calculated)	mg/L	NA	18	13	19
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U	1.0 U
Total	Aluminum (Al)	µg/L	NA	630	370	730
Total	Antimony (Sb)	µg/L	NA	10 U	10 U	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	2.9	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U	50 U
Total	Barium (Ba)	µg/L	NA	35	19	35
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Copper (Cu)	µg/L	NA	2.0 U	2.4	2.0
Total	Iron (Fe)	µg/L	NA	2200	830	2300
Total	Potassium (K)	mg/L	NA	4.2	4.1	4.3
Total	Manganese (Mn)	µg/L	NA	500	110	500
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U	10 U
Total	Sodium (Na)	mg/L	NA	3.5	2.2	3.4
Total	Nickel (Ni)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U	1.0 U
Total	Strontium (Sr)	µg/L	NA	21	16	21
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Titanium (Ti)	µg/L	NA	10 U	10 U	10 U
Total	Vanadium (V)	µg/L	NA	10 U	10 U	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- All sampling locations are classified as fresh water.

Location: Sutton Plant on Cape Fear River

Date: 9/29/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Acute WQS (hardness=13)	Acute WQS (hardness=18)	Acute WQS (hardness=19)	Chronic WQS (hardness=13)	Chronic WQS (hardness=18)	Chronic WQS (hardness=19)	SUTTON_ UP Rep-1	SUTTON_ UP Rep-2	SUTTON_ LK_BREACH Rep-1	SUTTON_ LK_BREACH Rep-2	SUTTON_ DOWN Rep-1	SUTTON_ DOWN Rep-2
Total	Hardness	mg/L	13	18	19	13	18	19						
Dissolved	Silver (Ag)	µg/L	0.10	0.17	0.18	0.06	0.06	0.06	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	NA	NA	NA	NA	380	380	260	270	380	400
Dissolved	Antimony (Sb)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	340	340	150	150	150	2.0 U	2.0 U	2.8	3.0	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	NA	NA	NA	NA	31	31	18	18	31	31
Dissolved	Beryllium (Be)	µg/L	65	65	65	6.5	6.5	6.5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.46	0.61	0.64	0.09	0.12	0.12	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	16	16	11	11	11	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	2.0	2.7	2.8	1.6	2.1	2.2	2.0 U	2.0 U	2.0	2.0 U	2.0 U	2.0 U
Dissolved	Iron (Fe)	µg/L	NA	NA	NA	NA	NA	NA	1500	1500	460	460	1600	1600
Dissolved	Potassium (K)	mg/L	NA	NA	NA	NA	NA	NA	4.2	4.1	4.2	4.2	4.2	4.2
Dissolved	Manganese (Mn)	µg/L	NA	NA	NA	NA	NA	NA	480	470	120	110	480	480
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	NA	NA	NA	NA	3.4	3.4	2.1	2.1	3.3	3.3
Dissolved	Nickel (Ni)	µg/L	83	110	115	9.3	12.2	12.8	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	6.6	9.6	10.2	0.3	0.4	0.4	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	NA	NA	NA	NA	21	20	16	16	20	20
Dissolved	Thallium (Tl)	µg/L	NA	NA	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	21	27	29	21	28	29	10 U	10 U	10 U	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Some metals WQS vary based on water hardness. See total metals results table for hardness at each sampling location.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI.

Location: Sutton Plant on Cape Fear River

Date: 9/30/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	Freshwater WQS	SUTTON_UP	SUTTON_LK_BREACH	SUTTON_DOWN
Total	Hardness (calculated)	mg/L	NA	19	14	19
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U	1.0 U
Total	Aluminum (Al)	µg/L	NA	600	400	570
Total	Antimony (Sb)	µg/L	NA	10 U	10 U	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	5.9	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U	50 U
Total	Barium (Ba)	µg/L	NA	34	21	34
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Copper (Cu)	µg/L	NA	2.0 U	2.5	2.0 U
Total	Iron (Fe)	µg/L	NA	2000	1400	2100
Total	Potassium (K)	mg/L	NA	4.3	4.1	4.3
Total	Manganese (Mn)	µg/L	NA	350	160	390
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U	10 U
Total	Sodium (Na)	mg/L	NA	4.1	2.2	4.1
Total	Nickel (Ni)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U	1.0 U
Total	Strontium (Sr)	µg/L	NA	22	21	21
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Titanium (Ti)	µg/L	NA	10 U	10 U	10 U
Total	Vanadium (V)	µg/L	NA	10 U	10 U	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	15	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- All sampling locations are classified as fresh water.

Location: Sutton Plant on Cape Fear River

Date: 9/30/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Acute WQS (hardness=14)	Acute WQS (hardness=19)	Chronic WQS (hardness=14)	Chronic WQS (hardness=19)	SUTTON_UP Rep-1	SUTTON_UP Rep-2	SUTTON_LK_BREACH Rep-1	SUTTON_LK_BREACH Rep-2	SUTTON_DOWN Rep-1	SUTTON_DOWN Rep-2
Total	Hardness	mg/L	14	19	14	19						
Dissolved	Silver (Ag)	µg/L	0.11	0.18	0.06	0.06	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	NA	NA	370	320	300	270	390	540
Dissolved	Antimony (Sb)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	340	150	150	2.0 U	2.0 U	5.4	5.0	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	NA	NA	29	25	21	19	30	33
Dissolved	Beryllium (Be)	µg/L	65	65	6.5	6.5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.49	0.64	0.10	0.12	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	16	11	11	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	2.1	2.8	1.7	2.2	2.0 U	2.0 U	2.3	2.0 U	2.0 U	2.0 U
Dissolved	Iron (Fe)	µg/L	NA	NA	NA	NA	1100	1000	1100	680	1200	1700
Dissolved	Potassium (K)	mg/L	NA	NA	NA	NA	4.1	3.5	4.1	4.1	4.3	4.3
Dissolved	Manganese (Mn)	µg/L	NA	NA	NA	NA	330	280	150	150	380	380
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	NA	NA	3.8	3.3	2.2	2.2	4.1	4.1
Dissolved	Nickel (Ni)	µg/L	89	115	9.9	12.8	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	7.2	10.2	0.3	0.4	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	NA	NA	20	18	21	20	21	21
Dissolved	Thallium (Tl)	µg/L	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	22	29	22	29	10 U	10 U	10 U	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Some metals WQS vary based on water hardness. See total metals results table for hardness at each sampling location.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI.

Location: Sutton Plant on Cape Fear River

Date: 10/1/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	Freshwater WQS	SUTTON_UP	SUTTON_LK_BREACH	SUTTON_DOWN
Total	Hardness (calculated)	mg/L	NA	22	15	21
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U	1.0 U
Total	Aluminum (Al)	µg/L	NA	720	360	780
Total	Antimony (Sb)	µg/L	NA	10 U	10 U	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	5.2	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U	50 U
Total	Barium (Ba)	µg/L	NA	33	21	34
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Copper (Cu)	µg/L	NA	2.0 U	2.3	2.0 U
Total	Iron (Fe)	µg/L	NA	1900	1100	2000
Total	Potassium (K)	mg/L	NA	4.5	4.3	4.4
Total	Manganese (Mn)	µg/L	NA	240	160	280
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U	10 U
Total	Sodium (Na)	mg/L	NA	4.8	2.3	4.9
Total	Nickel (Ni)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U	1.0 U
Total	Strontium (Sr)	µg/L	NA	24	21	23
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Titanium (Ti)	µg/L	NA	10 U	10 U	10 U
Total	Vanadium (V)	µg/L	NA	10 U	10 U	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- All sampling locations are classified as fresh water.

