

Chapter 7

Neuse River Subbasin 03-04-07

Including the: Contentnea Creek, Little Contentnea Creek, Little Creek, Moccasin Creek, Turkey Creek, Hominy Swamp, Toisnot Swamp and Nahunta Swamp

7.1 Subbasin Overview

Subbasin 03-04-07 at a Glance

Land Cover (percent)

Forest/Wetland:	52.9
Surface Water:	0.6
Urban:	4.1
Cultivated Crop:	39.8
Pasture/ Managed Herbaceous:	2.6

Counties

Franklin, Greene, Johnston, Lenoir, Nash, Pitt, Wake, Wayne and Wilson

Municipalities

Bailey, Middlesex, Lucama, Black Creek, Fremont, Pikeville, Saratoga, Snow Hill, Grifton, Zebulon, Wilson and Farmville

Stream Statistics

Total Streams:	655.5 mi/1,307.9 ac
Total Supporting:	165.3 mi
Total Impaired:	84.6 mi
Total Not Rated:	46.7 mi/510.5 ac
Total No Data:	358.9 mi

This is the largest subbasin in the Neuse River basin, encompassing over 1,000 square miles in 9 different counties, including portions of Franklin, Wake, Johnston, Nash, Wilson, Wayne, Pitt, Lenoir, and almost all of Greene County. It contains the entire Contentnea Creek watershed, including Buckhorn Reservoir and its 2 primary tributaries, Moccasin Creek and Turkey Creek.

Over the past decade, the cumulative growth in population for the 3 major municipalities is over 8,000. Zebulon and Wilson increased by 21.6 percent and 16.8 percent respectively. Farmville's population has decreased by 0.6 percent. Over half of the land cover is forest/wetland and cultivated cropland covers the other portion. There are many hog farms located throughout this subbasin. Additional information regarding population and land use changes throughout the entire basin can be found in Chapter 16.

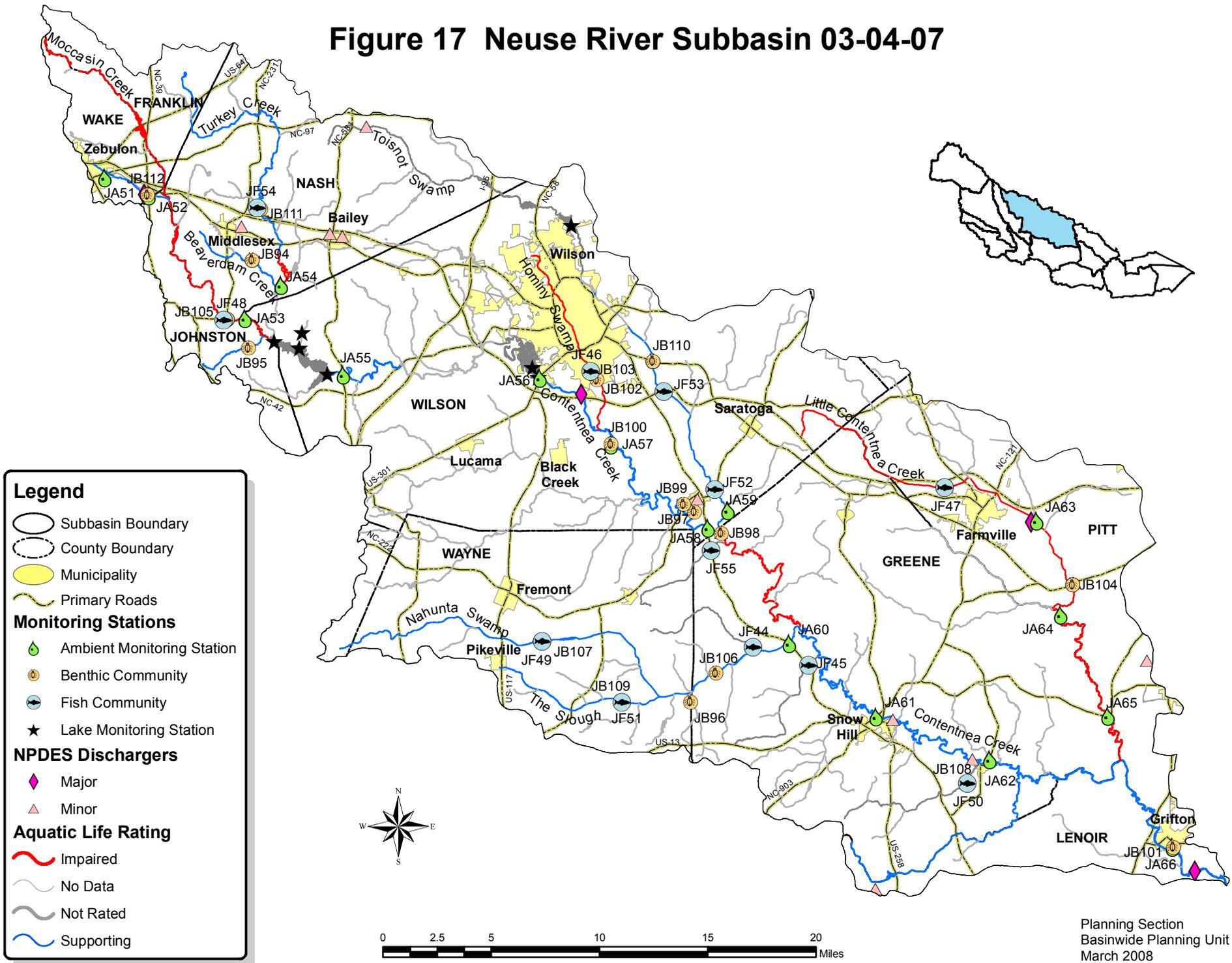
There are 4 major and 12 minor NPDES wastewater discharge permits in this subbasin with a total permitted flow of 23.4 MGD. The largest is Wilson WWTP (14 MGD). There are also 40 individual NPDES stormwater permit in the subbasin. Refer to Appendix III for identification and

more information on individual NPDES permit holders. Franklin, Nash, Wake and Wayne Counties have developed a stormwater program under Phase II. Johnston County has a model stormwater ordinances as required by the Neuse NSW strategy stormwater rules (Chapter 18). There are also 150 permitted animal operations in this subbasin. Both agricultural practices and point source dischargers impact the water quality in this subbasin.

There are three new water quality impairments in this subbasin, a biological impairment based on a fair benthic bioclassification in Contentnea Creek and two low dissolved oxygen (DO) impairments in Moccasin and Turkey Creeks. The entire length of Little Contentnea and Hominy Swamp remained impaired for biological integrity.

Water quality improvement was documented in Nahunta Swamp with the benthic bioclassification improving from fair to good-fair during this assessment period. Nahunta Swamp contained the highest diversity of macroinvertebrate fauna in this subbasin. Over \$108,000 of the Agriculture Cost Share Program funds were spent between September 2000 and December 2006 on BMP implementation in this watershed. The best management practices used ranged from conservation tillage, cropland conversion, to field border and riparian buffer

Figure 17 Neuse River Subbasin 03-04-07



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 22 Neuse River Basin

Subbasin (WBD-8 Number) 03020203

DWQ Subbasin

03-04-07

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
Classification	DWQ Subbasin	Miles/Acres								
Watershed (WBD-10 Number) 0302020301				Buckhorn Reservoir						
Subwatershed (WBD-12 Number) 030202030101				Upper Moccasin Creek						
27-86-2	Moccasin Creek (Bunn Lake)	5	Habitat Degradation General Agriculture/Pasture	Aquatic Life	Impaired	Standard Violation	Low Dissolved Oxygen	2006	2008	5
From source to Contentnea Creek			Low Dissolved Oxygen	Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity FishCom	2005		1
C;NSW	03-04-07	22.8 FW Miles		Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2005		1
				Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
27-86-2-4	Little Creek (West Side)	2	Fecal Coliform Bacteria Stormwater Runoff	Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
From source to Moccasin Creek			Low Dissolved Oxygen WWTP NPDES	Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2005		1
C;NSW	03-04-07	4.1 FW Miles	Nutrient Impacts Stormwater Runoff WWTP NPDES	Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
Subwatershed (WBD-12 Number) 030202030102				Lower Moccasin Creek						
27-86-2-6.5	Bull Branch	2		Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2000		1
From source to Moccasin Creek										
C;NSW	03-04-07	4.0 FW Miles								
Subwatershed (WBD-12 Number) 030202030103				Upper Turkey Creek						
27-86-3-(1)a1	Turkey Creek	2	Low Dissolved Oxygen	Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2001		1
From source to Old Middlesex Road				Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity FishCom	2005		3a
C;NSW	03-04-07	19.4 FW Miles								
Subwatershed (WBD-12 Number) 030202030104				Lower Turkey Creek						
27-86-3-(1)a2	Turkey Creek	5	Low Dissolved Oxygen	Aquatic Life	Impaired	Standard Violation	Low Dissolved Oxygen	2006	2008	5
From Old Middlesex Road to SR 1101				Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
C;NSW	03-04-07	2.0 FW Miles								
27-86-3-8	Beaverdam Creek	2		Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2001		1
From source to Turkey Creek										
C;NSW	03-04-07	5.6 FW Miles								
Subwatershed (WBD-12 Number) 030202030105				Little Creek-Buckhorn Reservoir						

