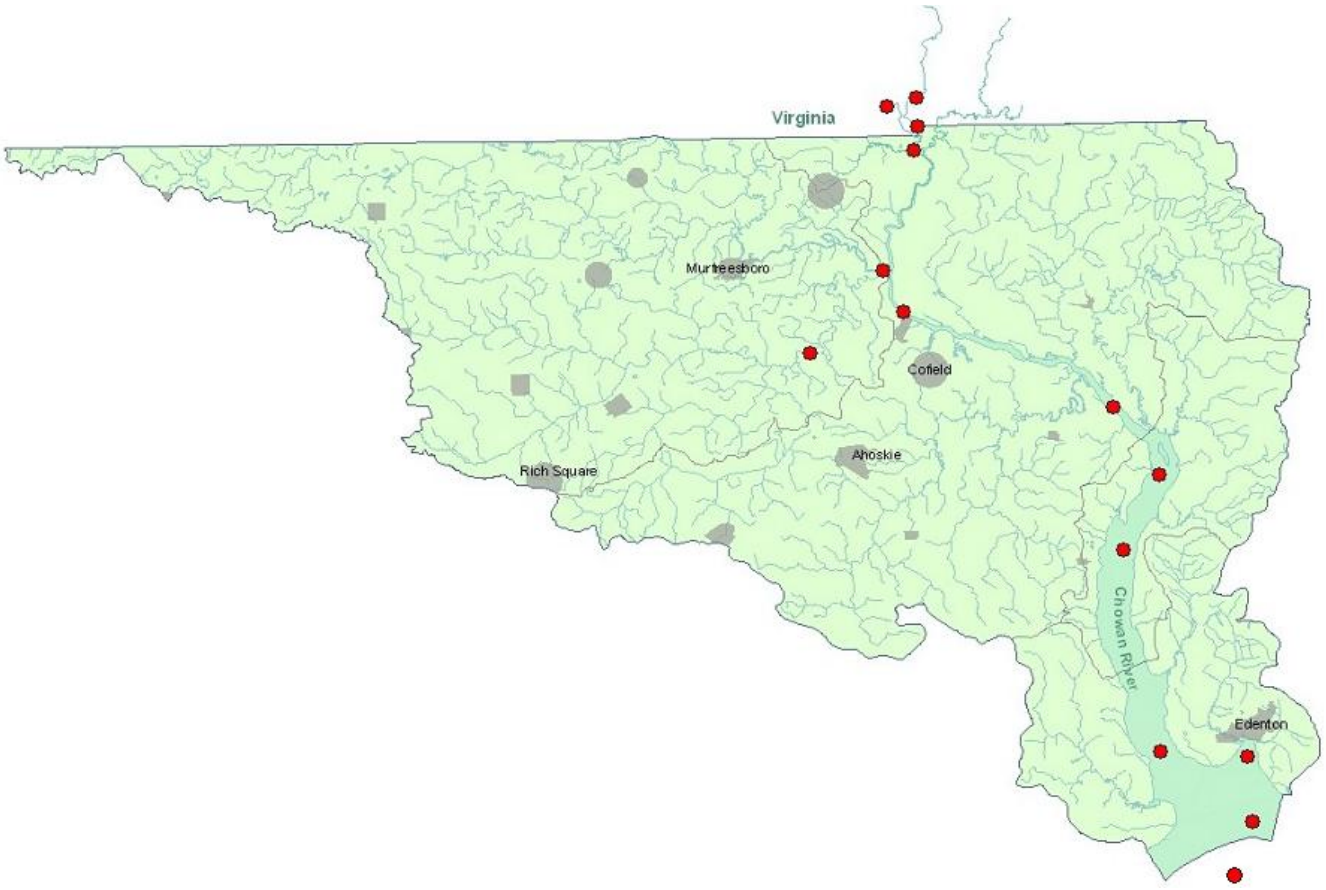
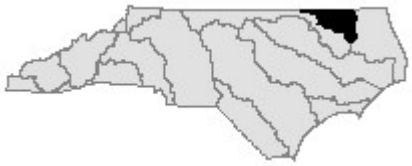


Chowan River Basin
Ambient Monitoring System Report

January 1, 2006 through December 31, 2010



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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

APPENDIX

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
N – nitrogen
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 – State 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
VA – Virginia

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, 2006 through December 31, 2010) chemical and physical measurements were obtained by the NC Division of Water Quality (DWQ) from 14 stations located throughout the Chowan 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, 2010). 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 10 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. The criteria for fecal coliform varied based on the classification of the water body. See the Parameters section for an explanation of fecal coliform methods. 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.

All data were collected between January 1, 2006 and December 31, 2010. Dissolved oxygen was the parameter that most frequently exceeded the evaluation limit in the Chowan basin during the current assessment period. Stations with SSEs were found for dissolved oxygen < 4 mg/L (three sites), dissolved oxygen < 5 mg/L (five sites), and pH < 6 SU (one site). One additional 10 percent violation for dissolved oxygen (< 4 mg/L) that was not a statistically significant exceedance also occurred. Among the 14 stations in the basin, D4150000 on Potecasi Creek had the most frequent exceedances of dissolved oxygen and pH evaluation levels. Although no Chowan waterbodies have been assigned a DWQ supplemental “Swamp Waters” (Sw) classification, it is likely that many of the low dissolved oxygen and pH results were due to natural characteristics of swamps, rather than anthropogenic influences.

No 10 percent violations occurred for chlorophyll *a* during the current assessment period or the previous assessment period of 2000 through 2005. This represents a significant improvement over the historical problems faced in the Chowan Basin concerning algal blooms. All point sources were removed from the Chowan River basin during corrective actions in the 1970’s and 1980’s, which over time has resulted in reductions in chlorophyll *a* and nutrient concentrations.

The following table gives a summary of the problem areas identified by using these criteria (Table 1). 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 5 samples be taken in the span of 30 days, which was not done for this data. Therefore any fecal coliform violations 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 all waters, but specifically to fresh waters as a daily average. The 4 mg/L standard applies to fresh waters only as an instantaneous minimum value.

Table 1. Areas of Concern in the Chowan River Basin

8-Digit HUC/ Station ID	Location	Class	Parameter / Evaluation Level	% Exceed	% Conf
03010202	**Blackwater River**				
D0001800	Blackwater River 0.5 Mile Upstream of Mouth near Wyanoke	B NSW	Dissolved Oxygen (<4)	25.0	99.9
			Dissolved Oxygen (<5)*	50.0	100.0
03010203	**Chowan River**				
D0010000	Chowan River near Riddicksville	B NSW	Dissolved Oxygen (<4)	20.3	98.7
			Dissolved Oxygen (<5)*	45.8	100.0
D6250000	Chowan River at US 13 at Winton	B NSW	Dissolved Oxygen (<5)*	28.8	100.0
03010204	**Meherrin River and Potecasi Creek**				
D4150000	Potecasi Creek at NC 11 near Union	C NSW	Dissolved Oxygen (<4)	40.0	100.0
			Dissolved Oxygen (<5)*	48.3	100.0
			pH (<6)	25.0	99.9
D5000000	Meherrin River at SR 1175 Parkers Ferry near Como	B NSW	Dissolved Oxygen (<4)	10.2	45.4
			Dissolved Oxygen (<5)*	40.7	100.0

* Applies to saltwater (class SA, SB, and SC) primarily, and to freshwater (class B, C, and WS) as a daily average. Not considered critical in freshwater areas.

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 locations were chosen to characterize the effects of point source dischargers and nonpoint sources such as agriculture, animal operations and urbanization within watersheds.

The 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. Parameters of interest are determined by freshwater or saltwater waterbody 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. 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 DWQ monitored water quality and collected samples at 14 stations throughout the basin. The locations of the sampling sites are illustrated in Figure 1 and listed in Table 4.

In January 2007 the DWQ began collection of samples from a series of randomly determined 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 site in the Chowan River Basin which is being sampled during 2011 and 2012. Because the basinwide reports assess in five-year windows and RAMS stations will only have two years of data, they are not included in the ambient reports. Once a sufficient number of samples have been collected statewide, RAMS data will be discussed in a separate report.