Location: Sutton Plant on Cape Fear River

Date: 10/1/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Acute WQS (hardness=15)	Acute WQS (hardness=21)	Acute WQS (hardness=22)	Chronic WQS (hardness=15)	Chronic WQS (hardness=21)	Chronic WQS (hardness=22)	SUTTON_ UP Rep-1	SUTTON_ UP Rep-2	SUTTON_ LK_BREACH Rep-1	SUTTON_ LK_BREACH Rep-2	SUTTON_ DOWN Rep-1	SUTTON_ DOWN Rep-2
Total	Hardness	mg/L	15	21	22	15	21	22						
Dissolved	Silver (Ag)	µg/L	0.12	0.22	0.24	0.06	0.06	0.06	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	NA	NA	NA	NA	450	350	270	220	430	390
Dissolved	Antimony (Sb)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	340	340	150	150	150	2.0 U	2.0 U	5.1	4.9	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	NA	NA	NA	NA	30	30	20	19	31	30
Dissolved	Beryllium (Be)	µg/L	65	65	65	6.5	6.5	6.5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.52	0.70	0.73	0.10	0.13	0.14	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	16	16	11	11	11	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	2.2	3.1	3.2	1.8	2.4	2.5	2.0 U	2.0 U	2.1	2.2	2.0 U	2.0 U
Dissolved	Iron (Fe)	µg/L	NA	NA	NA	NA	NA	NA	1200	930	670	520	1200	1100
Dissolved	Potassium (K)	mg/L	NA	NA	NA	NA	NA	NA	4.3	4.5	4.2	4.2	4.4	4.4
Dissolved	Manganese (Mn)	µg/L	NA	NA	NA	NA	NA	NA	230	220	150	150	260	260
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	NA	NA	NA	NA	4.7	4.8	2.2	2.2	4.9	4.9
Dissolved	Nickel (Ni)	µg/L	94	125	130	10.4	13.9	14.4	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	7.8	11.4	12.0	0.3	0.4	0.5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	NA	NA	NA	NA	23	24	21	22	23	23
Dissolved	Thallium (Tl)	µg/L	NA	NA	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	23	31	32	24	31	33	10 U	10 U	10 U	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Some metals WQS vary based on water hardness. See total metals results table for hardness at each sampling location.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI.

Location: Sutton Plant on Cape Fear River

Date: 10/2/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	Freshwater WQS	SUTTON_ UP	SUTTON_ LK_BREACH	SUTTON_ DOWN		Saltwater WQS	B9050000
Total	Hardness (calculated)	mg/L	NA	22	15	22			NA
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U	1.0 U		NA	1.0 U
Total	Aluminum (Al)	µg/L	NA	560	330	500		NA	440
Total	Antimony (Sb)	µg/L	NA	10 U	10 U	10 U		NA	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	5.4	2.0 U		10	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U	50 U		NA	50 U
Total	Barium (Ba)	µg/L	NA	34	22	33		NA	32
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U	5.0 U		NA	5.0 U
Total	Cadmium (Cd)	µg/L	NA	no data	no data	no data		NA	no data
Total	Cobalt (Co)	µg/L	NA	50 U	50 U	50 U		NA	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U	5.0 U		NA	5.0 U
Total	Copper (Cu)	µg/L	NA	2.0 U	2.2	2.0 U		NA	2.0 U
Total	Iron (Fe)	µg/L	NA	1800	1100	1800		NA	1700
Total	Potassium (K)	mg/L	NA	4.5	4.3	4.4		NA	4.4
Total	Manganese (Mn)	µg/L	NA	200	160	220		NA	210
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U	10 U		NA	10 U
Total	Sodium (Na)	mg/L	NA	5.8	2.3	5.7		NA	5.9
Total	Nickel (Ni)	µg/L	NA	2.0 U	2.0 U	2.0 U		NA	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U	2.0 U		NA	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U	1.0 U		71	1.0 U
Total	Strontium (Sr)	µg/L	NA	26	23	29		NA	26
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U	2.0 U		NA	2.0 U
Total	Titanium (Ti)	µg/L	NA	10 U	10 U	10 U		NA	10 U
Total	Vanadium (V)	µg/L	NA	10 U	10 U	10 U		NA	10 U
Total	Zinc (Zn)	µg/L	NA	no data	no data	no data		NA	no data

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- B9050000 is classified as salt water (SC). Other sampling locations are classified as fresh water.

Location: Sutton Plant on Cape Fear River

Date: 10/2/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Fresh Acute WQS (hardness=15)	Fresh Acute WQS (hardness=22)	Fresh Chronic WQS (hardness=15)	Fresh Chronic WQS (hardness=22)	SUTTON_ UP Rep-1	SUTTON_ UP Rep-2	SUTTON_ LK_BREACH Rep-1	SUTTON_ LK_BREACH Rep-2	SUTTON_ DOWN Rep-1	SUTTON_ DOWN Rep-2		Saltwater Acute WQS	Saltwater Chronic WQS	B9050000 Rep-1	B9050000 Rep-2
Total	Hardness	mg/L	15	22	15	22											
Dissolved	Silver (Ag)	µg/L	0.12	0.24	0.06	0.06	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		1.9	0.1	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	NA	NA	340	270	260	230	290	280		NA	NA	320	380
Dissolved	Antimony (Sb)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	340	150	150	2.0 U	2.0 U	5.5	5.4	2.0 U	2.0 U		69	36	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U		NA	NA	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	NA	NA	30	29	20	19	29	29		NA	NA	29	30
Dissolved	Beryllium (Be)	µg/L	65	65	6.5	6.5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U		NA	NA	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.52	0.73	0.10	0.14	no data	no data	no data	no data	no data	no data		40	8.8	no data	no data
Dissolved	Cobalt (Co)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U		NA	NA	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	16	11	11	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U		1100	50	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	2.2	3.2	1.8	2.5	2.0 U	2.0 U	2.0	2.0	2.0 U	2.0 U		4.8	3.1	2.0 U	2.0 U
Dissolved	Iron (Fe)	µg/L	NA	NA	NA	NA	980	750	760	570	830	820		NA	NA	930	1200
Dissolved	Potassium (K)	mg/L	NA	NA	NA	NA	4.3	4.4	4.2	4.2	4.3	4.4		NA	NA	4.3	4.3
Dissolved	Manganese (Mn)	µg/L	NA	NA	NA	NA	180	180	150	150	200	210		NA	NA	190	190
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	NA	NA	5.6	5.7	2.2	2.3	5.7	5.7		NA	NA	5.8	5.8
Dissolved	Nickel (Ni)	µg/L	94	130	10.4	14.4	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U		74	8.2	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	7.8	12.0	0.3	0.5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U		210	8.1	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U		NA	NA	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	NA	NA	26	26	22	22	26	25		NA	NA	26	26
Dissolved	Thallium (Tl)	µg/L	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U		NA	NA	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	23	32	24	33	no data	no data	no data	no data	no data	no data		90	81	no data	no data

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Some metals WQS vary based on water hardness. See total metals results table for hardness at each sampling location.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI.

Location: Sutton Plant on Cape Fear River

Date: 10/3/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	Freshwater WQS	SUTTON_UP	SUTTON_LK_BREACH	SUTTON_DOWN
Total	Hardness (calculated)	mg/L	NA	24	15	23
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U	1.0 U
Total	Aluminum (Al)	µg/L	NA	560	290	640
Total	Antimony (Sb)	µg/L	NA	10 U	10 U	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	5.7	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U	50 U
Total	Barium (Ba)	µg/L	NA	35	20	34
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Copper (Cu)	µg/L	NA	2.0	2.4	2.0
Total	Iron (Fe)	µg/L	NA	1700	920	1900
Total	Potassium (K)	mg/L	NA	4.6	4.3	4.5
Total	Manganese (Mn)	µg/L	NA	180	150	200
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U	10 U
Total	Sodium (Na)	mg/L	NA	6.6	2.3	6.6
Total	Nickel (Ni)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U	1.0 U
Total	Strontium (Sr)	µg/L	NA	33	26	33
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Titanium (Ti)	µg/L	NA	13	10 U	13
Total	Vanadium (V)	µg/L	NA	10 U	10 U	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- All sampling locations are classified as fresh water.

