Chapter 4
Cape Fear River Subbasin 03-06-04
Including: Haw River, Robeson Creek and Jordan Reservoir Haw River Arm

4.1 Subbasin Overview

Subbasin 03-06-04 at a Glance

Land and Water Area

Total area:	331 mi²
Land area:	327 mi²
Water area:	4 mi²

Population Statistics

2000 Est. Pop.: 59,718 people
Pop. Density: 181 persons/mi²

Land Cover (percent)

Forest/Wetland:	73.0%
Surface Water:	1.7%
Urban:	0.3%
Cultivated Cropland:	3.0%
Pasture/ Managed Herbaceous:	22.0%

Counties

Alamance, Chatham and Orange

Municipalities

Pittsboro

Subbasin 03-06-04 is in the Carolina slate belt characterized by low flowing streams during summer months. Most of the watershed is forested with extensive agriculture present. Development is occurring around Pittsboro and north along the US 15/501 corridor. Population is expected to grow by 60,000 people in counties with portions or all of their areas in this subbasin by 2020.

There are six individual NPDES wastewater discharge permits in this subbasin with a permitted flow of 0.83 MGD (Figure 7). The largest is Pittsboro WWTP (0.75 MGD). Refer to Appendix VI and Chapter 30 for more information on NPDES permit holders. Issues related to compliance with NPDES permit conditions are discussed below in Section 4.3 for Impaired waters.

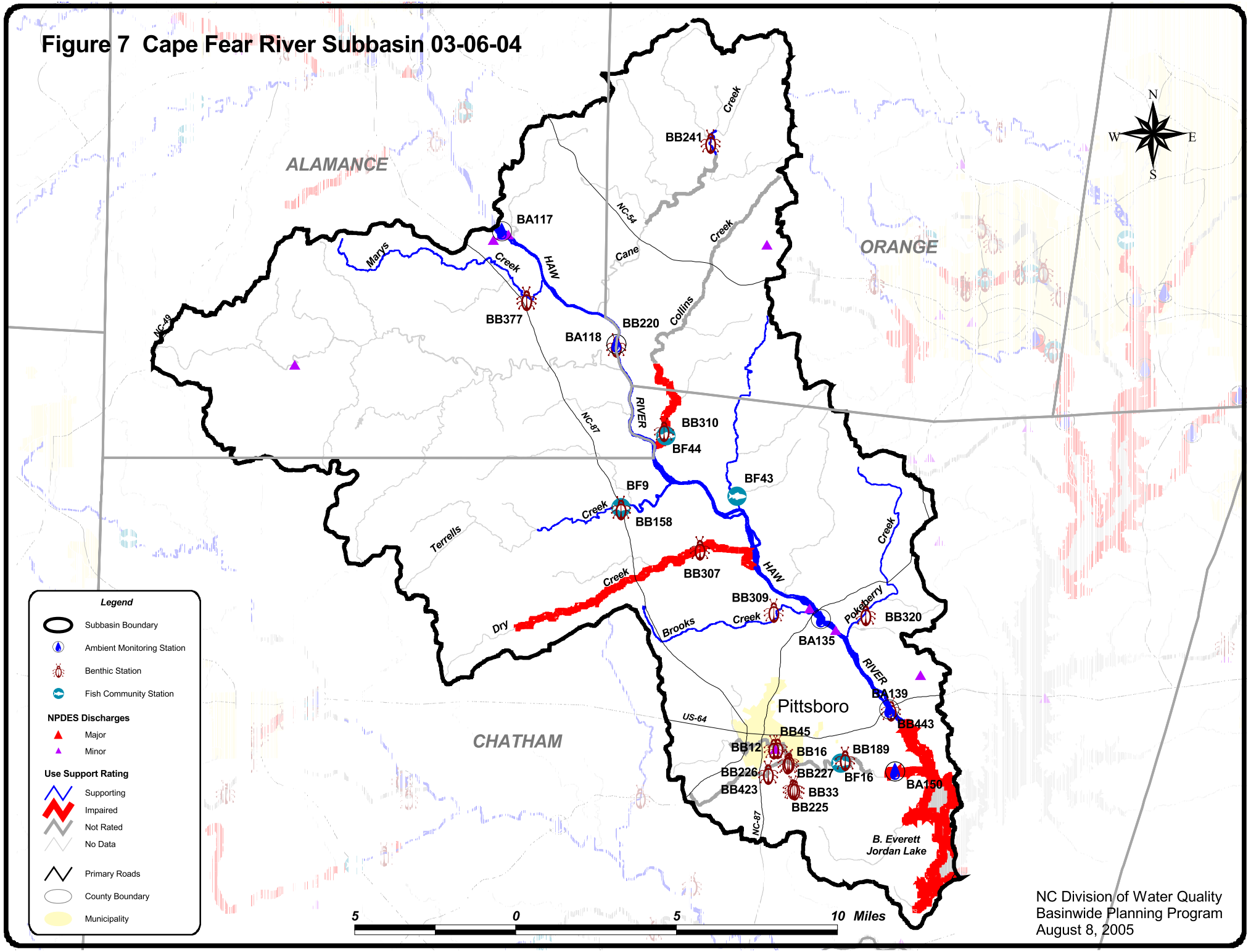
There are no municipal areas in this subbasin required to develop stormwater programs (Chapter 31).

