Chapter 12
Cape Fear River Subbasin 03-06-12
Including: Rocky River, Loves Creek, Tick Creek and Bear Creek

12.1 Subbasin Overview

Subbasin 03-06-12 at a Glance

Land and Water Area

Total area:	244 mi²
Land area:	243 mi²
Water area:	1 mi²

Population Statistics

2000 Est. Pop.:	20,039people
Pop. Density:	82 persons/mi²

Land Cover (percent)

Forest/Wetland:	68.9%
Surface Water:	0.6%
Urban:	1.3%
Cultivated Crop:	2.5%
Pasture/ Managed Herbaceous:	26.8%

Counties

Alamance, Chatham and Randolph

Municipalities

Siler City

Subbasin 03-06-12 is in the Carolina Slate belt and is characterized by seasonally low flowing streams. Most of the watershed is forested, with extensive pastureland as well. Development is occurring along the US 64 corridor between Siler City and Pittsboro. Population is expected to grow by 110,000 people in counties with portions or all of their areas in this subbasin by 2020.

There are four individual NPDES wastewater discharge permits in this subbasin with a permitted flow of 4.02 MGD (Figure 15). The largest is Siler City WWTP (4 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 12.3 for Impaired waters and in Section 12.4 for other waters.

There is one registered dairy, three registered cattle operations and one registered swine operation in this subbasin. Issues related to agricultural activities are discussed below in Section 12.3 for Impaired waters.

There were 12 benthic community samples and four fish community samples (Figure 15 and Table 15) collected during this assessment period. Data were also collected from three ambient monitoring stations including two UCFRBA (Appendix V) stations and one DWQ ambient station. One reservoir was 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 15 Cape Fear River Subbasin 03-06-12

