

BASINWIDE ASSESSMENT REPORT WHITE OAK RIVER BASIN



**NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND
NATURAL RESOURCES
Division of Water Quality
Environmental Sciences Section**

April 2005



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WHITE OAK RIVER BASIN

OVERVIEW

The Division of Water Quality uses a basinwide approach to water quality management. Activities within the Division, including permitting, monitoring, modeling, nonpoint source assessments, and planning are coordinated and integrated for each of the 17 major river basins within the state. All basins are reassessed every five years, and the White Oak River basin was sampled by the Environmental Sciences Section in 1994 and 1999, prior to this assessment in 2004.

The Environmental Sciences Section collects a variety of biological, chemical, and physical data that can be used in a myriad of ways within the basinwide planning program. In some areas there may be adequate data from several program areas to allow a fairly comprehensive analysis of ecological integrity or water quality. In other areas, data may be limited to one program area, such as only benthic macroinvertebrate data or only fisheries data, with no other information available. Such data may or may not be adequate to provide a definitive assessment of water quality, but can provide general indications of water quality. The primary program areas from which data were drawn for this assessment of the White Oak River basin include benthic macroinvertebrates, fish tissue, phytoplankton monitoring, ambient monitoring, and aquatic toxicity monitoring for the period 2000-2004. Details of biological sampling methods (including habitat evaluation) and rating criteria can be found in the appendices to this report. Technical terms are defined in the Glossary. Studies conducted prior to 2000 were previously summarized in NCDENR (2000).

The document is structured with physical, geographical, and biological data discussions presented by subbasin. General water quality conditions are given in an upstream to downstream format. Subbasins within the basin are described by a six digit code (030501– 030505), but are often referred to by their last two digits (e.g. Subbasin 01). Lakes data, ambient chemistry data and aquatic toxicity data, with summaries, are presented in separate chapters following the subbasins.

This river basin lies entirely within the southern outer coastal plain, where 1,233 square miles of watershed drain into the New, White Oak, Newport, and North rivers (Figure 1). The basin contains 267 miles of freshwater streams and rivers. The basin also contains extensive estuarine areas in Bogue and Core sounds. There are about 192 square miles of saltwater in the basin.

The largest cities are Jacksonville on the New River and the Morehead City - Beaufort area on Bogue Sound and the Newport River. Richlands, Swansboro, Cape Carteret, Newport, Atlantic Beach, and Bogue Banks are other urban areas. Large portions of the basin are publicly owned areas such as Croatan National Forest, Hoffman State Forest, and Cape Lookout National Seashore (Figure 2).



Figure 1. Location of subbasins in the White Oak River basin.

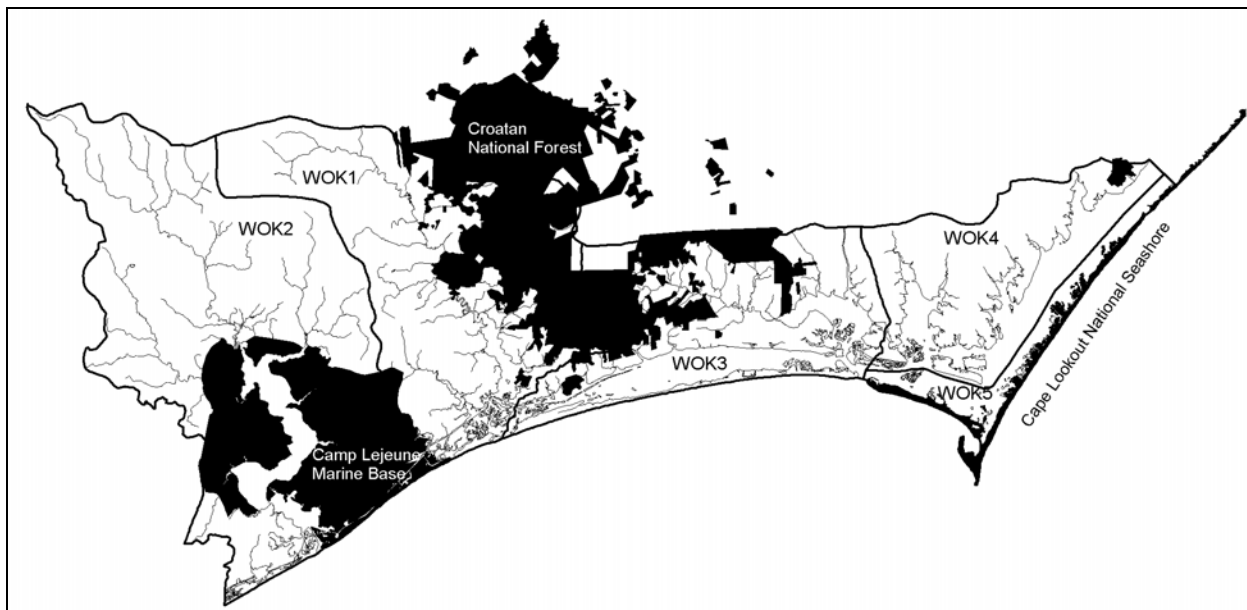


Figure 2. Federally owned lands in the White Oak River basin.

Many waterbodies have been designated as Outstanding Resources Waters (ORW) in the White Oak River basin, :

- Subbasin 01 -- the waters between Hammocks Beach State Park and the Intracoastal Waterway (ICW);
- Subbasin 02 -- Alligator Bay, Goose Bay, and a portion of the ICW south of the New River;
- Subbasin 03 -- the western half of Bogue Sound and the swamp and salt waters of the Theodore Roosevelt State Natural Area;
- Subbasin 04 -- most of Back Sound; and
- Subbasins 04 and 05 --Core Sound (except for a small area around the town of Atlantic (Figure 3).

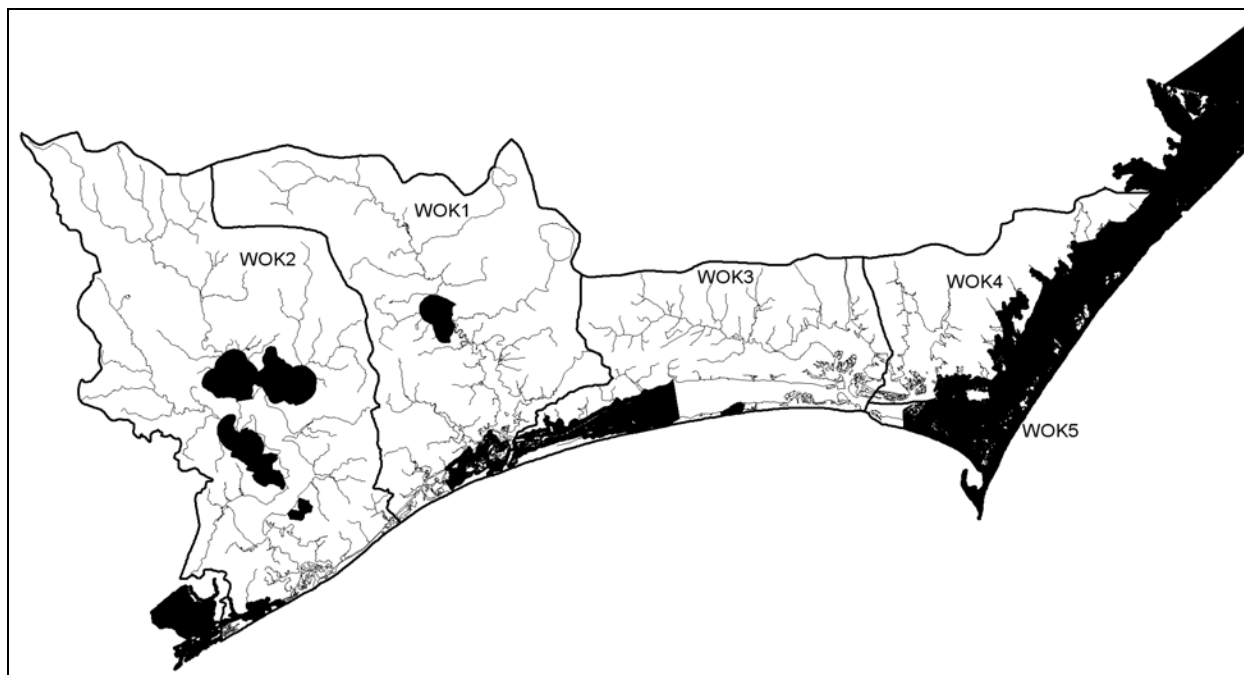


Figure 3. Outstanding Resource Waters and High Quality Waters in the White Oak River basin

Several waterbodies have also been designated as High Quality Waters (HQW) based upon their use as primary nursery areas. An example is in Subbasin 01 where a two mile section of the White Oak River, between Spring Branch and Hunters Creek is now supplementally classified as HQW.

The White Oak River watershed is east of the New River. Much of the watershed lies within the Croatan National Forest and the Hoffman State Forest. Extensive pocosins dominate much of the landscape. Water quality is generally good in these areas. Streams flowing through these forests, including Holston Creek, Hunters Creek, and Pettiford Creek, have naturally low pH, turbidity, and conductivity values. The west side of the river is more developed, so streams on this side, such as Starkeys Creek and Webb Creek, have higher pH and conductivity values and support benthic communities more tolerant to pollution than streams on the east side of the river.

The New River, in the southwestern portion of the basin, is a blackwater river whose watershed is located entirely within Onslow County. The watershed above the City of Jacksonville is characterized by gum-cypress swamps with upland areas used primarily for forestry and agriculture. The river is narrow, freshwater, and perennially flowing. At Jacksonville, near the US 17 bridge, the river widens, slows, and begins to exhibit estuarine influence until it discharges into the Atlantic Ocean. Land use in this lower section of the river is dominated by the city of Jacksonville and the US Marine Corps' Camp Lejeune.

The New River near Gum Branch, in the freshwater section, has been sampled for benthos since 1983. Bioclassifications were Good in the 1980s, but declined to Good-Fair since then. Most swampy tributaries such as Northeast Creek and Harris Creek, showed moderate signs of stress, while Little Northeast Creek appeared to be fairly natural in character.

Bogue Sound is located in Carteret County, east of the White Oak River, between Bogue Banks and the mainland. Water quality seemed to be generally high here, although continued development along the mainland has led to the closure of several tidal creeks to shellfishing because of increased fecal coliform concentrations.

The Newport River widens into the Newport River estuary, which separates Bogue Sound from Back Sound and Morehead City from Beaufort. The head of the estuary, near Newport, has periodic, naturally low dissolved oxygen concentrations and low pH values due to swamp water inflow. The North and South Prongs of Newport River are swamp streams relatively unstressed by anthropogenic impacts.

The North River is east of Newport River and drains into Back Sound. Water quality is generally high in the sound, with low nutrients and bacteria concentrations and with ample dissolved oxygen. Most inland use is agricultural and farmed by Open Ground Farms. Taylors Creek is closed to shellfishing because of the presence of the City of Beaufort's WWTP outfall.

Core Sound is located northeast of Back Sound. Water quality is considered high throughout the sound and in many of the adjacent bays and creeks.

WHITE OAK RIVER SUBBASIN 01

Description

This subbasin consists of the White Oak River and its tributaries in Onslow, Jones, Craven and Carteret counties (Figure 4). Most of this area, including its two lakes (Catfish Lake and Great Lake), lies within the US Forest Service's Croatan National Forest and North Carolina's Hoffman State Forest and is relatively undisturbed.

A significant portion of waters in this subbasin are estuarine, including the waters around Hammocks Beach State Park, the Intracoastal Waterway, Bogue Sound, much of the White Oak River, and most of Queens Creek and Bear Creek.

With the exception of the Town of Maysville, most development is on the coast near the towns of Swansboro and Cape Carteret. There are nine NPDES permitted dischargers in this subbasin. None of them are required to monitor their effluent's toxicity. The largest discharger, Swansboro WWTP, discharges 0.3 MGD into Fosters Creek.

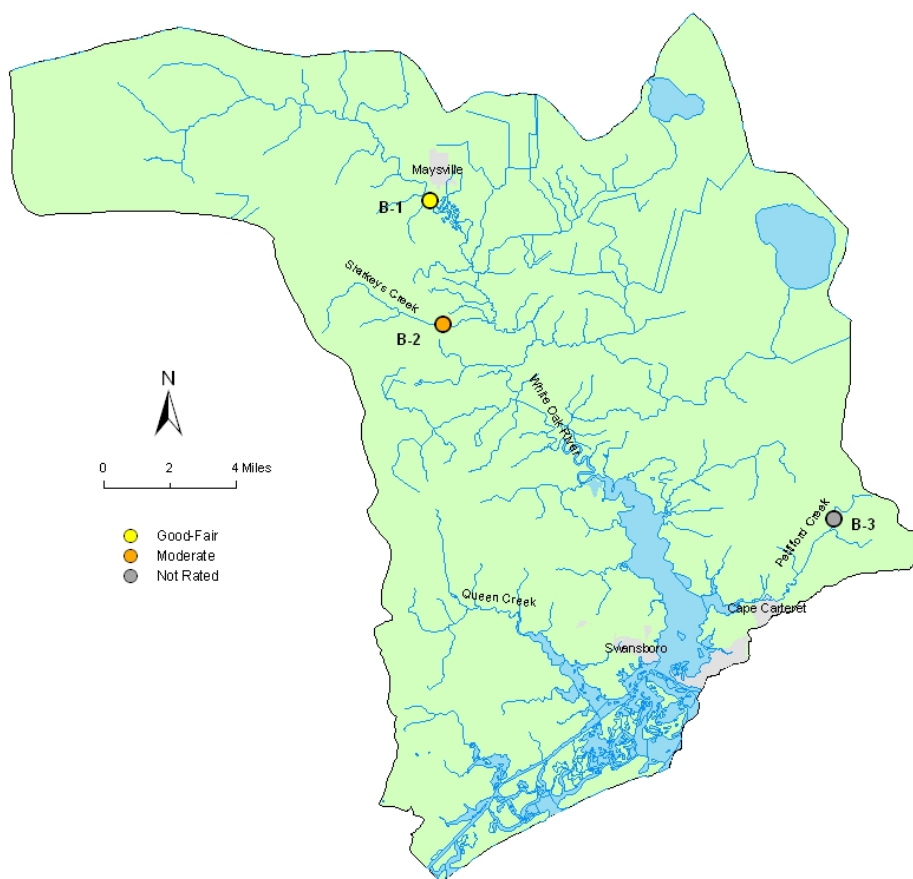


Figure WOK01. Sampling sites in Subbasin 01 of the White Oak River basin.

Overview of Water Quality

The New River from its headwaters to Grey Point (half way between Jacksonville and the Atlantic Ocean) has the supplemental classification of Nutrient Sensitive Waters. Bogue Sound and the waters between Bear Island and Hammocks Beach State Park, plus the Intracoastal Waterway are Outstanding Resource Waters. This area includes Taylor Bay, but excludes all other creeks and bays. A portion of the White Oak River between Spring Branch and Hunters Creek is High Quality Waters based on its designation as primary nursery area.

Benthic macroinvertebrate data were used to rate two streams monitored in this subbasin. The White Oak River at US 17 in Onslow County was rated Good-Fair, and Starkeys Creek was rated Moderate using swamp stream criteria. Pettiford Creek had a pH value too low to use the benthos for water quality evaluation.

Table WOK-1. Waterbodies monitored in Subbasin 01 in the White Oak River basin for basinwide assessment, 1999-2004.

Map #	Waterbody	County	Location	1999 Bioclassification	2004 Bioclassification
B-1	White Oak R	Onslow	US 17	Good-Fair	Good-Fair
B-2	Starkeys Cr	Onslow	SR 1434	Moderate	Moderate
B-3	Pettiford Cr	Carteret	Forest Service Rd	Natural	Not Rated

Tributaries on the eastern side of the White Oak River, such as Holston Creek, Hunters Creek, and Pettiford Creeks, drain the Croatan National Forest. These streams are generally low in pH and undisturbed. Tributaries on the west side of the river were more heavily developed and showed greater impacts.

Benthos Assessment

White Oak River, US 17



This site was located adjacent to a campground near Maysville in Onslow County in the upper portion of the watershed. The river was six meters wide, with a bottom substrate that was a good mix of gravel, rubble, and sand below the bridge, but very sandy upstream of the bridge. Snags and root mats also provided habitat. The pH was high (6.9) for a tannic stream. The dissolved oxygen (DO) concentration (5.1 mg/l) was higher than recorded in 1999. The conductivity was 110 μ mhos/cm and the habitat score was 56, due largely to lack of riparian vegetation.

This site was rated Good-Fair (using Coastal A benthos criteria) in both 1999 and 2004. In 2004, however, EPT taxa richness increased by 6 to 21 from the 15 found in 1999. The Biotic Index (BI) dropped from 7.07 to 6.36, which also indicates improved water quality. Total taxa richness was largely unchanged at 72 vs 74 taxa. The increased EPT taxa included two stonefly taxa, and several edge dwelling caddisfly taxa (*Oectis persimillis* and *Nectopsyche pavidus*). The leech fauna declined from 5 taxa in 1999 to none collected in 2004, which may be another indicator of higher DO levels. The mussel, *Elliptio*, was again Common at this site.

Starkeys Creek, SR 1434

This four meter wide braided swamp stream, on the west side of the White Oak River in Swamp Region P, has a drainage area of about 16 square miles. When sampled in March it had a pH value of 6.2, a conductivity value of 90 μ mhos/cm, and a high habitat score (85). Though much of the watershed is agricultural, the stream at this site had good riparian and instream habitat.



Total taxa richness dropped dramatically from 93 taxa in 1999 to only 50 taxa in 2004. EPT taxa richness also declined from 15 to 11, but EPT abundance increased slightly from 41 to 51. Both samples were given a Moderate stress rating using swamp stream criteria. The decline in EPT taxa richness was offset by an improvement in the Biotic Index value from 7.2 to 6.9. There were many changes in the taxonomic composition of the stream, but no consistent pattern was suggested by abundances within indicator taxa. Two stoneflies (*Clioptera clio* and *Perlesta*) were collected in 2004, and many taxa went from Abundant in 1999 to Rare in 2004, but others did the reverse (from Rare to Abundant).

Increases in abundance of *Stenonema modestum* and *Cheumatopsyche* and a decline in the odonate fauna from 15 taxa in 1999 to 7 in 2004 suggest that some community changes might be related to the higher flows in 2003. The decrease in midge taxa from 25 to 14 might be related to the high flows during and before sampling in 2004, as seen in the adjacent photo.

Starkeys Creek at SR 1434, Onslow County

Pettiford Creek, Forest Service Road



This six meter wide braided stream was sampled in 1998 and 1999 as a reference stream for Swamp Region P. It is located in the Croatan National Forest. This tannic stream had a substrate mainly of decomposing detritus. It has had very low pH values each time previously sampled (4.2 and 4.3), but in 2004 the pH was 3.6. New swamp criteria preclude rating a sample with such a low pH. Habitat scores were 83 in 2004, 84 in 1999, and 96 in 1998. Conductivity was very low in 2004 (52 μ mhos/cm).

The 1998 and 1999 samples were given a Natural bioclassification, and even though the 2004 sample was not rated, the community was very similar. Such low pH streams have a naturally reduced fauna. Total taxa richness in 2004 was 35, with EPT taxa richness of 10. In 1999 these values were 38 and 10. Abundant EPT taxa both years included *Eurylophella doris*, *Leptophlebia*, *Stenonema modestum* and *Pycnopsyche*. Black flies, amphipods, damselflies and lumbricid worms were also abundant.

WHITE OAK RIVER SUBBASIN 02

Description

This subbasin is on the western end of the White Oak River basin and lies entirely within Onslow County (Figure 5). It contains the New River and its tributaries plus several small coastal streams. Nearly one-half of this subbasin is estuarine, with estuarine waters in the New River reaching upstream to Jacksonville and tidal fresh waters reaching nearly to Richlands. Most of the development in this subbasin is on the New River: the Town of Richlands near the headwaters, the City of Jacksonville and the U. S. Marine Corps' Camp Lejeune in the middle reaches, and the Town of Sneads Ferry near the mouth.

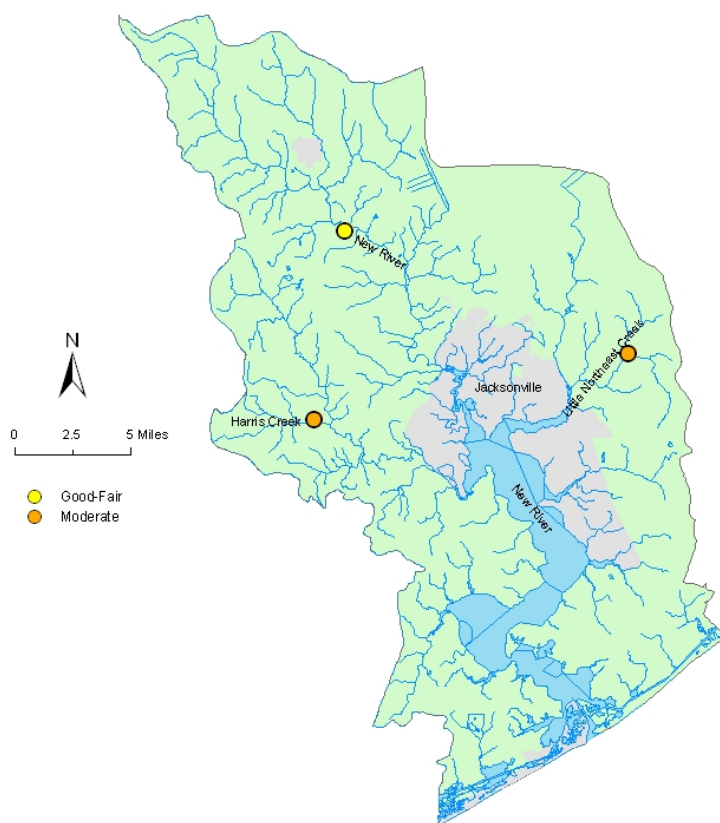


Figure WOK02. Sampling sites in Subbasin 02 of the White Oak River basin.

Overview of Water Quality

The New River at SR 1314 in Onslow County was rated Good-Fair, a rating it has had since 1990.

Table WOK-2. Waterbodies monitored in Subbasin 02 in the White Oak River basin for basinwide assessment, 1999 - 2004.

Map # ¹	Waterbody	County	Location	1999 Bioclass	2004 Bioclass
B-2	New R	Onslow	SR 1314	Good-Fair	Good-Fair
B-18	L Northeast Cr	Onslow	SR 1423	Natural	Moderate

Benthos Assessment

New River, SR 1314 near Gum Branch



This benthos site is located not quite midway down the length of the New River, and is downstream of Richlands. Stream width was nine meters and drainage area was 95 square miles. The sample location above the bridge is unusual in that there is some limestone outcropping present that provides hard substrate, but the substrate was still 70% sand. The water was tannin stained and had a pH of 6.8, after heavy rains earlier in the week. Conductivity was fairly high: 214 $\mu\text{mhos/cm}$. The habitat scored 75.

Bioclassifications were Good from 1984 to 1988. In 1990, there was a significant decline in water quality to Good-Fair, and water quality has not improved since that time. The area around Richlands is still being developed, and even though road widening impacts were thought to be the original cause of the decline, ongoing stress from urban runoff has not allowed any recovery. The 2004 sampling also resulted in a Good-Fair bioclassification. Benthic metrics are very similar between 1999 and 2004; EPT taxa richness was 11 and 13, BI was 6.4 each year. Total taxa richness increased from 53 in 1999 to 73 in 2004, despite the high flows prior to sampling. Most of that increase was in the midge and beetle fauna (11 taxa with 10 of those Common or Abundant). Dominant taxa in 2004 were amphipods, *Nectopsyche exquisita*, *Stenonema modestum*, and *Cheumatopsyche*. All these are generally pollution tolerant taxa.

Little Northeast Creek, SR 1423



This site was located above much of the suburban area of Jacksonville. The site was four meters wide with an all sand substrate when it was sampled in March. Drainage area at this location is 8.3 square miles. The habitat score of 86 indicated few habitat problems. The pH was below neutral (6.1), and conductivity was 79 $\mu\text{mhos/cm}$.

A high abundance of intolerant taxa (EPT N = 69) produced a lower biotic Index in 2004 (BI = 6.16) than in 1999, however total taxa richness dropped from 61 to 50 (caused primarily by a decrease in chironomids) and EPT taxa richness dropped from 15 to 11. This caused a change in bioclassification from Natural in 1999 to Moderate in 2004.

However, this rating was borderline; collection of two more taxa would have resulted in a Natural rating. Many of the abundant taxa were the same both years: *Baetis frondalis*, *Eurylophella doris*, *Stenonema modestum*, *Pycnopsyche*, *Gammarus*, and *Calopteryx*. This was the only stream in the White Oak River basin in 2004 where any stonefly (*Perlesta*) was abundant.

Harris Creek, SR 1109



Harris Creek was sampled approximately one kilometer above its confluence with Southwest Creek, a tributary to the New River west of Jacksonville in Onslow County. At this location the stream was five meters wide and had a drainage area of 9.5 square miles. The stream had a typical sand and silt substrate, pH was 5.7 and habitat score was 72. Conductivity (86 $\mu\text{mhos/cm}$) was about half the value found in 1999. Agriculture and forest were the main land uses in the watershed.

Unlike Little Northeast Creek, Harris Creek retained the Moderate rating found in 1999 . Even though there was improvement in the BI from 7.13 to 6.24, total taxa richness dropped from 63 to 50, while EPT taxa richness was similar in both years (13 to 11). This stream had some characteristics of a Coastal A stream, but apparently flow is reduced enough in some years to make swamp sampling most appropriate.

WHITE OAK RIVER SUBBASIN 03

Description

This subbasin lies in the center of Carteret County, extending from the U. S. Forest Service's Croatan National Forest to the Town of Beaufort and the Beaufort Inlet (Figure WOK03). Most of this subbasin is estuarine with the Newport River as the only major source of freshwater. With the exception of the Town of Newport, most of the development in this subbasin is along the coast and includes Morehead City, Beaufort, Atlantic Beach and Bogue Banks.

There are two major dischargers in this subbasin: the Newport WWTP (0.5 MGD) discharges to the Newport River and Morehead City's WWTP (3.4 MGD) discharges into Calico Creek.

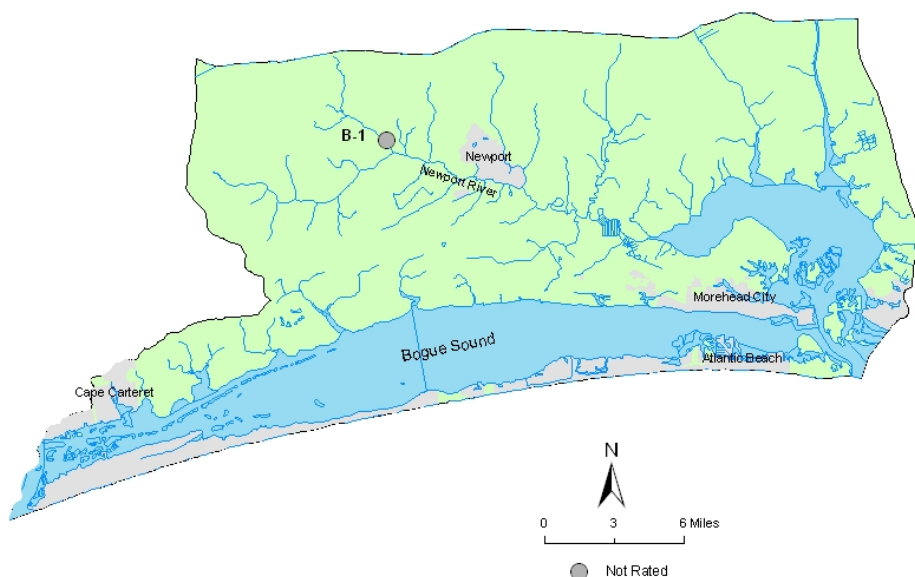


Figure WOK03. Sampling sites in Subbasin 03 of the White Oak River basin.

Overview of Water Quality

There are two Outstanding Resource Waters in this subbasin: the western half of Bogue Sound and the swamp and salt waters of the Theodore Roosevelt State Natural Area. The Division of Marine Fisheries has classified waters in this subbasin to have Fair to Good commercial fisheries value. Oyster production was considered Fair, while clam production was considered Good. Newport River was found to be the most productive area for both clams and oysters. Only Northwest Prong of Newport River was sampled

for benthos, but it was not rated due to the low pH of 3.4. Benthos communities associated with acidic conditions are generally of such low diversity that water quality evaluations are impractical.

Table WOK-3. Waterbodies monitored in Subbasin 03 in the White Oak River basin for basinwide assessment, 1999 - 2004.

Map # ¹	Waterbody	County	Location	1999 Bioclass	2004 Bioclass
B-1	NW Prong Newport R	Onslow	SR 1206	Natural	Not Rated

Benthos Assessment

Northwest Prong Newport River, SR 1206



This five meters wide swamp stream has a drainage area of 9.7 square miles. Conductivity was not elevated at 86 $\mu\text{mhos/cm}$, but pH was so low (3.4) that the benthic community could not be rated. When pH values get that low, natural stresses cannot be separated from anthropogenic stresses. The nearby watershed was forested and the instream substrate was a mix of sand and detritus with a good variety of pools.

Taxa richness was much lower in 2004 (25) than in 1999 (40). No mayflies or stoneflies were collected in 1999, but *Stenonema modestum* was abundant in 2004.

Pycnopsyche, *Cheumatopsyche* and *Hydropsyche decalda*

were abundant caddisflies in 2004. Low EPT abundance is characteristic of swamp sites with low pH, but abundance here more than doubled from 1999 to 2004. This, with the good instream habitat and low NCBI (5.89) indicate natural conditions, as was found in 1999. This site should be dropped as a benthos basin site, since it cannot be rated.

WHITE OAK RIVER SUBBASIN 04

Description

This subbasin lies to the east and north of the City of Beaufort in Carteret County. Major waterbodies in this subbasin include the North River, Jarrett Bay and Nelson Bay, plus the landward halves of Back Sound and Core Sound. Most of this subbasin is estuarine with freshwater drainage from adjacent land including Open Grounds Farm. The Town of Atlantic, at the northern end of the subbasin and Harkers Island at the south, are the two most densely developed areas within the subbasin. The two major dischargers in this subbasin are Beaufort Fisheries No. 2 (3 MGD) and Beaufort 's WWTP (1.5 MGD). Both facilities discharge into Taylors Creek.

Overview of water quality

Water quality seems to be generally high in this subbasin. Large portions of this subbasin have been classified as Outstanding Resource Waters: Core Sound and most of Back Sound, Styron Bay, Brett Bay, Oyster Creek, Jarrett Bay, Willis Creek, Fulchers Creek, Maria Creek, Fork Creek, Ditch Creek, Broad Creek, Great Creek, Howland Creek, Jump Run, Tush Creek, and Great Marsh Creek.

No sites were sampled in this subbasin as part of the basinwide monitoring program.

WHITE OAK RIVER SUBBASIN 05

Description

This subbasin includes the eastern side of Core Sound and the southern side of Back Sound in Carteret County. All of this subbasin is estuarine. The land within this subbasin, Shackleford Banks, Cape Lookout, and Core Banks, is part of the Cape Lookout National Seashore and is nearly undeveloped. The entire subbasin has been classified as Outstanding Resource Waters. There are no major dischargers in this subbasin.

Overview of water quality

Because of the high quality water in this subbasin, there are no shellfish sanitation monitoring sites in the nearly 14,000 acres of Core Sound in this subbasin and all waters are open to shellfishing. The Division of Marine Fisheries classified the shellfish fishery in Back Sound as having Good commercial value, with oyster and clam production rated Good. The commercial value of Core Sound was Good to Excellent, with clam production rated Good to Excellent and oyster production rated Fair. The extensive grass beds of *Thalassia testudinum* and *Halodule wrightii* support the state's remaining scallop fishery.

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GLOSSARY

7Q10	A value which represents the lowest average flow for a seven day period that will recur on a ten year frequency. This value is applicable at any point on a stream. 7Q10 flow (in cfs) is used to allocate the discharge of toxic substances to streams.
Bioclass	Criteria have been developed to assign bioclassifications ranging from Poor to Excellent to each benthic sample based on the number of taxa present in the intolerant groups (EPT) and the Biotic Index value.
cfs	Cubic feet per second, generally the unit in which stream flow is measured.
CHL <i>a</i>	Chlorophyll <i>a</i> .
Class C Waters	Freshwaters protected for secondary recreation, fishing, aquatic life including propagation and survival, and wildlife. All freshwaters shall be classified to protect these uses at a minimum.
Conductivity	In this report, synonymous with specific conductance and reported in the units of $\mu\text{mhos/cm}$ at 25 °C. Conductivity is a measure of the resistance of a solution to electrical flow. Resistance is reduced with increasing content of ionized salts.
Division	The North Carolina Division of Water Quality.
D.O.	Dissolved Oxygen.
Ecoregion	An area of relatively homogeneous environmental conditions, usually defined by elevation, geology, and soil type. Examples include Southern Outer Piedmont, Carolina Flatwoods, Sandhills, and Slate Belt.
EPT	The insect orders (Ephemeroptera, Plecoptera, Trichoptera); as a whole, the most intolerant insects present in the benthic community.
EPT N	The abundance of Ephemeroptera, Plecoptera, Trichoptera insects present, using values of 1 for Rare, 3 for Common and 10 for Abundant.
EPT S	Taxa richness of the insect orders Ephemeroptera, Plecoptera and Trichoptera. Higher taxa richness values are associated with better water quality.
HQW	High Quality Waters. Waters which are rated as excellent based on biological and physical/chemical characteristics through Division monitoring or special

	studies; primary nursery areas designated by the Marine Fisheries Commission; and all Class SA waters.
IWC	Instream Waste Concentration. The percentage of a stream comprised of an effluent calculated using permitted flow of the effluent and 7Q10 of the receiving stream.
Major Discharger	Greater than or equal to one million gallons per day discharge (≥ 1 MGD).
MGD	Million Gallons per Day, generally the unit in which effluent discharge flow is measured.
Minor Discharger	Less than one million gallons per day discharge (< 1 MGD).
NPDES	National Pollutant Discharge Elimination System.
NCBI (EPT BI)	North Carolina Biotic Index, EPT Biotic Index. A summary measure of the tolerance values of organisms found in the sample, relative to their abundance. Sometimes noted as the NCBI or EPT BI.
NCIBI	North Carolina Index of Biotic Integrity (NCIBI); a summary measure of the effects of factors influencing the fish community.
NSW	Nutrient Sensitive Waters. Waters subject to growths of microscopic or macroscopic vegetation requiring limitations on nutrient inputs.
NTU	Nephelometric Turbidity Unit.
ORW	Outstanding Resource Waters. Unique and special waters of exceptional state or national recreational or ecological significance which require special protection to maintain existing uses.
Parametric Coverage	A listing of parameters measured and reported.
SA Waters	Suitable for commercial shellfishing and all other tidal saltwaters uses.
SB Waters	Saltwaters protected for primary recreation which includes swimming on a frequent or organized basis and all Class SC waters.
SC Waters	Saltwaters protected for secondary recreation, fishing, aquatic life including propagation and survival, and wildlife. All saltwaters shall be classified to protect these uses at a minimum.
SOC	A consent order between an NPDES permittee and the Environmental Management Commission that specifically modifies compliance responsibility of the permittee, requiring that specified actions are taken to resolve non-compliance with permit limits.
Total S (or S)	The number of different taxa present in a benthic macroinvertebrate sample.
UT	Unnamed tributary.
WWTP	Wastewater treatment plant.

Appendix B. Benthic macroinvertebrate data, sampling methods and criteria.

Benthos Summary

Based on benthic macroinvertebrate data, water quality in the White Oak River basin is generally Good-Fair. Since 1999, 14 benthic macroinvertebrate basinwide samples have been collected with five sites receiving Moderate Bioclassifications (36%), four receiving Good-Fair bioclassifications (29%), three resulting in Natural designations (21%), and two resulting in Not Rated designations (14%). Comparisons of benthos data from 1999 to 2004 between repeat sites show that one site (Little Northeast Creek) declined in bioclassification from Natural to Moderate, while Pettiford Creek and Northwest Prong of Newport River changed from Natural to Not Rated. The changes in these two sites were due to measured pH values being less than 4.0 in 2004. Swamps with pH values less than 4.0 are currently not rateable (DENR 2003). The remaining sites in the White Oak River basin were unchanged from 1999 to 2004. Overall, water quality remains unchanged in the White Oak River basin from 1999.

Rare invertebrate taxa collected in the White Oak River basin in 2004 included the caddisflies *Oxyethira* and *Nectopsyche pavidus* (White Oak River) and the stonefly *Acroneuria mela* was also collected from the White Oak River.

Standard Qualitative (Full Scale) or EPT Methods

Benthic macroinvertebrates can be collected from wadeable, freshwater, flowing waters using two sampling procedures. The Biological Assessment Unit's standard qualitative (Full Scale) sampling procedure includes 10 composite samples: two kick-net samples, three bank sweeps, two rock or log washes, one sand sample, one leafpack sample, and visual collections from large rocks and logs (NCDENR 2003). The samples are picked on-site. The purpose of these collections is to inventory the aquatic fauna and produce an indication of relative abundance for each taxon. Organisms are classified as Rare (1 - 2 specimens), Common (3 - 9 specimens), or Abundant (≥ 10 specimens).

Benthic macroinvertebrates can also be collected using the EPT sampling procedure. Four rather than 10 composite qualitative samples are taken at each site: 1 kick, 1 sweep, 1 leafpack and visual collections. Only EPT taxa are collected and identified and only EPT criteria are used to assign a bioclassification.

Swamp Stream Method

The Biological Assessment Unit defines "swamp streams" as those streams that are within the coastal plain ecoregion and that normally have no visible flow during a part of the year. This low flow period usually occurs during the summer, but flowing water should be present in swamp streams during the winter. Sampling during winter, high flow periods provides the best opportunity for detecting differences in communities from what is natural, and only winter (February to early March) benthos data can be used when evaluating swamp streams. The swamp stream must have visible flow in this winter period, with flow comparable to a coastal plain stream that would have acceptable flow for sampling in summer. Swamp streams with pH values of 4 s.u. or lower cannot be rated, and even those below 4.5 s.u. are difficult to evaluate.

