Chapter 6
Neuse River Subbasin 03-04-06
Including the: Little River and Buffalo Creek

6.1 Subbasin Overview

Subbasin 03-04-06 at a Glance

Land Cover (percent)

Forest/Wetland:	59.4
Surface Water:	0.8
Urban:	3.2
Cultivated Crop:	33.0
Pasture/ Managed Herbaceous:	3.7

Counties
Franklin, Johnston, Wake, Wayne and Wilson

Municipalities
Rolesville, Zebulon, Wendell, Kenly and Goldsboro

Stream Statistics

Total Streams:	220.2 mi/50.7ac
Total Supporting:	103.5 mi
Total Impaired:	8.7 mi
Total Not Rated:	7.7 mi/0.0 ac
Total No Data:	100.3 mi

This subbasin includes eastern Wake County, northeast Johnston County, and central Wayne County; a small portion of Franklin County at the headwaters of Little River is included as well. The main waterbodies in this subbasin is the Little River, from the headwaters of the stream to the Neuse River and Buffalo Creek.

The collective population of the municipalities in this subbasin has increased by a little over 600 in the past ten years. The town of Goldsboro's population has decreased by 4 percent (1,562) during the same time period. Land cover for this subbasin is over half forest/wetland, with the remainder crop and pastureland and about three percent urban. Additional information regarding population and land use changes throughout the entire basin can be found in Chapter 16.

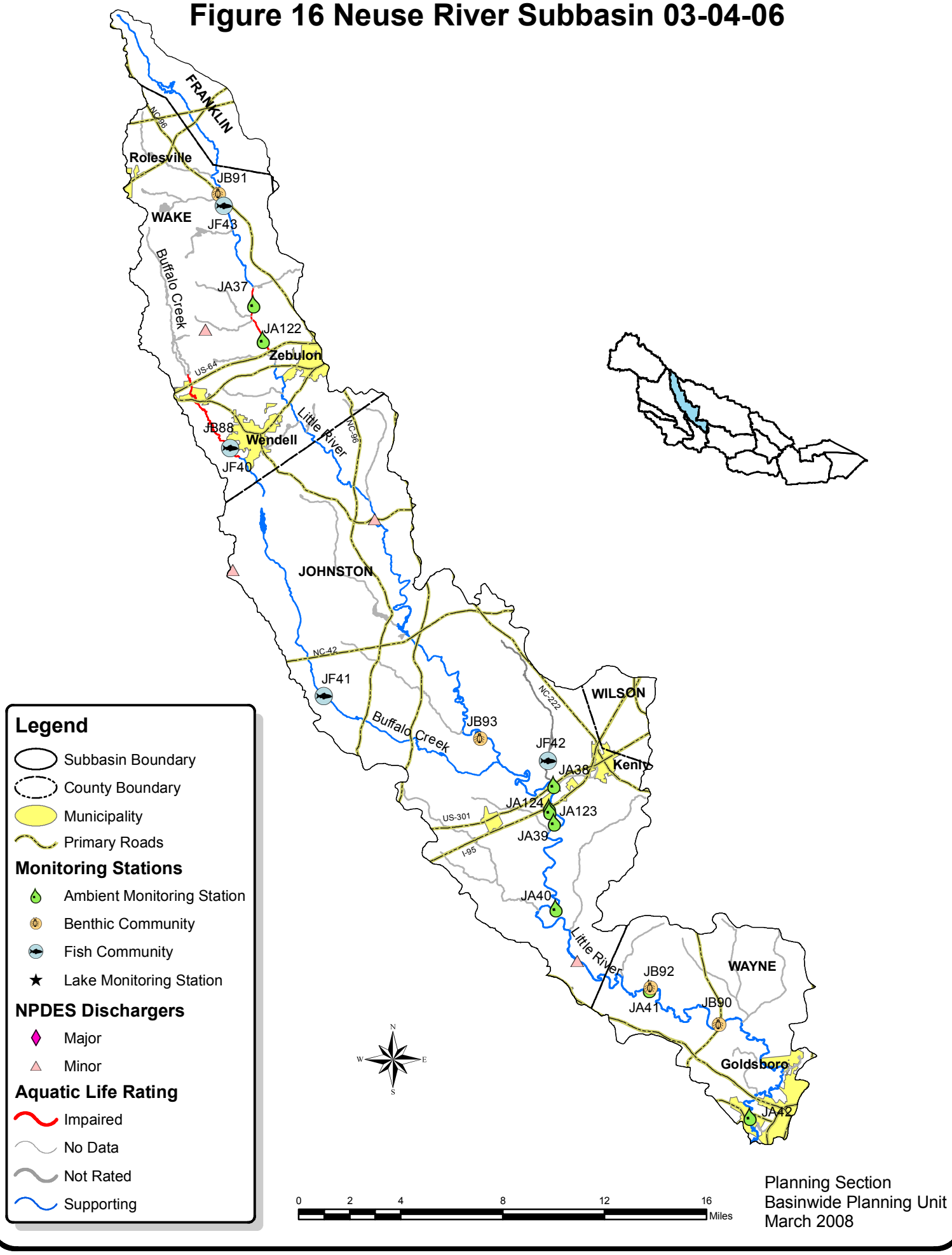
There are 6 minor NPDES wastewater discharge permits in this subbasin with a total permitted flow of 1.18 MGD. The largest of these is Kenly Regional WWTP (0.60 MGD). There are also 9 individual NPDES stormwater permits in the subbasin. Refer to Appendix III for identification and more information on NPDES permit holders. Wayne and Wake counties have developed a stormwater program under Phase II. Wake, Johnston, and Wayne County have also developed model stormwater ordinances as required by the Neuse NSW strategy stormwater rules (Chapter 18). There are also 16 permitted animal operations in this subbasin.

