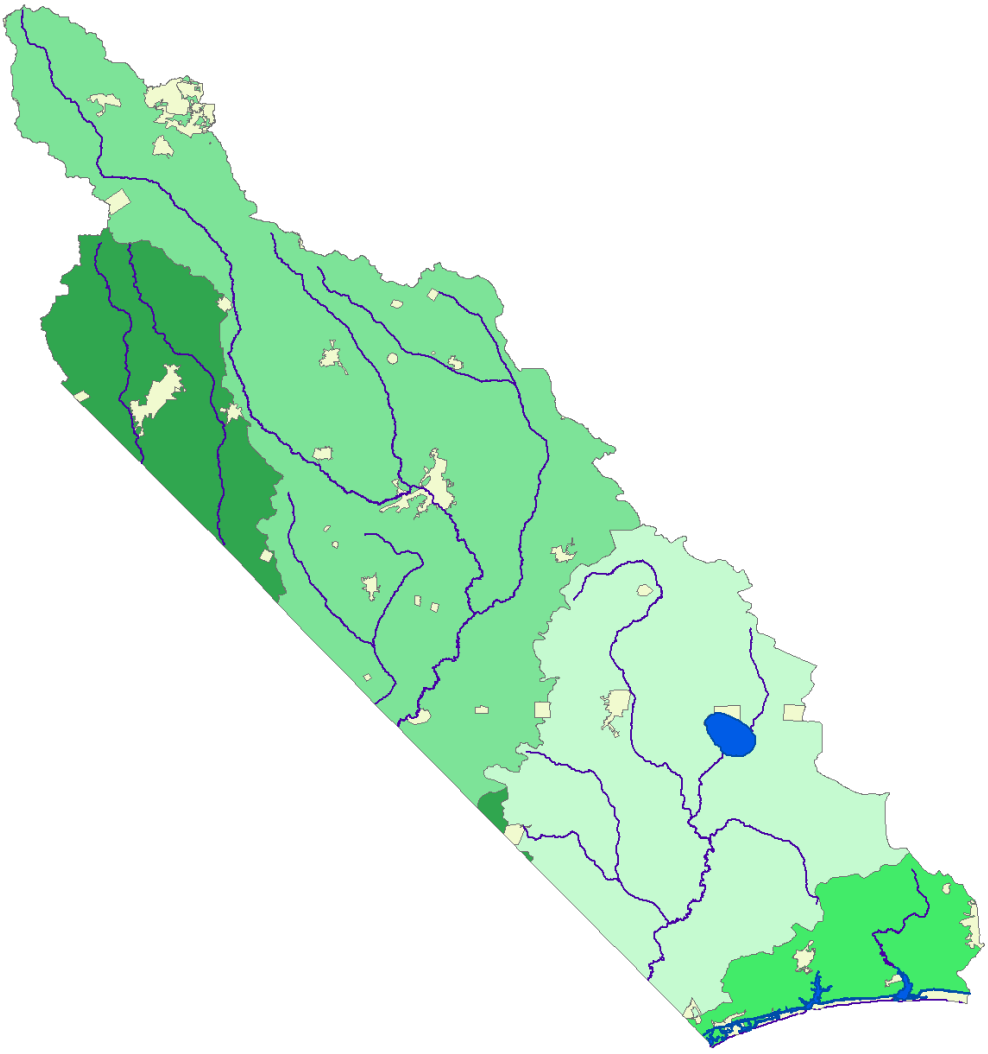
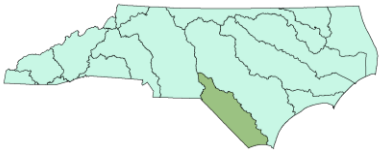


Lumber River Basin
Ambient Monitoring System Report

January 1, 2007 through December 31, 2011



Prepared by:

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Environmental Sciences Section

For more information on the Ambient Monitoring System
and electronic copies of this publication:

http://portal.ncdenr.org/web/wq/ess/eco/ams

The mission of the NC Division of Water Quality:

To protect and enhance North Carolina's surface water and groundwater resources for the citizens of North Carolina and future generations.

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Evaluation Levels

In order to assist the reader in developing a rapid understanding of the summary statistics provided throughout this data review, concentrations of water quality variables may be compared to an Evaluation Level (EL). Evaluation levels may be a water quality standard, an action level, an ecological threshold, or simply an arbitrary threshold that facilitates a rapid data review. Evaluation levels are further examined for frequency to determine if they have been exceeded in more than 10 percent of the observed samples. This summary approach facilitates a rapid and straightforward presentation of the data but may not be appropriate for making specific use support decisions necessary for identification of impaired waters under the Clean Water Act's requirements for 303(d) listings. The reader is advised to review the state's 303(d) listing methodology for this purpose (http://portal.ncdenr.org/web/wq/ps/mtu/assessment).

TABLES

FIGURES

ACRONYMS

°C – degrees Celsius
colonies/100 mL – colonies [of bacteria] per 100 milliliters
AMS – Ambient Monitoring System
DO – dissolved oxygen
DWQ – Division of Water Quality
EL – evaluation level
EPA – Environmental Protection Agency
HUC – hydrologic unit code
mg/L – milligrams per liter
NC – North Carolina
NCAC – North Carolina Administrative Code
NCRWQP – North Carolina Recreational Water Quality Program
NTU – nephelometric turbidity units
RAMS – Random Ambient Monitoring System
SOP – standard operating procedure
SR – secondary road
SSE – statistically significant exceedance
SU – standard units
TMDL – total maximum daily load
µg/L – micrograms per liter
µmhos/cm – micro-ohms per centimeter (equivalent to µS/cm, microsiemens per centimeter)
US – United States
µS/cm – microsiemens per centimeter (equivalent to µmhos/cm, micro-ohms per centimeter)
USGS – United States Geological Survey

EXECUTIVE SUMMARY

A general understanding of human activities and natural forces that affect pollution loads and their potential impacts on water quality can be obtained through routine sampling from fixed water quality monitoring stations. During this assessment period (January 1, 2007 through December 31, 2011) chemical and physical measurements were obtained by the NC Division of Water Quality (DWQ) from 22 stations located throughout the Lumber River basin.

The DWQ uses a ten percent criterion to determine whether a water body is meeting applicable water quality standards (NC Division of Water Quality, 2012). The water quality evaluation level (EL) for a given parameter may be an ecological evaluation level, a narrative or numeric standard, or an action level as specified in 15A NCAC 2B .0200. If more than 10% of the monitoring results exceed the EL in question then the water body is not meeting the standard. In order to evaluate water quality results, a minimum of ten observations is desired.

For this report, if at least 10 results per parameter were collected for a given site, the results were compared to water quality evaluation levels. If less than 10 results were collected, then no comparison to evaluation levels was made. When more than 10 percent of the results exceeded the EL, a binomial statistical test was employed to determine the level of statistical confidence associated with the conclusion that the results truly exceeded the 10% criterion. If at least 95% confidence was found that a 10% exceedance occurred, then that was termed a statistically significant exceedance (SSE). This criterion was applied to all parameters with an evaluation level, except for fecal coliform bacteria for which a 20% exceedance criterion was applied in the same way.

Table 1 provides a summary of the problem areas identified by using these criteria. While reading the table, please note the following: The majority of the parameters listed are compared directly to water quality standards. There are two exceptions, however. The fecal coliform standard requires that five samples be taken in the span of thirty days, which was not done for this data. Therefore any fecal coliform exceedances should be taken as a recommendation to collect the data required by the standard. The second exception is the dissolved oxygen (< 5 mg/L) standard which applies to salt waters as an instantaneous minimum value, and to fresh waters as a daily average requiring the collection of at least four samples in one day. Since only one dissolved oxygen sample was collected per day at each station, exceedances of the 5 mg/L daily average standard at freshwater stations should be used for informational purposes only. The 4 mg/L standard applies to fresh waters as an instantaneous minimum value, and should be regarded as the primary evaluation level for freshwater stations. Neither standard is applicable to waters with the DWQ supplemental “Swamp Waters” (Sw) classification.

In general, problem areas were focused in the saltwater portion of the basin, in the Long Bay hydrologic unit (HUC). Dissolved oxygen and fecal coliform were the most common exceedances. The dissolved oxygen exceedances may be explained as natural variation, as they occurred in waters that could be described as poorly flushed tidal streams and embayments. All of the fresh waters in the upper Lumber HUCs have been assigned a supplemental Sw classification; however, the salt waters in the lower portion of the basin have not. It is likely that many of the low dissolved oxygen and pH results were due to natural characteristics of swamps.

All data were collected between January 1, 2007 and December 31, 2011. Stations with SSEs were found for dissolved oxygen (four sites), fecal coliform (two sites), pH (three sites) and turbidity (one site). For all parameters, four additional 10 percent exceedances that were not SSEs also occurred. Only one of the 10% exceedances occurred in the freshwater portion of the basin due to pH measurements at station I8970000, Waccamaw River at Freeland, that were below the 4.3 SU standard for pH in waters with a supplemental Sw classification. The results of the data analysis are displayed in tables and maps. For complete summaries on each station, reference the AMS Station Summary Sheets located in Appendix A.

Table 1. Areas of Concern in the Lumber River basin

8-Digit HUC/ Station ID	Location	Class	Parameter / Evaluation Level	% Exceed	% Conf
03040206	**Waccamaw River**				
I8970000	Waccamaw River at NC-130 at Freeland	C Sw	pH (<4.3)	22.0	>99
03040208	**Long Bay / Atlantic Ocean**				
I9385000	Montgomery Slough at SR-1105 near Long Beach	SA HQW	Dissolved Oxygen (<5)	13.6	82
			Fecal coliform (>43 colonies/100 mL)	32.1	>99
I9420000	Lockwood Folly River at NC-211 at Supply	SC HQW	Dissolved Oxygen (<5)	42.6	>99
			pH (<6.8)	20.7	99
I9430000	Lockwood Folly River near Sandy Hill	SC HQW	Dissolved Oxygen (<5)	29.1	>99
I9440000	Lockwood Folly River at Varnum	SA HQW	Dissolved Oxygen (<5)	10.3	47
			Fecal coliform (>43 colonies/100 mL)	14.5	82
I9700000	Shallotte River at US-17 Business at Shallotte	SC	Dissolved Oxygen (<5)	22.0	>99
			pH (<6.8)	23.5	>99
I9820000	Shallotte River at Shell Point near Shallotte	SA HQW	Dissolved Oxygen (<5)	11.6	62
I9916000	Calabash River at NC-179 near Calabash	SA HQW	Dissolved Oxygen (<5)	25.0	>99
			Turbidity (>25 NTU)	33.9	>99
			Fecal coliform (>43 colonies/100 mL)	79.7	>99

INTRODUCTION

The DWQ's Ambient Monitoring System (AMS) is a network of stream, lake and estuarine stations strategically located for the collection of physical and chemical water quality data. The stations are located at convenient access points (e.g. bridge crossings) that are sampled on a monthly basis. These targeted locations were chosen for specific reasons, such as to characterize the effects of point source dischargers and nonpoint sources (e.g. agriculture, animal operations and urbanization) within watersheds, to determine the quality of water in water supplies or to elucidate changes over time (i.e. trends).

The monitoring data are used to identify long term trends within watersheds, to develop Total Maximum Daily Loads (TMDLs) and to compare measured values with water quality standards to identify possible areas of impairment. Core parameters are determined by freshwater or saltwater water body classification and corresponding water quality standards. Under this arrangement, core parameters are based on Class C waters with additional parameters added when justified (Table 2).

Within this document, an analysis of how monitoring results compare with water quality standards and evaluation levels is presented. An educational and conceptual overview of water quality standards is provided at: http://www.epa.gov/waterscience/standards. Specific information on North Carolina water quality standards is provided at: http://portal.ncdenr.org/web/wq/ps/csu. A summary of selected water quality standards are listed in Table 3.

Water quality data are evaluated in five year periods. This basin assessment report summarizes data collected from January 1, 2007 through December 31, 2011. Some stations have little or no data for one or more parameters over the period. However, for the purpose of standardization, data summaries for each station are included in this report. The locations of the sampling stations are depicted in Figure 1 and listed in Table 4.

In January 2007 the DWQ began assessing water quality in NC from a series of randomly selected sites. A description of the Random Ambient Monitoring System (RAMS) can be found here: http://portal.ncdenr.org/web/wq/ess/eco/rams. There is currently one RAMS sites in the Lumber River basin which is being sampled during 2011 and 2012. Because the basinwide reports assess in five-year windows and RAMS stations assess water quality in two-year windows, the RAMS data are not included in the ambient reports. The RAMS data will be analyzed on a statewide basis and discussed in a separate report.

Table 2. Parameters collected for the Ambient Monitoring System

Parameter	NC Administrative Code References for Standards	
	Freshwater	**Saltwater**
Dissolved oxygen (s)	15A NCAC 2B.0211(3)(b)	15A NCAC 2B.0220(3)(b)
pH (s)	15A NCAC 2B.0211(3)(g)	15A NCAC 2B.0220(3)(g)
Specific conductance	None	None
Temperature (s)	15A NCAC 2B.0211(3)(j)	15A NCAC 2B.0220(3)(k)
Total suspended solids	effluent limits only, 15A NCAC 2B.0224(1)(b)(ii)	None
Turbidity (s)	15A NCAC 2B.0211(3)(k)	15A NCAC 2B.0220(3)(l)
Fecal coliform bacteria (s)	15A NCAC 2B.0211(3)(e); 15A NCAC 2B.0219(3)(b)	15A NCAC 2B.0221(3)(d)
Nutrients:		
- Total phosphorus	None	None
- Ammonia as N	None	None
- Total Kjeldahl as N	None	None
- Nitrate+nitrite as N (s)	15A NCAC 2B.0212(3)(h)(i)(E)	None
Chlorophyll *a* (s)	15A NCAC 2B.0211(3)(a)	15A NCAC 2B.0220(3)(a)

Notes:
An (s) indicates the parameter has a numeric standard.
Chlorophyll *a* and nutrient sampling are only done in areas of concern, such as NSW, estuaries, lakes and areas with known enrichment issues.