Table 2. Parameters collected for the Ambient Monitoring System

Parameter
Dissolved oxygen (s)
pH (s)
Specific conductance
Temperature (s)
Total suspended solids
Turbidity (s)
Fecal coliform bacteria (s)
Nutrients (phosphorus and nitrogen species):
- Total phosphorus
- Ammonia as N
- Total Kjeldahl as N
- Nitrate+nitrite as N (s)
Chlorophyll *a* (s)

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]

Parameter	Standards for All Freshwater			Standards to Support Additional Uses		
	Aquatic Life	Human Health	Water Supply Classifications	Trout Water	HQW	Swamp Waters
Chloride (mg/L)	230		250			
Chlorophyll *a* (µg/L)	40[2]			15[2]		
Coliform, total (MFTCC/100 mL)[3]			50[2] (WS-I only)			
Coliform, fecal (MFFCC/100 mL)[4]		200[2]				
Dissolved oxygen (mg/L)	4.0[5,6]			6.0		[2, 6]
Hardness, total (mg/L)			100			
Nitrate nitrogen (mg/L)			10			
pH (standard units)	6.0 - 9.0[2, 6]					[2, 6]
Solids, total suspended (mg/L)					10 Trout, 20 other[7]	
Turbidity (NTU)	50, 25[2]			10[2]		

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).
[2]Refer to 2B.0211 for narrative description of limits.
[3]Membrane filter total coliform count per 100 ml of sample.
[4]Membrane filter fecal coliform count per 100 ml of sample.
[5]An instantaneous reading may be as low as 4.0 mg/L, but the daily average must be 5.0 mg/L or more.
[6]Designated swamp waters may have a dissolved oxygen less than 5.0 mg/L and a pH as low as 4.3, if due to natural conditions.
[7]For effluent limits only, refer to 2B.0224(1)(b)(ii).

Parameter (µg/L, unless noted)	Standards for All Saltwater			Standards To Support Additional Uses	
	Aquatic Life	Human Health[1]	Class SA[2]	HQW	Swamp Waters
Chlorophyll *a* (corrected)	40[3]				
Coliform, fecal (MFFCC/100 mL)[4]		200[3]	14[3]		
Dissolved oxygen (mg/L)	5.0[8]			6.0	[3, 5]
PH (standard units)	6.8 - 8.5[5]				[3, 5]
Solids, total suspended (mg/L)				10 PNA[6], 20 other[7]	
Turbidity (NTU)	25[3]				

[1]Standards are based on consumption of fish only unless dermal contact studies are available, see 2B.0208 for equation.
[2]Class SA = shellfishing waters, see 2B.0101 for description.
[3]See 2B.0220 for narrative description of limits.
[4]MFFCC/100ml means membrane filter fecal coliform count per 100 ml of sample.
[5]Designated swamp waters may have a dissolved oxygen less than 5.0 mg/L and a pH as low as 4.3 s.u., if due to natural conditions.
[6]PNA = Primary Nursery Areas.
[7]For effluent limits only, see 2B.0224.
[8]Swamp waters, poorly flushed tidally influenced streams, or embayments, or estuarine bottom waters may have lower values if caused by natural conditions.

Table 4. DWQ Monitoring stations in the Chowan River Basin, 2006 - 2010

8-Digit HUC/ Station ID	Location	Class	Latitude	Longitude
03010201	**Nottaway River**			
D0000050	Nottaway River at US 258 near Riverdale, VA	II Estuarine	36.5668	-76.9465
03010202	**Blackwater River**			
D0001200	Blackwater River at Horseshoe Bend at Cherry Grove, VA	II Estuarine	36.5734	-76.9180
D0001800	Blackwater River 0.5 mile upstream of mouth near Wyanoke	B NSW	36.5512	-76.9171
03010203	**Chowan River**			
D0010000	Chowan River near Riddicksville	B NSW	36.5320	-76.9210
D6250000	Chowan River at US 13 at Winton	B NSW	36.4026	-76.9343
D8356200	Chowan River at CM 16 near Gatesville	B NSW	36.3236	-76.7335
D8430000	Chowan River at CM 12 downstream of Holiday Island	B NSW	36.2689	-76.6914
D8950000	Chowan River near CM 7 at Colerain	B NSW	36.2098	-76.7268
D9490000	Chowan River at US 17 at Edenhouse	B NSW	36.0476	-76.6961
03010204	**Meherrin River and Potecasi Creek**			
D4150000	Potecasi Creek at NC 11 near Union	C NSW	36.3712	-77.0259
D5000000	Meherrin River at SR 1175 Parkers Ferry near Como	B NSW	36.4365	-76.9533
03010205	**Albemarle Sound**			
D999500C	Albemarle Sound near Edenton Mid-Channel	B NSW	35.9900	-76.6092
D999500N	Albemarle Sound near Edenton North Shore	C NSW	36.0422	-76.6128
D999500S	Albemarle Sound near Edenton South Shore	SB	35.9479	-76.6079

Note:

Primary Water Use Classifications
C: Aquatic Life
B: Primary Recreation
WS-I, WS-II, WS-III, WS-IV, WS-V: Water Supply
SA: Saltwater Shellfish Harvesting
SB: Saltwater Primary Recreation
SC: Saltwater Aquatic Life

Secondary Water Use Classifications
Sw: Swamp Water
HQW: High Quality Water
ORW: Outstanding Resource Water
Tr: Trout Waters
CA, +: Critical Area
NSW: Nutrient Sensitive Waters

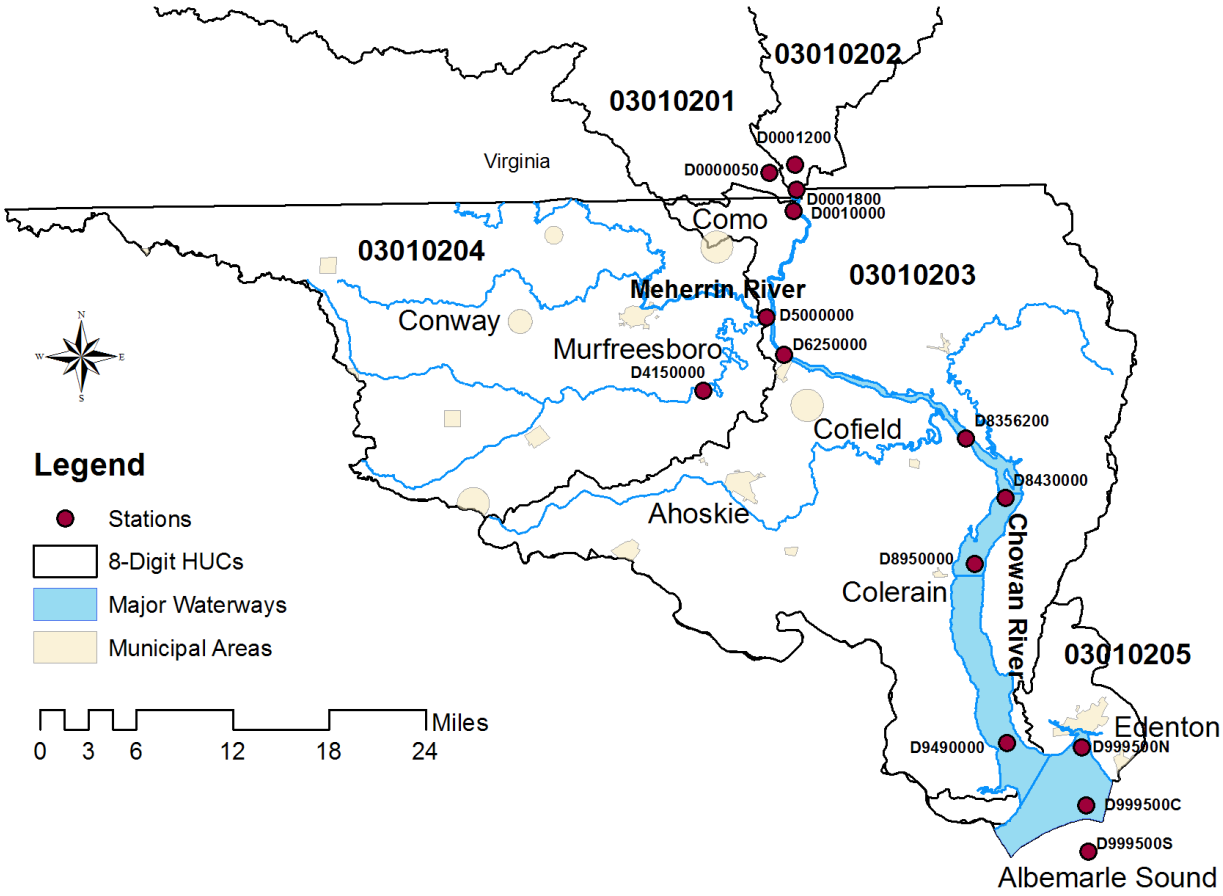

Figure 1. DWQ's Ambient Monitoring System in the Chowan River Basin

DATA ASSESSMENT AND INTERPRETATION

Monitoring and sampling results considered in this report represent samples collected or measurements taken at less than one-meter depth, except for chlorophyll *a*, which may be collected as a composite over the entire photic depth. The AMS raw 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 at http://portal.ncdenr.org/web/wq/ess/eco/ams.

Percentile statistics were calculated for most of the data 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 10 percent of the results exceed a water quality standard. This interpretation is the same whether 1 out of 10, 5 out of 50, or 25 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 10 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 10 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 1 exceedance out of 10 (35 percent confidence) than when there are 3 exceedances out of 10 (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%	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%	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.

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, 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 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.0200).
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.

Specific information on water quality standards and action levels can be found in 15A NCAC 2B.0200 (May 1, 2007).