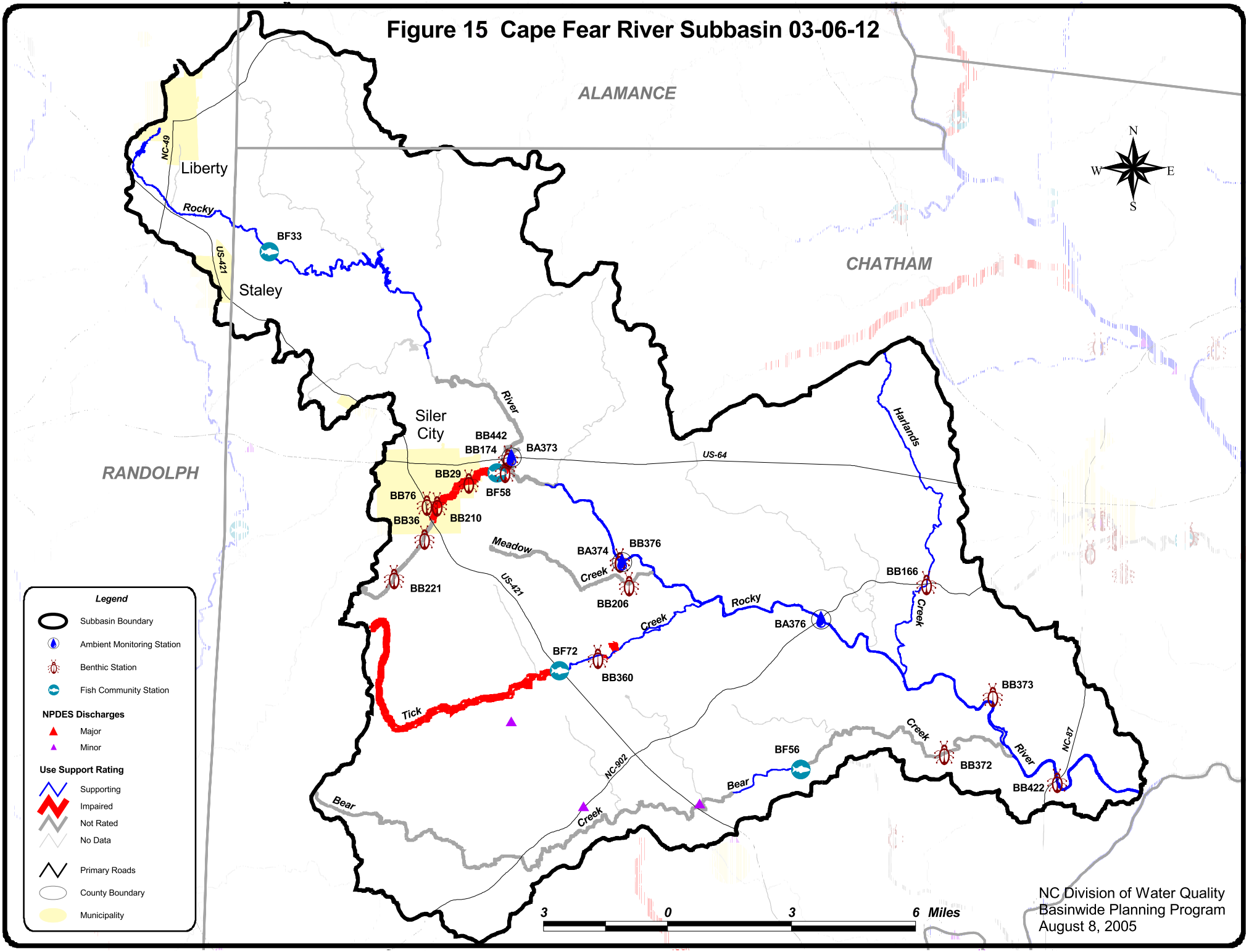

Table 15 CAPE FEAR Subbasin 03-06-12

AU Number	Classification	Length/Area	Description	Aquatic Life Assessment					Recreation Assessment			Stressors	Sources
				AL Rating	Station	Result	Year/ Parameter	% Exc	REC Rating	Station	Result		
Bear Creek													
17-43-16b	C	2.0 FW Miles		**S**					ND				
	From SR 2189 to SR 2187				BF56	GF	'1999						
					BF56	F	'1999						
					BF56	GF	'2003						
17-43-16c	C	7.3 FW Miles		**NR**					ND			Habitat Degradation	
	From SR 2187 to Rocky River				BB372	NR	'2003						
Harlands Creek(Hollands Creek)													
17-43-15	C	10.2 FW Miles		**S**					ND			Habitat Degradation	
	From source to Rocky River				BB166	GF	'2003						
Loves Creek													
17-43-10a	C	3.3 FW Miles		**NR**					ND			Habitat Degradation	MS4 NPDES
	From source to Chatham Avenue				BB221	NR	'2003						
					BB36	NR	'2003						
17-43-10b	C	2.5 FW Miles		**I**					ND			Habitat Degradation	MS4 NPDES
	From Chatham Avenue to Siler City WWTP				BB210	F	'2003						
					BB29	F	'2003						
					BF58	GF	'2003						
17-43-10c	C	0.4 FW Miles		**I**					ND			Habitat Degradation	WWTP NPDES
	From Siler City WWTP to Rocky River				BB174	F	'2003					Habitat Degradation	MS4 NPDES
Meadow Creek													
17-43-12	C	5.0 FW Miles		**NR**					ND				
	From source to Rocky River				BB206	NR	'2003						