Location: Sutton Plant on Cape Fear River

Date: 10/3/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Acute WQS (hardness=15)	Acute WQS (hardness=23)	Acute WQS (hardness=24)	Chronic WQS (hardness=15)	Chronic WQS (hardness=23)	Chronic WQS (hardness=24)	SUTTON_UP Rep-1	SUTTON_UP Rep-2	SUTTON_LK_BREACH Rep-1	SUTTON_LK_BREACH Rep-2	SUTTON_DOWN Rep-1	SUTTON_DOWN Rep-2
Total	Hardness	mg/L	15	23	24	15	23	24						
Dissolved	Silver (Ag)	µg/L	0.12	0.26	0.28	0.06	0.06	0.06	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	NA	NA	NA	NA	240	260	200	210	260	320
Dissolved	Antimony (Sb)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	340	340	150	150	150	2.0 U	2.0 U	5.0	5.0	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	NA	NA	NA	NA	30	30	19	19	30	30
Dissolved	Beryllium (Be)	µg/L	65	65	65	6.5	6.5	6.5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.52	0.76	0.79	0.10	0.14	0.14	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	16	16	11	11	11	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	2.2	3.4	3.5	1.8	2.6	2.6	2.0 U	2.0 U	2.0	2.0	2.0 U	2.0 U
Dissolved	Iron (Fe)	µg/L	NA	NA	NA	NA	NA	NA	670	750	450	480	760	920
Dissolved	Potassium (K)	mg/L	NA	NA	NA	NA	NA	NA	4.4	4.5	4.3	4.3	4.4	4.3
Dissolved	Manganese (Mn)	µg/L	NA	NA	NA	NA	NA	NA	150	160	140	140	160	160
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	NA	NA	NA	NA	6.4	6.4	2.3	2.3	6.7	6.6
Dissolved	Nickel (Ni)	µg/L	94	135	140	10.4	15.0	15.5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	7.8	12.6	13.3	0.3	0.5	0.5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	NA	NA	NA	NA	32	31	26	25	32	32
Dissolved	Thallium (Tl)	µg/L	NA	NA	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	23	34	35	24	34	35	10 U	10 U	10 U	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Some metals WQS vary based on water hardness. See total metals results table for hardness at each sampling location.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI.

Location: Sutton Plant on Cape Fear River

Date: 10/4/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	Freshwater WQS	SUTTON_ UP	SUTTON_ LK_BREACH	SUTTON_ DOWN
Total	Hardness (calculated)	mg/L	NA	23	15	24
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U	1.0 U
Total	Aluminum (Al)	µg/L	NA	520	270	510
Total	Antimony (Sb)	µg/L	NA	10 U	10 U	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	6.0	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U	50 U
Total	Barium (Ba)	µg/L	NA	34	20	35
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Copper (Cu)	µg/L	NA	2.0 U	2.4	2.0 U
Total	Iron (Fe)	µg/L	NA	1700	900	1800
Total	Potassium (K)	mg/L	NA	4.3	4.2	4.6
Total	Manganese (Mn)	µg/L	NA	170	150	200
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U	10 U
Total	Sodium (Na)	mg/L	NA	7.2	2.3	7.9
Total	Nickel (Ni)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U	1.0 U
Total	Strontium (Sr)	µg/L	NA	32	27	32
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Titanium (Ti)	µg/L	NA	10 U	10 U	10 U
Total	Vanadium (V)	µg/L	NA	10 U	10 U	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- All sampling locations are classified as fresh water.

Location: Sutton Plant on Cape Fear River

Date: 10/4/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Acute WQS (hardness=15)	Acute WQS (hardness=23)	Acute WQS (hardness=24)	Chronic WQS (hardness=15)	Chronic WQS (hardness=23)	Chronic WQS (hardness=24)	SUTTON_ UP Rep-1	SUTTON_ UP Rep-2	SUTTON_ LK_BREACH Rep-1	SUTTON_ LK_BREACH Rep-2	SUTTON_ DOWN Rep-1	SUTTON_ DOWN Rep-2
Total	Hardness	mg/L	15	23	24	15	23	24						
Dissolved	Silver (Ag)	µg/L	0.12	0.26	0.28	0.06	0.06	0.06	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	NA	NA	NA	NA	290	230	200	200	300	230
Dissolved	Antimony (Sb)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	340	340	150	150	150	2.0 U	2.0 U	5.6	4.9	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	NA	NA	NA	NA	31	30	18	18	31	30
Dissolved	Beryllium (Be)	µg/L	65	65	65	6.5	6.5	6.5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.52	0.76	0.79	0.10	0.14	0.14	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	16	16	11	11	11	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	2.2	3.4	3.5	1.8	2.6	2.6	2.0 U	2.0 U	2.1	2.0 U	2.0 U	2.0 U
Dissolved	Iron (Fe)	µg/L	NA	NA	NA	NA	NA	NA	1100	680	440	450	1100	720
Dissolved	Potassium (K)	mg/L	NA	NA	NA	NA	NA	NA	4.4	4.4	4.2	4.2	4.5	4.5
Dissolved	Manganese (Mn)	µg/L	NA	NA	NA	NA	NA	NA	150	140	130	130	160	150
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	NA	NA	NA	NA	7.3	7.3	2.3	2.3	7.8	7.8
Dissolved	Nickel (Ni)	µg/L	94	135	140	10.4	15.0	15.5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	7.8	12.6	13.3	0.3	0.5	0.5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	NA	NA	NA	NA	32	32	26	26	32	31
Dissolved	Thallium (Tl)	µg/L	NA	NA	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	23	34	35	24	34	35	10 U	10 U	10 U	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Some metals WQS vary based on water hardness. See total metals results table for hardness at each sampling location.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI.

Location: Sutton Plant on Cape Fear River

Date: 10/5/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	Freshwater WQS	SUTTON_ UP	SUTTON_ LK_BREACH_3	SUTTON_ DOWN
Total	Hardness (calculated)	mg/L	NA	25	15	24
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U	1.0 U
Total	Aluminum (Al)	µg/L	NA	390	250	410
Total	Antimony (Sb)	µg/L	NA	10 U	10 U	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	6.0	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U	50 U
Total	Barium (Ba)	µg/L	NA	34	20	34
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Copper (Cu)	µg/L	NA	2.0 U	2.9	2.0 U
Total	Iron (Fe)	µg/L	NA	1500	720	1700
Total	Potassium (K)	mg/L	NA	4.5	4.4	4.3
Total	Manganese (Mn)	µg/L	NA	160	130	180
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U	10 U
Total	Sodium (Na)	mg/L	NA	8.7	2.6	8.1
Total	Nickel (Ni)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U	1.0 U
Total	Strontium (Sr)	µg/L	NA	34	32	34
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Titanium (Ti)	µg/L	NA	10 U	10 U	10 U
Total	Vanadium (V)	µg/L	NA	10 U	10 U	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- All sampling locations are classified as fresh water.

