

Chapter 8

Neuse River Subbasin 03-04-08

Including the: Core Creek and Neuse River

8.1 Subbasin Overview

Subbasin 03-04-08 at a Glance

Land Cover (percent)

Forest/Wetland:	67.3
Surface Water:	1.2
Urban:	3.9
Cultivated Crop:	26.3
Pasture/ Managed Herbaceous:	1.2

Counties

Craven, Jones and Pitt

Municipalities

Cove City and New Bern

Stream Statistics

Total Streams:	
Freshwater	129.8 mi
Saltwater	426.5 ac
Total Supporting:	
Freshwater	46.4 mi
Saltwater	426.5 ac
Total Impaired:	
Freshwater	3.0mi
Saltwater	0.0 ac
Total Not Rated:	
Freshwater	0.0 mi
Saltwater	0.0 ac
Total No Data:	
Freshwater	80.5 mi
Saltwater	0.0 ac

This subbasin consists of the Neuse River and its tributaries from Contentnea Creek to New Bern. Most of this subbasin lies within Craven County. The two largest tributaries in this subbasin are Core Creek and Bachelor Creek. The headwaters of Core Creek have been channelized to promote drainage.

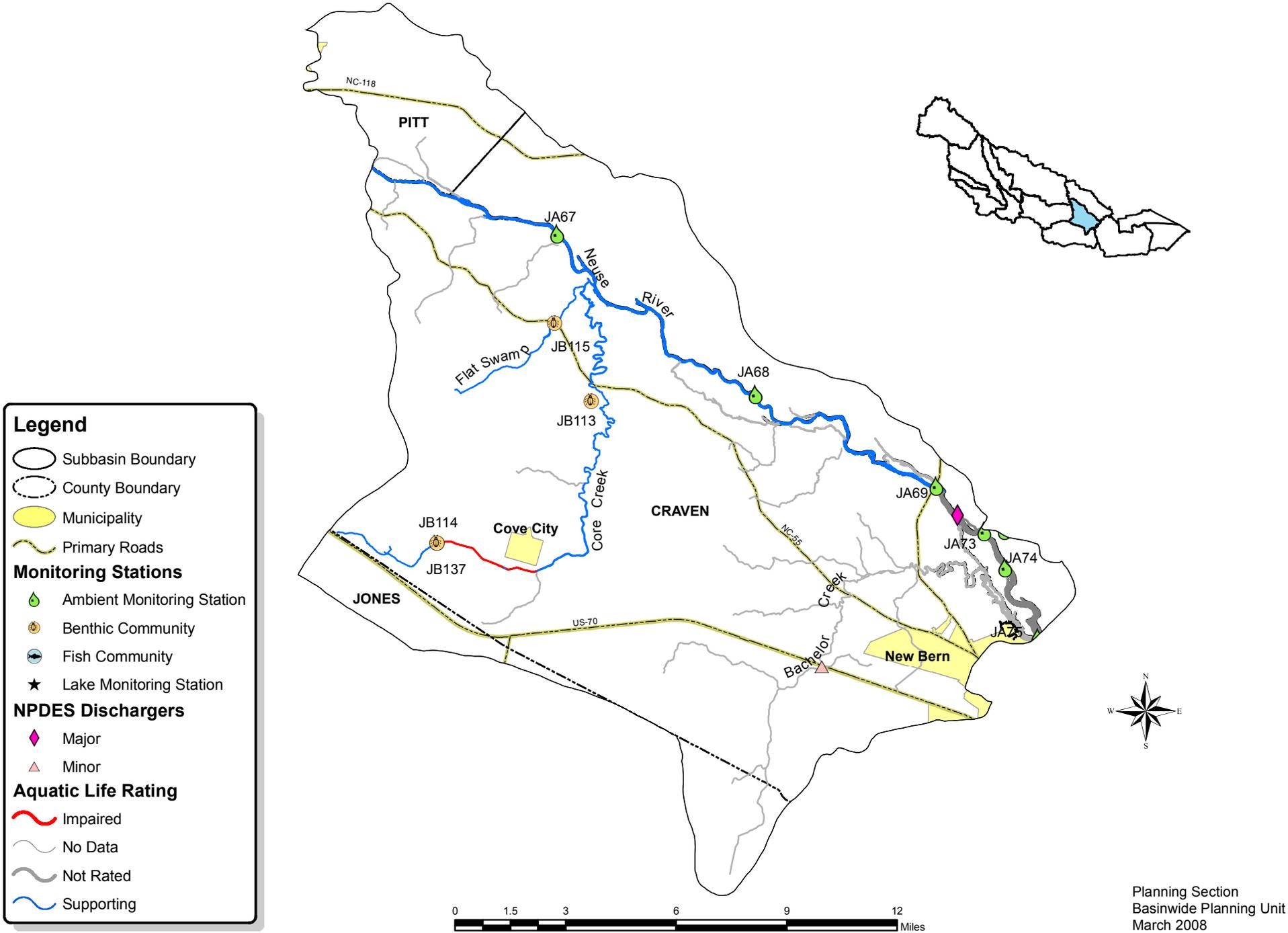
The majority of the population in this subbasin is found in and around the Town of New Bern. In the past decade New Bern’s population has increased by 24.9 percent (5,748). Forest/wetlands cover about 66 percent of the land in this subbasin. Most of the remaining land cover is agriculture with a small portion of urban area. Additional information regarding population and land use changes throughout the entire basin can be found in Chapter 16.