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 discharges. Water quality standards for dissolved oxygen vary depending on the classification of the body of water. For freshwaters, 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 saltwaters, 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 Chowan basin display physical and chemical characteristics, including low dissolved oxygen and pH values, of swamp waters even though none of these waters have been assigned a Swamp (Sw) supplemental classification by the DWQ. Graphing of results over time showed a seasonal pattern as dissolved oxygen varied in response to changes in temperature (Figure 2).

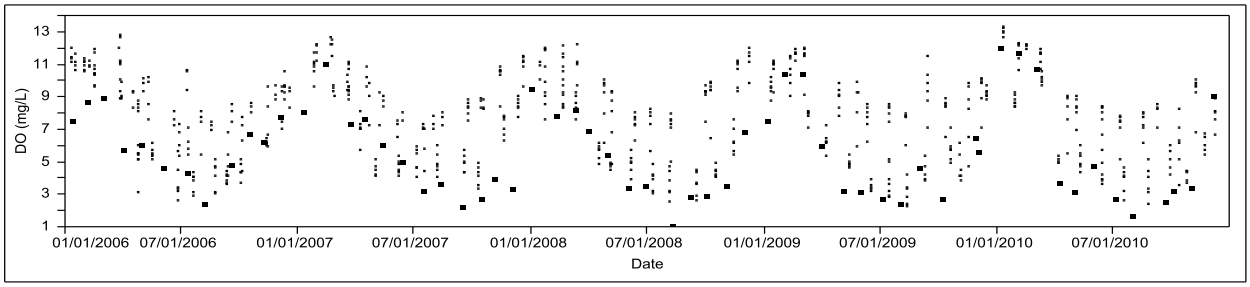

Figure 2. Dissolved oxygen seasonal variation, 2006 – 2010, for all Chowan monitoring stations

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 accuracy of field measurements is limited by the abilities of field equipment, which is generally accurate to within 0.2 SU, and by natural variation within a site.

The water quality standards for pH in freshwaters consider values less than 6.0 SU or greater than 9.0 SU to warrant attention. In swamp waters, a pH below 4.3 SU is of concern. For saltwaters, the acceptable range is narrower: 6.8 SU to 8.5 SU.

The pH evaluation level was exceeded more than ten percent of the time at only one station, D4150000 on Potecasi Creek, in the Chowan basin during the assessment timeframe. As previously discussed, it is possible that swampy conditions influenced pH values in the Chowan 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.

Few turbidity evaluation level exceedances occurred in the Chowan basin during the assessment timeframe.

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 Chowan basin had less than ten total metals results from quarterly sampling during 2006 and 2007 before the suspension. Iron, which naturally occurs in North Carolina surface waters, was detected at all of the freshwater stations within North Carolina. Copper was detected above the evaluation level (7 µg/L) in place at the time of sampling once at Station D9490000 with a result of 10 µg/L in November 2006. Because of the small number of total metals samples collected during the 2006 through 2010 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.

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 waterbody. For all freshwater sites within North Carolina in the Chowan River Basin, the standard specified in Administrative Code 15A NCAC 02B.0211 (3)(e) (May 1, 2007) 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) (May 1, 2007):

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 and 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 in violation of 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. Details regarding the analysis of fecal coliform bacteria are available in the DWQ's Standard Operating Procedure (SOP) for analyzing Fecal Coliform using Standard Methods, 20th Edition, 9222 D (NC Division of Water Quality Laboratory Section, 2007).

While the Chowan River Basin contains salt waters, it does not contain Class SA waters. During the current assessment period, no site yielded a geometric mean greater than 200 colonies/100 mL, nor did the results from any site exceed 400 colonies/100 mL greater than 20 percent of the time. Geometric means and evaluation level exceedance percentages for individual sites are indicated on the respective station summary sheets.

In addition, for all tidal salt waters, the following is applicable 15A NCAC 02B .0220 (3)(e) (May 1, 2007):

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. One location in the Chowan basin was 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://www.deh.enr.state.nc.us/shellfish/Water_Monitoring/RWQweb/home.htm.

Table 6. Frequency of Evaluation Level Exceedances, 2006-2010

8-Digit HUC/ Station ID	Class	% of Results that Exceeded the Evaluation Limit						
		Dissolved Oxygen (<5)[1]	Dissolved Oxygen (<4)[2]	pH (<6 in B, C) pH (<6.8 in SB)	Water Temperature	Chlorophyll a	Turbidity	Fecal Coliform
03010201	**Nottaway River**							
D0000050	II Estuarine	NA	NA	NA	NA	NA	NA	NA
03010202	**Blackwater River**							
D0001200	II Estuarine	NA	NA	NA	NA	NA	NA	NA
D0001800	B NSW	50	25	2	0	0	0	2
03010203	Chowan River							
D0010000	B NSW	46	20	3	0	0	0	2
D6250000	B NSW	29	3	3	0	0	0	0
D8356200	B NSW	9	2	7	0	0	0	0
D8430000	B NSW	8	0	8	0	0	0	0
D8950000	B NSW	4	0	3	0	0	0	2
D9490000	B NSW	0	0	0	0	0	0	0
03010204	Meherrin River and Potecasi Creek							
D4150000	C NSW	48	40	25	0	0	3	8
D5000000	B NSW	41	10	2	0	0	0	2
03010205	Albemarle Sound							
D999500C	B NSW	0	0	0	0	0	0	0
D999500N	C NSW	0	0	0	0	0	0	0
D999500S	SB	0	NA	7	0	0	2	NA

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 as an instantaneous value.

WATER QUALITY PATTERNS IN THE CHOWAN 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 3, 4 and 5, respectively). Station symbol colors signified the degree of water quality exceedance at each location.

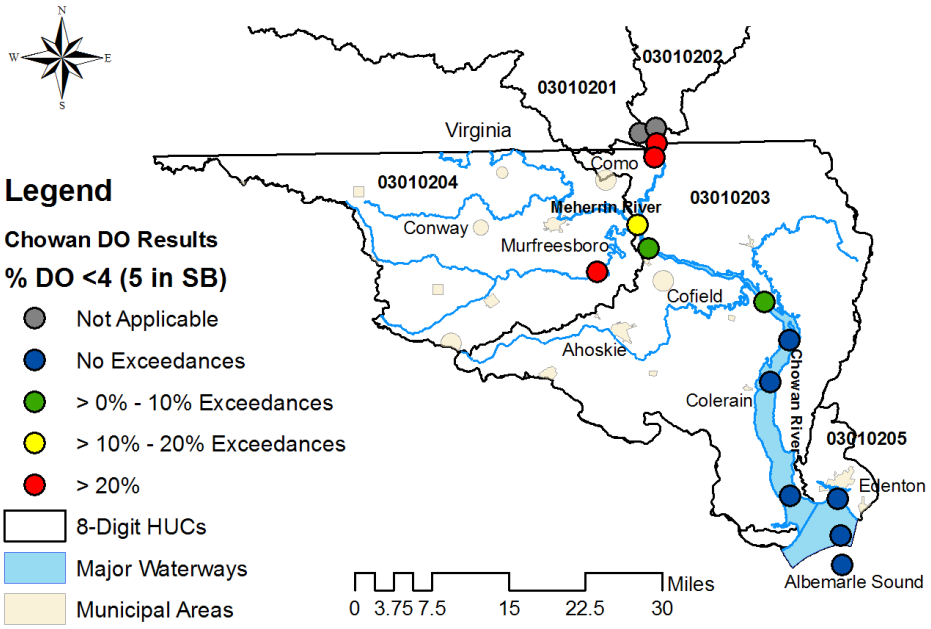

Figure 3. Geographic Distribution and Percentage of Dissolved Oxygen Exceedances (less than 4.0 mg/L in freshwater; less than 5.0 mg/L in saltwater)

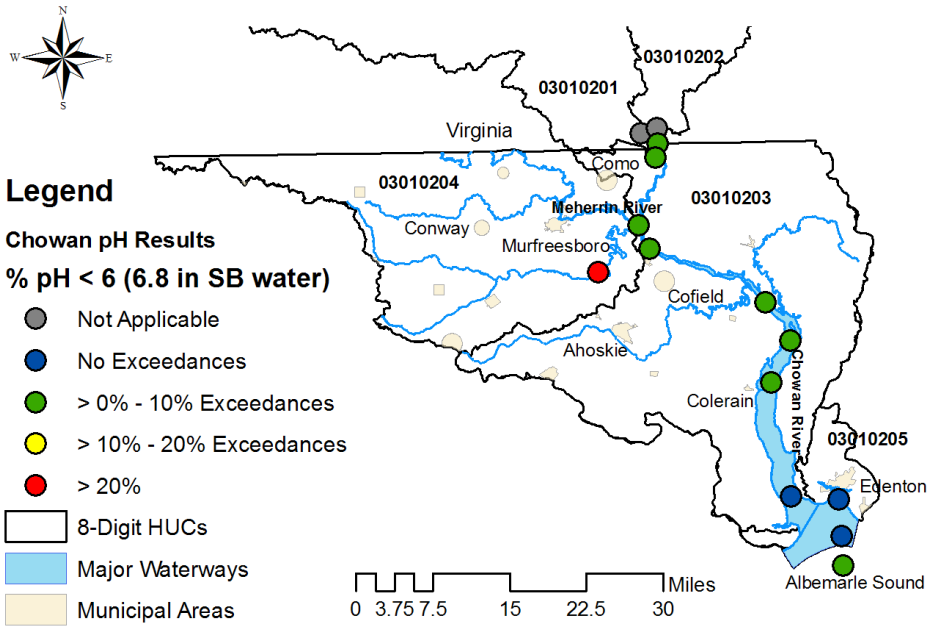

Figure 4. Geographic Distribution and Percentage of pH Exceedances (less than 6.0 in freshwater; less than 6.8 in saltwater)

