

Chapter 11

Neuse River Subbasin 03-04-11

Including the: Trent River, Beaver Creek and Musselshell Creek

11.1 Subbasin Overview

Subbasin 03-04-11 at a Glance

Land Cover (percent)

Forest/Wetland:	70.1
Water:	0.3
Urban:	1.5
Cultivated Crop:	24.7
Pasture/ Managed Herbaceous:	2.4

Counties

Craven, Jones, Lenoir and Onslow

Municipalities

Pink Hill, Pollocksville, Trenton and River Bend

Stream Statistics

Total Streams:	
Freshwater	295.8 mi
Saltwater	252.7 ac
Total Supporting:	
Freshwater	96.1 mi
Saltwater	0.0 ac
Total Impaired:	
Freshwater	18.1 mi
Saltwater	0.0 ac
Total Not Rated:	
Freshwater	5.3 mi
Saltwater	0.0 ac
Total No Data:	
Freshwater	165.9 mi
Saltwater	252.7 ac

This subbasin makes up the entire Trent River watershed and is mostly located in a flat swampy area that is poorly drained. The tributaries to the Trent River assessed during this assessment period were; Tuckahoe Creek, Beaver Creek, Musselshell Creek, Beaverdam Creek and Island Creek.

The population for this subbasin is focused mainly around the small towns of River Bend and Trenton. The primary land use here is agriculture and forest with the only suburban area concentrated around the Town of Trenton. There are numerous large scale animal operations in this subbasin, mainly concentrated in the Jones/Lenoir County boundary area. Additional information regarding population and land use changes throughout the entire basin can be found in Chapter 16.

There are 3 minor NPDES wastewater discharge permits in this subbasin with a total permitted flow of 0.4 MGD. The largest discharger is River Bend WWTP (0.33 MGD). There are 2 individual NPDES stormwater permit in the subbasin. Refer to Appendix III for identification and more information on individual NPDES permit holders. There are also 68 permitted animal operations in this subbasin.

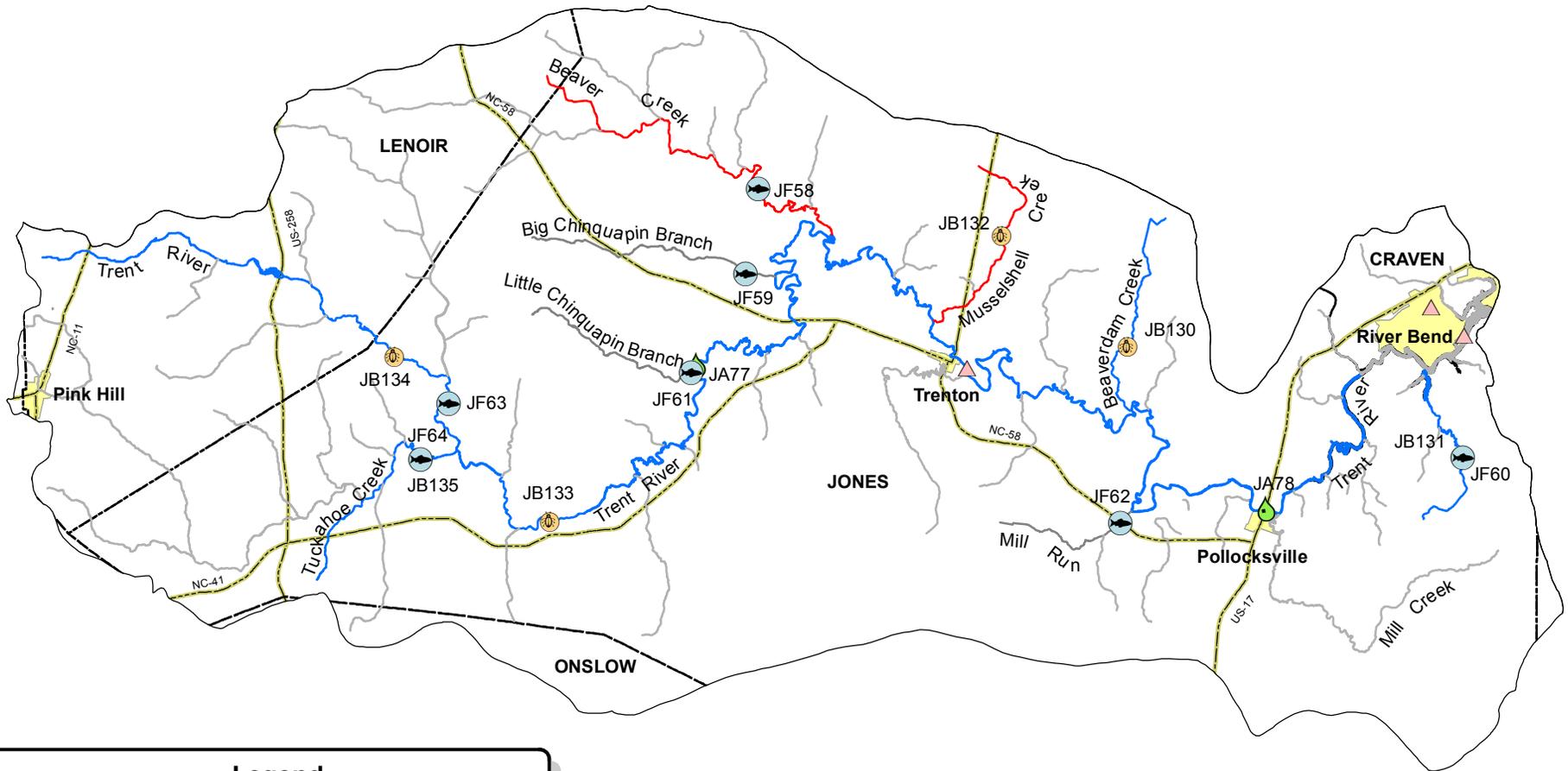
There is a single new water quality impairment in this subbasin, a biological impairment based on a severe swamp bioclassification in Musselshell Creek. Musselshell Creek like many of the other tributaries in this watershed is