Location: Sutton Plant on Cape Fear River

Date: 10/5/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Acute WQS (hardness=15)	Acute WQS (hardness=24)	Acute WQS (hardness=25)	Chronic WQS (hardness=15)	Chronic WQS (hardness=24)	Chronic WQS (hardness=25)	SUTTON_ UP Rep-1	SUTTON_ UP Rep-2	SUTTON_ LK_BREACH_3 Rep-1	SUTTON_ LK_BREACH_3 Rep-2	SUTTON_ DOWN Rep-1	SUTTON_ DOWN Rep-2
Total	Hardness	mg/L	15	24	25	15	24	25						
Dissolved	Silver (Ag)	µg/L	0.12	0.28	0.30	0.06	0.06	0.06	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	NA	NA	NA	NA	200	180	160	190	200	240
Dissolved	Antimony (Sb)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	340	340	150	150	150	2.0 U	2.0 U	5.3	5.8	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	NA	NA	NA	NA	30	30	17	19	30	31
Dissolved	Beryllium (Be)	µg/L	65	65	65	6.5	6.5	6.5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.52	0.79	0.82	0.10	0.14	0.15	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	16	16	11	11	11	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	2.2	3.5	3.6	1.8	2.6	2.7	2.0 U	2.0 U	2.5	2.6	2.0 U	2.0 U
Dissolved	Iron (Fe)	µg/L	NA	NA	NA	NA	NA	NA	710	650	400	510	670	1000
Dissolved	Potassium (K)	mg/L	NA	NA	NA	NA	NA	NA	4.3	4.2	3.7	4.2	4.3	4.4
Dissolved	Manganese (Mn)	µg/L	NA	NA	NA	NA	NA	NA	120	120	99	120	140	150
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	NA	NA	NA	NA	8.5	8.5	2.3	2.6	8.2	8.2
Dissolved	Nickel (Ni)	µg/L	94	140	145	10.4	15.5	16.1	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	7.8	13.3	13.9	0.3	0.5	0.5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	NA	NA	NA	NA	33	34	27	30	34	32
Dissolved	Thallium (Tl)	µg/L	NA	NA	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	NA	NA	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	23	35	36	24	35	36	10 U	10 U	10 U	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Some metals WQS vary based on water hardness. See total metals results table for hardness at each sampling location.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI.

Location: Sutton Plant on Cape Fear River

Date: 10/9/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	Freshwater WQS	B9020000	SUTTON_LK_ BREACH_3		Saltwater WQS	B9050000
Total	Hardness (calculated)	mg/L	NA	30	15			33
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U		NA	1.0 U
Total	Aluminum (Al)	µg/L	NA	300	230		NA	280
Total	Antimony (Sb)	µg/L	NA	10 U	10 U		NA	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	7.1		10	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U		NA	50 U
Total	Barium (Ba)	µg/L	NA	36	21		NA	39
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U		NA	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U		NA	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U		NA	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U,J	5.0 U,J		NA	5.0 U,J
Total	Copper (Cu)	µg/L	NA	2.0 U,J	3.9 J		NA	2.0 U,J
Total	Iron (Fe)	µg/L	NA	1500	790		NA	1500
Total	Potassium (K)	mg/L	NA	5.0	4.2		NA	5.3
Total	Manganese (Mn)	µg/L	NA	84	130		NA	110
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U		NA	10 U
Total	Sodium (Na)	mg/L	NA	12	2.9		NA	12
Total	Nickel (Ni)	µg/L	NA	2.0 U,J	2.0 U,J		NA	2.0 U,J
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U		NA	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U		71	1.0 U
Total	Strontium (Sr)	µg/L	NA	35	33		NA	37
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U		NA	2.0 U
Total	Titanium (Ti)	µg/L	NA	10 U	10 U		NA	10 U
Total	Vanadium (V)	µg/L	NA	10 U	10 U		NA	10 U
Total	Zinc (Zn)	µg/L	NA	10 U,J	10 U,J		NA	10 U,J

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Results with estimated values are shown with a J qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- B9050000 is classified as salt water (SC). Other sampling locations are classified as fresh water.

Location: Sutton Plant on Cape Fear River

Date: 10/9/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Fresh Acute WQS (hardness=15)	Fresh Acute WQS (hardness=30)	Fresh Chronic WQS (hardness=15)	Fresh Chronic WQS (hardness=30)	B9020000 Rep-1	B9020000 Rep-2	SUTTON_LK_BREA CH_3 Rep-1	SUTTON_LK_BREA CH_3 Rep-2		Salt Acute WQS	Salt Chronic WQS	B9050000 Rep-1	B9050000 Rep-2
Total	Hardness	mg/L	15	30	15	30									
Dissolved	Silver (Ag)	µg/L	0.12	0.41	0.06	0.06	1.0 U	1.0 U	1.0 U	1.0 U		1.9	0.1	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	NA	NA	170	160	180	180		NA	NA	140	150
Dissolved	Antimony (Sb)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	340	150	150	2.0 U	2.0 U	5.9	6.1		69	36	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U		NA	NA	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	NA	NA	29	29	20	20		NA	NA	30	30
Dissolved	Beryllium (Be)	µg/L	65	65	6.5	6.5	5.0 U	5.0 U	5.0 U	5.0 U		NA	NA	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.52	0.96	0.10	0.17	0.50 U	0.50 U	0.50 U	0.50 U		40	8.8	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U		NA	NA	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	16	11	11	5.0 U	5.0 U	5.0 U	5.0 U		1100	50	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	2.2	4.3	1.8	3.2	2.0 U	2.0 U	2.4	2.4		4.8	3.1	2.0 U	2.0 U
Dissolved	Iron (Fe)	µg/L	NA	NA	NA	NA	740	710	510	510		NA	NA	610	680
Dissolved	Potassium (K)	mg/L	NA	NA	NA	NA	4.4	4.3	4.2	4.3		NA	NA	4.4	4.4
Dissolved	Manganese (Mn)	µg/L	NA	NA	NA	NA	53	50	120	120		NA	NA	72	72
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	NA	NA	10	11	3.0	2.9		NA	NA	10	10
Dissolved	Nickel (Ni)	µg/L	94	169	10.4	18.8	2.0 U	2.0 U	2.0 U	2.0 U		74	8.2	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	8	17	0.3	0.7	2.0 U	2.0 U	2.0 U	2.0 U		210	8.1	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U		NA	NA	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	NA	NA	34	35	30	30		NA	NA	36	36
Dissolved	Thallium (Tl)	µg/L	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U		NA	NA	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	23	42	24	43	10 U	10 U	10 U	10 U		90	81	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Some metals WQS vary based on water hardness. See total metals results table for hardness at each sampling location.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI.

Location: Sutton Plant on Cape Fear River

Date: 10/18/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	Freshwater WQS	B9020000	SUTTON_LK_ BREACH_3		Saltwater WQS	B9050000
Total	Hardness (calculated)	mg/L	NA	22	16			23
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U		NA	1.0 U
Total	Aluminum (Al)	µg/L	NA	570	220		NA	580
Total	Antimony (Sb)	µg/L	NA	10 U	10 U		NA	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	5.5		10	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U		NA	50 U
Total	Barium (Ba)	µg/L	NA	31	22		NA	31
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U		NA	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U		NA	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U		NA	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U		NA	5.0 U
Total	Copper (Cu)	µg/L	NA	2.4	4.1		NA	2.3
Total	Iron (Fe)	µg/L	NA	1600	810		NA	1500
Total	Potassium (K)	mg/L	NA	4.6	4.2		NA	4.5
Total	Manganese (Mn)	µg/L	NA	91	84		NA	88
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U		NA	10 U
Total	Sodium (Na)	mg/L	NA	7.2	4.6		NA	8.6
Total	Nickel (Ni)	µg/L	NA	2.0 U	2.0 U		NA	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U		NA	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U		71	1.0 U
Total	Strontium (Sr)	µg/L	NA	27	38		NA	29
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U		NA	2.0 U
Total	Titanium (Ti)	µg/L	NA	10 U	10 U		NA	10 U
Total	Vanadium (V)	µg/L	NA	10 U	10 U		NA	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	10 U		NA	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- B9050000 is classified as salt water (SC). Other sampling locations are classified as fresh water.