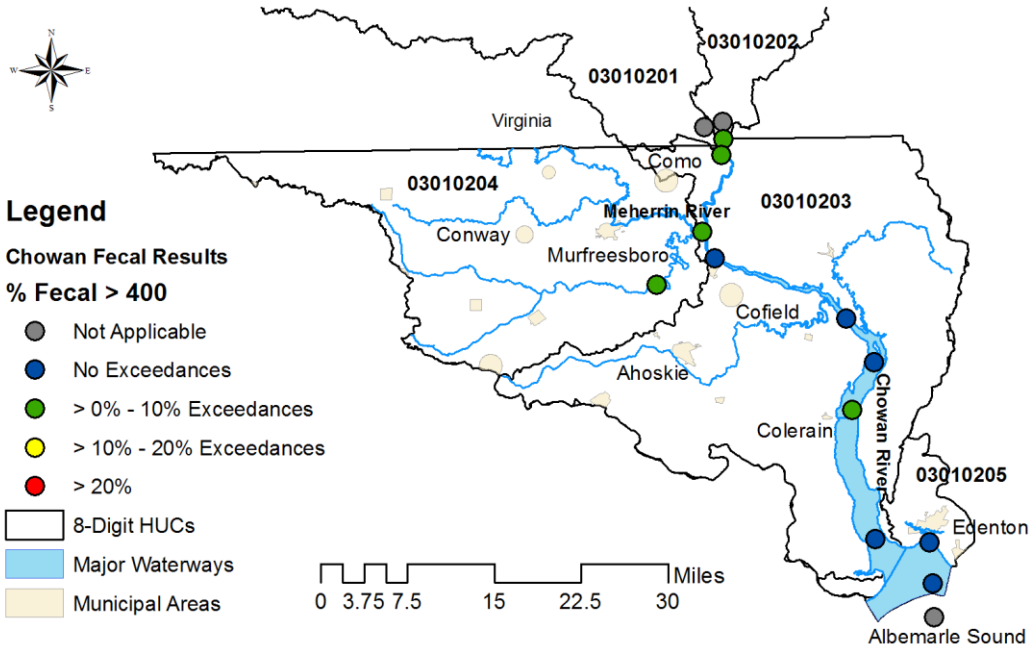

Figure 5. Geographic Distribution and Percentage of Fecal Coliform Exceedances (greater than 400 colonies/100 mL by membrane filter fecal coliform count)

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Appendix A: Station Summary Sheets

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

Location: NOTTAWAY RIV AT US 258 NR RIVERDALE VA
Station #: D0000050 **Hydrologic Unit Code:** 03010201
Latitude: 36.56683 **Longitude:** -76.94646 **Stream class:** II Estuarine
Agency: NCAMBNT **NC stream index:**

Time period: 01/30/2006 to 12/08/2010

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	59	0	N/A				3.3	4	4.5	5.6	9	10.8	12.2
pH (SU)	59	0	N/A				5.8	6.2	6.3	6.5	6.7	7	7.1
Salinity (ppt)	58	0	N/A				0.01	0.02	0.03	0.04	0.08	0.11	0.17
Spec. conductance (umhos/cm at 25°C)	58	0	N/A				50	63	77	113	178	243	340
Water Temperature (°C)	59	0	N/A				2.6	6.4	10.5	19.6	25.9	28.7	31.5
Other													
Chlorophyll a (ug/L)	59	24	N/A				1	1	1	1	3	5	9
Hardness (mg/L)	4	0	N/A				14	14	18	31	32	33	33
TSS (mg/L)	19	16	N/A				2.5	3	6.2	6.2	6.2	6.2	11
Turbidity (NTU)	60	0	N/A				2.3	3	4	5.6	8.1	12	20
Nutrients (mg/L)													
NH3 as N	58	30	N/A				0.02	0.02	0.02	0.02	0.04	0.05	0.07
NO2 + NO3 as N	58	8	N/A				0.02	0.02	0.04	0.08	0.12	0.15	0.19
TKN as N	58	0	N/A				0.24	0.35	0.42	0.5	0.62	0.69	0.78
Total Phosphorus	58	0	N/A				0.03	0.05	0.06	0.07	0.08	0.09	0.13
Metals (ug/L)													
Aluminum, total (Al)	5	0	N/A				200	200	245	350	490	540	540
Arsenic, total (As)	5	5	N/A				5	5	5	5	5	5	5
Cadmium, total (Cd)	5	5	N/A				1	1	1.5	2	2	2	2
Chromium, total (Cr)	5	5	N/A				10	10	18	25	25	25	25
Copper, total (Cu)	5	5	N/A				2	2	2	2	2	2	2
Iron, total (Fe)	5	0	N/A				870	870	885	1500	1600	1700	1700
Lead, total (Pb)	5	5	N/A				10	10	10	10	10	10	10
Manganese, total (Mn)	3	0	N/A				66	66	66	80	110	110	110
Mercury, total (Hg)	4	4	N/A				0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	5	5	N/A				10	10	10	10	10	10	10
Zinc, total (Zn)	5	4	N/A				10	10	10	10	10	11	11

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
59	14.1	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)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

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

Location: BLACKWATER RIV AT HORSESHOE BEND AT CHERRY GROVE VA
Station #: D0001200 **Hydrologic Unit Code:** 03010202
Latitude: 36.57341 **Longitude:** -76.91795 **Stream class:** II Estuarine
Agency: NCAMBNT **NC stream index:**

Time period: 01/30/2006 to 08/26/2010

	# results	# ND	EL	Results not meeting EL #	%	%Conf	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	55	0	N/A				2.2	2.7	3.7	4.9	9	10.1	12.1
pH (SU)	55	0	N/A				5.5	6	6.2	6.4	6.6	6.8	6.9
Salinity (ppt)	54	0	N/A				0.02	0.03	0.04	0.04	0.06	0.08	0.14
Spec. conductance (umhos/cm at 25°C)	54	0	N/A				70	84	95	112	146	186	296
Water Temperature (°C)	55	0	N/A				2.5	6	10.3	20	26.2	29.3	31.1
Other													
Chlorophyll a (ug/L)	56	22	N/A				1	1	1	1	3	9	22
Hardness (mg/L)	3	0	N/A				22	22	22	32	37	37	37
TSS (mg/L)	19	15	N/A				2.5	2.8	6.2	6.2	7	12	12
Turbidity (NTU)	56	0	N/A				1.5	2.7	3.4	4.6	6.7	9	14
Nutrients (mg/L)													
NH3 as N	55	17	N/A				0.02	0.02	0.02	0.03	0.06	0.09	0.2
NO2 + NO3 as N	55	2	N/A				0.02	0.03	0.07	0.12	0.21	0.25	0.42
TKN as N	55	0	N/A				0.39	0.48	0.58	0.68	0.76	0.85	0.91
Total Phosphorus	55	0	N/A				0.02	0.04	0.06	0.07	0.1	0.12	0.18
Metals (ug/L)													
Aluminum, total (Al)	6	0	N/A				95	95	114	180	328	470	470
Arsenic, total (As)	6	6	N/A				5	5	5	5	5	5	5
Cadmium, total (Cd)	6	6	N/A				1	1	1	2	2	2	2
Chromium, total (Cr)	6	6	N/A				10	10	10	25	25	25	25
Copper, total (Cu)	6	6	N/A				2	2	2	2	2	2	2
Iron, total (Fe)	6	0	N/A				490	490	865	1600	2225	2300	2300
Lead, total (Pb)	6	6	N/A				10	10	10	10	10	10	10
Manganese, total (Mn)	5	0	N/A				35	35	56	87	148	210	210
Mercury, total (Hg)	4	4	N/A				0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	6	6	N/A				10	10	10	10	10	10	10
Zinc, total (Zn)	6	4	N/A				10	10	10	10	21	48	48

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
55	19.2	1	1.8	

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)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

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

Location: BLACKWATER RIV .5 MI UPS MOUTH NR WYANOKE
Station #: D0001800 **Hydrologic Unit Code:** 03010202
Latitude: 36.55118 **Longitude:** -76.91711 **Stream class:** B NSW
Agency: NCAMBNT **NC stream index:** 25