Table 22 Neuse River Basin

Subbasin (WBD-8 Number) 03020203

DWQ Subbasin

03-04-07

Assessment Unit Number	Name		Overall Category	Potential Stressors	Use Support Category	Use Support Rating	Reason for Rating	Parameter of Interest	Collection Year	Listing Year	IR Category
Description	DWQ Subbasin	Miles/Acres		Potential Sources							
27-86-(1)a	Contentnea Cr (Buckhorn Reservoir)		4a	Chlorophyll a	Aquatic Life	Not Rated	Data Inconclusive	Water Quality Standards Aquatic Life	2005		3a
Buckhorn Reservoir				General Agriculture/Pasture	Aquatic Life	Not Rated	Data Inconclusive	Low Dissolved Oxygen	1998	1998	4a
WS-V;NSW	03-04-07	758.2 FW Acres		Nutrient Impacts	Water Supply	Not Rated	Data Inconclusive	Water Quality Standards Water Supply	2005		3a

Watershed (WBD-10 Number) 0302020303

Toisnot Swamp

			Subwatershed (WBD-12 Number) 030202030301	Upper Toisnot Swamp						
27-86-11-(1)	Toisnot Swamp (Silver Lake, Lake Wilson)		3a	Aquatic Life	Not Rated	Data Inconclusive	High Water Temperature	2005		3a
From source to a point 0.6 mile upstream of Wilson County SR 1326				Water Supply	Supporting	No Criteria Exceeded	Water Quality Standards Water Supply	2005		1
WS-III;NSW	03-04-07	18.4 FW Miles								

			Subwatershed (WBD-12 Number) 030202030303	Middle Toisnot Swamp						
27-86-11-(5)b	Toisnot Swamp		2	Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
From UT 0.9 miles south of US 301 to Contentnea Creek				Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity FishCom	2005		3a
C;Sw,NSW	03-04-07	12.0 FW Miles		Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2005		1
				Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1

Watershed (WBD-10 Number) 0302020304

Wiggins Mill Reservoir-Contentnea Creek

			Subwatershed (WBD-12 Number) 030202030401	Little Swamp-Contentnea Creek						
27-86-(1)b	Contentnea Cr (Buckhorn Reservoir)		2	Aquatic Life	Not Rated	Data Inconclusive	Iron	2006		3m
From Buckhorn Reservoir to a point 0.6 mile upstream of Marsh Swamp				Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
WS-V;NSW	03-04-07	5.8 FW Miles		Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
				Water Supply	Supporting	No Criteria Exceeded	Water Quality Standards Water Supply	2006		1

			Subwatershed (WBD-12 Number) 030202030403	Hominy Swamp							
27-86-8	Hominy Swamp		5	Habitat Degradation	Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity FishCom	2005		3a
From source to Contentnea Creek				MS4 NPDES	Aquatic Life	Impaired	Biological Criteria Exceeded	Ecological/biological Integrity Benthos	2001	2004	5
C;Sw,NSW	03-04-07	9.9 FW Miles	Low Dissolved Oxygen								

Subwatershed (WBD-12 Number) 030202030404

City of Wilson-Contentnea Creek

Table 22 Neuse River Basin

Subbasin (WBD-8 Number) 03020203

DWQ Subbasin 03-04-07

Assessment Unit Number	Name		Overall Category	Potential Stressors	Use Support Category	Use Support Rating	Reason for Rating	Parameter of Interest	Collection Year	Listing Year	IR Category
Description	DWQ Subbasin	Miles/Acres		Potential Sources							
27-86-(5.8)	Contentnea Creek (Wiggins Mill Reservoir)		3a		Aquatic Life	Not Rated	Data Inconclusive	High Water Temperature	2005		3a
From a point 0.6 mile downstream of Shepard Branch to dam at Wilson Water Supply Intake (Wiggins Mill Reservoir)											
WS-IV;NSW,CA	03-04-07	510.5 FW Acres									
27-86-(7)a	Contentnea Creek		2		Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
From dam at Wilson Water Supply (Wiggins Mill Pond) to 0.7 miles upstream of Toisnot Swamp											
C;Sw,NSW	03-04-07	19.6 FW Miles			Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2005		1
					Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
				Subwatershed (WBD-12 Number) 030202030405	Turner Swamp-Contentnea Creek						
27-86-(7)b1	Contentnea Creek		5	Fecal Coliform Bacteria	Aquatic Life	Impaired	Biological Criteria Exceeded	Ecological/biological Integrity Benthos	2002	2008	5
0.7 miles upstream of Toisnot Swamp to Nahunta Swamp											
C;Sw,NSW	03-04-07	15.1 FW Miles		General Agriculture/Pasture WWTP NPDES							
				Habitat Degradation							
				General Agriculture/Pasture Stormwater Runoff							
				Watershed (WBD-10 Number) 0302020305	Nahunta Swamp						
				Subwatershed (WBD-12 Number) 030202030501	Headwaters Nahunta Swamp						
27-86-14	Nahunta Swamp		2		Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
From source to Contentnea Creek											
C;Sw,NSW	03-04-07	27.1 FW Miles			Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity FishCom	2005		3a
					Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2005		1
					Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
				Subwatershed (WBD-12 Number) 030202030502	The Slough						
27-86-14-1	The Slough		2		Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity FishCom	2005		3a
From source to Nahunta Swamp											
C;Sw,NSW	03-04-07	8.6 FW Miles			Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2001		1
				Subwatershed (WBD-12 Number) 030202030505	Lower Nahunta Swamp						
27-86-14-7	Appletree Swamp		3a		Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity FishCom	2005		3a
From source to Nahunta Swamp											
C;Sw,NSW	03-04-07	6.6 FW Miles									
				Watershed (WBD-10 Number) 0302020306	Little Contentnea Creek						

Table 22 Neuse River Basin

Subbasin (WBD-8 Number) 03020203

DWQ Subbasin

03-04-07

Assessment Unit Number	Name		Overall Category	Potential Stressors	Use Support Category	Use Support Rating	Reason for Rating	Parameter of Interest	Collection Year	Listing Year	IR Category
Description	DWQ Subbasin	Miles/Acres		Potential Sources							
				Subwatershed (WBD-12 Number) 030202030602			Upper Little Contentnea Creek				
27-86-26	Little Contentnea Creek		5	Habitat Degradation	Aquatic Life	Not Rated	Data Inconclusive	Iron	2006		3m
From source to Contentnea Creek				ANOPS land app site	Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards	2006		1
C;Sw,NSW	03-04-07	34.9 FW Miles		Low Dissolved Oxygen	Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity	2005		3a
				Nutrient Impacts	Aquatic Life	Impaired	Biological Criteria Exceeded	Ecological/biological Integrity	2005	1998	5
				ANOPS land app site	Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
				Watershed (WBD-10 Number) 0302020307			Contentnea Creek				
				Subwatershed (WBD-12 Number) 030202030701			Beaman Run-Contentnea Creek				
27-86-12	Watery Branch		3a		Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity	2005		3a
From source to Contentnea Creek								FishCom			
C;Sw,NSW	03-04-07	5.9 FW Miles									
				Subwatershed (WBD-12 Number) 030202030702			Tyson Marsh-Contentnea Creek				
27-86-(7)b2	Contentnea Creek		2		Aquatic Life	Not Rated	Data Inconclusive	Iron	2006		3m
From Nahunta Swamp to Neuse River					Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards	2006		1
C;Sw,NSW	03-04-07	45.1 FW Miles			Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity	2000		3a
								Benthos			
					Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
27-86-15	Fort Run		3a		Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity	2005		3a
From source to Contentnea Creek								FishCom			
C;Sw,NSW	03-04-07	7.1 FW Miles									
				Subwatershed (WBD-12 Number) 030202030703			Rainbow Creek-Contentnea Creek				
27-86-21	Rainbow Creek		3a		Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity	2005		3a
From source to Contentnea Creek								FishCom			
C;Sw,NSW	03-04-07	8.6 FW Miles									
				Subwatershed (WBD-12 Number) 030202030704			Wheat Swamp Creek				
27-86-24	Wheat Swamp Creek		2		Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity	2000		1
From source to Contentnea Creek								Benthos			
C;Sw,NSW	03-04-07	14.0 FW Miles									

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.

installation or preservation to name a few. These helped to reduce the contribution of nitrogen, phosphorus and soil to the waterway. These likely contributed to the improved bioclassification in Nahunta Swamp. Nahunta Swamp like all of the other streams in this subbasin suffers from low DO, high nutrient and elevated conductivity. Many of these are indicative of nonpoint source pollution contribution.