Location: Sutton Plant on Cape Fear River

Date: 10/18/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Fresh Acute WQS (hardness=16)	Fresh Acute WQS (hardness=22)	Fresh Chronic WQS (hardness=16)	Fresh Chronic WQS (hardness=22)	B9020000 Rep-1	B9020000 Rep-2	SUTTON_LK_ BREACH_3 Rep-1	SUTTON_LK_ BREACH_3 Rep-2		Salt Acute WQS	Salt Chronic WQS	B9050000 Rep-1	B9050000 Rep-2
Total	Hardness	mg/L	16	22	16	22									
Dissolved	Silver (Ag)	µg/L	0.14	0.24	0.06	0.06	1.0 U	1.0 U	1.0 U	1.0 U		1.9	0.1	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	NA	NA	270	280	170	150		NA	NA	200	260
Dissolved	Antimony (Sb)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	340	150	150	2.0 U	2.0 U	5.0	5.1		69	36	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U		NA	NA	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	NA	NA	28	29	22	21		NA	NA	27	28
Dissolved	Beryllium (Be)	µg/L	65	65	6.5	6.5	5.0 U	5.0 U	5.0 U	5.0 U		NA	NA	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.55	0.73	0.11	0.14	0.50 U	0.50 U	0.50 U	0.50 U		40	8.8	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U		NA	NA	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	16	11	11	5.0 U	5.0 U	5.0 U	5.0 U		1100	50	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	2.4	3.2	1.9	2.5	2.0 U	2.0 U	3.8	3.7		4.8	3.1	2.0	2.2
Dissolved	Iron (Fe)	µg/L	NA	NA	NA	NA	970	1100	630	520		NA	NA	790	900
Dissolved	Potassium (K)	mg/L	NA	NA	NA	NA	4.5	4.6	4.2	4.2		NA	NA	4.4	4.5
Dissolved	Manganese (Mn)	µg/L	NA	NA	NA	NA	69	75	80	79		NA	NA	51	61
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	NA	NA	7.2	7.2	4.7	4.7		NA	NA	8.5	8.6
Dissolved	Nickel (Ni)	µg/L	99	130	11.0	14.4	2.0 U	2.0 U	2.0 U	2.0 U		74	8.2	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	8	12	0.3	0.5	2.0 U	2.0 U	2.0 U	2.0 U		210	8.1	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U		NA	NA	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	NA	NA	26	26	36	37		NA	NA	28	27
Dissolved	Thallium (Tl)	µg/L	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U		NA	NA	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	25	32	25	33	10 U	10 U	10 U	10 U		90	81	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Some metals WQS vary based on water hardness. See total metals results table for hardness at each sampling location.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI.

Location: Sutton Plant on Cape Fear River

Date: 10/24/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	Freshwater WQS	SUTTON_UP	SUTTON_LK_ BREACH_3		Saltwater WQS	B9050000
Total	Hardness (calculated)	mg/L	NA	26	18			26
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U		NA	1.0 U
Total	Aluminum (Al)	µg/L	NA	280	220		NA	300
Total	Antimony (Sb)	µg/L	NA	10 U	10 U		NA	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	5.0		10	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U		NA	50 U
Total	Barium (Ba)	µg/L	NA	30	22		NA	28
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U		NA	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U		NA	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U		NA	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U		NA	5.0 U
Total	Copper (Cu)	µg/L	NA	2.0 U	5.3		NA	2.0 U
Total	Iron (Fe)	µg/L	NA	1100	810		NA	1000
Total	Potassium (K)	mg/L	NA	4.1	4.2		NA	3.8
Total	Manganese (Mn)	µg/L	NA	55	60		NA	44
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U		NA	10 U
Total	Sodium (Na)	mg/L	NA	9.8	5.0		NA	10
Total	Nickel (Ni)	µg/L	NA	2.0 U	2.0 U		NA	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U		NA	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U		71	1.0 U
Total	Strontium (Sr)	µg/L	NA	33	41		NA	39
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U		NA	2.0 U
Total	Titanium (Ti)	µg/L	NA	10 U	10 U		NA	10 U
Total	Vanadium (V)	µg/L	NA	10 U	10 U		NA	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	10 U		NA	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- B9050000 is classified as salt water (SC). Other sampling locations are classified as fresh water.

Location: Sutton Plant on Cape Fear River

Date: 10/24/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Fresh Acute WQS (hardness=18)	Fresh Acute WQS (hardness=26)	Fresh Chronic WQS (hardness=18)	Fresh Chronic WQS (hardness=26)	SUTTON_UP Rep-1	SUTTON_UP Rep-2	SUTTON_LK_ BREACH_3 Rep-1	SUTTON_LK_ BREACH_3 Rep-2		Salt Acute WQS	Salt Chronic WQS	B9050000 Rep-1	B9050000 Rep-2
Total	Hardness	mg/L	18	26	18	26									
Dissolved	Silver (Ag)	µg/L	0.17	0.32	0.06	0.06	1.0 U	1.0 U	1.0 U	1.0 U		1.9	0.1	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	NA	NA	91	82	160	150		NA	NA	110	120
Dissolved	Antimony (Sb)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	340	150	150	2.0 U	2.0 U	5.1	4.7		69	36	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U		NA	NA	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	NA	NA	27	26	22	22		NA	NA	26	27
Dissolved	Beryllium (Be)	µg/L	65	65	6.5	6.5	5.0 U	5.0 U	5.0 U	5.0 U		NA	NA	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.61	0.85	0.12	0.15	0.50 U	0.50 U	0.50 U	0.50 U		40	8.8	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U		NA	NA	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	16	11	11	5.0 U	5.0 U	5.0 U	5.0 U		1100	50	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	2.7	3.8	2.1	2.8	2.0 U	2.9	5.0	4.9		4.8	3.1	2.0 U	2.2
Dissolved	Iron (Fe)	µg/L	NA	NA	NA	NA	460	480	620	590		NA	NA	470	580
Dissolved	Potassium (K)	mg/L	NA	NA	NA	NA	4.1	4.2	4.3	4.3		NA	NA	3.9	3.9
Dissolved	Manganese (Mn)	µg/L	NA	NA	NA	NA	35	33	58	57		NA	NA	27	31
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	NA	NA	9.8	9.9	5.1	5.2		NA	NA	10	10
Dissolved	Nickel (Ni)	µg/L	110	150	12.2	16.6	2.0 U	2.0 U	2.0 U	2.0 U		74	8.2	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	10	15	0.4	0.6	2.0 U	2.0 U	2.0 U	2.0 U		210	8.1	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U		NA	NA	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	NA	NA	33	34	34	35		NA	NA	34	34
Dissolved	Thallium (Tl)	µg/L	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U		NA	NA	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	27	37	28	38	10 U	10 U	10 U	10 U		90	81	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Some metals WQS vary based on water hardness. See total metals results table for hardness at each sampling location.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI.

Location: Sutton Plant on Cape Fear River

Date: 11/1/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	Freshwater WQS	B9020000	SUTTON_LK_ BREACH_3		Saltwater WQS	B9050000
Total	Hardness (calculated)	mg/L	NA	32	18			25
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U		NA	1.0 U
Total	Aluminum (Al)	µg/L	NA	630	200		NA	550
Total	Antimony (Sb)	µg/L	NA	10 U	10 U		NA	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	5.7		10	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U		NA	50 U
Total	Barium (Ba)	µg/L	NA	31	23		NA	29
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U		NA	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U		NA	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U		NA	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U		NA	5.0 U
Total	Copper (Cu)	µg/L	NA	3	6.7		NA	2.9
Total	Iron (Fe)	µg/L	NA	1300	780		NA	1100
Total	Potassium (K)	mg/L	NA	4.1	4.2		NA	4.0
Total	Manganese (Mn)	µg/L	NA	75	43		NA	46
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U		NA	10 U
Total	Sodium (Na)	mg/L	NA	8.6	5.3		NA	10
Total	Nickel (Ni)	µg/L	NA	2.0 U	2.0 U		NA	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U		NA	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.2		71	1.0 U
Total	Strontium (Sr)	µg/L	NA	32	49		NA	35
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U		NA	2.0 U
Total	Titanium (Ti)	µg/L	NA	10 U	10 U		NA	10 U
Total	Vanadium (V)	µg/L	NA	10 U	10 U		NA	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	10 U		NA	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- B9050000 is classified as salt water (SC). Other sampling locations are classified as fresh water.