Table 3. Selected Water Quality Standards[1]

	Standards for All Freshwater			Standards to Support Additional Uses		
Parameter	**Aquatic Life**	**Human Health**	**Water Supply Classifications**	**Trout Water**	**HQW**	**Swamp Waters**
Chloride (mg/L)	230	-	250	-	-	-
Chlorophyll *a* (µg/L)	40	-	-	15	-	-
Coliform, fecal (MFFCC/100 mL)[2]	-	200 / 400[2]	-	-	-	-
Dissolved oxygen (mg/L)	4.0 / 5.0[3]	-	-	6.0	6.0	-
Hardness, total (mg/L)	-	-	100	-	-	-
Nitrate nitrogen (mg/L)	-	-	10	-	-	-
pH (standard units)	6.0 - 9.0[4]	-	-	-	-	4.3[4]
Solids, total suspended (mg/L)	-	-	-	10 HQW[5]	20 (10 Tr)[5]	-
Turbidity (NTU)	25 / 50[6]	-	-	10	-	-

Notes:
[1]Standards apply to all classifications. For the protection of water supply and supplemental classifications, standards listed under Standards to Support Additional Uses should be used unless standards for aquatic life or human health are listed and are more stringent. Standards are the same for all water supply classifications (Administrative Code 15A NCAC 2B.0200, eff. May 1, 2007).
- There is not a numeric standard for this parameter in this water use category.
[2]MFFCC = Membrane filter fecal coliform count per 100 mL of sample. Fecal coliform shall not exceed a geometric mean of 200 MFFCC/100 mL, nor exceed 400 MFFCC/100 mL in over 20 percent of samples. Evaluation of each standard requires a minimum of five samples in a 30-day period.
[3]An instantaneous reading may be as low as 4.0 mg/L; the daily average must be 5.0 mg/L or more.
[4]Designated swamp waters may have pH as low as 4.3 if due to natural conditions.
[5]For effluent limits only, see 15A NCAC 2B.0224(1)(b)(ii).
[6]The 50 NTU standard applies to streams not designated as trout waters; the 25 NTU standard applies to lakes and reservoirs not designated as trout waters.

	Standards for All Saltwater		Standards To Support Additional Uses	
Parameter	**Aquatic Life**	**Class SA[1]**	**HQW**	**Swamp Waters**
Chlorophyll *a* (µg/L , corrected)	40[2]	-	-	-
Coliform, fecal (MFFCC/100 mL)	-	14 / 43[3]	-	-
Dissolved oxygen (mg/L)	5.0[2]	-	6.0[6]	[7]
pH (standard units)	6.8 - 8.5[2]	-	-	4.3[4]
Solids, total suspended (mg/L)	-	-	10 PNA[5], 20 other[6]	-
Turbidity (NTU)	25[2]	-	-	-

Notes:
[1]Class SA = shellfishing waters, see 15A NCAC 2B.0101(d)(3) for description. Except as specified in 15A NCAC 2B.0221, standards for all saltwater also apply to SA waters.
[2]See 15A NCAC 2B.0220(3) for narrative description of limits.
[3]See 15A NCAC 2B.0221(3)(d) for narrative description of limits.
[4]Designated swamp waters may have pH as low as 4.3 if due to natural conditions.
[5]PNA = Primary Nursery Areas.
[6]For effluent limits only, see 15A NCAC 2B.0224(1)(b)(ii).
[7]Swamp waters, poorly flushed tidally influenced streams or embayments, or estuarine bottom waters may have lower values if caused by natural conditions.

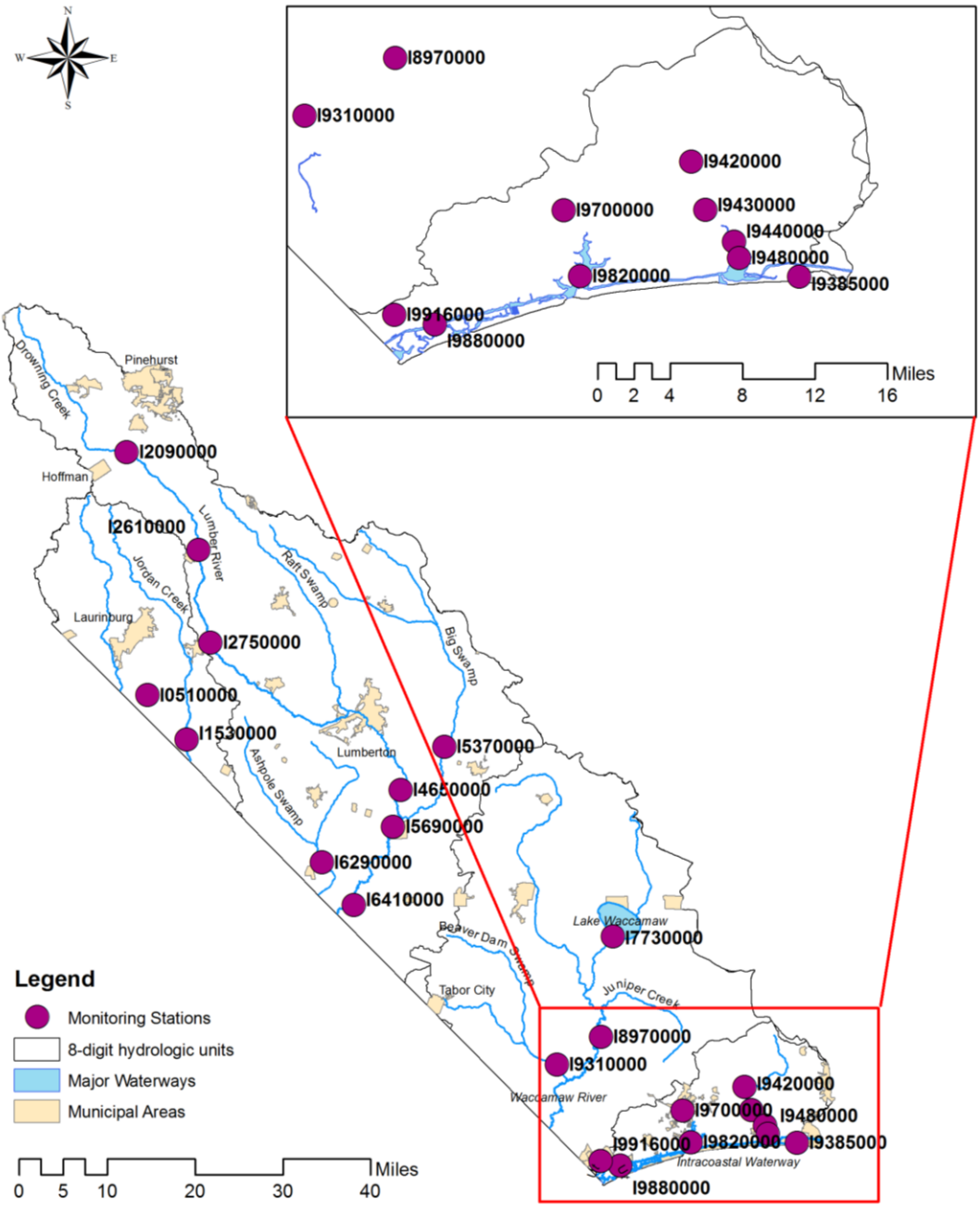

Figure 1. DWQ's Ambient Monitoring System in the Lumber River basin

Table 4. DWQ Monitoring stations in the Lumber River basin, 2007 - 2011

STATION NUMBER	LOCATION	STREAM CLASS	LATITUDE	LONGITUDE
HUC 03040203: Lumber River				
I2090000	Drowning Creek at US-1 near Hoffman	C Sw HQW	35.0610	-79.4939
I2610000	Lumber River at US-401 near Wagram	WS-IV B Sw HQW	34.9003	-79.3490
I2750000	Lumber River at SR-1303 near Maxton	B Sw HQW	34.7470	-79.3246
I4650000	Lumber River at SR-2121 near Kingsdale	C Sw	34.5040	-78.9444
I5370000	Big Swamp at NC-211 near Richardson	C Sw	34.5749	-78.8572
I5690000	Lumber River at US-74 at Boardman	C Sw	34.4430	-78.9596
I6290000	Ashpole Swamp at SR-2258 near Barnesville	C Sw	34.3839	-79.1017
I6410000	Lumber River at NC-904 at Fair Bluff	B Sw	34.3134	-79.0380
HUC 03040204: Little Pee Dee River				
I0510000	Leith Creek at SR-1615 near Smyrna Church	C Sw	34.6597	-79.4501
I1530000	Shoe Heel Creek at SR-1101 near Rowland	C Sw	34.5868	-79.3719
HUC 03040206: Waccamaw River				
I7730000	Lake Waccamaw at Dam Spillway near Lake Waccamaw	B Sw ORW	34.2611	-78.5232
I8970000	Waccamaw River at NC-130 at Freeland	C Sw	34.0952	-78.5478
I9310000	Seven Creeks at NC-905 near Bug Hill	C Sw	34.0493	-78.6350
HUC 03040208: Long Bay / Atlantic Ocean				
I9385000	Montgomery Slough at SR-1105 near Long Beach	SA HQW	33.9178	-78.1609
I9420000	Lockwood Folly River at NC-211 at Supply	SC HQW	34.0108	-78.2636
I9430000	Lockwood Folly River near Sandy Hill	SC HQW	33.9722	-78.2503
I9440000	Lockwood Folly River at Varnum	SA HQW	33.9465	-78.2232
I9480000	Lockwood Folly River at CM R6, W channel, NW Sunset Harbor	SA HQW	33.9332	-78.2185
I9700000	Shallotte River at US-17 Business at Shallotte	SC	33.9724	-78.3864
I9820000	Shallotte River at Shell Point near Shallotte	SA HQW	33.9197	-78.3711
I9880000	Intracoastal Waterway at SR-1172 near Sunset Beach	SA HQW	33.8817	-78.5109
I9916000	Calabash River at NC-179 near Calabash	SA HQW	33.8895	-78.5495

DATA ASSESSMENT AND INTERPRETATION

Monitoring and sampling results considered in this report represent samples collected or measurements taken at less than one-meter depth. The AMS data are available online from the US Environmental Protection Agency's Storage and Retrieval (STORET) Data Warehouse. Links and instructions for accessing STORET data are provided on the AMS website: http://portal.ncdenr.org/web/wq/storethome.

Percentile statistics were calculated using JMP statistical software (version 8.0.2; SAS Institute, Cary, NC). Values less than the minimum reporting level (non-detects) were evaluated as equal to the reporting level.

Providing Confidence in the Exceedances of Water Quality Standards

Historically, the DWQ has used guidance provided by the US Environmental Protection Agency (EPA) for determining when the number of results that exceed a water quality standard indicate potential water quality issues (US Environmental Protection Agency, 1997). The EPA has suggested that management actions be implemented when more than ten percent of the results exceed a water quality standard. This interpretation is the same whether two out of ten, six out of fifty, or 26 out of 250 results exceed a standard. Evaluating exceedances in this manner is termed the "raw-score" approach. Although this "10 percent exceedance criterion" defines a point where potential water quality issues may be present, it does not consider uncertainty. Some results are subject to chance or other factors such as calibration errors or sample mishandling. Uncertainty levels change with sample size: the smaller the sample size, the greater the uncertainty. Therefore, applying the raw-score approach to small sample sizes could result in an impairment listing of a stream that is not really impaired.

This document uses a nonparametric procedure (Lin *et al.,* 2000) to identify when a sufficient number of exceedances have occurred that indicate a true exceedance probability of ten percent. Calculating the minimum number of exceedances needed for a particular sample size was done using the BINOMDIST function in Microsoft Excel®. This statistical function suggests that at least three exceedances need to be observed in a sample of ten in order to be about 95 percent confident that the results statistically exceed the water quality standard more than 10% of the time. For example, there is less statistical confidence associated with two exceedance out of ten (74 percent confidence) than when there are three exceedances out of ten (93 percent confidence) (Table 5).