The major source of the added nutrients in this watershed is from agricultural sources including concentrated animal operations and the land application of their waste. Point source dischargers and urban stormwater runoff from the growing towns in this watershed are also contributing to the impairments. There is a great need for additional agricultural and urban BMP installation throughout the Contentnea Creek watershed.

A map including the locations of the NPDES facilities and water quality monitoring stations is presented in Figure 17. Table 22 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 22 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.

7.2 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 23 for a summary of use support for waters in subbasin 03-04-07 (see Chapter 23, Section 23.3 for description of the IR category (for each parameter of interest) and Overall (river segment) category).

7.3 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 is presented at http://h2o.enr.state.nc.us/tmdl/General_303d.htm.

Table 23 Summary of Use Support Ratings in Subbasin 03-04-07

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	Miles/ Acres	
Freshwater acres (impoundments)	1,269	758	58	0	0.0	511	39		1,308	
Freshwater miles (streams)	297	85	13	165	25	47	359		656	

% - Percent of total miles/acres.

7.3.1 Moccasin Creek (Bunn Lake) [AU# 27-86-2]

Northwestern Portion of Subbasin Watershed Map (Figure 18).

Current Status

Moccasin Creek [AU# 27-86-2; C; NSW] from source to Contentnea Creek (22.8 miles) is Impaired for aquatic life due to low dissolved oxygen standard violations at ambient monitoring station JA53. Dissolved oxygen levels were below 4 mg/l in 11 percent and below 5 mg/l in 22 percent of the samples. The minimum recorded DO level was 2.1 mg/l. The conductivity was also elevated at times with reading ranging from 50 to 193 μ mhos/cm.

This segment is supporting for recreational uses because the fecal coliform bacteria levels were only above of state standard of 400 CFU/100 ml in 12 percent of the samples collected.

The biological sampling that occurred approximately 1 mile upstream and was found to support a Good-Fair benthic community at site JB105 and a Good fish community at site JF48. The overall rating is Impaired for biological integrity based on the ambient monitoring data. The station locations for the biological and ambient were collected close enough that a split in this segment was not justified. If the dissolved oxygen levels continue to decline, it will have a direct impact on the biological communities in this creek.

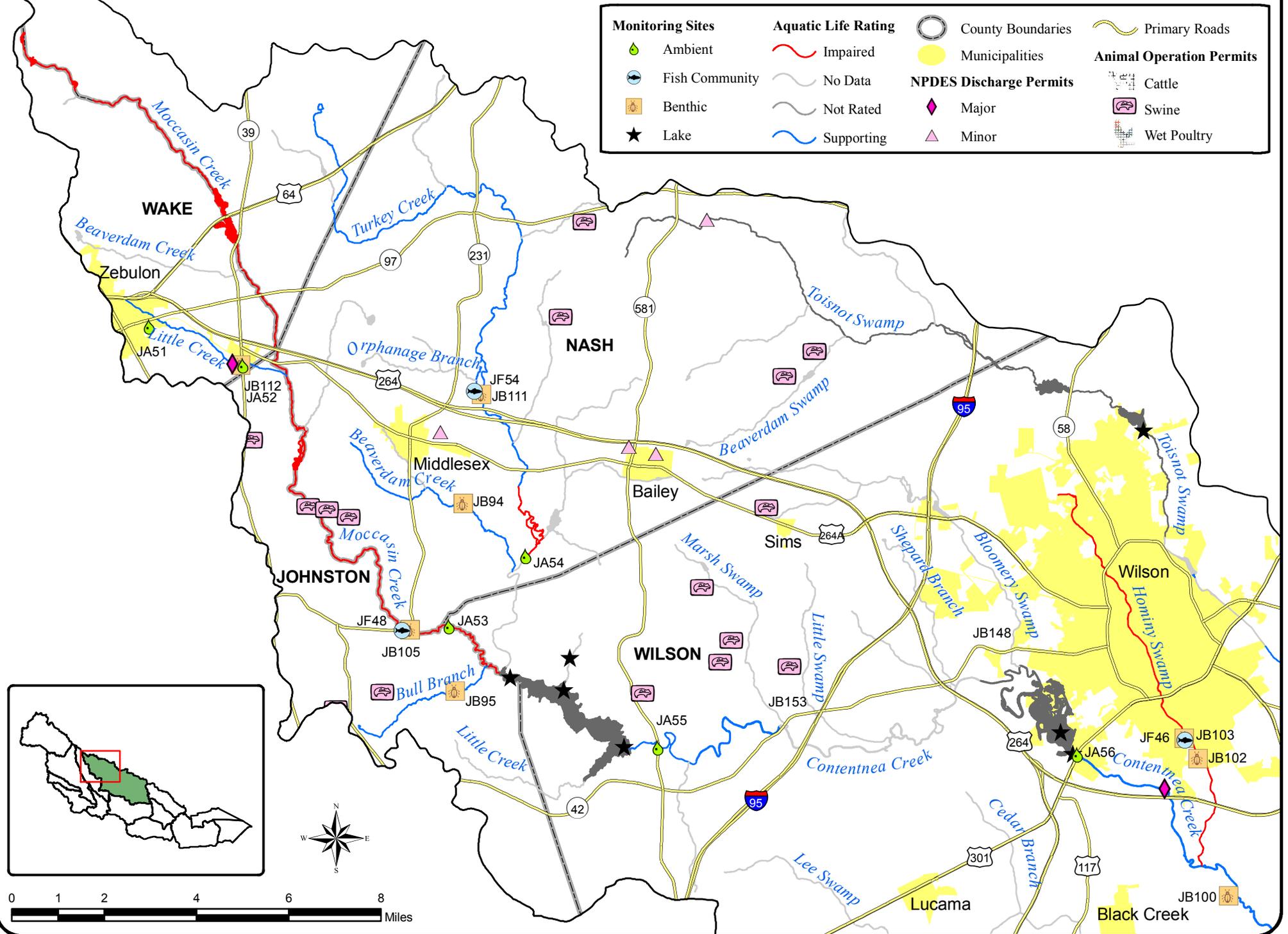
The overall instream habitat was good, however trash was present in the stream channel at the time of sampling and a moderate amount of erosion was observed. While the benthic bioclassification remained the same as the 2000 rating, the fish rating decreased from Excellent in 2000 to Good in 2005. The change in bioclassification is possibly a result of natural variation, but may also be related to the post-hurricane de-snagging efforts that occurred in this reach of Moccasin Creek since the 2000 fish community sample. The trophic structure in this transitional (Piedmont to Coastal Plain) section of the stream was skewed towards a high percentage of insectivores (90 percent) and the percentage of omnivores plus herbivores was low (5 percent).

Moccasin Creek will be added to the 2008 303(d) list for low DO standard violations.

Recommendations

DWQ will continue to monitor this watershed. Local resource agencies are encouraged to install appropriate BMPs in this watershed to aid in water quality improvements.

Figure 18 Northwestern Portion of Subbasin 03-04-07



7.3.2 Little Creek (West Side) [AU# 27-86-2-4]

2002 Recommendations

Previously Little Creek was impaired because dissolved oxygen levels were below 4 mg/l in 20.8 and 12.1 percent of samples. These sites are upstream and downstream of the Zebulon/Little Creek WWTP. DWQ and LNBA will continue to monitor the site to detect any water quality changes. DWQ will work with the Zebulon WWTP and the Town of Zebulon to determine the sources of low dissolved oxygen in Little Creek.