The City of Raleigh's Little Creek WWTP in subbasin 03-04-07 is looking to expand to about 8 MGD. This WWTP currently discharges 2.2 MGD to Little Creek which has a 7Q10 low flow of zero at the discharge point, which limits its waste assimilation capacity during dry weather. The City of Raleigh is looking at a possible discharge site in the Little River in Wake County just north of the Johnston County line.

The City of Raleigh is also in the process of purchasing land in the upper Little River watershed for the development of a 1,100 acre Little River Reservoir which will likely yield about 17 MGD. This is in the City of Raleigh's long term plans for providing adequate drinking water supply to the growing Raleigh area and the six municipalities it supplies.

There is a single new water quality impairment on the Little River for low dissolved oxygen. This is in the area of the proposed reservoir. This impairment is possibly due to the extensive network of beaver dams in the area. One of the main stressors in this watershed is habitat

Figure 16 Neuse River Subbasin 03-04-06



Planning Section
Basinwide Planning Unit
March 2008

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
Watershed (WBD-10 Number) 0302020115	**Upper Little River**										
Subwatershed (WBD-12 Number) 030202011501	**Headwaters Little River**										
27-57-(1)a	**Little River (Moores Pond, Mitchell Mill Pond)**		**2**		Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity FishCom	2004		1
From source to Big Branch					Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2005		1
WS-II;HQW,NSW	03-04-06	13.2 FW Miles									
27-57-(1)b	**Little River (Moores Pond, Mitchell Mill Pond)**		**5**	**Low Dissolved Oxygen**	Aquatic Life	Impaired	Standard Violation	Low Dissolved Oxygen	2006	2008	5
From Big Branch to 0.2 miles upstream of Wake County SR 2368					Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
WS-II;HQW,NSW	03-04-06	2.9 FW Miles			Water Supply	Supporting	No Criteria Exceeded	Water Quality Standards Water Supply	2006		1
Subwatershed (WBD-12 Number) 030202011502	**Upper Buffalo Creek**										
27-57-16-(2)	**Buffalo Creek**		**5**	**Habitat Degradation**	Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity FishCom	2005		1
From dam at Robertsons Pond to a point 200 feet upstream from West Haywood Street near Wendell				Construction Stormwater Runoff **Low Dissolved Oxygen**	Aquatic Life	Impaired	Biological Criteria Exceeded	Ecological/biological Integrity Benthos	2005	1998	5
B;NSW	03-04-06	5.8 FW Miles									
27-57-16-(3)a	**Buffalo Creek (Wendell Lake)**		**2**		Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity FishCom	2005		1
From a point 200 feet upstream from West Haywood Street near Wendell to UT on west side of creek 0.8 miles south of Wendell Lake											
C;NSW	03-04-06	4.0 FW Miles									
Subwatershed (WBD-12 Number) 030202011503	**Cattail Creek-Little River**										
27-57-(8.5)a	**Little River (Tarpleys Pond)**		**2**		Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2005		1
From bridge at N.C. Hwy. 97 to Little Buffalo Creek											
WS-V;NSW	03-04-06	33.5 FW Miles									
Subwatershed (WBD-12 Number) 030202011504	**Lower Buffalo Creek**										