The swamp sampling method utilizes a variety of collection techniques to inventory the macroinvertebrate fauna. Nine sweep samples (1 series of 3 by each field team member) are collected from each of the following habitats: macrophytes, root mats/undercut banks, and detritus. If one of these habitat types is not present, a sweep from one of the other habitats is substituted. A sweep is defined as the area that can be reached from a given standing location. Each sweep should be emptied into a tub before the next sweep is collected, to prevent clogging of the net, but all three sweeps can be combined in the same tub. Three log/debris washes are also collected. Visual collections are the final technique used at each site.

Habitat Evaluation

An assessment form has been developed by the Biological Assessment Unit to better evaluate the physical habitat of a stream. The habitat score, which ranges between 1 and 100, is based on the evaluation of channel modification, amount of instream habitat, type of bottom substrate, pool variety, bank stability, light penetration, and riparian zone width. Higher numbers suggest better habitat quality, but no criteria have been developed to assign impairment ratings.

Data Analysis

Criteria for bioclassifications for standard qualitative samples are given below and are based on EPT S and the NCBI.

Criteria for Standard Qualitative (Full Scale) samples.

Score	BI Values	EPT Values
	Coastal Plain (CA)	Coastal Plain (CA)
5	< 5.42	> 28
4.6	5.42 - 5.46	28
4.4	5.47 - 5.51	27
4	5.52 - 6.00	22 - 26
3.6	6.01 - 6.05	21
3.4	6.06 - 6.10	20
3	6.11 - 6.67	15 - 19
2.6	6.68 - 6.72	14
2.4	6.73 - 6.77	13
2	6.78 - 7.68	8 - 12
1.6	7.69 - 7.73	7
1.4	7.74 - 7.79	6
1	> 7.79	≤ 5

Tolerance values for individual species and biotic index values have a range of 0 - 10, with higher numbers indicating more tolerant species or more polluted conditions. Water quality scores (5 = Excellent, 4 = Good, 3 = Good-Fair, 2 = Fair and 1 = Poor) assigned with the biotic index numbers are averaged with EPT taxa richness scores to produce a final bioclassification. Criteria for piedmont and coastal plain streams are used for the Cape Fear River basin. EPT abundance and Total taxa richness calculations also are used to help examine between-site differences in water quality.

EPT S and BI values can be affected by seasonal changes. DWQ criteria for assigning bioclassification are based on summer sampling: June - September. For samples collected outside summer, EPT S can be adjusted by subtracting out winter/spring Plecoptera or other adjustment based on resampling of summer site. The BI values also are seasonally adjusted for samples outside the summer season.

Swamp Stream Criteria

Swamp stream criteria evaluate a stream based on three benthic macroinvertebrate metrics (Total taxa richness, EPT taxa richness, and Biotic Index) and the coastal plain form habitat value. The values for each of these metrics is used to derive a score for each metric, using the tables and graphs below. There are only three possible scores for each metric. A score of 5 is assigned if the metric value falls within the range for Natural, a score of 3 is assigned to values in the range for Moderate and a score of 1 is assigned to values in the range given for Severe. The final site score is derived by the formula:

$$\text{Site Score} = [(2 \times \text{BI score} + \text{Habitat Score} + \text{EPT S score} + \text{Taxa Richness Score}) - 5] / 2$$

Stress ratings based on the scores are: **Natural** (9 - 10), **Moderate** (4 - 8) and **Severe** (1 - 3).

Table B-1. Benthic macroinvertebrate basinwide monitoring data collected in the White Oak River basin, 1999-2004. No other data were collected during this basinwide cycle.

Waterbody	Location	County	Map No.	Index No.	Date	ST	EPTS	BI	BIEPT	BioClass
Subbasin 01										
White Oak R	US 17	Jones	B-1	20-(1)	6/04	72	21	6.36	5.38	Good-Fair
					7/99	70	15	7.07	6.16	Good-Fair
					2/99	61	11	7.11	5.83	Not Rated
Starkeys Cr	SR 1434	Onslow	B-2	20-10	3/04	50	11	6.24	-	Moderate
					2/99	93	15	7.27	-	Moderate
Pettiford Cr	USFS Rd	Carteret	B-3	20-29-1	3/04	35	10	6.13	-	Not Rated
					2/99	38	10	6.38	-	Natural
Subbasin 02										
New R	SR 1314	Onslow	B-1	19-(1)	6/04	76	13	6.39	5.72	Good-Fair
					7/99	53	11	6.40	6.08	Good-Fair
L Northeast Cr	SR 1423	Onslow	B-2	19-16-2	3/04	50	11	6.16	-	Moderate
					2/99	62	15	6.61	-	Natural
Harris Cr	SR 1109	Onslow	B-3	19-17-3	3/04	50	11	6.24	-	Moderate
					2/99	63	13	7.13	-	Natural
Subbasin 03										
NW Pr Newport R	SR 1206	Carteret	B-1	21-2	3/04	25	6	5.89	-	Not Rated
					2/99	40	6	6.53	-	Natural

Appendix F. Fish Kills Summary

The Division of Water Quality has systematically monitored and reported fish kill events across the state since 1996. From 1999 to 2004, field investigators reported nine kill events in the White Oak River basin. Most events occurred in estuarine waters. Fish kills occurred on the New River and Northeast Creek from Jacksonville to Gray Point. Additional kill events were also reported in the White Oak River, Pasture Branch, Taylor's Creek near Beaufort, and Core Sound. Mortality estimates ranged from 30 to more than 160,000 fish per event.

The most significant event to occur during the basin cycle was reported from Taylor's Creek near Beaufort. During December 2001 investigators observed dead and dying fish in the creek adjacent to the Beaufort waterfront. The majority of fish were reported as juvenile pinfish with a few juvenile flounder and mullet. Dead and dying spot, mullet, and flounder were also observed at the public boat ramp near Beaufort Fisheries. Investigators reported an oil sheen on the surface along with organic material. Beaufort Fisheries was subsequently investigated for an illegal discharge. Numerous leaks from the menhaden holding vats were discovered upon investigation of the plant. The leaking material, consisting of fish oil, fats, and blood emitted a large plume into Taylor's Creek. Water samples were taken from above and below the Beaufort Fisheries plant. After counts were made it was estimated that 161,783 fish were killed.

LAKE & RESERVOIR ASSESSMENTS – White Oak River Basin



***Great Lake –
Carteret County***

Assessment Overview

Catfish and Great Lakes were sampled in the White Oak River Basin by DWQ in June, July, and August 2004. Both natural lakes are located within the Croatan National Forest in Carteret County. Because of dystrophic conditions present in these lakes (low pH and tannin-stained water), calculation of the trophic state was not appropriate. The following section presents background information and provides an assessment of conditions in the two lakes.

Subbasin 030501

Catfish and Great Lakes exhibited increases in total phosphorus and total Kjeldahl nitrogen concentrations in 2004 as compared with 1994. In 1994, mean total phosphorus for Catfish Lake was 0.02 mg/L and increased to a mean value of 0.05 mg/L in 2004. Great Lake exhibited a similar increase in total phosphorus from a mean value of 0.03 mg/L in 1994 to 0.06 mg/L in 2004. Mean total Kjeldahl nitrogen for Catfish Lake in 1994 was 0.50 mg/L and 0.63 mg/L in 2004. Great Lake exhibited an increase in mean total Kjeldahl nitrogen from 0.45 mg/L in 1994 to 0.58 mg/L in 2004. These increases in mean nutrient concentrations were likely due to rainfall shortly before each sampling event in 2004 which increased both runoff from the surrounding forested wetlands and suspension of organic material from the bottom of the lakes into the water column. Secchi depths also exhibited a decrease, particularly in July when Secchi depth was 0.1 m, in response to these rain events. Secchi depth was 1.0 m in August.

LAKES ASSESSMENT – WHITE OAK RIVER BASIN

Subbasin		030501	
Waterbody		Catfish Lake	Great Lake
Classification		C	C
Trophic Status (NC TSI)		Dystrophic	Dystrophic
Mean Depth (meters)		1.5	1.0
Volume (10 ⁶ m ³)		0.6	1.2
Watershed Area (mi ²)		15.4	-
Sampling Dates		06/04 – 09/04	06/04– 08/04
Number of Samples (click here to see data)		n = 6	n = 6
Water Quality Standards			
Chlorophyll a	>10% above standard (N>9) = Y; exceeding 40 ug/L but not 10% of time = C	NE	NE
Dissolved Oxygen	Below standard >10% of samples (N>9)	NE	NE
pH	Below or above standard >10% of samples (N>9)	NE	NE
Turbidity	>10% above standard (N>9)	NE	E (see text)
Temperature	Minor and infrequent excursions of temperature standards due to anthropogenic activity. No impairment of species evident. (N>9)	NE	NE
Metals (excluding copper, iron & zinc)	>10% above standard (N>9)	NE	NE
Other Data			
% Saturation DO	>10% above >120%	N	N
Algae	Documented blooms during 2 or more sampling events in 1 year with historic blooms	N	N
Fish	Kills related to eutrophication	N	N
Chemically/ Biologically Treated	For algal or macrophyte control - either chemicals or biologically by fish, etc.	N	N
Aesthetics complaints	Documented sheens, discoloration, etc. - written complaint and follow-up by a state	N	N
TSI	Increase of 2 trophic levels from one 5-yr period to next	N	N
Historic DWQ Data	Conclusions from other reports (link to other reports)	N	N
AGPT	Algal Growth Potential Test 5-9 mg/L = C 10 mg/L or more = P	NS	NS
Macrophytes	Limiting access to public ramps, docks, swimming areas; reducing access by fish and other aquatic life to habitat	N	N
Taste and Odor	Public complaints = P; Potential based on algal spp = C	N	N
Sediments	Clogging intakes – dredging program necessary = P Public/agency complaints – visual	N	N

Note: C = of notable Concern or productive P= Problematic or highly productive
E = parameter is Exceeded, but in less than 10 percent of the measurements
N = Not a concern NS = No sample taken for this parameter
NE = Not exceeded but insufficient samples to rate as N

Turbidity in Great Lake was greater than the state water quality standard of 25 NTU in 2004. Again, this was most likely the result of the suspension of particulate detritus from the lake bottom due to storm wind mixing. Neither lake exhibited elevated chlorophyll a values in 2004 in response to increases in nutrients. This lack of increase in chlorophyll a values is expected due to the natural light limitation associated with dystrophic lakes.

Catfish and Great Lakes continue to support their designated use for aquatic life in 2004. For further background information on these lakes (including sampling data), please go to <http://www.esb.enr.state.nc.us/>.

Assessment Methodology

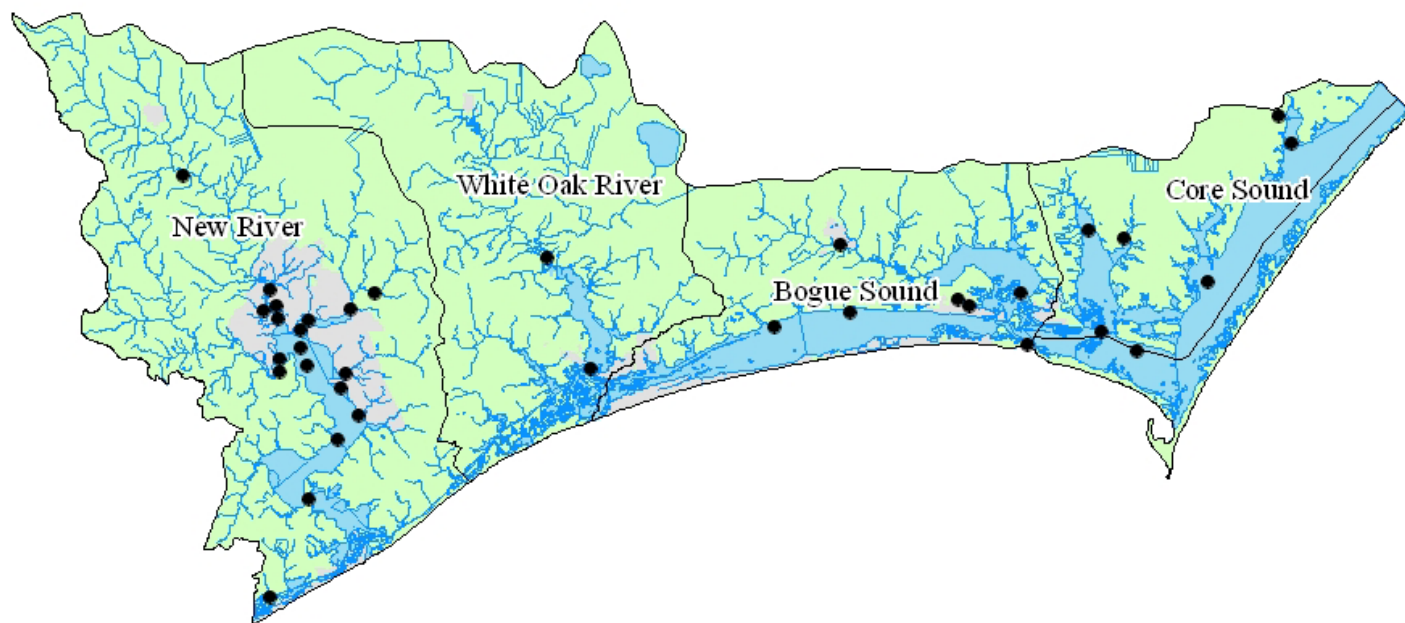
Like streams, lakes are classified for a variety of uses. Most of the lakes monitored as part of North Carolina's Ambient Lakes Monitoring Program are classified for recreation (B & SB) and water supply (WS-I through WS-V). The surface water quality numeric standard specifically associated with recreation is fecal coliform. For water supplies, there are 29 numeric standards based on consumption of water and fish. Narrative standards for B and WS classifications include aesthetics such as no odors and no untreated wastes. There are other numeric standards that also apply to lakes under protection of aquatic life and human health. These standards also apply to all other waters of the state and are listed under the Class C rules.

When possible, lake use support evaluations are made similar to free-flowing waters. Parameters with sufficient (10 or more observations), quality-assured, surface water quality data will be compared to surface water quality standards. However, for nutrient enrichment - one of the main causes of impacts to lakes and reservoirs, a more holistic or weight of evidence approach is necessary since nutrient impacts are not always reflected by the parameters sampled. For instance, some lakes have taste and odor problems associated with particular algal species, yet these lakes do not have chlorophyll a concentrations above 40 ug/L frequently enough to impair them based on the standard.

In addition to being moderated by biological factors, environmental factors such as climate, hydrology and morphology can impact whether nutrient loading results in loss of uses. Shorter retention times (less than 14 days) prevent excessive growth of algae even in the presence of elevated nutrients. Therefore, just measuring standard water quality parameters such as chlorophyll a and nutrients may not give an accurate picture of lake water quality. Where exceedances of surface water quality standards are not sufficient to impair a lake, the weight of evidence approach can take into consideration indicators and parameters not in the standards to allow a sounder determination of water quality.

The following sources of information are used in determining lake use support through the weight of evidence approach:

- Quantitative water quality parameters - dissolved oxygen, chlorophyll a, pH, etc.
- Algal bloom reports
- Fish kill reports
- Third party reports – citizens, water treatment plant operators, State agencies, etc. – including taste, odor, sheens, odd colors, and other aesthetic and safety conditions.



White Oak River Basin Ambient Monitoring System Report

September 1, 1999 through August 31, 2004



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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 evaluated 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 constructing lists of impaired waters under the Clean Water Act's requirements for 303(d) listings. The reader is advised to review the states 303(d) listing methodology for this purpose. (see http://h2o.enr.state.nc.us/tmdl/General_303d.htm).

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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 (September 1, 1999 through August 31, 2004) chemical and physical measurements were obtained by DWQ from 35 stations located throughout the White Oak River Basin.

In order to confidently evaluate acceptable water quality criteria at least 10 observations are desired. If at least 10 results were collected for a given site for a given parameter, the results are then compared to water quality evaluation levels. The water quality evaluation level may be an ecological evaluation level, a narrative or numeric standard, or an action level as specified in 15A NCAC 2B .0200 (Table 3). 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 evaluation level, a binomial statistical test was employed to determine if there was sufficient statistical confidence (95% confidence) to conclude that the results statistically exceed the 10% criteria. When that is found to be true, it is 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, box plots, scatter plots, and maps. For complete data on each station, reference the AMS Station Summary Sheets located in Appendix A.

All data were collected between September 1, 1999 and August 31, 2004. Stations with SSEs were found for dissolved oxygen (four sites), fecal coliform (four sites), pH, turbidity, chlorophyll *a* (three sites each, and copper (one site), and water temperature (one site). For all parameters, 19 additional 10 percent violations that were not SSEs also occurred.

A special study was initiated in 1998 in the New River. This phytoplankton monitoring study indicated that overall water quality conditions have improved since 1986. Ambient data from 1999 to 2004 indicate that while the New River has improved, it is still impacted. While long-term trends indicate that water quality in the New River has improved, short term (1999-2004) trends indicate that at some stations (see Figures 27 and 28), nutrient concentrations have begun to increase.

During 2004-2005 DWQ conducted a special study in Calico Creek, focusing particularly on fecal coliform counts. Based on the excessive number of exceedances of fecal coliform standard, DWQ recommends that Calico Creek be added to the Impaired Waters list.

The following table gives a summary of the problem areas located in the basin.

Table 1. Violations and Areas of Concern in the White Oak River Basin

Subbasin/ Station ID	Location	Class	Parameter/Evaluation Level	% Exceedance	% Confidence
1	White OakRiver				
P6400000	White Oak R at SR 1442 near Stella	SA HWQ	Dissolved Oxygen (<5)	28.1%	100%
			pH (<6.8 only)	35.1%	100%
			Fecal Coliform (>10%>43)	47%*	100%
			Fecal Coliform (median>14)	Median: 41*	
2	New River				
P0600000	New R at SR 1314 near Gum Branch	C NSW	Total Iron (>1000)	10.7%	69%
P1200000	New R at US 17 at Jacksonville	SB HWQ NSW	Dissolved Oxygen (<5)	12.3%	79%
			pH (<6.8 and >8.5)	10.5%	66%
			Chlorophyll a (corrected) (>40)	15.4%	91%
			Total Copper (>3)	21.4%	98%
P2105000	Brinson Cr at mouth at Jacksonville	SC NSW	ph (>8.5 only)	10.7%	67%
			Chlorophyll a (corrected) (>40)	29.7%	100%
			Total Copper (>3)	18.8%	93%
P2113000	New R at Wilson Bay at Center Point	SC HQW NSW	Chlorophyll a (corrected) (>40)	22.9%	99%
P3100000	Little Northeast Cr at SR 1406 near Jacksonville	C NSW	Dissolved Oxygen (<4)	20.0%	99%
			Total Iron (>1000)	35.7%	100%
P3700000	Northeast Cr at NC 24 at Jacksonville	SC HQW NSW	pH (<6.8 only)	10.5%	66%
			Chlorophyll a (corrected) (>40)	18.4%	97%
P4100000	Southwest Cr at the Narrows	C HQW NSW	Total Copper (>3)	12.5%	79%
			Total Iron (>1000)	26.7%	99%
			Total Zinc (>50)	12.5%	79%
P9860000	ICW at NC 210 near Goose Bay	SA ORW	Dissolved Oxygen (<5)	12.9%	81%
3	Newport River & Coastal Drainages				
P7300000	Newport R at SR 1247 at Newport	C	Dissolved Oxygen (<4)	23.2%	100%
			ph (<6)	26.8%	100%
			Total Iron (>1000)	51.9%	100%
P8700000	Newport R at channel marker G1 at Newport Marshes	SA HQW	Total Copper (>3)	13.3%	82%
P8750000	Calico Cr at SR 1243 at Morehead City	SC HQW	Fecal Coliform (>20%>400)	86.2%**	100%
			Fecal Coliform (Geomean>200)	Geomean: 1,344**	
			Turbidity (>25)	39.1%	100%
P8800000	Calico Cr at SR 1176 at Morehead City	SC HQW	Dissolved Oxygen (<5)	17.4%	93%
			Fecal Coliform (>20%>400)	30%**	94%
			Turbidity (>25)	34.8%	100%
4	North River & Coastal Drainages				
P8975000	North R at US 70 near Bettie	SA HQW	Fecal Coliform (>10%>43)	17.9%*	98%
			Turbidity (>25)	19.3%	99%
P8976000	Ward Cr at US 70 near Otway	SA HQW	Fecal Coliform (>10%>43)	24.6%*	100%
			Fecal Coliform (median>14)	Median: 16*	
P8978000	Broad Cr at US 70 near Masontown	SC	Dissolved Oxygen (<5)	28.6%	100%
			pH (<6.8)	26.8%	100%

Blue entries indicate violations of standards. Black entries indicate violations of action levels or evaluation levels.

* The percentages, geomeans, and medians given are for the 5-year monitoring period, which does not meet the requirements of the fecal coliform standard. We recommend that intensive sampling be done for these sites

** Violations of the fecal coliform standard have occurred at these sites. Refer to the Calico Creek section of the report for details.

INTRODUCTION

The DWQ's Ambient Monitoring System 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. Currently the DWQ does not conduct probabilistic (random) monitoring.

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. Parametric coverage is 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 action levels is presented. A 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://h2o.enr.state.nc.us/csu/swstdsfaq.html>.

Water quality data are evaluated in five year periods. Some stations have little or no data for several parameters over the period. However, for the purpose of standardization, data summaries for each station are included in this report.

Table 2. Parametric coverage for the Ambient Monitoring System.¹

Parameter	All Waters	Water Supply
Dissolved oxygen (s)	✓	✓
pH (s)	✓	✓
Specific conductance	✓	✓
Temperature (s)	✓	✓
Total phosphorus ²	✓	✓
Ammonia as N ²	✓	✓
Total Kjeldahl as N ²	✓	✓
Nitrate+nitrite as N ² (s)	✓	✓
Total suspended solids	✓	✓
Turbidity (s)	✓	✓
Fecal coliform bacteria (s)	✓	✓
Aluminum	✓	✓
Arsenic (s)	✓	✓
Cadmium (s)	✓	✓
Chromium, total (s)	✓	✓
Copper, total (s)	✓	✓
Iron (s)	✓	✓
Lead (s)	✓	✓
Mercury (s)	✓	✓
Nickel (s)	✓	✓
Zinc (s)	✓	✓
Manganese (s)	---	✓
Chlorophyll <i>a</i> ² (s)	✓	✓

¹A check (✓) indicates the parameter is collected and an 's' indicates the parameter has a standard or action level.

²Chlorophyll *a* is collected in Nutrient Sensitive Waters (NSW) and some coastal areas. Since 2001, nutrient sampling likewise is only done in areas of concern, such as NSW, estuaries, and areas with known enrichment issues.

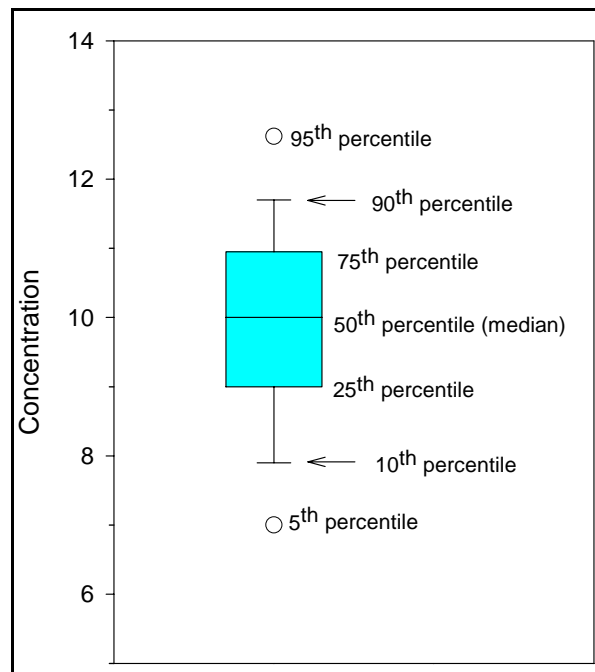


Figure 1. Explanation of box plots.

Table 3. Selected water quality standards for parameters sampled as part of the Ambient Monitoring System.¹

Parameter (µg/L, unless noted)	Standards for All Freshwater			Standards to Support Additional Uses		
	Aquatic Life	Human Health	Water Supply Classifications	Trout Water	HQW	Swamp Waters
Arsenic		10				
Cadmium	2.0			0.4		
Chloride (mg/l)	230 ²		250			
Chlorophyll a (corrected)	40 ³			15 ³		
Chromium, total	50					
Coliform, total (MFTCC/100 ml) ⁴			50 ³ (WS-I only)			
Coliform, fecal (MFFCC/100 ml) ⁵		200 ³				
Copper, total	7 ²					
Dissolved oxygen (mg/L)	5.0 ^{6,7}			6.0		3, 7
Hardness, total (mg/L)			100			
Iron	1,000 ²					
Lead	25 ³					
Manganese			200			
Mercury	0.012					
Nickel	88		25			
Nitrate nitrogen			10,000			
pH (units)	6.0 - 9.0 ^{3,7}					3, 7
Solids, total suspended (mg/L)					10 Trout, 20 other ⁸	
Turbidity (NTU)	50, 25 ³			10 ³		
Zinc	50 ²					

¹Standards 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. April 1, 2001).

²Action level.

³Refer to 2B.0211 for narrative description of limits.

⁴Membrane filter total coliform count per 100 ml of sample.

⁵Membrane filter fecal coliform count per 100 ml of sample.

⁶An instantaneous reading may be as low as 4.0 mg/L, but the daily average must be 5.0 mg/L or more.

⁷Designated 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.

⁸For 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
Arsenic		10			
Cadmium	5.0				
Chlorophyll a (corrected)	40 ³				
Chromium, total	20				
Coliform, fecal (MFFCC/100ml) ⁴		200 ³	14 ³		
Copper, total	3 ⁵				
Dissolved oxygen (mg/L)	5.0 ⁹			6.0	3, 6
Lead	25 ³				
Mercury	0.025				
Nickel	8.3				
PH (units)	6.8 - 8.5 ⁶				3, 6
Selenium	71				
Silver	0.1 ⁵				
Solids, total suspended (mg/L)				10 PNA ⁷ , 20 other ⁸	
Turbidity (NTU)	25 ³				
Zinc	86 ⁵				

¹Standards are based on consumption of fish only unless dermal contact studies are available, see 2B.0208 for equation.

²Class SA = shellfishing waters, see 2B.0101 for description.

³See 2B.0220 for narrative description of limits.

⁴MFFCC/100ml means membrane filter fecal coliform count per 100 ml of sample.

⁵Values represent action levels as specified in 2B.0220.

⁶Designated 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.

⁷PNA = Primary Nursery Areas.

⁸For effluent limits only, see 2B.0224.

⁹Swamp waters, poorly flushed tidally influenced streams, or embayments, or estuarine bottom waters may have lower values if caused by natural conditions.

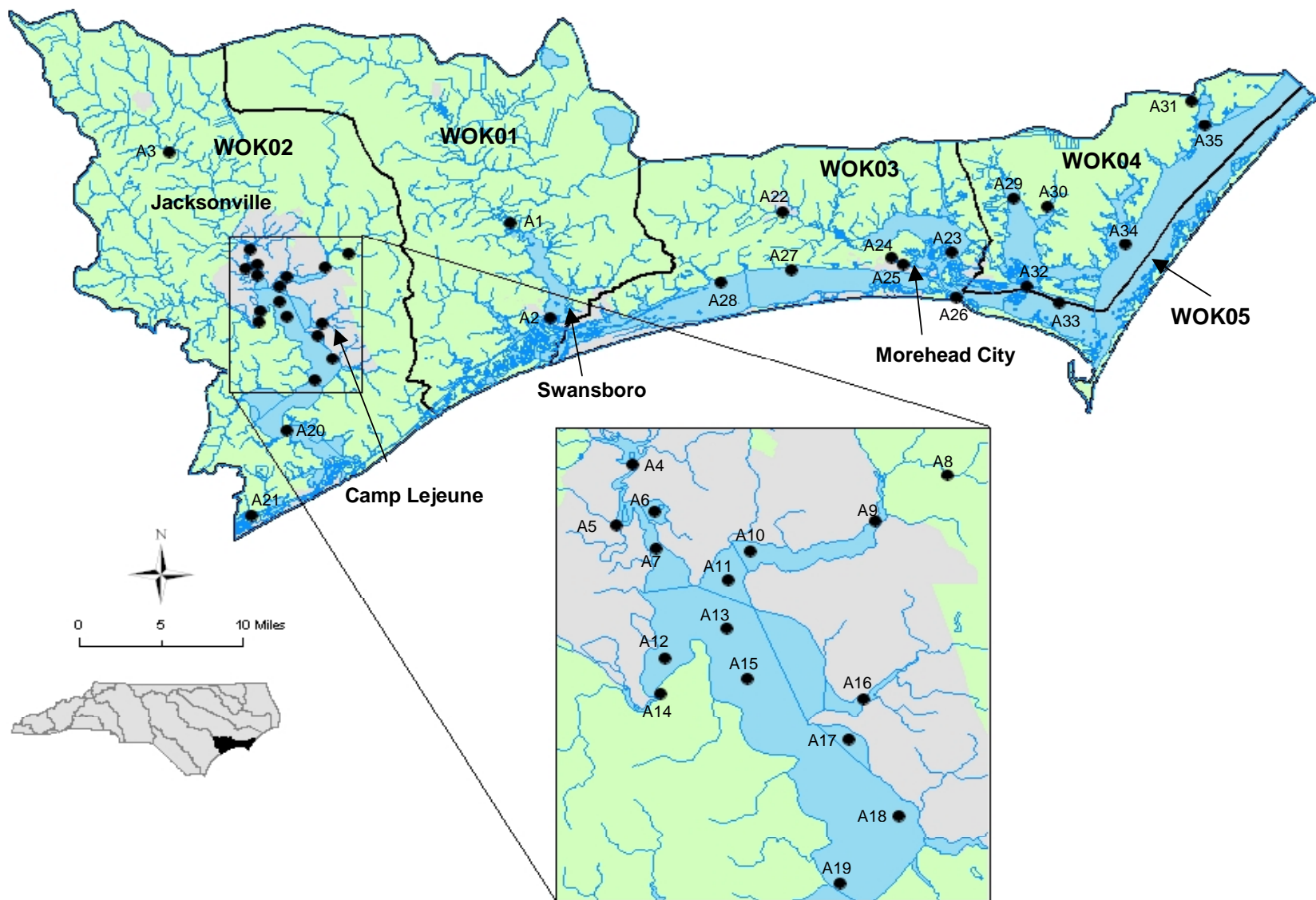


Figure 2. DWQ's Ambient Monitoring System within the White Oak River Basin.

Table 4. Monitoring stations in the White Oak River Basin, 1999 - 2004.

Subbasin/ Station ID	Location	Class	Lat.	Long.	County	Map ID
01	White Oak River					
P6400000	White Oak R at SR 1442 near Stella	SA HQW	34.77486	-77.15383	Onslow	A1
P6850000	White Oak R at NC 24 at Swansboro	SA HQW	34.68271	-77.11291	Onslow	A2
02	New River					
P0600000	New R at SR 1314 near Gum Branch	C NSW	34.84897	-77.51961	Onslow	A3
P1200000	New R at US 17 at Jacksonville	SB HQW NSW	34.75304	-77.43433	Onslow	A4
P2105000	Brinson Cr at mouth at Jacksonville	SC NSW	34.73475	-77.44025	Onslow	A5
P2113000	New R at Wilson Bay at center point	SC HQW NSW	34.73854	-77.42746	Onslow	A6
P2210000	New R at channel marker 55 at Jacksonville	SC HQW NSW	34.72783	-77.42696	Onslow	A7
P3100000	Little Northeast Cr at SR 1406 near Jacksonville	C NSW	34.74835	-77.32925	Onslow	A8
P3700000	Northeast Cr at NC 24 at Jacksonville	SC HQW NSW	34.73479	-77.35358	Onslow	A9
P3960000	Northeast Cr above Paradise Point ¹	SC HQW NSW	34.72639	-77.39556	Onslow	A10
P4000000	Northeast Cr (above Paradise Point) near Jacksonville ²	SC NSW	34.718	-77.40300	Onslow	A11
P4075000	Southwest Cr at channel marker R2 near Camp Lejeune	C HWQ NSW	34.69467	-77.42463	Onslow	A12
P4087500	New R at channel marker 50 near Ragged Point ³	SC NSW	34.70317	-77.40405	Onslow	A13
P4100000	Southwest Cr at the narrows	C HQW NSW	34.68399	-77.42621	Onslow	A14
P4200000	New R at channel marker 47 at Morgan Bay	SC NSW	34.68839	-77.39716	Onslow	A15
P4400000	Wallace Cr at Main Service Road at Camp Lejeune	SB NSW	34.68172	-77.35857	Onslow	A16
P4570000	New R at channel marker 43 at Town Point	SC NSW	34.66959	-77.36359	Onslow	A17
P4600000	New R upstream of Frenchs Creek	SC NSW	34.64669	-77.34756	Onslow	A18
P4700000	New R at channel marker 37 near Grey Point	SC NSW	34.62658	-77.36771	Onslow	A19
P4750000	New R at NC 172 near Sneads Ferry	SA HQW	34.57847	-77.39893	Onslow	A20
P9860000	Intracoastal Waterway at NC 210 near Goose Bay	SA ORW	34.49724	-77.43887	Onslow	A21
03	Newport River & Coastal Drainages					
P7300000	Newport R at SR 1247 at Newport	C	34.78054	-76.85971	Carteret	A22
P8700000	Newport R at channel marker G1 at Newport Marshes	SA HWQ	34.73793	-76.67825	Carteret	A23
P8750000	Calico Cr at SR 1243 at Morehead City ⁴	SC HQW	34.73383	-76.74269	Carteret	A24
P8800000	Calico Cr at SR 1176 at Morehead City ⁴	SC HQW	34.728	-76.73100	Carteret	A25
P8965500	Morehead City Harbor at channel marker G17 near Morehead City	SA HQW	34.69518	-76.67389	Carteret	A26
P9580000	Bogue Sound at channel marker G15 near Salter Path	SA HQW	34.72414	-76.85134	Carteret	A27
P9600000	Bogue Sound at channel marker R24 at Emerald Isle	SA ORW	34.71449	-76.92773	Carteret	A28
04	North River & Coastal Drainages					
P8975000	North R at US 70 near Bettie	SA HQW	34.78901	-76.61005	Carteret	A29
P8976000	Ward Cr at US 70 near Otway	SA HQW	34.78086	-76.57383	Carteret	A30
P8978000	Broad Cr at US 70 near Masontown	SC	34.8798	-76.41476	Carteret	A31
P8990000	North River at channel marker 56 near Beaufort	SA HQW	34.70372	-76.59821	Carteret	A32
P9720000	Back Sound at channel marker G3 at Harkers Island	SA ORW	34.68744	-76.56354	Carteret	A33
P9730000	Core Sound at channel marker R36 near Jarrett Bay	SA ORW	34.74249	-76.49079	Carteret	A34
P9740000	Core Sound at channel marker G1 mouth of Nelson Bay	SA ORW	34.85596	-76.40208	Carteret	A35

¹Sample collection at station P3960000 began on 5/25/00 and ceased on 6/17/02.

²Sample collection at station P4000000 ceased on 4/19/00.

³Sample collection at station P4087500 began on 8/28/00 and ceased on 10/16/00.

⁴Sample collection at stations P8750000 and P8800000 began on 9/26/02.

DATA ASSESSMENT AND INTERPRETATION

Monitoring and sampling results considered in this report represent samples collected or measurements taken at less than one-meter depth.

Percentile statistics were calculated for most of the data using JMP statistical software (version 5.01; SAS Institute, Cary, NC). Values less than the minimum reporting level (non-detects) were evaluated as equal to the reporting level. Box and whisker plots (constructed using SigmaPlot version 8.02) and maps are presented for most water quality parameters collected at each monitoring station. Significant trends in water quality parameters (constructed using Microsoft Excel) are illustrated as scatterplots. Significant trends are found by assessing the probability that the linear model explains the data no better than chance. If that chance is 5% or less (an observed significance probability of 0.05 or less) then that is considered evidence of a regression effect in this document. The strength of the regression effect is given as an r^2 value, the portion of the data that is explained by the linear model.

Analytical Considerations

Two issues were noted by the DWQ Laboratory Section as part of the analytical processes during this assessment period:

- 1) Between February and April 2001, improved analytical techniques and protocols for nutrient samples were implemented. No nutrient samples were processed during the period when the techniques and protocols were being implemented.
- 2) In early 2001 the Laboratory Section reviewed their internal QA/QC programs and some of the analytical methods. This effort resulted in a temporary increase in reporting levels for certain parameters. New analytical equipment and methods were subsequently acquired to establish more accurate reporting levels and rigorous quality assurance. Because of the improvements, the reporting levels quickly declined back down to or near the previous reporting levels. Nutrients were especially affected by these changes (Table 5).

Table 5. Changes in the Laboratory Section's reporting levels for nutrients.

Reporting Level By Date (mg/l)				
Parameter	Pre-2001	3/13/2001 to 3/29/2001	3/30/2001 to 7/24/2001	7/25/2001 to present
NH ₃	0.01	0.5	0.2	0.01
TKN	0.1	1.0	0.6	0.20
NO ₂ +NO ₃	0.01	0.5	0.15	0.01
TP	0.01	0.5	0.1	0.02

Providing Confidence in the Exceedances of Water Quality Standards

NC DWQ uses guidance provided by the US EPA for determining when the number of results that exceed a water quality standard indicate potential water quality issues. Historically, the US EPA has suggested that management actions be implemented when 10 percent of the results exceeded a water quality standard. This interpretation is the same whether 1 out of 10, or 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.

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 a 1 exceedance out of 10 (73 percent) than when there are 3 exceedances out of 10 (93 percent confidence (Table 6).