Current Status

Little Creek [AU# 27-86-2-4; C; NSW] from the source to Moccasin Creek (4.1 miles) is Supporting aquatic life due to Good-Fair benthic bioclassification at site JB112 and because No Criteria Exceeded the state standards at ambient monitoring stations JA51 and JA52. The DO levels have improved since the last assessment period in which this segment was impaired due to low DO levels. During this assessment period the DO levels were only below 4 mg/l in 7 percent of the samples at JA52 with a minimum recorded level of 3.2 mg/l. At this same site the DO levels were below 5 mg/l in 23 percent of the samples. At the ambient station upstream of the Little Creek WWTP, 3 percent of the DO readings were below 4 mg/l and 10 percent were below 5mg/l. The DO levels are greatly improved since the last assessment period but it appears that the WWTP and the town of Zebulon remain a stressor to this segment of the watershed. This can also be seen by the difference in the conductivity range upstream and downstream of the WWTP. The recorded conductivity range upstream of the WWTP was 50 to 145 µmhos/cm and downstream was 71 to 688µmhos/cm. Nutrient levels were also high at both ambient monitoring stations. There was an instream nitrate-nitrite reading of 10.8 mg/l at station JA52 (below the WWTP) while the highest recorded reading above the WWTP was 0.79 mg/l.

Despite the low DO (4.2 mg/l) and high conductivity (429 µmhos/cm) readings at the time of the benthic sampling, this site (JB112) received a Good-Fair benthic rating. The most abundant taxa found were indicative of an organic enriched and low DO environment, most likely from the WWTP upstream of the benthic site (JB112). There were also a few indicator taxa that would suggest that low flow may also be an issue during portions of the year.

Little Creek will be removed from the 2008 303(d) list of impaired waters for DO standard violations. This stream still remains very fragile and could easily be pushed back on the impaired waters list if care is not taken to improve and protect water quality in this area.

Little Creek is currently Supporting for recreation. The fecal coliform levels were above 400 CFU/100 ml in 14 percent of the samples upstream of the WWTP (JA51) and in 7 percent of the samples downstream of the WWTP (JA52).

Little Creek WWTP (NC0079316) was formerly owned by the Town of Zebulon, which merged its water and sewer operations in 2006 with the City of Raleigh Public Utilities Department (CORPUD). The Little Creek WWTP is currently permitted to discharge 2.2 MGD. The CORPUD is looking to increase the discharge up to 6 MGD in order to accommodate growth in towns of Zebulon, Wendell and Middlesex. Little Creek has a 7Q10 low flow of zero at the discharge point, which limits its waste assimilation capacity during dry weather. This would require a new discharge location and/or other discharge options to be assessed in order to increase the discharge from this plant. The City of Raleigh is looking at a possible discharge site in the Little River in subbasin 03-04-06 in addition to the 2.2 MGD into Little Creek.

Recommendations

Continued monitoring of this creek is necessary. DWQ recommends the use of stormwater BMPs as well as continued WWTP improvements to reduce the impacts to this stream.

7.3.3 Turkey Creek [AU# 27-86-3-(1)a1 & 27-86-3-(1)a2]

Current Status

Turkey Creek [AU# 27-86-3-(1)a1; C; NSW] from source to Old Middlesex Road (19.4 miles) is Supporting for aquatic life due to a Good-Fair benthic bioclassification at site JB111. This site was reassessed in 2001 to determine if the original 2000 Fair rating was accurately representing the conditions at this site. The biologist felt that the 2000 sample was possibly affected by high flow at the time of sampling. This site was not reassessed during the basinwide assessment in 2005. Turkey Creek is listed as critical habitat for the mussel *Alasmidonta heterodon*, although none were observed during the 2001 assessment. However, this part of Turkey Creek was supporting a good mussel community of *Elliptio complanata* and *Elliptio icterina*. Low dissolved oxygen levels are of concern in this area. DO at the time of sampling was 4.8-5.8 mg/l. Further downstream is impaired due to low DO standard violations.

The fish community was also assessed at this site (JF54) and currently are Not Rated due to the fact that the Coastal Plain ecoregion assessment criteria is not complete. The fauna found at this site was typical of that found in many Coastal Plain streams. This fish site should be ratable during the next assessment period.

Turkey Creek [AU# 27-86-3-(1)a2; C; NSW] from Old Middlesex Road to SR 1101 (2.0 miles) is Impaired for aquatic life due to low DO levels at ambient monitoring station JA54. DO levels were below 4 mg/l in 29 percent of the samples and below 5 mg/l in 47 percent of the samples. The minimum recorded DO value was 1.9 mg/l at this station. The conductivity was also elevated (maximum recorded value was 287 μ mhos/cm) and 5 percent of the samples had a pH less than 6 (minimum pH was 5.1) at this site. It is uncertain if DO levels are naturally low or if there are other factors contributing to the low DO levels in Turkey Creek.

This segment will be added to the 2008 303(d) list of impaired waters for low DO standard violations. The TMDL management strategy will assess DO levels throughout this watershed.

Recommendation

Turkey Creek should be assessed for macroinvertebrates during the next assessment period.

Local resource agencies are encouraged to install appropriate BMPs in this watershed to aid in water quality improvements.

7.3.4 Contentnea Watershed [AU# 27-86-(1)a, 27-86-(1)b, 27-86-(5.8), 27-86-(7)a, 27-86-(7)b1 & 27-86-(7)b2]

Northwestern (Figure 18), Central (Figure 19) and Southeastern (Figure 20) Portion of the Subbasin Watershed Maps.

2002 Recommendations

DWQ will continue to monitor Contentnea Creek to assess water quality changes and determine the cause of low dissolved oxygen at the ambient monitoring site JA55. DWQ will work with

the Wilson WWTP to ensure the discharge minimizes water quality impacts to Contentnea Creek. Because of the water quality impacts and the development in the watershed, Contentnea Creek near Wilson is a NCWRP targeted local watershed.

Current Status

Contentnea Creek (Buckhorn Reservoir) [AU# 27-86-(1)a & 27-86-(1)b]

This segment of Contentnea Creek has been split in order to have the data better represent the actual hydrograph. The actual reservoir (segment (1)a) is sampled using DWQ Lakes assessment methodology and the lower portion (segment (1)b) is sampled using DWQ riverine criteria for both aquatic life and ambient monitoring. This entire segment was added to the 1998 303(d) list for impaired biological integrity and low DO standard violations. It appears that this was improperly impaired for biology in 1998. The last biological sample was taken in 1996 at NC42 and was rated as Good-Fair. It appears that this segment was improperly impairment and will be removed from the 2008 303(d) list.

Contentnea Creek (Buckhorn Reservoir) [AU# 27-86-(1)a; WS-V; NSW] (758.2 Acres) is currently Not Rated for aquatic life due to insufficient data to determine if the lake supports its designated uses (Figure 18). Only 7 samples were collected between May and August 2005. This does not meet the 10 sample minimum required to give a rating of supporting or impaired therefore it is classified as not rated for the most current use support rating.