Location: Sutton Plant on Cape Fear River

Date: 11/1/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Fresh Acute WQS (hardness=18)	Fresh Acute WQS (hardness=32)	Fresh Chronic WQS (hardness=18)	Fresh Chronic WQS (hardness=32)	B9020000 Rep-1	B9020000 Rep-2	SUTTON_LK_ BREACH_3 Rep-1	SUTTON_LK_ BREACH_3 Rep-2		Salt Acute WQS	Salt Chronic WQS	B9050000 Rep-1	B9050000 Rep-2
Total	Hardness	mg/L	18	32	18	32									
Dissolved	Silver (Ag)	µg/L	0.17	0.45	0.06	0.06	1.0 U	1.0 U	1.0 U	1.0 U		1.9	0.1	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	NA	NA	110	230	140	150		NA	NA	130	73
Dissolved	Antimony (Sb)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	340	150	150	2.0 U	2.0 U	4.7	5.0		69	36	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U		NA	NA	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	NA	NA	24	27	22	23		NA	NA	26	25
Dissolved	Beryllium (Be)	µg/L	65	65	6.5	6.5	5.0 U	5.0 U	5.0 U	5.0 U		NA	NA	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.61	1.01	0.12	0.18	0.50 U	0.50 U	0.50 U	0.50 U		40	8.8	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U		NA	NA	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	16	11	11	5.0 U	5.0 U	5.0 U	5.0 U		1100	50	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	2.7	4.6	2.1	3.4	2.4	2.4	6.2	6.4		4.8	3.1	2.4	2.4
Dissolved	Iron (Fe)	µg/L	NA	NA	NA	NA	430	650	510	650		NA	NA	440	330
Dissolved	Potassium (K)	mg/L	NA	NA	NA	NA	4.2	4.3	4.3	4.3		NA	NA	4.1	4.0
Dissolved	Manganese (Mn)	µg/L	NA	NA	NA	NA	19	42	38	39		NA	NA	14	14
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	NA	NA	8.8	8.9	5.3	5.4		NA	NA	11	12
Dissolved	Nickel (Ni)	µg/L	110	179	12.2	19.8	2.0 U	2.0 U	2.0 U	2.0 U		74	8.2	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	10	18	0.4	0.7	2.0 U	2.0 U	2.0 U	2.0 U		210	8.1	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	NA	NA	1.0 U	1.0 U	1.2	1.2		NA	NA	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	NA	NA	31	31	47	47		NA	NA	34	35
Dissolved	Thallium (Tl)	µg/L	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U		NA	NA	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U		NA	NA	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	27	45	28	45	10 U	10 U	10 U	10 U		90	81	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Some metals WQS vary based on water hardness. See total metals results table for hardness at each sampling location.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI.

Location: Sutton Plant on Cape Fear River
Date: 11/26/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units		Saltwater WQS	B9050000
Total	Hardness (calculated)	mg/L		NA	20
Total	Silver (Ag)	µg/L		NA	1.0 U
Total	Aluminum (Al)	µg/L		NA	520
Total	Antimony (Sb)	µg/L		NA	10 U
Total	Arsenic (As)	µg/L		10	2.0 U
Total	Boron (B)	µg/L		NA	50 U
Total	Barium (Ba)	µg/L		NA	24
Total	Beryllium (Be)	µg/L		NA	5.0 U
Total	Cadmium (Cd)	µg/L		NA	0.50 U
Total	Cobalt (Co)	µg/L		NA	50 U
Total	Chromium (Cr)	µg/L		NA	5.0 U
Total	Copper (Cu)	µg/L		NA	2.0 U
Total	Iron (Fe)	µg/L		NA	950
Total	Potassium (K)	mg/L		NA	3.5
Total	Manganese (Mn)	µg/L		NA	34
Total	Molybdenum (Mo)	µg/L		NA	10 U
Total	Sodium (Na)	mg/L		NA	6.2
Total	Nickel (Ni)	µg/L		NA	2.0 U
Total	Lead (Pb)	µg/L		NA	2.0 U
Total	Selenium (Se)	µg/L		71	1.0 U
Total	Strontium (Sr)	µg/L		NA	29
Total	Thallium (Tl)	µg/L		NA	2.0 U
Total	Titanium (Ti)	µg/L		NA	10 U
Total	Vanadium (V)	µg/L		NA	10 U
Total	Zinc (Zn)	µg/L		NA	10 U

Location: Sutton Plant on Cape Fear River
Date: 11/26/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units		Salt Acute WQS	Salt Chronic WQS	B9050000 Rep-1	B9050000 Rep-2
Dissolved	Silver (Ag)	µg/L		1.9	0.1	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L		NA	NA	260	170
Dissolved	Antimony (Sb)	µg/L		NA	NA	10 U	10 U
Dissolved	Arsenic (As)	µg/L		69	36	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L		NA	NA	50 U	50 U
Dissolved	Barium (Ba)	µg/L		NA	NA	21	21
Dissolved	Beryllium (Be)	µg/L		NA	NA	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L		40	8.8	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L		NA	NA	50 U	50 U
Dissolved	Chromium (Cr)	µg/L		1100	50	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L		4.8	3.1	2.0 U	2.0 U
Dissolved	Iron (Fe)	µg/L		NA	NA	420	390
Dissolved	Potassium (K)	mg/L		NA	NA	3.5	3.6
Dissolved	Manganese (Mn)	µg/L		NA	NA	24	22
Dissolved	Molybdenum (Mo)	µg/L		NA	NA	10 U	10 U
Dissolved	Sodium (Na)	mg/L		NA	NA	6.2	6.5
Dissolved	Nickel (Ni)	µg/L		74	8.2	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L		210	8.1	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L		NA	NA	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L		NA	NA	28	29
Dissolved	Thallium (Tl)	µg/L		NA	NA	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L		NA	NA	10 U	10 U
Dissolved	Vanadium (V)	µg/L		NA	NA	10 U	10 U
Dissolved	Zinc (Zn)	µg/L		90	81	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- B9050000 is classified as salt water (SC).

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI.

Appendix IV

Metals Results Summary for Samples Collected at Duke Energy's H.F. Lee Plant Following Hurricane Florence

Location: Lee Plant on Neuse River

Date: 9/23/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	WQS	UPS Result	MID Result	DNS Result
Total	Calcium (Ca)	mg/L	NA	5.9	5.6	5.6
Total	Magnesium (mg)	mg/L	NA	2.2	2.1	2.1
Total	Hardness (calculated)	mg/L	100	24	23	23
Total	Silver (Ag)	µg/L	NA	1 U	1.0 U	1.0 U
Total	Aluminum (Al)	µg/L	NA	440	480	360
Total	Antimony (Sb)	µg/L	NA	10 U	10 U	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	2.0 U	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U	50 U
Total	Barium (Ba)	µg/L	1000	43	44	43
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U	5.0 U
Total	Copper (Cu)	µg/L	NA	2.2	2.2	2.0
Total	Iron (Fe)	µg/L	NA	1100	1200	1000
Total	Mercury (Hg)	µg/L	0.012	0.20 U	0.20 U	0.20 U
Total	Potassium (K)	mg/L	NA	4.5	4.8	4.8
Total	Lithium (Li)	µg/L	NA	25 U	25 U	25 U
Total	Manganese (Mn)	µg/L	NA	120	190	210
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U	10 U
Total	Sodium (Na)	mg/L	NA	6.2	5.4	5.4
Total	Nickel (Ni)	µg/L	25	2.0 U	2.0 U	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U	1.0 U
Total	Strontium (Sr)	µg/L	NA	35	32	33
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U	2.0 U
Total	Titanium (Ti)	µg/L	NA	15	14	10 U
Total	Vanadium (V)	µg/L	NA	10 U	10 U	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	10 U	10 U

Notes:

- Water Quality Standards (WQS) are provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Results below DWR laboratory detection limits (non-detects) are shown with the PQL and a U qualifier.