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

Note: Bold entries indicate that there is at least 95% confidence that at least 10% of the possible samples exceed the standard/action level.

Methods Used to Summarize Results

Methods used to summarize the results in this report encompass both tabular and graphical 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 action 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 most details on a station-by-station basis. They are included as an appendix to this report.

Use Support Assessment Considerations

- 1) The dissolved freshwater oxygen concentrations of 5.0 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" (15A NCAC 2B.0200).
- 2) Action levels (copper, iron, and zinc) are used primarily as evaluation guidelines because results include fractions that may have little effect on aquatic life. Where appropriate, follow-up toxicological work will need to be conducted before use support determination can be made for these parameters.
- 3) The geometric mean and median statistics 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 (August 1, 2004).

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 [see, for example: 15A NCAC 02B.0211(1)(b) and 15A NCAC 02B.0220 (1)(b)] but generally results less than 4.0 mg/L can be problematic. Consistent patterns of low concentrations of dissolved oxygen can be subject to intense management review and corrective actions, although patterns of low dissolved oxygen can occur naturally in and near swamp waters.

pH

The pH of natural waters can vary throughout the state. Low values (< 7.0 s.u.) can be found in waters rich in dissolved organic matter, such as swamp lands, whereas high values (> 7.0 s.u.) may be found during algal blooms. Point source dischargers can also influence the pH of a stream. The measurement of pH is relatively easy; however the accuracy of field measurements is limited by the abilities of the field equipment, which is accurate to within 0.2 S.U. This is due, in part, because the scale for measuring pH is logarithmic (i.e. a pH of 8 is ten times less concentrated in hydrogen ions than a pH of 7).

The water quality standards for pH in freshwaters consider values less than 6.0 s.u. or greater than 9.0 s.u. to warrant attention; whereas in salt waters pH values less than 6.8 or greater than 8.5 warrant attention.

Conductivity

In this report, conductivity is synonymous with specific conductance. It is reported in micromhos per centimeter ($\mu\text{mhos/cm}$) at 25°C. Conductivity is a measure of the ability of water to conduct an electric

current. The presence of ions and temperature are major factors in the ability of water to conduct a current. Clean freshwater has a low conductivity, whereas high conductivities 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. Conductivities in US fresh waters commonly vary between 50 to 1,500 $\mu\text{mhos/cm}$ (APHA 1998). North Carolina freshwater streams have a natural conductance range of 17-65 $\mu\text{mhos/cm}$, however (USGS 1992).

Conductivity 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 conductivity. However, water bodies that contain saltwater will also have high conductivities. Therefore those wishing to use conductivity 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. Tidal surges can also disturb shallow estuarine sediments and naturally increase turbidity.

Metals

A number of metals are essential micronutrients for the support of aquatic life. However, there are threshold concentrations over which metals can be toxic. Currently the DWQ monitors total (not dissolved) concentrations for aluminum, arsenic, cadmium, chromium, copper, iron, lead, mercury, manganese (Water Supply waters only), nickel, and zinc. Aluminum and iron are commonly found in soils.

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 ($\text{NH}_3\text{-N}$), total Kjeldahl nitrogen (TKN) and nitrite+nitrate nitrogen ($\text{NO}_2\text{+NO}_3\text{-N}$). 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 growth of algae (algal blooms) and other plants may be accelerated.

In addition to the possibility of causing algal blooms, ammonia-nitrogen may combine with high pH water to form NH_4OH , a form toxic to fish and other aquatic organisms.

Fecal Coliform Bacteria

Concentrations of fecal coliform bacteria can vary greatly. The descriptive statistics used to evaluate fecal coliform bacteria data include the geometric mean and the median depending on the classification of the waterbody. For all sites in the White Oak River Basin, the standard specified in Administrative Code 15A NCAC 02B.0211 (3)(e) (August 1, 2004) 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."

The strict application of the standard is often hindered because the monthly (*circa* 30 day) sampling frequency employed for water quality monitoring usually does not provide more than one sample per 30-day period. However, water quality problems can be discerned using monthly sampling.

Both SA class and other waters are present in the White Oak River basin. Non-SA class sites where the geometric mean was greater than 200 colonies/100ml, or where greater than 20 percent of the results exceed 400 colonies/100ml are indicated on the respective station summary sheets. Likewise, SA class sites where the median exceeds 14 colonies/100ml or where greater than 10 percent of the results exceed 43 colonies/100ml are indicated on the sheets.

Table 7. Summary of Evaluation Level Exceedances

Subbasin	Station	Class	Percentage Of Results That Exceeded The Evaluation Level												
			Stations With Less Than 10 Measurements Were Not Evaluated												
			Dissolved Oxygen (<5) ¹	Dissolved Oxygen (<4) ²	pH (combined) ³	Water Temperature	Turbidity	Chlorophyll A	Arsenic	Copper	Iron ²	Mercury	Nickel	Zinc	Fecal Coliform
1 White Oak River															
	P6400000	SA	28%	NA	35%	0%	0%	BT	0%	4%	NA	0%	0%	4%	47%
	P6850000	SA	0%	NA	0%	0%	0%	BT	0%	7%	NA	0%	0%	0%	12%
2 New River															
	P0600000	C NSW	2%	0%	0%	0%	4%	0%	7%	0%	11%	0%	0%	0%	14%
	P1200000	SB NSW	12%	NA	11%	4%	2%	15%	4%	21%	NA	0%	0%	0%	9%
	P2105000	SC NSW	9%	NA	11%	4%	8%	30%	0%	19%	NA	0%	0%	0%	12%
	P2113000	SC HQW NSW	4%	NA	9%	4%	0%	23%	0%	7%	NA	0%	0%	0%	2%
	P2210000	SC HQW NSW	0%	NA	0%	4%	BT	7%	BT	BT	NA	BT	BT	BT	0%
	P3100000	C NSW	42%	20%	2%	0%	0%	3%	0%	4%	36%	0%	0%	0%	14%
	P3700000	SC NSW	5%	NA	11%	4%	5%	18%	0%	7%	NA	0%	0%	0%	10%
	P3960000	SC NSW	0%	NA	0%	0%	BT	0%	BT	NA	BT	BT	BT	BT	0%
	P4000000	SC NSW	BT	NA	BT	BT	BT	BT	BT	BT	NA	BT	BT	BT	BT
	P4075000	C HWQ NSW	0%	0%	0%	0%	BT	0%	BT	BT	BT	BT	BT	BT	0%
	P4087500	SC NSW	BT	NA	BT	BT	BT	BT	BT	BT	NA	BT	BT	BT	BT
	P4100000	C HQW NSW	23%	5%	0%	2%	0%	3%	0%	13%	27%	0%	0%	13%	2%
	P4200000	SC NSW	0%	NA	0%	0%	BT	0%	BT	BT	NA	BT	BT	BT	0%
	P4400000	SB NSW	0%	NA	3%	0%	0%	0%	5%	0%	NA	0%	0%	5%	3%
	P4570000	SC NSW	0%	NA	0%	0%	BT	0%	BT	BT	NA	BT	BT	BT	0%
	P4600000	SC NSW	0%	NA	0%	0%	0%	3%	4%	4%	NA	0%	0%	0%	0%
	P4700000	SC NSW	0%	NA	3%	0%	BT	0%	BT	BT	NA	BT	BT	BT	0%
	P4750000	SA	0%	NA	3%	0%	4%	0%	0%	0%	NA	0%	0%	0%	0%
	P9860000	SA	13%	NA	0%	0%	0%	BT	0%	0%	NA	0%	0%	6%	0%
3 Newport River & Coastal Drainages															
	P7300000	C	50%	23%	27%	0%	0%	BT	0%	0%	52%	0%	0%	4%	12%
	P8700000	SA	0%	NA	0%	0%	0%	BT	0%	13%	NA	7%	0%	7%	4%
	P8750000	SC HQW	4%	NA	0%	9%	39%	BT	BT	BT	NA	BT	BT	BT	86%
	P8800000	SC HQW	17%	NA	0%	13%	35%	BT	BT	BT	NA	BT	BT	BT	30%
	P8965500	SA	0%	NA	0%	0%	0%	BT	0%	0%	NA	0%	7%	7%	4%
	P9580000	SA	4%	NA	0%	0%	0%	BT	0%	0%	NA	0%	0%	0%	4%
	P9600000	SA ORW	0%	NA	0%	0%	0%	BT	0%	0%	NA	0%	0%	0%	0%
4 North River & Coastal Drainages															
	P8975000	SA	0%	NA	0%	2%	19%	BT	0%	4%	NA	0%	0%	4%	18%
	P8976000	SA	4%	NA	2%	4%	9%	BT	0%	4%	NA	0%	0%	4%	25%
	P8978000	SC	29%	NA	27%	0%	7%	BT	0%	4%	NA	4%	0%	4%	15%
	P8990000	SA	0%	NA	0%	0%	0%	BT	0%	0%	NA	7%	0%	7%	0%
	P9720000	SA ORW	0%	NA	0%	0%	0%	BT	0%	8%	NA	8%	0%	8%	0%
	P9730000	SA ORW	0%	NA	0%	0%	0%	BT	0%	0%	NA	0%	0%	8%	8%
	P9740000	SA	0%	NA	0%	0%	0%	BT	0%	0%	NA	0%	0%	8%	0%

Notes:

Bold entries indicate at least 10% (at least 20% for fecal coliform not in SA waters; for SA fecal **bold** indicates at least 10%) of results exceeded the evaluation level.

Underlined entries indicate 95% confidence that site conditions truly exceed the evaluation level at least 10% of the time, with a minimum of 10 results required before determination.

NA: Not Applicable. The evaluation level is not applicable to this station (see following notes).

BT: Below Threshold. This station was not evaluated because less than 10 samples/measurements were collected for this paramter.

¹ Applies to saltwater (class SA, SB, and SC) primarily, and to freshwater (class B, C, and WS) as a daily average. Not considered critical (therefore not bolded for violations) in freshwater areas.

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

³ If both the maximum pH (9, or 8.5 for saltwater) and the minimum pH (6, or 6.8 for saltwater) were exceeded at a site, the total of the two is displayed.

WATER QUALITY PATTERNS IN THE WHITE OAK RIVER BASIN

Box and whisker plots, scatterplots, and maps were used to depict differences in a variety of water quality parameters throughout the basin. While graphs 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. For the box plots, stations with fewer than 10 data points for a given parameter were not included.

Regional Patterns

Box and whisker plots were generated for each station for each water quality parameter that has an evaluation level, plus specific conductance, total nitrate/nitrite, total kjeldahl nitrogen, total ammonia, and total phosphorus. Maps were also generated for parameters with the most exceedances.

In general, problem areas were scattered throughout the basin. Particular problem areas include the several locations on/near the New River in Jacksonville and Calico Creek in Morehead City.

Eight stations (four with SSEs) had at least 10 percent of measurements fall below the evaluation level for dissolved oxygen. During the summer months each year, dissolved oxygen reaches its lowest levels, and its highest during the winter. Dissolved Oxygen is significantly correlated with log-transformed water temperature ($\text{prob} > F$ is < 0.0001) and over 30% of the variation in dissolved oxygen could be explained by water temperature ($r^2 = 0.314$). Other possible causes include low flow, inputs from water naturally low in dissolved oxygen (swampy water), and various human point and non-point sources. Swampy, low-flow waters also tend to have a low pH, and may be part of the cause of the three pH SSEs.

Two stations on Calico Creek have between them three SSEs and 10 total Exceedance levels above 10%. 86% and 30% of fecal coliform measurements exceeded the 400 count per 100 ml standard at the two Calico Creek sites. Calico Creek is surrounded by Morehead City, is the receiving water for the Morehead City wastewater treatment plant, and is poorly flushed. Any or all of those factors may contribute to the significant issues there.

Trends over Time

Several significant trends ($p < 0.05$) were identified over the monitoring period, in particular concerning rising pH, rising turbidity, and rising nutrients. One site in particular, P8750000, located on Calico Creek at SR 1243 in Morehead City, has significant trends for pH, total kjeldahl nitrogen, total nitrate/nitrite, and total phosphorus. P and r^2 values are included on the time graphs.

At five sites rising pH trends were identified. It is unclear what may be causing this trend. Rising turbidity was likewise identified at six sites. This appears to be partially explained by the end of the drought in the winter of 2002/2003.

The New River

A previous study conducted in the New River during 1986-1989 (NCDEHNR 1990) resulted in the New River being classified as Nutrient Sensitive Waters (NSW). During this assessment period Wilson Bay exhibited high concentrations of nutrients, chlorophyll *a*, and phytoplankton that were likely attributable to the City of Jacksonville's WWTP discharge into Wilson Bay. In March 1998, Jacksonville's WWTP was converted to a non-discharge land application system. In addition, multiple New River WWTP's from Camp Lejeune were consolidated into a single discharge near French's Creek. In order to evaluate water quality conditions from the multiple WWTP's restructuring, a special study was initiated in 1998. This phytoplankton monitoring study indicated that overall water quality conditions have improved (New River Phytoplankton Study in Onslow County 1998-2001 (NCDWQ 2003)). The results indicated that chlorophyll *a*, total nitrogen, and total phosphorous were significantly lower than during 1986-1989. Algal concentrations decreased and algal species diversity increased in Wilson Bay, and similar, yet not as

dramatic improvements, were noted in Northeast Creek and Jacksonville. These results are consistent with another New River study conducted by the Center for Marine Science at UNC-Wilmington during 1995-2002 (Mallin et al. 2004).

Ambient data from 1999 to 2004 indicate that while the New River has improved, it is still impacted. Three stations in the New River and its tributaries have SSEs for Chlorophyll *a*. Total Kjeldahl Nitrogen and Total Phosphorus both significantly correlate with high Chlorophyll *a* concentrations. While long term trends indicate that water quality in the New River has improved, short term (1999-2004) trends indicate that at some stations (see Figures 27 and 28), nutrient concentrations have begun to increase.

Calico Creek

During 2004-2005 DWQ conducted a special study of fecal coliform, nutrients, and their response variables in Calico Creek (NCDENR 2005). Among other methods, the study used fecal coliform data collected by the Morehead City Waste Water Treatment Plant (WWTP) to evaluate whether the fecal coliform standard was violated. The standard states that *"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."* DWQ determined the geomean for each period in the dataset that met the minimum 5 sample / maximum 30 day requirement. The results are summarized in the following table and graph.

Table 8. Calico Creek: Exceedances of the Fecal Coliform Geomean Standard

Data Collected by the Morehead City Wastewater Treatment Plant

Time Period	Calico Creek (upper) at SR 1243			Calico Creek (lower) at SR 1176		
	Geomean Periods	Geomean Exceedances	Percent Exceedances	Geomean Periods	Geomean Exceedances	Percent Exceedances
2002	461	456	99%	461	49	11%
2003	407	397	98%	407	389	96%
2004	415	411	99%	414	207	50%
2002-2004	1283	1264	99%	1282	645	50%

Note:

For January 2002 through November 2004, geomeans were calculated for each set of five or more consecutive measurements within a 30 day period. The geomeans were then compared to the 200 colonies/100 mL standard.

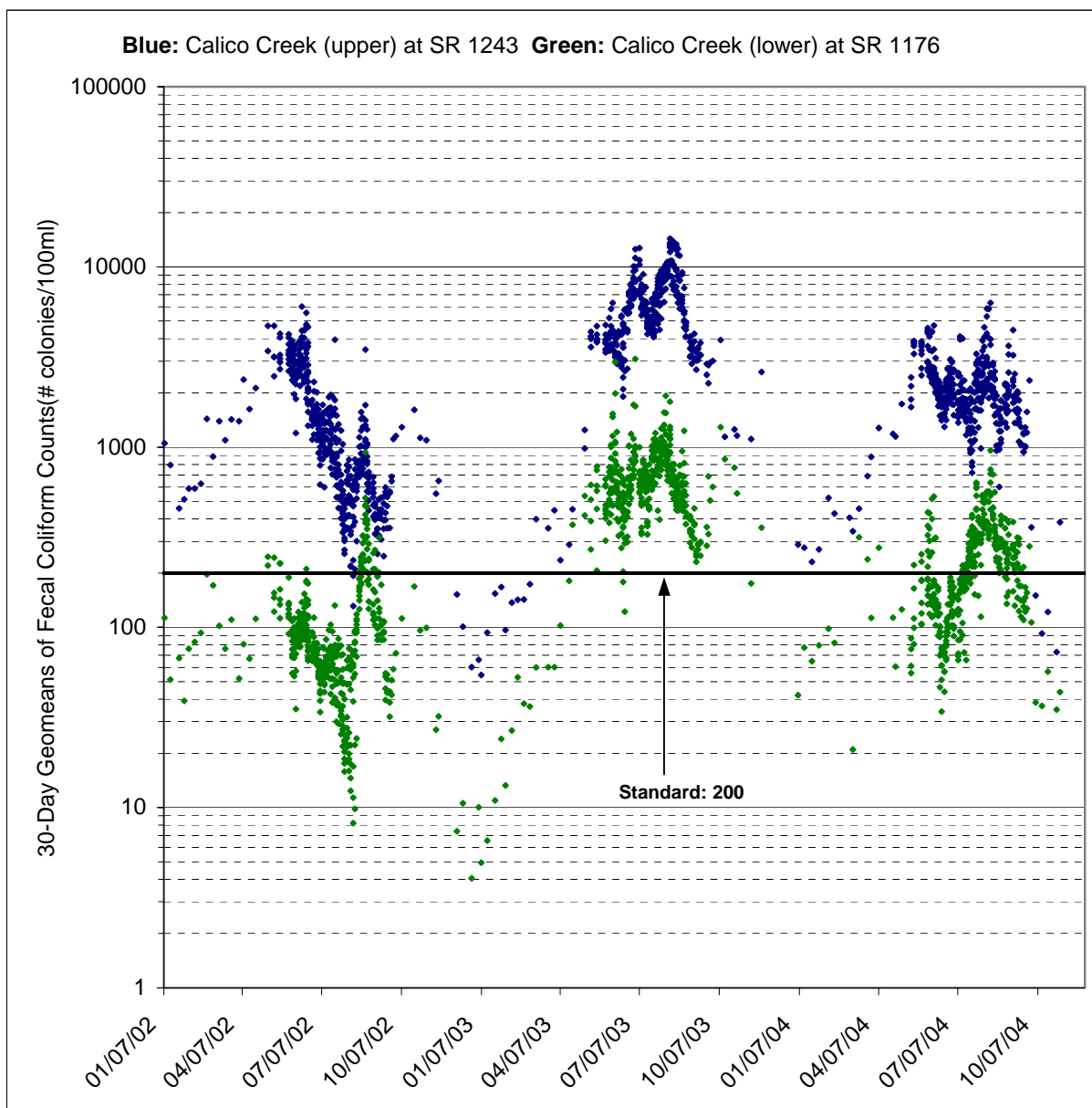
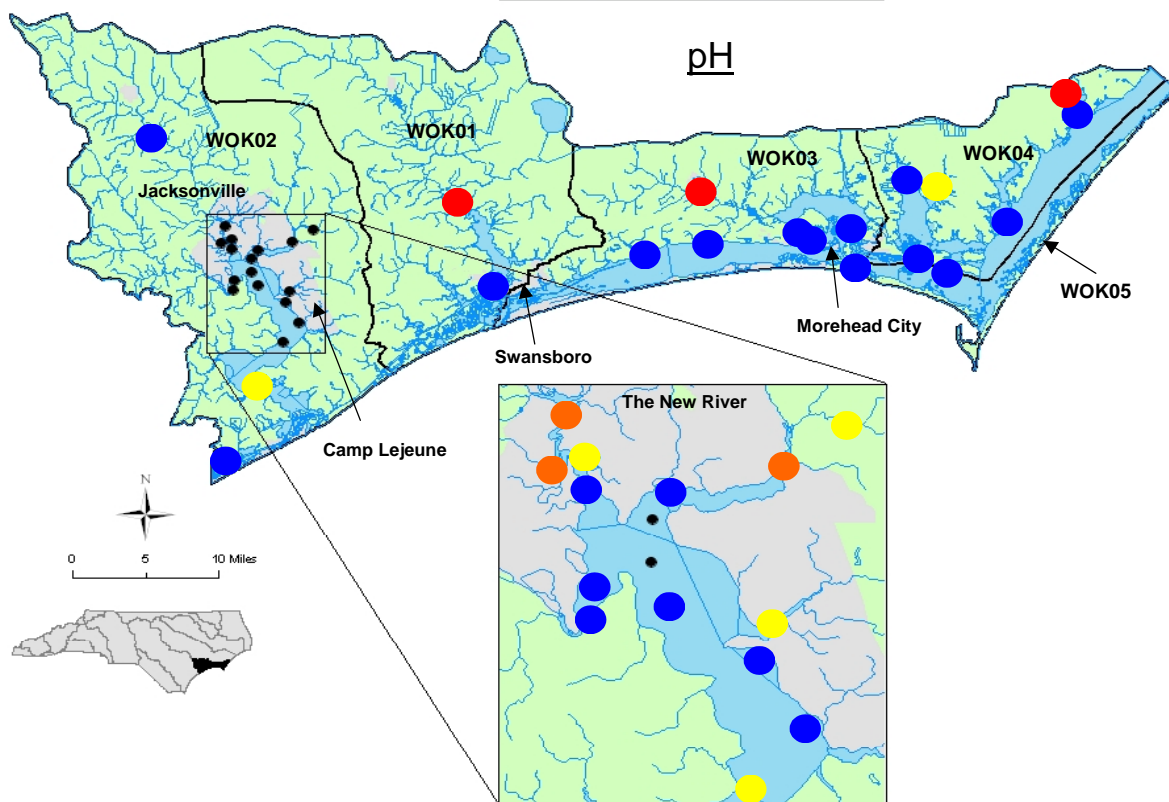
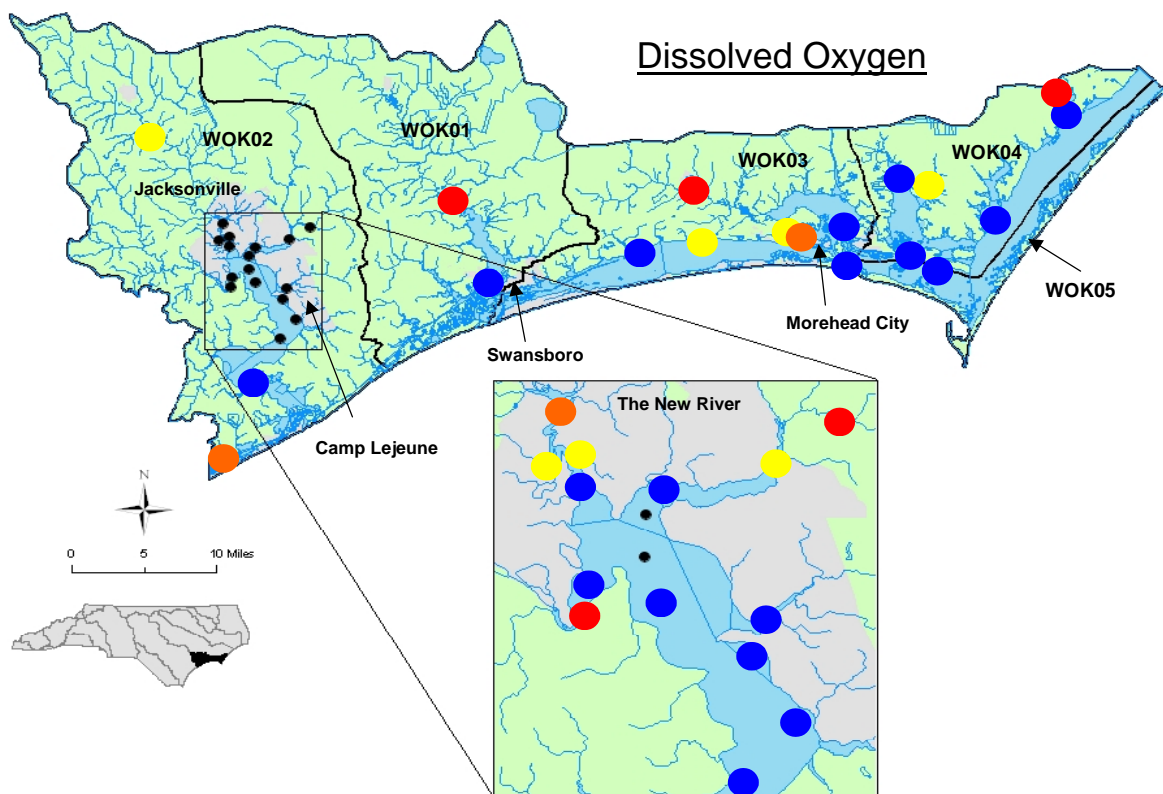


Figure 3. 30-Day Geomeans of Fecal Coliform in Calico Creek over Time

Calico Creek appears to have several significant trends as well. The upper station has increasing trends for two types of nitrogen, phosphorus, and pH. The lower station also has an increasing trend for pH. Taken together with the two SSEs in this water body for turbidity, the fecal coliform violations, and high concentrations of chlorophyll a and copper, it may be one of the most impacted water bodies in the basin.

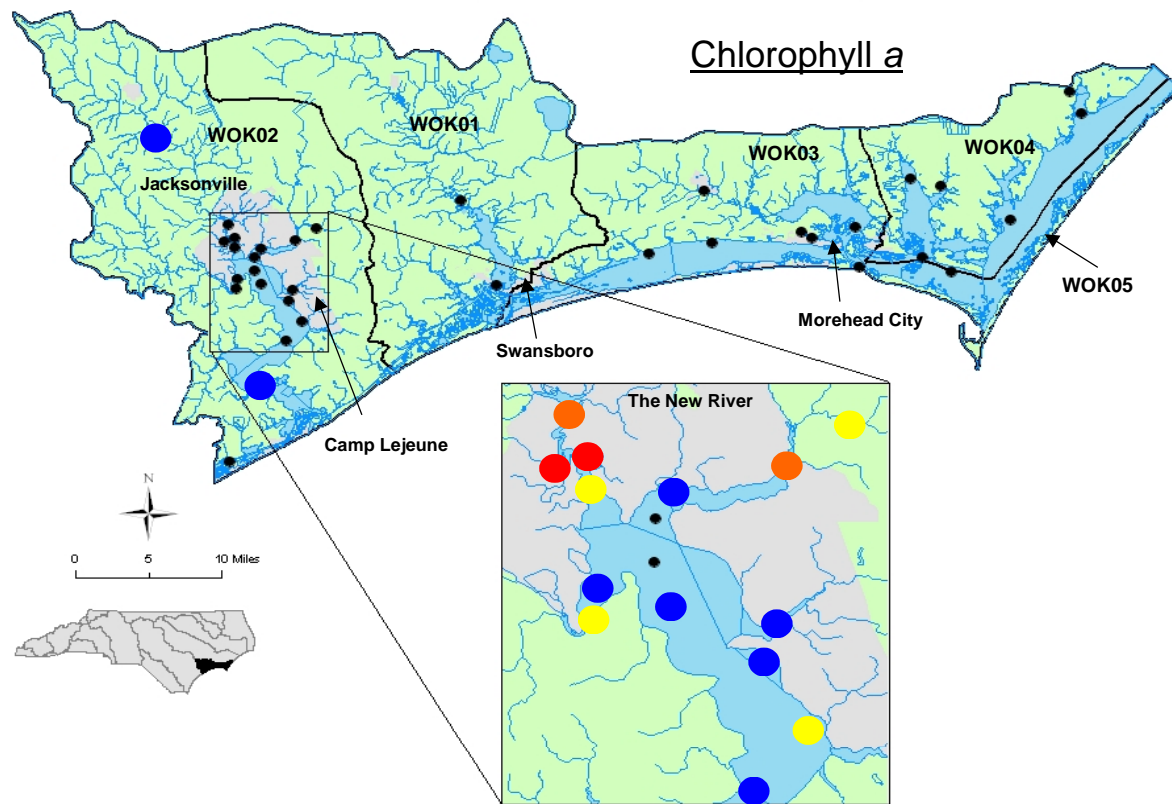
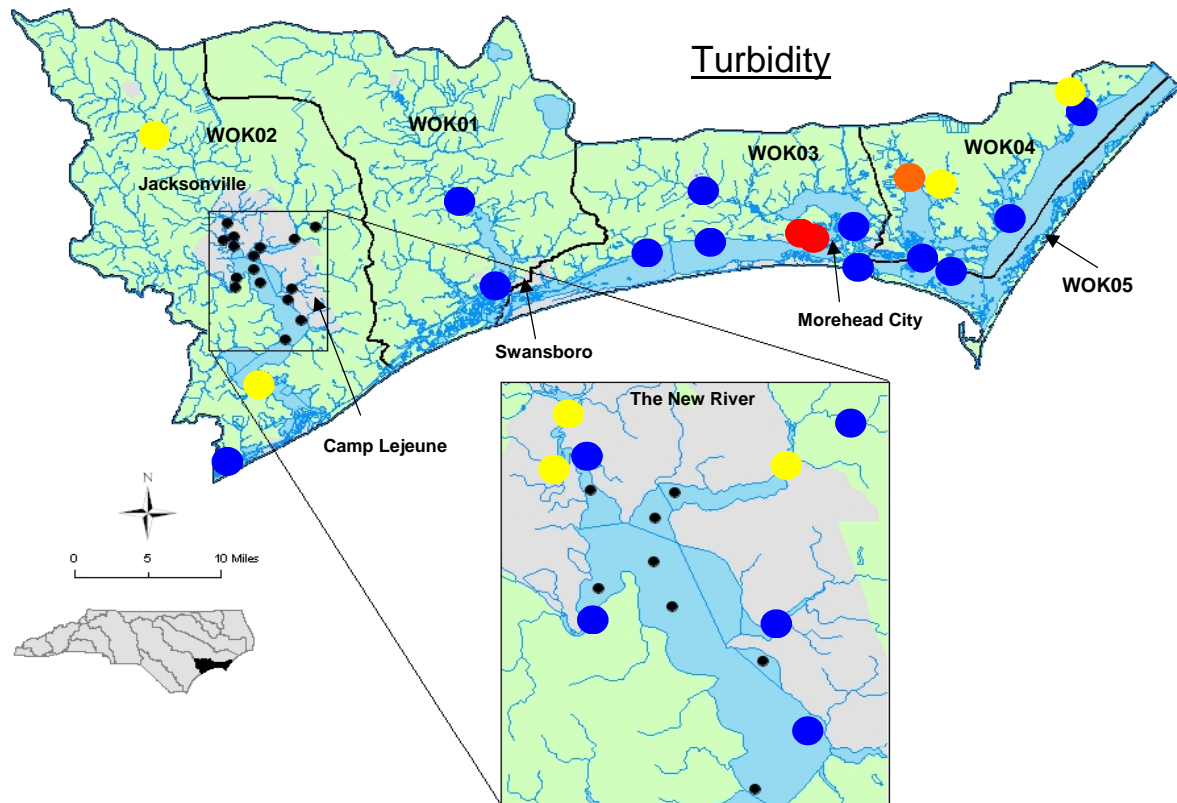
Based on the excessive number of exceedances of fecal coliform standard, DWQ recommends that Calico Creek be added to the Impaired Waters list.



● >20% Exceedances
 ● 10% to 20% Exceedances
 ● 0% to 10% Exceedances
 ● No Exceedances

Note: Stations with no circle have no Evaluation Level for the given parameter, or were sampled fewer than 10 times for that parameter.

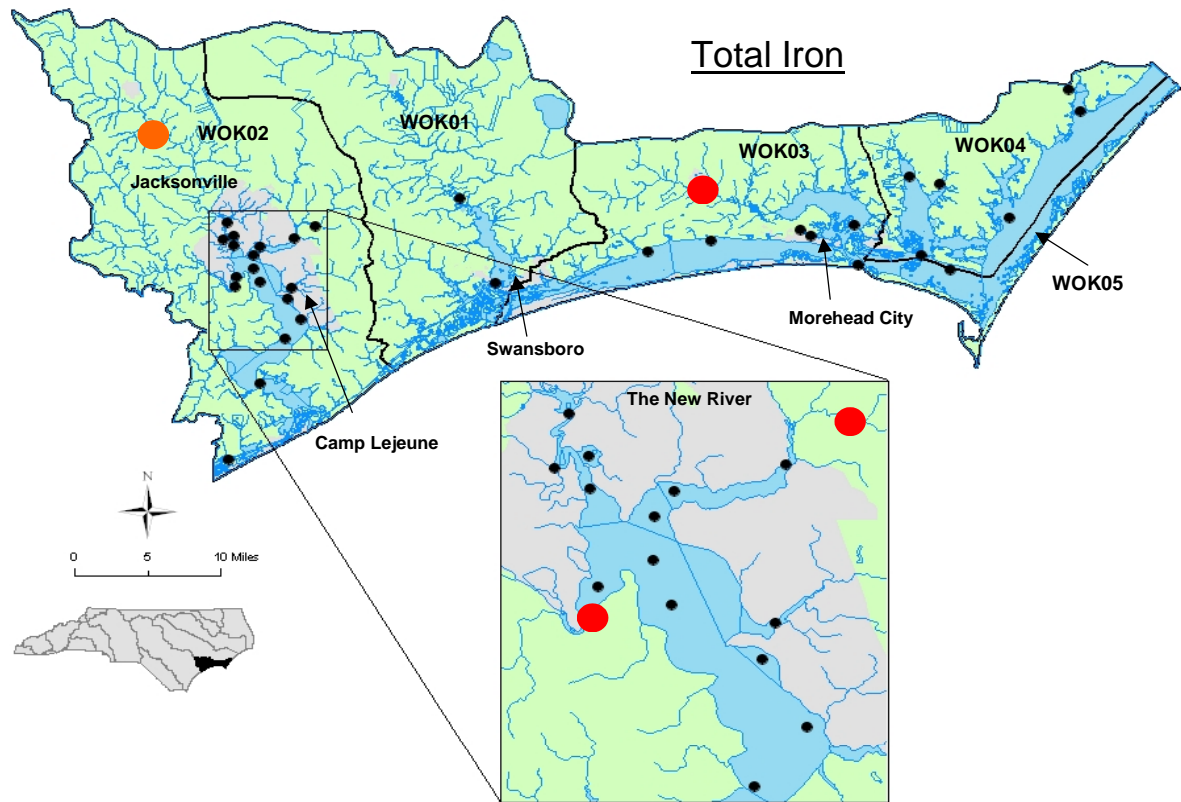
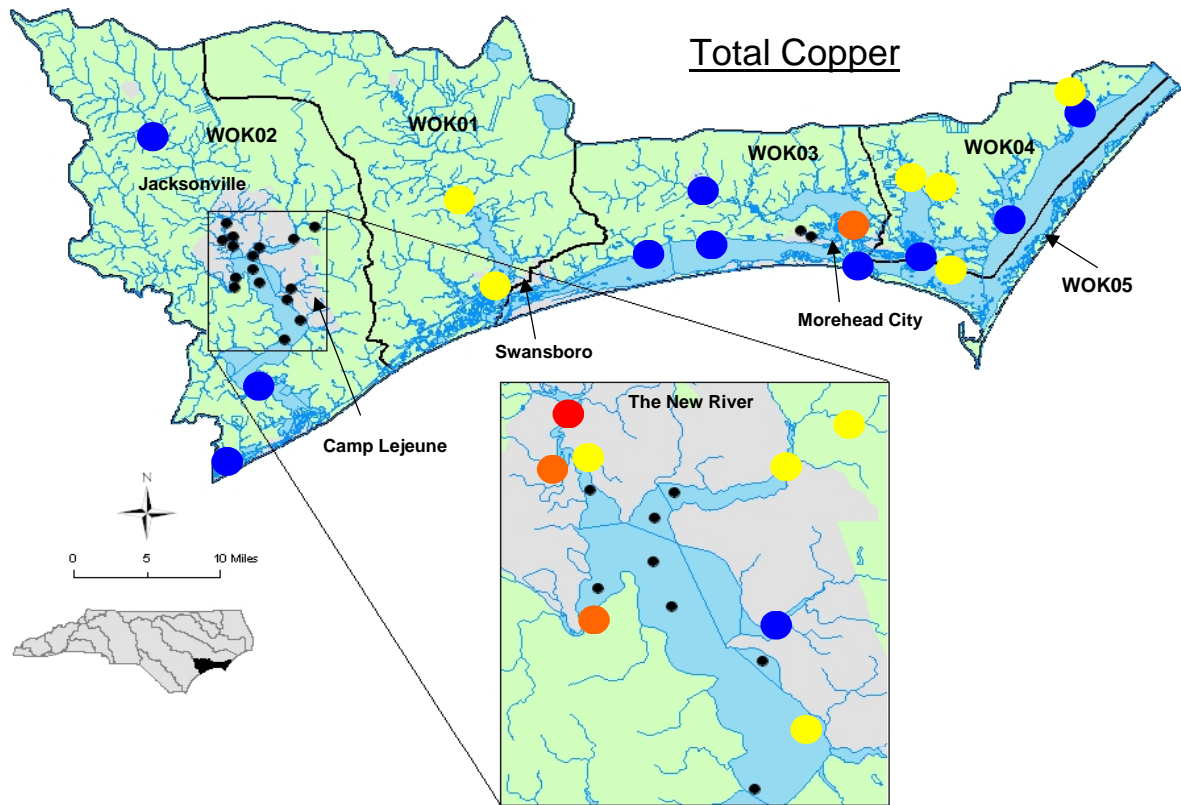
Figure 4. Dissolved Oxygen and pH in the White Oak River Basin



● >20% Exceedances
 ● 10% to 20% Exceedances
 ● 0% to 10% Exceedances
 ● No Exceedances

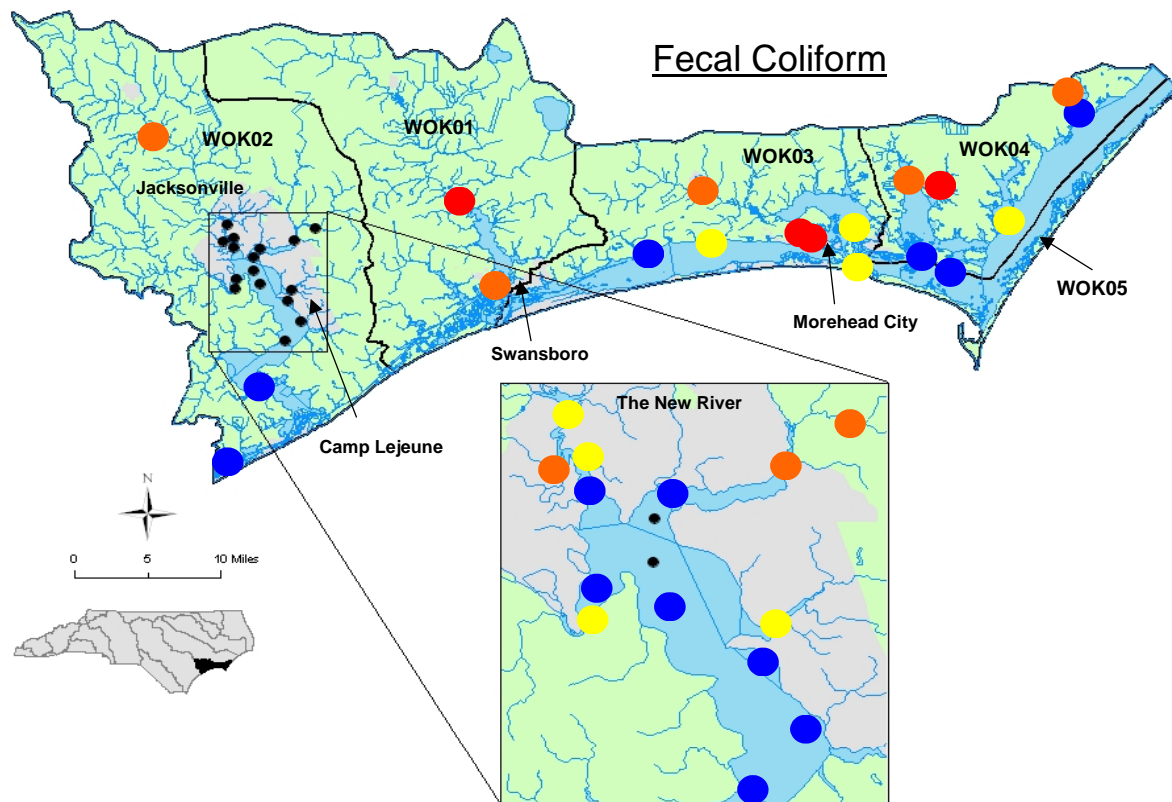
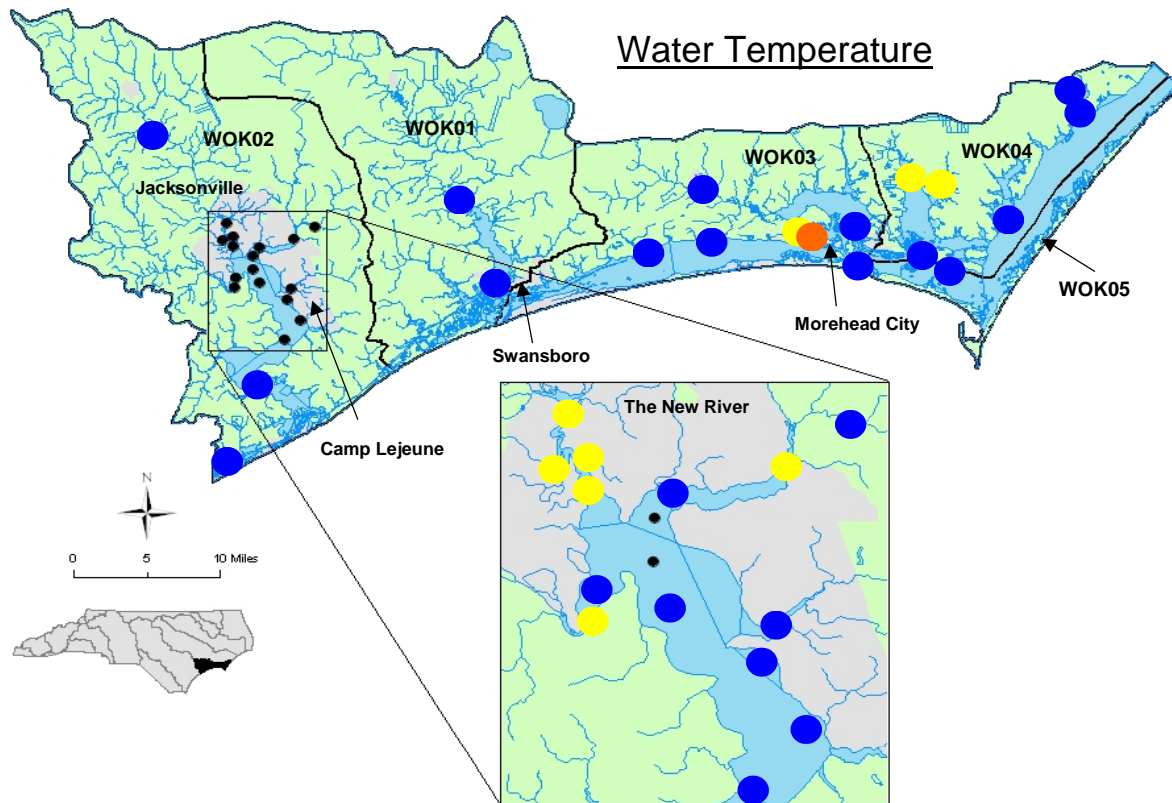
Note: Stations with no circle have no Evaluation Level for the given parameter, or were sampled fewer than 10 times for that parameter.