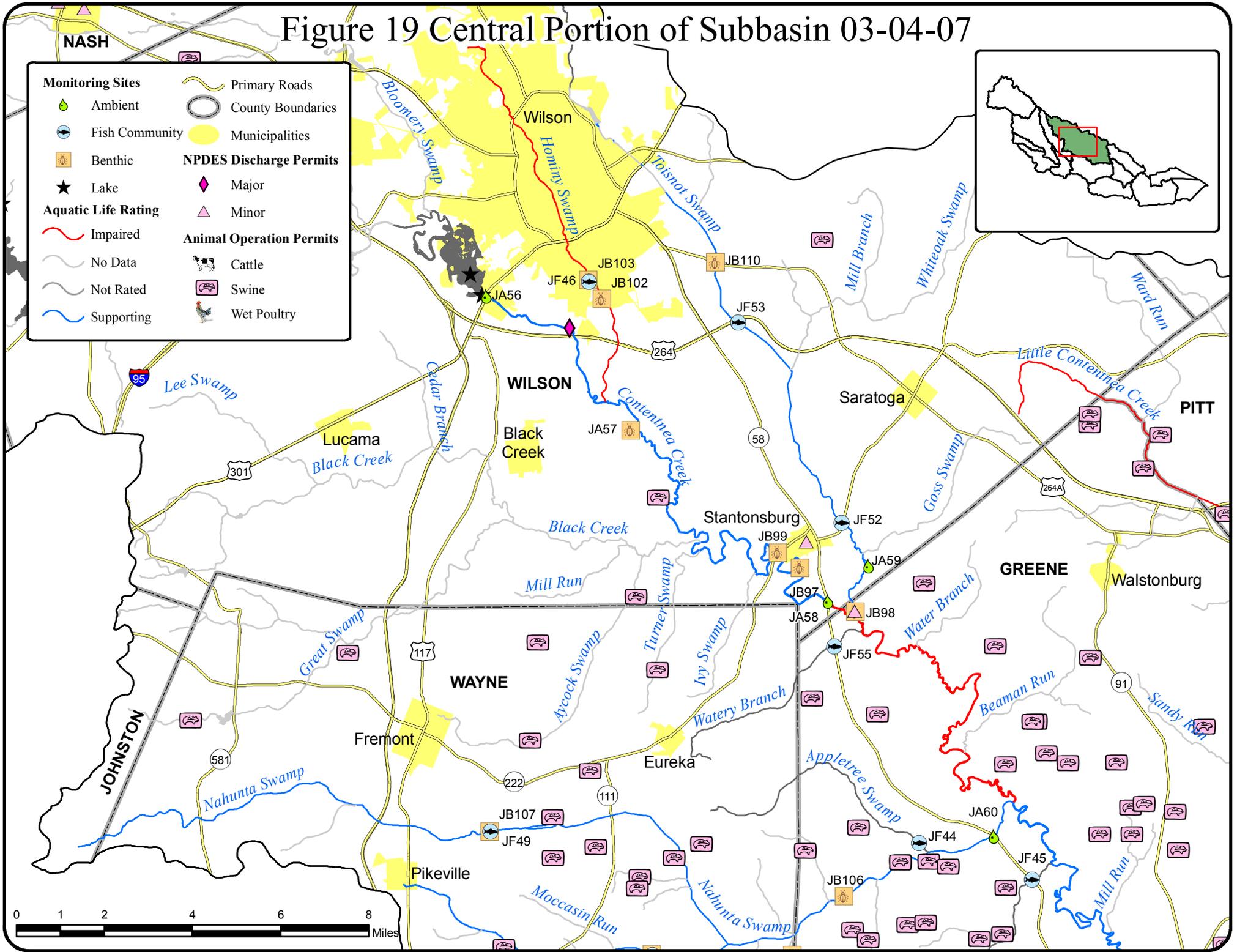
No observed surface DO values were below the state standard of 4 mg/l (instantaneous value). The surface readings ranged between 5.3 and 10.2 mg/l DO during this assessment period. Nutrient concentrations of total Kjeldahl nitrogen and total organic nitrogen in 2005 were generally moderate to high indicating a potential for high biological productivity. Total Kjeldahl nitrogen values ranged from 0.41 mg/l to 0.76 mg/l and total organic nitrogen values ranged from 0.40 mg/l to 0.74 mg/l. Phytoplankton analyses of samples collected in the upstream section of the reservoir indicated mild to severe blue-green blooms during June, July, and August of 2005 with the most severe blooms found in early August.

This segment will remain on the 303(d) impaired waters list for low DO standard violation since there were not enough samples collected during this assessment period to officially make a rating on Buckhorn Reservoir.

Contentnea Creek (Buckhorn Reservoir) [AU# 27-86-(1)b; WS-V; NSW] from the Buckhorn Reservoir dam to a point 0.6 miles upstream of Marsh Swamp (5.8 miles) is Supporting aquatic life and recreational uses due to No Criteria Exceeded at ambient monitoring station (JA55) (Figure 18). The pH was below 6 in 8.5 percent of the samples and the conductivity levels ranged between 42 and 520 μ mhos/cm. This segment of Contentnea Creek is currently on the 303(d) list for low DO standard violations. During this assessment period, the DO readings were below 4 mg/l in 5 percent of the samples and below 5 mg/l in 15 percent of the samples, therefore this segment will be removed from the 2008 303(d) list for low DO. The DO levels are still low but did not fall below the states instantaneous standard of 4 mg/l DO more than 10 percent of the time.

This segment of Contentnea Creek is Supporting recreational uses because fecal coliform bacteria levels were well below the state standard.

Figure 19 Central Portion of Subbasin 03-04-07



Monitoring Sites	
	Ambient
	Fish Community
	Benthic
	Lake
Aquatic Life Rating	
	Impaired
	Supporting
	No Data
	Not Rated
NPDES Discharge Permits	
	Major
	Minor
Animal Operation Permits	
	Cattle
	Swine
	Wet Poultry



Through the use of 2004 orthoimagery, it is estimated that 75 percent of the streams in the above watersheds are buffered with a 100 foot or greater average buffer width. This watershed is mostly cropland agriculture, although development has and will most likely continue to grow around the reservoir. There are several developments and individual housing units in this watershed. In this watershed, September 2000 – December 2006, EQIP has funded: 476 ac long term no till, 2 watering facilities, 1 water well, 172 ac of nutrient management, and 18 ac of pest management. A total of 36.3 ac of CRP CP 33 Upland Bird Habitat Buffer have also been established. This watershed contains 2 active hog lagoons. Land on the western side of Wilson County can be characterized with greater slopes therefore resulting in greater runoff reaching tributaries.

Contentnea Creek [27-86-(4.5)]

Contentnea Creek [27-86-(4.5); WS-IV; NSW] from a point 0.6 mile upstream of Marsh Swamp to a point 0.6 mile downstream of Shepard Branch (7.7 miles) is currently listed as No Data (Figure 18). Due to limited resources this segment of Contentnea Creek was not assessed in this assessment window. This may be a good place to suggest a benthic station during the next assessment period.

This watershed contains 2 active and 3 inactive hog lagoons. A great percentage of this watershed is agricultural. There are several areas of wetland buffers. There are also a few areas where agricultural fields lie directly next to the stream, therefore resulting in the potential need for buffers in this area.

Contentnea Creek (Wiggins Mill Reservoir) [27-86-(5.8)]

Contentnea Creek (Wiggins Mill Reservoir) [27-86-(5.8); WS-IV; NSW; CA] from a point 0.6 miles downstream of Shepard Branch to dam at Wilson Water Supply Intake (Wiggins Mill Reservoir) (510.5 acres) is Not Rated for aquatic life due to insufficient data to determine if the lake supports its designated uses (Figure 18). Seven samples were collected between May and September 2005. This does not meet the 10 sample minimum required to give a rating of supporting or impaired therefore, it is classified as Not Rated. All other parameters have remained relatively consistent since the last assessment of this lake.

Through the use of 2004 orthoimagery, it is estimated that the streams in this watershed are at least 70 percent buffered. The area is characterized fairly well with development. The east side of the reservoir borders the city of Wilson, with housing units surrounding the east, south, and west sides. There is little to no buffer of the southern portion of this segment. There is one active hog lagoon and 1 closed hog lagoon in the watershed leading to this segment.

Contentnea Creek [27-86-(7)a, 27-86-(7)b1 & 27-86-(7)b2]

Contentnea Creek [27-86-(7)a C; Sw; NSW] from dam at Wilson Water Supply Intake (Wiggins Mill Reservoir) to 0.7 miles upstream of Toisnot Swamp (19.6 miles) is Supporting aquatic life and recreation due to a Good benthic rating at JB99, a Good-Fair benthic rating at JB97 and JB100 as well as No Criteria Exceeded at ambient monitoring stations JA56, JA57 and JA58 (Figure 19). This segment of the Contentnea Creek has a supplemental classification of swamp water so this area is not assessed for DO because swamp waters are known to have naturally occurring low DO levels. The minimum recorded DO levels at these sites ranged from 3.4 to 4.3 mg/l. The fecal coliform bacteria levels were below the state standard; however they were elevated at the two ambient monitoring stations below the Wilson WWTP (11 and 12 percent

exceeded). The nutrient and conductivity levels were also elevated in this segment of the watershed (conductivity ranged between 50 and 474 $\mu\text{mhos/cm}$).

The Town of Wilson was awarded the 2006 Clean Water State Revolving Fund (CWSRF) Pisces Award for success in environmental performance, innovation and creation. The City of Wilson improved the biosolids processing and constructed a new 6.0 MGD water reclamation facility as part of an overall strategy to improve water quality in the Neuse River Basin. The city utilized several funding sources to complete the project, which included \$32.3 million in CWSRF loans. The city also created an incentives program to use reclaimed water thus conserving water resources and increasing nutrient removal.

The benthic sites in this reach of the Contentnea Creek ranged from Good-Fair (JB97 & JB100) to Good (JB99). The furthest upstream site was rated Good-Fair (JB100) in 2001. A site just upstream had received a fair rating in 1996. This site could not be resampled in 2001 so a site was chosen downstream at the next road crossing. This portion of the creek was noted as being affected by both point and nonpoint source pollution from the Town of Wilson and may be stressed by low DO in the summer months.