Table 15 CAPE FEAR Subbasin 03-06-12

AU Number / Description	Classification	Length/Area	Aquatic Life Assessment: AL Rating	Station	Result	Year/ Parameter	% Exc	Recreation Assessment: REC Rating	Station	Result	Stressors	Sources
Rocky River												
17-43-(1)a	WS-III	10.6 FW Miles	**S**					ND				
From source to upper Rocky River Reservoir				BF33	GF	2003						
17-43-(1)b	WS-III	3.9 FW Miles	**S**	BL24	NCE			ND			Chlorophyll a	Agriculture
From upper Rocky River Reservoir to a point 0.3 mile downstream of Lacy Creek											Chlorophyll a	Pasture
17-43-(8)a	C	6.7 FW Miles	**NR**	BA373	NCE			**S**	BA373	NCE	Turbidity	Unknown
From dam at lower supply reservoir for Siler City to Varnal Creek				BB442	NR	2003					Habitat Degradation	Impervious Surfac
17-43-(8)b	C	21.6 FW Miles	**S**	BA374	NCE			**S**	BA374	NCE	Habitat Degradation	Pasture
				BA376	NCE				BA376	NCE	Habitat Degradation	Agriculture
From Varnal Creek to Deep River				BB376	GF	2003					Habitat Degradation	MS4 NPDES
				BB376	NR	2002						
Tick Creek												
17-43-13a	C	8.2 FW Miles	**I**					ND				
From source to US 421				BF72	F	2003						
17-43-13b	C	4.9 FW Miles	**S**					ND			Habitat Degradation	Agriculture
From US 421 to Rocky River				BB360	GF	2003					Habitat Degradation	Impervious Surfac
											Habitat Degradation	Pasture

Table 15 CAPE FEAR Subbasin 03-06-12

AU Number	Classification	Length/Area	Description	Aquatic Life Assessment					Recreation Assessment				
				AL Rating	Station	Result	Year/ Parameter	% Exc	REC Rating	Station	Result	Stressors	Sources

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	53.2	FW Miles
NR	m	22.4	FW Miles
I	m	11.1	FW Miles
NR	e	14.9	FW Miles
ND		59.6	FW Miles
ND			FW Acres

Recreation Rating Summary

S	m	28.3	FW Miles
ND		132.9	FW Miles
ND			FW Acres

Fish Consumption Rating Summary

I	e	161.2	FW Miles
			FW Acres

12.2 Use Support Assessment Summary

Use support ratings were assigned for waters in subbasin 03-06-12 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 (42 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 86.7 stream miles (51.7 percent) monitored during this assessment period in the aquatic life category. There are 11.1 stream miles (6.6 percent) identified as Impaired in this same category.

12.3 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.

12.3.1 Loves Creek [AU#17-43-10a, b and c]

2000 Recommendations
These segments of Loves Creek were recommended for resampling using the 303(d) approach. Siler City was encouraged to develop a stormwater program and other watershed initiatives to improve water quality in this creek.

Current Status
Loves Creek [17-43-10b and c] from Chatham Avenue to the Rocky River (2.9 miles) is Impaired for aquatic life because of Fair benthic community ratings at sites BB29, BB174 and BB210. The upper 3.3 miles are Not Rated because benthic community ratings could not be assigned at sites BB221 and BB36.

A stressor study completed in the Loves Creek watershed indicated toxic chemicals in runoff from Siler City are the main stressors to the benthic community. Streambank erosion, sedimentation and excessive algal growth are also stressors. The WWTP was not the main stressor, and agricultural land uses are also a source. The survey noted runoff from animal operations in the upper watershed may be contributing nutrients and bacteria to the creek.

2005 Recommendations
DWQ will continue to monitor the Loves Creek watershed. DWQ will work with DSWC to evaluate if BMPs can be implemented to reduce nutrients from animal operations in the watershed. Refer to Chapter 31 for more information and recommendations for urban streams.

All segments will remain on the 303(d) list of Impaired waters. TMDLs (Chapter 35) will be developed for identified stressors within 8-13 years of listing.

Water Quality Initiatives
The NCEEP initiated a Local Watershed Planning that included Loves Creek. The preliminary findings are discussed under the Rocky River in this chapter.

12.3.2 Rocky River [AU#17-43-(1)a and b and 17-43-(8)a]

2000 Recommendations
The 2000 basin plan recommended that the Rocky River be resampled and that agricultural BMPs, including fencing cattle out of streams be implemented.

Current Status
Rocky River [17-43-(1)a] from source to upper Rocky River Reservoir (10.6 miles) is Supporting aquatic life because of a Good-Fair fish community rating at site BF33.

Upper Rocky River Reservoir [17-43-(1)b] from upper Rocky River Reservoir to downstream of Lacy Creek (3.9 miles) is Supporting aquatic life because no criteria were exceeded during lakes monitoring in 2003. The reservoir is hypereutrophic. In August 2003, chlorophyll *a* levels were elevated and there indications that animal operations (both cattle and horse) may be contributing nutrients to the reservoir and downstream.