There is 1 major (with two outfalls) and 1 minor NPDES wastewater discharge permits in this subbasin with a total permitted flow of 32.2 MGD (Figure 21). The largest is Weyerhaeuser New Bern Mill (32 MGD). There are also 9 individual NPDES stormwater permit in the subbasin. Refer to Appendix III for identification and more information on individual NPDES permit holders. New Bern has developed a stormwater program under Phase II and has a model stormwater ordinance as required by the Neuse NSW strategy stormwater rules (Chapter 18). There are 11 permitted animal operations in this subbasin.

There is a single new water quality impairments in this subbasin, a biological impairment based on a Severe swamp bioclassification in the upper portion of Core Creek. This site was assessed for the first time and had very poor instream macroinvertebrate habitat. The stream was channelized, had no riparian zone, eroding stream banks and the only instream habitat were undercut banks. The lower portion of Core Creek improved from a fair to a good-fair bioclassification.

In 2000, the NC Cooperative Extension Service initiated a 5 year, \$1.3 million Core Creek Project funded by the Clean Water Management Trust Fund to restore degraded land for the ability to protect and restore water quality and acquire wetland easements for restoration of riparian buffers and wetlands in the Core Creek watershed. Over \$106,000 of the Agriculture Cost Share Program funds were also spent on BMP implementation in this watershed between September 2000 and December 2006.

Figure 21 Neuse River Subbasin 03-04-08



Legend

- Subbasin Boundary
- County Boundary
- Municipality
- Primary Roads

Monitoring Stations

- Ambient Monitoring Station
- Benthic Community
- Fish Community
- Lake Monitoring Station