There are two registered swine operations and 18 registered cattle operations in this subbasin. Issues related to agricultural activities are discussed below in Section 4.3 for Impaired waters.

There were 15 benthic macroinvertebrate community samples and four fish community samples (Figure 7 and Table 7) collected during this assessment period. Data were also collected from three ambient monitoring stations including one DWQ station, one UCFRBA (Appendix V) station, and one shared ambient station. Three reservoirs were also monitored. Refer to the *2003 Cape Fear River Basinwide Assessment Report* at http://www.esb.enr.state.nc.us/bar.html and Appendix IV for more information on monitoring.

Waters in the following sections are identified by assessment unit number (AU#). This number is used to track defined segments in the water quality assessment database, 303(d) Impaired waters list and the various tables in this basin plan. The assessment unit number 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 assessment unit and the DWQ index segment are the same.

Figure 7 Cape Fear River Subbasin 03-06-04



NC Division of Water Quality
Basinwide Planning Program
August 8, 2005

Table 7 CAPE FEAR Subbasin 03-06-04

AU Number	Classification	Length/Area	Description	Aquatic Life Assessment					Recreation Assessment				
				AL Rating	Station	Result	Year/ Parameter	% Exc	REC Rating	Station	Result	Stressors	Sources
Brooks Creek (Branch)													
16-36	WS-IV&B	7.3 FW Miles	From source to Haw River	**S**	BB309	NI	2001		ND				
Cane Creek (Cane Creek Reservoir)													
16-27-(2.5)a	WS-II HQ	1.2 FW Miles	From a point 0.4 miles upstream of Turkey Creek to UT 0.5 miles downstream of SR 1114	**S**	BB241	GF	2003		ND				
					BB241	GF	2003						
					BB241	GF	2003						
16-27-(2.5)b	WS-II HQ	25.1 FW Acres	From UT 0.5 miles downstream of SR1114 to dam at Cane Creek Reservoir	**NR**	BL10	NCE	Chlor a	66	ND			Chlorophyll a	Agriculture
Collins Creek													
16-30-(1.5)	WS-IV NS	3.7 FW Miles	From a point 0.8 miles downstream of Orange County SR 1005 to Haw River	**I**	BB310	GF	2003		ND			Habitat Degradation	Agriculture
					BF44	P	2003						
Dry Creek													
16-34-(0.7)	WS-IV NS	10.1 FW Miles	From a point 0.3 miles downstream of Chatham County SR 1506 to Haw River	**I**	BB307	F	2003		ND			Turbidity	Land Clearing
					BB307	F	2003					Habitat Degradation	Unknown