completely channelized and flows through agricultural fields. The benthic substrate in Musselshell Creek was nearly all silt (70 percent) and was thick enough to impede wading. This creek received one of the lowest habitat scores in the entire Neuse basin.

The water quality is heavily influenced by the many agricultural practices utilized in this watershed. There is a considerable need for additional agricultural BMPs. A trend analysis indicated that there was a significant increase in total phosphorus (TP) concentration in the Trent River between 1990 and 2005. This trend suggests that there was an average increase of 1.6 percent in TP concentration per year during this time period.

A map including the locations of the NPDES facilities and water quality monitoring stations is presented in Figure 33. Table 36 contains a list of assessment unit numbers (AU#) and length,

Figure 33 Neuse River Subbasin 03-04-11



Legend

Subbasin Boundary	NPDES Dischargers
County Boundary	Major
Municipality	Minor
Primary Roads	Aquatic Life Rating
Monitoring Stations	Impaired
Ambient Monitoring Station	No Data
Benthic Community	Not Rated
Fish Community	Supporting
Lake Monitoring Station	

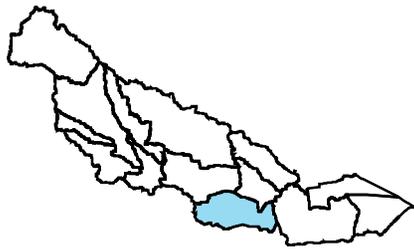


Table 36 Neuse River Basin

Subbasin (WBD-8 Number) 03020204

DWQ Subbasin

03-04-11

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) 030202040205			Beaverdam Creek-Trent River				
27-101-21	Beaverdam Creek		2		Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2005		1
From source to Trent River											
C;Sw,NSW	03-04-11	6.0 FW Miles									
				Subwatershed (WBD-12 Number) 030202040206			Town of Pollocksville-Trent River				
27-101-23	Mill Run		3a		Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity FishCom	2005		3a
From source to Trent River											
C;Sw,NSW	03-04-11	3.9 FW Miles									
				Watershed (WBD-10 Number) 0302020403			Lower Trent River				
				Subwatershed (WBD-12 Number) 030202040302			Island Creek-Trent River				
27-101-33	Island Creek		2		Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity FishCom	2005		3a
From source to Trent River											
C;Sw,NSW	03-04-11	6.1 FW Miles			Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2005		1

Note:

See Section 23.3 for Overall and IR Category explanation.