Figure 5. Turbidity and Chlorophyll a in the White Oak River Basin



● >20% Exceedances
 ● 10% to 20% Exceedances
 ● 0% to 10% Exceedances
 ● No Exceedances
 Note: Stations with no circle have no Evaluation Level for the given parameter, or were sampled fewer than 10 times for that parameter.

Figure 6. Total Copper and Total Iron in the White Oak River Basin



● >20% Exceedances
 ● 10% to 20% Exceedances
 ● 0% to 10% Exceedances
 ● No Exceedances

Note: Stations with no circle have no Evaluation Level for the given parameter, or were sampled fewer than 10 times for that parameter.

Figure 7. Water Temperature and Fecal Coliform in the White Oak River Basin

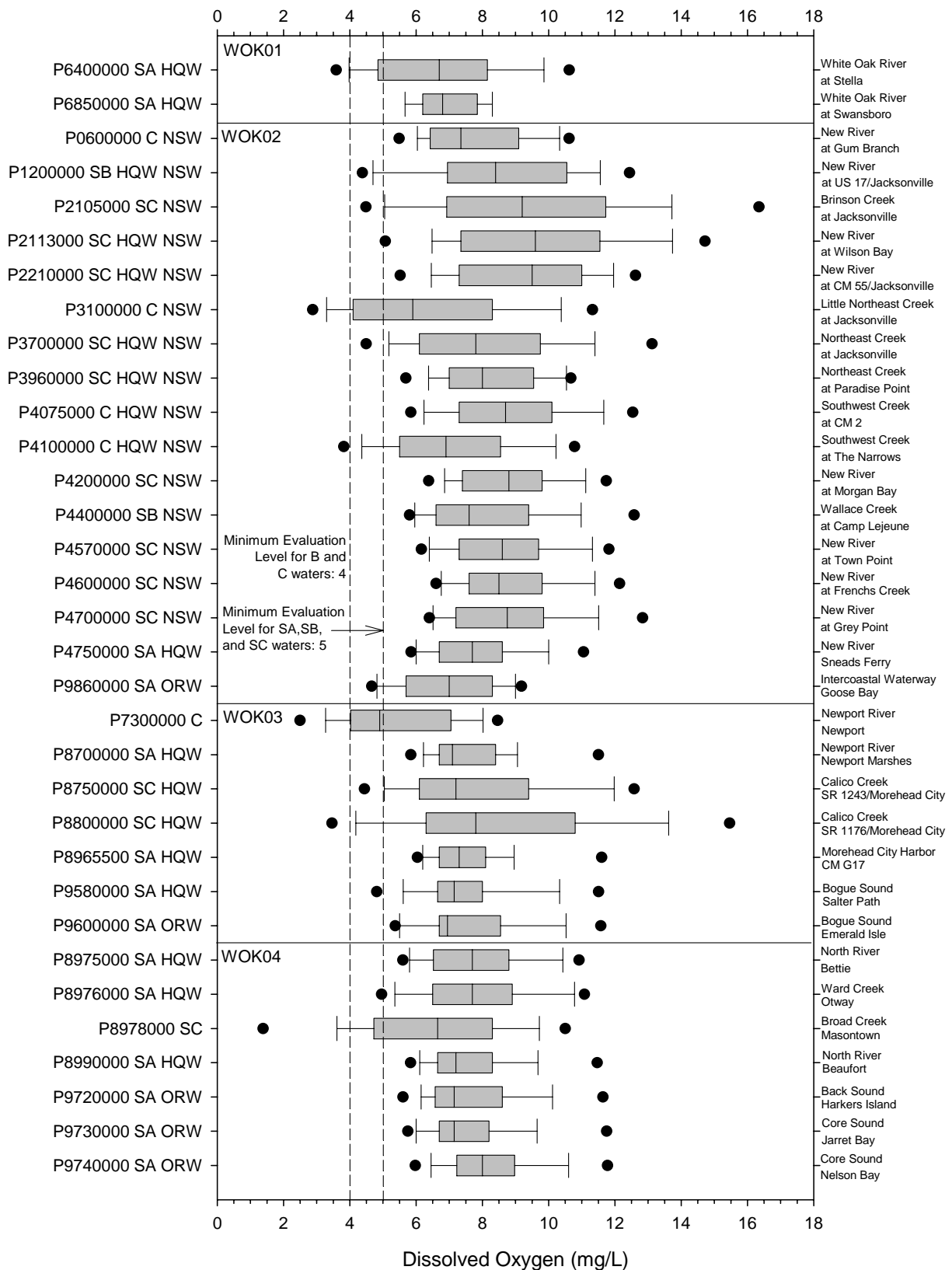


Figure 8. Box Plots for Dissolved Oxygen in the White Oak River Basin

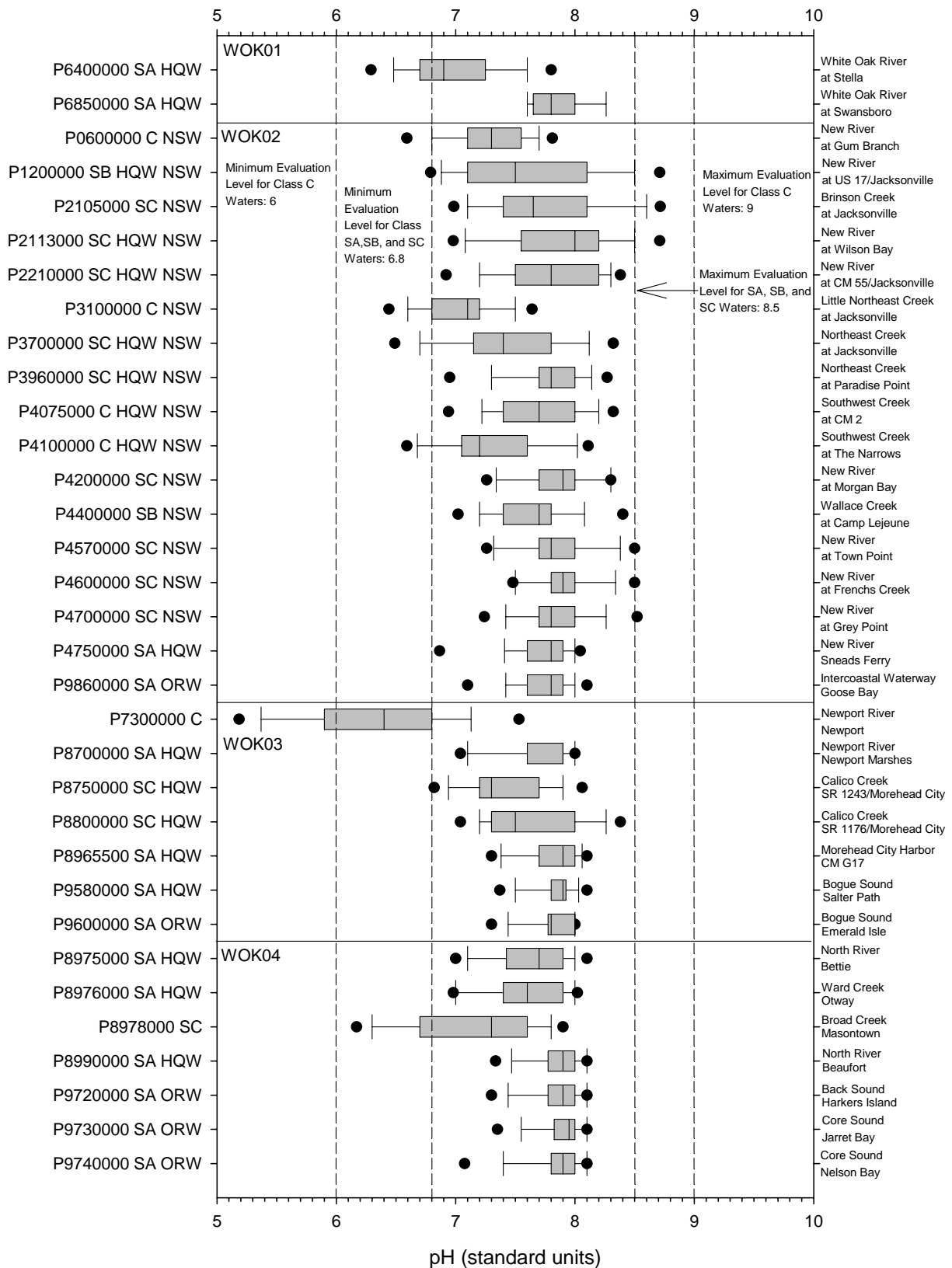


Figure 9. Box Plots for pH in the White Oak River Basin

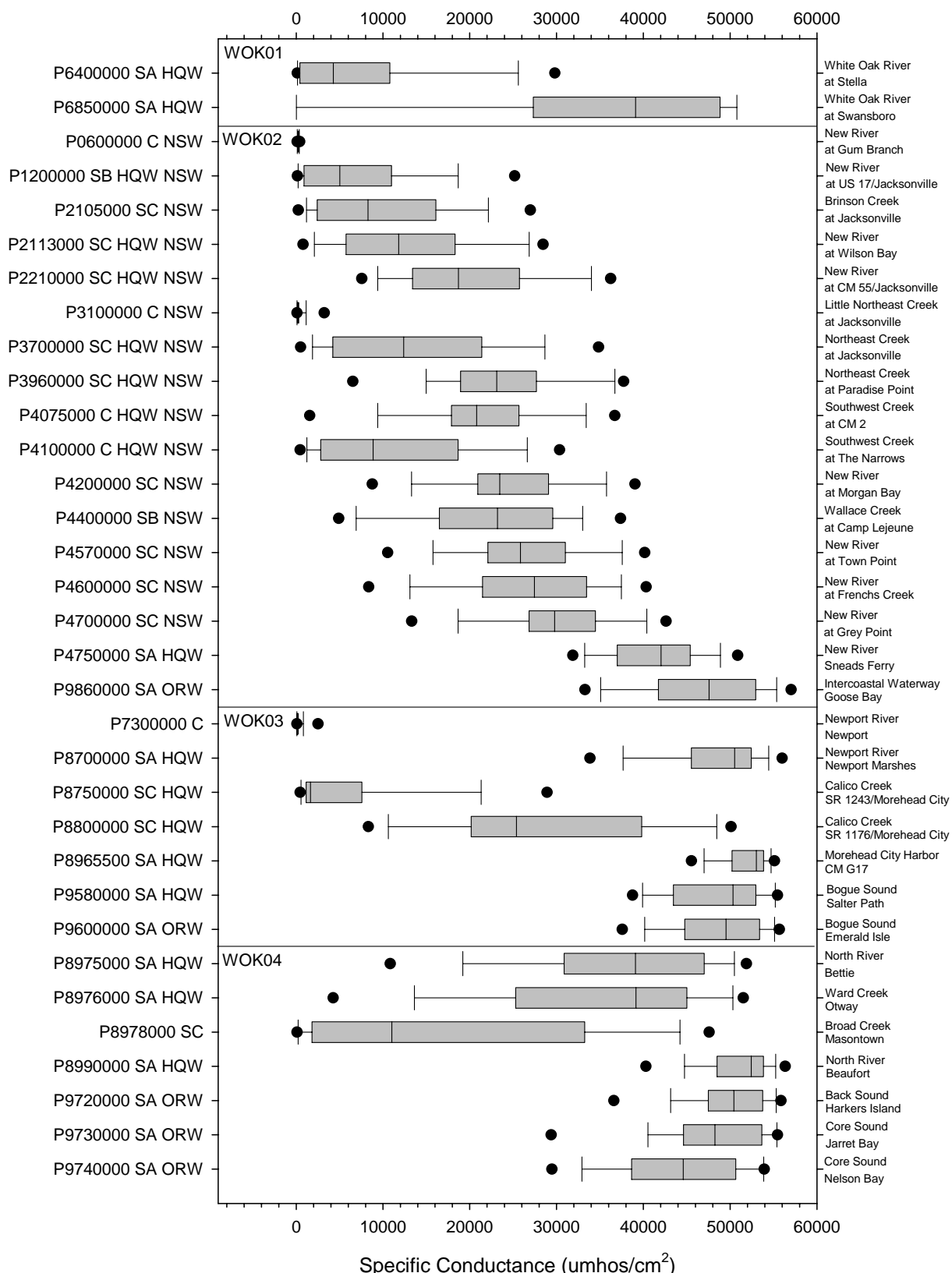


Figure 10. Box Plots for Specific Conductance in the White Oak River Basin

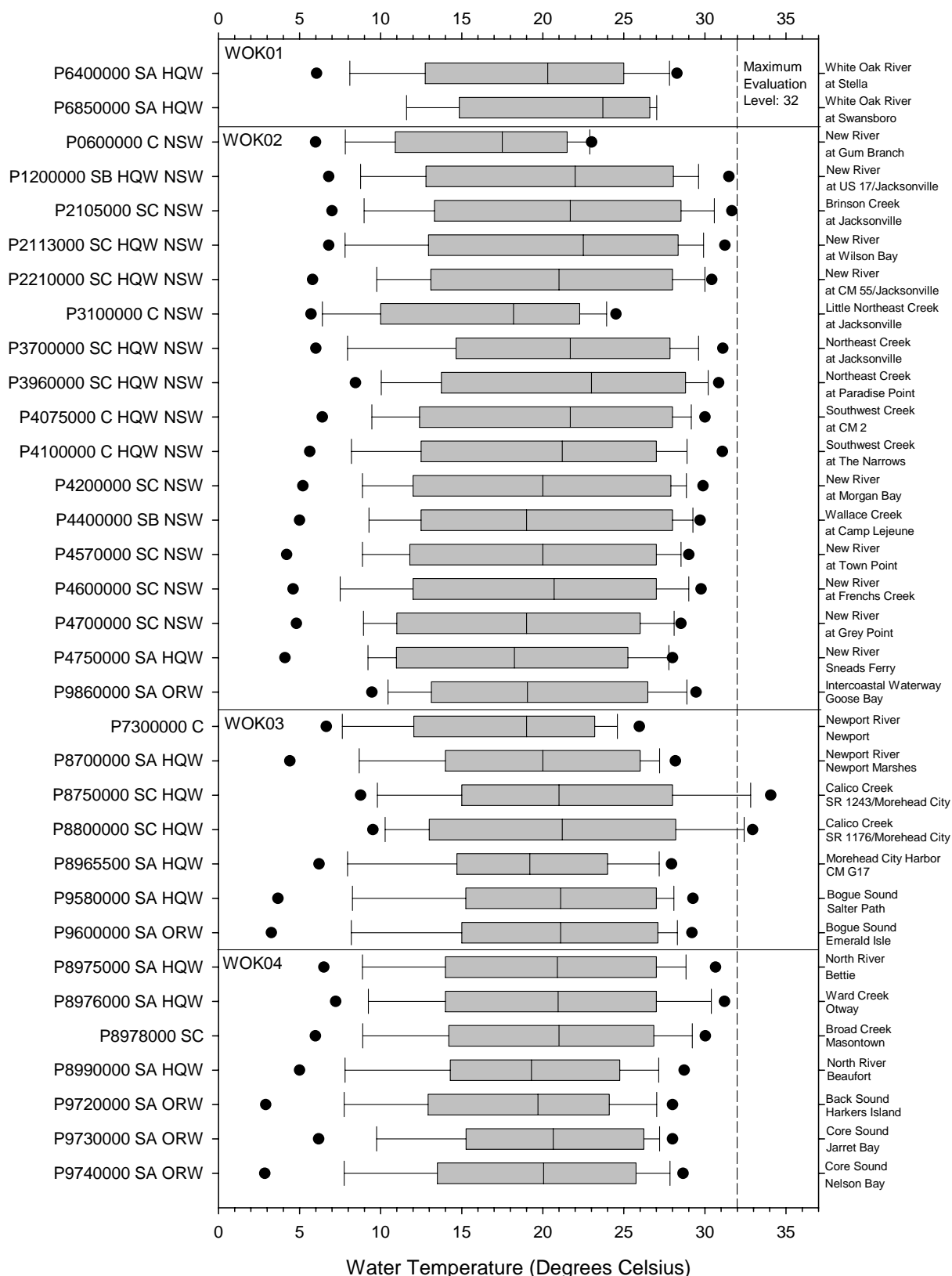


Figure 11. Box Plots for Water Temperature in the White Oak River Basin

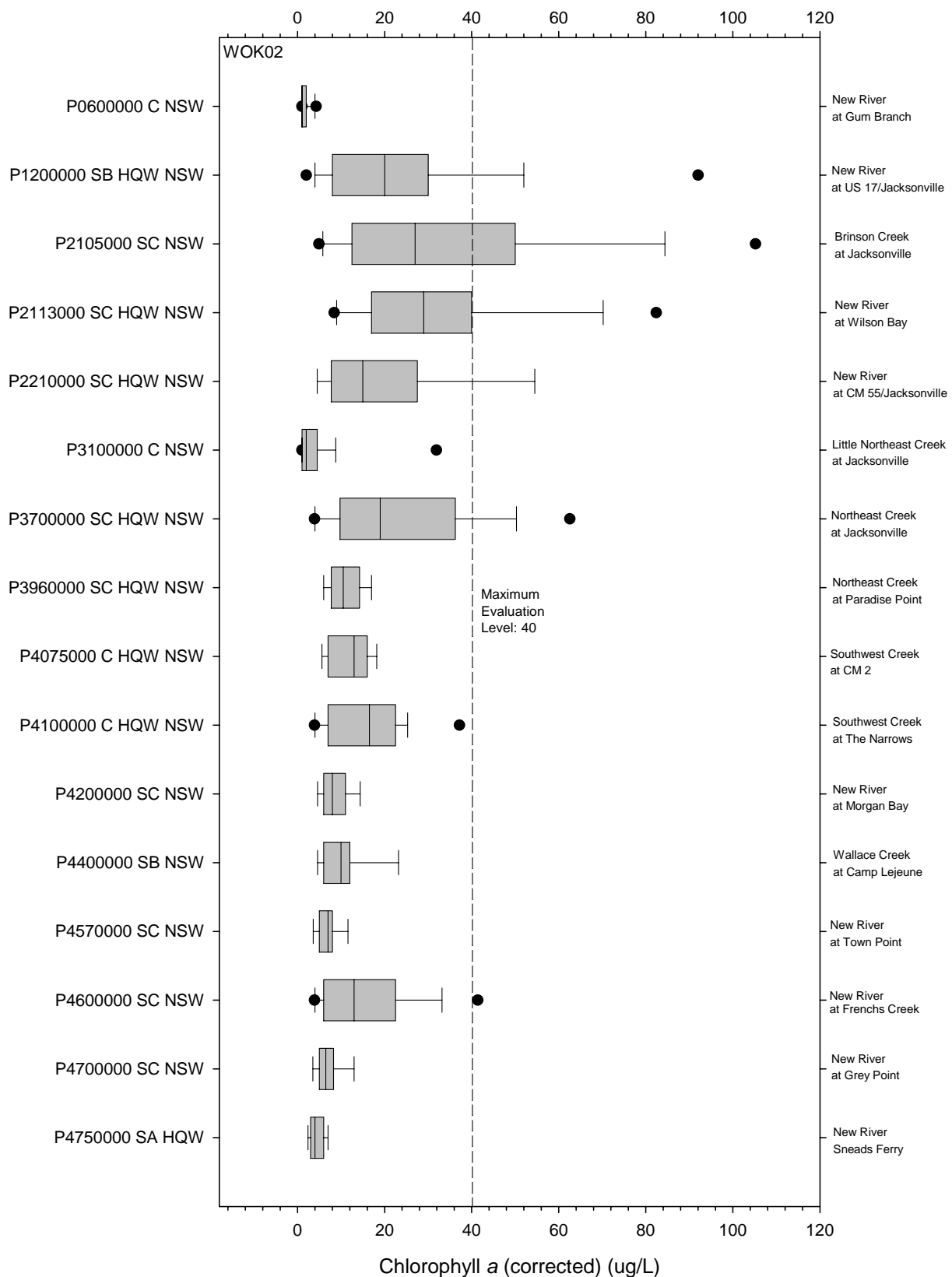


Figure 12. Box Plots for Chlorophyll a in the White Oak River Basin

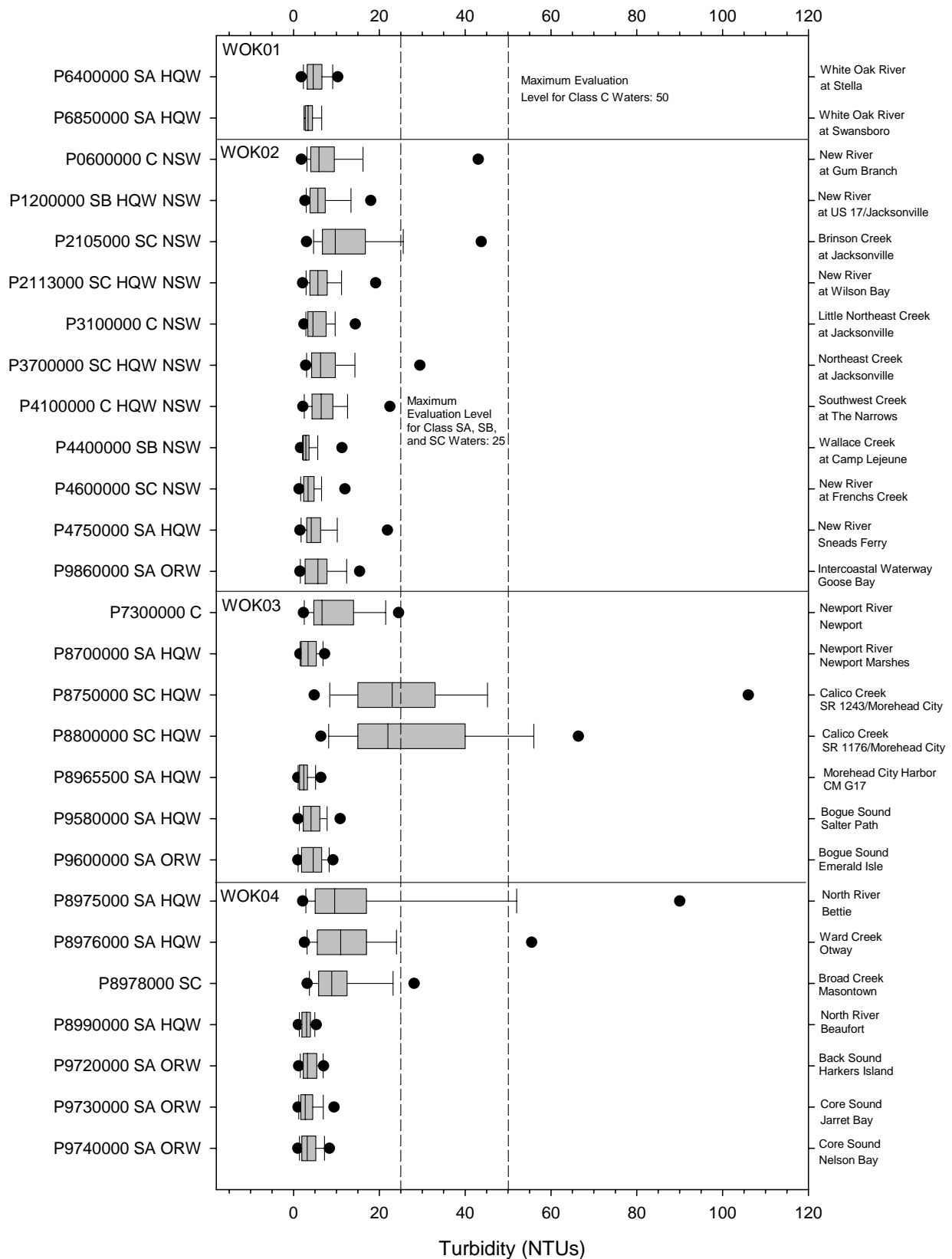


Figure 13. Box Plots for Turbidity in the White Oak River Basin

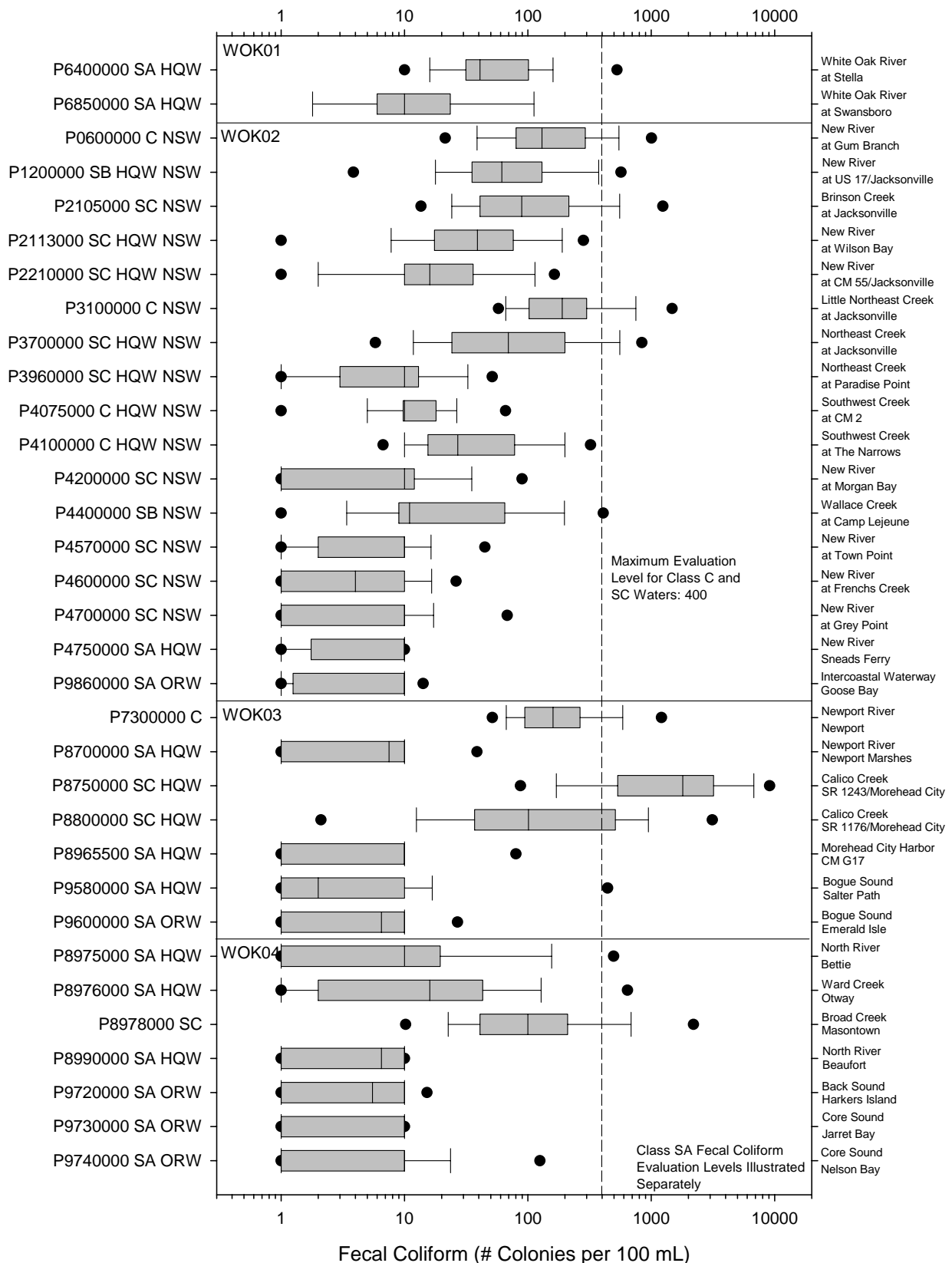
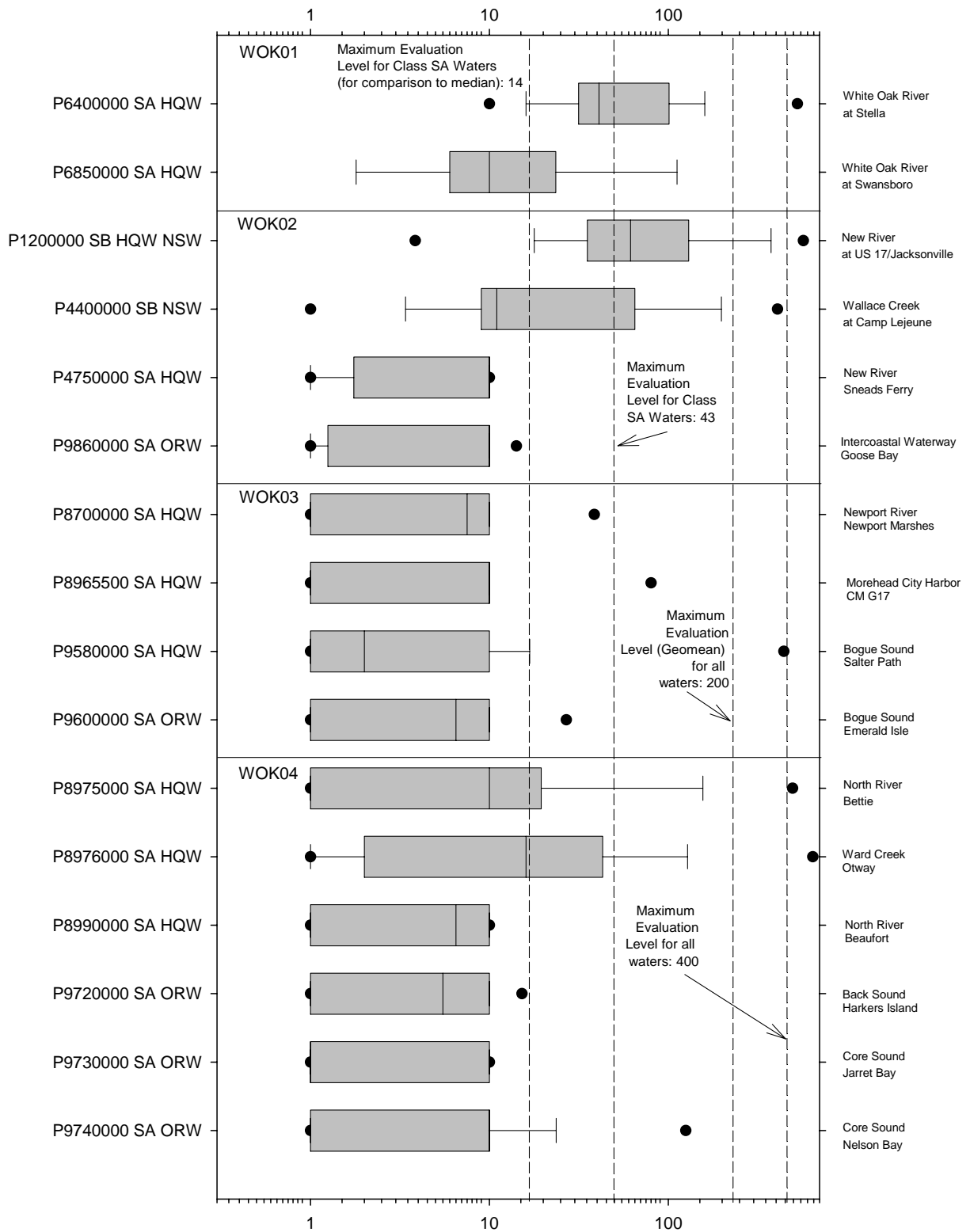


Figure 14. Box Plots for Fecal Coliform in the White Oak River Basin



Fecal Coliform (# of Colonies per mL)

Figure 15. Box Plots for Fecal Coliform in Class SA waters in the White Oak River Basin (SB Waters also shown for comparison)