Table 7 CAPE FEAR Subbasin 03-06-04

AU Number	Classification	Length/Area	Description	Aquatic Life Assessment						Recreation Assessment				
				AL Rating	Station	Result	Year/ Parameter	% Exc		REC Rating	Station	Result	Stressors	Sources
HAW RIVER														
16-(28.5)	WS-IV NS	11.4 FW Miles	From a point 0.4 miles downstream of Cane Creek (South side of Haw River) to a point 0.4 miles downstream of Brooks Branch	S	BA135	NCE				S	BA135	NCE		
16-(36.3)	WS-IV NS	0.5 FW Miles	From a point 0.4 miles downstream of Brooks Branch to Pittsboro water supply intake (located 0.3 miles upstream of Pokeberry Creek)	S	BA139	NCE				S	BA139	NCE		
16-(36.7)	WS-IV NS	3.8 FW Miles	From Pittsboro water supply intake to a point 0.5 mile downstream of U.S. Hw. 64	S	BB443	G	2002			S				
16-(37.3)	WS-IV NS	53.2 FW Acres	From a point 0.5 mile downstream of US Hwy 64 to approximately 1.0 mile below US Hwy 64	I	BL1	CE	Chlor a	33		ND			High pH	Agriculture
					BL1	CE	High pH	23.5					High pH	Impervious Surfac
													High pH	MS4 NPDES
													High pH	WWTP NPDES
													Chlorophyll a	Agriculture
													Chlorophyll a	Impervious Surfac
													Chlorophyll a	MS4 NPDES
													Chlorophyll a	WWTP NPDES
Haw River (B. Everett Jordan Lake below normal pool elevatio														
16-(37.5)	WS-IV&B	1,392.3 FW Acres	From approximately 1.0 mile below U.S. Hwy. 64 to dam at B. Everett Jordan Lake)	I	BA150	CE	Chlor a	24		ND			High pH	Agriculture
					BL1	CE	Chlor a	33					High pH	Impervious Surfac
					BL1	CE	High pH	23.5					High pH	MS4 NPDES
													High pH	WWTP NPDES
													Chlorophyll a	Agriculture
													Chlorophyll a	Impervious Surfac
													Chlorophyll a	MS4 NPDES
													Chlorophyll a	WWTP NPDES

Table 7 CAPE FEAR Subbasin 03-06-04

AU Number	Classification	Length/Area	Description	Aquatic Life Assessment						Recreation Assessment			Stressors	Sources
				AL Rating	Station	Result	Year/ Parameter	% Exc		REC Rating	Station	Result		
Marys Creek														
16-26	C NSW	10.1 FW Miles		**S**						ND			Habitat Degradation	
	From source to Haw River				BB377	GF	2003							
					BB377	NR	2003							
					BB377	GF	2000							
Pokeberry Creek														
16-37	WS-IV NS	8.0 FW Miles		**S**						ND			Habitat Degradation	Land Clearing
	From source to Haw River				BB320	GF	2003							
					BB320	GF	2003							
Robeson Creek														
16-38-(3)b	WS-IV NS	16.7 FW Acres		**NR**	BL11	NCE	Chlor a	100		ND			Chlorophyll a	Impervious Surfac
	Pittsboro Lake												Chlorophyll a	WWTP NPDES
16-38-(3)c	WS-IV NS	2.4 FW Miles		**I**						ND			Habitat Degradation	ND land app site
	From Pittsboro Lake to UT across from SR 1951				BB12	F	2001						Habitat Degradation	Impervious Surfac
					BB16	F	2001						Habitat Degradation	WWTP NPDES
					BB45	F	2001							
16-38-(3)d	WS-IV NS	3.1 FW Miles		**S**						ND			Habitat Degradation	
	From UT across from SR 1951 to Jordan Reservoir				BB189	GF	2001							
					BB189	F	2001							
					BF16	G	2003							
Terrells Creek (Ferrells Creek) (North Side Haw River)														
16-32	WS-IV NS	7.6 FW Miles		**S**						ND				
	From source to Haw River				BF43	G	2003							
Terrells Creek (South Side Haw River)														
16-31-(2.5)	WS-IV NS	6.7 FW Miles		**S**						ND			Low Dissolved Oxygen	
	From Cattail Creek to Haw River				BB158	GF	2003							
					BB158	F	2003							
					BF9	E	2003							

Table 7 CAPE FEAR Subbasin 03-06-04

AU Number / Description	Classification	Length/Area	Aquatic Life Assessment: AL Rating	Station	Result	Year/ Parameter	% Exc	Recreation Assessment: REC Rating	Station	Result	Stressors	Sources
Turkey Creek												
16-38-4	WS-IV NS	4.1 FW Miles	**NR**					ND				
From source to Robeson Creek				BB226	NR	2001						
				BB227	NR	2001						
				BB423	NR	2001						

AL - Aquatic Life	BF - Fish Community Survey	E - Excellent	S - Supporting, I - Impaired
REC - Recreation	BB - Benthic Community Survey	G - Good	NR - Not Rated
	BA - Ambient Monitoring Site	GF - Good-Fair	NR*- Not Rated for Recreation (screening criteria exceeded)
	BL- Lake Monitoring	F - Fair	ND-No Data Collected to make assessment
	S- DEH RECMON	P - Poor	**Results**
		NI - Not Impaired	CE-Criteria Exceeded > 10% and more than 10 samples
	Miles/Acres	S- Severe Stress	NCE-No Criteria Exceeded
	FW- Fresh Water	M-Moderate Stress	
	S- Salt Water	N- Natural	