Table 5. Exceedance Confidence

Number of Samples	Number of Exceedances																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
10	35%	74%	93%	99%	100%	100%	100%	100%	100%	100%								
12	28%	66%	89%	97%	100%	100%	100%	100%	100%	100%	100%	100%						
14	23%	58%	84%	96%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%				
16	19%	51%	79%	93%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
18	15%	45%	73%	90%	97%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
20	12%	39%	68%	87%	96%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
22	10%	34%	62%	83%	94%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
24	8%	29%	56%	79%	91%	97%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
26	6%	25%	51%	74%	89%	96%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
28	5%	22%	46%	69%	86%	94%	98%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
30	4%	18%	41%	65%	82%	93%	97%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
32	3%	16%	37%	60%	79%	91%	96%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
34	3%	13%	33%	55%	75%	88%	95%	98%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%
36	2%	11%	29%	51%	71%	85%	94%	98%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%
38	2%	10%	25%	46%	67%	83%	92%	97%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%
40	1%	8%	22%	42%	63%	79%	90%	96%	98%	99%	100%	100%	100%	100%	100%	100%	100%	100%
42	1%	7%	20%	38%	59%	76%	88%	95%	98%	99%	100%	100%	100%	100%	100%	100%	100%	100%
44	1%	6%	17%	35%	55%	73%	85%	93%	97%	99%	100%	100%	100%	100%	100%	100%	100%	100%
46	1%	5%	15%	31%	51%	69%	83%	92%	96%	99%	100%	100%	100%	100%	100%	100%	100%	100%
48	1%	4%	13%	28%	47%	65%	80%	90%	95%	98%	99%	100%	100%	100%	100%	100%	100%	100%
50	1%	3%	11%	25%	43%	62%	77%	88%	94%	98%	99%	100%	100%	100%	100%	100%	100%	100%
52	0%	3%	10%	22%	40%	58%	74%	86%	93%	97%	99%	100%	100%	100%	100%	100%	100%	100%
54	0%	2%	8%	20%	36%	54%	71%	83%	91%	96%	98%	99%	100%	100%	100%	100%	100%	100%
56	0%	2%	7%	18%	33%	51%	67%	81%	90%	95%	98%	99%	100%	100%	100%	100%	100%	100%
58	0%	2%	6%	16%	30%	47%	64%	78%	88%	94%	97%	99%	100%	100%	100%	100%	100%	100%
60	0%	1%	5%	14%	27%	44%	61%	75%	86%	93%	97%	99%	99%	100%	100%	100%	100%	100%
62	0%	1%	5%	12%	24%	40%	57%	72%	84%	91%	96%	98%	99%	100%	100%	100%	100%	100%
64	0%	1%	4%	11%	22%	37%	54%	69%	81%	90%	95%	98%	99%	100%	100%	100%	100%	100%
66	0%	1%	3%	9%	20%	34%	51%	66%	79%	88%	94%	97%	99%	99%	100%	100%	100%	100%
68	0%	1%	3%	8%	18%	31%	47%	63%	76%	86%	93%	96%	98%	99%	100%	100%	100%	100%
70	0%	1%	2%	7%	16%	29%	44%	60%	74%	84%	91%	96%	98%	99%	100%	100%	100%	100%
72	0%	0%	2%	6%	14%	26%	41%	57%	71%	82%	90%	95%	97%	99%	100%	100%	100%	100%
74	0%	0%	2%	5%	13%	24%	38%	54%	68%	80%	88%	94%	97%	99%	99%	100%	100%	100%
76	0%	0%	1%	5%	11%	22%	35%	51%	65%	77%	86%	93%	96%	98%	99%	100%	100%	100%
78	0%	0%	1%	4%	10%	20%	33%	48%	62%	75%	85%	91%	95%	98%	99%	100%	100%	100%
80	0%	0%	1%	4%	9%	18%	30%	45%	59%	72%	83%	90%	95%	97%	99%	99%	100%	100%
82	0%	0%	1%	3%	8%	16%	28%	42%	56%	70%	81%	88%	94%	97%	98%	99%	100%	100%
84	0%	0%	1%	3%	7%	14%	25%	39%	53%	67%	78%	87%	93%	96%	98%	99%	100%	100%
86	0%	0%	1%	2%	6%	13%	23%	36%	51%	64%	76%	85%	91%	95%	98%	99%	100%	100%
88	0%	0%	1%	2%	5%	12%	21%	34%	48%	62%	74%	83%	90%	95%	97%	99%	99%	100%
90	0%	0%	0%	2%	5%	10%	19%	31%	45%	59%	71%	81%	89%	94%	97%	98%	99%	100%
92	0%	0%	0%	1%	4%	9%	17%	29%	42%	56%	69%	79%	87%	93%	96%	98%	99%	100%
94	0%	0%	0%	1%	4%	8%	16%	27%	39%	53%	66%	77%	86%	92%	95%	98%	99%	99%
96	0%	0%	0%	1%	3%	7%	14%	24%	37%	50%	64%	75%	84%	90%	95%	97%	99%	99%
98	0%	0%	0%	1%	3%	6%	13%	22%	34%	48%	61%	73%	82%	89%	94%	97%	98%	99%
100	0%	0%	0%	1%	2%	6%	12%	21%	32%	45%	58%	70%	80%	88%	93%	96%	98%	99%

Note: Shaded entries indicate at least 95% confidence that at least 10% of the possible samples exceed the standard/evaluation level. Values at 100% are rounded from confidence levels of 99.5% or greater.

Methods Used to Summarize Results

Methods used to summarize the results in this report encompass both tabular and spatial formats. Individual summary sheets for each station provide details on station location and stream classification, along with specifics on what parameters were measured, the number of samples taken (i.e. sample size), the number of results below reporting levels, the number of results exceeding a water quality standard or evaluation level, statistical confidence that more than 10% of results exceeded the evaluation level, and a general overview of the distribution of the results using percentiles. These station summary sheets provide the greatest details on a station-by-station basis. They are included as Appendix A to this report.

Use Support Assessment Considerations

1) The freshwater dissolved oxygen concentrations of 5.0 mg/L and 4.0 mg/L are presented as evaluation levels. Instantaneous concentrations of 4.0 mg/L or less (5.0 mg/L in salt water) are in violation of the standard unless caused by natural (e.g. swampy) conditions. The 5.0 mg/L evaluation level is based upon a freshwater standard which specifies "not less than a daily average of 5.0 mg/L" (15A NCAC 2B.0211(3)(b)).
2) The geometric mean and percentage of results greater than evaluation level threshold values were calculated for fecal coliform results for each station as appropriate for stream class.
3) The accuracy of results is limited by natural variation within a site and by the abilities of analytical equipment. Results that are returned at very close to evaluation levels may be within the margin of error for the accuracy of field equipment or laboratory instrumentation. Meters commonly used for in-field measurements of temperature, specific conductance, dissolved oxygen, and pH of surface waters at AMS stations may have manufacturer accuracy specifications of up to ± 0.2 °C, ± 1% of reading or ± 1 µS/cm (whichever is greater), ± 0.6 mg/L, and ± 0.2 standard pH units, respectively. Results from laboratory analyses are considered reliable when they are at or above practical quantitation limits (PQLs, available at http://portal.ncdenr.org/web/wq/lab/staffinfo/techassist) and meet laboratory quality assurance protocols, including a defined acceptable margin of error (http://portal.ncdenr.org/web/wq/lab/qualityassurance).

Specific information on water quality standards and action levels can be found in 15A NCAC 2B.0200 (available at http://portal.ncdenr.org/web/wq/ps/csu/rules).

PARAMETERS

Dissolved Oxygen

Dissolved oxygen is one of the most important of all the chemical measurements. Dissolved oxygen provides valuable information about the ability of the water to support aquatic life and the capacity of water to assimilate point and nonpoint source discharges. Water quality standards for dissolved oxygen vary depending on the classification of the body of water. For fresh waters, 15A NCAC 02B .0211 (3)(b) specifies:

Dissolved oxygen: not less than 6.0 mg/l for trout waters; for non-trout waters, not less than a daily average of 5.0 mg/l with a minimum instantaneous value of not less than 4.0 mg/l; swamp waters, lake coves or backwaters, and lake bottom waters may have lower values if caused by natural conditions.

For salt waters, 15A NCAC 02B .0220 (3)(b) applies instead:

Dissolved oxygen: not less than 5.0 mg/l, except that swamp waters, poorly flushed tidally influenced streams or embayments, or estuarine bottom waters may have lower values if caused by natural conditions.

Many of the surface waters in the Lumber basin display physical and chemical characteristics, including low dissolved oxygen and pH values, of swamp waters even though only the fresh waters have been assigned a supplemental Swamp (Sw) classification by the DWQ.

pH

The scale for measuring pH is logarithmic (i.e. a pH of 8.0 is ten times less concentrated in hydrogen ions than a pH of 7.0). A pH value of 7.0 Standard Units (SU) is neutral, while lower values are more acidic and higher values are more basic. The pH of ambient waters varies naturally depending upon interaction with soils and in-stream constituents, upstream inputs, and conditions in the surrounding environment. Point source discharges can also influence the pH of a stream. Values much lower than 7.0 SU may be found in waters rich in dissolved organic matter (e.g. swamp lands). Values much greater than 7.0 SU may be observed during algal blooms. The water quality standards for pH in fresh waters consider values less than 6.0 SU or greater than 9.0 SU to warrant attention. For salt waters, the acceptable range is narrower: 6.8 SU to 8.5 SU. In swamp waters, a pH below 4.3 SU is of concern.

The pH evaluation level was exceeded more than ten percent of the time at one fresh water station (I8970000, Waccamaw River at NC-130 at Freeland) and two salt water stations (I9420000, Lockwood Folly River at NC-211 at Supply, and I9700000, Shallotte River at US-17 Business at Shallotte) in the Lumber basin during the assessment timeframe. As previously discussed, it is possible that swampy conditions influenced pH values in the Lumber basin.

Specific Conductance

Specific conductance is a measure of the ability of water to conduct an electric current. It is reported in microsiemens per centimeter (µS/cm) at 25°C. The presence of ions and temperature are major factors in the ability of water to conduct a current. Clean freshwater has a low specific conductance, whereas high specific conductance values may indicate polluted water or saline conditions. Measurements reported are corrected for temperature, thus the range of values reported over a period of time indicate the relative presence of ions in water.

Specific conductance can be used to evaluate variations in dissolved mineral concentrations (ions) among sites with varying degrees of impact resulting from point source discharges. Generally, impacted sites show elevated and widely ranging values for specific conductance. Water bodies that contain saltwater will also have high specific conductance values. Therefore those wishing to use specific conductance as an indicator for problems must first account for salinity.

Turbidity

Turbidity data may denote episodic high values on particular dates or within narrow time periods. These can often be the result of intense or sustained rainfall events; however elevated values can occur at other times. In coastal areas, tidal surges can also disturb shallow estuarine sediments and naturally increase turbidity.

For freshwater, 15A NCAC 02B .0211 (3)(k) specifies:

Turbidity: the turbidity in the receiving water shall not exceed 50 Nephelometric Turbidity Units (NTU) in streams not designated as trout waters and 10 NTU in streams, lakes or reservoirs designated as trout waters; for lakes and reservoirs not designated as trout waters, the turbidity shall not exceed 25 NTU; if turbidity exceeds these levels due to natural conditions, the existing turbidity level shall not be increased.

For saltwater, 15A NCAC 02B .0220 (3)(l) applies instead:

Turbidity: the turbidity in the receiving water shall not exceed 25 NTU; if turbidity exceeds these levels due to natural conditions, the existing turbidity level shall not be increased.

Few turbidity evaluation level exceedances occurred in the Lumber River basin during the assessment timeframe. However the turbidity standard of 25 NTU in salt waters was exceeded more than ten percent of the time at one monitoring station: I9916000, the Calabash River at NC-179 near Calabash.

Metals

A number of metals are essential micronutrients for the support of aquatic life. However, there are threshold concentrations over which metals can be harmful. Traditionally, the DWQ has considered total metals concentrations in surface waters to evaluate potential adverse effects on human and aquatic life. However, metals can exist in many forms within the water column. Scientific investigation has revealed that different forms present different levels of risk to aquatic organisms (US Environmental Protection Agency, 2007). Therefore, as of May 2007, the DWQ suspended routine collection of total metals at AMS stations, and is currently reviewing water quality standards for metals.

The stations in the Lumber basin had less than ten total metals results from quarterly sampling during 2007 before the suspension. Due to the small number of total metals samples collected during the 2007 through 2011 timeframe, the total metals results are not considered in the tables and figures in this report. The results are summarized in Appendix A on the Station Summary Sheets.

Nutrients

Compounds of nitrogen and phosphorus are major components of living organisms and thus are essential to maintain life. These compounds are collectively referred to as "nutrients." Nitrogen compounds include ammonia-nitrogen (NH_3-N), total Kjeldahl nitrogen (TKN) and nitrite+nitrate nitrogen (NO_2+NO_3-N). Phosphorus is measured as total phosphorus. When nutrients are introduced to an aquatic ecosystem from municipal and industrial treatment processes, or runoff from urban or agricultural land, the excessive growth of algae and other plants may occur.

At neutral pH in water, ammonia normally forms an ionized solution of ammonium hydroxide, with only a small amount of ammonia. However, as pH increases, more ammonia is left unionized. Unionized ammonia is toxic to fish and other aquatic organisms. At higher pH and temperature, the process of nitrification (i.e. two-step conversion of ammonium to nitrite, then nitrate) consumes oxygen. As previously described, oxygen depletion can be detrimental to the health of surface waters and their associated biota.

Bacteria

Concentrations of fecal coliform bacteria can vary greatly. The descriptive statistics used to evaluate fecal coliform bacteria data include the percentage of results above evaluation level threshold values, as well as either the geometric mean or the median colony count per 100 mL, depending upon the classification of the water body. For all freshwater sites in the Lumber River basin, the standard specified in the North Carolina Administrative Code 15A NCAC 02B.0211 (3)(e) is applicable:

"Organisms of the coliform group: fecal coliforms shall not exceed a geometric mean of 200/100ml (MF count) based upon at least five consecutive samples examined during any 30 day period, nor exceed 400/100ml in more than 20 percent of the samples examined during such period; violations of the fecal coliform standard are expected during rainfall events and, in some cases, this violation is expected to be caused by uncontrollable nonpoint source pollution; all coliform concentrations are to be analyzed using the membrane filter technique unless high turbidity or other adverse conditions necessitate the tube dilution method; in case of controversy over results, the MPN 5-tube dilution technique shall be used as the reference method."