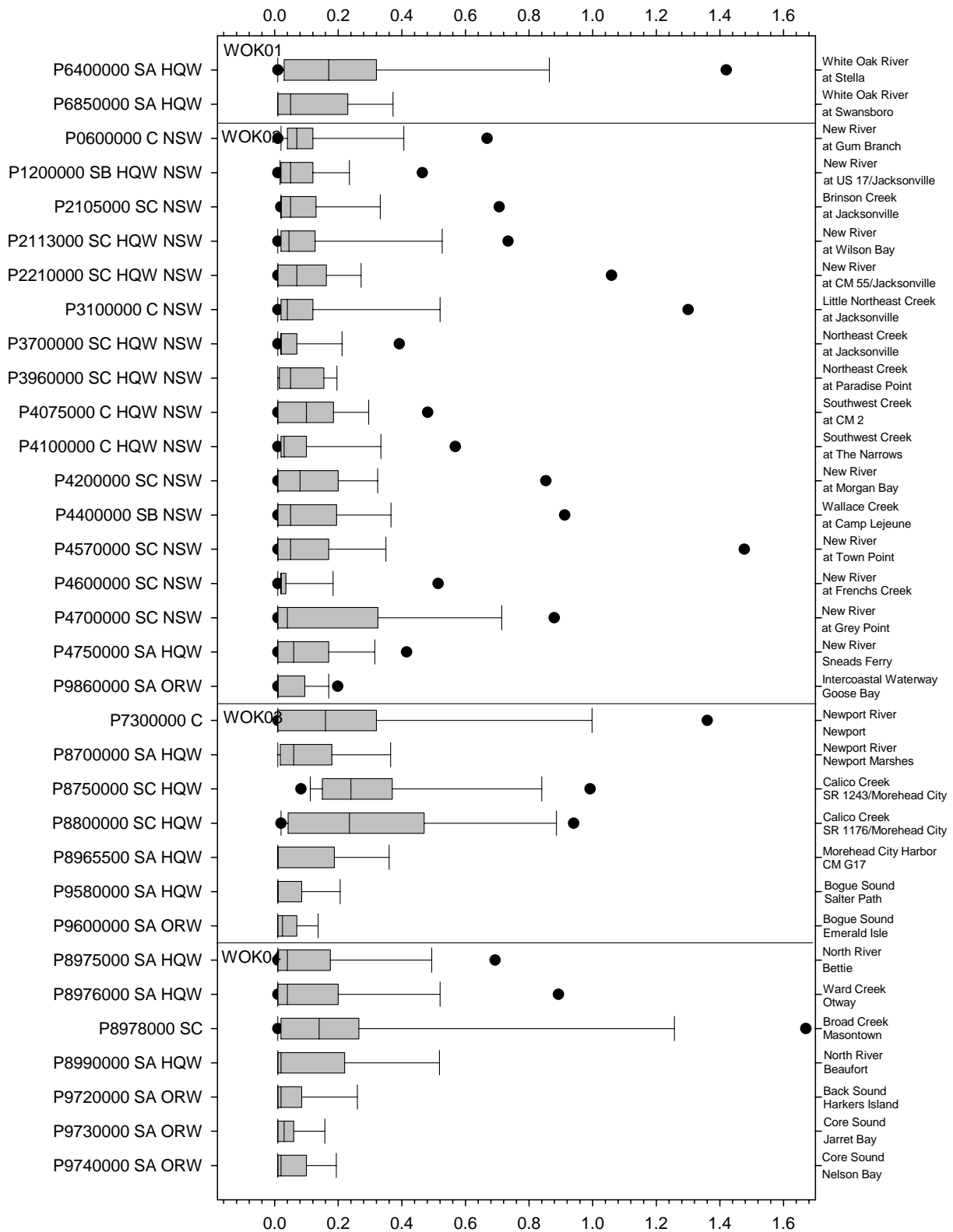


Figure 16. Box Plots for Total Ammonia in the White Oak River Basin

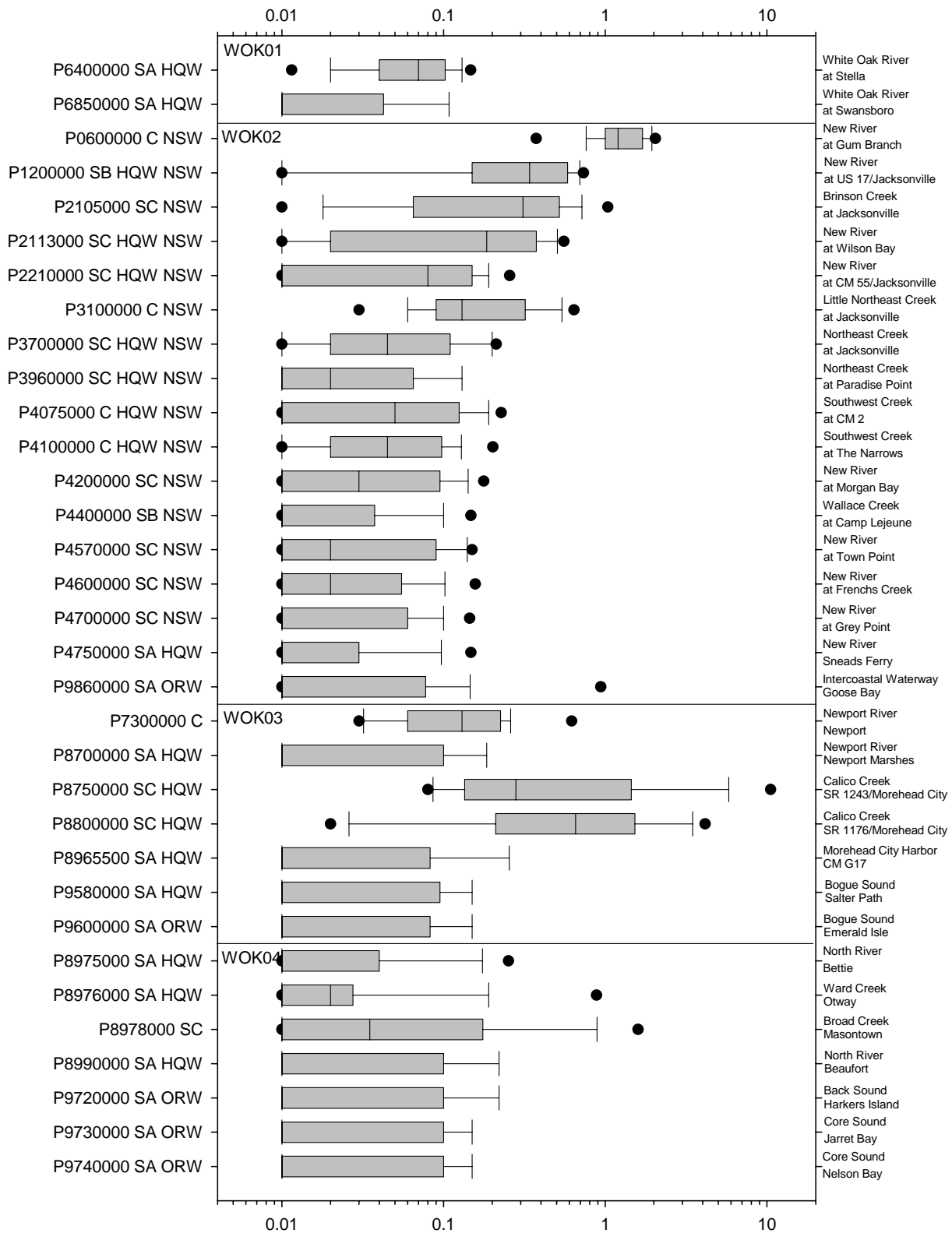


Figure 17. Box Plots for Total Nitrate/Nitrite in the White Oak River Basin

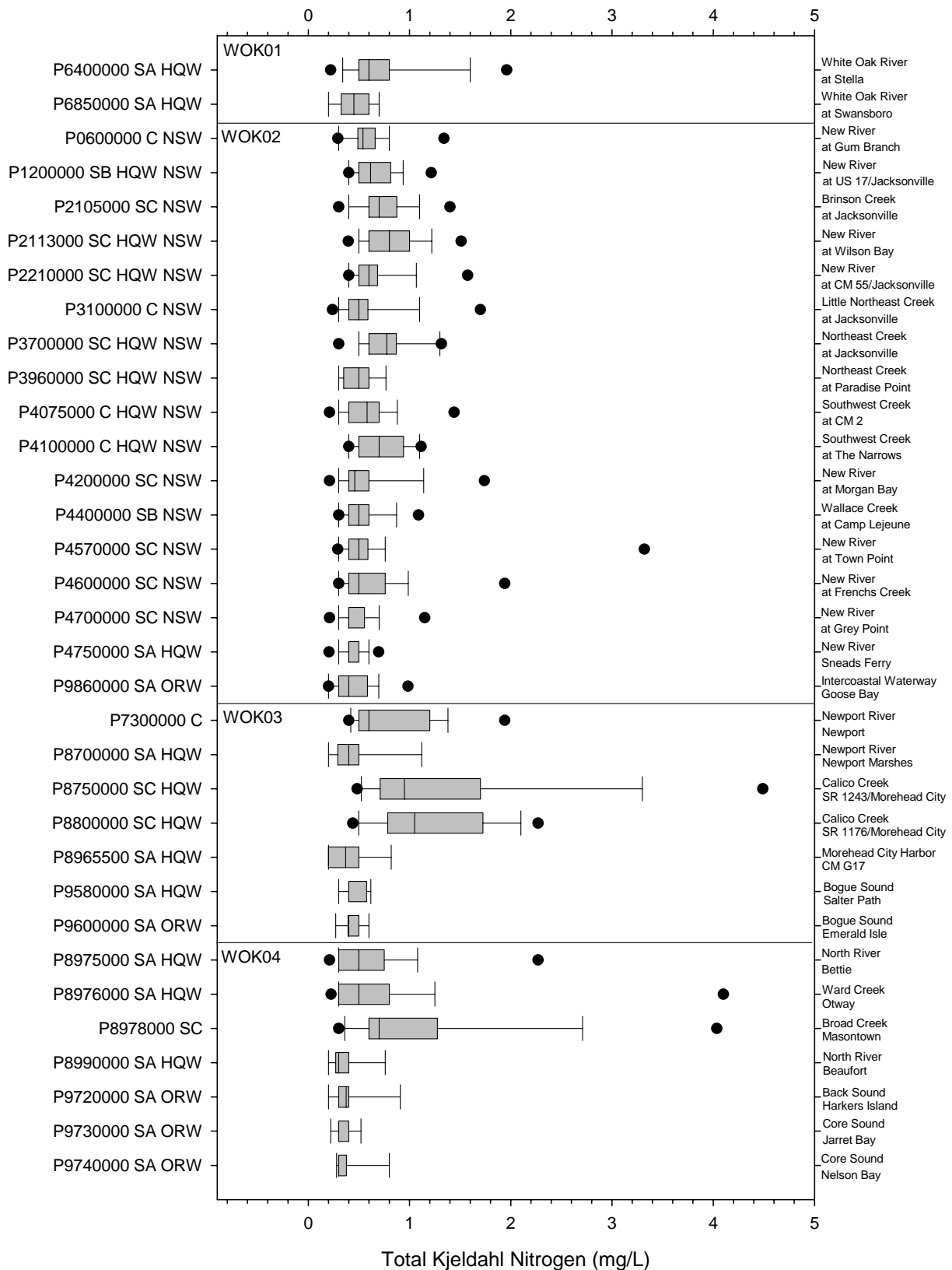


Figure 18. Box Plots for Total Kjeldahl Nitrogen in the White Oak River Basin

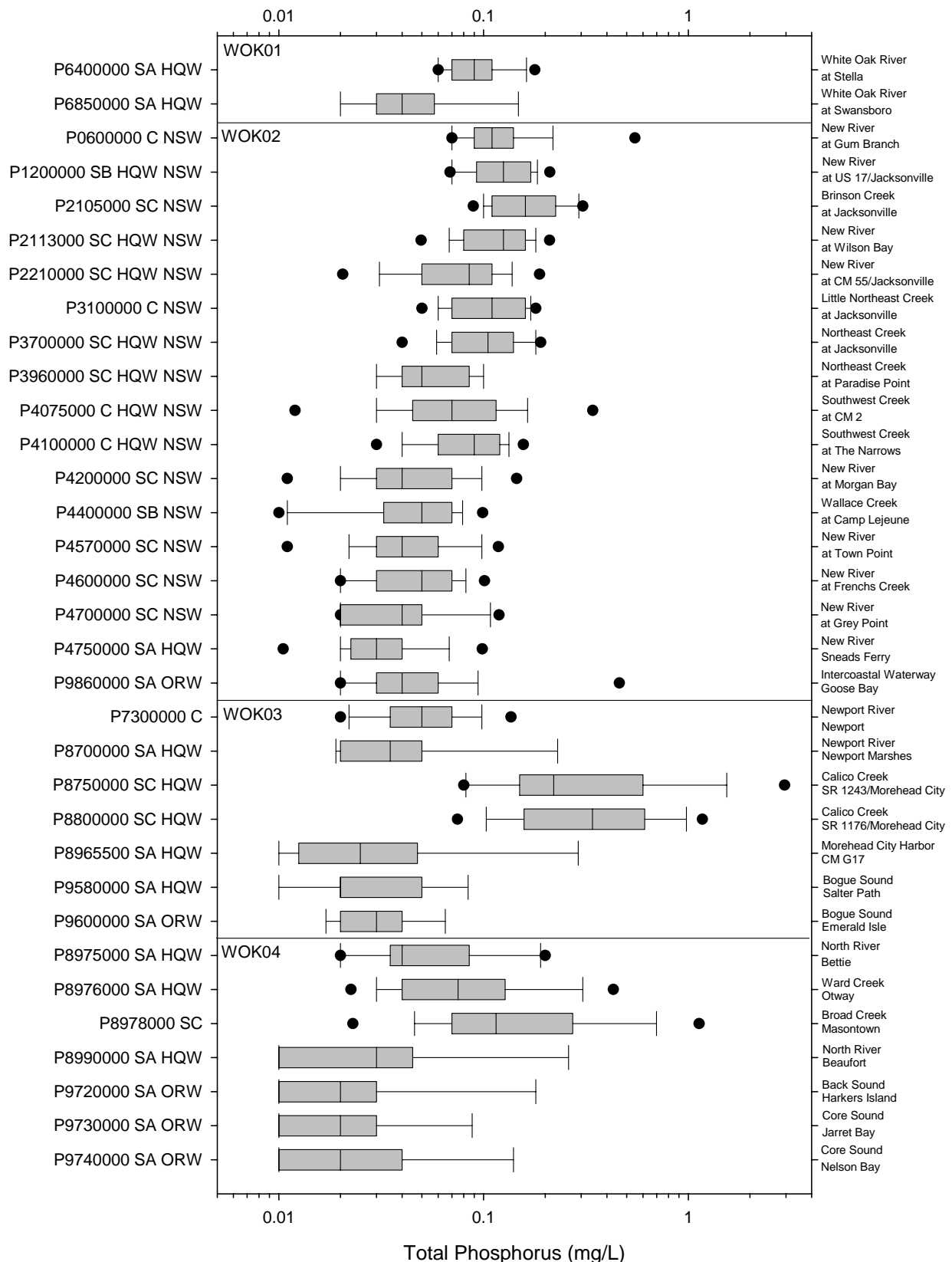


Figure 19. Box Plots for Total Phosphorus in the White Oak River Basin

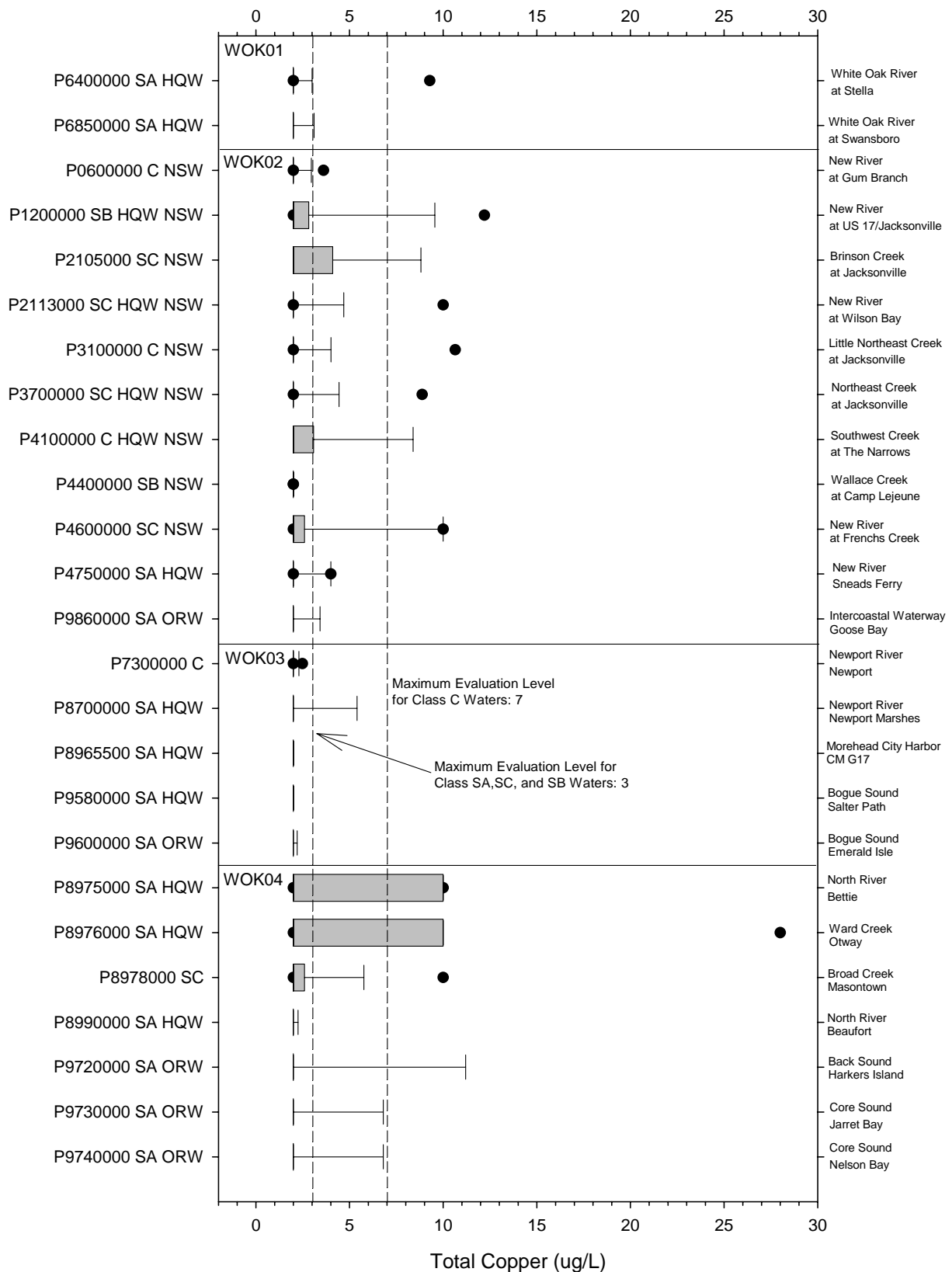


Figure 20. Box Plots for Total Copper in the White Oak River Basin

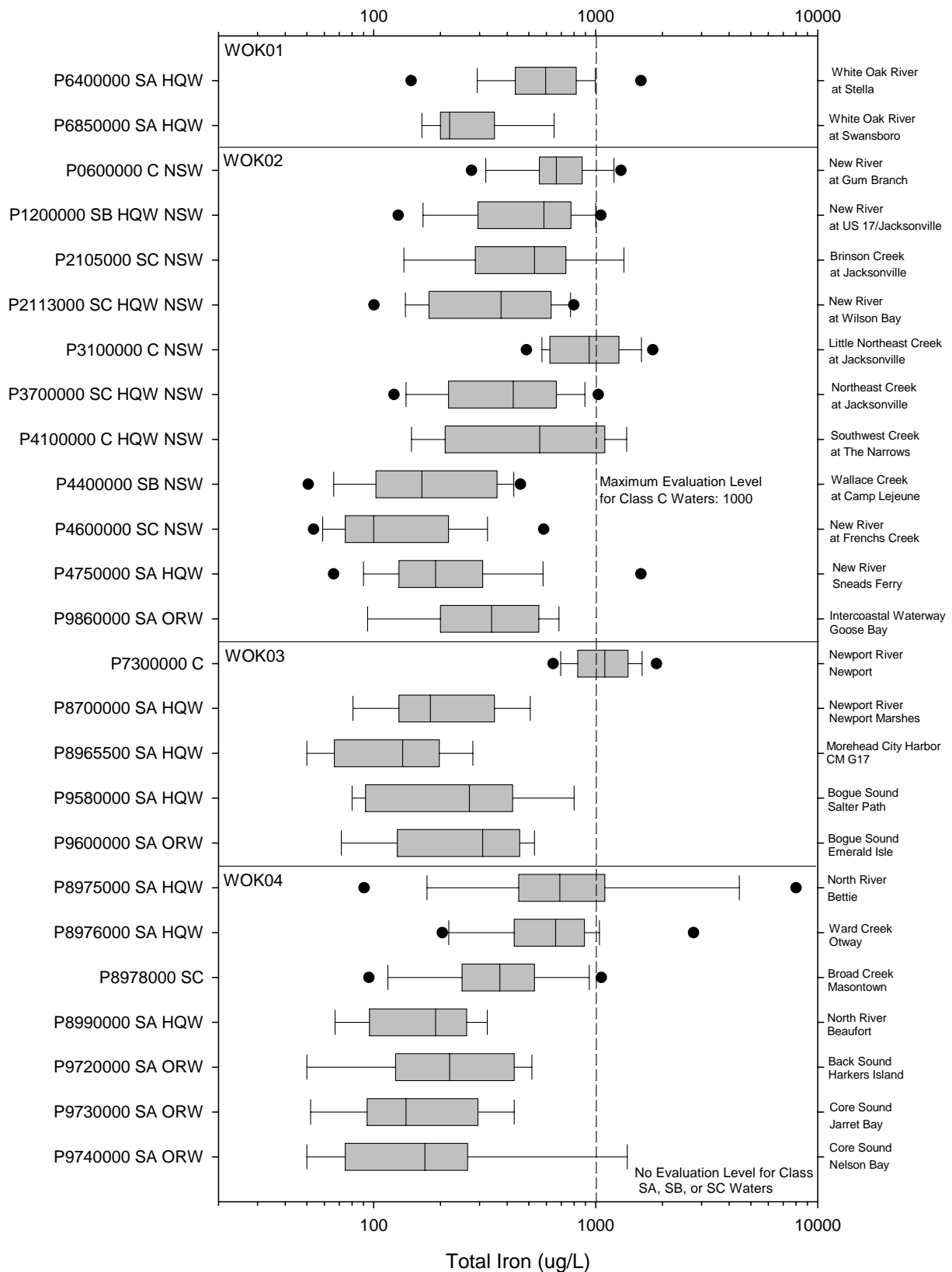


Figure 21. Box Plots for Total Iron in the White Oak River Basin

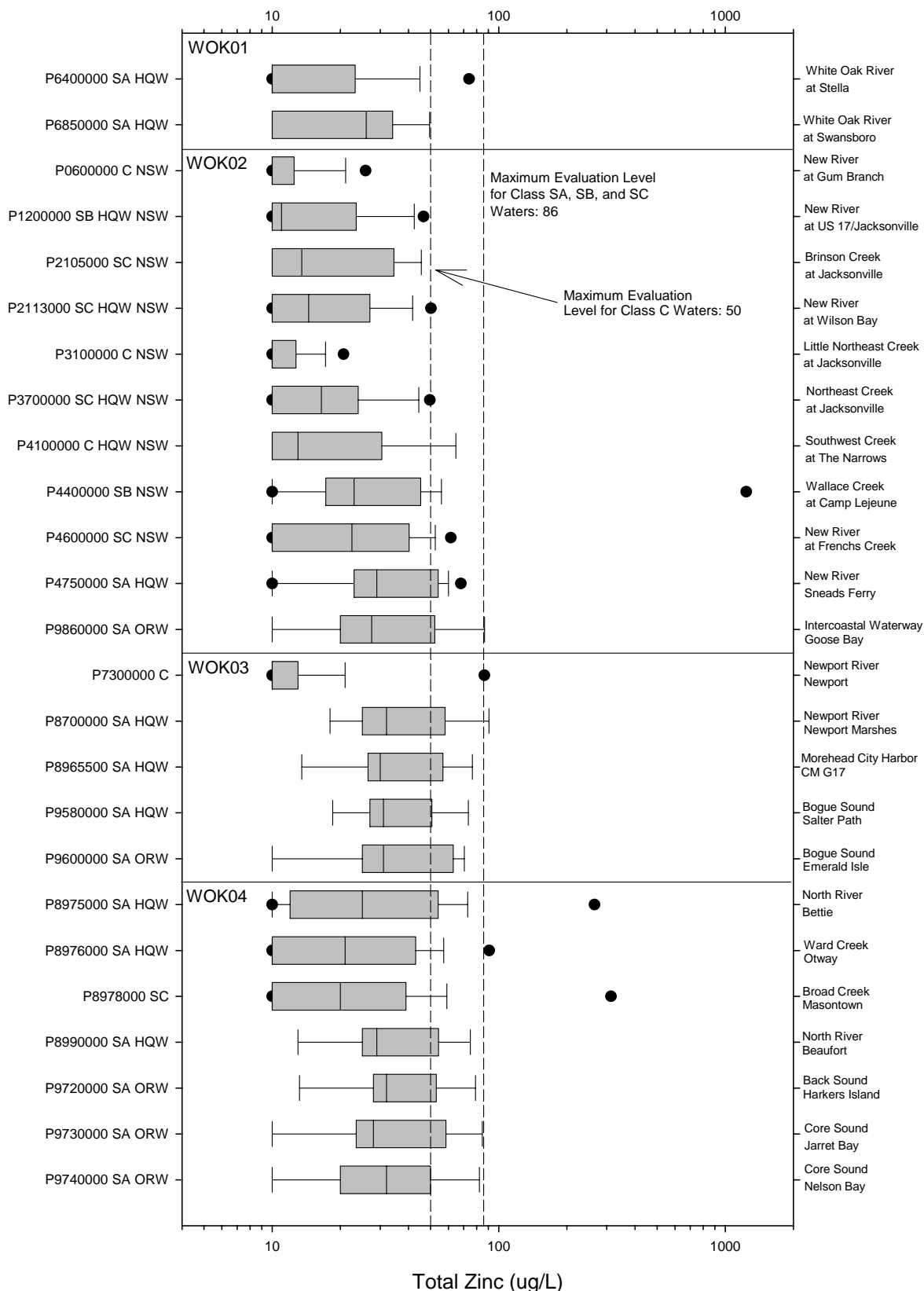


Figure 22. Box Plots for Total Zinc in the White Oak River Basin

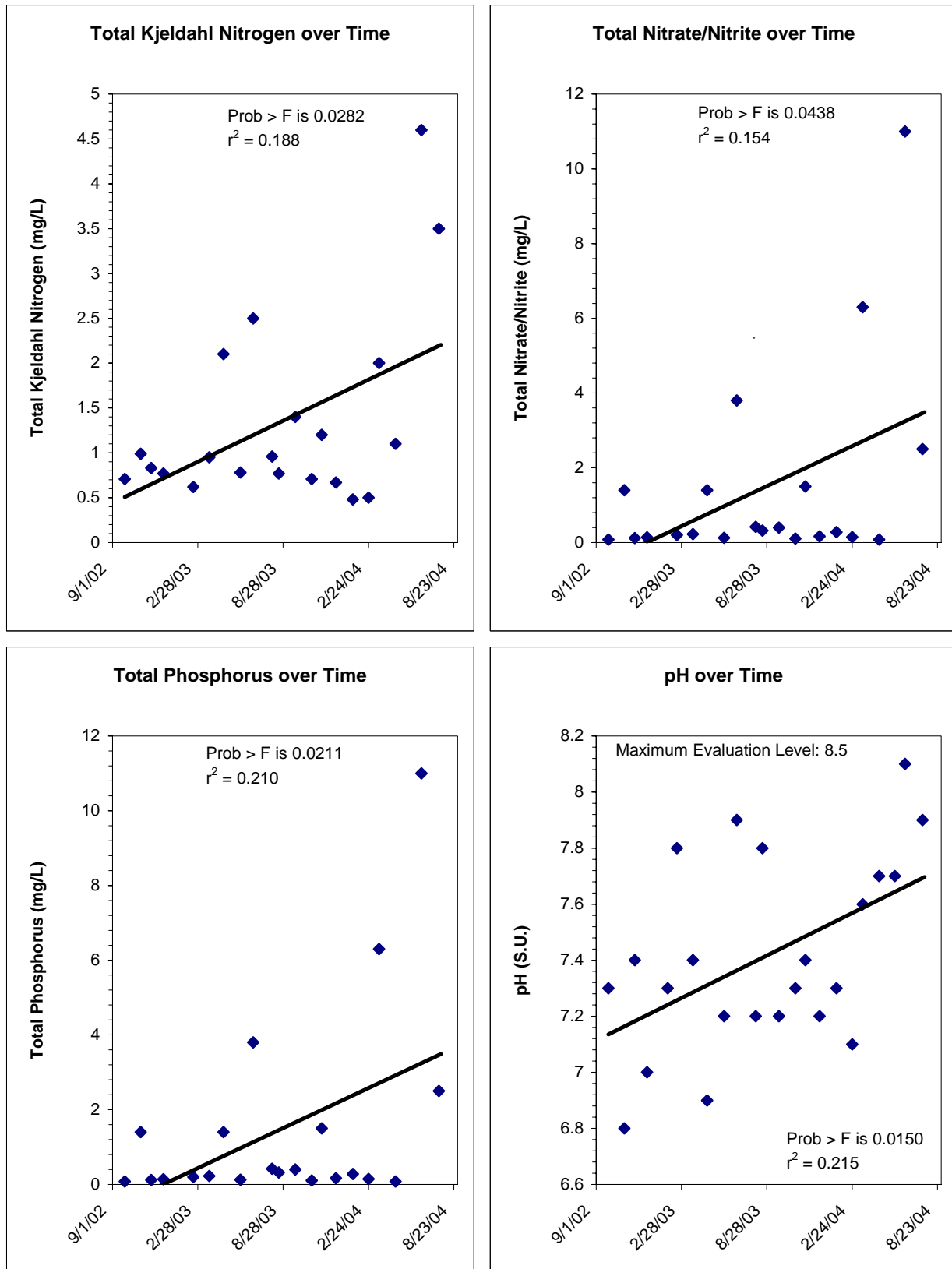


Figure 23. Trends in Selected Parameters for Station P8750000: Calico Creek at SR 1243 at Morehead City

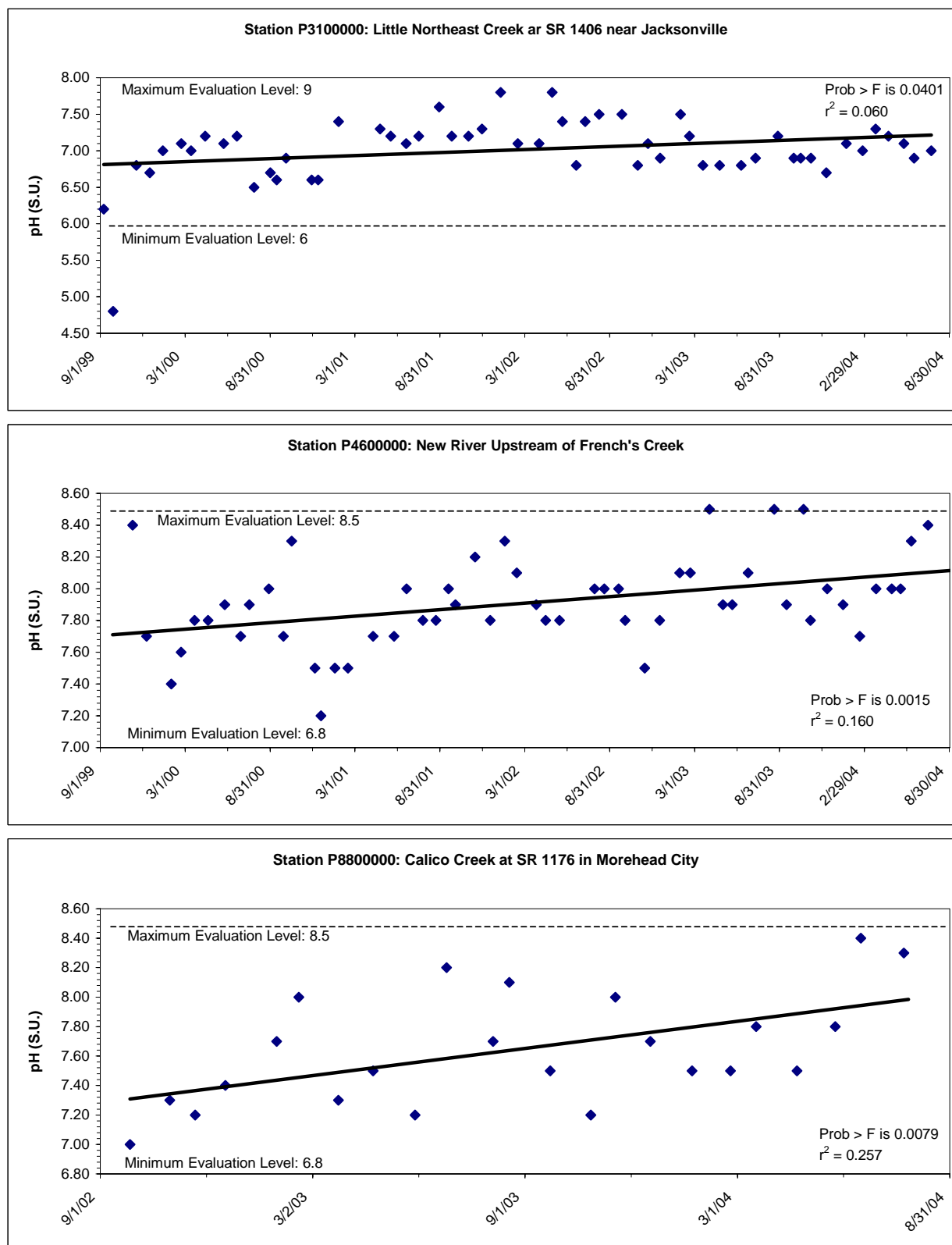


Figure 24. pH Trends at Selected Stations in the White Oak River Basin

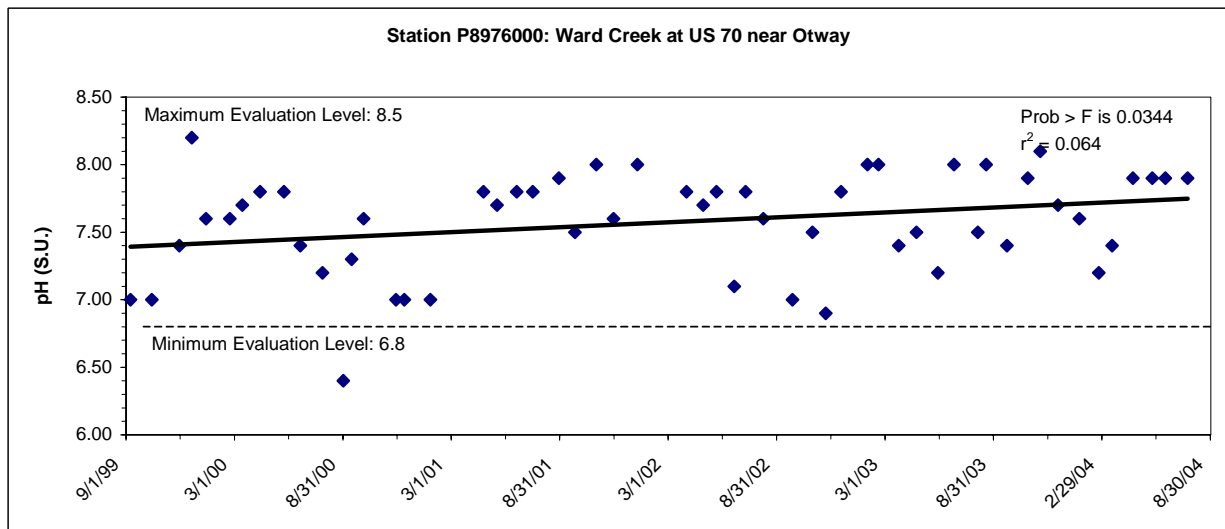
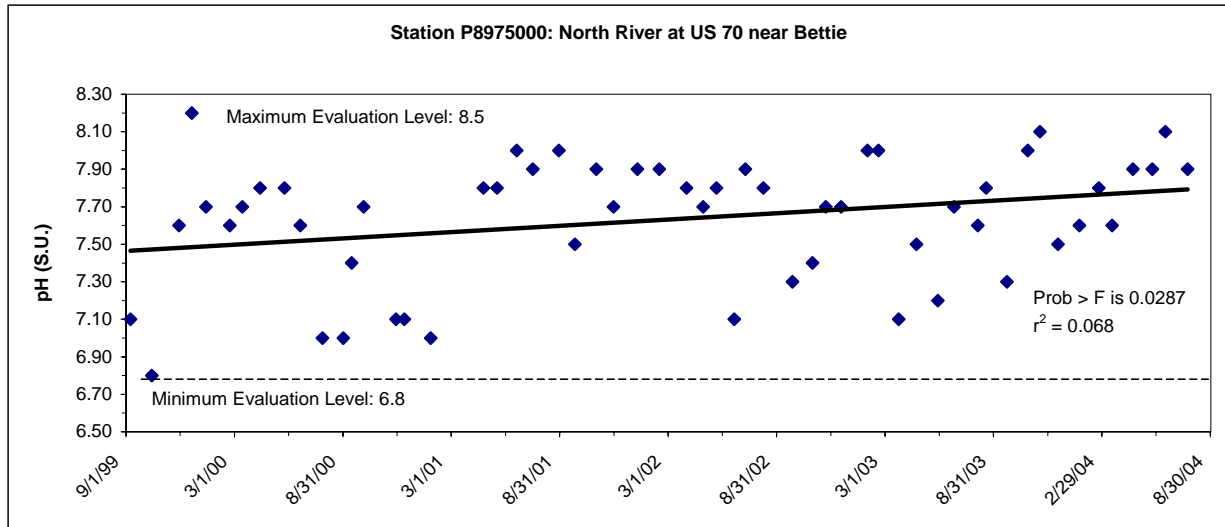