Aquatic Life Rating Summary

S	m	59.8	FW Miles
NR	m	4.1	FW Miles
I	m	16.1	FW Miles
NR	m	41.8	FW Acres
I	m	1,445.5	FW Acres
NR	e	9.4	FW Miles
ND		167.8	FW Miles

Recreation Rating Summary

S	m	15.7	FW Miles
ND		241.4	FW Miles
ND		1,487.3	FW Acres

Fish Consumption Rating Summary

I	m	1,392.3	FW Acres
I	e	257.1	FW Miles
I	e	95.0	FW Acres

4.2 Use Support Assessment Summary

Use support ratings were assigned for waters in subbasin 03-06-04 in the aquatic life, recreation, fish consumption and water supply categories. All waters are Impaired on an evaluated basis in the fish consumption category because of fish consumption advice that applies to the entire basin. In the water supply category, all WS classified waters (1,434.6 acres and 132.5 miles) are Supporting on an evaluated basis based on reports from DEH regional water treatment plant consultants. Refer to Appendix X for a complete list of monitored waters and more information on Supporting monitored waters.

There were 80 stream miles (31.1 percent) and 1,487.3 freshwater acres (100 percent) monitored during this assessment period in the aquatic life category. There were 16.1 miles (6.3 percent) and 1,445.5 acres (97.2 percent) of Impaired waters in this category.

4.3 Status and Recommendations of Previously and Newly Impaired Waters

The following waters were either identified as Impaired in the previous basin plan (2000) 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 2006 303(d) list. The current status and recommendations for addressing these waters are presented below, and each is identified by an assessment unit number (AU#). Refer to the overview for more information on AUs. Information regarding 303(d) listing and reporting methodology is presented in Appendix VII.

4.3.1 Collins Creek [AU # 16-30-(0.5) and (1.5)]

Current Status
Collins Creek was Fully Supporting in the 2000 basin plan; however, Collins Creek [16-30-(1.5)] from 0.8 miles downstream of SR 1005 to the Haw River (3.7 miles) is currently Impaired for aquatic life because of a Poor fish community rating at site BF44. There are indications of nutrient enrichment in Collins Creek, and the fish community has been adversely affected by drought conditions during the assessment period. Habitat and riparian area were stable at site BF44. The watershed is experiencing rapid growth but is currently in rural residential development.

Collins Creek [16-30-(0.5)] from source to downstream of SR 1005 (8.5 miles) is currently Not Rated on an evaluated basis for aquatic life because Trails WWTP (NC0042285) had significant violations of biological oxygen demand permit limits during the last two years of the assessment period that could have adversely impacted aquatic life. The facility is currently upgrading and expanding.

2005 Recommendations
DWQ will continue to monitor the Collins Creek watershed to document the effects of development and the implementation of best management practices (BMPs). The NPDES compliance process will be used to address the significant permit violations noted above. In

addition to implementing BMPs on agricultural lands, BMPs need to be installed during and post-development activities. Further recommendations to protect streams in urbanizing areas and to restore streams in existing urban areas are discussed in Chapter 31.

Segment 16-30-(1.5) will be added to the 303(d) list of Impaired waters. TMDLs (Chapter 35) will be developed for identified stressors within 8-13 years of listing.

4.3.2 Dry Creek [AU # 16-34-(0.7)]

Current Status
Dry Creek was Fully Supporting in the 2000 basinwide plan; however, Dry Creek from 0.3 miles downstream of SR 1506 to the Haw River (10.1 miles) is currently Impaired for aquatic life because of a Poor benthic community rating at site BB307. There are indications of low dissolved oxygen in Dry Creek, although no ambient monitoring data were collected. The benthic community may have been adversely affected by drought conditions during the assessment period, although the creek has had low community ratings in past collections. Habitat and riparian area were stable at site BB307. Pools were filled with sediment and habitat variety was lacking. A new development in a tributary to Dry Creek is a potential source of sediment. The DLR has inspected the site and indicated that BMPs were in place. Haw River Watch monitoring indicates frequent high levels of turbidity downstream of the development. There are concerns that the BMPs are not adequate to protect water quality in Dry Creek.

2005 Recommendations
DWQ will continue to monitor the Dry Creek watershed to document the effects of development and the implementation and effectiveness of best management practices (BMPs). In addition to implementing BMPs on agricultural lands, BMPs need to be installed and maintained during and post-development activities. Further recommendations to protect streams in urbanizing areas and to restore streams in existing urban areas are discussed in Chapter 31.