The next site further downstream was rated Good (JB99) even though the instream habitat for colonization was sparse. This site improved from a Good-Fair rating in 2000 to a Good rating in 2005. The total taxa and EPT taxa richness was slightly better in 2000, but there were more intolerant EPT taxa in 2005, which accounted for the increased rating at this site.

A special study was conducted in which benthic samples were collected upstream (JB97) and downstream (JB98) of the Stantonsburg WWTP. Sample JB98 (downstream site) is in the next stream segment assessed below (AU# 27-86-(7)b1). The instream habitat was relatively good at both sites, however, macrophyte areas and large woody debris were not as extensive at the upstream site. Both sites also had a wide and intact forested riparian zone but were experiencing moderated stream bank erosion. Cows were also encountered in the stream at one spot between the two sampling locations.

The upstream site while it had a lower overall species diversity and lower EPT abundance than the downstream site, it also had a more intolerant species composition, which gave the upstream site a higher borderline Good-Fair rating than the downstream site, which had a more pollution tolerant taxa and resulted in a Fair benthic bioclassification.

The Stantonsburg WWTP (NC0057606) had total residual chlorine violations throughout most of 2006. At times this plant was discharging over 1 g/l of total residual chlorine in early 2006. It is likely that these concentrations had a direct impact on the biological community downstream of this facility. This facility has been in compliance with the 28 $\mu\text{g/l}$ permit limit for total residual chlorine since October 2006. This facility has also experienced sporadic fecal coliform bacteria violations throughout the same period. They are currently under a SOC for exceeding 80 percent of their designed permitted capacity.

The Stantonsburg WTP (NC0007536) has also had total residual chlorine issues over the last several years. They installed a dechlorination system in April 2007. This plant has a 17 $\mu\text{g/l}$ total residual chlorine permit limit.

A Wilson County SWDC technician notes an area located in this section of Contentnea Creek that is a good area for stream restoration. Approximately 1500 feet of stream restoration is needed around the location where Woodbridge Road intersects Contentnea Creek. This area is marked with degrading road structures. Stream banks running up to the road are washing away rapidly, causing roads to collapse into the stream. Sections such as these will only get worse over time.

Contentnea Creek [AU# 27-86-(7)b1]

Contentnea Creek [AU# 27-86-(7)b1; C; Sw; NSW] from a point 0.7 miles upstream of Toisnot Swamp to Nahunta Swamp (15.1 miles) is Impaired for aquatic life due to a Fair benthic bioclassification at site JB98 (Figure 19). This was discussed above in Contentnea Creek AU# 27-86-(7)a.

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

Contentnea Creek [AU# 27-86-(7)b2]

Contentnea Creek [AU# 27-86-(7)b2; C; Sw; NSW] from Nahunta Swamp to Neuse River (45.1 miles) is Supporting recreational uses due to No Criteria Exceeded at ambient monitoring stations JA61, JA62 and JA66 (Figure 20). This same section is Not Rated for aquatic life due to the inability to find suitable habitat to take a macroinvertebrate sample during the routine 2005 benthic monitoring schedule. This site had received a Good-Fair benthic bioclassification at JB101 in 2000. However, the hydrology of the stream appears to have changed substantially between the two sampling dates, which didn't allow for an adequate sample to be collected in 2005. This site should be reassessed during the next Neuse Basin assessment window.

As with the segments listed above, this segment of the Contentnea Creek also has a supplemental classification of swamp water so this area is not assessed for DO because swamp waters are known to have naturally occurring low DO levels. The minimum recorded DO levels at these sites ranged from 2.2 to 2.4 mg/l. The fecal coliform bacteria levels were below the state standard, however they were elevated at JA61 (13 percent exceeded). All these stations had elevated nutrients with a maximum TKN reading of 2.25 mg/l and a nitrate-nitrite of 1.25 mg/l at station JA61.

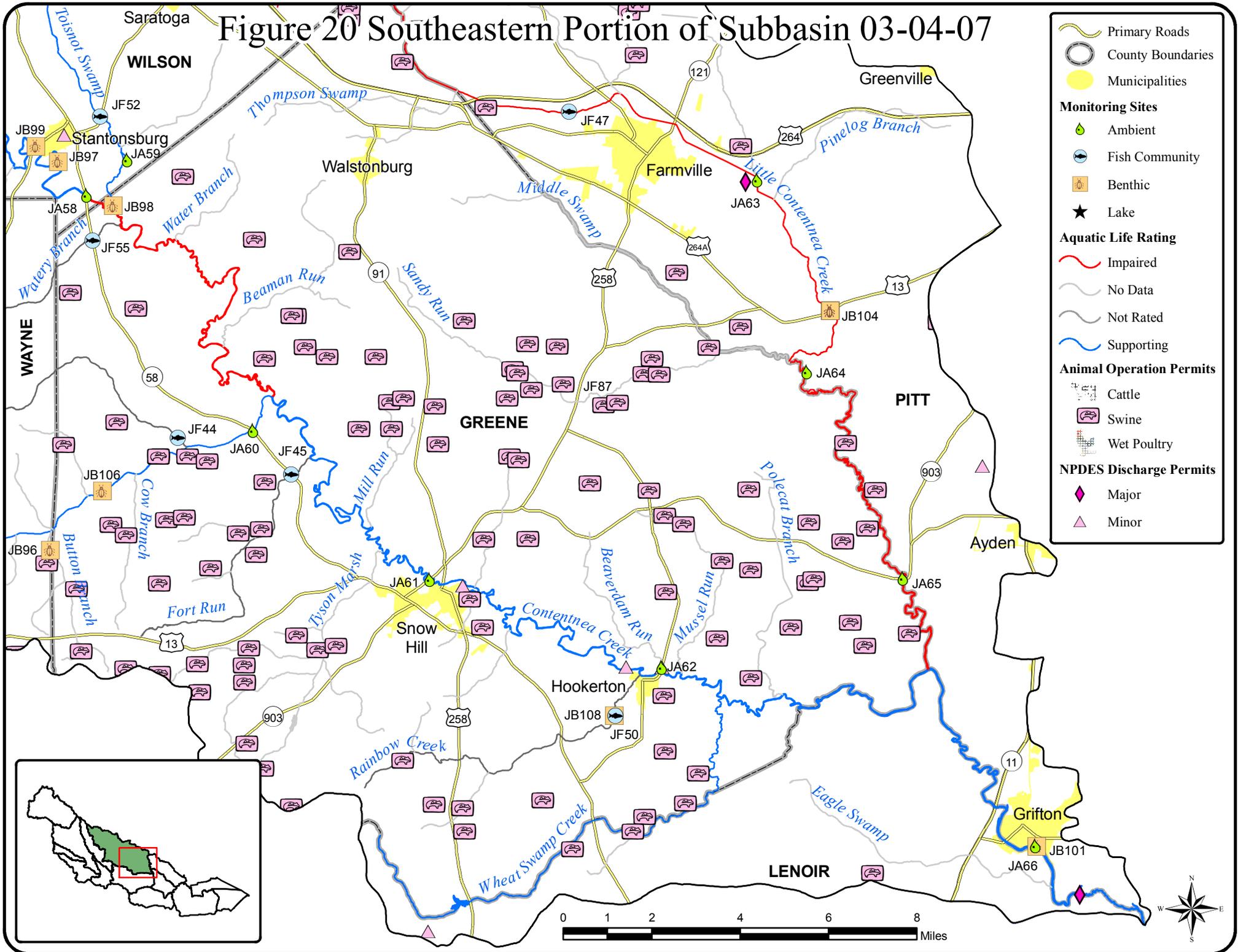
The Contentnea Metropolitan Sewerage District WWTP (NC0032077) had several total cyanide limit violations in the later half of 2006 and early 2007. The source of the cyanide is believed to be a metal finishing facility which discharges wastewater to this plant. The metal finishing facility is in the process of changing their process so they will no longer be using cyanide. If this is truly the source of the cyanide, then this problem will be eliminated. The biologist should sample below this discharge site to see if there has been a direct impact to the aquatic organisms from the repeated cyanide exposure. DWQ should also consider doing some sediment toxicity testing in this area as well.

Contentnea Creek - Fish Tissue Monitoring

All waters in the Neuse River basin are Impaired on an evaluated basis in the Fish Consumption category for mercury contamination. This is based on a fish consumption advice from the NC Department of Health and Human Services (NC DHHS). For more information on fish consumption advisories and advice, contact NC DHHS

(<http://www.schs.state.nc.us/epi/fish/current.html>).