27-57-16-(3)b	**Buffalo Creek (Wendell Lake)**		**2**		Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity FishCom	2005		1
From UT on west side of creek 0.8 miles south of Wendell Lake to Little River											
C;NSW	03-04-06	15.0 FW Miles									
Watershed (WBD-10 Number) 0302020116	**Lower Little River**										
Subwatershed (WBD-12 Number) 030202011601	**Little Buffalo 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
27-57-17	**Little Buffalo Creek**		**3a**		Aquatic Life	Not Rated	Data Inconclusive	Ecological/biological Integrity FishCom	2005		3a
From source to Little River											
C;NSW	03-04-06	7.7 FW Miles									
				Subwatershed (WBD-12 Number) 030202011602							**Little Creek-Little River**
27-57-(20.2)a	**Little River**		**2**		Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards 1n3	2006		1
From Spring Branch to 4.2 miles upstream of NC 581					Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
WS-IV;NSW	03-04-06	8.5 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
27-57-(8.5)b	**Little River (Tarpleys Pond)**		**2**		Aquatic Life	Not Rated	Data Inconclusive	Iron	2006		3m
From Little Buffalo Creek to Spring Branch					Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
WS-V;NSW	03-04-06	11.5 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) 030202011603							**Dennis Branch-Little River**
27-57-(20.2)b	**Little River**		**2**		Aquatic Life	Supporting	No Criteria Exceeded	Ecological/biological Integrity Benthos	2005		1
From 4.2 miles upstream of NC 581 to a point 0.6 mile downstream of Smith Mill Run											
WS-IV;NSW	03-04-06	11.9 FW Miles									
				Subwatershed (WBD-12 Number) 030202011604							**Buck Swamp-Little River**
27-57-(21.1)	**Little River**		**2**		Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
From a point 0.6 mile downstream of Smith Mill Run to City of Goldsboro water supply intake					Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
WS-IV;NSW,CA	03-04-06	1.1 FW Miles									
27-57-(21.2)	**Little River**		**2**		Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
From City of Goldsboro water supply intake to U.S. Hwy. 70					Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
C;NSW	03-04-06	1.2 FW Miles									
27-57-(21.4)	**Little River**		**2**		Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
From U. S. Highway 70 to a point 1.0 mile downstream from U. S. Highway 70					Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1
B;NSW	03-04-06	1.0 FW Miles									

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
27-57-(22)		**Little River**	**2**		Aquatic Life	Supporting	No Criteria Exceeded	Water Quality Standards Aquatic Life	2006		1
From a point 1.0 mile downstream from U.S. 70 to Neuse River											
C;NSW	03-04-06	2.6 FW Miles			Recreation	Supporting	No Criteria Exceeded	Fecal Coliform (recreation)	2006		1

Note:

See Section 23.3 for Overall and IR Category explanation.

Supporting waters are listed in Categories 1-3.

Impaired waters are listed in Categories 4 or 5.

degradation. This is likely due to stormwater runoff from the developing towns of Zebulon and Wendell as well as from agricultural practices in the watershed.