Time period: 01/30/2006 to 12/08/2010

	#	#		Results not meeting EL			Percentiles						
	results	**ND**	**EL**	**#**	**%**	**%Conf**	**Min**	**10th**	**25th**	**50th**	**75th**	**90th**	**Max**
Field													
D.O. (mg/L)	59	0	<4	15	25.4	> 99.9	2.4	3.2	3.9	4.9	8.4	9.2	11.9
	59	0	<5	30	50.8	> 99.9	2.4	3.2	3.9	4.9	8.4	9.2	11.9
pH (SU)	59	0	<6	1	1.7		5.8	6.1	6.3	6.5	6.8	7	7.6
	59	0	>9	0	0		5.8	6.1	6.3	6.5	6.8	7	7.6
Salinity (ppt)	58	0	N/A				0.03	0.04	0.04	0.06	0.09	0.15	0.51
Spec. conductance (umhos/cm at 25°C)	58	0	N/A				81	92	108	140	199	285	1000
Water Temperature (°C)	59	0	>32	0	0		2.6	6.8	10.6	19.4	25.8	29.7	31.1
Other													
Chlorophyll a (ug/L)	60	16	>40	0	0		1	1	1	2	4	6	12
Hardness (mg/L)	4	0	N/A				28	28	30	36	44	47	47
TSS (mg/L)	20	15	N/A				2.5	3	5.7	6.2	6.2	12	12
Turbidity (NTU)	60	0	>50	0	0		1.9	2.7	3.4	5	7.1	9.2	17
Nutrients (mg/L)													
NH3 as N	58	9	N/A				0.02	0.02	0.02	0.05	0.07	0.17	0.3
NO2 + NO3 as N	58	0	N/A				0.02	0.03	0.06	0.11	0.18	0.3	0.66
TKN as N	58	0	N/A				0.34	0.48	0.59	0.69	0.79	0.91	1.7
Total Phosphorus	58	0	N/A				0.04	0.06	0.07	0.09	0.12	0.18	0.7
Metals (ug/L)													
Aluminum, total (Al)	5	0	N/A				120	120	145	300	375	380	380
Arsenic, total (As)	5	5	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	5	5	>2	0	0		1	1	1.5	2	2	2	2
Chromium, total (Cr)	5	5	>50	0	0		10	10	18	25	25	25	25
Copper, total (Cu)	5	5	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	5	0	>1000	4	80		430	430	865	1400	1850	2200	2200
Lead, total (Pb)	5	5	>25	0	0		10	10	10	10	10	10	10
Mercury, total (Hg)	4	4	>0.012	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	5	5	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	5	5	>50	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	**Geomean**	**# > 400:**	**% > 400:**	**%Conf:**
59	19.3	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)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

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

Location: CHOWAN RIV NR RIDDICKSVILLE
Station #: D0010000 **Hydrologic Unit Code:** 03010203
Latitude: 36.53201 **Longitude:** -76.92096 **Stream class:** B NSW
Agency: NCAMBNT **NC stream index:** 25

Time period: 01/30/2006 to 12/08/2010

	#	#		Results not meeting EL			Percentiles						
	results	**ND**	**EL**	**#**	**%**	**%Conf**	**Min**	**10th**	**25th**	**50th**	**75th**	**90th**	**Max**
Field													
D.O. (mg/L)	59	0	<4	12	20.3	98.7	2.8	3.4	4.1	5.1	8.8	10	12.1
	59	0	<5	27	45.8	> 99.9	2.8	3.4	4.1	5.1	8.8	10	12.1
pH (SU)	59	0	<6	2	3.4		5.9	6.2	6.3	6.5	6.7	7	7.4
	59	0	>9	0	0		5.9	6.2	6.3	6.5	6.7	7	7.4
Salinity (ppt)	58	0	N/A				0.02	0.03	0.04	0.06	0.08	0.12	0.31
Spec. conductance (umhos/cm at 25°C)	58	0	N/A				66	78	94	132	184	251	600
Water Temperature (°C)	59	0	>32	0	0		2.4	6.5	10.5	19.9	25.7	28.8	30
Other													
Chlorophyll a (ug/L)	60	19	>40	0	0		1	1	1	2	3	5	7
Hardness (mg/L)	4	0	N/A				26	26	27	31	38	40	40
TSS (mg/L)	20	14	N/A				2.5	3.3	6.2	6.2	8.4	12	12
Turbidity (NTU)	60	0	>50	0	0		2.4	2.8	3.4	5.3	7.9	10.9	15
Nutrients (mg/L)													
NH3 as N	59	11	N/A				0.02	0.02	0.02	0.04	0.06	0.08	0.17
NO2 + NO3 as N	59	3	N/A				0.02	0.02	0.05	0.08	0.15	0.2	0.27
TKN as N	59	0	N/A				0.38	0.48	0.56	0.62	0.67	0.77	1
Total Phosphorus	59	0	N/A				0.04	0.06	0.07	0.08	0.1	0.13	0.37
Metals (ug/L)													
Aluminum, total (Al)	5	0	N/A				150	150	190	300	420	470	470
Arsenic, total (As)	5	5	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	5	5	>2	0	0		1	1	1.5	2	2	2	2
Chromium, total (Cr)	5	5	>50	0	0		10	10	18	25	25	25	25
Copper, total (Cu)	5	4	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	5	0	>1000	4	80		920	920	1060	1200	1550	1800	1800
Lead, total (Pb)	5	5	>25	0	0		10	10	10	10	10	10	10
Mercury, total (Hg)	4	4	>0.012	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	5	5	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	5	4	>50	0	0		10	10	10	10	14	18	18

Fecal Coliform Screening(#/100mL)

# results:	**Geomean**	**# > 400:**	**% > 400:**	**%Conf:**
59	13.6	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)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

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

Location: POTECASI CRK AT NC 11 NR UNION
Station #: D4150000 **Hydrologic Unit Code:** 03010204
Latitude: 36.37121 **Longitude:** -77.02591 **Stream class:** C NSW
Agency: NCAMBNT **NC stream index:** 25-4-8

Time period: 01/12/2006 to 12/07/2010

	#	#		Results not meeting EL			Percentiles						
	results	**ND**	**EL**	**#**	**%**	**%Conf**	**Min**	**10th**	**25th**	**50th**	**75th**	**90th**	**Max**
Field													
D.O. (mg/L)	60	0	<4	24	40	> 99.9	1.2	2.7	3.4	5.1	7.8	10.5	12.2
	60	0	<5	29	48.3	> 99.9	1.2	2.7	3.4	5.1	7.8	10.5	12.2
pH (SU)	60	0	<6	15	25	> 99.9	4.7	5.6	5.9	6.3	6.5	6.8	7.6
	60	0	>9	0	0		4.7	5.6	5.9	6.3	6.5	6.8	7.6
Salinity (ppt)	60	0	N/A				0.01	0.02	0.03	0.04	0.05	0.06	0.08
Spec. conductance (umhos/cm at 25°C)	60	0	N/A				52	63	72	98	127	148	170
Water Temperature (°C)	60	0	>32	0	0		0.1	4	8.8	15	22	24.8	26.6
Other													
Chlorophyll a (ug/L)	60	33	>40	0	0		1	1	1	1	2	4	10
Hardness (mg/L)	4	0	N/A				19	19	20	27	36	38	38
TSS (mg/L)	20	8	N/A				5	5.6	6.2	6.2	11.4	25.7	30
Turbidity (NTU)	60	0	>50	2	3.3		2.7	6.3	7.7	10	14	24.6	70
Nutrients (mg/L)													
NH3 as N	60	17	N/A				0.02	0.02	0.02	0.03	0.07	0.12	0.57
NO2 + NO3 as N	59	21	N/A				0.02	0.02	0.02	0.04	0.11	0.19	0.88
TKN as N	57	0	N/A				0.38	0.43	0.55	0.8	1	1.2	1.5
Total Phosphorus	60	0	N/A				0.05	0.07	0.09	0.12	0.15	0.19	0.22
Metals (ug/L)													
Aluminum, total (Al)	5	0	N/A				360	360	360	550	1135	1600	1600
Arsenic, total (As)	5	5	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	5	5	>2	0	0		1	1	1.5	2	2	2	2
Chromium, total (Cr)	5	5	>50	0	0		10	10	18	25	25	25	25
Copper, total (Cu)	5	4	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	5	0	>1000	5	100		1600	1600	2300	3300	4050	4600	4600
Lead, total (Pb)	5	5	>25	0	0		10	10	10	10	10	10	10
Mercury, total (Hg)	4	4	>0.012	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	5	5	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	5	1	>50	0	0		10	10	10	12	13	13	13

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
60	51.5	5	8.3	

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)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