For waters where commercial shellfishing is done (Class SA), an additional water quality standard is applied (15A NCAC 02B .0221 (3)(d)):

Organisms of coliform group: fecal coliform group not to exceed a median MF of 14/100 ml and not more than 10 percent of the samples shall exceed an MF count of 43/100 ml in those areas most probably exposed to fecal contamination during the most unfavorable hydrographic and pollution conditions.

Fecal coliform problems are screened using annual summaries of ambient sampling results. If the screening indicates that the station may be exceeding a standard, the station is assessed using the method required by law. All class B (and class SB/SA in coastal basins) waters are assessed, and other waters as resources permit. The required assessment method is known as "5 in 30", collecting a minimum five samples within a span of 30 days. If a water body exceeds the standard more than the specified percentage of the time during the 30-day period, or if the median or geometric mean for the 30-day period is greater than the threshold values described in the relevant standard(s), then that water body is considered impaired and is added to the impaired water list, the 303(d) list.

During the current assessment period, none of the freshwater stations in the Lumber River basin exceeded the fecal coliform evaluation level of 400 colonies/100 mL more than twenty percent of the time. The basin also contains salt waters, some of which are classified as Class SA waters. Three of the SA stations (I9385000, Montgomery Slough at SR-1105 near Long Beach; I9440000, Lockwood Folly River at Varnum; and I9916000, Calabash River at NC-179 near Calabash) exceeded the EL of 43 colonies/100 mL more than ten percent of the time, and two of these (I9385000 and I9916000) exceeded a median fecal coliform result of 14 colonies/100 mL. Geometric means, medians and evaluation level exceedance percentages for individual sites are indicated in Table 6 and/or on the respective station summary sheets in Appendix A.

In addition, for all tidal salt waters, the following is applicable 15A NCAC 02B .0220 (3)(e):

Enterococcus, including Enterococcus faecalis, Enterococcus faecium, Enterococcus avium, and Enterococcus gallinarium: not to exceed a geometric mean of 35 enterococci per 100 ml based upon a minimum of five samples within any consecutive 30 days.

The DWQ does not collect *Enterococcus* samples. The NC Recreational Water Quality Program (NCRWQP), administered by the NC Department of Environment and Natural Resources' Division of Environmental Health, collects *Enterococcus* samples. The NCRWQP mission is to protect the public health by monitoring the quality of NC's coastal recreational waters and notifying the public when bacteriological standards for safe bodily contact are exceeded. The program monitors 240 stations statewide, and meets all the requirements of the EPA national beach rule. Coastal waters monitored include ocean beaches, sounds, bays and estuarine rivers. Over twenty coastal locations in the Lumber basin were monitored for *Enterococcus* bacteria by the NCRWQP during the current assessment period.

Enterococcus bacteria is an indicator organism found in the intestines of warm-blooded animals. While it may not cause illness itself, its presence is correlated with that of organisms that can cause illness. The program tests 240 ocean and sound-side areas. Swimming season begins on April 1st and ends September 30th. All ocean beaches and high-use sound-side beaches (Tier 1) are tested weekly. Lower-use beaches (Tier 2 and Tier 3) are tested twice a month. All sites are tested twice a month in October and monthly from November through March. The NCRWQP currently uses a single sample test to determine compliance with their rules (15A NCAC 18A .3402):

(a) The Enterococcus level in a Tier I swimming area shall not exceed either:

- *(1) A geometric mean of 35 enterococci per 100 milliliter of water, that includes a minimum of at least five samples collected within 30 days; or*
- *(2) A single sample of 104 enterococci per 100 milliliter of water.*

(b) The enterococcus level in a tier II swimming area shall not exceed a single sample of 276 enterococci per 100 milliliter of water.

(c) The enterococcus level in a tier III swimming area shall not exceed two consecutive samples of 500 enterococci per 100 milliliter of water"

The results of NCRWQP sampling can be found on their website: http://portal.ncdenr.org/web/mf/recreational-water-quality.

Table 6. Frequency of Evaluation Level Exceedances, 2007-2011

8-Digit HUC/ Station ID	Class	% of Results that Exceeded the Evaluation Limit					
		Dissolved Oxygen (<5)[1]	Dissolved Oxygen (<4)[2]	pH (<4.3 in Sw; <6.8 in salt)[3]	Water Temperature (>32 °C)	Turbidity (>50 NTU in fresh; >25 NTU in salt)	Fecal Coliform (>400/100 mL in fresh; >43/100 mL in SA)
03040203	**Lumber River**						
I2090000	C Sw HQW	NA	NA	0.0%	0.0%	0.0%	6.9%
I2610000	WS-IV B Sw HQW	NA	NA	0.0%	0.0%	0.0%	8.9%
I2750000	B Sw HQW	NA	NA	0.0%	0.0%	0.0%	7.1%
I4650000	C Sw	NA	NA	0.0%	0.0%	0.0%	5.2%
I5370000	C Sw	NA	NA	1.9%	0.0%	0.0%	7.3%
I5690000	C Sw	NA	NA	0.0%	0.0%	0.0%	1.7%
I6290000	C Sw	NA	NA	0.0%	0.0%	2.1%	10.4%
I6410000	B Sw	NA	NA	0.0%	0.0%	0.0%	0.0%
03040204	**Little Pee Dee River**						
I0510000	C Sw	NA	NA	0.0%	0.0%	1.7%	10.2%
I1530000	C Sw	NA	NA	1.7%	0.0%	0.0%	3.5%
03040206	**Waccamaw River**						
I7730000	B Sw ORW	NA	NA	0.0%	5.0%	0.0%	0.0%
I8970000	C Sw	NA	NA	22.0%	3.3%	0.0%	3.3%
I9310000	C Sw	NA	NA	0.0%	0.0%	0.0%	10.0%
03040208	**Long Bay / Atlantic Ocean**						
I9385000	SA HQW	13.6%	NA	0.0%	3.7%	0.0%	32.1%
I9420000	SC HQW	42.6%	NA	20.7%	0.0%	0.0%	NA
I9430000	SC HQW	29.1%	NA	6.8%	0.0%	0.0%	NA
I9440000	SA HQW	10.3%	NA	0.0%	0.0%	0.0%	14.5%
I9480000	SA HQW	3.1%	NA	0.0%	0.0%	0.0%	3.6%
I9700000	SC	22.0%	NA	23.5%	0.0%	0.0%	NA
I9820000	SA HQW	11.6%	NA	0.0%	0.0%	0.0%	0.0%
I9880000	SA HQW	9.0%	NA	1.5%	2.9%	0.0%	6.9%
I9916000	SA HQW	25.0%	NA	2.5%	7.4%	33.9%	79.7%

Notes:

NA: Not Applicable. The evaluation level is not applicable to this station.

[1] Applies to saltwater (class SA, SB and SC) primarily, and to freshwater (class B, C, and WS) as a daily average.

[2] Applies to freshwater (class B, C and WS) only.

[3] No exceedances of the maximum pH standard (8.5 in saltwater) observed during the current assessment period.

Less than 10 samples per station were collected for chlorophyll α and metals, which are not included in this table.

WATER QUALITY PATTERNS IN THE LUMBER RIVER BASIN

Maps were used to depict data for a variety of water quality parameters throughout the basin so that the relationship of stations to each other could be seen and regional patterns could become clear. While figures portray information visually, specific and accurate details can only be conveyed in tables. Individual station summary sheets should be consulted when exact information is needed.

Maps were utilized specifically to display the geographic distribution of evaluation level exceedances for dissolved oxygen, pH and fecal coliform (Figures 2, 3 and 4, respectively). Station symbol colors signified the degree of water quality exceedance at each location.

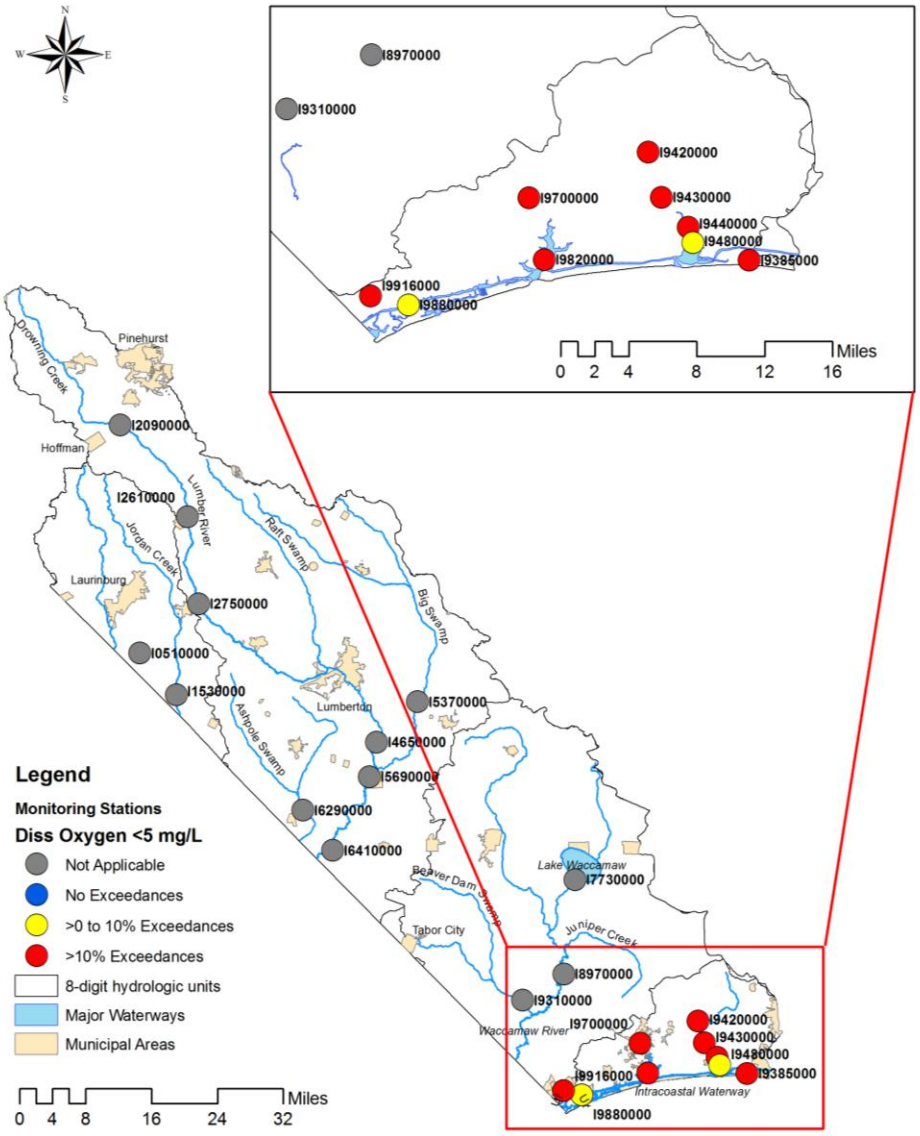

Figure 2. Geographic distribution and percentage of dissolved oxygen exceedances (not applicable in swamp waters in the freshwater portion of the basin; less than 5.0 mg/L in saltwater at the lower end of the basin)

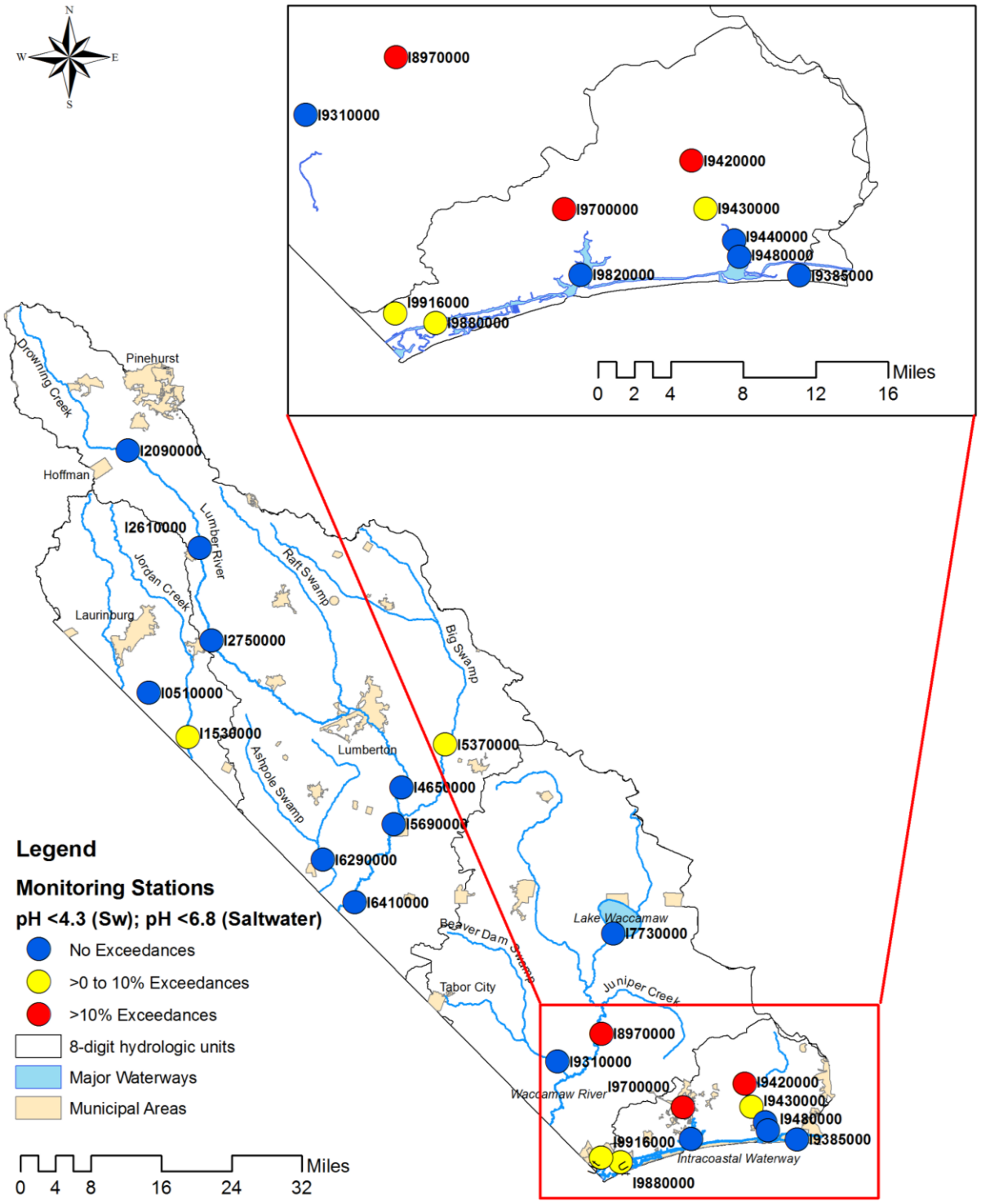

Figure 3. Geographic distribution and percentage of pH exceedances (less than 4.3 in freshwater with swamp (Sw) classification; less than 6.8 in saltwater)