A map including the locations of the NPDES facilities and water quality monitoring stations is presented in Figure 9. Table 20 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 20 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.

6.2 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 21 for a summary of use support for waters in subbasin 03-04-06 (see Chapter 23, Section 23.3 for description of the IR category (for each parameter of interest) and Overall (river segment) category).

6.3 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 21 Summary of Use Support Ratings in Subbasin 03-04-06

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	51	51
Freshwater miles (streams)	120	9	4	104	47	8	100	220

% - Percent of total miles/acres.

6.3.1 Little River Watershed [27-57-(1)a, 27-57-(1)b, 27-57-(8.5)a, 27-57-(8.5)b, 27-57-(20.2)a, 27-57-(20.2)b, 27-57-(21.1), 27-57-(21.2), 27-57-(21.4) & 27-57-(22)]

2002 Recommendations

DWQ and LNBA will continue to monitor the Little River to assess impacts related to land use changes and to determine the source of the low dissolved oxygen. Because of the rare species in the Little River, this watershed should be targeted for land acquisition to protect the riparian area beyond the 50-foot required buffer. Wake County Parks and Recreation has received a CWMTF grant to establish greenways on portions of the Little River.

Current Status

Little River (Moors Pond, Mitchell Mill Pond) [AU# 27-57-(1)a]

Little River [AU# 27-57-(1)a; WS-II; HQW; NSW] from source to Big Branch (13.2 miles) is Supporting for aquatic life due to a Good-Fair benthic and Good fish community bioclassification at JB91 and JF43 respectively. These stream banks were stable with no evidence of erosion and the riparian zone was wide and intact on both sites.

The macroinvertebrates have consistently received a Good-Fair rating at site JB91 since 1995. The DO levels have been low each time ranging from 2.6 to 4.0 mg/l. This site was observed to be highly productive during this assessment period. The taxa tolerance ranged from intolerant to tolerant to pollutants.

Little River (Moors Pond, Mitchell Mill Pond) [AU# 27-57-(1)b]

Little River [AU# 27-57-(1)b; WS-II; HQW; NSW] from Big Branch to 0.2 miles upstream of Wake County SR 2368 (2.9 miles) is Impaired for aquatic life due to low dissolved oxygen levels of less than 4 mg/l in 34 percent of the samples at ambient monitoring station JA37. DO was below 5 mg/l in 42 percent of the samples. There are no other ambient monitoring stations further up in this watershed. The biologists have noted that there have been consistently low DO levels seen at the benthic site upstream. The bugs however have consistently been rated Good-Fair at that site. It is currently unclear if the low DO levels are due to natural conditions or due to some human influence. Dissolved oxygen levels were also low at ambient monitoring station JA122. Data was collected at this site between May and September 2003. Eighty percent were below 4mg/l and 90 percent were below 5 mg/l. The minimum DO reading at JA37 was 0.5 mg/l and at JA122 was 1.6 mg/l.

These segments are also Supporting for recreation due to acceptable fecal coliform bacteria levels at sites JA37 and JA122.

These segments of the Little River will be added to the 2008 303(d) impaired waters list for low DO standard violation. It is important to note that this impairment is within an area that has a supplemental classification of High Quality Water (HQW). It is possible that the many beaver dams in the area are contributing to the low dissolved oxygen. There are no NPDES point source dischargers in upper reaches of the Little River however; there are a few cattle and horse farm operations above the impaired area.

Wake County is purchasing land in this area for a possible future drinking water reservoir (see details below).

Little River (Tarpleys Pond) [AU# 27-57-(8.5)a]
Little River [AU# 27-57-(8.5)a; WS-V; NSW] from bridge at NC Hwy 97 to Little Buffalo Creek (33.5 miles) is Supporting aquatic life due to a Good benthic bioclassification at site JB93. This was the second consecutive time that this site was rated Good (2000 and 2005). The water was slightly turbid at the time of sampling and the instream substrate embeddedness was about 50 percent. The bank vegetation was sparse, allowing for erosion during high flow events. The riparian zone was wide and intact on both sides of the stream. The tolerance estimate for the most abundant taxa collected ranged from intolerant to tolerant.