Supporting waters are listed in Categories 1-3.

Impaired waters are listed in Categories 4 or 5.

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 36 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.

11.2 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, Poor, Natural, Moderate or Severe 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 37 for a summary of use support for waters in subbasin 03-04-11 (see Chapter 23, Section 23.3 for description of the IR category (for each parameter of interest) and Overall (river segment) category).

11.3 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 37 Summary of Use Support Ratings in Subbasin 03-04-11

Units	Total Monitored Waters	Total Impaired Waters		Total Supporting Waters		Total Not Rated Waters	Total No Data	Total
	Miles/Acres	Miles/Acres	%	Miles/Acres	%	Miles/Acres	Miles/Acres	Miles/Acres
Freshwater miles (streams)	130	18	6	96	33	16	166	296
Estuarine acres	0	0	0.0	0	0.0	0	253	253

% - Percent of total miles/acres.

11.3.1 Musselshell Creek [AU# 27-101-17]

2002 Recommendations

Musselshell Creek was previously not rated due to the lack of approved swamp water criteria. DWQ biologists were able to reassess this site using the newly established criteria and found that this creek had a severe swamp benthic bioclassification in both 1995 and 2000. Habitat degradation was noted with infrequent pools, lack of instream habitat, little riparian area, eroding banks and channelized segments. There is extensive cotton farming in the watershed. DWQ will continue to monitor water quality in this creek to evaluate possible impacts from agriculture practices.

Current Status

Musselshell Creek [AU# 27-101-17; C; Sw; NSW] from source to Trent River (5.8 miles) is Impaired for aquatic life due to a Severe benthic bioclassification at site JB132.

This segment of Musselshell Creek is completely channelized and flows through an agricultural field. The benthic substrate was nearly all silt (70 percent) with sand (30 percent) comprising the remainder. The instream silt accumulation was thick enough to impede wading. Land use in this catchment is almost all agriculture with only small tracts of forest. Some logging has occurred in the lower portion of the watershed. There were numerous habitat problems at this site (e.g., channelization, lack of snags, streambank erosion, poor riparian area) and the habitat received one of the lowest habitat scores in the entire Neuse basin.

Musselshell Creek has been sampled twice previously using benthic swamp criteria. Sampling in 1995, 2000 and 2005 all produced a Severe swamp benthic bioclassifications with very low total and EPT taxa. These data clearly indicate a pollution tolerant invertebrate community. The taxa found were indicative of organic enrichment and low dissolved oxygen.

Musselshell Creek will be added to the 2008 303(d) list of impaired waters for impaired biological integrity.

Recommendations

DWQ recommends the Division of Soil and Water Conservation to evaluate the need for more agricultural conservation practices in this watershed including filter strips and conservation tillage.

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

The following BMPs were installed in this watershed through state and federal cost share assistance programs: water control structures affecting 134 acres, nutrient management plans covering 630.6 acres, and 39.5 acres of long-term no till.

The Agriculture Cost Share Program (ACSP) funded over \$7,000 of the BMP listed above (September 2000 – December 2006). Cumulatively, the ACSP practices affected 64 acres, saved

63 Tons of soil, 1,431 pounds of nitrogen, 2,385 pounds of phosphorus, managed 98,928 pounds of waste- Nitrogen, and managed 5,312 pounds of waste-Phosphorus.

Additional lands within this watershed are using no-till practices without cost share assistance.

11.3.2 Beaver Creek [AU# 27-101-15]

Current Status

Beaver Creek [AU# 27-101-15; C; Sw; NSW] from source to Trent River (12.3 miles) is currently Not Rated for aquatic life due to a fish bioclassification rating at JF58. Coastal Plain criteria are not complete at this time so this segment could not be rated. This site on Beaver Creek was sampled for the first time for fish community assessments in 2005. The stream drains an agricultural area, row crops and confined animal operations, of northwestern Jones and northeastern Lenoir counties and there are no NPDES facilities within the stream's rural residential and agricultural watershed upstream of the monitoring site. This site was entrenched and may have been channelized a very long time ago. The instream and riparian habitats were of high quality with wooded buffers. The conductivity was also elevated at 260 $\mu\text{mhos/cm}$ and is indicative of nonpoint source runoff. The fauna was typical of that found in many Coastal Plain streams.