Figure 25. pH Trends at Selected Stations in the White Oak River Basin

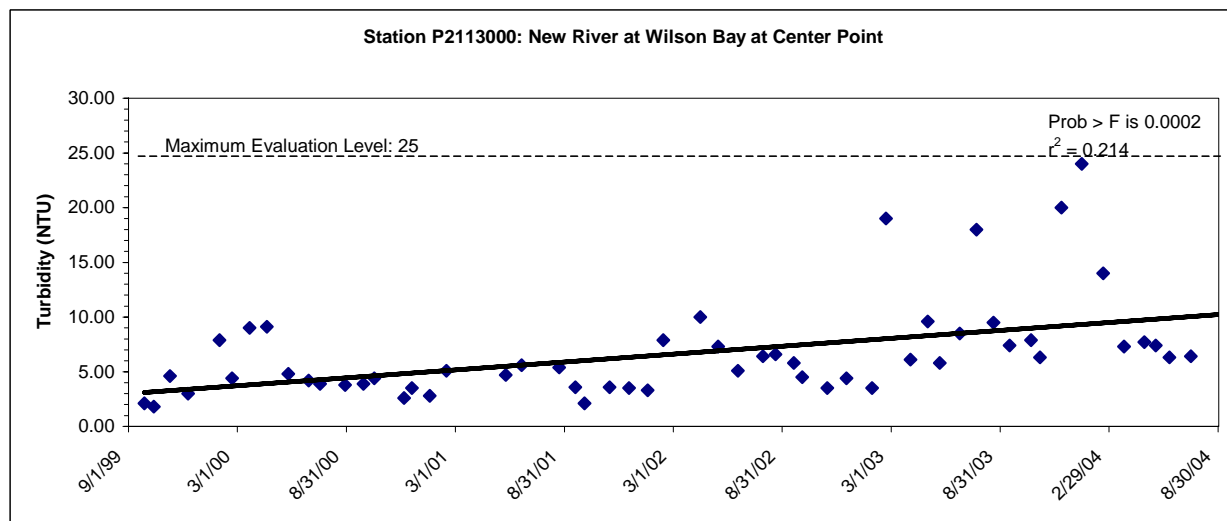
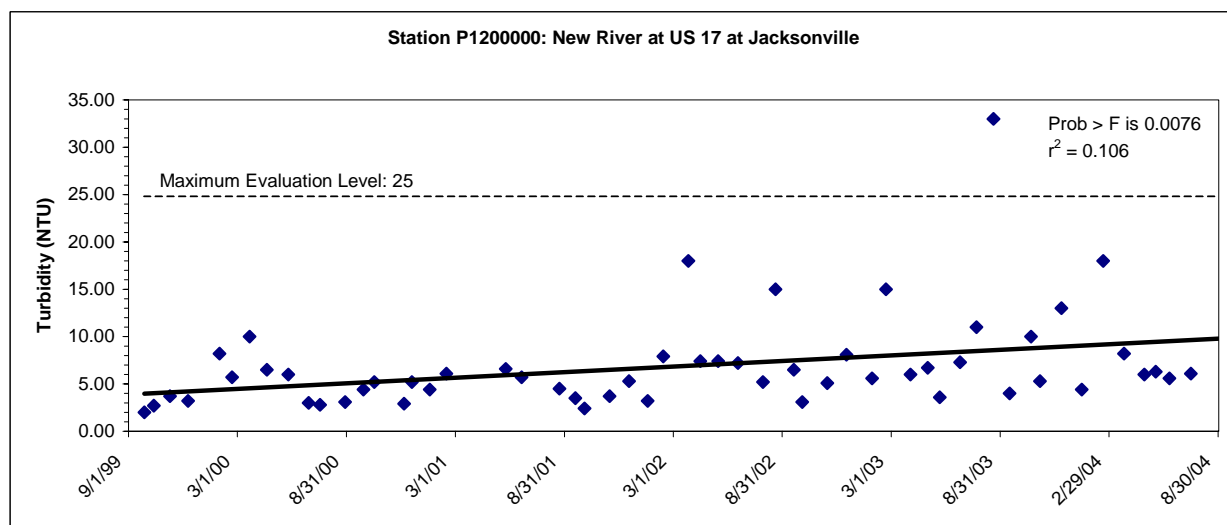
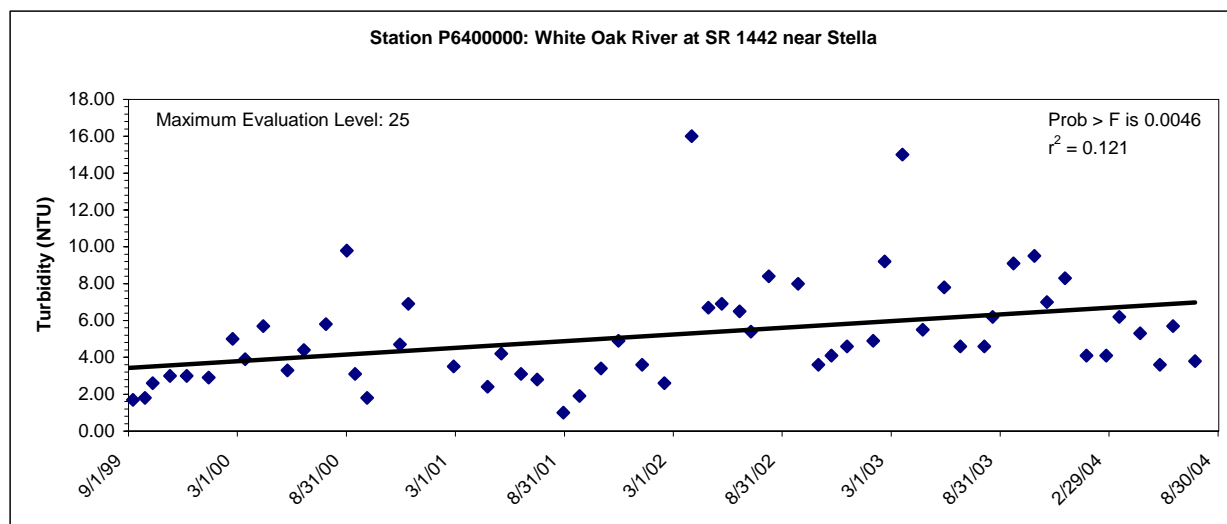


Figure 26. Turbidity Trends at Selected Stations in the White Oak River Basin

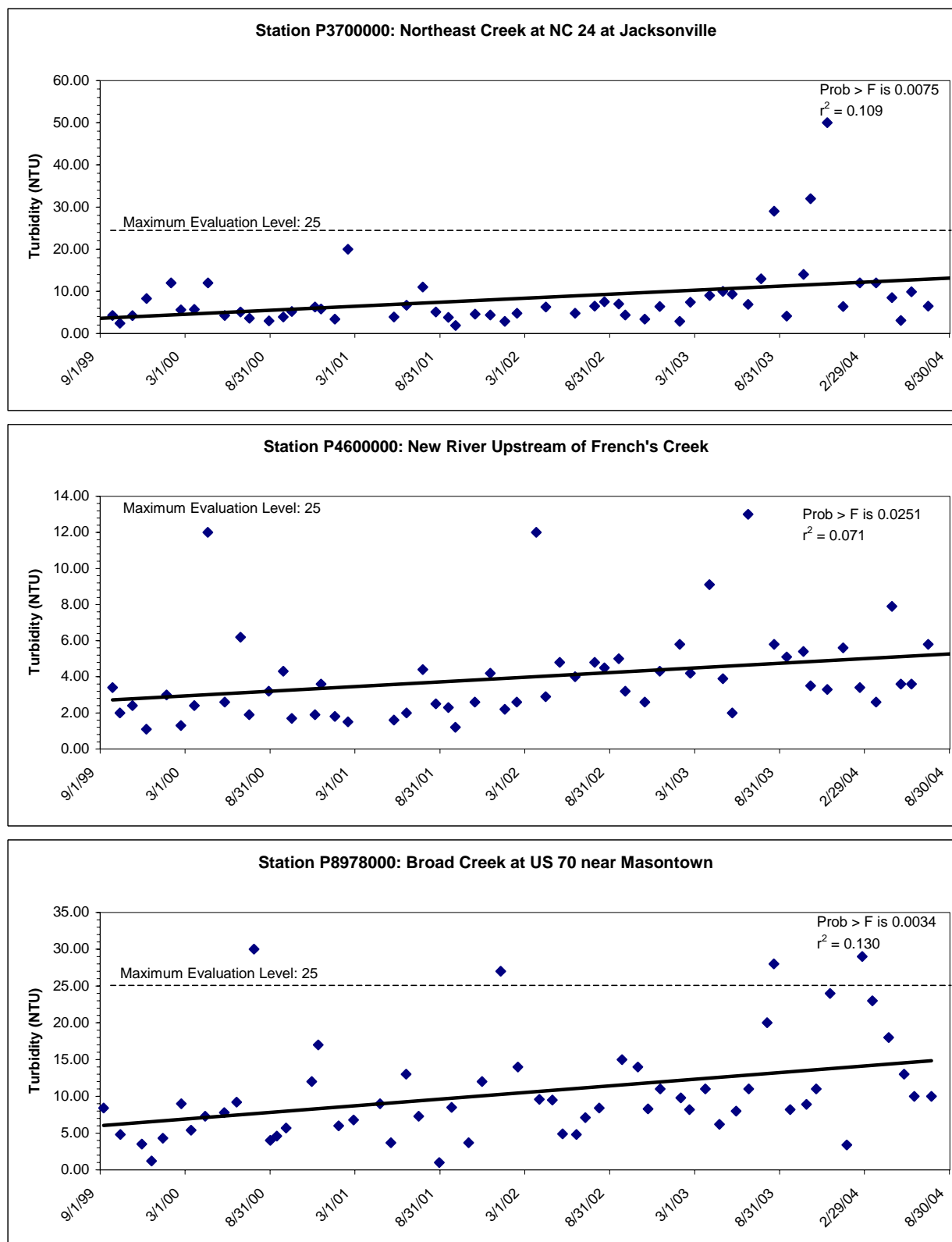


Figure 27. Turbidity Trends at Selected Stations in the White Oak River Basin

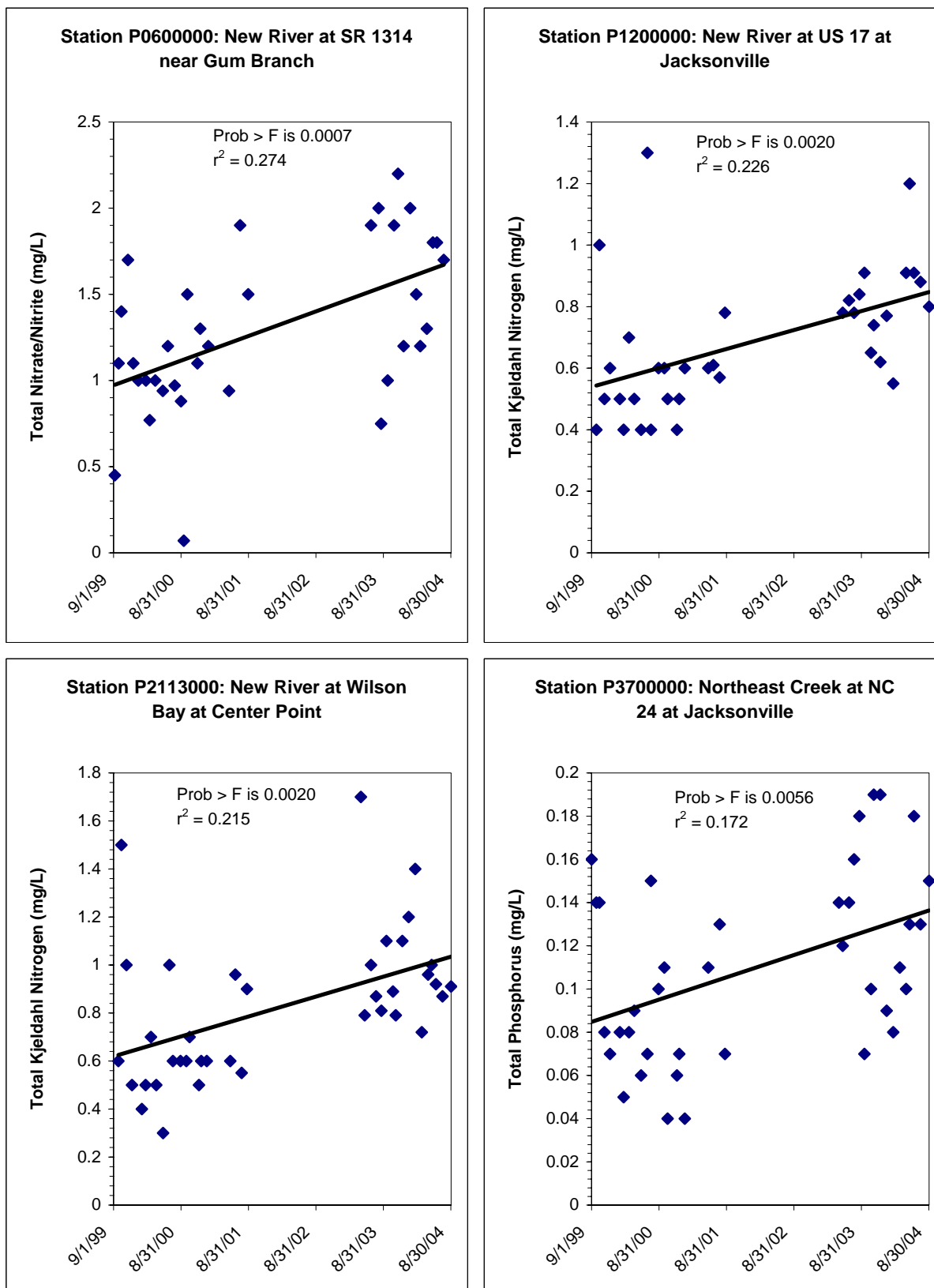


Figure 28. Nutrient Trends at Selected Stations in the White Oak River Basin

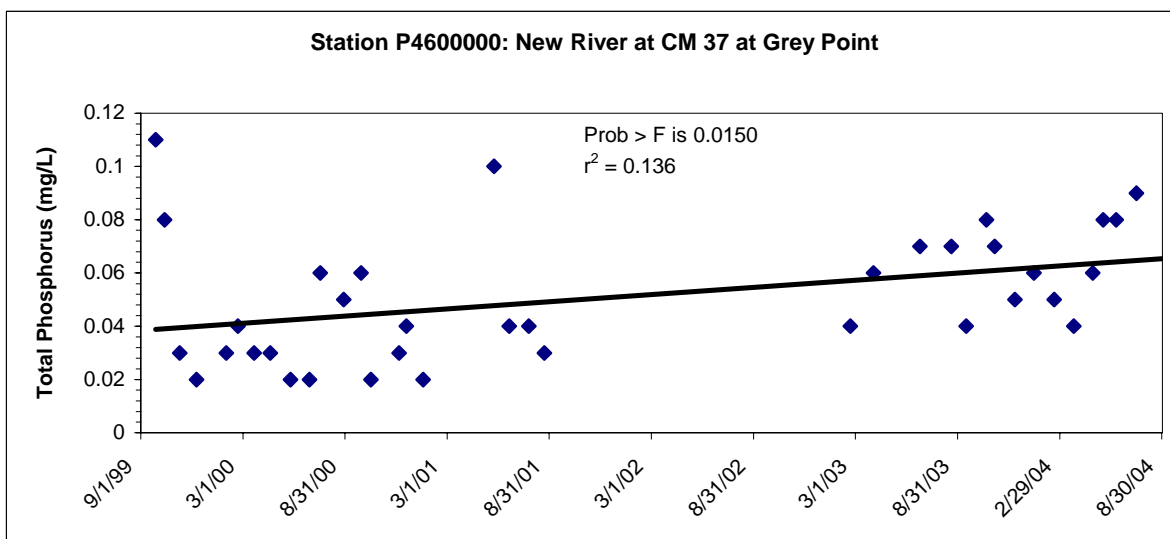
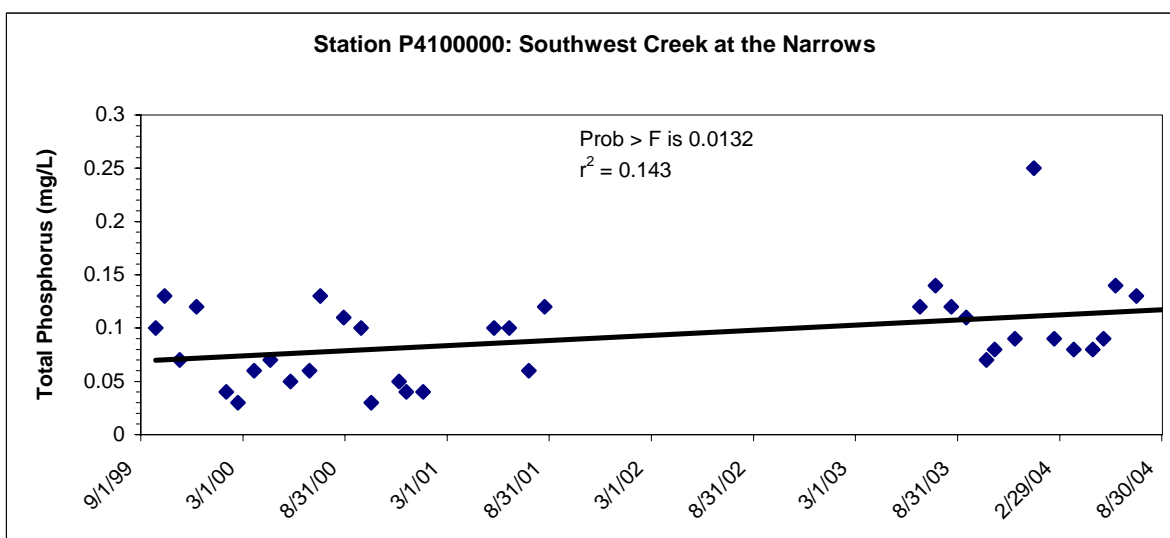
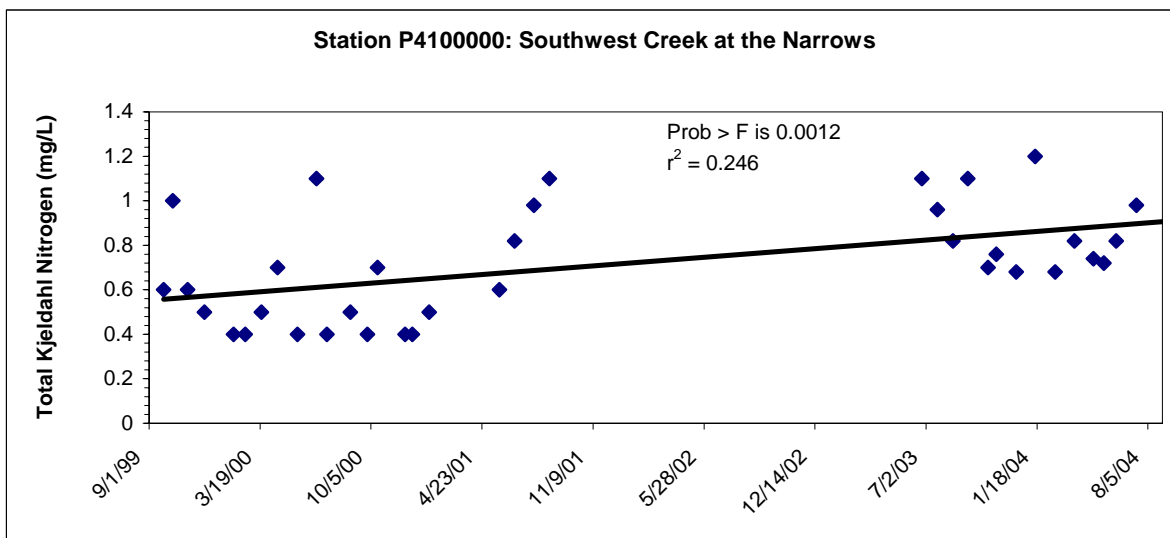


Figure 29. Nutrient Trends at Selected Stations in the White Oak River Basin

Appendix A: AMS Station Summary Sheets

Ambient Monitoring System Station
NCDENR, Division of Water
Basinwide Assessment

Location: NEW RIV AT SR 1314 NR GUM BRANCH

Station #: P0600000

Latitude: 34.84897

Longitude: -77.51961

Agency: NCAMBNT

Subbasin: WOK02

Stream class: C NSW

NC stream index: 19-(1)

Time period: 09/08/1999 to 07/22/2004

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	56	0	<4	0	0		4.4	6	6.4	7.4	9.1	10.3	11.6
	56	0	<5	1	1.8		4.4	6	6.4	7.4	9.1	10.3	11.6
pH (SU)	57	0	<6	0	0		6.2	6.8	7.1	7.3	7.5	7.7	7.9
	57	0	>9	0	0		6.2	6.8	7.1	7.3	7.5	7.7	7.9
Salinity (ppt)	55	21	N/A				0	0	0.1	0.2	0.2	0.2	0.2
Spec. conductance (umhos/cm at 25°C)	56	0	N/A				98	127	186	234	324	356	406
Water Temperature (°C)	57	0	>32	0	0		4	7.8	10.9	17.5	21.5	22.9	23.1
Other													
Chlorophyll A (ug/L)	38	20	>40	0	0		1	1	1	1	2	4	9
TSS (mg/L)	27	8	N/A				1	1	2	5	9	17	34
Turbidity (NTU)	56	1	>50	2	3.6		1	3	4	6	10	16	110
Nutrients (mg/L)													
NH3 as N	35	5	N/A				0.01	0.02	0.04	0.07	0.12	0.41	1.3
NO2 + NO3 as N	35	0	N/A				0.07	0.76	1	1.2	1.7	1.94	2.2
TKN as N	35	1	N/A				0.26	0.3	0.49	0.54	0.66	0.8	2.3
Total Phosphorus	35	0	N/A				0.07	0.07	0.09	0.11	0.14	0.22	0.82
Metals (ug/L)													
Aluminum, total (Al)	28	0	N/A				58	130	195	385	748	1020	1600
Arsenic, total (As)	28	26	>10	2	7.1		10	10	10	10	10	12	50
Cadmium, total (Cd)	27	27	>2	0	0		2	2	2	2	2	2	2
Chromium, total (Cr)	27	27	>50	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	28	22	>7	0	0		2	2	2	2	2	3	4
Iron, total (Fe)	28	0	>1000	3	10.7	No	240	320	558	665	870	1210	1300
Lead, total (Pb)	28	28	>25	0	0		10	10	10	10	10	10	10
Mercury, total (Hg)	28	28	>0.012	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	28	28	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	28	18	>50	0	0		10	10	10	10	12	21	29
Fecal coliform (#/100mL)													
# results:	Geomean			# > 400: % > 400: 95%:									
56	143			8 14									

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

95% : States whether there is 95% 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
 Basinwide Assessment

Location: NEW RIV AT US 17 AT JACKSONVILLE

Station #: P1200000

Latitude: 34.75304

Longitude: -77.43433

Agency: NCAMBNT

Subbasin: WOK02

Stream class: SB HQW NSW

NC stream index: 19-(10.5)

Time period: 09/27/1999 to 08/31/2004

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	57	0	<5	7	12.3	No	3.9	4.7	7	8.4	10.6	11.6	17.5
pH (SU)	57	0	<6.8	2	3.5		6.7	6.9	7.1	7.5	8.1	8.5	8.9
	57	0	>8.5	4	7		6.7	6.9	7.1	7.5	8.1	8.5	8.9
Salinity (ppt)	56	2	N/A				0	0.1	0.33	2.75	6.23	11.1	18.3
Spec. conductance (umhos/cm at 25°C)	56	0	N/A				100	223	902	5020	10971	18662	29945
Water Temperature (°C)	57	0	>32	2	3.5		5	8.8	12.8	22	28.1	29.6	33.7
Other													
Chlorophyll A (ug/L)	39	0	>40	6	15.4	No	1	4	8	20	30	52	100
TSS (mg/L)	19	1	N/A				1	1	4	7	9	11	12
Turbidity (NTU)	57	0	>25	1	1.8		2	3	4	6	7	13	33
Nutrients (mg/L)													
NH3 as N	36	8	N/A				0.01	0.02	0.02	0.05	0.12	0.24	1
NO2 + NO3 as N	36	5	N/A				0.01	0.01	0.15	0.34	0.58	0.7	0.75
TKN as N	36	1	N/A				0.4	0.4	0.5	0.62	0.81	0.94	1.3
Total Phosphorus	36	0	N/A				0.06	0.07	0.09	0.12	0.17	0.18	0.27
Metals (ug/L)													
Aluminum, total (Al)	28	0	N/A				74	98	140	325	542	675	750
Arsenic, total (As)	28	27	>10	1	3.6		10	10	10	10	18	50	50
Cadmium, total (Cd)	28	28	>5	0	0		2	2	2	2	2	10	10
Chromium, total (Cr)	28	28	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	28	22	>3	6	21.4	Yes	2	2	2	2	3	10	14
Iron, total (Fe)	28	0	N/A				120	167	295	585	775	1000	1100
Lead, total (Pb)	28	28	>25	0	0		10	10	10	10	10	50	50
Mercury, total (Hg)	28	28	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	28	28	>8.3	0	0		10	10	10	10	10	14	50
Zinc, total (Zn)	28	11	>86	0	0		10	10	10	11	24	42	47

Fecal coliform (#/100mL)

# results:	Geomean	# > 400:	% > 400:	95%:
58	65	5	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

95% : States whether there is 95% 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
 Basinwide Assessment

Location: BRINSON CRK AT MOUTH AT JACKSONVILLE

Station #: P2105000

Latitude: 34.73475

Longitude: -77.44025

Agency: NCAMBNT

Subbasin: WOK02

Stream class: SC NSW

NC stream index: 19-12

Time period: 09/27/1999 to 08/31/2004

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	56	0	<5	5	8.9		4.3	5	6.9	9.2	11.7	13.7	18.5
pH (SU)	56	0	<6.8	0	0		6.9	7.1	7.4	7.6	8.1	8.6	9
	56	0	>8.5	6	10.7	No	6.9	7.1	7.4	7.6	8.1	8.6	9
Salinity (ppt)	55	0	N/A				0.1	0.52	1.3	4.6	7.3	13.44	20.4
Spec. conductance (umhos/cm at 25°C)	55	0	N/A				199	1196	2423	8270	16090	22148	32940
Water Temperature (°C)	56	0	>32	1	1.8		5.1	9	13.3	21.7	28.5	30.6	33.7
Other													
Chlorophyll A (ug/L)	37	0	>40	11	29.7	Yes	4	6	12	27	50	84	170
TSS (mg/L)	15	1	N/A				1	3	8	10	14	24	28
Turbidity (NTU)	36	0	>25	3	8.3		3	5	7	10	17	26	65
Nutrients (mg/L)													
NH3 as N	37	10	N/A				0.01	0.02	0.02	0.05	0.13	0.33	1.3
NO2 + NO3 as N	37	7	N/A				0.01	0.02	0.07	0.31	0.52	0.72	1.1
TKN as N	37	1	N/A				0.3	0.4	0.6	0.7	0.88	1.1	1.4
Total Phosphorus	37	0	N/A				0.08	0.1	0.11	0.16	0.23	0.29	0.35
Metals (ug/L)													
Aluminum, total (Al)	16	0	N/A				79	136	220	335	492	2290	2500
Arsenic, total (As)	15	15	>10	0	0		10	10	10	10	10	50	50
Cadmium, total (Cd)	16	16	>5	0	0		2	2	2	2	2	10	10
Chromium, total (Cr)	16	16	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	16	12	>3	3	18.8	No	2	2	2	2	4	9	10
Iron, total (Fe)	16	0	N/A				130	137	288	530	735	1340	1900
Lead, total (Pb)	16	16	>25	0	0		10	10	10	10	10	50	50
Mercury, total (Hg)	16	16	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	16	16	>8.3	0	0		10	10	10	10	10	22	50
Zinc, total (Zn)	16	5	>86	0	0		10	10	10	14	34	46	47

Fecal coliform (#/100mL)

# results:	Geomean	# > 400:	% > 400:	95%:
57	95	7	12	

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

95% : States whether there is 95% 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
Basinwide Assessment

Location: NEW RIV AT WILSON BAY AT CENTER POINT

Station #: P2113000

Latitude: 34.73854

Longitude: -77.42746

Agency: NCAMBNT

Subbasin: WOK02

Stream class: SC HQW NSW

NC stream index: 19-14

Time period: 09/27/1999 to 08/31/2004

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	57	0	<5	2	3.5		4.4	6.5	7.4	9.6	11.5	13.7	15.6
pH (SU)	57	0	<6.8	1	1.8		6.7	7.1	7.5	8	8.2	8.5	8.8
	57	0	>8.5	4	7		6.7	7.1	7.5	8	8.2	8.5	8.8
Salinity (ppt)	56	0	N/A				0.1	1.1	2.87	6.45	10.92	16.39	22.3
Spec. conductance (umhos/cm at 25°C)	56	0	N/A				136	2091	5744	11807	18298	26845	35347
Water Temperature (°C)	57	0	>32	2	3.5		3.5	7.8	12.9	22.5	28.4	29.9	33.2
Other													
Chlorophyll A (ug/L)	35	0	>40	8	22.9	Yes	6	9	17	29	40	70	120
TSS (mg/L)	18	0	N/A				2	3	6	8	10	16	19
Turbidity (NTU)	56	0	>25	0	0		2	3	4	6	8	11	24
Nutrients (mg/L)													
NH3 as N	38	13	N/A				0.01	0.01	0.02	0.04	0.13	0.53	1
NO2 + NO3 as N	38	11	N/A				0.01	0.01	0.02	0.19	0.38	0.51	0.64
TKN as N	38	1	N/A				0.3	0.5	0.6	0.8	1	1.22	1.7
Total Phosphorus	38	0	N/A				0.04	0.07	0.08	0.12	0.16	0.18	0.21
Metals (ug/L)													
Aluminum, total (Al)	28	0	N/A				91	127	172	260	495	645	870
Arsenic, total (As)	28	28	>10	0	0		10	10	10	10	50	50	50
Cadmium, total (Cd)	28	28	>5	0	0		2	2	2	2	2	10	10
Chromium, total (Cr)	28	28	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	28	24	>3	2	7.1		2	2	2	2	2	5	10
Iron, total (Fe)	28	0	N/A				76	139	178	375	630	771	810
Lead, total (Pb)	28	27	>25	0	0		10	10	10	10	10	50	50
Mercury, total (Hg)	28	28	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	28	28	>8.3	0	0		10	10	10	10	10	10	50
Zinc, total (Zn)	28	12	>86	0	0		10	10	10	14	27	42	52
Fecal coliform (#/100mL)													
# results:		Geomean		# > 400:		% > 400:		95%:					
57		36		1		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

95% : States whether there is 95% 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
 Basinwide Assessment

Location: NEW RIV AT CM 55 AT JACKSONVILLE

Station #: P2210000

Latitude: 34.72783 **Longitude:** -77.42696

Agency: NCAMBNT

Subbasin: WOK02

Stream class: SC HQW NSW

NC stream index: 19-(11)

Time period: 09/27/1999 to 06/17/2002

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	31	0	<5	0	0		5.1	6.5	7.3	9.5	11	12	13.1
pH (SU)	31	0	<6.8	0	0		6.8	7.2	7.5	7.8	8.2	8.3	8.5
	31	0	>8.5	0	0		6.8	7.2	7.5	7.8	8.2	8.3	8.5
Salinity (ppt)	30	0	N/A				3.7	5.14	7.75	10.75	15.85	20.97	23.2
Spec. conductance (umhos/cm at 25°C)	31	0	N/A				6770	9396	13410	18689	25724	34024	36630
Water Temperature (°C)	31	0	>32	0	0		4	9.8	13.1	21	28	30	30.9
Other													
Chlorophyll A (ug/L)	14	0	>40	1	7.1		3	4	8	15	28	54	71
Nutrients (mg/L)													
NH3 as N	20	4	N/A				0.01	0.01	0.01	0.07	0.16	0.27	1.1
NO2 + NO3 as N	20	7	N/A				0.01	0.01	0.01	0.08	0.15	0.19	0.26
TKN as N	20	1	N/A				0.4	0.4	0.5	0.6	0.68	1.07	1.6
Total Phosphorus	20	1	N/A				0.02	0.03	0.05	0.09	0.11	0.14	0.19
Fecal coliform (#/100mL)													
# results:	Geomean		# > 400:	% > 400:		95%:							
31	16		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

95% : States whether there is 95% 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
 Basinwide Assessment

Location: LITTLE NORTHEAST CRK AT SR 1406 NR JACKSONVILLE

Station #: P3100000

Subbasin: WOK02

Latitude: 34.74835

Longitude: -77.32925

Stream class: C NSW

Agency: NCAMBNT

NC stream index: 19-16-2

Time period: 09/08/1999 to 07/22/2004

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	55	0	<4	11	20	Yes	2.4	3.3	4.1	5.9	8.3	10.4	12
	55	0	<5	23	41.8	Yes	2.4	3.3	4.1	5.9	8.3	10.4	12
pH (SU)	55	0	<6	1	1.8		4.8	6.6	6.8	7.1	7.2	7.5	7.8
	55	0	>9	0	0		4.8	6.6	6.8	7.1	7.2	7.5	7.8
Salinity (ppt)	54	17	N/A				0	0	0.08	0.2	0.2	1.12	17
Spec. conductance (umhos/cm at 25°C)	55	0	N/A				90	100	139	207	290	1146	6531
Water Temperature (°C)	56	0	>32	0	0		4	6.4	10	18.2	22.3	23.9	26.6
Other													
Chloride (mg/L)	1	0	>230	0	0		19	19	19	19	19	19	19
Chlorophyll A (ug/L)	37	6	>40	1	2.7		1	1	1	2	4	9	58
TSS (mg/L)	17	4	N/A				1	1	2	2	4	5	5
Turbidity (NTU)	52	0	>50	0	0		1	3	3	5	8	10	24
Nutrients (mg/L)													
NH3 as N	39	14	N/A				0.01	0.01	0.02	0.04	0.12	0.52	1.6
NO2 + NO3 as N	39	0	N/A				0.01	0.06	0.09	0.13	0.32	0.54	0.81
TKN as N	39	1	N/A				0.24	0.3	0.4	0.5	0.59	1.1	1.9
Total Phosphorus	39	0	N/A				0.03	0.06	0.07	0.11	0.16	0.17	0.21
Metals (ug/L)													
Aluminum, total (Al)	28	0	N/A				85	108	165	250	485	1300	2200
Arsenic, total (As)	28	28	>10	0	0		10	10	10	10	10	10	10
Cadmium, total (Cd)	27	27	>2	0	0		2	2	2	2	2	2	2
Chromium, total (Cr)	27	27	>50	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	28	22	>7	1	3.6		2	2	2	2	2	4	16
Iron, total (Fe)	28	0	>1000	10	35.7	Yes	470	573	622	935	1275	1610	1900
Lead, total (Pb)	28	28	>25	0	0		10	10	10	10	10	10	10
Mercury, total (Hg)	28	28	>0.012	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	28	28	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	28	19	>50	0	0		10	10	10	10	13	17	22
Fecal coliform (#/100mL)													
# results:		Geomean		# > 400:		% > 400:		95%:					
56		200		8		14							

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

95% : States whether there is 95% 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
 Basinwide Assessment

Location: NORTHEAST CRK AT NC 24 AT JACKSONVILLE

Station #: P3700000

Latitude: 34.73479

Longitude: -77.35358

Agency: NCAMBNT

Subbasin: WOK02

Stream class: SC HQW NSW

NC stream index: 19-16-(3.5)

Time period: 09/01/1999 to 08/31/2004

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	57	0	<5	3	5.3		4	5.2	6.1	7.8	9.8	11.4	13.6
pH (SU)	57	0	<6.8	6	10.5	No	6.3	6.7	7.1	7.4	7.8	8.1	8.5
	57	0	>8.5	0	0		6.3	6.7	7.1	7.4	7.8	8.1	8.5
Salinity (ppt)	56	0	N/A				0	0.9	2.15	7.05	12.72	17.16	21.9
Spec. conductance (umhos/cm at 25°C)	56	0	N/A				113	1880	4224	12385	21384	28661	52549
Water Temperature (°C)	57	0	>32	1	1.8		4.9	8	14.7	21.7	27.8	29.6	32.8
Other													
Chlorophyll A (ug/L)	38	0	>40	7	18.4	Yes	2	4	10	19	36	50	92
TSS (mg/L)	16	0	N/A				2	3	6	8	10	16	22
Turbidity (NTU)	56	0	>25	3	5.4		2	3	4	6	10	14	50
Nutrients (mg/L)													
NH3 as N	38	16	N/A				0.01	0.01	0.02	0.02	0.07	0.21	0.43
NO2 + NO3 as N	38	12	N/A				0.01	0.01	0.02	0.04	0.11	0.2	0.24
TKN as N	38	1	N/A				0.3	0.5	0.6	0.77	0.87	1.3	1.6
Total Phosphorus	38	0	N/A				0.04	0.06	0.07	0.11	0.14	0.18	0.19
Metals (ug/L)													
Aluminum, total (Al)	28	0	N/A				68	157	232	450	828	1410	2200
Arsenic, total (As)	28	28	>10	0	0		10	10	10	10	50	50	50
Cadmium, total (Cd)	28	28	>5	0	0		2	2	2	2	10	10	10
Chromium, total (Cr)	28	28	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	28	26	>3	2	7.1		2	2	2	2	2	4	10
Iron, total (Fe)	28	0	N/A				110	140	218	425	665	895	1100
Lead, total (Pb)	28	28	>25	0	0		10	10	10	10	40	50	50
Mercury, total (Hg)	28	28	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	28	28	>8.3	0	0		10	10	10	10	10	14	50
Zinc, total (Zn)	28	10	>86	0	0		10	10	10	16	24	44	51

Fecal coliform (#/100mL)

# results:	Geomean	# > 400:	% > 400:	95%:
58	67	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

95% : States whether there is 95% 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
Basinwide Assessment

Location: NORTHEAST CRK ABOVE PARADISE POINT

Station #: P3960000

Latitude: 34.72639

Longitude: -77.39556

Agency: NCAMBNT

Subbasin: WOK02

Stream class: SC HQW NSW

NC stream index: 19-16-(3.5)