Little River (Tarpleys Pond) [AU# 27-57-(8.5)b]
Little River [AU# 27-57-(8.5)b; WS-V; NSW] from Little Buffalo Creek to Spring Branch (11.5 miles) is Supporting for aquatic life and recreation due to No Criteria Exceeded at ambient monitoring stations JA38, JA39, JA40, JA123 and JA124. The DO levels at these stations ranged from 0 to 6 percent of the readings below 4 mg/l and 6 to 28 percent below 5 mg/l. These are all within the state criteria for supporting waters as can be seen by the Good (JB93) and Good-Fair (JB92) benthic bioclassification above and below these stations.

This section of Little River will be removed from the 303(d) impaired waters list for low dissolved oxygen standard violation.

The Kenly Regional WWTP (NC0064891) is a minor discharger (<1MGD) that discharges into this segment of the Little River. It has had fecal coliform bacteria violations off and on for the last several years. During 2006, the facility had 12 weekly or monthly geometric mean exceedances. This facility uses an ultraviolet (UV) disinfection system to kill bacteria. The regional office noted that the UV bulbs are not changed often enough resulting in violations of the state standard and an issuance of a notice of violation from the state.

Little River [AU# 27-57-(20.2)a]
Little River [AU# 27-57-(20.2)a; WS-IV; NSW] from Spring Branch to 4.2 miles upstream of NC581 (8.5 miles) is Supporting for aquatic life and recreation due to a Good-Fair benthic bioclassification at site JB92 and No Criteria Exceeded at ambient monitoring station JA41. Only 5 percent of the samples monitored were below 5 mg/l DO, with a minimum recorded reading of 4.3 mg/l during this assessment period.

This segment was previously added to the 2004 impaired waters list due to low DO reading during the last assessment period (Sept 1995 – Aug 2000). The benthic macroinvertebrate site

(JB92) was a special study site requested within the low DO 303(d) listed segment. The hope was to determine if the low DO levels were due to natural causes. Since this was the first time this site was sampled the biologist were unable to make that determination. However, the DO levels in this segment of the Little River are currently classified as Supporting or adequate for aquatic life. There were two abundant taxa that were indicators of possible organic enrichment and one taxa an indicator of low DO. The tolerance range for the taxa found at this site ranged from slightly intolerant to highly tolerant.

The stream banks had little or no woody vegetation present for stabilization, which makes them susceptible to erosion as well as provided minimal shading. The riparian zone was wide and intact on the left, very narrow but intact on the right. There was limited instream habitat available for macroinvertebrate colonization.

This segment of the Little River will be removed from the 2008 impaired waters list for low DO standard violations.

Princeton WWTP (NC0026662) had numerous limit violations over the prior five years, leading to several Notices of Violations (NOVs) and an active Special Order of Consent (SOC) between August 2003 and December 2005. This facility had 7 fecal coliform bacteria limit violations in 2006 and 3 in 2007. According to the Raleigh Regional Office staff, this facility was having fecal coliform issue due to the length and low flow of effluent in their discharge pipe. They have rectified the problem and have not had any violations since August 2007.

Little River [AU# 27-57-(20.2)b]

Little River [AU# 27-57-(20.2)b; WS-IV; NSW] from 4.2 miles upstream of NC581 to a point 0.6 mile downstream of Smith Mill Run (11.9 miles) is Supporting for aquatic life due to a Good benthic bioclassification at site JB90. This site was rated Good in 1991, as Good-Fair in 1995 and 2000 and has returned to Good in 2005 (current assessment period). There has been a shift in the substrate composition, from large substrate particles to smaller (mostly sand and silt). This may account for the sudden appearance and abundance of certain species at this site. This data can be found in the 2006 ESS Neuse River Basinwide Assessment Report (http://h2o.enr.state.nc.us/esb/Basinwide/Neuse06BasinReportFinal.pdf). The tolerance value of the abundant taxa ranged from intolerant to highly tolerant.