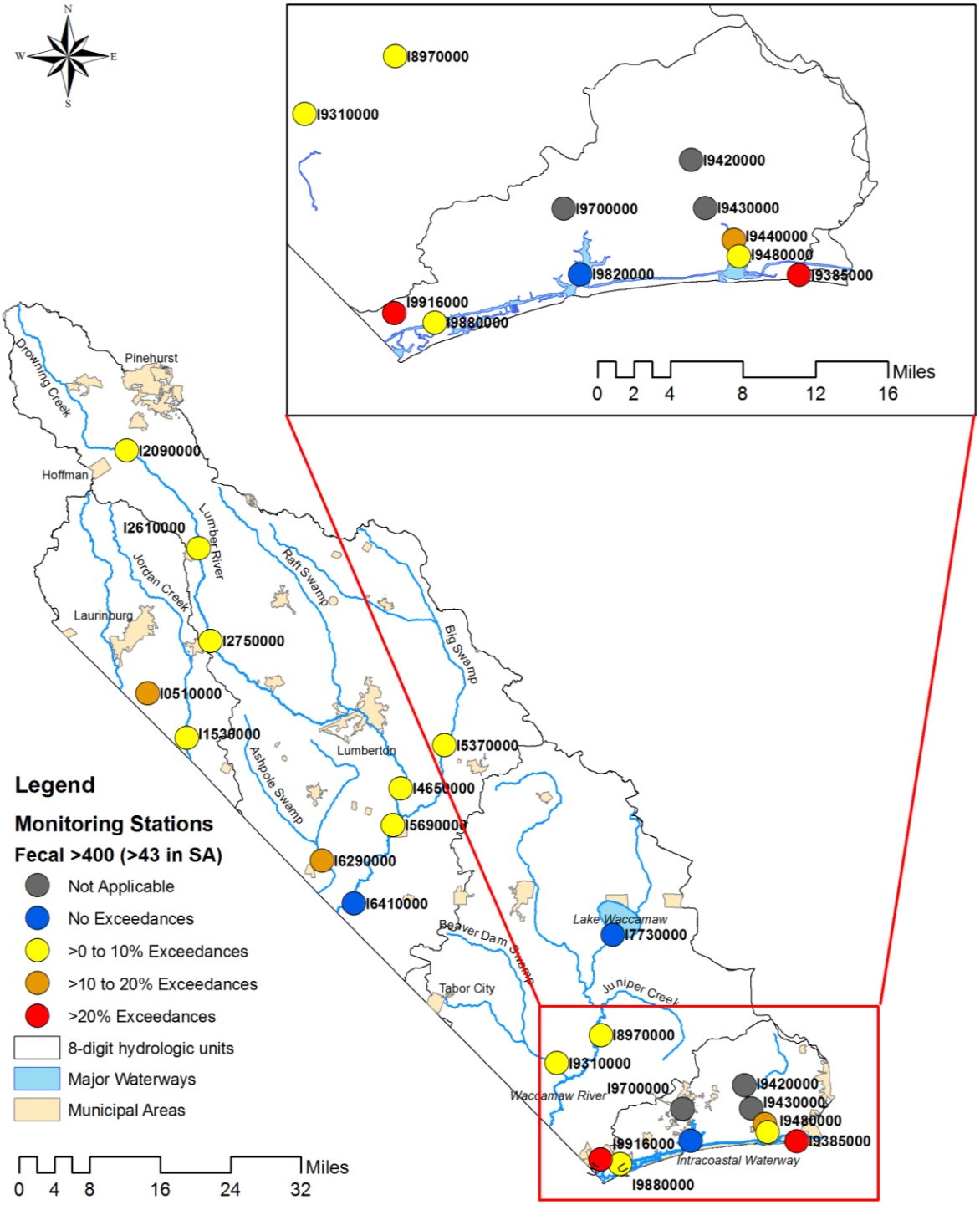

Figure 4. Geographic distribution and percentage of fecal coliform exceedances by membrane filter fecal coliform count (greater than 400 colonies/100 mL in freshwaters, greater than 43 colonies/100 mL in SA saltwaters; not applicable in SB and SC saltwaters)

References

Lin, P., D. Meeter and X. Niu, 2000. A Nonparametric Procedure for Listing and Delisting Impaired Waters Based on Criterion Exceedances. Tallahassee, Florida: Florida State University. *Available at* http://www.dep.state.fl.us/water/tmdl/docs/Supdocument.PDF.

NC Division of Water Quality. 2010. 2010 Use Assessment Methodology. Raleigh, North Carolina: NC Department of Environment and Natural Resources. *Available at* http://portal.ncdenr.org/c/document_library/get_file?uuid=a6046356-8ec6-46a5-ab4e-6de03f22df10&groupId=38364.

US Environmental Protection Agency, Assessment and Watershed Protection Division. September, 1997. Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates, Volume 2. *Available at* http://water.epa.gov/type/watersheds/monitoring/upload/2003_07_24_monitoring_305bguide_v2ch3.pdf. *Full guidelines available at* http://water.epa.gov/type/watersheds/monitoring/guidelines.cfm.

US Environmental Protection Agency. March 2007. Framework for Metals Risk Assessment. EPA 120/R-07/001. Washington, DC. *Available at* www.epa.gov/raf/metalsframework/pdfs/metals-risk-assessment-final.pdf.

Appendix A: Station Summary Sheets

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Leith Creek at SR-1615 near Smyrna Church
Station #: I0510000 **Hydrologic Unit Code:** 03040204
Latitude: 34.65965 **Longitude:** -79.45012 **Stream class:** C Sw
Agency: NCAMBNT **NC stream index:** 14-33

Time period: 01/22/2007 to 12/13/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Percentiles Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	58	0	N/A				0	0.9	2.8	4.9	8.1	9.1	10.8
pH (SU)	54	0	<4.3	0	0		5.1	5.4	5.9	6.2	6.4	6.6	7.9
	54	0	>9	0	0		5.1	5.4	5.9	6.2	6.4	6.6	7.9
Spec. conductance (umhos/cm at 25°C)	55	0	N/A				42	61	67	74	82	103	176
Water Temperature (°C)	58	0	>32	0	0		5.4	7.5	11.4	18.2	22.9	24.7	25.7
Other													
Hardness (mg/L)	6	0	N/A				5	5	9	16	21	22	22
TSS (mg/L)	19	17	N/A				2.5	2.5	6.2	6.2	8.5	12	68
Turbidity (NTU)	58	1	>50	1	1.7		1	1.2	1.8	2.8	5.5	8.1	90
Metals (ug/L)													
Aluminum, total (Al)	2	0	N/A				130	130	130	135	140	140	140
Arsenic, total (As)	2	2	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	2	2	>2	0	0		1	1	1	1	1	1	1
Chromium, total (Cr)	2	2	>50	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	2	2	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	2	0	>1000	0	0		370	370	370	660	950	950	950
Lead, total (Pb)	2	2	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	2	2	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	2	2	>50	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
59	109.3	6	10.2	

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
EL: Evaluation Level; applicable numeric or narrative water quality standard or action level
Results not meeting EL: number and percentages of observations not meeting evaluation level
%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Shoe Heel Creek at SR-1101 near Rowland
Station #: I1530000 **Hydrologic Unit Code:** 03040204
Latitude: 34.58681 **Longitude:** -79.37192 **Stream class:** C Sw
Agency: NCAMBNT **NC stream index:** 14-34

Time period: 01/04/2007 to 12/06/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	56	0	N/A				3.4	4.6	5.4	6.1	8.1	10.8	12.5
pH (SU)	58	0	<4.3	1	1.7		4.2	5.3	5.5	5.9	6.3	6.7	7.2
	58	0	>9	0	0		4.2	5.3	5.5	5.9	6.3	6.7	7.2
Spec. conductance (umhos/cm at 25°C)	57	0	N/A				22	46	49	54	60	68	92
Water Temperature (°C)	59	0	>32	0	0		0.6	4.8	12.2	18	23.6	25.7	29.5
Other													
Hardness (mg/L)	1	0	N/A				8	8	8	8	8	8	8
	6	0	N/A				8	8	8	8	11	11	11
TSS (mg/L)	19	16	N/A				2.5	3.5	6.2	6.2	9.8	12	12
Turbidity (NTU)	58	0	>50	0	0		1	1.3	2	3	4.5	5.8	16
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				250	250	250	250	250	250	250
Arsenic, total (As)	1	1	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	1	1	>2	0	0		1	1	1	1	1	1	1
Chromium, total (Cr)	1	1	>50	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	1	1	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	1	0	>1000	0	0		130	130	130	130	130	130	130
Lead, total (Pb)	1	1	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	1	1	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	1	1	>50	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
57	81.4	2	3.5	

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
EL: Evaluation Level; applicable numeric or narrative water quality standard or action level
Results not meeting EL: number and percentages of observations not meeting evaluation level
%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Drowning Creek at US-1 near Hoffman
Station #: I2090000 **Hydrologic Unit Code:** 03040203
Latitude: 35.06100 **Longitude:** -79.49389 **Stream class:** C Sw HQW
Agency: NCAMBNT **NC stream index:** 14-2-(10.5)

Time period: 01/22/2007 to 05/11/2009

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	29	0	N/A				4.7	6.2	7	8.2	9.5	10.6	11.3
pH (SU)	27	0	<4.3	0	0		4.6	5.1	5.3	5.6	5.8	6.5	6.8
	27	0	>9	0	0		4.6	5.1	5.3	5.6	5.8	6.5	6.8
Spec. conductance (umhos/cm at 25°C)	27	0	N/A				22	22	24	26	28	30	36
Water Temperature (°C)	29	0	>32	0	0		5.6	5.9	9	15.6	20.6	22.7	23.7
Other													
TSS (mg/L)	10	9	N/A				2.5	2.7	5.8	6.2	6.2	11.4	12
Turbidity (NTU)	29	0	>50	0	0		2.5	3.5	4	5.1	7	11	16
Nutrients (mg/L)													
NH3 as N	29	20	N/A				0.02	0.02	0.02	0.02	0.02	0.04	0.16
NO2 + NO3 as N	29	0	N/A				0.02	0.09	0.1	0.14	0.22	0.32	0.48
TKN as N	29	1	N/A				0.2	0.22	0.28	0.32	0.4	0.45	0.55
Total Phosphorus	29	13	N/A				0.02	0.02	0.02	0.02	0.02	0.02	0.03
Metals (ug/L)													
Aluminum, total (Al)	2	0	N/A				390	390	390	450	510	510	510
Arsenic, total (As)	2	2	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	2	2	>2	0	0		1	1	1	1	1	1	1
Chromium, total (Cr)	2	2	>50	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	2	2	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	2	0	>1000	0	0		380	380	380	485	590	590	590
Lead, total (Pb)	2	2	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	2	2	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	2	2	>50	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
29	83.6	2	6.9	

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
EL: Evaluation Level; applicable numeric or narrative water quality standard or action level
Results not meeting EL: number and percentages of observations not meeting evaluation level
%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Lumber River at US-401 near Wagram
Station #: I2610000 **Hydrologic Unit Code:** 03040203
Latitude: 34.90025 **Longitude:** -79.34900 **Stream class:** WS-IV B Sw HQW
Agency: NCAMBNT **NC stream index:** 14-(3)