Figure 20 Southeastern Portion of Subbasin 03-04-07



Primary Roads

County Boundaries

Municipalities

Monitoring Sites

- Ambient
- Fish Community
- Benthic
- Lake

Aquatic Life Rating

- Impaired
- No Data
- Not Rated
- Supporting

Animal Operation Permits

- Cattle
- Swine
- Wet Poultry

NPDES Discharge Permits

- Major
- Minor

0 1 2 4 6 8 Miles



Largemouth bass, sunfish, redhorse sucker, and catfish samples were collected from Contentnea Creek at Snow Hill during 2003 and analyzed for mercury. The samples were collected as part of an eastern North Carolina mercury assessment. Individuals from all species (15 of 24 total samples) contained mercury concentrations exceeding the state criteria of 0.4 ppm. Mercury levels in all samples ranged from 0.13 to 0.82 ppm.

For more information on fish tissue monitoring see the Environmental Sciences Section, Basinwide Assessment Report Neuse River Basin, 2006 (<http://h2o.enr.state.nc.us/esb/Basinwide/Neuse06BasinReportFinal.pdf>).

Recommendations

DWQ recommends that the local resource agency pursue buffer restoration in this watershed as well as other agricultural BMPs to help reduce sedimentation and nutrient loading.

Water Quality Initiatives

The Division of Soil and Water Conservation was awarded a Section 319 Clean Water Act Grant to implement the Agricultural Sediment Initiative in this watershed as well as another watershed in the Tar-Pamlico River basin. This \$300,000 grant will fund best management practice installation in Pitt, Lenoir, and Greene counties through their local Soil and Water Conservation Districts to improve water quality in these watersheds.

From September 2000 – December 2006, over \$370,000 of the Agriculture Cost Share Program funds were spent on BMP implementation in this watershed. Practices included 392 acres of 3 year conservation tillage, 317 acres of long term no-till, 110 acres of cropland conversion to grass, 3 acres of critical area planting, 7,400 feet of diversions, 5,215 acres of conservation tillage, 616 acres of grassed waterways, 28 acres of field borders, 13 acres of filter strip, 321 acres of riparian buffer, 714 acres of nutrient management, 1 grade stabilization structure, 8 incinerators, 1 hydrant, 2 waste application equipment, and 1 solid set. Cumulatively, these practices affect 10,675 acres, saved 38,495 Tons of soil, 130,880 pounds of nitrogen, 35,511 pounds of phosphorus, 207,942 pounds of Waste-N managed, and 201,616 pounds of Waste-P managed.

7.3.5 Hominy Swamp [AU# 27-86-8]

2002 Recommendations

DWQ will continue to monitor Hominy Swamp to assess water quality impacts from urban and developing areas in Wilson. As part of the 303(d) list approach, DWQ will begin the process of identifying problem parameters that may be causing biological impairment in Hominy Swamp. NCWRP has a restoration project on Hominy Swamp Creek, as well as a grant focusing on the assessment of water quality problems and the development of a restoration plan for this local watershed. Because of the water quality impairment and the restoration assessment, Hominy Swamp is a NCWRP targeted local watershed.

Wilson should consider water quality impacts to Hominy Swamp during development.

2002 Water Quality Initiatives

The City of Wilson received a CWMTF grant to make upgrades to the WWTP.

Current Status

Hominy Swamp [AU# 27-86-8; C; Sw; NSW] from source to Contentnea Creek (9.9 miles) remains impaired due to a Poor benthic bioclassification at sites JB102 and JB103 (Figure 19). Hominy Swamp runs through the Town of Wilson and is highly impacted by urban nonpoint source runoff. The most upstream site (JB103) received very low habitat score for both the bug and the co-located fish site (JF46). The low habitat score reflects a stream having evidence of channelization with eroding banks and very little instream habitat. The benthic fauna was very sparse, dominated by highly tolerant worms and midges, with no EPT taxa. This resulted in a Poor rating at this site. The fish community was Not Rated at this site due to the fact that there are no criteria for the Coastal Plain ecoregion complete at this time, however, there were no intolerant fish found at this location. A greater percentage of tolerant fish were present at this site than at any other site in the Coastal Plain, except of at Big Chinquapin Branch (in subbasin 11).

The downstream site (JB102) location was chosen to see if the Bruce Foods Corporation spray fields were having an impact on Hominy Swamp. Bruce Foods Corp has a non-discharge spray irrigation system for wastewater disposal consisting of lagoons and spray fields. The Raleigh Regional Office found wastewater running off the fields and into Hominy Swamp and its tributaries. Measurements indicated low DO and high conductivity levels. The biologist found that this site was similar to the upstream location (~0.5 miles upstream). The habitat score was slightly higher as a result of a somewhat better riparian zone and canopy as well as more stable banks. The instream habitat conditions were much the same but with more sludge and silt along the banks. This site had an overall lower taxa richness and more tolerance species resulting in a Poor rating as well.

Hominy Swamp will remain on the 303(d) impaired waters list for impaired biological integrity.

Recommendations

More spray fields have been added to this area, resulting in a greater potential for runoff. DWQ recommends increasing the number of inspections in order to assure compliance.

It is estimated that 68 percent of Hominy Swamp is buffered with a 90 foot or greater average buffer width. The section runs directly through the city with a small amount of agriculture on the southern stretch where Hominy Swamp meets Contentnea Creek. This watershed would benefit greatly from the establishment and education of community conservation. This is a prime spot for funds such as the Community Conservation Assistance Program (CCAP).

Water Quality Initiatives

From September 2000 – December 2006, EQIP has funded 50 acres of long term no till, nutrient management, and pest management, and 0.5 acres of upland wildlife habitat management in this watershed

7.3.6 Nahunta Swamp [AU# 27-86-14]

2002 Recommendations

DWQ will continue to monitor Nahunta Swamp to assess water quality changes. As part of the 303(d) list approach, DWQ will begin the process of identifying problem parameters that may be causing biological impairment in Nahunta Swamp. DWQ will contact the Division of Soil and

Water Conservation (DSWC) to evaluate the potential for installation of agricultural BMPs that would protect water quality and aquatic habitat in Nahunta Swamp.

Current Status

Nahunta Swamp [AU# 27-86-14; C; SW; NSW] from source to Contentnea Creek (27.1 miles) is Supporting aquatic life and recreation due to a Good-Fair benthic bioclassification at sites JB106 and JB107 as well as No Criteria Exceeded at the ambient monitoring station JA60 (Figure 19). Nahunta Swamp has a supplemental classification of swamp water so this area is not assessed for DO because swamp waters are known to have naturally occurring low DO levels. The minimum recorded DO levels at these was 1.6 mg/l. The recorded conductivity ranged from 65 to 173 $\mu\text{mhos/cm}$ indicative of nonpoint source pollution influences. Nutrients were also elevated at this station. The fecal coliform bacteria levels were below the state standard.

The benthic site JB107 was requested by the Washington Regional Office in order to assess the aquatic health in the upper Nahunta watershed. A fish assessment (JF49) was also conducted at this same location. There are no NPDES dischargers or concentrated animal operations upstream of this monitoring site. The biologist noted that the quality of the instream habitat was low but that the streambanks and riparian zone were intact. The taxa found at this location were indicative of possible low DO and organic enrichment in this area.

The fish community (JF49) is currently Not Rated due to the fact that the Coastal Plain ecoregion assessment criteria is not complete. The fauna found at this site was typical of that found in many Coastal Plain streams. This fish site should be ratable during the next assessment period.

Benthic site JB106 has been sampled 6 times prior to the 2005 basinwide cycle. It was rated Fair in 1988, 1995, 1999 and 2000. It was rated Good-Fair in 1990 (twice) and again during this assessment period (2005). In 2005, this site had the highest taxa richness (96) and EPT taxa richness (19) ever recorded at this site. In fact, this site contained the highest diversity of macroinvertebrate fauna in subbasin 07. Twenty-four new taxa were found at this site in 2005. The improved water quality in this area could be accounted for possibly due to the extended drought experienced in the basin during this assessment period. This may have resulted in less nonpoint source runoff from the large number of concentrated animal operations in this area.

Nahunta Swamp will be removed from the 2008 303(d) impaired waters list for impaired biological integrity.

Recommendations

Local resource agencies are encouraged to install appropriate BMPs in this watershed to aid in water quality improvements.

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>).