The banks were sparsely vegetated or otherwise composed of grasses, allowing for erosion during high flow events. The riparian zone was wide on both sides, but with frequent breaks on one side of the stream.

Little River [AU# 27-57-(21.1), 27-57-(21.2), 27-57-(21.4), 27-57-(22)]

Little River [AU# 27-57-(21.1); WS-IV; NSW; CA, AU# 27-57-(21.2); C; NSW, AU# 27-57-(21.4); B; NSW, AU# 27-57-(22); C; NSW] from a point 0.6 miles downstream of Smith Mill Run to Neuse River (5.9 miles) is Supporting for aquatic life and recreation due to No Criteria Exceeded at ambient monitoring station JA42. Four percent of the samples were below 5 mg/l DO with a minimum recorded reading of 4.4 mg/l.

Little 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 JA40 was chosen due to the close proximity of the USGS gauging station (#02088500) at SR 2320 near Princeton. Trends were done on data collected between 1990 and 2000. The analysis included trends on total nitrogen (TN), defined as the sum of total Kjeldahl nitrogen and nitrate-nitrogen, total phosphorus (TP) and temperature. A trend analysis was not possible for TN and TP for the current use support assessment window due to a decrease in nutrient sampling frequency at site JA40 starting in 2001. Care should be taken when interpreting these results since it is not known if this trend has continued, reversed or leveled off after 2000.

The results indicated that there was a significant decrease TN concentration in the Little River at station JA40. This trend suggests that the average decrease in TN concentration per year was 0.012 mg/l, which corresponds to an average median TN concentration decrease of 1.5 percent per year during the time period of 1990 through 2000.

In contrast, there was also a significant increase in TP concentration in the Little River. The average increase in TP concentration per year was 0.003 mg/l corresponding to the median TP concentration increasing by an average of 2.3 percent per year during the same time period (1990-2000). TP exhibited a strong seasonal pattern, with higher concentrations generally occurring from May-October.

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

Recommendations

DWQ should increase the sampling frequency at site JA40 in order to assess future trends at this location. A minimum of 9 samples/year are required in order to perform a statistical trends analysis. It is recommended that this site be sampled monthly.

DWQ and LNBA will continue to monitor the Little River to assess impacts related to land use changes and to determine the source of the low dissolved oxygen. Because of the rare species in the Little River, this watershed should be targeted for land acquisition to protect the riparian area beyond the 50-foot required buffer. Wake County Parks and Recreation has received a CWMTF grant to establish greenways on portions of the Little River.

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 existing and future urbanization of the watershed can be found in Chapter 12 of the *Supplemental Guide to North Carolina's Basinwide Planning* document (http://h2o.enr.state.nc.us/basinwide/SupplementalGuide.htm).

Water Quality Initiatives

Wake County with the assistance of several municipalities are looking at building a new drinking water reservoir on the Little River in the eastern part of the Wake County. More than 2000 acres will be acquired for the reservoir and park facilities, which will include 200-ft buffers surrounding the reservoir. According to Wake County website, as of June 2006, 1,880 acres have been acquired at a cost of $14,419,992. The expected completion date for the reservoir is 2025. This reservoir will help Wake County and several municipalities to meet their expected

water needs through 2040. It is estimated that the reservoir will provide 17 million gallons of water per day.

Wake County entered into a partnership with the federal government to preserve 94 acres of farmland and greenway approximately one mile upstream from the proposed Little River Reservoir site and Mitchell Mill State Natural Area. Wake County used funds from the Open Space Preservation Program and a grant from the USDA NRCS Farm and Ranch Lands Protection Program which provides grant funds to assist local governments to purchase agricultural conservation easements designed to restrict the property from any future development or use other than agriculture-related activities. The property consists of approximately 83 acres of farm and timberland, 11 acres of floodplain and 3,500 feet of river frontage on Little River. Increased development is likely to occur in this area; therefore it is important to preserve more open space in the watershed in order to decrease the impact from future development on this important water supply watershed.