NPDES Dischargers

- Major
- Minor

Aquatic Life Rating

- Impaired
- No Data
- Not Rated
- Supporting

Table 24 Neuse River Basin

Subbasin (WBD-8 Number) 03020202

DWQ Subbasin

03-04-08

Assessment Unit Number	Name	Overall Category	Potential Stressors Potential Sources	Use Support Category	Use Support Rating	Reason for Rating	Parameter of Interest	Collection Year	Listing Year	IR Category
Watershed (WBD-10 Number) 0302020206				Hog Island-Neuse River						
				Subwatershed (WBD-12 Number) 030202020601			Headwaters Core Creek			
27-90a1	Core Creek	2		Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2004		1
From source to upstream crossing of SR 1239										
C;Sw,NSW	03-04-08	3.4	FW Miles							
27-90a2	Core Creek	5	Habitat Degradation	Aquatic Life	Impaired	Biological Criteria Exceeded	Ecological/biological Integrity Benthos	2004	2008	5
From upstream crossing of SR 1239 to Grape Creek										
C;Sw,NSW	03-04-08	3.0	FW Miles	General Agriculture/Pasture Industrial Site Nutrient Impacts ANOPS land app site General Agriculture/Pasture Industrial Site Toxic Impacts General Agriculture/Pasture Industrial Site						
27-90b	Core Creek	2		Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2005		1
From Grape Creek to Neuse River										
C;Sw,NSW	03-04-08	15.4	FW Miles							
				Subwatershed (WBD-12 Number) 030202020602			Outlet Core Creek			
27-90-3	Flat Swamp	2		Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2005		1
From source to Core Creek										
C;Sw,NSW	03-04-08	5.2	FW Miles							
				Subwatershed (WBD-12 Number) 030202020603			Halfmoon Creek-Neuse River			
27-(85)	NEUSE RIVER (above model segment)	2		Aquatic Life	Not Rated	Data Inconclusive	Iron	2006		3m
From mouth of Contentnea Creek to Streets Ferry										
C;Sw,NSW	03-04-08	22.3	FW Miles	Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
				Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
				Subwatershed (WBD-12 Number) 030202020607			Hog Island-Neuse River			
27-(96)a	NEUSE RIVER Estuary	2t		Aquatic Life	Not Rated	Data Inconclusive	Iron	2006		3m
From Streets Ferry to Bachelor Creek (river model segment)										
SC;Sw,NSW	03-04-08	426.5	S Acres	Aquatic Life	Not Rated	Data Inconclusive	Copper	2006		3m
				Aquatic Life	Supporting	No Criteria Exceeded	Chlorophyll a	2006	2004	2t
				Aquatic Life	Not Rated	Data Inconclusive	Low pH	2006		3a
				Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1

Note: See Section 23.3 for Overall and IR Category explanation.

Supporting waters are listed in Categories 1-3. Impaired waters are listed in Categories 4 or 5.

A stressor study completed on Core Creek found high levels of nutrients and identified pesticides and organics in the sediment. This is likely due to runoff from the many agricultural fields in this area. These pesticides were related to fish kills in the Core Creek area on April 23, 2003 and May 3, 2003.

Agricultural activities have the greatest impact on the water quality in this subbasin. Additional agricultural BMPs should be utilized in the watershed to aid in water quality improvements.

A map including the locations of the NPDES facilities and water quality monitoring stations is presented in Figure 11. Table 24 contains a list of assessment unit numbers (AU#) and length, streams monitored, monitoring data types, locations and use support ratings for waters in the subbasin. Refer to http://h2o.enr.state.nc.us/tmdl/General_303d.htm for more information about use support methodology.

Waters in the following sections and in Table 24 are identified by an assessment unit number (AU#). This number is used to track defined segments in the water quality assessment database, list 303(d) Impaired waters and identify waters throughout the basin plan. The AU# is a subset of the DWQ index number (classification identification number). A letter attached to the end of the AU# indicates that the assessment is smaller than the DWQ index segment. No letter indicates that the AU# and the DWQ index segment are the same.

8.2 Use Support Assessment Summary

All surface waters in the state are assigned a classification appropriate to the best-intended use of that water. Waters are regularly assessed by DWQ to determine how well they are meeting their best-intended use. For aquatic life, an Excellent, Good, Good-Fair, Fair, or Poor bioclassification is assigned to a stream based on the biological data collected by DWQ. For more information about bioclassification and use support assessment, refer to http://h2o.enr.state.nc.us/tmdl/General_303d.htm. Appendix X provides definitions of the terms used throughout this basin plan.

Refer to Table 25 for a summary of use support for waters in subbasin 03-04-08 (see Chapter 23, Section 23.3 for description of the IR category (for each parameter of interest) and Overall (river segment) category).

8.3 Status and Recommendations of Previously and Newly Impaired Waters

The following waters were either identified as Impaired in the previous basin plan (2002) or are newly Impaired based on recent data. If previously identified as Impaired, the water will either remain on the state's 303(d) list or will be delisted based on recent data showing water quality improvements. If the water is newly Impaired, it will likely be placed on the 2008 303(d) list. The current status and recommendations for addressing these waters are presented below, and each is identified by an AU#. Information regarding 303(d) listing and reporting methodology can be found at http://h2o.enr.state.nc.us/tmdl/General_303d.htm.