Dry Creek will be added to the 303(d) list of Impaired waters. TMDLs (Chapter 35) will be developed for identified stressors within 8-13 years of listing.

4.3.3 Haw River [AU # 16-(28.5), (36.3), (36.7), (37.3) and (37.5)]

Current Status
Haw River [16-(28.5)] from downstream of Cane Creek to downstream of Brooks Branch to Pittsboro water supply intake (11.4 miles) was Fully Supporting in the 2000 basinwide plan and is currently Supporting aquatic life because no criteria were exceeded at site BA135. Total nitrogen (TN) and total phosphorus (TP) trend analyses were completed for the 19-year period from 1985 to 2003 at site BA135. The analyses indicated a significant 57 percent decrease in TP over the time period. There was no trend observed for TN. Possible explanations for the decrease in TP include the phosphate detergent ban (1988) and improved TP removal from wastewater discharges upstream of site BA135.

Haw River [16-(36.3) and 16-(36.7)] from downstream of Brooks Branch to downstream of US64 (4.3 miles) was Fully Supporting in the 2000 basinwide plan and is currently Supporting aquatic life because of a Good benthic community rating at site BB443. Bynum WWTP

(NC0035866) had significant violations of pH permit limits during the last two years of the assessment period.

The Haw River [16-(37.3) and (37.5) from 0.5 miles downstream of US 64 to 1 mile downstream of US 64 (53.2 acres) and from 1 mile downstream of US 64 to B. Everett Jordan Reservoir Dam (1,392.3 acres) are considered part of Jordan Reservoir and are discussed with the remainder of the reservoir in Chapter 5. The Haw River Arm [16-(37.5)] is also Impaired on a monitored basis in the fish consumption category.

2005 Recommendations
DWQ will continue to monitor the Haw River. Although there has been a decrease in TP in the Haw River; DWQ recommends NPDES discharges continue to improve TP and TN removal capabilities, and all land-disturbing activities utilize appropriate BMPs to reduce TP and TN delivery to the Haw River watershed. The NPDES compliance process will be used to address the significant permit violations noted above. Segment 16-(37.5) will be placed on the 303(d) list for aquatic life and fish consumption.

Water Quality Initiatives
The NCEEP has also preserved 32,000 linear feet of stream in this watershed (Chapter 34).

4.3.4 Marys Creek [AU # 16-30-(1.5)]

2000 Recommendations
The 2000 basin plan recommended that Marys Creek be resampled to determine stressors to the biological community and the effects of agricultural BMPs installation.

Current Status
Marys Creek from source to the Haw River (10.1 miles) is Supporting aquatic life because of a Good-Fair benthic community rating at site BB377. The benthic community has been impacted by drought conditions, but was able to recover by time of sampling in 2003.

2005 Recommendations
DWQ will continue to monitor the Marys Creek watershed. Marys Creek was removed from the 2002 303(d) list of Impaired waters because of the improved biological community rating.

Water Quality Initiatives
The NCEEP completed 2,500 linear feet of stream restoration in this watershed (Chapter 34).

4.3.5 Pittsboro Lake and Robeson Creek [AU # 16-38-(3)a, b, c and d]

2000 Recommendations
The 2000 basin plan recommended that Robeson Creek and Pittsboro Lake be resampled and that local governments work to protect water quality in the watershed. The 2000 basin plan improperly identified the lower portion of Robeson Creek. A portion Impaired for chlorophyll *a* is actually an embayment of Jordan Reservoir and is discussed in Chapter 5.

Current Status

Robeson Creek [16-38-(3)a] from source to Pittsboro Lake (0.9 miles) is Not Rated on an evaluated basis for aquatic life because Haw River Assembly information indicate habitat degradation and a pollution tolerant benthic community. Agriculture, as well as impervious surfaces associated with Pittsboro, are potential sources of degradation.

Pittsboro Lake [16-38-(3)b] a 16.7-acre impoundment of Robeson Creek is Not Rated for aquatic life because all chlorophyll *a* samples exceeded the water quality criterion; however, only three samples were collected. A minimum of 10 samples are needed to assign a use support rating (Appendix X). The chlorophyll *a* levels were the highest recorded for the lake by DWQ.