Time period: 01/22/2007 to 12/13/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	57	0	N/A				4.1	5.6	6.2	7.3	8.8	9.9	11.1
pH (SU)	53	0	<4.3	0	0		4.3	5	5.5	5.9	6.2	6.5	7.1
	53	0	>9	0	0		4.3	5	5.5	5.9	6.2	6.5	7.1
Spec. conductance (umhos/cm at 25°C)	54	0	N/A				29	31	36	41	45	61	72
Water Temperature (°C)	57	0	>32	0	0		3.3	7.4	10.4	17.1	22	23.8	25.3
Other													
Hardness (mg/L)	5	0	>100	0	0		8	8	8	9	14	14	14
TSS (mg/L)	18	17	N/A				2.5	2.5	6.2	6.2	6.2	7.4	12
Turbidity (NTU)	57	0	>50	0	0		1.7	2.2	3	3.5	4.6	8	14
Nutrients (mg/L)													
NH3 as N	57	41	N/A				0.02	0.02	0.02	0.02	0.02	0.02	0.07
NO2 + NO3 as N	57	0	>10	0	0		0.06	0.25	0.44	0.69	1	1.5	2.2
TKN as N	57	1	N/A				0.2	0.28	0.33	0.39	0.46	0.56	0.68
Total Phosphorus	57	0	N/A				0.02	0.04	0.05	0.09	0.16	0.21	0.43
Metals (ug/L)													
Aluminum, total (Al)	2	0	N/A				290	290	290	320	350	350	350
Arsenic, total (As)	2	2	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	2	2	>2	0	0		1	1	1	1	1	1	1
Chromium, total (Cr)	2	2	>50	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	2	2	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	2	0	>1000	0	0		370	370	370	420	470	470	470
Lead, total (Pb)	2	2	>25	0	0		10	10	10	10	10	10	10
Manganese, total (Mn)	2	0	>200	0	0		11	11	11	12	13	13	13
Nickel, total (Ni)	2	2	>25	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	2	0	>50	0	0		29	29	29	32	36	36	36

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
56	87.8	5	8.9	

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
EL: Evaluation Level; applicable numeric or narrative water quality standard or action level
Results not meeting EL: number and percentages of observations not meeting evaluation level
%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Lumber River at SR-1303 near Maxton
Station #: I2750000 **Hydrologic Unit Code:** 03040203
Latitude: 34.74704 **Longitude:** -79.32455 **Stream class:** B Sw HQW
Agency: NCAMBNT **NC stream index:** 14-(4.5)

Time period: 01/22/2007 to 12/20/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	57	0	N/A				3.9	5.3	6.4	7	8.9	10.4	12.1
pH (SU)	53	0	<4.3	0	0		4.6	5.4	5.8	6.2	6.5	6.9	7.6
	53	0	>9	0	0		4.6	5.4	5.8	6.2	6.5	6.9	7.6
Spec. conductance (umhos/cm at 25°C)	54	0	N/A				28	36	41	51	60	78	96
Water Temperature (°C)	57	0	>32	0	0		3.7	8	11.3	18.1	23	24.7	26.8
Other													
Hardness (mg/L)	6	0	N/A				8	8	9	10	14	14	14
TSS (mg/L)	19	17	N/A				2.5	6.2	6.2	6.2	6.2	19	31
Turbidity (NTU)	57	0	>50	0	0		1.2	2.2	3	3.5	4.4	6.8	20
Nutrients (mg/L)													
NH3 as N	56	33	N/A				0.02	0.02	0.02	0.02	0.02	0.04	0.07
NO2 + NO3 as N	56	1	N/A				0.02	0.15	0.37	0.64	1.07	1.43	1.6
TKN as N	54	0	N/A				0.27	0.3	0.39	0.44	0.53	0.73	1.2
Total Phosphorus	56	0	N/A				0.02	0.05	0.07	0.12	0.2	0.24	0.57
Metals (ug/L)													
Aluminum, total (Al)	2	0	N/A				260	260	260	280	300	300	300
Arsenic, total (As)	2	2	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	2	2	>2	0	0		1	1	1	1	1	1	1
Chromium, total (Cr)	2	2	>50	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	2	2	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	2	0	>1000	0	0		390	390	390	410	430	430	430
Lead, total (Pb)	2	2	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	2	2	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	2	0	>50	0	0		32	32	32	32	33	33	33

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
56	73	4	7.1	

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
EL: Evaluation Level; applicable numeric or narrative water quality standard or action level
Results not meeting EL: number and percentages of observations not meeting evaluation level
%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Lumber River at SR-2121 near Kingsdale
Station #: I4650000 **Hydrologic Unit Code:** 03040203
Latitude: 34.50397 **Longitude:** -78.94441 **Stream class:** C Sw
Agency: NCAMBNT **NC stream index:** 14-(13)

Time period: 01/16/2007 to 12/21/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Min	Percentiles 10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	55	0	N/A				3.2	4.2	5.3	6.4	7.9	10.5	13.4
pH (SU)	56	0	<4.3	0	0		4.8	5.6	5.9	6.2	6.5	6.7	7
	56	0	>9	0	0		4.8	5.6	5.9	6.2	6.5	6.7	7
Spec. conductance (umhos/cm at 25°C)	54	0	N/A				49	58	72	92	134	174	367
Water Temperature (°C)	59	0	>32	0	0		2.7	7.3	12.1	16.9	24.8	27.1	28.8
Other													
Hardness (mg/L)	1	0	N/A				15	15	15	15	15	15	15
	6	0	N/A				14	14	15	18	20	24	24
TSS (mg/L)	20	18	N/A				2.5	3.8	6.2	6.2	6.9	12	12
Turbidity (NTU)	59	0	>50	0	0		1.3	1.6	2	2.6	3.5	5.3	12
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				200	200	200	200	200	200	200
Arsenic, total (As)	1	1	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	1	1	>2	0	0		1	1	1	1	1	1	1
Chromium, total (Cr)	1	1	>50	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	1	1	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	1	0	>1000	0	0		200	200	200	200	200	200	200
Lead, total (Pb)	1	1	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	1	1	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	1	0	>50	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
58	62.2	3	5.2	

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
EL: Evaluation Level; applicable numeric or narrative water quality standard or action level
Results not meeting EL: number and percentages of observations not meeting evaluation level
%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Big Swamp at NC-211 near Richardson
Station #: I5370000 **Hydrologic Unit Code:** 03040203
Latitude: 34.57487 **Longitude:** -78.85717 **Stream class:** C Sw
Agency: NCAMBNT **NC stream index:** 14-22

Time period: 01/16/2007 to 12/21/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	53	0	N/A				2.7	3.5	4	5.6	7.5	10.1	12.4
pH (SU)	52	0	<4.3	1	1.9		4.2	4.5	4.9	5.3	5.7	6.1	7.2
	52	0	>9	0	0		4.2	4.5	4.9	5.3	5.7	6.1	7.2
Spec. conductance (umhos/cm at 25°C)	50	0	N/A				22	59	63	70	88	135	188
Water Temperature (°C)	55	0	>32	0	0		2.6	7.7	12.8	18.1	25.5	28.7	31.7
Other													
Hardness (mg/L)	1	0	N/A				13	13	13	13	13	13	13
	4	0	N/A				15	15	16	21	25	25	25
TSS (mg/L)	18	9	N/A				2.5	5.8	6.2	6.6	12.6	36.3	39
Turbidity (NTU)	55	0	>50	0	0		1	1.3	2.7	4.8	8.1	11	27
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				320	320	320	320	320	320	320
Arsenic, total (As)	1	1	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	1	1	>2	0	0		1	1	1	1	1	1	1
Chromium, total (Cr)	1	1	>50	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	1	1	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	1	0	>1000	0	0		310	310	310	310	310	310	310
Lead, total (Pb)	1	1	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	1	1	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	1	1	>50	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
55	94.8	4	7.3	

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
EL: Evaluation Level; applicable numeric or narrative water quality standard or action level
Results not meeting EL: number and percentages of observations not meeting evaluation level
%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Lumber River at US-74 at Boardman
Station #: I5690000 **Hydrologic Unit Code:** 03040203
Latitude: 34.44295 **Longitude:** -78.95959 **Stream class:** C Sw
Agency: NCAMBNT **NC stream index:** 14-(13)

Time period: 01/16/2007 to 12/21/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	55	0	N/A				2.4	4	4.8	6.2	7.5	9.7	13.1
pH (SU)	56	0	<4.3	0	0		4.6	5.5	5.7	6.1	6.5	6.7	7.1
	56	0	>9	0	0		4.6	5.5	5.7	6.1	6.5	6.7	7.1
Spec. conductance (umhos/cm at 25°C)	54	0	N/A				37	60	73	92	125	156	359
Water Temperature (°C)	59	0	>32	0	0		2.2	7.2	12.2	17.3	25	27.4	29.5
Other													
Hardness (mg/L)	6	0	N/A				14	14	16	18	22	32	32
	1	0	N/A				15	15	15	15	15	15	15
TSS (mg/L)	20	19	N/A				2.5	4.4	6.2	6.2	6.2	6.2	7.1
Turbidity (NTU)	59	1	>50	0	0		1	1.4	1.8	2.3	3.4	5.6	11
Nutrients (mg/L)													
NH3 as N	58	25	N/A				0.02	0.02	0.02	0.02	0.02	0.05	0.11
NO2 + NO3 as N	58	1	N/A				0.02	0.07	0.12	0.35	0.72	1.01	1.4
TKN as N	57	0	N/A				0.35	0.4	0.48	0.6	0.74	0.84	0.96
Total Phosphorus	58	0	N/A				0.02	0.03	0.05	0.08	0.16	0.25	0.38
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				200	200	200	200	200	200	200
Arsenic, total (As)	1	1	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	1	1	>2	0	0		1	1	1	1	1	1	1
Chromium, total (Cr)	1	1	>50	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	1	1	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	1	0	>1000	0	0		180	180	180	180	180	180	180
Lead, total (Pb)	1	1	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	1	1	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	1	0	>50	0	0		11	11	11	11	11	11	11

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
59	68.9	1	1.7	

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
EL: Evaluation Level; applicable numeric or narrative water quality standard or action level
Results not meeting EL: number and percentages of observations not meeting evaluation level
%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Ashpole Swamp at SR-2258 near Barnesville
Station #: I6290000 **Hydrologic Unit Code:** 03040203
Latitude: 34.38393 **Longitude:** -79.10166 **Stream class:** C Sw
Agency: NCAMBNT **NC stream index:** 14-30

Time period: 01/16/2007 to 08/22/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Min	Percentiles 10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	46	0	N/A				0	0.6	1.4	2.7	4.4	7.2	10.7
pH (SU)	46	0	<4.3	0	0		4.8	5.4	5.6	5.8	6.1	6.3	6.5
	46	0	>9	0	0		4.8	5.4	5.6	5.8	6.1	6.3	6.5
Spec. conductance (umhos/cm at 25°C)	46	0	N/A				57	74	81	94	116	174	228
Water Temperature (°C)	50	0	>32	0	0		1.8	8	11.9	16.5	23.7	26.2	28.8
Other													
Hardness (mg/L)	1	0	N/A				35	35	35	35	35	35	35
	3	0	N/A				22	22	22	40	63	63	63
TSS (mg/L)	15	11	N/A				2.5	3.9	6.2	6.2	12	45.8	62
Turbidity (NTU)	47	2	>50	1	2.1		1	1.2	2.3	4.1	13	32.8	430
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				57	57	57	57	57	57	57
Arsenic, total (As)	1	1	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	1	1	>2	0	0		1	1	1	1	1	1	1
Chromium, total (Cr)	1	1	>50	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	1	1	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	1	0	>1000	0	0		110	110	110	110	110	110	110
Lead, total (Pb)	1	1	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	1	1	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	1	1	>50	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
48	68.3	5	10.4	

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
EL: Evaluation Level; applicable numeric or narrative water quality standard or action level
Results not meeting EL: number and percentages of observations not meeting evaluation level
%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Lumber River at NC-904 at Fair Bluff
Station #: I6410000 **Hydrologic Unit Code:** 03040203
Latitude: 34.31342 **Longitude:** -79.03801 **Stream class:** B Sw
Agency: NCAMBNT **NC stream index:** 14-(28)

Time period: 01/16/2007 to 12/21/2011

	#	#		Results not meeting EL			Percentiles						
	results	ND	EL	#	%	%Conf	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	55	0	N/A				3.1	5.3	5.9	6.8	8.7	11.2	13
pH (SU)	56	0	<4.3	0	0		4.9	5.5	5.8	6.1	6.7	6.8	7.3
	56	0	>9	0	0		4.9	5.5	5.8	6.1	6.7	6.8	7.3
Spec. conductance (umhos/cm at 25°C)	54	0	N/A				49	60	70	82	121	153	269
Water Temperature (°C)	59	0	>32	0	0		2.1	7.6	12.4	17.8	26.2	28.5	30.5
Other													
Hardness (mg/L)	1	0	N/A				15	15	15	15	15	15	15
	6	0	N/A				15	15	16	18	20	22	22
TSS (mg/L)	20	19	N/A				2.5	6	6.2	6.2	11.2	12	12
Turbidity (NTU)	58	1	>50	0	0		1	1.1	1.6	2.1	3.2	4.2	19
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				230	230	230	230	230	230	230
Arsenic, total (As)	1	1	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	1	1	>2	0	0		1	1	1	1	1	1	1
Chromium, total (Cr)	1	1	>50	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	1	1	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	1	0	>1000	0	0		190	190	190	190	190	190	190
Lead, total (Pb)	1	1	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	1	1	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	1	1	>50	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
59	51.5	0	0	

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
EL: Evaluation Level; applicable numeric or narrative water quality standard or action level
Results not meeting EL: number and percentages of observations not meeting evaluation level
%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Lake Waccamaw at Dam Spillway near Lake Waccamaw
Station #: I7730000 **Hydrologic Unit Code:** 03040206
Latitude: 34.26107 **Longitude:** -78.52321 **Stream class:** B Sw ORW
Agency: NCAMBNT **NC stream index:** 15-2