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

Location: MEHERRIN RIV AT SR 1175 PARKERS FERRY NR COMO
Station #: D5000000 **Hydrologic Unit Code:** 03010204
Latitude: 36.43653 **Longitude:** -76.95332 **Stream class:** B NSW
Agency: NCAMBNT **NC stream index:** 25-4-(5)

Time period: 01/30/2006 to 12/08/2010

	#	#		Results not meeting EL			Percentiles						
	results	**ND**	**EL**	**#**	**%**	**%Conf**	**Min**	**10th**	**25th**	**50th**	**75th**	**90th**	**Max**
Field													
D.O. (mg/L)	59	0	<4	6	10.2	45.4	2.9	3.6	4.4	5.5	9.1	10.5	12.1
	59	0	<5	24	40.7	> 99.9	2.9	3.6	4.4	5.5	9.1	10.5	12.1
pH (SU)	59	0	<6	1	1.7		5.8	6.1	6.3	6.5	6.7	6.8	7.1
	59	0	>9	0	0		5.8	6.1	6.3	6.5	6.7	6.8	7.1
Salinity (ppt)	58	0	N/A				0.01	0.02	0.03	0.04	0.04	0.06	1.31
Spec. conductance (umhos/cm at 25°C)	58	0	N/A				52	69	81	92	108	144	2436
Water Temperature (°C)	59	0	>32	0	0		2.8	6.8	10.9	20.5	25.6	29	30.2
Other													
Chlorophyll a (ug/L)	59	20	>40	0	0		1	1	1	2	4	6	17
Hardness (mg/L)	4	0	N/A				15	15	19	30	33	34	34
TSS (mg/L)	19	13	N/A				2.5	2.5	2.8	6.2	6.2	12	210
Turbidity (NTU)	60	0	>50	0	0		1.5	3.1	4	6	10.8	20.7	30
Nutrients (mg/L)													
NH3 as N	59	14	N/A				0.02	0.02	0.02	0.03	0.06	0.09	0.4
NO2 + NO3 as N	59	6	N/A				0.02	0.02	0.05	0.1	0.14	0.19	0.22
TKN as N	59	0	N/A				0.31	0.39	0.46	0.58	0.65	0.79	0.96
Total Phosphorus	59	0	N/A				0.03	0.04	0.06	0.07	0.08	0.1	0.14
Metals (ug/L)													
Aluminum, total (Al)	5	0	N/A				250	250	250	460	630	650	650
Arsenic, total (As)	5	5	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	5	5	>2	0	0		1	1	1.5	2	2	2	2
Chromium, total (Cr)	5	5	>50	0	0		10	10	18	25	25	25	25
Copper, total (Cu)	5	4	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	5	0	>1000	5	100		1200	1200	1200	1900	2350	2600	2600
Lead, total (Pb)	5	5	>25	0	0		10	10	10	10	10	10	10
Mercury, total (Hg)	4	4	>0.012	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	5	5	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	5	4	>50	0	0		10	10	10	10	13	16	16

Fecal Coliform Screening(#/100mL)

# results:	**Geomean**	**# > 400:**	**% > 400:**	**%Conf:**
59	10.4	1	1.7	

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)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

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

Location: CHOWAN RIV AT US 13 AT WINTON
Station #: D6250000 **Hydrologic Unit Code:** 03010203
Latitude: 36.40263 **Longitude:** -76.93434 **Stream class:** B NSW
Agency: NCAMBNT **NC stream index:** 25

Time period: 01/30/2006 to 12/08/2010

	#	#		Results not meeting EL			Percentiles						
	results	**ND**	**EL**	**#**	**%**	**%Conf**	**Min**	**10th**	**25th**	**50th**	**75th**	**90th**	**Max**
Field													
D.O. (mg/L)	59	0	<4	2	3.4		3.3	4.3	4.9	6	8.5	10.3	12.1
	59	0	<5	17	28.8	> 99.9	3.3	4.3	4.9	6	8.5	10.3	12.1
pH (SU)	59	0	<6	2	3.4		5.8	6.1	6.3	6.5	6.8	7	7.3
	59	0	>9	0	0		5.8	6.1	6.3	6.5	6.8	7	7.3
Salinity (ppt)	58	0	N/A				0.02	0.02	0.03	0.04	0.06	0.12	1.63
Spec. conductance (umhos/cm at 25°C)	58	0	N/A				60	69	88	102	141	250	3017
Water Temperature (°C)	59	0	>32	0	0		2.6	7.3	10.9	20.3	25.8	28.9	30.4
Other													
Chlorophyll a (ug/L)	59	18	>40	0	0		1	1	1	2	5	8	21
Hardness (mg/L)	4	0	N/A				17	17	18	26	40	42	42
TSS (mg/L)	20	14	N/A				3	3.3	5.3	6.2	6.2	11.7	15
Turbidity (NTU)	60	0	>50	0	0		1.6	3.3	4.1	5.9	8.7	15.8	21
Nutrients (mg/L)													
NH3 as N	59	7	N/A				0.02	0.02	0.02	0.04	0.06	0.08	0.17
NO2 + NO3 as N	59	8	N/A				0.02	0.02	0.04	0.08	0.13	0.2	0.26
TKN as N	59	0	N/A				0.35	0.45	0.52	0.62	0.71	0.77	0.94
Total Phosphorus	59	0	N/A				0.04	0.05	0.07	0.08	0.1	0.11	0.29
Metals (ug/L)													
Aluminum, total (Al)	6	0	N/A				110	110	222	300	642	650	650
Arsenic, total (As)	6	6	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	6	4	>2	2	33.3		1	1	1	2	2.6	3.6	3.6
Chromium, total (Cr)	6	6	>50	0	0		10	10	10	25	25	25	25
Copper, total (Cu)	6	4	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	6	0	>1000	5	83.3		760	760	1165	1600	1725	1800	1800
Lead, total (Pb)	6	6	>25	0	0		10	10	10	10	10	10	10
Mercury, total (Hg)	4	4	>0.012	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	6	6	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	6	5	>50	0	0		10	10	10	10	11	14	14

Fecal Coliform Screening(#/100mL)

# results:	**Geomean**	**# > 400:**	**% > 400:**	**%Conf:**
58	7.1	0	0	

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

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

Location: CHOWAN RIV AT CM 16 NR GATESVILLE
Station #: D8356200 **Hydrologic Unit Code:** 03010203
Latitude: 36.32360 **Longitude:** -76.73354 **Stream class:** B NSW
Agency: NCAMBNT **NC stream index:** 25

Time period: 01/17/2006 to 11/08/2010

	#	#		Results not meeting EL			Percentiles						
	results	**ND**	**EL**	**#**	**%**	**%Conf**	**Min**	**10th**	**25th**	**50th**	**75th**	**90th**	**Max**
Field													
D.O. (mg/L)	59	0	<4	1	1.7		3.5	5	5.9	7.1	9.1	10.6	11.5
	59	0	<5	5	8.5		3.5	5	5.9	7.1	9.1	10.6	11.5
pH (SU)	59	0	<6	4	6.8		5.6	6	6.4	6.7	6.8	7.1	7.7
	59	0	>9	0	0		5.6	6	6.4	6.7	6.8	7.1	7.7
Salinity (ppt)	59	0	N/A				0.02	0.03	0.03	0.04	0.09	0.21	2.4
Spec. conductance (umhos/cm at 25°C)	59	0	N/A				64	75	90	103	209	421	4376
Water Temperature (°C)	59	0	>32	0	0		2.8	7.4	10.5	20.2	26.9	29.5	31.5
Other													
Chlorophyll a (ug/L)	57	12	>40	0	0		1	1	1	3	8	14	31
Hardness (mg/L)	4	0	N/A				20	20	22	27	40	43	43
TSS (mg/L)	19	14	N/A				5	5	5.5	6.2	6.2	12	13
Turbidity (NTU)	59	0	>50	0	0		1.5	3	4	5.8	7.3	13	19
Nutrients (mg/L)													
NH3 as N	59	14	N/A				0.02	0.02	0.02	0.03	0.06	0.09	0.17
NO2 + NO3 as N	59	10	N/A				0.02	0.02	0.03	0.07	0.12	0.18	0.26
TKN as N	57	0	N/A				0.4	0.48	0.55	0.65	0.74	0.79	0.87
Total Phosphorus	59	0	N/A				0.03	0.05	0.06	0.08	0.1	0.13	0.15
Metals (ug/L)													
Aluminum, total (Al)	5	0	N/A				210	210	255	300	490	620	620
Arsenic, total (As)	5	5	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	5	5	>2	0	0		1	1	1.5	2	2	2	2
Chromium, total (Cr)	5	5	>50	0	0		10	10	18	25	25	25	25
Copper, total (Cu)	5	4	>7	0	0		2	2	2	2	3	4	4
Iron, total (Fe)	5	0	>1000	4	80		720	720	960	1300	1800	2200	2200
Lead, total (Pb)	5	5	>25	0	0		10	10	10	10	10	10	10
Mercury, total (Hg)	4	4	>0.012	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	5	5	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	5	4	>50	0	0		10	10	10	10	12	14	14