The Open Space Program is targeting 184 acres in the Little River Watershed.

6.3.2 Buffalo Creek [AU# 27-57-16-(2)]

2002 Recommendations
DWQ will continue to monitor Buffalo Creek to assess future impacts related to development in the upper watershed. Communities in eastern Wake County should consider water quality impacts to Buffalo Creek during development and utilize BMPs to minimize these impacts during and after development activities. Because of the water quality impacts and the rapid development, Buffalo Creek is a NCWRP targeted local watershed.

Current Status
Buffalo Creek [AU# 27-57-16-(2); B; NSW] from the dam at Robertsons Pond to a point 200 feet upstream from West Haywood St. near Wendell (5.8 miles) is Impaired for aquatic life due to a Fair benthic bioclassification at JB88. This site was sampled one other time in 1991 and received a Poor bioclassification. This site was requested to assess this rapidly developing area upstream of Lake Wendell.

The instream habitat available for colonization was lacking and could contribute to the degraded benthic community. Low DO levels (3.2 mg/l at the time of sampling) are also likely limiting the benthic community. Urbanization around the site is the likely source for stressors to this stream. Grasses were the dominate vegetation on the stream bank, allowing for a high erosion potential to occur in this area. The riparian zone was wide and intact. The tolerance estimate for the taxa found ranged from slightly intolerant to highly tolerant, with 2 abundant taxa as indicators of low dissolved oxygen and another an indicator of organic enrichment. This site has improved slightly since it was last sampled in 1991.

Fish community was also assessed at this site (JF40) and received a Good bioclassification rating. The sample showed a fairly good trophic structure despite the low number of fish collected.

This site will remain on the 303(d) list of impaired waters for impaired biological integrity due to the Fair benthic bioclassification rating during this assessment period.

All of Buffalo Creek will be included in a TMDL management strategy.

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 existing and future urbanization of the watershed can be found in Chapter 12 of the *Supplemental Guide to North Carolina's Basinwide Planning* document (http://h2o.enr.state.nc.us/basinwide/SupplementalGuide.htm).

6.4 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.

6.4.1 Buffalo Creek [AU# 27-57-16-(3)a & 27-57-16-(3)b]

Current Status
Buffalo Creek [AU# 27-57-16-(3)a; C; NSW] from a point 200 feet upstream from West Haywood Street near Wendell to UT on west side of creek 0.8 miles south of Wendell Lake (4 miles) and [AU# 27-57-16-(3)b; C; NSW] from UT on west side of creek 0.8 miles south of Wendell Lake to Little River (15.0 miles) is currently Supporting aquatic life due to a Good-Fair fish community bioclassification at site (JF41). The rating at this site remained the same as the 2000 rating, however the total number of fish collected was roughly half of that caught during the last assessment period. The instream habitat and the vegetative cover were good and the riparian corridor was wide and intact.

The Pace Mobile Home Park treatment facility (NC0064246), a small 15,000 GPD discharger has had several discharge violations over the last 1.5 years. Between January 2006 and April 2007 they had 4 BOD daily or monthly maximum violations, 3 major fecal coliform daily maximum violations and 5 monthly average exceedances in total ammonia nitrogen concentrations. Many of these resulted in civil penalties.

Section 27-57-16-(3)a should have been removed from the 303(d) list during the last assessment due the Good-Fair rating at JF41 in 2002. This segment will be removed from the 2008 303(d) list.

Recommendation
DWQ should take a benthic sample in the lower Buffalo Creek watershed during the next assessment period. Benthic organisms tend to be a little more sensitive and would be a good

indicator as to the effects from development on this segment of the creek. A benthic assessment was done in 2000 and was found to support a good-fair benthic population.

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.

6.5 Additional Water Quality Issues within Subbasin 03-04-06

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.

6.5.1 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.