Water Quality Initiatives

From September 2000 – December 2006, over \$108,000 of the Agriculture Cost Share Program funds were spent on BMP implementation in this watershed. Practices included 467 acres of 3 year conservation tillage, 397 acres of long term no-till, 53 acres of cropland conversion to grass,

36 acres of cropland conversion to trees, 20 acres of pastureland conversion to trees, 900 feet of diversions, 645 acres of conservation tillage, 5 acres of grassed waterways, 2 acres of field borders, 92 acres of riparian buffer, 1 incinerator, 1 hydrant, and 1 waste application equipment. Cumulatively, these practices affect 2,549 acres, saved 8,399 Tons of soil, 27,969 pounds of nitrogen, 8,474 pounds of phosphorus, 19,416 pounds of Waste-N managed, and 12,474 pounds of Waste-P managed.

7.3.7 Little Contentnea Creek [AU# 27-86-26]

2002 Recommendations

DWQ will continue to monitor Little Contentnea Creek to determine probable causes of impairment. As part of the 303(d) list approach, DWQ will begin the process of identifying problem parameters that may be causing biological impairment in Little Contentnea Creek.

Current Status

Little Contentnea Creek [AU# 27-86-26; C; Sw; NSW] from source to Contentnea Creek is Impaired for aquatic life due to a Fair benthic bioclassification at JB104 (Figure 18). This site received a Fair in 2000 and 2001 as well. There were good snag and bank habitats although the stream was channelized and there were no pools. The low bioclassification is reflective of problems in the upper watershed. Low dissolved oxygen may also be contributing to the impairment.

Little Contentnea Creek has a supplemental classification of swamp water. Swamps waters are known to have naturally occurring low DO levels. The low DO levels within this watershed appear to be affecting the benthic fauna. The minimum recorded DO levels ranged from 0.7 to 2.3 mg/l at ambient monitoring stations JA63, JA64 and JA65. DO levels appear to improve somewhat downstream, closer to the confluence with Contentnea Creek. The recorded conductivity levels ranged between 50 and 1232 μ mhos/cm. Nutrients were also elevated throughout this creek. Total Kjeldahl nitrogen ranged from 0.2 to 11 mg/l, ammonia ranged from 0.01 to 2.3 mg/l, nitrite + nitrate nitrogen ranged from 0.02 to 1.8 mg/l and total phosphorus ranged from 0.04 to 5.98 mg/l. There are a lot of concentrated animal feed operations (CAFOs) in this watershed than may be contributing to nonpoint source pollution. Better BMPs on these CAFOs spray fields or newer non-lagoon waste technology could possibly help to decrease the nutrient load making it into the nutrient sensitive waters of the Neuse River basin. These were some of the highest nutrient reading recorded in the Contentnea Creek watershed.

Little Contentnea Creek is supporting for recreational uses, however elevated fecal coliform bacteria were seen at JA63 and JA65, with levels above the state standard in 15 and 18 percent of the samples respectively.

Little Contentnea Creek will remain on the 303(d) list of impaired waters for biological integrity.

Little Contentnea Creek will also remain on the 303(d) list for low DO standard violations. This Creek was added to the impaired waters list prior to the current swamp criteria. Swamp waters that were added to the impaired waters list will remain on the list until it can be scientifically proven that the cause of the low DO in these waters are in fact due to natural causes and not as a result of anthropogenic sources.

It is estimated that 80 percent of the streams in this watershed are buffered with a 100 foot or greater average buffer width. This area is mainly lower sloping agricultural land.

Recommendations

Local resource agencies are encouraged to install appropriate BMPs in this watershed to aid in water quality improvements.

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>).

Water Quality Initiative

From September 2000 – December 2006, EQIP has funded: 1050 acres of nutrient management, 1047 acres of pest management, 98 acres of long term no till, 2445 feet of field borders, and 10.1 acres of grassed waterways. In this same time period, 41.5 acres of CRP CP 33 Upland Bird Habitat Buffer have been established.

7.4 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.

7.4.1 Toisnot Swamp (Silver Lake, Lake Wilson) [AU # 27-86-11-(1)] Central Portion of Subbasin Watershed Map (Figure 19).

Current Status

Toisnot Swamp (Silver Lake, Lake Wilson) [AU # 27-86-11-(1); WS-III; NSW] from source to a point 0.6 miles upstream of Wilson County SR 1326 (18.4 miles) is Not Rated for aquatic life due to insufficient data to determine if the lake supports its designated uses. Seven samples were collected between May and August 2005. This does not meet the 10 sample minimum required to give a rating of supporting or impaired therefore, it is classified as not rated.

Nutrient concentrations in 2005 were high for total phosphorus (range 0.06 mg/L to 0.09 mg/L), total Kjeldahl nitrogen (range 0.62 mg/L to 0.95 mg/L), and total organic nitrogen (range 0.56 mg/L to 0.94 mg/L) indicating a potential for high algal activity. Some aquatic weeds and filamentous algae were found in a small area near the shoreline in the upstream end of the reservoir in May of 2005. The weeds were identified as water primrose (*Ludwigia hexapetala*) while the algae was identified as black mat algae (*Lyngbya wollei*). Water primrose is considered invasive and *Lyngbya wollei* is a noxious blue-green algae and is known to form thick, foul smelling mats that choke coves and cover shorelines. According to staff of the City of

Wilson, copper sulfate was used to treat the weeds and algae in June of 2005 and they were less prevalent after that date.

This section of Toisnot Swamp is starting to grow like Hominy Swamp. There are subdivisions or individual housing units in areas around both Lake Wilson and Silver Lake. Because of these developments, the amount of buffer in these areas is very little if any. Other than development the land is mostly agriculture. Using the 2004 orthoimagery, the streams in this watershed are estimated to be at least 50 percent buffered.

Recommendations

There is at least 3500 feet of stream in need of streambank restoration in this section of Toisnot Swamp. Wilson Technical Community College is located in the US 301 their property contains approximately 3500 feet of stream bank that is in definite need of restoration. DWQ recommends that the local resource agencies work with Wilson Technical Community College to proceed with this restoration project.

Local resource agencies are also encouraged to install appropriate BMPs in this watershed to aid in water quality improvements.

7.4.2 Toisnot Swamp [AU# 27-86-11-(5)b]

Toisnot Swamp [AU# 27-86-11-(5)b; C; Sw; NSW] from UT 0.9 miles south of US 301 to Contentnea Creek (12 miles) is Supporting aquatic life and recreation due to a Good-Fair benthic bioclassification at JB110 and No Criteria Exceeded at ambient monitoring station JA59 (Figure 19). The instream macroinvertebrate habitat was sparse at this location; however the biological integrity has steadily improved since the 1996 fair bioclassification at this site.

There are two fish community sites assessed on this segment of Toisnot Swamp. Both sites are currently Not Rated due to the fact that the Coastal Plain ecoregion assessment criteria is not complete. Site JF53 (upstream site) was last sampled in 1991. The diversity of fish species remained the same; however the total abundance was lower in 2005 with 14 of 22 fish species represented by only 1 or 2 fish per species. Fish community site JF52 (downstream site) was sampled during the past 3 basinwide cycles. In 2005, the numbers of fish and species declined from the 2000 totals. These fish sites should be ratable during the next assessment period.

These segments of Toisnot Swamp have a supplemental classification of swamp water so this area is not assessed for DO because swamp waters are known to have naturally occurring low DO levels. The minimum recorded DO levels at JA59 was 0.9 mg/l. The fecal coliform bacteria levels were below the state standard. The recorded conductivity reading ranged between 50 and 223 μ mhos/cm indicating possible influences from non-point source pollution in this watershed.

This lower section of Toisnot Swamp is also growing. City and housing developments are encroaching further from the city. Around 75 percent of the streams in this watershed are buffered with a 100 foot or greater average buffer width. There are two active hog lagoons, four closed hog lagoons, and one active chicken operation in this watershed.

Water Quality Initiatives

From September 2000 – December 2006, EQIP has funded: 2 lagoon closures, 27 acres of upland wildlife habitat management, 880 acres of nutrient management and pest management,

124 acres of long term no till, 1.7 acres of grassed waterways, 96,500 feet of field borders, and 15 acres of waste utilization. There are 60 acres of CRP CP33 Upland Bird Habitat Buffer established in this watershed.

7.5 Additional Water Quality Issues within Subbasin 03-04-07

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.

7.5.1 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.

See section 7.3.4 (Contentnea Creek) within this chapter for site-specific fish tissue information collected near Snow Hill.