Table 25 Summary of Use Support Ratings in Subbasin 03-04-08

Units	Total Monitored Waters	Total Impaired Waters		Total Supporting Waters		Total Not Rated Waters	Total No Data	Total
	Miles/Acres	Miles/Acres	%	Miles/Acres	%	Miles/Acres	Miles/Acres	Miles/Acres
Freshwater miles (streams)	49	3	2	46	6	0	81	130
Estuarine acres	427	0	0	427	100	0	0	427

% - Percent of total miles/acres.

8.3.1 Core Creek Watershed [AU# 27-90a1, 27-90a2 & 27-90b]

Previously, Core Creek [AU# 27-90b] from Grape Creek to Neuse River was added to the 1998 303(d) list of impaired waters for impaired biological integrity.

A TMDL stressor survey was completed on the Core Creek watershed. Agricultural practices dominated the land use in this watershed. Most of the residential development is located in the Cove City area. There was evidence of previous high flow events and streambank erosion at several stations throughout this watershed. Low DO levels and high conductivity reading were observed at several locations as well. Nutrient samples were collected at sites where periphyton was observed on the surface of rocks. Nutrient values were present in high amounts indicating enrichment possibly from fertilizers used on the agricultural fields in the area. Sediment pesticides and organics were assessed at one station. Several chlorinated and organophosphate pesticides and semi-volatile organics were identified. These pesticides and organics were related to fish kills in the Core Creek area on April 23, 2003 and May 3, 2003 (see information below).

The numerous agricultural fields located in the watershed contribute to significant sedimentation of Core Creek due to nonpoint source runoff after rainfall events. Additionally, nutrient inputs from farmland and a few animal operations probably contribute to nutrient enrichment and subsequent biological impacts or impairment.

2002 Recommendations

DWQ will continue to monitor Core Creek to evaluate impacts from nonpoint sources in the watershed. As part of the 303(d) list approach, DWQ will begin the process of identifying problem parameters that may be causing biological impairment in Core Creek. Because of the presence of significant natural areas, important fisheries habitat and the noted water quality impairment, Core Creek is a NCWRP targeted local watershed.

2002 Water Quality Initiatives

There are two buffer acquisition projects and one restoration project funded through grants by CWMTF in this watershed.

Current Status

Core Creek [AU# 27-90a1; C; Sw; NSW] from source to upstream crossing of SR 1237 (3.4 miles) is supporting aquatic life due to a Moderate swamp bioclassification at site JB137. This is the first time this site has been analyzed. Benthic macroinvertebrates were collected using swamp stream methodology. Swamp streams are defined as those streams that are within the

Coastal Plain ecoregion and that normally have no visible flow during the summer months, but flowing water should be present in swamp streams during the winter months (generally sampled between February and March). The stream banks at site JB137 were stable and the riparian zone was intact and provided good instream shading. The EPT taxa were reflective of a relatively intolerant community for a swamp stream with such a low pH value (4.7).

Core Creek [AU# 27-90a2; C; Sw; NSW] from upstream crossing of SR1239 to Grape Creek (3.0 miles) is impaired for aquatic life due to a Severe swamp bioclassification at site JB114. This site was assessed for the first time using swamp stream criteria. This site is ~1 miles below site JB137. There is the Salt Wood Products waste site between the two sites. The stream at this site was channelized, had no riparian zone, eroding stream banks and the only instream macroinvertebrate habitat were undercut banks. The benthic community was similar to the upstream site, however the habitat was severely degraded which resulted in an overall severe/impaired rating.

This segment will be added to the 2008 303(d) impaired waters list for impaired biological integrity.

The most likely stressors to this system are lack of flow, which is normal for streams in this geographic region, lack of adequate macroinvertebrate habitat due to channelization (hydromodification) and periodic toxic inputs from agricultural activities and the Salt Wood Product site.