Fecal Coliform Screening(#/100mL)

# results:	**Geomean**	**# > 400:**	**% > 400:**	**%Conf:**
59	3.7	0	0	

Key:
result: number of observations
ND: number of observations reported to be below detection level (non-detect)
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Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

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

Location: CHOWAN RIV AT CM 12 DNS HOLIDAY ISLAND
Station #: D8430000 **Hydrologic Unit Code:** 03010203
Latitude: 36.26890 **Longitude:** -76.69140 **Stream class:** B NSW
Agency: NCAMBNT **NC stream index:** 25

Time period: 01/17/2006 to 12/06/2006

	#	#		Results not meeting EL			Percentiles						
	results	**ND**	**EL**	**#**	**%**	**%Conf**	**Min**	**10th**	**25th**	**50th**	**75th**	**90th**	**Max**
Field													
D.O. (mg/L)	12	0	<4	0	0		4.7	4.9	6.1	7.4	9.9	11	11
	12	0	<5	1	8.3		4.7	4.9	6.1	7.4	9.9	11	11
pH (SU)	12	0	<6	1	8.3		5.8	5.9	6.5	6.8	7.2	7.8	7.9
	12	0	>9	0	0		5.8	5.9	6.5	6.8	7.2	7.8	7.9
Salinity (ppt)	12	0	N/A				0.02	0.02	0.02	0.04	0.09	0.12	0.13
Spec. conductance (umhos/cm at 25°C)	12	0	N/A				59	60	71	94	194	263	279
Water Temperature (°C)	12	0	>32	0	0		8	8	11	20.8	27.3	30.8	31.4
Other													
Chlorophyll a (ug/L)	12	3	>40	0	0		1	1	1	2	10	22	26
TSS (mg/L)	4	2	N/A				2.5	2.5	2.5	4.4	7	7.2	7.2
Turbidity (NTU)	12	0	>50	0	0		3.1	3.4	4.2	4.8	8	8.3	8.3
Nutrients (mg/L)													
NH3 as N	12	3	N/A				0.02	0.02	0.02	0.04	0.05	0.07	0.07
NO2 + NO3 as N	12	5	N/A				0.02	0.02	0.02	0.04	0.13	0.15	0.15
TKN as N	12	0	N/A				0.44	0.45	0.52	0.56	0.72	0.8	0.81
Total Phosphorus	12	0	N/A				0.05	0.05	0.06	0.08	0.11	0.12	0.12
Metals (ug/L)													
Aluminum, total (Al)	4	0	N/A				260	260	262	360	608	660	660
Arsenic, total (As)	4	4	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	4	4	>2	0	0		2	2	2	2	2	2	2
Chromium, total (Cr)	4	4	>50	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	4	4	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	4	0	>1000	3	75		840	840	905	1200	1300	1300	1300
Lead, total (Pb)	4	4	>25	0	0		10	10	10	10	10	10	10
Mercury, total (Hg)	4	4	>0.012	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	4	4	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	4	4	>50	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	**Geomean**	**# > 400:**	**% > 400:**	**%Conf:**
12	2.9	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)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

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

Location: CHOWAN RIV AT CM 7 AT COLERAIN
Station #: D8950000 **Hydrologic Unit Code:** 03010203
Latitude: 36.20983 **Longitude:** -76.72677 **Stream class:** B NSW
Agency: NCAMBNT **NC stream index:** 25

Time period: 01/17/2006 to 11/08/2010

	#	#		Results not meeting EL			Percentiles						
	results	**ND**	**EL**	**#**	**%**	**%Conf**	**Min**	**10th**	**25th**	**50th**	**75th**	**90th**	**Max**
Field													
D.O. (mg/L)	59	0	<4	0	0		4.4	6.8	7.3	8.4	10.5	11.7	12.6
	59	0	<5	1	1.7		4.4	6.8	7.3	8.4	10.5	11.7	12.6
pH (SU)	59	0	<6	2	3.4		4.3	6.4	6.8	7.1	7.3	7.6	8.1
	59	0	>9	0	0		4.3	6.4	6.8	7.1	7.3	7.6	8.1
Salinity (ppt)	59	0	N/A				0.02	0.03	0.04	0.06	0.21	1.17	3.81
Spec. conductance (umhos/cm at 25°C)	59	0	N/A				59	76	93	142	418	2203	6820
Water Temperature (°C)	59	0	>32	0	0		1.5	7	10.2	20.4	26.6	28.9	30.9
Other													
Chlorophyll a (ug/L)	58	12	>40	0	0		1	1	1	4	8	14	36
Hardness (mg/L)	4	0	N/A				21	21	21	23	25	25	25
TSS (mg/L)	20	15	N/A				2.5	2.8	5.3	6.2	8	12	12
Turbidity (NTU)	59	1	>50	0	0		1	2	3.6	5.7	7.8	11	17
Nutrients (mg/L)													
NH3 as N	59	25	N/A				0.02	0.02	0.02	0.02	0.05	0.08	0.15
NO2 + NO3 as N	59	15	N/A				0.02	0.02	0.02	0.06	0.13	0.2	0.29
TKN as N	57	0	N/A				0.3	0.43	0.51	0.62	0.7	0.74	0.78
Total Phosphorus	59	0	N/A				0.02	0.04	0.06	0.07	0.08	0.11	0.19
Metals (ug/L)													
Aluminum, total (Al)	6	0	N/A				190	190	272	390	505	610	610
Arsenic, total (As)	6	6	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	6	6	>2	0	0		1	1	1	2	2	2	2
Chromium, total (Cr)	6	6	>50	0	0		10	10	10	25	25	25	25
Copper, total (Cu)	6	6	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	6	0	>1000	4	66.7		650	650	680	1400	1700	1700	1700
Lead, total (Pb)	6	6	>25	0	0		10	10	10	10	10	10	10
Mercury, total (Hg)	4	4	>0.012	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	6	6	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	6	6	>50	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
59	4.6	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)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

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

Location: CHOWAN RIV AT US 17 AT EDENHOUSE
Station #: D9490000 **Hydrologic Unit Code:** 03010203
Latitude: 36.04760 **Longitude:** -76.69611 **Stream class:** B NSW
Agency: NCAMBNT **NC stream index:** 25

Time period: 01/17/2006 to 11/08/2010

	#	#		Results not meeting EL			Percentiles						
	results	**ND**	**EL**	**#**	**%**	**%Conf**	**Min**	**10th**	**25th**	**50th**	**75th**	**90th**	**Max**
Field													
D.O. (mg/L)	59	0	<4	0	0		6.3	7.2	8	9.2	11.1	11.6	13
	59	0	<5	0	0		6.3	7.2	8	9.2	11.1	11.6	13
pH (SU)	59	0	<6	0	0		6.2	6.7	7.1	7.3	7.5	7.8	8.9
	59	0	>9	0	0		6.2	6.7	7.1	7.3	7.5	7.8	8.9
Salinity (ppt)	59	0	N/A				0.03	0.03	0.04	0.15	0.84	2.5	4.38
Spec. conductance (umhos/cm at 25°C)	59	0	N/A				64	86	111	313	1581	4410	7794
Water Temperature (°C)	59	0	>32	0	0		1.7	7	9.9	19.6	26.6	28.8	31
Other													
Chlorophyll a (ug/L)	58	8	>40	0	0		1	1	2	4	9	14	37
Hardness (mg/L)	4	0	N/A				25	25	25	26	32	34	34
TSS (mg/L)	19	12	N/A				2.5	2.8	6.2	6.2	7	12	12
Turbidity (NTU)	59	0	>50	0	0		1	1.7	3.2	5.2	8.1	11	15
Nutrients (mg/L)													
NH3 as N	59	30	N/A				0.02	0.02	0.02	0.02	0.03	0.06	0.08
NO2 + NO3 as N	59	23	N/A				0.02	0.02	0.02	0.06	0.15	0.17	0.26
TKN as N	57	0	N/A				0.34	0.38	0.48	0.54	0.62	0.69	0.75
Total Phosphorus	59	1	N/A				0.02	0.02	0.04	0.07	0.08	0.09	0.11
Metals (ug/L)													
Aluminum, total (Al)	5	0	N/A				210	210	225	340	555	720	720
Arsenic, total (As)	5	5	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	5	5	>2	0	0		1	1	1.5	2	2	2	2
Chromium, total (Cr)	5	5	>50	0	0		10	10	18	25	25	25	25
Copper, total (Cu)	5	4	>7	1	20		2	2	2	2	6	10	10
Iron, total (Fe)	5	0	>1000	3	60		470	470	580	1100	1500	1700	1700
Lead, total (Pb)	5	5	>25	0	0		10	10	10	10	10	10	10
Mercury, total (Hg)	4	4	>0.012	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	5	5	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	5	4	>50	0	0		10	10	10	10	11	12	12

Fecal Coliform Screening(#/100mL)