- All mercury samples were below the 0.20 µg/L PQL of method 245.1. Future sampling at this site will include collection of samples for mercury analysis via method 1631 to achieve a PQL of 0.001 µg/L.

Location: Lee Plant on Neuse River

Date: 9/23/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Acute WQS	Chronic WQS	UPS Rep-1	UPS Rep-2	MID Rep-1	MID Rep-2	DNS Rep-1	DNS Rep-2
Dissolved	Silver (Ag)	µg/L	0.27	0.06	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	100	260	430	440	400	250
Dissolved	Antimony (Sb)	µg/L	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	150	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	40	42	43	43	44	41
Dissolved	Beryllium (Be)	µg/L	65	6.5	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.78	0.14	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	11	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	3.5	2.6	2.0 U	2.0 U	2.0	2.0 U	2.1	2.0 U
Dissolved	Iron (Fe)	µg/L	NA	NA	380	640	1100	1200	1100	630
Dissolved	Mercury (Hg)	µg/L	NA	NA	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dissolved	Potassium (K)	mg/L	NA	NA	4.3	4.5	4.7	4.8	4.8	4.7
Dissolved	Lithium (Li)	µg/L	NA	NA	25 U	25 U	25 U	25 U	25 U	25 U
Dissolved	Manganese (Mn)	µg/L	NA	NA	95	86	180	190	210	180
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	6.2	6.3	5.4	5.4	5.3	5.3
Dissolved	Nickel (Ni)	µg/L	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	13.1	0.5	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	35	34	30	31	31	30
Dissolved	Thallium (Tl)	µg/L	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	10 U	10 U	13	14	12	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	10 U	10 U	10 U	10 U	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	35	35	10 U	10 U	10 U	10 U	10 U	10 U

Notes:

- Water Quality Standards (WQS) are provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- WQS shown for dissolved total chromium are the WQS for Cr VI.

- Results below DWR laboratory detection limits (non-detects) are shown with the PQL and a U qualifier.

Location: Lee Plant on Neuse River

Date: 10/12/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	WQS	UPS Result (Lee1A)	DNS Result (Lee2A)
Total	Hardness (calculated)	mg/L	100	30	31
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U
Total	Aluminum (Al)	µg/L	NA	900	800
Total	Antimony (Sb)	µg/L	NA	10 U	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U
Total	Barium (Ba)	µg/L	1000	48	46
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U
Total	Copper (Cu)	µg/L	NA	2.0	2.0 U
Total	Iron (Fe)	µg/L	NA	2800	2400
Total	Potassium (K)	mg/L	NA	4.4	4.6
Total	Manganese (Mn)	µg/L	NA	290	210
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U
Total	Sodium (Na)	mg/L	NA	10	9.3
Total	Nickel (Ni)	µg/L	25	2.0 U	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U
Total	Strontium (Sr)	µg/L	NA	73	45
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U
Total	Titanium (Ti)	µg/L	NA	24	21
Total	Vanadium (V)	µg/L	NA	10 U	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- All sampling locations are classified as freshwater water supply (WS) waters.

Location: Lee Plant on Neuse River

Date: 10/12/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Acute WQS (Hardness = 30)	Acute WQS (Hardness = 31)	Chronic WQS (Hardness = 30)	Chronic WQS (Hardness = 31)	UPS (Lee1A) Rep-1	UPS (Lee1A) Rep-2	DNS (Lee2A) Rep-1	DNS (Lee2A) Rep-2
Total	Hardness		30	31	30	31				
Dissolved	Silver (Ag)	µg/L	0.41	0.43	0.06	0.06	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	NA	NA	200	66	190	230
Dissolved	Antimony (Sb)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	340	150	150	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	NA	NA	36	34	37	38
Dissolved	Beryllium (Be)	µg/L	65	65	6.5	6.5	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.96	0.99	0.17	0.18	0.50 U	0.50 U	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	16	11	11	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	4.3	4.5	3.2	3.3	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Iron (Fe)	µg/L	NA	NA	NA	NA	970	840	870	1100
Dissolved	Potassium (K)	mg/L	NA	NA	NA	NA	4.4	4.4	4.5	4.6
Dissolved	Manganese (Mn)	µg/L	NA	NA	NA	NA	120	84	89	110
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	NA	NA	10	9.9	9.1	9.2
Dissolved	Nickel (Ni)	µg/L	169	174	19	19	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	17.0	17.7	0.7	0.7	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	NA	NA	43	42	44	46
Dissolved	Thallium (Tl)	µg/L	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	42	43	43	44	10 U	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Some metals WQS vary based on water hardness. See total metals results table for hardness at each sampling location.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI.

Location: Lee Plant on Neuse River

Date: 10/19/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	WQS	UPS Result (Lee1A)	DNS Result (Lee2A)
Total	Hardness (calculated)	mg/L	100	25	26
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U
Total	Aluminum (Al)	µg/L	NA	740 J	1300
Total	Antimony (Sb)	µg/L	NA	10 U	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U
Total	Barium (Ba)	µg/L	1000	38	42
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U
Total	Copper (Cu)	µg/L	NA	2.2	2.6
Total	Iron (Fe)	µg/L	NA	1400	2000
Total	Potassium (K)	mg/L	NA	3.5	3.6
Total	Manganese (Mn)	µg/L	NA	230	230
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U
Total	Sodium (Na)	mg/L	NA	8.0	8.1
Total	Nickel (Ni)	µg/L	25	2.0 U	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U
Total	Strontium (Sr)	µg/L	NA	50 U	50 U
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U
Total	Titanium (Ti)	µg/L	NA	22 J	41
Total	Vanadium (V)	µg/L	NA	10 U	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Results with estimated values are shown with a J qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- All sampling locations are classified as freshwater water supply (WS) waters.

Location: Lee Plant on Neuse River

Date: 10/19/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Acute WQS (Hardness = 25)	Acute WQS (Hardness = 26)	Chronic WQS (Hardness = 25)	Chronic WQS (Hardness = 26)	UPS (Lee1A) Rep-1	UPS (Lee1A) Rep-2	DNS (Lee2A) Rep-1	DNS (Lee2A) Rep-2
Total	Hardness		25	26	25	26				
Dissolved	Silver (Ag)	µg/L	0.30	0.32	0.06	0.06	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	NA	NA	80	50	220	120
Dissolved	Antimony (Sb)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	340	150	150	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	NA	NA	24	22	28	25
Dissolved	Beryllium (Be)	µg/L	65	65	6.5	6.5	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.82	0.85	0.15	0.15	0.50 U	0.50 U	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	16	11	11	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	3.6	3.8	2.7	2.8	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Iron (Fe)	µg/L	NA	NA	NA	NA	210	150	500	270
Dissolved	Potassium (K)	mg/L	NA	NA	NA	NA	3.4	3.3	3.5	3.5
Dissolved	Manganese (Mn)	µg/L	NA	NA	NA	NA	30	12	80	32
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	NA	NA	8.1	7.9	8.0	8.0
Dissolved	Nickel (Ni)	µg/L	145	150	16	17	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	13.9	14.5	0.5	0.6	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	NA	NA	33	33	36	36
Dissolved	Thallium (Tl)	µg/L	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	36	37	36	38	10 U	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Some metals WQS vary based on water hardness. See total metals results table for hardness at each sampling location.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI.