Core Creek [AU# 27-90b; C; Sw; NSW] from Grape Creek to Neuse River (15.4 miles) is currently supporting aquatic life due to a Good-Fair benthic bioclassification at site JB113. This site rated Poor or Fair during the last three basinwide cycles. The bioclassification increased to Good-Fair during this assessment period. The taxa present during this period suggested possible low DO and low flow conditions may still affect the benthic community at this site. The DO at the time of sampling was 4.2 mg/l and the pH value was 6.8.

This segment of Core Creek will be removed from the impaired waters list for impaired biological integrity.

Fish kills

There were two pesticide linked fish kills in this watershed in 2003. The first occurred on April 23, 2003 on Core Creek near Cove City. This affected several different species (Bluegill sunfish, Crappie, Largemouth bass, Carp and Bowfin) and killed about 1,200 total fish. It was determined that the fish kill was a result of a chlorpyrifos (Dursban) spill, a broad spectrum insecticide (organophosphate) that poses acute toxicity risks to aquatic organism. The second pesticide event occurred on Grape Creek near Cove City on May 3, 2003. This event killed 2000 fish of mixed species (Sunfish, Largemouth bass, Eel, Catfish, Bowfin and Carp). Water samples collected in the wake of both events showed chlorpyrifos levels as high as 5.1 µg/l in addition to the presence of fenamiphos (a highly toxic organophosphate) and malathion (organophosphate; one of the most commonly used pesticides in the US; commonly used for mosquito eradication). The Craven County Health Department posted a temporary human health advisory in Core and Grape Creek for swimming and fishing which was lifted in July of 2003 after levels were found to be below levels of concern for both ingestion and dermal exposure. The 2003 Annual Fish Kill Report can be found at <http://h2o.enr.state.nc.us/esb/Fishkill/2003KillReport.pdf>.

Recommendations

DWQ recommends continued implementation of agricultural BMPs in this watershed to continue the effort in reducing sedimentation and nutrient loading to the Neuse River Estuary.

Water Quality Initiatives

From September 2000 – December 2006, over \$106,000 of the Agriculture Cost Share Program funds were spent on BMP implementation in this watershed. Practices included 1251 acres of 3 year conservation tillage, 35 acres of long term no-till, 53 acres of cropland conversion to trees, 356 acres of land smoothing, 217 acres of riparian buffer, and 2 incinerators. Cumulatively, these practices affect 1,251 acres, saved 2,236 tons of soil, 18,559 pounds of nitrogen, 220 pounds of phosphorus, 7,231 pounds of Waste-N managed, and 2,200 pounds of Waste-P managed.

In 2000, the NC Cooperative Extension Service initiated a 5 year; \$1.3 million Core Creek Project funded by the Clean Water Management Trust Fund to restore degraded land for the ability to protect and restore water quality and acquired wetland easements for restoration of riparian buffers and wetlands. The project implemented and evaluated agricultural BMPs throughout the Core Creek watershed. At the conclusion of the project, nitrogen management plans and mapping systems were developed for over 44,000 acres of cropland, 106 water control structures were designed , built and installed to control drainage on over 6,200 acres and a 24 acre tract was enrolled into a conservation easement. Over 1,630 linear feet of stream and 10 acres of riparian wetlands were restored within the easement boundaries. Monitoring of the watershed indicated a 30 percent reduction in nitrogen loading after BMP installations (not including the stream and wetland restoration).

8.3.2 Neuse River [AU# 27-(85) & 27-(96)a]

2002 Recommendations

The Neuse River [AU# 27-(96)a] was impaired in 2002 due to high chlorophyll *a* levels in this segment and was included in the Neuse River Estuarine TMDL management strategy (from Streets Ferry bridge to upstream of the mouth of the Neuse River) .

Current Status

The Neuse River [AU# 27-(85); C; Sw; NSW] from mouth of Contentnea Creek to Streets Ferry (22.3 miles) is currently Supporting for both aquatic life and recreational uses due to No Criteria Exceedances at ambient monitoring stations JA67, JA68 and JA69. Elevated nutrients were detected in the Neuse River throughout this subbasin. DO levels ranged from 3.0 to 16.4 mg/l and a chlorophyll *a* maximum of 71 µg/l were recorded at these ambient monitoring stations (only a single exceedance of the standard were recorded at stations JA68 and JA69).