# results:	**Geomean**	**# > 400:**	**% > 400:**	**%Conf:**
59	3.4	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)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

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

Location: ALBEMARLE SOUND NR EDENTON MID CHANNEL
Station #: D999500C **Hydrologic Unit Code:** 03010205
Latitude: 35.99002 **Longitude:** -76.60920 **Stream class:** B NSW
Agency: NCAMBNT **NC stream index:** 26

Time period: 01/11/2006 to 11/08/2010

	#	#		Results not meeting EL			Percentiles						
	results	**ND**	**EL**	**#**	**%**	**%Conf**	**Min**	**10th**	**25th**	**50th**	**75th**	**90th**	**Max**
Field													
D.O. (mg/L)	59	0	<4	0	0		7.1	7.6	8.4	9.6	11.1	12	12.9
	59	0	<5	0	0		7.1	7.6	8.4	9.6	11.1	12	12.9
pH (SU)	59	0	<6	0	0		6.3	7	7.2	7.4	7.7	7.9	8.7
	59	0	>9	0	0		6.3	7	7.2	7.4	7.7	7.9	8.7
Salinity (ppt)	59	0	N/A				0.02	0.04	0.06	0.65	1.7	3.59	5.79
Spec. conductance (umhos/cm at 25°C)	59	0	N/A				64	98	139	1233	3142	6479	10235
Water Temperature (°C)	59	0	>32	0	0		1.8	6.1	10.5	19.5	25.7	28.2	30.1
Other													
Chlorophyll a (ug/L)	58	3	>40	0	0		1	1	4	9	11	17	34
Hardness (mg/L)	3	0	N/A				24	24	24	29	89	89	89
TSS (mg/L)	19	10	N/A				2.5	3.2	5.5	6.2	12	18	28
Turbidity (NTU)	59	0	>50	0	0		2	2.5	3.3	4.8	7	13	19
Nutrients (mg/L)													
NH3 as N	59	44	N/A				0.02	0.02	0.02	0.02	0.02	0.03	0.05
NO2 + NO3 as N	59	27	N/A				0.02	0.02	0.02	0.03	0.12	0.17	0.31
TKN as N	58	0	N/A				0.32	0.37	0.41	0.45	0.51	0.59	0.67
Total Phosphorus	59	0	N/A				0.02	0.02	0.03	0.04	0.06	0.08	0.11
Metals (ug/L)													
Aluminum, total (Al)	5	0	N/A				160	160	160	210	545	730	730
Arsenic, total (As)	5	5	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	5	5	>2	0	0		1	1	1.5	2	2	2	2
Chromium, total (Cr)	5	5	>50	0	0		10	10	18	25	25	25	25
Copper, total (Cu)	5	2	>7	0	0		2	2	2	2	3	3	3
Iron, total (Fe)	5	0	>1000	1	20		310	310	445	580	1135	1400	1400
Lead, total (Pb)	5	5	>25	0	0		10	10	10	10	10	10	10
Mercury, total (Hg)	4	4	>0.012	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	5	5	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	5	4	>50	0	0		10	10	10	10	10	10	10

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
59	3.3	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)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

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

Location: ALBEMARLE SOUND NR EDENTON N SHORE
Station #: D999500N **Hydrologic Unit Code:** 03010205
Latitude: 36.04216 **Longitude:** -76.61279 **Stream class:** C NSW
Agency: NCAMBNT **NC stream index:** 26-1

Time period: 01/11/2006 to 11/08/2010

	#	#		Results not meeting EL			Percentiles						
	results	**ND**	**EL**	**#**	**%**	**%Conf**	**Min**	**10th**	**25th**	**50th**	**75th**	**90th**	**Max**
Field													
D.O. (mg/L)	59	0	<4	0	0		6.9	7.5	8	9.2	10.8	11.9	13.2
	59	0	<5	0	0		6.9	7.5	8	9.2	10.8	11.9	13.2
pH (SU)	59	0	<6	0	0		6.3	7	7.2	7.3	7.6	7.8	8.2
	59	0	>9	0	0		6.3	7	7.2	7.3	7.6	7.8	8.2
Salinity (ppt)	59	0	N/A				0.03	0.04	0.06	0.48	1.66	3.32	5.45
Spec. conductance (umhos/cm at 25°C)	59	0	N/A				86	111	143	930	3062	6018	9658
Water Temperature (°C)	59	0	>32	0	0		1.4	6.6	10.1	19.5	26.8	28.9	30.6
Other													
Hardness (mg/L)	4	0	N/A				23	23	24	29	34	35	35
TSS (mg/L)	20	13	N/A				2.5	4	6.2	6.2	6.2	12.6	14
Turbidity (NTU)	59	0	>50	0	0		1.4	2.5	3.1	4.6	6.8	12	29
Nutrients (mg/L)													
NH3 as N	58	41	N/A				0.02	0.02	0.02	0.02	0.02	0.04	0.06
NO2 + NO3 as N	58	29	N/A				0.02	0.02	0.02	0.02	0.11	0.18	0.3
TKN as N	57	0	N/A				0.32	0.37	0.44	0.47	0.56	0.62	0.72
Total Phosphorus	58	1	N/A				0.02	0.03	0.03	0.04	0.07	0.08	0.16
Metals (ug/L)													
Aluminum, total (Al)	6	0	N/A				140	140	155	310	600	630	630
Arsenic, total (As)	6	6	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	6	6	>2	0	0		1	1	1	2	2	2	2
Chromium, total (Cr)	6	6	>50	0	0		10	10	10	25	25	25	25
Copper, total (Cu)	6	6	>7	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	6	0	>1000	3	50		330	330	510	1015	1375	1600	1600
Lead, total (Pb)	6	6	>25	0	0		10	10	10	10	10	10	10
Mercury, total (Hg)	4	4	>0.012	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	6	6	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	6	5	>50	0	0		10	10	10	10	10	11	11

Fecal Coliform Screening(#/100mL)

# results:	**Geomean**	**# > 400:**	**% > 400:**	**%Conf:**
59	2.8	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)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence

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

Location: ALBEMARLE SOUND NR EDENTON S SHORE
Station #: D999500S **Hydrologic Unit Code:** 03010205
Latitude: 35.94793 **Longitude:** -76.60793 **Stream class:** SB
Agency: NCAMBNT **NC stream index:** 30

Time period: 01/11/2006 to 11/08/2010

	#	#		Results not meeting EL			Percentiles						
	results	**ND**	**EL**	**#**	**%**	**%Conf**	**Min**	**10th**	**25th**	**50th**	**75th**	**90th**	**Max**
Field													
D.O. (mg/L)	59	0	<5	0	0		6.1	7.7	8.2	9.3	11.1	12.1	13.3
pH (SU)	59	0	<6.8	4	6.8		6.4	7	7.1	7.4	7.7	8	8.5
	59	0	>8.5	0	0		6.4	7	7.1	7.4	7.7	8	8.5
Salinity (ppt)	59	0	N/A				0.04	0.04	0.06	0.67	1.72	2.95	3.52
Spec. conductance (umhos/cm at 25°C)	59	0	N/A				94	109	129	1268	3185	5390	6279
Water Temperature (°C)	59	0	>32	0	0		1.7	6.8	9.7	19.3	26.3	28	30.2
Other													
Chlorophyll a (ug/L)	2	0	>40	0	0		25	25	25	28	32	32	32
TSS (mg/L)	19	9	N/A				4.8	5.8	6.2	6.2	11	14	27
Turbidity (NTU)	59	0	>25	1	1.7		1.8	2.5	3.1	5.2	10	15	26
Nutrients (mg/L)													
NH3 as N	59	38	N/A				0.02	0.02	0.02	0.02	0.02	0.05	0.12
NO2 + NO3 as N	59	22	N/A				0.02	0.02	0.02	0.07	0.14	0.25	0.55
TKN as N	58	0	N/A				0.28	0.34	0.38	0.46	0.49	0.62	0.78
Total Phosphorus	59	1	N/A				0.02	0.02	0.03	0.04	0.06	0.08	0.11
Metals (ug/L)													
Aluminum, total (Al)	5	0	N/A				240	240	260	280	560	660	660
Arsenic, total (As)	5	5	>10	0	0		5	5	5	5	5	5	5
Cadmium, total (Cd)	5	5	>5	0	0		1	1	1.5	2	2	2	2
Chromium, total (Cr)	5	5	>20	0	0		10	10	18	25	25	25	25
Copper, total (Cu)	5	3	>3	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	5	0	N/A				360	360	525	840	975	1100	1100
Lead, total (Pb)	5	5	>25	0	0		10	10	10	10	10	10	10
Mercury, total (Hg)	4	4	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	5	5	>8.3	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	5	4	>86	0	0		10	10	10	10	10	11	11

Fecal Coliform Screening(#/100mL)

# results:	Geomean	# > 400:	% > 400:	%Conf:
59	3.2	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)
Stations with less than 10 results for a given parameter were not evaluated for statistical confidence