Time period: 05/25/2000 to 06/17/2002

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	25	0	<5	0	0		5.6	6.4	7	8	9.5	10.5	10.7
pH (SU)	25	0	<6.8	0	0		6.8	7.3	7.7	7.8	8	8.1	8.3
	25	0	>8.5	0	0		6.8	7.3	7.7	7.8	8	8.1	8.3
Salinity (ppt)	24	0	N/A				2.2	8.45	11	14.35	17.05	23.3	24.1
Spec. conductance (umhos/cm at 25°C)	25	0	N/A				3990	14978	18944	23110	27676	36732	38010
Water Temperature (°C)	25	0	>32	0	0		8	10	13.8	23	28.8	30.2	31
Other													
Chlorophyll A (ug/L)	14	0	>40	0	0		6	6	8	10	14	17	18
Nutrients (mg/L)													
NH3 as N	13	3	N/A				0.01	0.01	0.01	0.05	0.16	0.2	0.2
NO2 + NO3 as N	13	8	N/A				0.01	0.01	0.01	0.02	0.06	0.13	0.15
TKN as N	13	1	N/A				0.3	0.3	0.35	0.5	0.6	0.77	0.8
Total Phosphorus	13	1	N/A				0.03	0.03	0.04	0.05	0.09	0.1	0.1
Fecal coliform (#/100mL)													
# results:	Geomean		# > 400:	% > 400:		95%:							
23	7		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

95% : States whether there is 95% 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
Basinwide Assessment

Location: NORTHEAST CRK NR JACKSONVILLE

Station #: P4000000

Latitude: 34.71800 **Longitude:** -77.40300

Agency: NCAMBNT

Subbasin: WOK02

Stream class: SC NSW

NC stream index: 19-16-(4.5)

Time period: 09/27/1999 to 04/19/2000

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	6	0	<5	0	0		7.3	7.3	9.5	10.9	13	16.2	16.2
pH (SU)	6	0	<6.8	0	0		7.3	7.3	7.3	7.6	8	8.4	8.4
	6	0	>8.5	0	0		7.3	7.3	7.3	7.6	8	8.4	8.4
Salinity (ppt)	5	0	N/A				5.5	5.5	6.4	11	13.4	13.4	13.4
Spec. conductance (umhos/cm at 25°C)	6	0	N/A				9750	9750	11715	20810	22925	24350	24350
Water Temperature (°C)	6	0	>32	0	0		5	5	11	15.1	16.8	17	17
Nutrients (mg/L)													
NH3 as N	7	3	N/A				0.01	0.01	0.01	0.02	0.38	0.71	0.71
NO2 + NO3 as N	7	3	N/A				0.01	0.01	0.01	0.02	0.07	0.15	0.15
TKN as N	7	0	N/A				0.3	0.3	0.4	0.5	0.5	1.1	1.1
Total Phosphorus	7	0	N/A				0.04	0.04	0.05	0.05	0.13	0.42	0.42

Fecal coliform (#/100mL)

# results:	Geomean	# > 400:	% > 400:	95%:
8	21	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

95% : States whether there is 95% 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
Basinwide Assessment

Location: SOUTHWEST CRK AT CM 2 NR CAMP LEJEUNE

Station #: P4075000

Latitude: 34.69467 **Longitude:** -77.42463

Agency: NCAMBNT

Subbasin: WOK02

Stream class: C HQW NSW

NC stream index: 19-17-(6.5)

Time period: 09/27/1999 to 06/17/2002

	# result	# ND	EL	Results not meeting EL		95%	Min	10th	25th	Percentile				Max
				#	%					50th	75th	90th		
Field														
D.O. (mg/L)	31	0	<4	0	0		5.6	6.2	7.3	8.7	10.1	11.7	13.2	
	31	0	<5	0	0		5.6	6.2	7.3	8.7	10.1	11.7	13.2	
pH (SU)	31	0	<6	0	0		6.7	7.2	7.4	7.7	8	8.2	8.5	
	31	0	>9	0	0		6.7	7.2	7.4	7.7	8	8.2	8.5	
Salinity (ppt)	30	0	N/A				1.2	5.14	10.45	12.9	15.95	20.99	23.3	
Spec. conductance (umhos/cm at 25°C)	31	0	N/A				660	9387	17900	20794	25680	33409	36780	
Water Temperature (°C)	31	0	>32	0	0		4	9.5	12.4	21.7	28	29.2	30	
Other														
Chloride (mg/L)	1	0	>230	1	100		8000	8000	8000	8000	8000	8000	8000	
Chlorophyll A (ug/L)	15	0	>40	0	0		5	6	7	13	16	18	20	
Nutrients (mg/L)														
NH3 as N	21	6	N/A				0.01	0.01	0.01	0.1	0.19	0.3	0.5	
NO2 + NO3 as N	21	9	N/A				0.01	0.01	0.01	0.05	0.12	0.19	0.23	
TKN as N	21	1	N/A				0.2	0.3	0.4	0.58	0.7	0.88	1.5	
Total Phosphorus	21	1	N/A				0.01	0.03	0.04	0.07	0.11	0.16	0.36	
Fecal coliform (#/100mL)														
# results:	Geomean	# > 400:		% > 400:		95%:								
30	11	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

95% : States whether there is 95% 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
 Basinwide Assessment

Location: NEW RIV AT CM 50 NR RAGGED POINT

Station #: P4087500

Latitude: 34.70317 **Longitude:** -77.40405

Agency: NCAMBNT

Subbasin: WOK02

Stream class: SC NSW

NC stream index: 19-(15.5)

Time period: 08/28/2000 to 10/16/2000

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	2	0	<5	0	0		7.3	7.3	7.3	9.5	11.6	11.6	11.6
pH (SU)	2	0	<6.8	0	0		8	8	8	8.2	8.5	8.5	8.5
	2	0	>8.5	0	0		8	8	8	8.2	8.5	8.5	8.5
Salinity (ppt)	2	0	N/A				7.8	7.8	7.8	11.05	14.3	14.3	14.3
Spec. conductance (umhos/cm at 25°C)	2	0	N/A				13610	13610	13610	18505	23400	23400	23400
Water Temperature (°C)	2	0	>32	0	0		20	20	20	24	28	28	28

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

95% : States whether there is 95% 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
Basinwide Assessment

Location: SOUTHWEST CRK AT THE NARROWS

Station #: P4100000

Latitude: 34.68399

Longitude: -77.42621

Agency: NCAMBNT

Subbasin: WOK02

Stream class: C HQW NSW

NC stream index: 19-17-(6.5)

Time period: 09/27/1999 to 08/31/2004

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	57	0	<4	3	5.3		2.9	4.4	5.5	6.9	8.6	10.2	14.7
	57	0	<5	13	22.8	Yes	2.9	4.4	5.5	6.9	8.6	10.2	14.7
pH (SU)	57	0	<6	0	0		6.5	6.7	7	7.2	7.6	8	8.4
	57	0	>9	0	0		6.5	6.7	7	7.2	7.6	8	8.4
Salinity (ppt)	56	0	N/A				0.2	0.7	1.42	5	10.17	16.28	22.6
Spec. conductance (umhos/cm at 25°C)	56	0	N/A				317	1231	2832	8860	18655	26630	35870
Water Temperature (°C)	57	0	>32	1	1.8		4	8.2	12.5	21.2	27	28.9	33.2
Other													
Chloride (mg/L)	1	0	>230	1	100		2800	2800	2800	2800	2800	2800	2800
Chlorophyll A (ug/L)	38	0	>40	1	2.6		2	4	7	16	22	25	79
TSS (mg/L)	15	0	N/A				4	4	6	7	9	16	22
Turbidity (NTU)	26	0	>50	0	0		2	2	4	6	9	13	27
Nutrients (mg/L)													
NH3 as N	36	12	N/A				0.01	0.01	0.02	0.03	0.1	0.33	0.84
NO2 + NO3 as N	36	12	N/A				0.01	0.01	0.02	0.04	0.1	0.13	0.21
TKN as N	36	1	N/A				0.4	0.4	0.5	0.7	0.94	1.1	1.2
Total Phosphorus	36	1	N/A				0.03	0.04	0.06	0.09	0.12	0.13	0.25
Metals (ug/L)													
Aluminum, total (Al)	15	0	N/A				66	104	140	320	630	814	880
Arsenic, total (As)	16	16	>10	0	0		10	10	10	10	10	33	50
Cadmium, total (Cd)	16	16	>2	0	0		2	2	2	2	10	10	10
Chromium, total (Cr)	16	16	>50	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	16	12	>7	2	12.5	No	2	2	2	2	3	8	10
Iron, total (Fe)	15	0	>1000	4	26.7	Yes	130	148	210	560	1100	1380	1500
Lead, total (Pb)	16	16	>25	0	0		10	10	10	10	10	50	50
Mercury, total (Hg)	16	16	>0.012	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	16	16	>88	0	0		10	10	10	10	10	22	50
Zinc, total (Zn)	16	7	>50	2	12.5	No	10	10	10	13	30	65	85
Fecal coliform (#/100mL)													
# results:		Geomean		# > 400:		% > 400:		95%:					
57		35		1		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

95% : States whether there is 95% 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
 Basinwide Assessment

Location: NEW RIV AT CM 47 IN MORGAN BAY

Station #: P4200000

Latitude: 34.68839 **Longitude:** -77.39716

Agency: NCAMBNT

Subbasin: WOK02

Stream class: SC NSW

NC stream index: 19-(15.5)

Time period: 09/27/1999 to 06/17/2002

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	31	0	<5	0	0		5.9	6.9	7.4	8.8	9.8	11.1	12.1
pH (SU)	31	0	<6.8	0	0		7.2	7.3	7.7	7.9	8	8.3	8.3
	31	0	>8.5	0	0		7.2	7.3	7.7	7.9	8	8.3	8.3
Salinity (ppt)	30	0	N/A				4.1	7.65	12.38	14.35	17.95	22.64	25.6
Spec. conductance (umhos/cm at 25°C)	31	0	N/A				7480	13292	20934	23450	29081	35762	39850
Water Temperature (°C)	31	0	>32	0	0		4	8.9	12	20	27.9	28.9	31.2
Other													
Chlorophyll A (ug/L)	15	0	>40	0	0		4	5	6	8	11	14	15
Nutrients (mg/L)													
NH3 as N	21	6	N/A				0.01	0.01	0.01	0.08	0.2	0.32	0.91
NO2 + NO3 as N	21	11	N/A				0.01	0.01	0.01	0.03	0.1	0.14	0.18
TKN as N	21	1	N/A				0.2	0.3	0.4	0.46	0.6	1.14	1.8
Total Phosphorus	21	1	N/A				0.01	0.02	0.03	0.04	0.07	0.1	0.15
Fecal coliform (#/100mL)													
# results:	Geomean		# > 400:	% > 400:		95%:							
30	7		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

95% : States whether there is 95% 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
 Basinwide Assessment

Location: WALLACE CRK AT MAIN SERVICE RD AT CAMP LEJEUNE

Station #: P4400000

Subbasin: WOK02

Latitude: 34.68172 **Longitude:** -77.35857

Stream class: SB NSW

Agency: NCAMBNT

NC stream index: 19-20

Time period: 09/27/1999 to 06/17/2002

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	31	0	<5	0	0		5.8	6	6.6	7.6	9.4	11	13.6
pH (SU)	31	0	<6.8	0	0		6.9	7.2	7.4	7.7	7.8	8.1	8.7
	31	0	>8.5	1	3.2		6.9	7.2	7.4	7.7	7.8	8.1	8.7
Salinity (ppt)	30	0	N/A				2.7	5.21	10.07	14	18.23	20.75	24.2
Spec. conductance (umhos/cm at 25°C)	31	0	N/A				4749	6910	16492	23205	29560	33026	38200
Water Temperature (°C)	31	0	>32	0	0		5	9.3	12.5	19	28	29.3	30
Other													
Chlorophyll A (ug/L)	15	0	>40	0	0		4	5	6	10	12	23	31
TSS (mg/L)	8	0	N/A				2	2	3	8	9	10	10
Turbidity (NTU)	30	0	>25	0	0		1	2	2	3	4	6	17
Nutrients (mg/L)													
NH3 as N	20	7	N/A				0.01	0.01	0.01	0.05	0.2	0.37	0.94
NO2 + NO3 as N	20	13	N/A				0.01	0.01	0.01	0.01	0.04	0.1	0.15
TKN as N	20	1	N/A				0.3	0.3	0.4	0.5	0.6	0.87	1.1
Total Phosphorus	20	1	N/A				0.01	0.01	0.03	0.05	0.07	0.08	0.1
Metals (ug/L)													
Aluminum, total (Al)	20	0	N/A				110	112	155	205	392	527	550
Arsenic, total (As)	20	19	>10	1	5		10	10	10	50	50	50	50
Cadmium, total (Cd)	20	20	>5	0	0		2	2	2	2	10	10	10
Chromium, total (Cr)	20	20	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	20	20	>3	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	20	1	N/A				50	66	102	165	360	428	460
Lead, total (Pb)	20	20	>25	0	0		10	10	10	10	10	50	50
Mercury, total (Hg)	20	20	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	20	20	>8.3	0	0		10	10	10	10	10	46	50
Zinc, total (Zn)	20	3	>86	1	5		10	10	17	23	45	56	1300
Fecal coliform (#/100mL)													
	# results:	Geomean		# > 400:	% > 400:	95%:							
	31	19		1	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

95% : States whether there is 95% 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
 Basinwide Assessment

Location: NEW RIV AT CM 43 AT TOWN PT

Station #: P4570000

Latitude: 34.66959

Longitude: -77.36359

Agency: NCAMBNT

Subbasin: WOK02

Stream class: SC NSW

NC stream index: 19-(15.5)

Time period: 09/27/1999 to 06/17/2002

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	31	0	<5	0	0		6.1	6.4	7.3	8.6	9.7	11.3	12
pH (SU)	31	0	<6.8	0	0		7.2	7.3	7.7	7.8	8	8.4	8.5
	31	0	>8.5	0	0		7.2	7.3	7.7	7.8	8	8.4	8.5
Salinity (ppt)	30	0	N/A				5.1	9.04	13.28	15.9	19.32	24.05	26.4
Spec. conductance (umhos/cm at 25°C)	31	0	N/A				8990	15764	22090	25840	31020	37568	41120
Water Temperature (°C)	31	0	>32	0	0		3	8.9	11.8	20	27	28.5	29
Other													
Chlorophyll A (ug/L)	15	0	>40	0	0		3	4	5	7	8	12	14
Turbidity (NTU)	1	0	>25	0	0		4	4	4	4	4	4	4
Nutrients (mg/L)													
NH3 as N	21	7	N/A				0.01	0.01	0.01	0.05	0.17	0.35	1.6
NO2 + NO3 as N	21	10	N/A				0.01	0.01	0.01	0.02	0.09	0.14	0.15
TKN as N	21	0	N/A				0.29	0.3	0.4	0.5	0.59	0.76	3.6
Total Phosphorus	21	1	N/A				0.01	0.02	0.03	0.04	0.06	0.1	0.12
Fecal coliform (#/100mL)													
# results:	Geomean	# > 400:		% > 400:		95%:							
31	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

95% : States whether there is 95% 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
Basinwide Assessment

Location: NEW RIV UPS OF FRENCHS CRK

Station #: P4600000

Latitude: 34.64669

Longitude: -77.34756

Agency: NCAMBNT

Subbasin: WOK02

Stream class: SC NSW

NC stream index: 19-(15.5)

Time period: 09/27/1999 to 08/31/2004

	# result	# ND	EL	Results not meeting EL		95%	Min	10th	25th	50th	75th	90th	Max
				#	%								
Field													
D.O. (mg/L)	55	0	<5	0	0		5.8	6.8	7.6	8.5	9.8	11.4	13
pH (SU)	55	0	<6.8	0	0		7.2	7.5	7.8	7.9	8	8.3	8.5
	55	0	>8.5	0	0		7.2	7.5	7.8	7.9	8	8.3	8.5
Salinity (ppt)	54	0	N/A				3.3	7.55	12.3	16.85	21	23.8	27.9
Spec. conductance (umhos/cm at 25°C)	54	0	N/A				5923	13115	21479	27452	33470	37472	43000
Water Temperature (°C)	55	0	>32	0	0		2.9	7.5	12	20.7	27	29	30.7
Other													
Chlorophyll A (ug/L)	37	0	>40	1	2.7		3	4	6	13	22	33	72
TSS (mg/L)	15	0	N/A				1	3	5	7	11	97	120
Turbidity (NTU)	57	0	>25	0	0		1	2	2	3	5	7	13
Nutrients (mg/L)													
NH3 as N	37	22	N/A				0.01	0.01	0.02	0.02	0.03	0.18	1.9
NO2 + NO3 as N	37	22	N/A				0.01	0.01	0.01	0.02	0.05	0.1	0.22
TKN as N	35	0	N/A				0.3	0.3	0.4	0.5	0.76	0.99	5.7
Total Phosphorus	37	1	N/A				0.02	0.02	0.03	0.05	0.07	0.08	0.11
Metals (ug/L)													
Aluminum, total (Al)	28	0	N/A				83	110	142	205	302	491	1400
Arsenic, total (As)	28	27	>10	1	3.6		10	10	10	50	50	50	52
Cadmium, total (Cd)	28	28	>5	0	0		2	2	2	10	10	10	10
Chromium, total (Cr)	28	28	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	28	26	>3	1	3.6		2	2	2	2	3	10	10
Iron, total (Fe)	28	1	N/A				50	59	74	100	218	326	750
Lead, total (Pb)	28	28	>25	0	0		10	10	10	10	50	50	50
Mercury, total (Hg)	28	28	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	28	28	>8.3	0	0		10	10	10	10	10	50	50
Zinc, total (Zn)	28	11	>86	0	0		10	10	10	22	40	53	65
Fecal coliform (#/100mL)													
	# results:	Geomean	# > 400:		% > 400:		95%:						
	56	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

95% : States whether there is 95% 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
Basinwide Assessment

Location: NEW RIV AT CM 37 AT GREY PT

Station #: P4700000

Latitude: 34.62658

Longitude: -77.36771

Agency: NCAMBNT

Subbasin: WOK02

Stream class: SC NSW

NC stream index: 19-(15.5)

Time period: 09/27/1999 to 06/17/2002

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	30	0	<5	0	0		6.4	6.5	7.2	8.8	9.9	11.5	14.1
pH (SU)	31	0	<6.8	0	0		7	7.4	7.7	7.8	8	8.3	8.7
	31	0	>8.5	1	3.2		7	7.4	7.7	7.8	8	8.3	8.7
Salinity (ppt)	30	0	N/A				7.5	10.57	16.7	18.85	21.75	26.16	28.2
Spec. conductance (umhos/cm at 25°C)	31	0	N/A				13150	18654	26838	29775	34480	40404	43670
Water Temperature (°C)	31	0	>32	0	0		3	8.9	11	19	26	28.1	29
Other													
Chlorophyll A (ug/L)	14	0	>40	0	0		3	4	5	6	8	13	17
Turbidity (NTU)	1	0	>25	0	0		1	1	1	1	1	1	1
Nutrients (mg/L)													
NH3 as N	21	7	N/A				0.01	0.01	0.01	0.04	0.33	0.71	0.89
NO2 + NO3 as N	21	12	N/A				0.01	0.01	0.01	0.01	0.06	0.1	0.15
TKN as N	21	1	N/A				0.2	0.3	0.4	0.4	0.56	0.7	1.2
Total Phosphorus	21	1	N/A				0.02	0.02	0.02	0.04	0.05	0.11	0.12
Fecal coliform (#/100mL)													
# results:	30	Geomean	5	# > 400:	0	% > 400:	0	95%:					

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

95% : States whether there is 95% 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
 Basinwide Assessment

Location: NEW RIV AT NC 172 NR SNEADS FERRY

Station #: P4750000

Latitude: 34.57847

Longitude: -77.39893

Agency: NCAMBNT

Subbasin: WOK02

Stream class: SA HQW

NC stream index: 19-(27)

Time period: 09/27/1999 to 06/17/2002

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	29	0	<5	0	0		5.8	6	6.7	7.7	8.6	10	11.6
pH (SU)	30	0	<6.8	1	3.3		6.7	7.4	7.6	7.8	7.9	8	8.1
	30	0	>8.5	0	0		6.7	7.4	7.6	7.8	7.9	8	8.1
Salinity (ppt)	29	0	N/A				20.6	21	23.35	27.3	29.4	32.1	34
Spec. conductance (umhos/cm at 25°C)	30	0	N/A				30361	33244	36994	42050	45396	48890	51650
Water Temperature (°C)	30	0	>32	0	0		3	9.2	11	18.2	25.2	27.8	28
Other													
Chlorophyll A (ug/L)	13	0	>40	0	0		2	2	3	4	6	7	7
TSS (mg/L)	8	1	N/A				1	1	8	11	22	30	30
Turbidity (NTU)	28	0	>25	1	3.6		2	2	3	4	6	10	30
Nutrients (mg/L)													
NH3 as N	20	7	N/A				0.01	0.01	0.01	0.06	0.17	0.31	0.42
NO2 + NO3 as N	20	11	N/A				0.01	0.01	0.01	0.01	0.03	0.1	0.15
TKN as N	20	1	N/A				0.2	0.3	0.4	0.4	0.5	0.6	0.7
Total Phosphorus	20	2	N/A				0.01	0.02	0.02	0.03	0.04	0.07	0.1
Metals (ug/L)													
Aluminum, total (Al)	19	0	N/A				120	210	290	420	580	1000	2900
Arsenic, total (As)	19	19	>10	0	0		10	10	10	50	50	50	50
Cadmium, total (Cd)	19	19	>5	0	0		2	2	2	10	10	10	10
Chromium, total (Cr)	19	19	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	19	19	>3	0	0		2	2	2	2	2	4	4
Iron, total (Fe)	19	0	N/A				66	90	130	190	310	580	1600
Lead, total (Pb)	19	19	>25	0	0		10	10	10	50	50	50	50
Mercury, total (Hg)	19	19	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	19	19	>8.3	0	0		10	10	10	10	50	50	50
Zinc, total (Zn)	19	3	>86	0	0		10	10	23	29	54	60	68
Fecal coliform (#/100mL)													
# results:	Geomean			# > 400:	% > 400:	95%:	Median	# > 43	% > 43	95%			
30	5			0	0		10	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

95% : States whether there is 95% 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
Basinwide Assessment

Location: WHITE OAK RIV AT SR 1442 NR STELLA

Station #: P6400000

Latitude: 34.77486

Longitude: -77.15383

Agency: NCAMBNT

Subbasin: WOK01

Stream class: SA HQW

NC stream index: 20-(18)

Time period: 09/01/1999 to 07/22/2004

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	57	0	<5	16	28.1	Yes	3.1	4	4.9	6.7	8.2	9.9	11.5
pH (SU)	57	0	<6.8	20	35.1	Yes	5.7	6.5	6.7	6.9	7.2	7.6	7.9
	57	0	>8.5	0	0		5.7	6.5	6.7	6.9	7.2	7.6	7.9
Salinity (ppt)	56	2	N/A				0	0.07	0.2	2.25	6.23	15.64	21.8
Spec. conductance (umhos/cm at 25°C)	57	0	N/A				80	155	419	4288	10786	25592	34678
Water Temperature (°C)	58	0	>32	0	0		4.4	8.1	12.8	20.3	25	27.8	30.5
Other													
TSS (mg/L)	17	3	N/A				1	1	3	6	10	25	47
Turbidity (NTU)	57	1	>25	0	0		1	2	3	5	7	9	16
Nutrients (mg/L)													
NH3 as N	23	6	N/A				0.01	0.01	0.03	0.17	0.32	0.86	1.5
NO2 + NO3 as N	22	2	N/A				0.01	0.02	0.04	0.07	0.1	0.13	0.15
TKN as N	23	2	N/A				0.2	0.34	0.5	0.6	0.8	1.6	2
Total Phosphorus	23	0	N/A				0.06	0.06	0.07	0.09	0.11	0.16	0.18
Metals (ug/L)													
Aluminum, total (Al)	28	0	N/A				190	301	422	560	708	833	1900
Arsenic, total (As)	28	28	>10	0	0		10	10	10	10	40	50	50
Cadmium, total (Cd)	27	27	>5	0	0		2	2	2	2	2	10	10
Chromium, total (Cr)	27	27	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	28	26	>3	1	3.6		2	2	2	2	2	3	10
Iron, total (Fe)	28	0	N/A				80	293	435	595	818	997	1600
Lead, total (Pb)	28	28	>25	0	0		10	10	10	10	10	50	50
Mercury, total (Hg)	28	28	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	28	28	>8.3	0	0		10	10	10	10	10	10	50
Zinc, total (Zn)	28	15	>86	1	3.6		10	10	10	10	23	45	91
Fecal coliform (#/100mL)													
# results:	Geomean			# > 400:	% > 400:	95%:	Median	# > 43	% > 43	95%			
57	53			4	7		41	27	47	Yes			

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

95% : States whether there is 95% 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
Basinwide Assessment

Location: WHITE OAK RIV AT NC 24 AT SWANSBORO

Station #: P6850000

Latitude: 34.68271

Longitude: -77.11291

Agency: NCAMBNT

Subbasin: WOK01

Stream class: SA HQW

NC stream index: 20-(18)

Time period: 09/08/1999 to 07/16/2001

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	16	0	<5	0	0		5.6	5.7	6.2	6.8	7.9	8.3	8.3
pH (SU)	17	0	<6.8	0	0		7.6	7.6	7.6	7.8	8	8.3	8.5
	17	0	>8.5	0	0		7.6	7.6	7.6	7.8	8	8.3	8.5
Salinity (ppt)	16	0	N/A				14.8	17.39	24.75	27.3	32.48	33.39	33.6
Spec. conductance (umhos/cm at 25°C)	17	0	N/A				34	35	27330	39100	48840	50784	51200
Water Temperature (°C)	17	0	>32	0	0		10	11.6	14.8	23.7	26.6	27	27.1
Other													
TSS (mg/L)	4	0	N/A				2	2	4	18	35	39	39
Turbidity (NTU)	16	0	>25	0	0		2	2	3	3	4	7	9
Nutrients (mg/L)													
NH3 as N	16	7	N/A				0.01	0.01	0.01	0.05	0.23	0.37	0.54
NO2 + NO3 as N	16	10	N/A				0.01	0.01	0.01	0.01	0.04	0.11	0.15
TKN as N	16	1	N/A				0.2	0.2	0.33	0.45	0.6	0.7	0.7
Total Phosphorus	16	1	N/A				0.02	0.02	0.03	0.04	0.06	0.15	0.26
Metals (ug/L)													
Aluminum, total (Al)	14	0	N/A				220	240	300	395	460	780	1100
Arsenic, total (As)	14	14	>10	0	0		10	10	50	50	50	50	50
Cadmium, total (Cd)	13	13	>5	0	0		2	2	2	10	10	10	10
Chromium, total (Cr)	13	13	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	14	13	>3	1	7.1		2	2	2	2	2	3	4
Iron, total (Fe)	14	0	N/A				140	165	200	220	350	650	690
Lead, total (Pb)	14	14	>25	0	0		10	10	10	50	50	50	50
Mercury, total (Hg)	14	14	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	14	14	>8.3	0	0		10	10	10	10	50	50	50
Zinc, total (Zn)	14	4	>86	0	0		10	10	10	26	34	50	59
Fecal coliform (#/100mL)													
# results:	Geomean			# > 400:	% > 400:	95%:	Median	# > 43	% > 43	95%			
17	11			0	0		10	2	12	No			

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

95% : States whether there is 95% 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
Basinwide Assessment

Location: NEWPORT RIV AT SR 1247 AT NEWPORT

Station #: P7300000

Latitude: 34.78054

Longitude: -76.85971

Agency: NCAMBNT

Subbasin: WOK03

Stream class: C

NC stream index: 21-(1)

Time period: 09/01/1999 to 07/22/2004

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	56	0	<4	13	23.2	Yes	1.2	3.3	4	4.9	7	8	8.8
	56	0	<5	28	50	Yes	1.2	3.3	4	4.9	7	8	8.8
pH (SU)	56	0	<6	15	26.8	Yes	5	5.4	5.9	6.4	6.8	7.1	7.8
	56	0	>9	0	0		5	5.4	5.9	6.4	6.8	7.1	7.8
Salinity (ppt)	55	18	N/A				0	0	0	0.2	0.2	0.43	2.9
Spec. conductance (umhos/cm at 25°C)	56	0	N/A				56	80	96	146	240	834	5342
Water Temperature (°C)	57	0	>32	0	0		4	7.6	12.1	19	23.2	24.6	27.9
Other													
Chloride (mg/L)	1	0	>230	0	0		14	14	14	14	14	14	14
TSS (mg/L)	17	3	N/A				1	2	2	8	14	23	24
Turbidity (NTU)	54	0	>50	0	0		1	2	5	7	14	22	27
Nutrients (mg/L)													
NH3 as N	21	6	N/A				0.01	0.01	0.01	0.16	0.32	1	1.4
NO2 + NO3 as N	21	0	N/A				0.03	0.03	0.06	0.13	0.22	0.26	0.66
TKN as N	21	0	N/A				0.4	0.42	0.5	0.6	1.2	1.38	2
Total Phosphorus	21	0	N/A				0.02	0.02	0.03	0.05	0.07	0.1	0.14
Metals (ug/L)													
Aluminum, total (Al)	27	0	N/A				690	748	800	940	1100	1320	1400
Arsenic, total (As)	27	27	>10	0	0		10	10	10	10	10	10	50
Cadmium, total (Cd)	26	26	>2	0	0		2	2	2	2	2	2	2
Chromium, total (Cr)	26	26	>50	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	27	21	>7	0	0		2	2	2	2	2	2	3
Iron, total (Fe)	27	0	>1000	14	51.9	Yes	620	696	830	1100	1400	1620	2000
Lead, total (Pb)	27	27	>25	0	0		10	10	10	10	10	10	10
Mercury, total (Hg)	27	27	>0.012	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	27	27	>88	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	27	15	>50	1	3.7		10	10	10	10	13	21	130
Fecal coliform (#/100mL)													
# results:		Geomean		# > 400:		% > 400:		95%:					
57		174		7		12							

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

95% : States whether there is 95% 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

**NCDENR, Division of Water Quality
Ambient Monitoring System Report
White Oak River Basin – February 2005
AMS-68**

Ambient Monitoring System Station
NCDENR, Division of Water
Basinwide Assessment

Location: CALICO CRK AT SR 1243 AT MOREHEAD CITY

Station #: P8750000

Latitude: 34.73383

Longitude: -76.74269

Agency: NCAMBNT

Subbasin: WOK03

Stream class: SC HWQ

NC stream index: 21-32

Time period: 09/26/2002 to 07/26/2004

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	23	0	<5	1	4.3		4.3	5	6.1	7.2	9.4	12	12.7
pH (SU)	23	0	<6.8	0	0		6.8	6.9	7.2	7.3	7.7	7.9	8.1
	23	0	>8.5	0	0		6.8	6.9	7.2	7.3	7.7	7.9	8.1
Salinity (ppt)	23	0	N/A				0.2	0.28	0.6	0.9	5.2	12.58	19.2
Spec. conductance (umhos/cm at 25°C)	22	0	N/A				442	556	1148	1651	7569	21308	30110
Water Temperature (°C)	23	0	>32	2	8.7		8.7	9.8	15	21	28	32.8	34.1
Other													
Chlorophyll A (ug/L)	4	0	>40	3	75		6	6	16	56	136	158	158
TSS (mg/L)	8	0	N/A				7	7	17	24	32	34	34
Turbidity (NTU)	23	0	>25	9	39.1	Yes	4	8	15	23	33	45	120
Nutrients (mg/L)													
NH3 as N	21	0	N/A				0.08	0.11	0.15	0.24	0.37	0.84	1
NO2 + NO3 as N	21	0	N/A				0.08	0.09	0.13	0.28	1.45	5.8	11
TKN as N	21	0	N/A				0.48	0.52	0.71	0.95	1.7	3.3	4.6
Total Phosphorus	21	0	N/A				0.08	0.08	0.15	0.22	0.6	1.54	3.1
Metals (ug/L)													
Aluminum, total (Al)	8	0	N/A				620	620	670	930	1800	2500	2500
Arsenic, total (As)	8	8	>10	0	0		10	10	10	10	40	50	50
Cadmium, total (Cd)	8	8	>5	0	0		2	2	2	2	8	10	10
Chromium, total (Cr)	8	8	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	8	2	>3	4	50		2	2	3	7	14	24	24
Iron, total (Fe)	8	0	N/A				870	870	1100	1500	1650	1900	1900
Lead, total (Pb)	8	8	>25	0	0		10	10	10	10	10	10	10
Mercury, total (Hg)	8	8	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	8	8	>8.3	0	0		10	10	10	10	10	10	10
Zinc, total (Zn)	8	2	>86	0	0		10	10	10	14	24	44	44
Fecal coliform (#/100mL)													
	# results:	Geomean		# > 400:	% > 400:	95%:							
	29	1344		25	86	Yes							

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

95% : States whether there is 95% 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
 Basinwide Assessment

Location: CALICO CRK AT SR 1176 MOREHEAD CITY

Station #: P8800000

Latitude: 34.72800

Longitude: -76.73100

Agency: NCAMBNT

Subbasin: WOK03

Stream class: SC HW

NC stream index: 21-32

Time period: 09/26/2002 to 07/26/2004

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	23	0	<5	4	17.4	No	3.3	4.2	6.3	7.8	10.8	13.6	15.7
pH (SU)	23	0	<6.8	0	0		7	7.2	7.3	7.5	8	8.3	8.4
	23	0	>8.5	0	0		7	7.2	7.3	7.5	8	8.3	8.4
Salinity (ppt)	23	0	N/A				4.49	6.18	11.9	16.1	25	31.38	32.9
Spec. conductance (umhos/cm at 25°C)	22	0	N/A				7999	10624	20162	25382	39826	48471	50157
Water Temperature (°C)	23	0	>32	2	8.7		9.4	10.3	13	21.2	28.2	32.4	33
Other													
Chlorophyll A (ug/L)	7	0	>40	4	57.1		8	8	31	76	82	98	98
TSS (mg/L)	8	0	N/A				5	5	14	24	46	80	80
Turbidity (NTU)	23	0	>25	8	34.8	Yes	6	8	15	22	40	56	68
Nutrients (mg/L)													
NH3 as N	22	4	N/A				0.02	0.02	0.04	0.23	0.47	0.89	0.94
NO2 + NO3 as N	22	3	N/A				0.02	0.03	0.21	0.66	1.52	3.47	4.2
TKN as N	22	0	N/A				0.43	0.5	0.79	1.05	1.73	2.1	2.3
Total Phosphorus	22	0	N/A				0.07	0.1	0.16	0.34	0.61	0.98	1.2
Metals (ug/L)													
Aluminum, total (Al)	8	0	N/A				360	360	485	995	1650	3800	3800
Arsenic, total (As)	8	8	>10	0	0		10	10	50	50	50	50	50
Cadmium, total (Cd)	8	8	>5	0	0		10	10	10	10	10	10	10
Chromium, total (Cr)	8	8	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	8	7	>3	1	12.5		2	2	9	10	10	10	10
Iron, total (Fe)	8	0	N/A				280	280	385	735	1050	1500	1500
Lead, total (Pb)	8	8	>25	0	0		10	10	10	30	50	50	50
Mercury, total (Hg)	8	8	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	8	8	>8.3	0	0		10	10	10	10	40	50	50
Zinc, total (Zn)	8	2	>86	0	0		10	10	10	12	13	71	71
Fecal coliform (#/100mL)													
	# results:	Geomean		# > 400:	% > 400:	95%:							
	30	120		9	30	No							

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

95% : States whether there is 95% 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
 Basinwide Assessment

Location: MOREHEAD CITY HARBOR AT CM G17 NR MOREHEAD CITY

Station #: P8965500

Subbasin: WOK03

Latitude: 34.69518 **Longitude:** -76.67389

Stream class: SA HQW

Agency: NCAMBNT

NC stream index: 21-(17)

Time period: 10/26/1999 to 06/05/2002

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	23	0	<5	0	0		6	6.2	6.7	7.3	8.1	9	12.2
pH (SU)	23	0	<6.8	0	0		7.3	7.4	7.7	7.9	8	8.1	8.1
	23	0	>8.5	0	0		7.3	7.4	7.7	7.9	8	8.1	8.1
Salinity (ppt)	22	0	N/A				1.3	9.11	32.18	35.1	35.73	36.3	36.7
Spec. conductance (umhos/cm at 25°C)	23	0	N/A				45510	47000	50225	53020	53864	54720	55191
Water Temperature (°C)	23	0	>32	0	0		6	8	14.7	19.2	24	27.2	28
Other													
TSS (mg/L)	6	0	N/A				3	3	5	11	26	32	32
Turbidity (NTU)	25	1	>25	0	0		1	1	1	2	3	5	7
Nutrients (mg/L)													
NH3 as N	16	8	N/A				0.01	0.01	0.01	0.01	0.19	0.36	0.5
NO2 + NO3 as N	16	13	N/A				0.01	0.01	0.01	0.01	0.08	0.26	0.5
TKN as N	15	2	N/A				0.2	0.2	0.2	0.37	0.5	0.82	1
Total Phosphorus	16	4	N/A				0.01	0.01	0.01	0.02	0.05	0.29	0.5
Metals (ug/L)													
Aluminum, total (Al)	13	0	N/A				93	95	125	240	360	472	480
Arsenic, total (As)	14	14	>10	0	0		10	10	10	50	50	50	50
Cadmium, total (Cd)	14	14	>5	0	0		2	2	8	10	10	10	10
Chromium, total (Cr)	14	14	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	14	14	>3	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	14	3	N/A				50	50	66	135	198	280	300
Lead, total (Pb)	14	14	>25	0	0		10	10	40	50	50	50	50
Mercury, total (Hg)	14	14	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	14	13	>8.3	1	7.1		10	10	10	34	50	50	50
Zinc, total (Zn)	14	1	>86	1	7.1		10	14	26	30	57	76	89
Fecal coliform (#/100mL)													
# results:	Geomean			# > 400:	% > 400:	95%:	Median	# > 43	% > 43	95%			
25	5			0	0		10	1	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