Robeson Creek [16-38-(3)c] from Pittsboro Lake to a UT across from SR 1951 (2.4 miles) is Impaired for aquatic life because of Fair benthic community ratings at sites BB45, BB16 and BB12. There are indications of nutrient enrichment in Robeson Creek. Habitat and riparian area were stable downstream in segment 16-38-(3)d at site BF16 and BB189. This lower segment (3.1 miles) is Supporting. The watershed drains Pittsboro and is experiencing rapid growth. The benthic communities were stressed by habitat degradation associated with runoff from urban areas and nutrients from Townsend Foods spray fields. Townsend Foods reduced capacity so that the waste generated could be managed on the spray field.

A TMDL for phosphorus was developed that called for 71 percent reduction from urban runoff and the Pittsboro WWTP. The TMDL for phosphorus was targeted at the lower portion of Robeson Creek. This segment has since been identified as part of the Haw River arm of Jordan Reservoir. The TMDL will be applied to Jordan Reservoir (Chapter 5).

2005 Recommendations

DWQ will continue to monitor the Robeson Creek and Pittsboro Lake watershed to document the effects of continued development and the removal of the Pittsboro WWTP discharge as recommended in the TMDL. Further recommendations to protect streams in urbanizing areas and to restore streams in existing urban areas are discussed in Chapter 31.

Pittsboro Lake [16-38-(3)b] and Robeson Creek [16-38-(3)a and c] will remain on the 303(d) list of Impaired waters. A TMDL is being developed for aquatic weeds in Pittsboro Lake. Segment [16-38-(3)d] will be removed because of the improved biological community ratings. Segment [16-38-(5)] will be added to the list because it is a part of Jordan Reservoir and is Impaired because of chlorophyll *a*. TMDLs (Chapter 35) will be developed for identified stressors within 8-13 years of listing.

Water Quality Initiatives

In 1999, NCSU received a $210,000 Section 319 grant (Chapter 34) to conduct watershed assessment and support monitoring stations to assist in development of the TMDL for the Robeson Creek watershed. The Haw River Assembly (Chapter 34) Stream Stewards Campaign has also received 319 grants to conduct citizen stream assessments in the Robeson Creek watershed and to encourage business participation in decreasing runoff into Robeson Creek. The NCSU Water Quality Group has worked with Pittsboro to form the Robeson Creek Watershed Council. The council meets regularly and includes members from state and federal resource agencies, local governments, businesses, residents and the Haw River Assembly.

4.4 Status and Recommendations for Waters with Noted Impacts

The surface waters discussed in this section are not Impaired. However, notable water quality problems and concerns have been documented for some waters based on this assessment. While these waters are not Impaired, attention and resources should be focused on these waters to prevent additional degradation or facilitate water quality improvement. Waters in the following section are identified by assessment unit number (AU#). See overview for more information on AU#s.

4.4.1 Cane Creek (Cane Creek Reservior) [AU# 16-27-(2.5)b]

Current Status and 2005 Recommendations
Cane Creek Reservoir (25.1 acres) is Not Rated for aquatic life because 66 percent of chlorophyll *a* samples exceeded the water quality standard; however, not enough samples were collected to assign a use support rating. Nutrient levels in the reservoir were higher than in previous years and blue-green algal blooms occurred throughout the summer months. These blooms can cause taste and odor problems in treated drinking water. Cattle have also been observed in tributary streams to Cane Creek. DWQ will determine if increased monitoring efforts in this lake are warranted to better assess water quality. DWQ will also contact DSWC staff to evaluate if BMPs can be implemented in this watershed to exclude cattle.

Water Quality Initiatives
In 1997, Orange Water and Sewer Authority (Chapter 34) received a $1,042,500 CWMTF grant to acquire 1,265 acres in the Cane Creek watershed to help protect the water supply. In 2001, Orange Water and Sewer Authority received a $687,000 CWMTF grant to acquire an additional 150 acres in the Cane Creek watershed to help protect the water supply. In 2003, the Haw River Assembly (Chapter 34) received a minigrant of $25,000 for transactional costs to purchase six tracts along Cane Creek and the Haw River. Also in 2003, Orange Water and Sewer Authority received a minigrant of $25,000 for transactional costs to purchase 144 acres and conservation easements on 467 acres in the Cane Creek watershed. The NCEEP also completed 9,700 linear feet of stream restoration in this watershed (Chapter 34).

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

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.

4.5.1 Jordan Haw River Watershed Nutrient Sensitive Waters Strategy

All land uses and discharges of wastewater and stormwater in subbasin 03-06-04 potentially contribute nutrients to Jordan Reservoir in subbasins 03-06-04 and 03-06-05. The reservoir is Impaired for aquatic life because chlorophyll *a* violated the standard in all segments of the reservoir. Refer to Chapter 36 for more information on this strategy.