Location: Lee Plant on Neuse River
Date: 10/26/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	WQS	UPS Result (Lee1A)	DNS Result (Lee2A)
Total	Hardness (calculated)	mg/L	100	31	32
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U
Total	Aluminum (Al)	µg/L	NA	540	480
Total	Antimony (Sb)	µg/L	NA	10 U	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U
Total	Barium (Ba)	µg/L	1000	38	39
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U
Total	Copper (Cu)	µg/L	NA	2.0 U	2.0 U
Total	Iron (Fe)	µg/L	NA	1500	1400
Total	Potassium (K)	mg/L	NA	4.4	4.6
Total	Manganese (Mn)	µg/L	NA	190	170
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U
Total	Sodium (Na)	mg/L	NA	14	13
Total	Nickel (Ni)	µg/L	25	2.0 U	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U
Total	Strontium (Sr)	µg/L	NA	47	50
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U
Total	Titanium (Ti)	µg/L	NA	12	11
Total	Vanadium (V)	µg/L	NA	10 U	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- All sampling locations are classified as freshwater water supply (WS) waters.

Location: Lee Plant on Neuse River
Date: 10/26/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Acute WQS (Hardness = 31)	Acute WQS (Hardness = 32)	Chronic WQS (Hardness = 31)	Chronic WQS (Hardness = 32)	UPS (Lee1A) Rep-1	UPS (Lee1A) Rep-2	DNS (Lee2A) Rep-1	DNS (Lee2A) Rep-2
Total	Hardness		31	32	31	32				
Dissolved	Silver (Ag)	µg/L	0.43	0.45	0.06	0.06	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	NA	NA	230	50 U	180	69
Dissolved	Antimony (Sb)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	340	150	150	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	NA	NA	35	31	34	32
Dissolved	Beryllium (Be)	µg/L	65	65	6.5	6.5	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.99	1.01	0.18	0.18	0.50 U	0.50 U	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	NA	NA	50 U	50 U	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	16	11	11	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	4.5	4.6	3.3	3.4	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Iron (Fe)	µg/L	NA	NA	NA	NA	990	330	630	360
Dissolved	Potassium (K)	mg/L	NA	NA	NA	NA	4.4	4.4	4.5	4.5
Dissolved	Manganese (Mn)	µg/L	NA	NA	NA	NA	170	150	140	140
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	NA	NA	14	14	13	12
Dissolved	Nickel (Ni)	µg/L	174	179	19	20	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	17.7	18.3	0.7	0.7	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	NA	NA	48	45	47	49
Dissolved	Thallium (Tl)	µg/L	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	NA	NA	11	10 U	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	NA	NA	10 U	10 U	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	43	45	44	45	10 U	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Some metals WQS vary based on water hardness. See total metals results table for hardness at each sampling location.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI.

Location: Lee Plant on Neuse River
Date: 11/2/2018, DWR Total Metals Samples

Sample Fraction	Parameter	Units	WQS	UPS Result (Lee1A)	DNS Result (Lee2A)
Total	Hardness (calculated)	mg/L	100	24	24
Total	Silver (Ag)	µg/L	NA	1.0 U	1.0 U
Total	Aluminum (Al)	µg/L	NA	660	860
Total	Antimony (Sb)	µg/L	NA	10 U	10 U
Total	Arsenic (As)	µg/L	10	2.0 U	2.0 U
Total	Boron (B)	µg/L	NA	50 U	50 U
Total	Barium (Ba)	µg/L	1000	31	32
Total	Beryllium (Be)	µg/L	NA	5.0 U	5.0 U
Total	Cadmium (Cd)	µg/L	NA	0.50 U	0.50 U
Total	Cobalt (Co)	µg/L	NA	50 U	50 U
Total	Chromium (Cr)	µg/L	NA	5.0 U	5.0 U
Total	Copper (Cu)	µg/L	NA	2.4	2.5
Total	Iron (Fe)	µg/L	NA	1300	1400
Total	Potassium (K)	mg/L	NA	3.5	3.6
Total	Manganese (Mn)	µg/L	NA	170	170
Total	Molybdenum (Mo)	µg/L	NA	10 U	10 U
Total	Sodium (Na)	mg/L	NA	7.7	7.7
Total	Nickel (Ni)	µg/L	25	2.0 U	2.0 U
Total	Lead (Pb)	µg/L	NA	2.0 U	2.0 U
Total	Selenium (Se)	µg/L	5	1.0 U	1.0 U
Total	Strontium (Sr)	µg/L	NA	35	35
Total	Thallium (Tl)	µg/L	NA	2.0 U	2.0 U
Total	Titanium (Ti)	µg/L	NA	20	23
Total	Vanadium (V)	µg/L	NA	10 U	10 U
Total	Zinc (Zn)	µg/L	NA	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- All sampling locations are classified as freshwater water supply (WS) waters.

Location: Lee Plant on Neuse River
Date: 11/2/2018, DWR Dissolved Metals Samples

Sample Fraction	Parameter	Units	Acute WQS (Hardness = 24)	Chronic WQS (Hardness = 24)	UPS (Lee1A) Rep-1	UPS (Lee1A) Rep-2	DNS (Lee2A) Rep-1	DNS (Lee2A) Rep-2
Total	Hardness		24	24				
Dissolved	Silver (Ag)	µg/L	0.28	0.06	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Aluminum (Al)	µg/L	NA	NA	71	50 U	50 U	50 U
Dissolved	Antimony (Sb)	µg/L	NA	NA	10 U	10 U	10 U	10 U
Dissolved	Arsenic (As)	µg/L	340	150	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Boron (B)	µg/L	NA	NA	50 U	50 U	50 U	50 U
Dissolved	Barium (Ba)	µg/L	NA	NA	21	20	21	21
Dissolved	Beryllium (Be)	µg/L	65	6.5	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Cadmium (Cd)	µg/L	0.79	0.14	0.50 U	0.50 U	0.50 U	0.50 U
Dissolved	Cobalt (Co)	µg/L	NA	NA	50 U	50 U	50 U	50 U
Dissolved	Chromium (Cr)	µg/L	16	11	5.0 U	5.0 U	5.0 U	5.0 U
Dissolved	Copper (Cu)	µg/L	3.5	2.6	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Iron (Fe)	µg/L	NA	NA	250	100	150	150
Dissolved	Potassium (K)	mg/L	NA	NA	3.6	3.5	3.6	3.6
Dissolved	Manganese (Mn)	µg/L	NA	NA	20	10 U	10 U	13
Dissolved	Molybdenum (Mo)	µg/L	NA	NA	10 U	10 U	10 U	10 U
Dissolved	Sodium (Na)	mg/L	NA	NA	7.9	7.9	8	8
Dissolved	Nickel (Ni)	µg/L	140	16	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Lead (Pb)	µg/L	13.3	0.5	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Selenium (Se)	µg/L	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U
Dissolved	Strontium (Sr)	µg/L	NA	NA	34	34	35	34
Dissolved	Thallium (Tl)	µg/L	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved	Titanium (Ti)	µg/L	NA	NA	10 U	10 U	10 U	10 U
Dissolved	Vanadium (V)	µg/L	NA	NA	10 U	10 U	10 U	10 U
Dissolved	Zinc (Zn)	µg/L	35	35	10 U	10 U	10 U	10 U

- Results below DWR laboratory detection limits (non-detects) are shown with the analytical practical quantitation limit (PQL) and a U qualifier.

- Water Quality Standards (WQS) provided for screening purposes, as some WQS require multiple metals sampling events to fully evaluate compliance.

- Some metals WQS vary based on water hardness. See total metals results table for hardness at each samplinglocation.

- Chromium results represent dissolved total chromium. WQS shown are for hexavalent chromium VI.