Rocky River [17-43-(8)a] from dam at Siler City water supply to Varnal Creek (6.7 miles) is Not Rated for aquatic life because of numerous reports of nuisance periphyton growth in the river. During summer months algal mats have been observed to cover areas down to the confluence with the Deep River. No criteria were exceeded at site BA373; however, nutrient levels were elevated. The Siler WWTP, as well as agriculture and residential activities, are potential sources of nutrients.

The watershed is predominately forested, but development is increasing. Agriculture, as well as the Loves Creek WWTP in Siler City, are likely the main sources of nutrients.

2005 Recommendations
DWQ will continue to monitor the Rocky River watershed. DWQ will work with DSWC staff to further implement BMPs to reduce the impacts of development and agriculture in this watershed. DWQ will work with Siler City to evaluate nutrient reduction strategies from urban areas as well as from the WWTP.

Segment 17-43-(1)a will be removed from the 303(d) list of Impaired waters because of the improved fish community rating.

Water Quality Initiatives
In 2002, Liberty received a $203,000 CWMTF (Chapter 34) grant to rehabilitate 7,556 linear feet of the wastewater collection system and rehabilitate or replace 43 manholes.

The NCEEP initiated a Local Watershed Planning project focusing on three local watersheds comprising the upper and middle Rocky River drainage system. The study area is located primarily in northwestern Chatham County, including Siler City and portions of Randolph and Alamance counties. The planning area addresses the Rocky River mainstem and tributary watersheds, including N. Prong Rocky River, Greenbriar Creek, Varnal Creek, Loves Creek, Tick Creek, Bear Creek and others.

A technical advisory team consisting of local resource professionals and municipal staff from the counties and towns in the planning area was formed to help guide the watershed assessment and plan development work. This team will also help identify optimal watershed project sites with cooperative landowners for the establishment of long-term conservation easements. Watershed projects to be identified include traditional stream and stream buffer restoration/enhancement sites, wetlands and buffer preservation sites, and sites for the implementation of urban stormwater or agricultural best management practices (BMPs).

The Preliminary Findings Report was completed in February 2005. The Phase II assessment & modeling of watershed conditions, and subsequent development of watershed restoration and protection strategies, are slated for completion by summer of 2005. To date, over 60 potential stream restoration sites and dozens of high-quality preservation tracts have been identified.

12.3.3 Tick Creek [AU#17-43-13a]

Current Status
This segment of Tick Creek was Fully Supporting in the 2000 plan; however, Tick Creek from source to US 421 (8.2 miles) is currently Impaired for aquatic life because of a Fair fish community rating at site BF72. Cattle have unrestricted access to the stream and under story vegetation has been heavily damaged by hoof traffic. Bare dirt and severely eroded banks were also noted at the sample site. Bonlee Elementary School (NC0039331) had significant violations of ammonia permit limits during the last two years of the assessment period.

2005 Recommendations
DWQ will continue to monitor the Tick Creek watershed. DWQ will also contact DSWC staff to prioritize BMP implementation in this watershed to limit cattle access to the stream. The NPDES compliance process will be used to address the significant permit violations noted above.

This segment 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.

Water Quality Initiatives
The NCEEP initiated a Local Watershed Planning that included Tick Creek. The preliminary findings are discussed under the Rocky River in this chapter.

12.4 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.

12.4.1 Bear Creek [AU#17-43-16a]

Current Status and 2005 Recommendations
Bear Creek [17-43-16a] from source to SR 2189 (14.9 miles) is Not Rated on an evaluated basis for aquatic life because Hill Forest Rest Home (NC0038849) had significant violations of ammonia permit limits in the last two years of the assessment period that could have negatively impacted aquatic life. The NPDES compliance process will be used to address the significant permit violations noted above.

Water Quality Initiatives
The NCEEP initiated a Local Watershed Planning that included Bear Creek. The preliminary findings are discussed under the Rocky River in this chapter.