The Neuse River [AU# 27-(96)a; SC; Sw; NSW] from Streets Ferry to subbasin 03-04-08/ 03-04-10 boundary (226.5 saltwater acres) was included in the Neuse River Estuary TMDL management strategy (river segment). The TMDL seeks to reduce chlorophyll *a* levels by decreasing total nitrogen levels by 30 percent (see Chapter 24 for more details on the TMDL management strategy for the Neuse River Estuary).

This segment was previously impaired due to high chlorophyll *a* levels during the previous assessment period. The maximum chlorophyll *a* recorded at station JA73 was 26 µg/l during the

current assessment period. Chlorophyll *a* levels were not monitored at station JA74. The lower estuarine segments remains impaired due to chlorophyll *a* violations. See Chapter 10 section 10.3.1 for the specific use support determination on this segment of the estuary. The estuary is discussed as a whole in Chapter 10.

Recommendations

DWQ will continue efforts to reduce the nitrogen load to the Neuse River Estuary.

8.4 Status and Recommendations for Waters with Noted Impacts

The surface waters discussed below are not Impaired. However, notable water quality problems and concerns were documented for these waters during this assessment. Attention and resources should be focused on these waters to prevent additional degradation and facilitate water quality improvements. DWQ will notify local agencies of these water quality concerns and work with them to conduct further assessments and to locate sources of water quality protection funding. Additionally, education on local water quality issues and voluntary actions are useful tools to prevent water quality problems and to promote restoration efforts. The current status and recommendations for addressing these waters are presented below, and each is identified by an AU#. Nonpoint source program agency contacts are listed in Appendix IV.

Only one other sample was collected during this assessment period.

Recommendations

Many of the streams within this subbasin are likely influenced by agricultural practices that occur within this watershed. DWQ recommends sampling Bachelor Creek during the next assessment period.

Further recommendations on how to protect and reduce water quality impacts from agricultural practices in the watershed can be found in Chapter 6 of the *Supplemental Guide to North Carolina's Basinwide Planning* document (<http://h2o.enr.state.nc.us/basinwide/SupplementalGuide.htm>).

8.5 Additional Water Quality Issues within Subbasin 03-04-08

The previous sections discussed water quality concerns for specific stream segments. The following section discusses issues that may threaten water quality in the subbasin that are not specific to particular streams, lakes, or reservoirs. The issues discussed may be related to waters near certain land use activities or within proximity to different pollution sources.

8.5.1 Mercury Contamination – Fish Tissue Assessment

The Division conducted fish tissue surveys at four stations within the Neuse River Basin from 1999 to 2004. These surveys were conducted as part of the mercury contaminant assessments in the eastern part of the state and during statewide pesticide assessments.

Tissue samples collected from the Neuse River at Goldsboro contained organic contaminants at undetectable levels or at levels less than the US EPA, US FDA, and State of North Carolina criteria. The Goldsboro samples consisted of composites of largemouth bass.

Elevated mercury concentrations (greater than the EPA and NC level of 0.4 ppm) were detected in fish samples collected from all four stations within the Neuse Basin. These included the Eno River near Durham, Neuse River at Goldsboro, Neuse River at Kinston, and Contentnea Creek at Snow Hill. Elevated levels were most often detected in largemouth bass, a species at the top of the food chain and most often associated with mercury bioaccumulation in North Carolina. Presently, there are no site-specific fish consumption advisories for mercury in the Neuse River basin; however, an advisory for the consumption of bowfin, and chain pickerel east of Interstate 85 was issued by NCDHHS in 2002 and a statewide advisory for the consumption of largemouth bass in 2006.

Because fish spend their entire lives in the aquatic environment, they incorporate chemicals from this environment into their body tissues. Contamination of aquatic resources has been documented for heavy metals, pesticides, and other complex organic compounds. Once these contaminants reach surface waters, they may be available for bioaccumulation, either directly or through aquatic food webs, and may accumulate in fish and shellfish tissues. Results from fish tissue monitoring can serve as an important indicator of further contamination of sediments and surface water.