95% : States whether there is 95% 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
Basinwide Assessment

Location: NORTH RIV AT US 70 NR BETTIE

Station #: P8975000

Latitude: 34.78901

Longitude: -76.61005

Agency: NCAMBNT

Subbasin: WOK04

Stream class: SA HQW

NC stream index: 21-35-1

Time period: 09/08/1999 to 07/22/2004

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	56	0	<5	0	0		5.5	5.8	6.5	7.7	8.8	10.4	11.5
pH (SU)	56	0	<6.8	0	0		6.8	7.1	7.4	7.7	7.9	8	8.2
	56	0	>8.5	0	0		6.8	7.1	7.4	7.7	7.9	8	8.2
Salinity (ppt)	55	0	N/A				0.8	12.2	19.3	25.2	30.8	33.28	35.7
Spec. conductance (umhos/cm at 25°C)	56	0	N/A				1517	19192	30876	39095	47008	50499	53966
Water Temperature (°C)	57	0	>32	1	1.8		6	8.9	14	20.9	27	28.8	33.8
Other													
TSS (mg/L)	18	1	N/A				2	8	15	24	54	136	190
Turbidity (NTU)	57	1	>25	11	19.3	Yes	1	3	5	10	17	52	100
Nutrients (mg/L)													
NH3 as N	21	8	N/A				0.01	0.01	0.01	0.04	0.17	0.49	0.71
NO2 + NO3 as N	21	12	N/A				0.01	0.01	0.01	0.01	0.04	0.17	0.26
TKN as N	21	1	N/A				0.2	0.3	0.3	0.5	0.75	1.08	2.4
Total Phosphorus	21	1	N/A				0.02	0.02	0.03	0.04	0.09	0.19	0.2
Metals (ug/L)													
Aluminum, total (Al)	27	0	N/A				92	406	810	1100	2300	6960	19000
Arsenic, total (As)	27	27	>10	0	0		10	10	50	50	50	50	50
Cadmium, total (Cd)	26	26	>5	0	0		2	2	8	10	10	10	20
Chromium, total (Cr)	26	26	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	27	25	>3	1	3.7		2	2	2	2	10	10	10
Iron, total (Fe)	27	0	N/A				51	174	450	690	1100	4440	10000
Lead, total (Pb)	27	27	>25	0	0		10	10	10	50	50	50	50
Mercury, total (Hg)	27	27	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	27	27	>8.3	0	0		10	10	10	10	50	50	50
Zinc, total (Zn)	27	6	>86	1	3.7		10	10	12	25	54	73	390
Fecal coliform (#/100mL)													
# results:	Geomean			# > 400:	% > 400:	95%:	Median	# > 43	% > 43	95%			
56	8			2	4		10	10	18	Yes			

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

95% : States whether there is 95% 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
Basinwide Assessment

Location: WARD CRK AT US 70 NR OTWAY

Station #: P8976000

Latitude: 34.78086

Longitude: -76.57383

Agency: NCAMBNT

Subbasin: WOK04

Stream class: SA HQW

NC stream index: 21-35-1-7

Time period: 09/08/1999 to 07/22/2004

	# result	# ND	EL	Results not meeting EL		95%	Min	10th	25th	50th	75th	90th	Max
				#	%								
Field													
D.O. (mg/L)	55	0	<5	2	3.6		4	5.4	6.5	7.7	8.9	10.8	12.5
pH (SU)	55	0	<6.8	1	1.8		6.4	7	7.4	7.6	7.9	8	8.2
	55	0	>8.5	0	0		6.4	7	7.4	7.6	7.9	8	8.2
Salinity (ppt)	54	0	N/A				0.2	7.15	15.48	24.5	29.23	33.1	35.8
Spec. conductance (umhos/cm at 25°C)	55	0	N/A				394	13636	25300	39143	45029	50321	54016
Water Temperature (°C)	56	0	>32	2	3.6		6	9.2	14	20.9	27	30.4	33.2
Other													
Chlorophyll A (ug/L)	3	0	>40	0	0		2	2	2	8	38	38	38
TSS (mg/L)	18	0	N/A				11	12	17	22	32	46	68
Turbidity (NTU)	57	0	>25	5	8.8		1	3	6	11	17	24	75
Nutrients (mg/L)													
NH3 as N	24	8	N/A				0.01	0.01	0.01	0.04	0.2	0.52	1
NO2 + NO3 as N	24	15	N/A				0.01	0.01	0.01	0.02	0.03	0.19	1.1
TKN as N	24	1	N/A				0.2	0.3	0.3	0.5	0.8	1.25	5
Total Phosphorus	24	1	N/A				0.02	0.03	0.04	0.07	0.13	0.3	0.45
Metals (ug/L)													
Aluminum, total (Al)	27	0	N/A				220	334	820	1200	1700	2420	6100
Arsenic, total (As)	27	27	>10	0	0		10	10	10	50	50	50	50
Cadmium, total (Cd)	26	26	>5	0	0		2	2	2	10	10	10	10
Chromium, total (Cr)	26	26	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	27	25	>3	1	3.7		2	2	2	2	10	10	40
Iron, total (Fe)	27	0	N/A				200	218	430	660	890	1040	3800
Lead, total (Pb)	27	27	>25	0	0		10	10	10	10	50	50	50
Mercury, total (Hg)	27	27	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	27	27	>8.3	0	0		10	10	10	10	50	50	50
Zinc, total (Zn)	27	9	>86	1	3.7		10	10	10	21	43	57	110
Fecal coliform (#/100mL)													
# results:	57	Geomean	13	# > 400:	2	% > 400:	4	95%:		Median	16	# > 43	14
												% > 43	25
												95%	Yes

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

95% : States whether there is 95% 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
Basinwide Assessment

Location: BROAD CRK AT US 70 NR MASONTOWN

Station #: P8978000

Latitude: 34.87980

Longitude: -76.41476

Agency: NCAMBNT

Subbasin: WOK04

Stream class: SC

NC stream index: 21-35-7-10-4

Time period: 09/08/1999 to 07/22/2004

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	56	0	<5	16	28.6	Yes	0.9	3.6	4.7	6.6	8.3	9.7	12.6
pH (SU)	56	0	<6.8	15	26.8	Yes	5.9	6.3	6.7	7.3	7.6	7.8	7.9
	56	0	>8.5	0	0		5.9	6.3	6.7	7.3	7.6	7.8	7.9
Salinity (ppt)	55	1	N/A				0	0.16	1.4	6.6	20.4	28.54	33.8
Spec. conductance (umhos/cm at 25°C)	56	0	N/A				17	231	1821	11034	33246	44223	51678
Water Temperature (°C)	57	0	>32	0	0		5.4	8.9	14.2	21	26.9	29.2	31
Other													
Chlorophyll A (ug/L)	1	0	>40	0	0		35	35	35	35	35	35	35
TSS (mg/L)	18	1	N/A				2	8	10	14	20	31	43
Turbidity (NTU)	57	0	>25	4	7		1	4	6	9	12	23	30
Nutrients (mg/L)													
NH3 as N	22	5	N/A				0.01	0.01	0.02	0.14	0.26	1.26	1.7
NO2 + NO3 as N	22	8	N/A				0.01	0.01	0.01	0.03	0.18	0.89	1.7
TKN as N	22	1	N/A				0.3	0.36	0.6	0.7	1.28	2.71	4.2
Total Phosphorus	22	1	N/A				0.02	0.05	0.07	0.11	0.27	0.7	1.2
Metals (ug/L)													
Aluminum, total (Al)	27	0	N/A				200	346	540	840	1300	1500	3900
Arsenic, total (As)	27	27	>10	0	0		10	10	10	10	50	50	50
Cadmium, total (Cd)	26	26	>5	0	0		2	2	2	2	10	10	10
Chromium, total (Cr)	26	26	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	27	20	>3	1	3.7		2	2	2	2	3	6	10
Iron, total (Fe)	27	0	N/A				92	116	250	370	530	936	1100
Lead, total (Pb)	27	27	>25	0	0		10	10	10	10	10	50	50
Mercury, total (Hg)	27	26	>0.025	1	3.7		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	27	27	>8.3	0	0		10	10	10	10	10	50	50
Zinc, total (Zn)	27	9	>86	1	3.7		10	10	10	20	39	59	480

Fecal coliform (#/100mL)

# results:	Geomean	# > 400:	% > 400:	95%:
55	100	8	15	

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

95% : States whether there is 95% 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
Basinwide Assessment

Location: NORTH RIV AT CM 56 NR BEAUFORT

Station #: P8990000

Latitude: 34.70372

Longitude: -76.59821

Agency: NCAMBNT

Subbasin: WOK04

Stream class: SA HQW

NC stream index: 21-35-(0.5)

Time period: 10/26/1999 to 06/05/2002

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	26	0	<5	0	0		5.8	6.1	6.6	7.2	8.3	9.7	12.2
pH (SU)	26	0	<6.8	0	0		7.3	7.5	7.8	7.9	8	8.1	8.1
	26	0	>8.5	0	0		7.3	7.5	7.8	7.9	8	8.1	8.1
Salinity (ppt)	25	0	N/A				24.4	28.92	32	34.8	35.75	36.72	37.8
Spec. conductance (umhos/cm at 25°C)	26	0	N/A				38274	44744	48498	52440	53852	55246	56820
Water Temperature (°C)	26	0	>32	0	0		5	7.8	14.3	19.3	24.7	27.2	29
Other													
TSS (mg/L)	6	0	N/A				8	8	9	14	21	29	29
Turbidity (NTU)	26	0	>25	0	0		1	1	2	3	4	5	5
Nutrients (mg/L)													
NH3 as N	17	10	N/A				0.01	0.01	0.01	0.02	0.22	0.52	0.59
NO2 + NO3 as N	17	13	N/A				0.01	0.01	0.01	0.01	0.1	0.22	0.5
TKN as N	15	2	N/A				0.2	0.2	0.27	0.3	0.4	0.76	1
Total Phosphorus	17	4	N/A				0.01	0.01	0.01	0.03	0.04	0.26	0.5
Metals (ug/L)													
Aluminum, total (Al)	13	0	N/A				100	112	170	320	520	618	630
Arsenic, total (As)	14	14	>10	0	0		10	10	10	30	50	50	50
Cadmium, total (Cd)	14	14	>5	0	0		2	2	10	10	10	10	10
Chromium, total (Cr)	14	14	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	14	14	>3	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	14	0	N/A				52	67	96	190	262	325	330
Lead, total (Pb)	14	14	>25	0	0		10	10	50	50	50	50	50
Mercury, total (Hg)	14	13	>0.025	1	7.1		0.2	0.2	0.2	0.2	0.2	0.2	0.3
Nickel, total (Ni)	14	14	>8.3	0	0		10	10	10	50	50	50	50
Zinc, total (Zn)	14	1	>86	1	7.1		10	13	25	29	54	75	87
Fecal coliform (#/100mL)													
# results:	Geomean	# > 400:		% > 400:		95%:	Median	# > 43	% > 43	95%			
26	3	0		0			6	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

95% : States whether there is 95% 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
Basinwide Assessment

Location: BOGUE SOUND AT CM G15 NR SALTER PATH

Station #: P9580000

Latitude: 34.72414 **Longitude:** -76.85134

Agency: NCAMBNT

Subbasin: WOK03

Stream class: SA HQW

NC stream index: 20-36-(8.5)

Time period: 10/26/1999 to 06/05/2002

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	26	0	<5	1	3.8		4.5	5.6	6.6	7.1	8	10.3	12.1
pH (SU)	26	0	<6.8	0	0		7.3	7.5	7.8	7.9	7.9	8	8.1
	26	0	>8.5	0	0		7.3	7.5	7.8	7.9	7.9	8	8.1
Salinity (ppt)	25	0	N/A				24.4	25.44	28.5	33.1	35	36.72	36.9
Spec. conductance (umhos/cm at 25°C)	26	0	N/A				38385	39912	43468	50338	52975	55208	55482
Water Temperature (°C)	26	0	>32	0	0		3	8.3	15.2	21.1	27	28.1	29.4
Other													
TSS (mg/L)	5	0	N/A				7	7	10	14	32	43	43
Turbidity (NTU)	26	1	>25	0	0		1	1	2	4	6	8	12
Nutrients (mg/L)													
NH3 as N	17	11	N/A				0.01	0.01	0.01	0.01	0.08	0.21	0.23
NO2 + NO3 as N	17	14	N/A				0.01	0.01	0.01	0.01	0.1	0.15	0.15
TKN as N	16	0	N/A				0.3	0.3	0.4	0.4	0.58	0.62	0.66
Total Phosphorus	17	3	N/A				0.01	0.01	0.02	0.02	0.05	0.08	0.1
Metals (ug/L)													
Aluminum, total (Al)	13	0	N/A				120	124	160	320	700	1052	1100
Arsenic, total (As)	14	14	>10	0	0		10	10	40	50	50	50	50
Cadmium, total (Cd)	14	14	>5	0	0		2	2	2	10	10	10	10
Chromium, total (Cr)	14	14	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	14	14	>3	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	14	0	N/A				72	80	92	270	422	800	880
Lead, total (Pb)	14	14	>25	0	0		10	10	10	50	50	50	50
Mercury, total (Hg)	14	14	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	14	14	>8.3	0	0		10	10	10	30	50	50	50
Zinc, total (Zn)	14	0	>86	0	0		15	18	27	31	51	74	83
Fecal coliform (#/100mL)													
# results:	Geomean			# > 400:	% > 400:	95%:	Median	# > 43	% > 43	95%			
25	4			1	4		2	1	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

95% : States whether there is 95% 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
Basinwide Assessment

Location: BOGUE SOUND AT CM R24 AT EMERALD ISLE

Station #: P9600000

Latitude: 34.71449

Longitude: -76.92773

Agency: NCAMBNT

Subbasin: WOK03

Stream class: SA ORW

NC stream index: 20-36-(0.5)

Time period: 10/26/1999 to 06/05/2002

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	26	0	<5	0	0		5.3	5.5	6.7	7	8.5	10.5	12.1
pH (SU)	26	0	<6.8	0	0		7.3	7.4	7.8	7.8	8	8	8
	26	0	>8.5	0	0		7.3	7.4	7.8	7.8	8	8	8
Salinity (ppt)	25	0	N/A				23	25.56	29.6	33	35.1	36.6	37
Spec. conductance (umhos/cm at 25°C)	26	0	N/A				36540	40149	44775	49530	53404	55118	55689
Water Temperature (°C)	26	0	>32	0	0		2	8.2	15	21.1	27.1	28.3	29.3
Other													
TSS (mg/L)	5	0	N/A				4	4	5	19	30	36	36
Turbidity (NTU)	26	2	>25	0	0		1	1	2	5	7	8	9
Nutrients (mg/L)													
NH3 as N	16	7	N/A				0.01	0.01	0.01	0.02	0.07	0.14	0.2
NO2 + NO3 as N	16	12	N/A				0.01	0.01	0.01	0.01	0.08	0.15	0.15
TKN as N	16	1	N/A				0.2	0.27	0.39	0.4	0.5	0.6	0.6
Total Phosphorus	16	1	N/A				0.01	0.02	0.02	0.03	0.04	0.07	0.1
Metals (ug/L)													
Aluminum, total (Al)	13	0	N/A				88	109	185	400	790	1056	1200
Arsenic, total (As)	14	14	>10	0	0		10	10	10	50	50	50	50
Cadmium, total (Cd)	14	14	>5	0	0		2	2	2	10	10	10	10
Chromium, total (Cr)	14	14	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	14	13	>3	0	0		2	2	2	2	2	2	2
Iron, total (Fe)	14	0	N/A				71	72	128	310	455	530	570
Lead, total (Pb)	14	14	>25	0	0		10	10	10	50	50	50	50
Mercury, total (Hg)	14	14	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	14	14	>8.3	0	0		10	10	10	10	50	50	50
Zinc, total (Zn)	14	2	>86	0	0		10	10	25	31	63	70	74
Fecal coliform (#/100mL)													
# results:	26	Geomean	3	# > 400:	0	% > 400:	0	95%:		Median	6	# > 43	0
												% > 43	0
												95%	

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

95% : States whether there is 95% 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
 Basinwide Assessment

Location: BACK SOUND AT CM G3 AT HARKERS ISLAND

Station #: P9720000

Latitude: 34.68744 **Longitude:** -76.56354

Agency: NCAMBNT

Subbasin: WOK04

Stream class: SA ORW

NC stream index: 21-35-(1.5)

Time period: 10/26/1999 to 06/05/2002

	# result	# ND	EL	Results not meeting EL			Percentile							
				#	%	95%	Min	10th	25th	50th	75th	90th	Max	
Field														
D.O. (mg/L)	26	0	<5	0	0		5.5	6.2	6.6	7.1	8.6	10.1	12.3	
pH (SU)	26	0	<6.8	0	0		7.3	7.4	7.8	7.9	8	8.1	8.1	
	26	0	>8.5	0	0		7.3	7.4	7.8	7.9	8	8.1	8.1	
Salinity (ppt)	25	0	N/A				21.2	28.74	31.3	33.1	35.75	36.78	37.4	
Spec. conductance (umhos/cm at 25°C)	26	0	N/A				33708	43153	47480	50435	53755	55307	56050	
Water Temperature (°C)	26	0	>32	0	0		2	7.8	12.9	19.7	24.1	27	28	
Other														
TSS (mg/L)	6	0	N/A				4	4	11	18	29	43	43	
Turbidity (NTU)	26	0	>25	0	0		1	2	2	3	5	7	7	
Nutrients (mg/L)														
NH3 as N	17	9	N/A				0.01	0.01	0.01	0.02	0.09	0.26	0.5	
NO2 + NO3 as N	17	12	N/A				0.01	0.01	0.01	0.01	0.1	0.22	0.5	
TKN as N	16	2	N/A				0.2	0.2	0.3	0.38	0.4	0.91	1	
Total Phosphorus	17	5	N/A				0.01	0.01	0.01	0.02	0.03	0.18	0.5	
Metals (ug/L)														
Aluminum, total (Al)	12	0	N/A				94	105	192	455	795	985	1000	
Arsenic, total (As)	13	13	>10	0	0		10	10	50	50	50	50	50	
Cadmium, total (Cd)	13	13	>5	0	0		2	2	2	10	10	10	10	
Chromium, total (Cr)	13	13	>20	0	0		25	25	25	25	25	25	25	
Copper, total (Cu)	13	12	>3	1	7.7		2	2	2	2	2	11	12	
Iron, total (Fe)	13	2	N/A				50	50	126	220	430	516	560	
Lead, total (Pb)	13	13	>25	0	0		10	10	50	50	50	50	50	
Mercury, total (Hg)	13	12	>0.025	1	7.7		0.2	0.2	0.2	0.2	0.2	0.2	0.3	
Nickel, total (Ni)	13	13	>8.3	0	0		10	10	10	50	50	50	50	
Zinc, total (Zn)	13	1	>86	1	7.7		10	13	28	32	53	79	89	
Fecal coliform (#/100mL)														
# results:	26	Geomean	3	# > 400:	0	% > 400:	0	95%:	Median	6	# > 43	0	% > 43	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

95% : States whether there is 95% 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
Basinwide Assessment

Location: CORE SOUND AT CM R36 NR JARRETT BAY

Station #: P9730000

Latitude: 34.74249

Longitude: -76.49079

Agency: NCAMBNT

Subbasin: WOK04

Stream class: SA ORW

NC stream index: 21-35-7

Time period: 10/26/1999 to 06/05/2002

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	24	0	<5	0	0		5.7	6	6.7	7.1	8.2	9.6	12.2
pH (SU)	24	0	<6.8	0	0		7.3	7.5	7.8	8	8	8.1	8.1
	24	0	>8.5	0	0		7.3	7.5	7.8	8	8	8.1	8.1
Salinity (ppt)	24	0	N/A				15.9	25.95	28.82	31.55	35.9	36.8	37
Spec. conductance (umhos/cm at 25°C)	24	0	N/A				26150	40527	44635	48254	53656	55396	55460
Water Temperature (°C)	24	0	>32	0	0		5.1	9.8	15.3	20.6	26.2	27.2	28.2
Other													
TSS (mg/L)	5	0	N/A				4	4	4	13	18	24	24
Turbidity (NTU)	24	1	>25	0	0		1	1	2	3	4	7	10
Nutrients (mg/L)													
NH3 as N	15	8	N/A				0.01	0.01	0.01	0.03	0.06	0.16	0.2
NO2 + NO3 as N	15	12	N/A				0.01	0.01	0.01	0.01	0.1	0.15	0.15
TKN as N	13	0	N/A				0.21	0.22	0.3	0.3	0.4	0.52	0.6
Total Phosphorus	15	4	N/A				0.01	0.01	0.01	0.02	0.03	0.09	0.1
Metals (ug/L)													
Aluminum, total (Al)	12	1	N/A				50	71	148	300	578	776	830
Arsenic, total (As)	13	13	>10	0	0		10	10	10	50	50	50	50
Cadmium, total (Cd)	13	13	>5	0	0		2	2	2	10	10	10	10
Chromium, total (Cr)	13	13	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	13	13	>3	0	0		2	2	2	2	2	7	10
Iron, total (Fe)	13	1	N/A				50	52	94	140	295	430	450
Lead, total (Pb)	13	13	>25	0	0		10	10	10	50	50	50	50
Mercury, total (Hg)	13	13	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	13	13	>8.3	0	0		10	10	10	10	50	50	50
Zinc, total (Zn)	13	2	>86	1	7.7		10	10	24	28	58	85	97
Fecal coliform (#/100mL)													
# results:	Geomean			# > 400:	% > 400:	95%:	Median	# > 43	% > 43	95%			
24	3			0	0		1	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

95% : States whether there is 95% 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
 Basinwide Assessment

Location: CORE SOUND AT CM G1 AT ENTRANCE TO NELSON BAY

Station #: P9740000

Subbasin: WOK04

Latitude: 34.85596 **Longitude:** -76.40208

Stream class: SA ORW

Agency: NCAMBNT

NC stream index: 21-35-7

Time period: 10/26/1999 to 06/05/2002

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	24	0	<5	0	0		5.9	6.4	7.2	8	9	10.6	12
pH (SU)	24	0	<6.8	0	0		7	7.4	7.8	7.9	8	8.1	8.1
	24	0	>8.5	0	0		7	7.4	7.8	7.9	8	8.1	8.1
Salinity (ppt)	23	0	N/A				18	20.22	26.3	29.1	33.6	35.7	36.4
Spec. conductance (umhos/cm at 25°C)	24	0	N/A				29113	32918	38650	44599	50642	53886	53944
Water Temperature (°C)	24	0	>32	0	0		2	7.8	13.5	20.1	25.8	27.8	28.9
Other													
TSS (mg/L)	5	0	N/A				3	3	4	8	18	26	26
Turbidity (NTU)	25	2	>25	0	0		1	1	2	3	5	7	8
Nutrients (mg/L)													
NH3 as N	15	9	N/A				0.01	0.01	0.01	0.02	0.1	0.19	0.2
NO2 + NO3 as N	15	12	N/A				0.01	0.01	0.01	0.01	0.1	0.15	0.15
TKN as N	14	0	N/A				0.26	0.28	0.3	0.3	0.38	0.8	1
Total Phosphorus	15	3	N/A				0.01	0.01	0.01	0.02	0.04	0.14	0.2
Metals (ug/L)													
Aluminum, total (Al)	12	0	N/A				84	101	160	305	590	698	710
Arsenic, total (As)	13	13	>10	0	0		10	10	50	50	50	50	50
Cadmium, total (Cd)	13	13	>5	0	0		2	2	2	10	10	10	10
Chromium, total (Cr)	13	13	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	13	13	>3	0	0		2	2	2	2	2	7	10
Iron, total (Fe)	13	2	N/A				50	50	74	170	265	1388	2100
Lead, total (Pb)	13	13	>25	0	0		10	10	30	50	50	50	50
Mercury, total (Hg)	13	13	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	13	13	>8.3	0	0		10	10	10	10	50	50	50
Zinc, total (Zn)	13	2	>86	1	7.7		10	10	20	32	50	82	97
Fecal coliform (#/100mL)													
# results:	25						Median						
Geomean	4							# > 43					
# > 400:				0			10	2					
% > 400:				0				8					
95%:													

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

95% : States whether there is 95% 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
Basinwide Assessment

Location: ICW AT NC 210 NR GOOSE BAY

Station #: P9860000

Latitude: 34.49724

Longitude: -77.43887

Agency: NCAMBNT

Subbasin: WOK02

Stream class: SA ORW

NC stream index: 19-39-(0.5)

Time period: 10/26/1999 to 06/24/2002

	# result	# ND	EL	Results not meeting EL			Percentile						
				#	%	95%	Min	10th	25th	50th	75th	90th	Max
Field													
D.O. (mg/L)	31	0	<5	4	12.9	No	4.6	4.8	5.7	7	8.3	9	9.3
pH (SU)	31	0	<6.8	0	0		6.8	7.4	7.6	7.8	7.9	8	8.1
	31	0	>8.5	0	0		6.8	7.4	7.6	7.8	7.9	8	8.1
Salinity (ppt)	29	0	N/A				20.1	22.1	27.05	31.3	35.9	36.8	38.6
Spec. conductance (umhos/cm at 25°C)	30	0	N/A				32210	35097	41738	47575	52954	55368	57640
Water Temperature (°C)	30	0	>32	0	0		8.8	10.5	13.1	19.1	26.5	28.9	30
Other													
TSS (mg/L)	8	0	N/A				12	12	15	22	30	44	44
Turbidity (NTU)	31	0	>25	0	0		2	2	3	6	8	12	16
Nutrients (mg/L)													
NH3 as N	20	12	N/A				0.01	0.01	0.01	0.01	0.1	0.17	0.2
NO2 + NO3 as N	20	14	N/A				0.01	0.01	0.01	0.01	0.08	0.15	0.98
TKN as N	20	2	N/A				0.2	0.2	0.3	0.4	0.59	0.7	1
Total Phosphorus	21	2	N/A				0.02	0.02	0.03	0.04	0.06	0.09	0.5
Metals (ug/L)													
Aluminum, total (Al)	17	0	N/A				160	216	345	710	945	1400	2200
Arsenic, total (As)	18	18	>10	0	0		10	10	10	50	50	50	50
Cadmium, total (Cd)	18	18	>5	0	0		2	2	2	10	10	10	10
Chromium, total (Cr)	18	18	>20	0	0		25	25	25	25	25	25	25
Copper, total (Cu)	18	17	>3	0	0		2	2	2	2	2	3	10
Iron, total (Fe)	17	0	N/A				90	94	200	340	555	684	820
Lead, total (Pb)	18	18	>25	0	0		10	10	10	50	50	50	50
Mercury, total (Hg)	18	18	>0.025	0	0		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nickel, total (Ni)	18	18	>8.3	0	0		10	10	10	10	50	50	50
Zinc, total (Zn)	18	2	>86	1	5.6		10	10	20	28	52	87	110
Fecal coliform (#/100mL)													
# results:	Geomean			# > 400:	% > 400:	95%:	Median	# > 43	% > 43	95%			
32	4			0	0		10	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

95% : States whether there is 95% 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

Appendix B: References

Mallin, M.A., M.R. McIver, H.A. Wells, D.C. Parsons, and V.L. Johnson.
Water quality improvements following sewage treatment upgrades in the New River Estuary, North Carolina. CMS Report No. 04-04. University of North Carolina at Wilmington.

NCDEHNR. 1990.

New River, Onslow County: Nutrient control measures and water quality characteristics for 1986-1989. Rep. 90-04. Raleigh, NC.

NCDWQ. 2003.

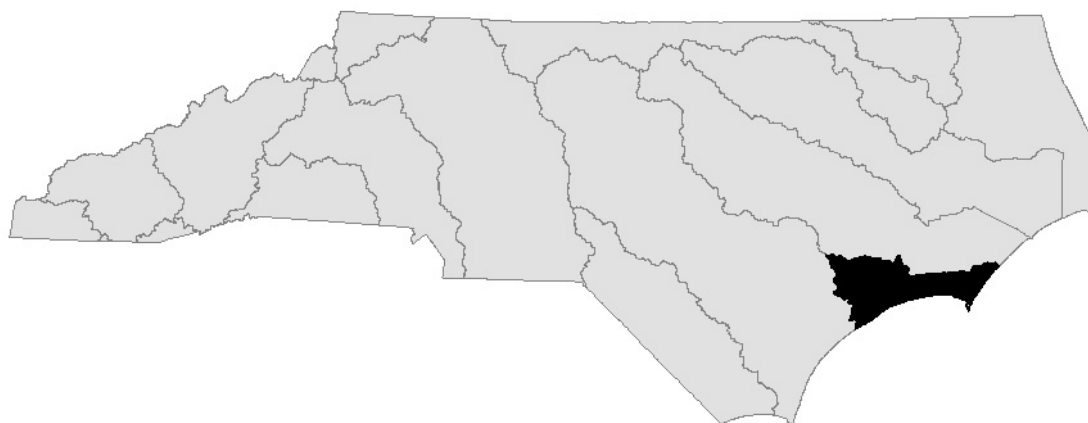
New River phytoplankton study in Onslow County (1998-2001). Ecosystems Unit. Environmental Sciences Branch. Raleigh, NC.

NCDENR. 2005. An Examination Of Fecal Coliform, Nutrients and their Response Variables in Calico Creek, Carteret County, North Carolina. Surface Water Protection Section. Wilmington, NC.

Appendix C: Morehead City WWTP Data Sheets

White Oak River Basin
Basinwide Assessment Report
Whole Effluent Toxicity Program

2000-2004



The Division of Water Quality's Whole Effluent Toxicity Monitoring Program

Acute and/or chronic toxicity tests are used to determine toxicity of discharges to sensitive aquatic species (usually fathead minnows or the water flea, *Ceriodaphnia dubia*). Results of these tests have been shown by researchers to be predictive of discharge effects to receiving stream populations.

Many facilities are required to monitor whole effluent toxicity (WET) by their NPDES permit. Facilities without monitoring requirements may have their effluents evaluated for toxicity by DWQ's Aquatic Toxicology Laboratory. If toxicity is detected, DWQ may include aquatic toxicity testing upon permit renewal.

DWQ's Aquatic Toxicology Unit maintains a compliance summary for all facilities required to perform tests and provides a monthly update of this information to regional offices and WQ administration. Ambient toxicity tests can be used to evaluate stream water quality relative to other stream sites and/or a point source discharge.

WET Monitoring in the White Oak River Basin – 2000-2004

Four facility permits in the White Oak River basin currently require whole effluent toxicity (WET) monitoring (Figure 1 and Table 1). All four facility permits have a WET limit.

Figure 1. White Oak River basin facilities required to conduct whole effluent toxicity testing

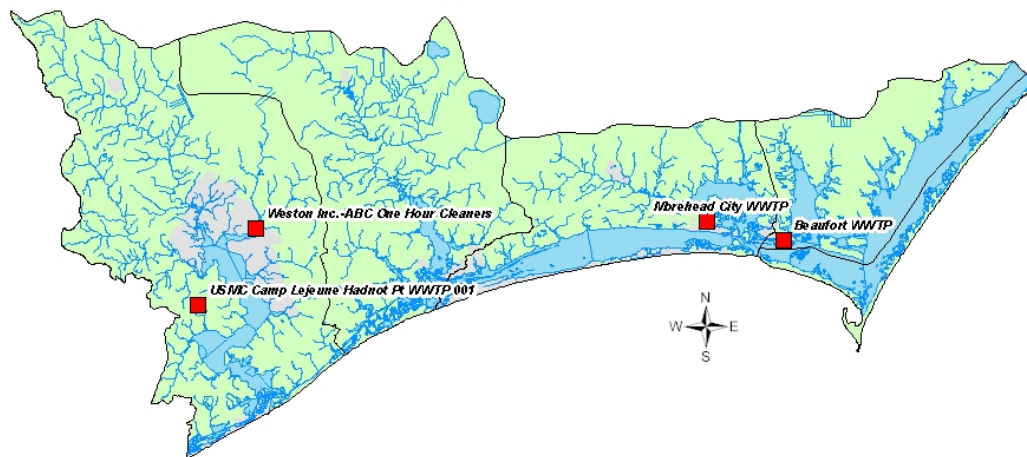


Table 1. White Oak River basin facilities required to conduct whole effluent toxicity testing

Subbasin/Facility	NPDES Permit No.	Receiving Stream	County	Flow (MGD)	IWC (%)	7Q10 (cfs)
03-05-02						
USMC Lejeune Hadnot Pt WWTP	NC0063029/001	New R.	Onslow	8.0	NA	Tidal
Weston Inc.-ABC One Hour Cleaners	NC0084395/001	Northeast Cr.	Onslow	0.216	90.0	Tidal
03-05-03						
Beaufort WWTP	NC0021831/001	Taylor Cr.	Carteret	1.5	NA	Tidal
Morehead City WWTP	NC0026611/001	Calico Cr.	Carteret	1.7	NA	Tidal

The relatively small number of facilities in this basin monitoring whole effluent toxicity increased slightly from 1990, the first year that monitoring was required, through 1997 when several wastewater plants operated by the USMC at Camp LeJeune were closed with wastewater treatment being consolidated at the Hadnot Point WWTP (Figure 2). Whole effluent toxicity limits were written into permits in North Carolina beginning in 1987. The compliance rate of those facilities has generally risen since the inception of the program. Since 1998 the compliance rate has stabilized at approximately 95-100% (Figure 1 and Table 2).

None of the facilities in this basin has had significant toxicity issues since 1999.

Figure 2. NPDES facility whole effluent toxicity compliance in the White Oak River basin, 1990-2004. The compliance values were calculated by determining whether facilities with WET limits were meeting their ultimate permit limits during the given time period, regardless of any SOCs in force.

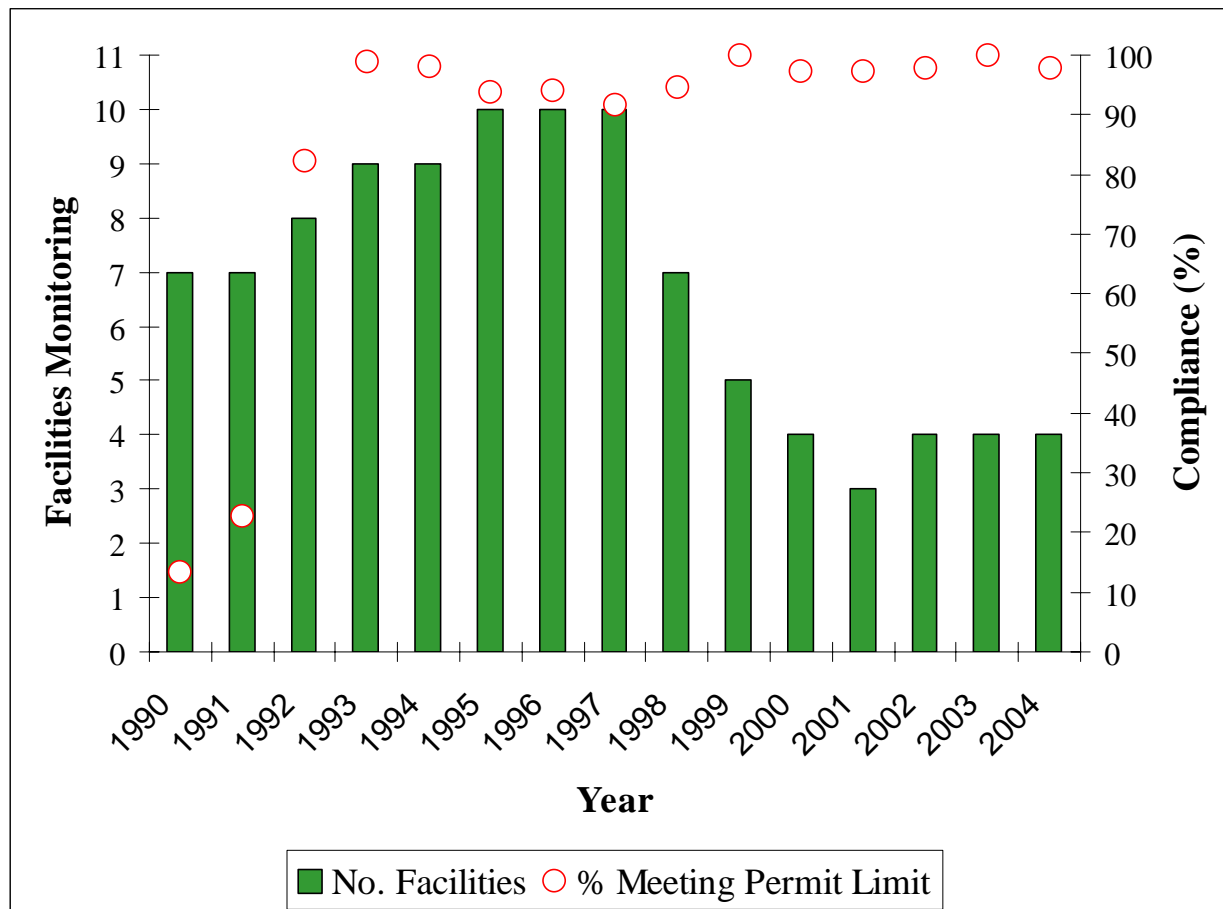


Table 2. Recent compliance record of facilities performing whole effluent toxicity testing in the White Oak River basin

Subbasin/Facility	NPDES Permit No.	2000- 2003 Passes	2000- 2003 Fails	2004 Passes	2004 Fails
03-05-02					
USMC Camp Lejeune Hadnot Pt WWTP 001	NC0063029/001	15	0	4	0
Weston Inc.-ABC One Hour Cleaners	NC0084395/001	9	0	4	0
03-05-03					
Beaufort WWTP	NC0021831/001	17	1	4	1
Morehead City WWTP	NC0026611/001	16	2	4	0

Note that "pass" denotes meeting a permit limit or, for those facilities with a monitoring requirement, meeting a target value. The actual test result may be a "pass" (from a pass/fail acute or chronic test), LC₅₀, or chronic value. Conversely, "fail" means failing to meet a permit limit or target value.