This site was sampled for benthic macroinvertebrates during the last assessment period. It was given a Not Rated rating since the swamp stream criteria were not complete at that time. Upon reassessment of the data using the approved swamp stream criteria, this site was impaired due to a Severe benthic bioclassification. This site was assessed in 1991 using Coastal A stream criteria and received a Fair rating. It was later determined that this stream should be assessed using the swamp stream criterion instead.

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

Recommendations

DWQ recommends that the Division of Soil and Water Conservation evaluate the need for more agricultural conservation practices in this watershed including filter strips and conservation tillage.

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

The following BMPs were installed in Beaver Creek through state and federal cost share assistance programs: nutrient management plans covering 1,298 acres, field borders affecting 739 acres, grass waterways affecting 490 acres, 49.5 acres of cropland conversion to grass, 7.5 acres of cropland conversion to trees, water control structures affecting 440 acres, 247.8 acres of long-term no till, 136.1 acres of 3 year no-till, 1 acre of critical area planting, 2 incinerators, 2 waters conservation contracts and nutrient and pest management plans covering 208.6 acres.

The Agriculture Cost Share Program funded over \$99,000 of the BMP listed above (September 2000 – December 2006). Cumulatively, the ACSP practices affected 3,387 acres, saved 5,730

Tons of soil, 36,494 pounds of nitrogen, 3,860 pounds of phosphorus, 67,879 pounds of Waste-N managed, and 7,247 pounds of Waste-P managed.

Additional lands within this watershed are using no-till practices without cost share assistance.

11.4 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.

11.4.1 Trent River [AU# 27-101-(1)]

Current Status

The Trent River [AU# 27-101-(1); C; Sw; NSW] is Supporting aquatic life and recreational uses due to a Good-Fair and Moderate benthic bioclassifications at sites JB133 and JB134 and because No Criteria were Exceeded at the ambient monitoring stations JA77 and JA78.

Benthic site JB134 is the furthest upstream site on the Trent River. This site was sampled (2000) during the last assessment period but was not rated due to the fact that the swamp stream criteria had not been completed before the final assessment was made for this basin. The rating would have been moderate which is consistent with the current rating. There were a few more tolerant taxa collected during this assessment period with some of these being indicators of organic enrichment. The land use in this catchment is comprised of scattered residential areas, agriculture, animal operations, and forest. There was also a new subdivision just upstream from the sampling site that was not there during the last assessment period and swine farm odors were noted at the time of sampling. The main habitat problems along this reach were the high percentage of silt substrate, and a lack of snags.

Benthic site JB133 near Comfort is an area comprised of similar land use as listed above. The main habitat issue in this reach of the stream was moderate streambank erosion and lack of large snags for instream macroinvertebrate habitat. This site was Not Rated during the last assessment period. It initially received a fair benthic rating and was scheduled for a follow up sample to confirm the impaired rating. This area had been hard hit by several hurricanes during the last assessment period. It was felt that the impairment might be the direct result of this stressor. Biologists were not able to resample this site due to low flow conditions in 2001 and was given a Not Rated assessment at that time. This site received a Good-Fair benthic bioclassification during this assessment period. There was an increase in the total and EPT taxa found as well as an increase in the number of intolerant taxa, which resulted in a more favorable rating. The improvement at this site could possibly be the result of lower flows throughout this assessment period. This area experienced several drought years and in catchments where non-point source pollution is the primary stressor, lower flows tend to improve water quality as fewer pollutants are washed from the land into streams.

Ambient monitoring data were collected at JA77 near Trenton and JA78 at Pollocksville. The data did not exceed any of the state standards. This segment of the Trent River has a supplemental classification of swamp water so there is no State DO standard; however both sites had ninety percent of the DO reading above 4.3 mg/l. A minimum DO reading of 2.9 mg/l was recorded at JA78. The conductivity was elevated at both sites with a range of readings between 34 and 1,525 μ mhos/cm. Nutrient levels were also elevated at both sites. Chlorophyll *a* samples were collected at JA77 and none of the readings were above the state standard of 40 μ g/l.

