Chapter 5
Neuse River Subbasin 03-04-05

Including the: Neuse River, Stoney Creek, Bear Creek, Falling Creek and Walnut Creek

5.1 Subbasin Overview

Subbasin 03-04-05 at a Glance

Land Cover (percent)

Forest/Wetland:	51.6
Surface Water:	0.8
Urban:	8.2
Cultivated Crop:	36.5
Pasture/ Managed Herbaceous:	2.9

Counties
Craven, Greene, Jones, Lenoir and Wayne

Municipalities
Dover, Walnut Creek, Goldsboro, La Grange and Kinston

Stream Statistics

Total Streams:	364.1 mi/8.0 ac
Total Supporting:	51.8 mi
Total Impaired:	58.0 mi
Total Not Rated:	19.0 mi/0.0 ac
Total No Data:	235.3 mi

This subbasin includes the southeast corner of Wayne County, most of Lenoir County, and small portions of Greene, Craven, and Jones Counties. The Neuse River, from the mouth of Stoney Creek to the mouth of (though not including) Contentnea Creek, is within the subbasin. The major tributaries are Walnut Creek, Bear Creek, Falling Creek, Southwest Creek, Stoney Creek, Moseley Creek, Briery Run and Stonyton Creek.

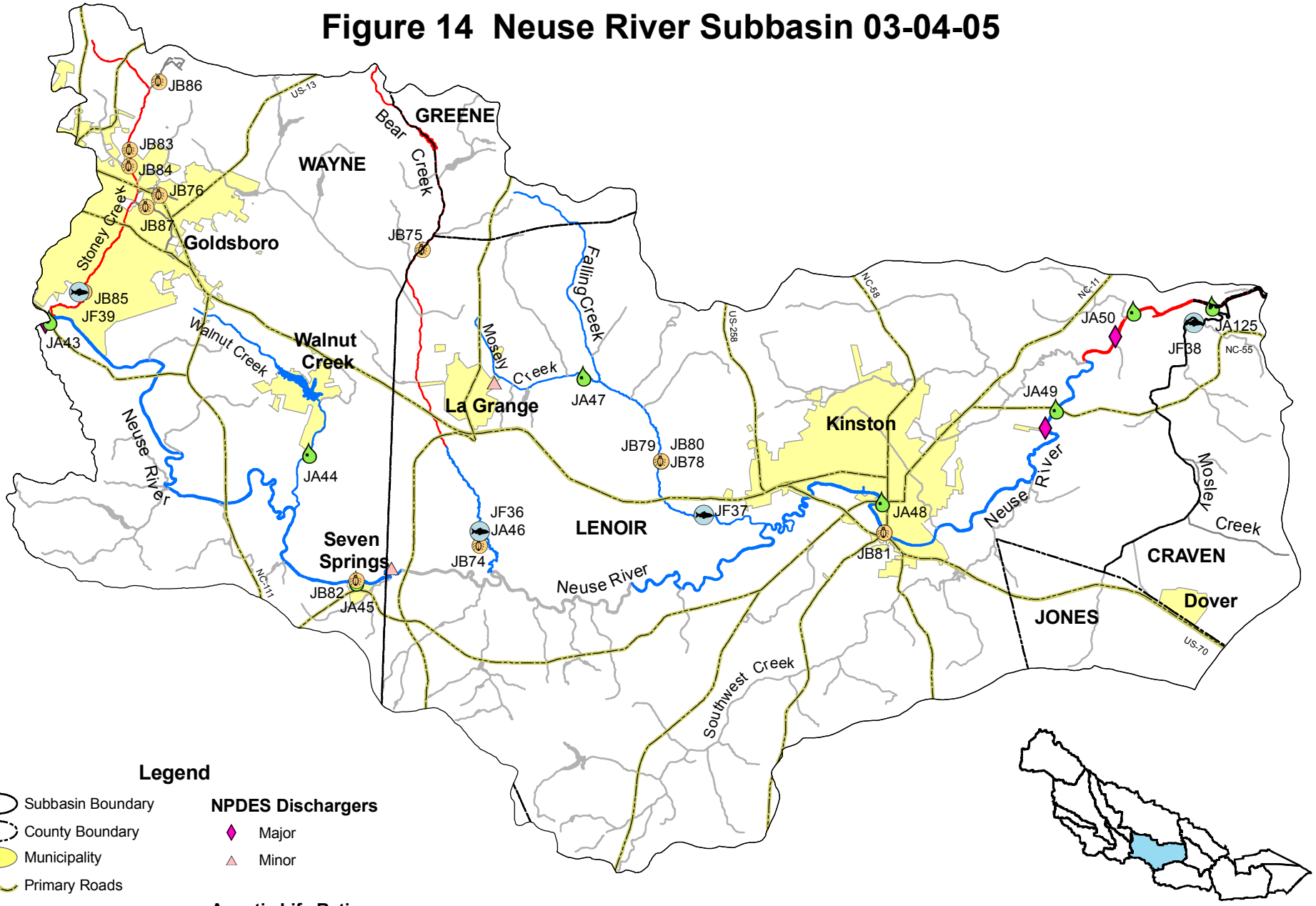
Population growth in this subbasin is near Goldsboro and Kinston. The population for the 2 main counties (Wayne and Lenoir) over the past ten years has had little change. Wayne County has seen a 9.8 percent (8,663) increase, and Lenoir County increased by 3.8 percent (2,324). The land cover is split between forest/wetland and cropland with a small portion covered by urbanization. Additional information regarding population and land use changes throughout the entire basin can be found in Chapter 16.

There are 4 major and 3 minor NPDES discharge permits in this subbasin with a total permitted flow of 40.5 MGD. The largest are Goldsboro WWTP (17.6 MGD) and Kinston Regional Water Reclamation (11.8 MGD). There are also 35 individual NPDES stormwater permit in the subbasin. Refer to Appendix III for identification and more information on NPDES permit holders. Goldsboro and Wayne County have developed a stormwater program under Phase II and model stormwater ordinances as required by the Neuse NSW strategy stormwater rules (Chapter 18). There are also 84 permitted animal operations in this subbasin.

There are two new water quality impairments in this subbasin, a biological impairment based on a fair benthic bioclassification in the Bear Creek watershed and a low dissolved oxygen (DO) impairment in the lower segment of the Neuse River mainstem. Bear Creek like many other creeks in the coastal plain have been channelized and is affected by the lack of riparian buffers and agricultural runoff.

Many small tributary in this subbasin are in agricultural land use areas. There are many municipal/industrial and swine waste land application fields in this area as well. These land use practices along with the growing urban areas in this subbasin may be impacting the river near Goldsboro and Kinston. Low dissolved oxygen detected at ambient monitoring stations may be the result of the large volume of discharges in this segment of the river as well as from possible swamp drainage.

Figure 14 Neuse River Subbasin 03-04-05



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

0 1.5 3 6 9 12 Miles

Planning Section
Basinwide Planning Unit
March 2008

Assessment Unit Number / Description / Classification	DWQ Subbasin	Name / Miles/Acres	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) 0302020117 Moccasin Creek-Neuse River											
Subwatershed (WBD-12 Number) 030202011705 Quaker Neck Lake-Neuse River											
27-(56)b NEUSE RIVER			5	**Mercury**	Aquatic Life	Not Rated	Data Inconclusive	Iron	2006		3m
From subbasin 030405-030412 boundary to a point 0.7 mile downstream of the mouth of Coxes Creek.					Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
				Nutrient Impacts							
				MS4 NPDES	Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2000		1
				Row Crop Agriculture							
				Turbidity	Fish Consumption	Impaired	Standard Violation	Mercury	2004	2004	5
				MS4 NPDES							
				Row Crop Agriculture	Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
C;NSW	03-04-05	21.5 FW Miles									
Watershed (WBD-10 Number) 0302020201 Walnut Creek-Neuse River											
Subwatershed (WBD-12 Number) 030202020101 Headwaters Stoney Creek											
27-62 Stoney Creek			5	**Habitat Degradation**	Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity FishCom	2005		3a
From source to Neuse River				General Agriculture/Pasture							
				MS4 NPDES	Aquatic Life	Impaired	Biological Criteria Exceeded	Ecological/biological Integrity Benthos	2005	1998	5
C;NSW	03-04-05	10.7 FW Miles									
27-62-0.5 Stoney Run			3a		Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity Benthos	2004		3a
From source to Stoney Creek											
C;NSW	03-04-05	2.5 FW Miles									
Subwatershed (WBD-12 Number) 030202020102 Outlet Stoney Creek											
27-62-3 Billy Branch			3a		Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity Benthos	2004		3a
From source to Stoney Creek											
C;NSW	03-04-05	1.3 FW Miles									
27-62ut23 UT 23 to Stoney Creek			3a	**Habitat Degradation**	Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity Benthos	2004		3a
From source to Stoney Creek				General Agriculture/Pasture							
				MS4 NPDES							
C;NSW	03-04-05	2.5 FW Miles									
Subwatershed (WBD-12 Number) 030202020106 Lake Wakena-Walnut Creek											
27-68 Walnut Creek (Lake Wackena, Spring Lake)			4a	**Low Dissolved Oxygen**	Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
From source to Neuse River				**Low pH**	Aquatic Life	Not Rated	Data Inconclusive	Aquatic Weeds	1998	1998	4a
C;NSW	03-04-05	6.9 FW Miles			Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
Watershed (WBD-10 Number) 0302020202 Bear Creek-Neuse River											
Subwatershed (WBD-12 Number) 030202020202 Headwaters Bear Creek											

Assessment Unit Number / Description / Classification	Name / DWQ Subbasin	Miles/Acres	Overall Category	Potential Stressors / Potential Sources	Use Support Category	Use Support Rating	Reason for Rating	Parameter of Interest	Collection Year	Listing Year	IR Category
27-72-(0.1)	**Bear Creek**		5	**Habitat Degradation** / General Agriculture/Pasture	Aquatic Life	Impaired	Biological Criteria Exceeded	Ecological/biological Integrity Benthos	2005	2008	5
From source to a point 0.3 mile downstream of Lenoir County SR 1002											
C;Sw,NSW	03-04-05	12.4 FW Miles									
Subwatershed (WBD-12 Number) 030202020203										**Outlet Bear Creek**	
27-72-(5)	**Bear Creek**		2		Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
From a point 0.3 mile downstream of Lenoir County SR 1002 to Neuse River					Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity FishCom	2005		3a
WS-IV;Sw,NSW	03-04-05	5.5 FW Miles			Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2005		1
					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) 030202020205										**Falling Creek**	
27-77	**Falling Creek**		2		Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity FishCom	2005		3a
From source to Neuse River					Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2005		1
C;Sw,NSW	03-04-05	15.5 FW Miles									
27-77-2	**Mosely Creek**		2		Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
From source to Falling Creek					Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
C;Sw,NSW	03-04-05	5.2 FW Miles									
Subwatershed (WBD-12 Number) 030202020206										**City of Kinston-Neuse River**	
27-(75.7)a	**NEUSE RIVER**		2		Aquatic Life	Not Rated	Data Inconclusive	Iron	2006		3m
From Lenoir County proposed water supply intake to Stoneyton Creek.					Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
C;NSW	03-04-05	25.6 FW Miles			Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2005		1
					Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
Watershed (WBD-10 Number) 0302020203										**Mosley Creek-Neuse River**	
Subwatershed (WBD-12 Number) 030202020306										**Mosley Creek**	
27-84	**Mosley Creek**		3a		Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity FishCom	2005		3a
From source to Neuse River											
C;Sw,NSW	03-04-05	12.7 FW Miles									
Subwatershed (WBD-12 Number) 030202020307										**Mosley Creek-Neuse River**	

Assessment Unit Number / Description / Classification	Name / DWQ Subbasin	Miles/Acres	Overall Category	Potential Stressors / Potential Sources	Use Support Category	Use Support Rating	Reason for Rating	Parameter of Interest	Collection Year	Listing Year	IR Category
27-(75.7)b	**NEUSE RIVER**		**5**	**Low Dissolved Oxygen**	Aquatic Life	Not Rated	Data Inconclusive	Iron	2006		3m
From Stoneyton Creek to mouth of Contentnea Creek.				ANOPS land app site	Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
C;NSW	03-04-05	6.5 FW Miles		ND land app site							
				Nutrient Impacts	Aquatic Life	Impaired	Standard Violation	Low Dissolved Oxygen	2006	2008	5
				Natural Conditions	Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
				Row Crop Agriculture							
				Stormwater Runoff							

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 map including the locations of the NPDES facilities and water quality monitoring stations is presented in Figure 14. Table 15 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 15 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.

5.2 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 16 for a summary of use support for waters in subbasin 03-04-05(see Chapter 23, Section 23.3 for description of the IR category (for each parameter of interest) and Overall (river segment) category).

5.3 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 16 Summary of Use Support Ratings in Subbasin 03-04-05

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 acres (impoundments)	0	0	0.0	0	0.0	0	8	8
Freshwater miles (streams)	129	58	16	52	14	19	235	364

% - Percent of total miles/acres.

5.3.1 Bear Creek Watershed [AU# 27-72-(0.1) & 27-72-(5)]

Bear Creek [AU# 27-72-(0.1)]

Current Status

Bear Creek [AU# 27-72-(0.1); C; Sw; NSW] from source to a point 0.3 miles downstream of Lenoir County SR1002 (12.4 miles) is Impaired for aquatic life due to a Fair benthic bioclassification at site JB75. This site was added during this assessment period to assess the conditions further up in the watershed in an area that may be undergoing changes in land use, from agriculture to urban. This site is 9.5 stream miles upstream from the normal basinwide site (JB74). The stream channel at this site was linear, indicating that the stream segment had been channelized sometime in the past. The substrate was a mix of silt and sand, and thus not conducive to colonization for most macroinvertebrates. The riparian zone on both banks contained breaks, and was narrow on the right side. There was a large erosional area on the right bank, which had little vegetation available for stabilization. Further upstream, the stream is a channelized ditch with no functional riparian zone for a distance of at least 100 m. The lack of adequate instream habitat is one probable contributor to the degraded benthic community at this site. Agricultural non-point source pollution not buffered by a healthy riparian zone upstream of the reach samples may be contributing to degradation. Channelization may also be affecting the benthic community by decreasing habitat diversity.

The upper reaches of Bear Creek may have experienced low flow conditions in June and July of 2005. This may have influenced the benthic conditions found at this site at the end of July. This site should be reassessed during the next basinwide cycle.

This section of Bear Creek will be added to the 303(d) impaired waters list in 2008 for impaired biological integrity.

Bear Creek [AU# 27-72-(5)]

2002 Recommendations

DWQ will continue to monitor Bear Creek to assess future impacts related to land use changes in the watershed.

Current Status

Bear Creek [27-72-(5); WS-IV; SW; NSW] from a point 0.3 miles downstream of Lenoir County SR 1002 to Neuse River (5.5 miles) is Supporting aquatic life due to a Good-Fair benthic bioclassification at site JB74 and No Criteria Exceeded at ambient monitoring station JA46.

The nutrients and the conductivity levels were elevated at this site. The nitrate reading range between 0.92 and 3.29 mg/l, with 50 percent of the readings above 2.19 mg/l.

The macroinvertebrate site (JB74) had been sampled three times prior to 2005. It was rated as Good-Fair for each sampling event up through 2005 except for 1995, when it was rated as Fair. For 2005, the site showed the greatest number of EPT taxa over all previous sampling events. The stream channel at this site had some sinuosity and did not have the appearance of a channel that had been dredged. Stream bank foliage comprised mostly of grasses with sparse woody vegetation, giving a high potential for bank failure during high flows. The riparian zone was wide and entirely intact at the sampling point. The water chemistry at the time of sampling was similar at the two sites which were sampled on the same day and therefore probably do not account for the differences in the EPT taxa observed at the two sites.

This segment is also Supporting for recreation due to acceptable fecal coliform bacteria levels at site JA46 (above the state standard 13 percent of the time).

Watershed 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.

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, in the two 14 digit watersheds that contain this portion of Bear Creek, the NC ACSP installed the following BMPs to reduce the impact of agricultural production on waters quality at cost to the program of $100,118: 87 acres of 3 year conservation tillage, 224 acres of long term no till, 18 acres of cropland conversion to grass, 250 acres of nutrient scavenger crop, 233 acres of conservation tillage, 17 acres of riparian buffers, 280 acres of nutrient management, 1 dry stack and 4 incinerators. These BMPs affected 3,424 acres of land, saving 7,657 Tons of soil, saving 52,252 pounds of nitrogen, saving 17,631 pounds of phosphorus, managing 47,479 pounds of waste-nitrogen, and managing 60,378 pounds of waste-phosphorus.

5.3.2 Stoney Creek Watershed [AU# 27-62, 27-62-0.5 & 27-62ut23]
Stoney Creek, Walnut Creek and Sleepy Creek Watershed Map (Figure 15)

The entire 10.7 mile stretch of Stoney Creek is currently on the NC State 303(d) impaired waters list for impaired biological integrity. Potential sources of the impairment were listed as urban runoff/storm sewers and agricultural. DWQ studied the stressors and sources of the biological impairment and outlined a general watershed strategy that recommends restoration activities and best management practices (BMPs) to address the identified problem (NC-DWQ, Stoney Creek WARP, June 2003; http://h2o.enr.state.nc.us/swpu/stoneycreek/scfinal.pdf). Stoney Creek is located in Wayne County and its headwaters start flowing north of Goldsboro and flows southward joining the Neuse River near Seymour Johnson Air Force Base (SJAFB). The upper portion of the watershed is primarily agriculture, although development activity is increasing. The majority of the lower watershed lies within the City of Goldsboro, where a mixture of

residential, military, commercial and light industrial land uses predominate. As of 1998, impervious areas cover approximately 20 percent of the study area, with higher levels (29 percent) evident in the lower study area below New Hope Rd. It is likely that this impervious percentage has increased substantially since 1998.

It is important to note that this area experienced several weather related extreme events that potentially impacted the study area. In September 1999 (before this assessment period), tropical storm Dennis and hurricane Floyd brought some of the largest amounts of rain and the most severe flooding on record. Precipitation at SJAFB during the month of September 1999 was 26.9 inches compared with a historic average of 4.8 inches. Then drought conditions prevailed with precipitation well below normal during 2000 (-15 percent), 2001 (-10.4 percent) and between January and September 2002 (-18.4 percent). The WARP study took place during this drought period. The normal basinwide samples were collected in 2004 and 2005. Samples taken later in the basinwide assessment should have allowed enough time for the aquatic organism to recover from the weather extremes seen in this watershed prior to and early on in this assessment period. However, Stoney Creek was added to the 303(d) impaired waters list in 1998 so the conditions in this area were already impacted before the extreme weather event, therefore, the natural populations may not have been suitable for re-colonization. See the 2003 WARP report for more details on the specific finding for the Stoney Creek watershed (NC-DWQ, June 2003 (Stoney Creek WARP)).

2002 Recommendations

DWQ will continue to monitor Stoney Creek to evaluate impacts of development in the Goldsboro area. As part of the 303(d) list approach, DWQ will begin the process of identifying problem parameters that may be causing biological impairment in Stoney Creek. The Watershed Assessment and Restoration Project is currently doing a detailed assessment of Stoney Creek to define the extent of water quality problems and narrow the possible causes.

Goldsboro and Seymour Johnson should consider water quality impacts to Stoney Creek and prevent potential water quality problems by installing and maintaining BMPs during and after development

Current Status

Stoney Creek [AU# 27-62]

Stoney Creek [AU# 27-62; C; NSW] from source to Neuse River (10.7 miles) is Impaired for aquatic life due to a fair benthic bioclassification at JB85. This site was sampled in 2001, twice in 2000 and in 1995. As in 2005, the site was rated Fair on each prior occasion, except in 1995 when it was rated poor. At the sampling location, the bank vegetation was sparse, allowing for bank failure during high flow events. The riparian zone was wide and intact on both sides of the stream. Most of the abundant organisms found at this site were classified as moderately to highly tolerant of pollutants.

Fish community was also assessed at this site (JF39). Fish sites in this basin are all Not Rated because no assessment criteria have been established for the Coastal Plain streams. However, the number of fish and number of species has gradually increased over time.

Site JB83 was the most upstream sampling location on Stoney Creek. This section of the stream was Not Rated due to the stream size at the time of sampling in 2001. The data indicated a degraded community that was limited by low dissolved oxygen. The habitat was extremely poor

at this site, where the negative impacts from channelization were evident. Habitat improved substantially downstream, where it was clearly adequate to support a more diverse benthic community than what currently exists. Since the benthos is impaired below this site it implies that other factors in addition to habitat conditions are likely impacting the benthic community.

The WARP report concluded that toxicity was considered one of the primary causes of impairment below JB83. Habitat degradation, low DO and scour were additional stressors that also contributed to biological degradation through the watershed.

Impairment in the lower Stoney Creek is also likely impacted by the lack of benthic colonization sources due to the low DO stress and poor habitat in the headwaters.

See the 2003 WARP study for more specifics on this watershed (http://h2o.enr.state.nc.us/swpu/stoneycreek/scfinal.pdf).

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

Recommendations
These are some of the recommendations from the 2003 WARP study. Please see the original document for complete details.

The following actions are necessary to address current sources of impairment in Stoney Creek.

1. Develop and implement a strategy to address toxic inputs from the urban portions of the watershed, including a variety of source reductions and stormwater treatment methods.
2. Evaluate the potential risk of agricultural pesticides on water quality, given the extensive crop acreage in the upper watershed.
3. Plant native woody riparian vegetation along Stoney Creek and its tributaries to provide an adequate supply of woody material to the stream and improve bank stability.
4. Implement feasible and cost-effective stormwater retrofit projects in the urban portions of the watershed to mitigate the hydrologic effects of development.
5. Encourage nutrient reduction efforts throughout the watershed. Low DO levels in the watershed are likely due primarily to natural swamp drainage, human inputs may significantly contribute to the problem.
6. Prevent further channel erosion and habitat degradation.
7. Develop and enforcement improved sediment and erosion control regulations.
8. Protect existing wetlands and riparian buffers along all waterbodies, including ephemeral streams.

Stoney Run Creek [AU# 27-62-0.5]
Stoney Run Creek [AU# 27-62-0.5] from source to Stoney Creek (2.5 miles) is Not Rated for aquatic life due to a benthic bioclassification at site JB86. This site could not be rated because the drainage size is less than 3 square miles. This small tributary to Stoney Creek is in the upper part of the watershed and is located about 150 meters below a small yard pond. It was very difficult to find an adequate sampling location in the upper part of the Stoney Creek watershed. These small tributaries often have no visible flow either in winter or summer. The lack of visible flow in this system is due to the low relief of the geographical area and the abundance of beaver dams in the area. The habitat was good at this location however, the high specific conductance (105 µmhos/cm) and the low pH (5.8) suggests some input from the upstream pond and lawns.

This site was not rated, however the overall data was indicative of a stressed stream. This stress could be either from upstream land use or unstable hydrology (stops flowing or dries up in the summer). The presence of a pond or other impoundments generally restrict any macroinvertebrate recolonization from upstream and inhibits normal flow in the stream below the impoundment, thereby adversely affecting the macroinvertebrate community directly down stream.

UT 23 to Stoney Creek [AU# 27-62ut23]
UT 23 to Stoney Creek [AU# 27-62ut23] from source to Stoney Creek (2.5 miles) is Not Rated due to the unstable hydrology of this watershed. The data suggest a stressed system with little instream habitat available for macroinvertebrate colonization. However, the stream banks were stable with little potential for erosion or failure, good shading and an extensive and intact riparian zone on one bank. The benthic community was dominated by the toxics or organics indicating species. This stream probably stops flowing during dry summer months. This site should be assessed using swamp methodology during the next assessment period.

5.3.3 Neuse River [AU# 27-(56)b, 27-(75.7)a & 27-(75.7)b]

2002 Recommendations
In order to maintain the historically Good bioclassification in this segment of the Neuse River, DWQ recommends continued improvements to the WWTPs and consideration of water quality impacts during development and other intensive land uses. Continued implementation of the Neuse NSW strategy should help to minimize water quality impacts to this segment of the Neuse River.

The Neuse River and tributaries (Falling Creek and Briery Run) near Kinston have indications of nonpoint source pollution impacts. NCEEP has a stream restoration project in Falling Creek, and the six local watersheds in this area are targeted for restoration.

Current Status
Neuse River [AU# 27-(56)b]
Neuse River [AU# 27-(56)b; C; NSW] from the subbasin 030405-030412 boundary to a point 0.7 miles downstream of the mouth of Coxes Creek (21.5 miles) is supporting aquatic life due to no criteria exceeded at ambient monitoring stations JA43 and JA45 (Figure 15). The data indicate that this area is impacted by non-point source runoff. The nutrients were elevated as can be seen in table 18 below, the turbidity was elevated with exceedances above the standard of 50 NTU in 7 and 3 percent of the samples at JA43 and JA45 respective and the conductive ranged between 60 and 264 µmhos/cm.

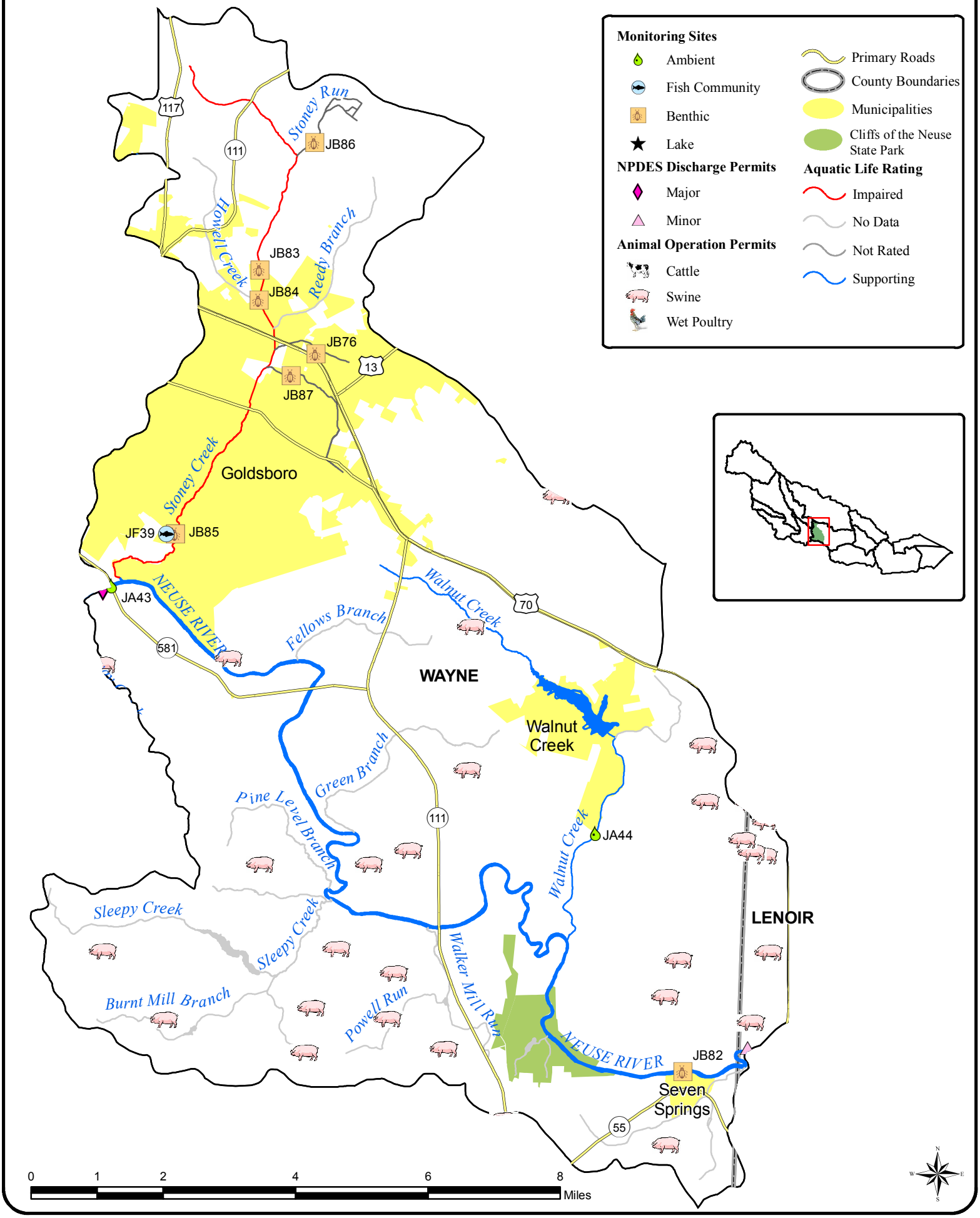
This segment was added to the 2004 303(d) list for fish consumption due to elevated mercury levels in fish tissue samples. See the text below for specifics on fish tissue sampling that occurred during this assessment period. All waters within the Neuse Basin and throughout the State of NC are impaired on an evaluated basis for fish consumption due to elevated mercury in fish tissue. This specific 2004 impairment was based on actual monitoring within this segment.

Neuse River [AU# 27-(75.7)a]
Neuse River [AU# 27-(75.7)a; C; NSW] from Lenoir County proposed water supply intake to Stoneyton Creek (25.6 miles) is Supporting for aquatic life and recreation due to a Good benthic rating at site JB81 and No Criteria Exceeded at ambient monitoring stations JA48 and JA49.

The data at benthic site JB81 was quite consistent between the 2000 and 2005 sampling period. Bank vegetation was sparse allowing for erosion during high flows. The riparian zone was relatively wide on both banks, intact on the right bank but with infrequent breaks on the left.

Low dissolved oxygen levels were seen at both of the ambient monitoring stations, however they did not exceed the state standard by greater than 10 percent (see Table 17). Dissolved oxygen levels less than 4 mg/l were seen in 6 percent of the samples taken at station JA49. They were also less than 5 mg/l in 12 percent of the samples at this same site. The minimum recorded DO readings were 2.8 mg/l and 3.1 mg/l at stations JA48 and JA49 respectively. The conductivity was also high in this segment with readings ranging between 55 and 1336 µmhos/cm. The range of nutrient concentrations can be seen in Table 18.

Figure 15 Stoney, Walnut, and Sleepy Creek Watersheds



The City of Kinston expanded and upgrade the 4.5 MGD Northside WWTP to an 11.85 MGD regional treatment facility (Kinston Regional Wastewater Reclamation Facility). This facility replaced the failing Peachtree WWTP. The Peachtree WWTP had many BOD, DO and NH3 violations over the last several year. Operations began at the new plant in August 2006 and ceased at the Peachtree plant September 1, 2006.

The DWQ biologist assessed a sludge spill in 2007 from the Peachtree WWTP to an unnamed tributary to the Neuse River. Benthic samples were collected above and below the affected area. Both areas were highly impacted by organic pollutants. The species found at these sites reflected the organically enriched, low dissolved oxygen conditions in this stream. The bottom substrate changed dramatically between the two sites with the upstream benthic substrate mostly sand to mostly biosolids and silt downstream of the sludge spill. The conductivity also went up from 234 µmhos/cm upstream to 337 µmhos/cm downstream. It appears that this stream as a whole is possibly impacted by urban runoff.

Neuse River [AU# 27-(75.7)b]

Neuse River [AU# 27-(75.7)b; C; NSW] from Stoneyton Creek to the mouth of Contentnea Creek (6.5 miles) is Impaired for aquatic life due to low DO levels at ambient station JA50. Twelve percent of the samples were below 4 mg/l and 21 percent were below 5 mg/l. The minimum recorded DO level was 2.5 mg/l. High levels of nutrients were also observed at this location (see Table 18). Station JA50, a Lower Neuse Basin Association site, replaced station JA125 in January 2003.

This section of the Neuse River will be added to the 2008 303(d) impaired waters list for DO standard violation.

Many small tributary in this subbasin are in agricultural land use areas. There are many municipal/industrial and swine waste land application fields in this area as well. These land use practices along with the growing urban areas in this subbasin may be impacting the river near Goldsboro and Kinston. Low dissolved oxygen detected at ambient monitoring stations may be the result of the large volume of discharges in this segment of the river as well as from possible swamp drainage.

Table 17 Dissolved Oxygen data over the last several assessment periods (instantaneous DO data).

	9/1/1995-08/31/2000	9/1/2000 - 8/31/2005 Assessment		**Current Assessment** 1/1/2002 - 12/31/2006	
Station ID MAP / DWQ #	DO < 4 mg/l (%)	DO < 4 mg/l (%)	DO < 5 mg/l (%)	DO < 4 mg/l (%)	DO < 5 mg/l (%)
JA43 / J5970000		0	1.7	0	1.7
JA45 / J6024000	3.8	1.2	8.2	1.2	8.2
JA48 / J6150000 – DWQ		0.6	3.1	1.0	3.9
JA48 / J6150000 - LNBA	2.5	1.2	8.2	1.2	7.1
Co-located – combined data		**0.8**	**4.9**	**1.0**	**4.8**
JA49 / J6250000	2.5	7.1	14.1	5.9	11.8
JA50 / J6340000		17.4*	30.4*	12.1**	21.2**
JA125 / J637000	2.5	0^	3.1^	0^^	0^^

* Data for 46 sampling dates between January 2003 and August 2005.
** Data for 66 sampling dates between January 2003 and December 2006.
^ Data for 32 sampling dates between September 2000 and December 2002.
^^ Data for 11 sampling dates between January 2002 and December 2002.

Table 18 Nutrient concentrations during this assessment periods.

	Current Assessment 1/1/2002 - 12/31/2006			
Station ID MAP / DWQ #	NH3 mg/l	NO3 mg/l	TKN mg/l	TP mg/l
JA43 / J5970000	0.02-0.08	0.07-0.82	0.35-0.74	0.06-0.3
JA45 / J6024000	0.01-0.38	0.07-1.38	0.2-1.88	0.02-0.67
JA48 / J6150000 – DWQ JA48 / J6150000 – LNBA Co-located station	0.02-0.11 0.01-0.31	0.11-1.1 0.08-1.02	0.29-0.8 0.2-1.84	0.05-0.21 0.02-0.32
JA49 / J6250000	0.01-0.5	0.03-3.77	0.22-1.89	0.03-0.45
JA50 / J6340000*	0.01-0.34	0.11-3.43	0.2-1.84	0.03-9.96
JA125 / J637000^	0.02-0.39	0.41-1.24	0.4-0.6	0.09-0.14

* Data for 66 sampling dates between January 2003 and December 2006.
^ Data for 11 sampling dates between January 2002 and December 2002.

Neuse River - 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).

Largemouth bass, striped bass, sunfish, and catfish samples were collected from the Neuse River near Goldsboro and Kinston during 2000 and analyzed for mercury and heavy metal contaminants. The samples were collected as part of an eastern North Carolina mercury assessment.

Near Goldsboro, three largemouth bass, and one striped bass (4 of 21 total samples) contained mercury concentrations exceeding the state criteria of 0.4 ppm. Mercury levels in all samples ranged from 0.10 to 0.52 ppm. Results for other metals were non-detectable or below EPA and North Carolina screening values. Two additional largemouth bass samples were collected from the Goldsboro station during 2003 and analyzed for organics and PCB contaminants. The samples contained trace amounts of DDE, a DDT metabolite, and dieldrin but concentrations were well below US EPA, US FDA, and State of North Carolina criteria. PCB contaminants were not detected.

Near Kinston, all largemouth bass samples (7 of 20 total samples) contained mercury concentrations exceeding the state criteria of 0.4 ppm. Mercury levels in all samples ranged from 0.11 to 1.40 ppm. Results for other metals were non-detectable or below EPA and North Carolina screening values. 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).

Water Quality Initiative

From September 2000 – December 2006, the following BMPs were installed through the NC ACSP at a cost of $36,132: 250 acres of 3 year conservation tillage, 25 acres of cropland conversion to grass, 5 acres of cropland conversion to trees, 1 acre of grassed waterway, 31 acres of filter strips and 186 acres of riparian buffers. These BMPs affect 590 acres and save 1,961 Tons of soil, 6,261 pounds of nitrogen, and 1,147 pounds of phosphorus.

5.3.4 Walnut Creek (Lake Wackena, Spring Lake) [AU# 27-68]

Stoney Creek, Walnut Creek and Sleepy Creek Watershed Map (Figure 15)

2002 Recommendations

DWQ and LNBA will continue to monitor the site to detect any water quality changes. DWQ will work with the Village WWTP to determine the source of low dissolved oxygen in Walnut Creek.

Current Status

Walnut Creek (Lake Wackena, Spring Lake) [AU# 27-68; C; NSW] from the source to the Neuse River (6.9 miles) is currently supporting aquatic life due to no criteria exceeded at ambient monitoring station JA44. The water quality appears to have improved significantly within this tributary of the Neuse River (see Table 19 below). This site was previously impaired for low dissolved oxygen with DO levels below 4 mg/l in 32.5 percent of the samples during the last assessment period (9/95-8/00). During this assessment period, DO levels were below 4 and 5 mg/l in 4.7 and 12.9 percent of the sample respectively. The number of pH readings below the state minimum pH standard of 6 has also dropped over this same time period (see Table 19). Nutrients however still appear to be elevated.

This segment is Supporting for recreation due to acceptable fecal coliform bacteria levels at site JA44.

This segment of Walnut Creek will be removed from the 2008 303(d) list for low DO standard violations.

Table 19 Percentage of dissolved oxygen and pH readings below the state standard over the last several assessment periods.

Assessment Period	DO < 4 mg/l (%)	DO < 5 mg/l (%)	pH < 6 (%)	n
1/2002 – 12/2006	4.7	12.9	2.4	85
9/2000 – 8/2005	7.1	22.4	14.1	85
9/1995 – 8/2000	32.5	51.3	33.8	80

5.4 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.

5.4.1 Falling Creek [AU# 27-77]

Current Status
Falling Creek [AU# 27-77; C; Sw; NSW] from source to the Neuse River is Supporting for aquatic life due to a Good-Fair benthic bioclassification at Site JB78. This site was tested in 2001 and 2005 and received a Good-Fair rating on both occasions. Stream bank vegetation was diverse and included trees, shrubs, and grasses, however erosional areas were present. The riparian zone was wide and intact on both banks. Fish community was assessed at site JF37. A rating was not assigned because an assessment criterion for a Coastal Plain stream is still being developed. It is likely that a rating could be assigned at a later date once the criteria have been finalized. This will be the case for all fish community sites sampled in this subbasin. The fish community was severely impacted at this site post-Hurricane Fran in 1996. The fish community now appears to be similar to the pre-Hurricane Fran in terms of species diversity and abundance.

5.5 Additional Water Quality Issues within Subbasin 03-04-05

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.

5.5.1 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 5.3.3 (Neuse River) within this chapter for site-specific fish tissue information collected near Goldsboro and Kinston.