Time period: 01/16/2007 to 12/08/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	59	0	N/A				6.6	7.5	7.9	9.3	10.3	12.3	13.9
pH (SU)	59	0	<4.3	0	0		5.4	5.8	6.2	6.5	6.8	7.1	7.9
	59	0	>9	0	0		5.4	5.8	6.2	6.5	6.8	7.1	7.9
Salinity (ppt)	59	0	N/A				0.01	0.02	0.03	0.03	0.03	0.03	0.1
Spec. conductance (umhos/cm at 25°C)	59	0	N/A				33	57	75	82	88	92	103
Water Temperature (°C)	60	0	>32	3	5		2.7	6.7	13	17.8	28	31	32.4
Other													
Chlorophyll a (ug/L)	6	0	>40	0	0		2	2	3	4	6	9	9
Hardness (mg/L)	6	0	N/A				28	28	29	31	33	35	35
TSS (mg/L)	20	14	N/A				2.5	6.2	6.2	6.2	11.8	18.9	38
Turbidity (NTU)	60	2	>25	1	1.7		1	1.1	1.7	3	5.2	8.5	32
Nutrients (mg/L)													
NH3 as N	60	57	N/A				0.02	0.02	0.02	0.02	0.02	0.02	0.04
NO2 + NO3 as N	60	56	N/A				0.02	0.02	0.02	0.02	0.02	0.02	0.08
TKN as N	59	0	N/A				0.36	0.46	0.56	0.65	0.72	0.78	1
Total Phosphorus	60	21	N/A				0.02	0.02	0.02	0.02	0.03	0.04	0.09
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				170	170	170	170	170	170	170
Arsenic, total (As)	1	1	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	1	1	>2	0	0		1	1	1	1	1	1	1
Chromium, total (Cr)	1	1	>50	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	1	1	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	1	0	>1000	0	0		290	290	290	290	290	290	290
Lead, total (Pb)	1	1	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	1	1	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	1	1	>50	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
61	13.9	0	0	

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
EL: Evaluation Level; applicable numeric or narrative water quality standard or action level
Results not meeting EL: number and percentages of observations not meeting evaluation level
%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Waccamaw River at NC-130 at Freeland
Station #: I8970000 **Hydrologic Unit Code:** 03040206
Latitude: 34.09518 **Longitude:** -78.54778 **Stream class:** C Sw
Agency: NCAMBNT **NC stream index:** 15-(1)

Time period: 01/16/2007 to 12/08/2011

	#	#		Results not meeting EL			Percentiles						
	results	**ND**	**EL**	**#**	**%**	**%Conf**	**Min**	**10th**	**25th**	**50th**	**75th**	**90th**	**Max**
Field													
D.O. (mg/L)	59	0	N/A				3.5	4.7	5.5	6.6	8	10.2	12.4
pH (SU)	59	0	<4.3	13	22	99.5	3.6	3.9	4.5	5	5.5	5.9	6.3
	59	0	>9	0	0		3.6	3.9	4.5	5	5.5	5.9	6.3
Salinity (ppt)	59	0	N/A				0.01	0.02	0.02	0.03	0.04	0.06	0.1
Spec. conductance (umhos/cm at 25°C)	59	0	N/A				50	64	74	80	96	141	222
Water Temperature (°C)	60	0	>32	2	3.3		1.4	6.4	12.8	17.3	26.5	29.6	33
Other													
Hardness (mg/L)	6	0	N/A				20	20	21	26	29	33	33
	1	0	N/A				23	23	23	23	23	23	23
TSS (mg/L)	20	18	N/A				2.5	3.8	6.2	6.2	6.2	7.2	12
Turbidity (NTU)	60	0	>50	0	0		1.1	1.8	2.6	3.4	5	6.4	12
Nutrients (mg/L)													
NH3 as N	60	30	N/A				0.02	0.02	0.02	0.02	0.07	0.15	0.19
NO2 + NO3 as N	60	27	N/A				0.02	0.02	0.02	0.02	0.09	0.12	0.62
TKN as N	59	0	N/A				0.55	0.7	0.8	0.98	1.4	1.6	2.6
Total Phosphorus	60	8	N/A				0.02	0.02	0.02	0.04	0.05	0.06	0.08
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				440	440	440	440	440	440	440
Arsenic, total (As)	1	1	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	1	1	>2	0	0		1	1	1	1	1	1	1
Chromium, total (Cr)	1	1	>50	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	1	1	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	1	0	>1000	0	0		330	330	330	330	330	330	330
Lead, total (Pb)	1	1	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	1	1	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	1	1	>50	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	**Geomean**	**# > 400:**	**% > 400:**	**%Conf:**
60	59.3	2	3.3	

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
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Results not meeting EL: number and percentages of observations not meeting evaluation level
%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Seven Creeks at NC-905 near Bug Hill
Station #: I9310000 **Hydrologic Unit Code:** 03040206
Latitude: 34.04926 **Longitude:** -78.63496 **Stream class:** C Sw
Agency: NCAMBNT **NC stream index:** 15-17

Time period: 01/16/2007 to 12/08/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	59	0	N/A				0	1.1	3.6	5	7.3	10.9	12.9
pH (SU)	59	0	<4.3	0	0		4.8	5.4	5.6	5.9	6.1	6.3	6.9
	59	0	>9	0	0		4.8	5.4	5.6	5.9	6.1	6.3	6.9
Salinity (ppt)	59	0	N/A				0.03	0.03	0.03	0.04	0.05	0.06	0.18
Spec. conductance (umhos/cm at 25°C)	59	0	N/A				76	80	87	98	117	133	362
Water Temperature (°C)	60	0	>32	0	0		1.6	7	12.2	16.6	24.4	26.4	30
Other													
Chlorophyll a (ug/L)	1	0	>40	1	100		110	110	110	110	110	110	110
Hardness (mg/L)	6	0	N/A				25	25	26	28	32	40	40
TSS (mg/L)	20	19	N/A				2.5	2.9	6.2	6.2	6.2	11.6	12
Turbidity (NTU)	60	0	>50	0	0		1	2.3	3.1	4.4	6.8	9.9	23
Nutrients (mg/L)													
NH3 as N	59	27	N/A				0.02	0.02	0.02	0.02	0.15	0.39	1.3
NO2 + NO3 as N	59	41	N/A				0.02	0.02	0.02	0.02	0.03	0.07	0.73
TKN as N	57	0	N/A				0.47	0.54	0.74	1.2	1.55	1.96	3.1
Total Phosphorus	59	1	N/A				0.02	0.02	0.04	0.05	0.07	0.11	0.24
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				180	180	180	180	180	180	180
Arsenic, total (As)	1	1	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	1	1	>2	0	0		1	1	1	1	1	1	1
Chromium, total (Cr)	1	1	>50	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	1	1	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	1	0	>1000	0	0		350	350	350	350	350	350	350
Lead, total (Pb)	1	1	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	1	1	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	1	1	>50	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
60	107.9	6	10	

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
EL: Evaluation Level; applicable numeric or narrative water quality standard or action level
Results not meeting EL: number and percentages of observations not meeting evaluation level
%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Montgomery Slough at SR-1105 near Long Beach
Station #: I9385000 **Hydrologic Unit Code:** 03040208
Latitude: 33.91777 **Longitude:** -78.16093 **Stream class:** SA HQW
Agency: NCAMBNT **NC stream index:** 15-25

Time period: 01/16/2007 to 12/08/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Percentiles Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	81	0	<5	11	13.6	81.6	3.5	4.5	5.2	6.4	7.7	9.6	11
pH (SU)	80	0	<6.8	0	0		6.9	7.2	7.3	7.6	7.7	7.8	7.8
	80	0	>8.5	0	0		6.9	7.2	7.3	7.6	7.7	7.8	7.8
Salinity (ppt)	80	0	N/A				9.66	19.26	23.28	27.76	31.48	32.72	34.76
Spec. conductance (umhos/cm at 25°C)	80	0	N/A				16509	31015	36721	42979	48179	49893	52641
Water Temperature (°C)	82	0	>32	3	3.7		4.9	8.9	15	22.9	29.8	30.9	32.6
Other													
Chlorophyll a (ug/L)	2	0	>40	0	0		24	24	24	26	29	29	29
TSS (mg/L)	18	0	N/A				14	14.9	18	30.5	39	46.5	60
Turbidity (NTU)	53	0	>25	1	1.9		4.1	5.5	7.8	12	15.5	22.2	26
Nutrients (mg/L)													
NH3 as N	2	2	N/A				0.02	0.02	0.02	0.02	0.02	0.02	0.02
NO2 + NO3 as N	2	1	N/A				0.02	0.02	0.02	0.02	0.02	0.02	0.02
TKN as N	2	0	N/A				0.41	0.41	0.41	0.45	0.5	0.5	0.5
Total Phosphorus	2	0	N/A				0.04	0.04	0.04	0.06	0.08	0.08	0.08
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				330	330	330	330	330	330	330
Arsenic, total (As)	1	1	>10	0	0		25	25	25	25	25	25	25
Cadmium, total (Cd)	1	1	>5	0	0		5	5	5	5	5	5	5
Chromium, total (Cr)	1	1	>20	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	1	1	>3	0	0		10	10	10	10	10	10	10
Iron, total (Fe)	1	0	N/A				250	250	250	250	250	250	250
Lead, total (Pb)	1	1	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	1	1	>8.3	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	1	1	>86	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:	Median	# > 43	% > 43	%Conf
53	23.8	1	1.9		24	17	32	100

Key:
result: number of observations
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EL: Evaluation Level; applicable numeric or narrative water quality standard or action level
Results not meeting EL: number and percentages of observations not meeting evaluation level
%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Lockwood Folly River at NC-211 at Supply
Station #: I9420000 **Hydrologic Unit Code:** 03040208
Latitude: 34.01077 **Longitude:** -78.26360 **Stream class:** SC HQW
Agency: NCAMBNT **NC stream index:** 15-25-1-(11)

Time period: 01/30/2007 to 12/14/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	54	0	<5	23	42.6	> 99.9	2.7	3.4	4.2	5.5	8.1	9.2	10.5
pH (SU)	58	0	<6.8	12	20.7	98.9	6.1	6.5	6.8	7	7.2	7.3	7.6
	58	0	>8.5	0	0		6.1	6.5	6.8	7	7.2	7.3	7.6
Salinity (ppt)	58	0	N/A				0.03	0.07	0.14	0.24	3.24	10.06	22.55
Spec. conductance (umhos/cm at 25°C)	58	0	N/A				86	153	276	486	5874	17139	35740
Water Temperature (°C)	58	0	>32	0	0		5.5	8.3	12.8	21.2	26.7	29.3	30.8
Other													
TSS (mg/L)	19	4	N/A				4.5	6.2	6.2	7.5	10	26	31
Turbidity (NTU)	58	0	>25	0	0		3	4.5	5.4	6.6	9.9	15	21
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				340	340	340	340	340	340	340
Arsenic, total (As)	1	1	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	1	1	>5	0	0		1	1	1	1	1	1	1
Chromium, total (Cr)	1	1	>20	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	1	1	>3	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	1	0	N/A				670	670	670	670	670	670	670
Lead, total (Pb)	1	1	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	1	1	>8.3	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	1	1	>86	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
57	123	3	5.3	

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
EL: Evaluation Level; applicable numeric or narrative water quality standard or action level
Results not meeting EL: number and percentages of observations not meeting evaluation level
%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Lockwood Folly River near Sandy Hill
Station #: I9430000 **Hydrologic Unit Code:** 03040208
Latitude: 33.97220 **Longitude:** -78.25029 **Stream class:** SC HQW
Agency: NCAMBNT **NC stream index:** 15-25-1-(11)

Time period: 01/30/2007 to 12/14/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Percentiles Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	55	0	<5	16	29.1	> 99.9	3.2	4	4.8	6.1	8	9.7	11.1
pH (SU)	59	0	<6.8	4	6.8		6.4	6.9	7.1	7.3	7.4	7.5	7.8
	59	0	>8.5	0	0		6.4	6.9	7.1	7.3	7.4	7.5	7.8
Salinity (ppt)	59	0	N/A				0.06	0.12	1.85	10.09	23.25	29.84	35.28
Spec. conductance (umhos/cm at 25°C)	59	0	N/A				133	255	3404	17185	38212	45923	53337
Water Temperature (°C)	59	0	>32	0	0		6	8.2	12.8	21.8	27.2	29.9	31.1
Other													
TSS (mg/L)	20	2	N/A				6.2	6.8	8.9	13	18.5	28.3	37
Turbidity (NTU)	57	0	>25	0	0		2.8	4.7	6.1	8.2	12	15	21
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				370	370	370	370	370	370	370
Arsenic, total (As)	1	1	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	1	1	>5	0	0		5	5	5	5	5	5	5
Chromium, total (Cr)	1	1	>20	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	1	1	>3	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	1	0	N/A				660	660	660	660	660	660	660
Lead, total (Pb)	1	1	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	1	1	>8.3	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	1	1	>86	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
56	51.3	3	5.4	

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
EL: Evaluation Level; applicable numeric or narrative water quality standard or action level
Results not meeting EL: number and percentages of observations not meeting evaluation level
%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Lockwood Folly River at Varnum
Station #: I9440000 **Hydrologic Unit Code:** 03040208
Latitude: 33.94647 **Longitude:** -78.22324 **Stream class:** SA HQW @
Agency: NCAMBNT **NC stream index:** 15-25-1-(16)