During the summer of 2008, dense areas of macrophytic algae were reported throughout the Trent River watershed. While this is outside the data window for this plan, it is important to point out that in order to support the macrophytic algal densities reported, this area is likely suffering from nutrient over enrichment. Dense macrophytic algae have not been reported in this area since 1999 when Hurricane Floyd flushed the system.

Trent River Trend Analysis

DWQ conducted a trends and annual load analysis at several stations throughout the basin. The stations chosen for assessment were those in close proximity to a USGS gauging station. All trends were assessed using flow and seasonal adjustments.

Station JA77 was chosen due to the close proximity of the USGS gauging station (#02092500) at SR 1129 near Trenton. Trends were done on data collected between 1990 and 2005. The analysis included trends on total nitrogen (TN), defined as the sum of total Kjeldahl nitrogen and nitrate-nitrogen, total phosphorus (TP), and temperature.

The results indicated that there was a significant increase in TP concentration in the Trent River at station JA77. This trend suggests that the average increase in TP concentration per year was 0.001 mg/l, which corresponds to an average median TP concentration increase of 1.6 percent per year during this time period (1990-2005).

In addition to TP, there was also a significant increase in surface water temperature with an average increase per year of 0.15 degrees Celsius in the Trent River. This corresponds to an average median temperature increase of 0.8 percent per year during the same time period (1990-2005).

TN did not show a significant trend for this time period.

Recommendations

DWQ recognizes the need to improve the assessment of the Trent River watershed in order to identify and reduce the excess nutrients that are likely responsible for the dense macrophytic algal growth within this watershed as well as contributing to the elevated productivity in the Neuse River Estuary.

DWQ continues to recommend that the Division of Soil and Water Conservation evaluate the potential for implementation of appropriate BMPs to reduce nutrient and sediment loading in this watershed.

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*

11.4.2 Big Chinquapin Branch [AU# 27-101-14]

Current Status

Big Chinquapin Branch [AU# 27-101-14; C; Sw; NSW] is currently Not Rated for aquatic life due to a fish bioclassification rating at JF59. Coastal Plain criteria are not complete at this time so this segment could not be rated. Big Chinquapin Branch was sampled for the first time for fish community assessments in 2005. This stream drains the agricultural area, row crops and confined animal operations of northwestern Jones County and there are no NPDES facilities within the stream's rural residential and agricultural watershed upstream of the monitoring site. This silt and sandy bottom, entrenched stream has been channelized and appeared to be maintained as a channelized waterbody. There were drag line or backhoe "teeth" marks along the stream bottom, bank, and into the limestone bedrock. Despite the channelization, the stream still maintained its sinuosity. There were no growths of macrophytes and coarse woody debris and snags were scarce. Big Chinquapin Branch had the highest conductivity (381 $\mu\text{mhos/cm}$) and lowest habitat score of any fish community site in the Coastal Plain in 2005. At the request of BAU staff, investigations by staff from the Washington Regional Office and from the Division of Soil and Water Conservation did not find any major spill or leakage from nearby farms in the past two years that may have accounted for the elevated conductivity measurement (David May and Joseph Gyamfi, pers. comm., February 23, 2006). There are several hog farms as well as chicken litter application fields in the western part of Jones County that could be contributing to nonpoint runoff in the watershed.

Recommendations

DWQ recommends the Division of Soil and Water Conservation to evaluate the need for more agricultural conservation practices in this watershed including filter strips and conservation tillage.

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

The following BMPs were installed in this watershed through state and federal cost share assistance programs: water control structures affecting 370 acres, 298 acres of field borders, 130 acres of grassed waterways, 1.6 acres of cropland conversion to trees, 20.3 acres of cropland conversion to grass, nutrient management plans covering 68 acres, nutrient and pest management plans covering 316.8 acres, 320 acres of long-term no till, 67.7 acres of 3 year no-till, 1 incinerator and 1 litter spreader.

The Agriculture Cost Share Program funded over \$30,000 of the BMP listed above (September 2000 – December 2006). Cumulatively, the ACSP practices affected 505 acres, saved 310 Tons of soil, 4,131 pounds of nitrogen, 72 pounds of phosphorus, 16,476 pounds of Waste-N managed, and 44,520 pounds of Waste-P managed.

Additional lands within this watershed are using no-till practices without cost share assistance.

11.5 Additional Water Quality Issues within Subbasin 03-04-11

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.

11.5.1 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.