Time period: 01/30/2007 to 12/14/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	58	0	<5	6	10.3	47.1	3.4	4.8	5.6	6.6	8.2	9	10.6
pH (SU)	62	0	<6.8	0	0		6.9	7.4	7.6	7.7	7.8	7.9	8.1
	62	0	>8.5	0	0		6.9	7.4	7.6	7.7	7.8	7.9	8.1
Salinity (ppt)	62	0	N/A				2.5	13.47	22.03	31.4	33.64	35.38	35.78
Spec. conductance (umhos/cm at 25°C)	62	0	N/A				4604	22627	36066	48262	51126	53470	54012
Water Temperature (°C)	62	0	>32	0	0		7.5	9.4	13.4	22	27.4	28.8	30.7
Other													
TSS (mg/L)	20	0	N/A				8.2	10	11.2	16	23.8	31	33
Turbidity (NTU)	57	0	>25	0	0		3	4.5	5.4	7.2	9	12	19
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				250	250	250	250	250	250	250
Arsenic, total (As)	1	1	>10	0	0		50	50	50	50	50	50	50
Cadmium, total (Cd)	1	1	>5	0	0		10	10	10	10	10	10	10
Chromium, total (Cr)	1	1	>20	0	0		50	50	50	50	50	50	50
Copper, total (Cu)	1	1	>3	0	0		20	20	20	20	20	20	20
Iron, total (Fe)	1	0	N/A				190	190	190	190	190	190	190
Lead, total (Pb)	1	1	>25	0	0		50	50	50	50	50	50	50
Nickel, total (Ni)	1	1	>8.3	0	0		50	50	50	50	50	50	50
Zinc, total (Zn)	1	1	>86	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:	Median	# > 43	% > 43	%Conf
55	10.6	1	1.8		11	8	15	82.0

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
EL: Evaluation Level; applicable numeric or narrative water quality standard or action level
Results not meeting EL: number and percentages of observations not meeting evaluation level
%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Lockwood Folly River at CM R6, W channel, NW Sunset Harbor
Station #: I9480000 **Hydrologic Unit Code:** 03040208
Latitude: 33.93319 **Longitude:** -78.21850 **Stream class:** SA HQW @
Agency: NCAMBNT **NC stream index:** 15-25-1-(16)

Time period: 01/30/2007 to 12/14/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Percentiles Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	64	0	<5	2	3.1		4.2	5.8	6.4	7.3	8.5	9.4	10.2
pH (SU)	69	0	<6.8	0	0		7.1	7.6	7.8	7.8	7.9	8	8.1
	69	0	>8.5	0	0		7.1	7.6	7.8	7.8	7.9	8	8.1
Salinity (ppt)	69	0	N/A				8.73	23	29.78	33.1	34.68	35.65	39.3
Spec. conductance (umhos/cm at 25°C)	69	0	N/A				15536	36386	45852	50354	52602	53831	54706
Water Temperature (°C)	69	0	>32	0	0		8.3	9.5	13.1	20.6	27.2	29.1	30.9
Other													
Chlorophyll a (ug/L)	1	0	>40	0	0		6	6	6	6	6	6	6
TSS (mg/L)	20	1	N/A				6.2	9	13	18.5	22	33.5	42
Turbidity (NTU)	57	0	>25	0	0		1.5	3.1	5.1	7.7	10.5	14	23
Nutrients (mg/L)													
NH3 as N	1	0	N/A				0.02	0.02	0.02	0.02	0.02	0.02	0.02
NO2 + NO3 as N	1	1	N/A				0.02	0.02	0.02	0.02	0.02	0.02	0.02
TKN as N	1	0	N/A				0.24	0.24	0.24	0.24	0.24	0.24	0.24
Total Phosphorus	1	0	N/A				0.05	0.05	0.05	0.05	0.05	0.05	0.05
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				230	230	230	230	230	230	230
Arsenic, total (As)	1	1	>10	0	0		50	50	50	50	50	50	50
Cadmium, total (Cd)	1	1	>5	0	0		10	10	10	10	10	10	10
Chromium, total (Cr)	1	1	>20	0	0		50	50	50	50	50	50	50
Copper, total (Cu)	1	1	>3	0	0		20	20	20	20	20	20	20
Iron, total (Fe)	1	0	N/A				150	150	150	150	150	150	150
Lead, total (Pb)	1	1	>25	0	0		50	50	50	50	50	50	50
Nickel, total (Ni)	1	1	>8.3	0	0		50	50	50	50	50	50	50
Zinc, total (Zn)	1	1	>86	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:	Median	# > 43	% > 43	%Conf
55	3.8	1	1.8		3	2	4	

Key:
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Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Shallotte River at US-17 Business at Shallotte
Station #: I9700000 **Hydrologic Unit Code:** 03040208
Latitude: 33.97244 **Longitude:** -78.38641 **Stream class:** SC
Agency: NCAMBNT **NC stream index:** 15-25-2-(5)

Time period: 01/16/2007 to 12/08/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Percentiles Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	82	0	<5	18	22	99.9	3.3	3.9	5.4	6.6	8	10.1	12.3
pH (SU)	81	0	<6.8	19	23.5	> 99.9	6.2	6.5	6.8	6.9	7.1	7.2	7.5
	81	0	>8.5	0	0		6.2	6.5	6.8	6.9	7.1	7.2	7.5
Salinity (ppt)	81	0	N/A				0.06	0.13	0.26	4.94	16.58	25.32	33.76
Spec. conductance (umhos/cm at 25°C)	81	0	N/A				143	278	501	8789	27142	39627	51284
Water Temperature (°C)	83	0	>32	0	0		3	6.4	13.7	19.7	29.1	30.4	31.9
Other													
TSS (mg/L)	20	5	N/A				2.8	6.2	6.4	14	22.5	30.3	32
Turbidity (NTU)	60	0	>25	1	1.7		4.2	5	6.7	10	13	17	28
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				510	510	510	510	510	510	510
Arsenic, total (As)	1	1	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	1	1	>5	0	0		1	1	1	1	1	1	1
Chromium, total (Cr)	1	1	>20	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	1	1	>3	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	1	0	N/A				850	850	850	850	850	850	850
Lead, total (Pb)	1	1	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	1	1	>8.3	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	1	1	>86	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
60	204.1	7	11.7	

Key:
result: number of observations
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%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
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Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Shallotte River at Shell Point near Shallotte
Station #: I9820000 **Hydrologic Unit Code:** 03040208
Latitude: 33.91966 **Longitude:** -78.37108 **Stream class:** SA HQW
Agency: NCAMBNT **NC stream index:** 15-25-2-(10)

Time period: 01/30/2007 to 12/14/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Percentiles Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	69	0	<5	8	11.6	61.5	4.5	4.8	6.2	7.1	8.3	9.3	9.7
pH (SU)	76	0	<6.8	0	0		7.3	7.6	7.7	7.8	7.9	7.9	8.1
	76	0	>8.5	0	0		7.3	7.6	7.7	7.8	7.9	7.9	8.1
Salinity (ppt)	76	0	N/A				20.6	27.44	31.76	33.84	34.83	35.68	36.51
Spec. conductance (umhos/cm at 25°C)	76	0	N/A				32936	42634	48549	51386	52714	53870	54888
Water Temperature (°C)	76	0	>32	0	0		7.8	9.3	12.4	20.1	26.3	28.4	30.4
Other													
TSS (mg/L)	20	0	N/A				9.8	11.3	16	18	24	40.9	47
Turbidity (NTU)	58	0	>25	0	0		1.5	3.3	4.6	7.3	9.5	12.1	20
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				390	390	390	390	390	390	390
Arsenic, total (As)	1	1	>10	0	0		50	50	50	50	50	50	50
Cadmium, total (Cd)	1	1	>5	0	0		10	10	10	10	10	10	10
Chromium, total (Cr)	1	1	>20	0	0		50	50	50	50	50	50	50
Copper, total (Cu)	1	1	>3	0	0		20	20	20	20	20	20	20
Iron, total (Fe)	1	0	N/A				270	270	270	270	270	270	270
Lead, total (Pb)	1	1	>25	0	0		50	50	50	50	50	50	50
Nickel, total (Ni)	1	1	>8.3	0	0		50	50	50	50	50	50	50
Zinc, total (Zn)	1	0	>86	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:	Median	# > 43	% > 43	%Conf
57	2.5	0	0		2	0	0	

Key:
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Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Intracoastal Waterway at SR-1172 near Sunset Beach
Station #: I9880000 **Hydrologic Unit Code:** 03040208
Latitude: 33.88168 **Longitude:** -78.51091 **Stream class:** SA HQW
Agency: NCAMBNT **NC stream index:** 15-25

Time period: 01/16/2007 to 12/14/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	67	0	<5	6	9		3.6	5.1	5.6	6.9	8.3	9.7	10.6
pH (SU)	67	0	<6.8	1	1.5		6.4	7.3	7.5	7.6	7.7	7.9	8
	67	0	>8.5	0	0		6.4	7.3	7.5	7.6	7.7	7.9	8
Salinity (ppt)	67	0	N/A				12.34	18.82	22.9	26.59	29.58	33.36	35.16
Spec. conductance (umhos/cm at 25°C)	67	0	N/A				20699	30405	36348	41200	45510	50778	53167
Water Temperature (°C)	69	0	>32	2	2.9		5.5	9.3	14.2	19.6	28	29.7	32.6
Other													
Chlorophyll a (ug/L)	1	0	>40	0	0		21	21	21	21	21	21	21
TSS (mg/L)	20	1	N/A				7	8.9	13	18	27	33.9	86
Turbidity (NTU)	59	0	>25	0	0		2.3	3.4	4.7	7.2	10	16	19
Nutrients (mg/L)													
NH3 as N	1	1	N/A				0.02	0.02	0.02	0.02	0.02	0.02	0.02
NO2 + NO3 as N	1	0	N/A				0.02	0.02	0.02	0.02	0.02	0.02	0.02
TKN as N	1	0	N/A				0.26	0.26	0.26	0.26	0.26	0.26	0.26
Total Phosphorus	1	0	N/A				0.05	0.05	0.05	0.05	0.05	0.05	0.05
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				280	280	280	280	280	280	280
Arsenic, total (As)	1	1	>10	0	0		25	25	25	25	25	25	25
Cadmium, total (Cd)	1	1	>5	0	0		5	5	5	5	5	5	5
Chromium, total (Cr)	1	1	>20	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	1	1	>3	0	0		10	10	10	10	10	10	10
Iron, total (Fe)	1	0	N/A				260	260	260	260	260	260	260
Lead, total (Pb)	1	1	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	1	1	>8.3	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	1	1	>86	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:	Median	# > 43	% > 43	%Conf
58	11.9	0	0		12	4	7	

Key:
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%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
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Ambient Monitoring System Station Summaries
NCDENR, Division of Water Quality
Basinwide Assessment Report

Location: Calabash River at NC-179 near Calabash
Station #: I9916000 **Hydrologic Unit Code:** 03040208
Latitude: 33.88951 **Longitude:** -78.54947 **Stream class:** SA HQW
Agency: NCAMBNT **NC stream index:** 15-25-13

Time period: 01/16/2007 to 12/08/2011

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	80	0	<5	20	25	> 99.9	3.6	3.9	4.8	6.8	8.4	11	12.4
pH (SU)	79	0	<6.8	2	2.5		6.6	6.9	7.1	7.3	7.5	7.7	7.7
	79	0	>8.5	0	0		6.6	6.9	7.1	7.3	7.5	7.7	7.7
Salinity (ppt)	79	0	N/A				0.28	5.58	11.08	17.62	21.62	25.46	33.22
Spec. conductance (umhos/cm at 25°C)	79	0	N/A				543	9976	18760	28682	34384	39821	50543
Water Temperature (°C)	81	0	>32	6	7.4		4.6	9.4	15.2	20.9	29	31.9	33.1
Other													
Chlorophyll a (ug/L)	2	0	>40	1	50		22	22	22	49	76	76	76
Hardness (mg/L)	1	0	N/A				46	46	46	46	46	46	46
TSS (mg/L)	20	0	N/A				13	17.1	23.5	33.5	74	281.7	556
Turbidity (NTU)	59	0	>25	20	33.9	> 99.9	3.1	6.2	12	21	32	95	230
Nutrients (mg/L)													
NH3 as N	2	1	N/A				0.02	0.02	0.02	0.02	0.02	0.02	0.02
NO2 + NO3 as N	2	1	N/A				0.02	0.02	0.02	0.03	0.04	0.04	0.04
TKN as N	2	0	N/A				0.92	0.92	0.92	1.36	1.8	1.8	1.8
Total Phosphorus	2	0	N/A				0.13	0.13	0.13	0.2	0.27	0.27	0.27
Metals (ug/L)													
Aluminum, total (Al)	1	0	N/A				810	810	810	810	810	810	810
Arsenic, total (As)	1	1	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	1	1	>5	0	0		5	5	5	5	5	5	5
Chromium, total (Cr)	1	1	>20	0	0		10	10	10	10	10	10	10
Copper, total (Cu)	1	1	>3	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	1	0	N/A				720	720	720	720	720	720	720
Lead, total (Pb)	1	1	>25	0	0		10	10	10	10	10	10	10
Nickel, total (Ni)	1	1	>8.3	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	1	1	>86	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:	Median	# > 43	% > 43	%Conf
59	116.2	6	10.2		150	47	80	100

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
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%Conf : States the percent statistical confidence that the actual percentage of exceedances is at least 10% (20% for Fecal Coliform in freshwater)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence