Chapter 10 -
Cape Fear River Subbasin 03-06-10
Includes the Deep River, Bear Creek and McLendons Creek

10.1 Water Quality Overview

Subbasin 03-06-10 at a Glance

Land and Water Area (sq. mi.)

Total area:	448
Land area:	446
Water area:	2

Population Statistics

1990 Est. Pop.:	21,107 people
Pop. Density:	47 persons / mi^2

Land Cover (%)

Forest / Wetland:	80.0
Surface Water:	0.9
Urban:	0.4
Cultivated Crop:	0.9
Pasture / Managed Herbaceous:	17.9

Use Support Ratings

Freshwater Streams:

Fully Supporting:	205.6 mi.
Partially Supporting:	6.2 mi.
Not Supporting:	2.2 mi.
Not Rated:	133.1 mi.

Lakes:

Carthage City Lake - Fully Supporting

This subbasin includes the middle section of the Deep River in Moore County. The Deep River here is classified as High Quality Waters (HQW) from Grassy Creek to NC 42, where Moore, Chatham and Lee counties meet near Carbonton. Cedar Creek, Scotchman Creek and Lick Creek are also HQWs. The towns of Robbins and Carthage are in this subbasin. Most of the land is forested, but there is some agriculture. A map of the subbasin, including water quality sampling locations, is presented in Figure B-10.

Biological ratings for these sample locations are presented in Table B-10. The current sampling resulted in impaired ratings for one stream in this subbasin. Refer to Appendix III for a complete listing of monitored waters and use support ratings. See Section A, Chapter 3, Table A-31 for a summary of lakes and reservoirs use support data.

Good bioclassifications were found using benthos data at Cabin Creek, Mill Creek, Wet Creek, Bear Creek and Buffalo Creek in 1998. Compared to 1993 data, this indicated a slight decline in water quality for Mill Creek, an improvement for Bear Creek and Buffalo Creek and no change for Cabin Creek and Mill Creek. Very low flows occurred here during the summer of 1998, with McLendons Creek, Richland Creek and Big Governors Creek reduced to pools of water between dry streambed. These streams have low flows due to underlying geologic formations (Triassic Basin) and could not be rated. The federally endangered Cape Fear shiner was collected in Falls Creek along with 25 other species of fish, the most for any Cape Fear basin fish samples.

For more detailed information on water quality in this subbasin, refer to *Basinwide Assessment Report – Cape Fear River Basin – June 1999*, available from DWQ Environmental Sciences Branch at (919) 733-9960.

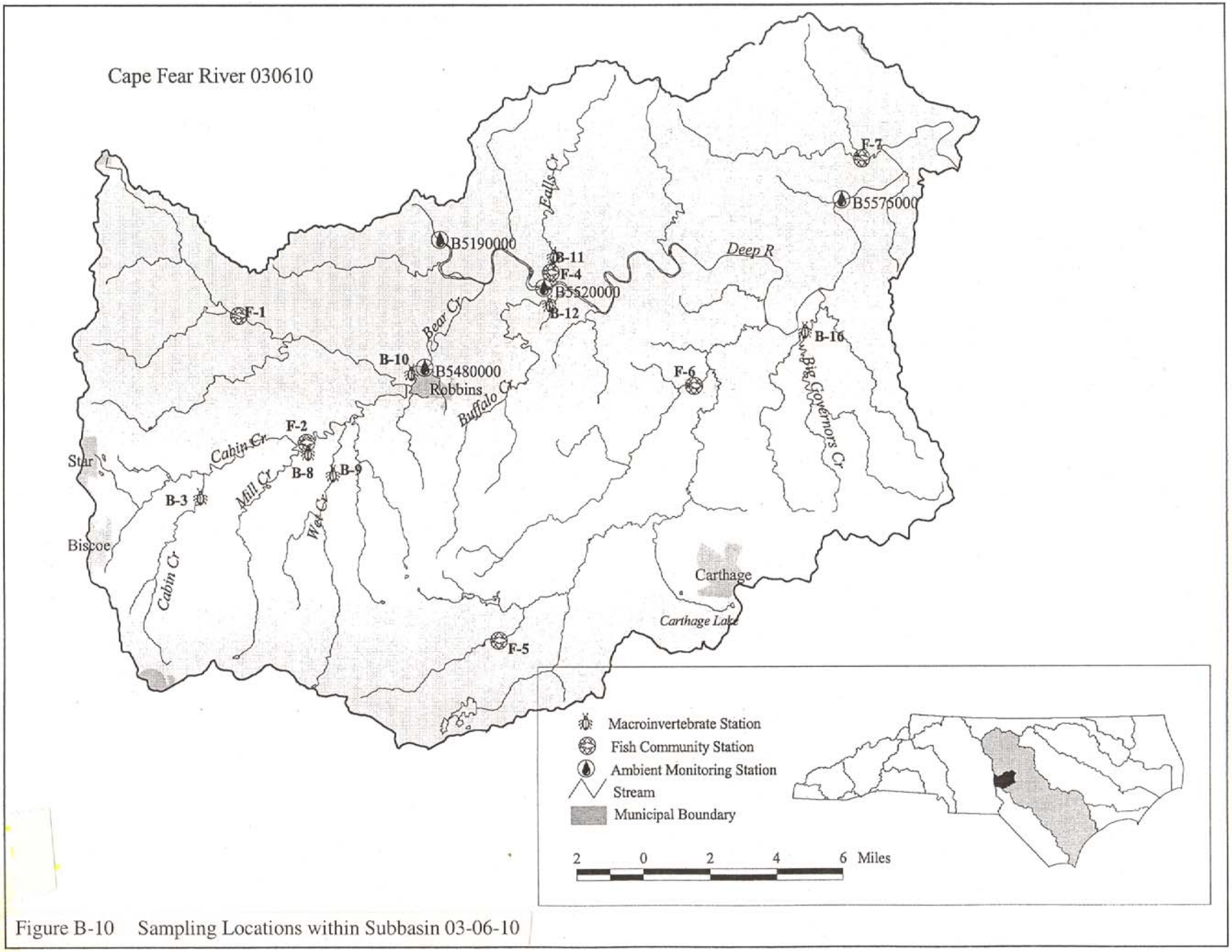

Figure B-10 Sampling Locations within Subbasin 03-06-10

Table B-10 Biological Assessment Sites in Cape Fear River Subbasin 03-06-10

BENTHOS				***Bioclassification***	
Site #	**Stream**	**County**	**Location**	**1993**	**1998**
B-3	Cabin Creek	Moore	SR 1400	Good	Good
B-8	Mill Creek	Moore	nr SR 1275	Excellent/Good	Good/G-F
B-9	Wet Creek	Moore	NC 24	Good	Good
B-10	Bear Creek	Moore	NC 705	Good-Fair	Good
B-11	Falls Creek	Moore	SR 1606	Fair	Not Rated
B-12	Buffalo Creek	Moore	NC 22	Good-Fair	Good
B-16	Big Governors Creek	Moore	SR 1625	Poor	Not Rated

FISH				***Bioclassification***	
Site #	**Stream**	**County**	**Location**	**1994**	**1998**
F-2	Cabin Creek	Moore	SR 1275	no sample	Good
F-4	Falls Creek	Moore	SR 1606	no sample	Good
F-5	McLendons Creek	Moore	SR 1210	no sample	Fair
F-6	Richland Creek	Moore	SR 1640	Poor	Poor
F-7	Indian Creek	Chatham	SR 2306	no sample	Good-Fair

10.2 Impaired Waters

Portions of Cotton Creek, Falls Creek, McLendons Creek, Richland Creek, Indian Creek and Big Governors Creek were identified as impaired in the 1996 Cape Fear River Basinwide Water Quality Plan. Portions of Cotton Creek are currently rated as impaired according to recent DWQ monitoring. Current status of each of these streams is discussed below. Prior recommendations, future recommendations and projects aimed at improving water quality for these waters are also discussed when applicable. 303(d) listed waters are summarized in Part 10.3 and waters with other issues, recommendations or projects are discussed in Part 10.4.

Cotton Creek

1996 Recommendations

Cotton Creek (6.6 miles from source to Cabin Creek) was partially supporting (PS) in the 1996 plan. The creek is a very low flow (zero 7Q10 and 30Q2) stream that receives a 90% industrial wastewater flow from the Star WWTP. It was recommended that the facility meet advanced tertiary treatment limits.

Current Status

The 0.5 miles above the Star WWTP had no discernible flow in 1998 and could not be rated. Star WWTP has been meeting permitted limits except for toxicity. The Town of Star has signed a special order of consent (SOC) to meet toxicity limits by January 2001. From the Star WWTP

to Lick Creek (2.2 stream miles), Cotton Creek is currently not supporting (NS) according to recent DWQ monitoring. The remaining 3.9 miles of Cotton Creek are currently partially supporting (PS). The stream has a biologically impaired benthic community. The Star WWTP discharge comprises 100% of the flow in this segment of Cotton Creek much of the year and is believed to be the cause of impairment. Agricultural and urban nonpoint source pollution may also be sources of impairment to Cotton Creek. This stream is on the state's year 2000 303(d) list (not yet EPA approved).

2000 Recommendations

Cotton Creek is a zero flow stream. It is necessary for Star WWTP to maintain the highest quality effluent possible to reduce impacts to downstream segments of Cabin Creek and minimize adverse effects in Cotton Creek. DWQ will continue to monitor the toxicity of discharge from this facility. The 303(d) list approach will be to resample for biological and chemical data to attempt to determine potential problem parameters.

Falls Creek

Current Status

Falls Creek (11.6 miles from source to Deep River) was partially supporting (PS) in the 1996 plan. The stream is in a forested watershed with good instream habitat. The Fair benthos community may be indicative of very low summer flows. More fish species were collected at the site on Falls Creek than at any other site in the basin. The stream is currently not rated (NR) and not on the 303(d) list.

McLendons Creek

Current Status

McLendons Creek (20.1 miles) was partially supporting (PS) in the 1996 plan. This stream is in a watershed with a large amount of agricultural land uses that have the potential to degrade instream habitat. Streambank erosion has also been noted in this stream. New biological information has determined that the previous rating was inappropriate because of the small size of the stream and the low summer flow conditions characteristic of Triassic Basin streams. This stream is currently not rated (NR) and no longer on the 303(d) list.

There is currently a study on McLendons Creek to evaluate water quality benefits of agricultural BMPs. Refer to Section C, Chapter 1, Part 1.5.2 for more information on this project.

Richland Creek

Current Status

Richland Creek (12.8 miles) was partially supporting (PS) in the 1996 plan. New biological information has determined that the previous rating was inappropriate because of the small size

of the stream and the low summer flow conditions characteristic of Triassic Basin streams. This stream is currently not rated (NR) and no longer on the 303(d) list.

Indian Creek

Current Status

Indian Creek (8.2 miles) was not supporting (NS) in the 1996 plan. New biological information has determined that the previous rating was inappropriate because of the small size of the stream and the low summer flow conditions characteristic of Triassic Basin streams. This stream is currently not rated (NR) and no longer on the 303(d) list.

Big Governors Creek

Current Status

Big Governors Creek (9.5 miles) was not supporting (NS) in the 1996 plan. New biological information has determined that the previous rating was inappropriate because of the small size of the stream and the low summer flow conditions characteristic of Triassic Basin streams. This stream is currently not rated (NR) and no longer on the 303(d) list.

Cabin Creek

Current Status

A portion of Cabin Creek (2.3 miles) was not sampled during recent DWQ monitoring, but is impaired based on data collected in 1995. This stream is impacted by low quality effluent from Star WWTP.

2000 Recommendations

For recommendations, see Cotton Creek in above. The 303(d) list approach for this stream will be to resample to obtain updated use support information.

10.3 303(d) Listed Waters

There are two streams (8.9 stream miles) in the subbasin that are impaired and on the state's year 2000 303(d) list (not yet EPA approved). Portions of Cotton Creek and Cabin Creek are discussed above. For information on 303(d) listing requirements and approaches, refer to Appendix IV.

10.4 Other Issues, Recommendations and Projects

The following surface water segments are rated as fully supporting using recent DWQ monitoring data. However, these data revealed some impacts to water quality. Although no action is required for these surface waters, continued monitoring is recommended. Enforcement

of sediment and erosion control laws will help to reduce impacts on these streams and lakes. DWQ encourages the use of voluntary measures to prevent water quality degradation. Education on local water quality issues is always a useful tool to prevent water quality problems and to promote restoration efforts. For information on water quality education programs, workshops and nonpoint source agency contacts, see Appendix V.

Bear Creek is in an agricultural area, and streams in this watershed are subject to erosion and habitat degradation. Implementation of agricultural BMPs would reduce potential adverse impacts to these streams.

Approximately 2% of the waters in this subbasin are impaired by nonpoint source pollution. All the waters of the subbasin are affected by nonpoint sources. DENR, other state agencies and environmental groups have programs and initiatives underway to address water quality problems associated with nonpoint sources. DWQ will notify local agencies of water quality concerns in this subbasin and work with these various agencies to conduct further monitoring, as well as assist agency personnel with locating sources of funding for water quality protection.

Upper Cape Fear River Basin Association

The Upper Cape Fear River Basin Association (UCFRBA) is starting to sample 45 sites in the upper Deep and Haw River watersheds. The data will be analyzed to support various studies and will be used with DWQ data to develop use support ratings for waters in the Cape Fear River basin during the upcoming basinwide cycle.

Deep River Dams

Impounded segments of the Deep River (near Carbonton) are slower flowing and can be periodically affected by low dissolved oxygen (DO) associated with algal blooms. Nutrients from upstream sources can potentially cause algal blooms. Regionalization of small discharges, advanced treatment by larger upstream facilities, and addressing nonpoint sources of nutrients will reduce potential for algal blooms in these impoundments.

Removal of impoundments and restoration of natural flow on the Deep River would also reduce the potential for algal blooms. Further monitoring of this segment is recommended to assess the severity of low dissolved oxygen (DO) and identify sources of nutrients that increase the potential for an algal bloom in slow moving segments behind dams.

General Recommendations for the Deep River Point Source Discharges

1996 Recommendations

This segment of the Deep River was not identified as impaired in the 1996 plan. Because of low dissolved oxygen (DO) behind dams downstream of High Point in the Deep River, the following limits were recommended for facilities between High Point Lake and the Carbonton dam:

New and expanding discharges ≥1 MGD: BOD_5 = 5 mg/l, NH_3-N = 2mg/l, TP = 1mg/l
New and expanding discharges <1 MGD: BOD_5 = 15 mg/l, NH_3-N = 4 mg/l
New and expanding discharges <1 MGD and ≥0.5 MGD: TP = 2mg/l

For smaller (<1 MGD) new and expanding discharges, regionalization of wastewater treatment was encouraged. If connection to a regional WWTP was not possible, an alternatives analysis was to be completed to determine if alternatives other than surface discharge were feasible.

Current Status

The Town of Robbins has recently completed an upgrade to the WWTP. DWQ will continue to monitor this segment of the Deep River.

2000 Recommendations

Efforts to regionalize wastewater treatment in this subbasin should continue. Water quality behind the dams will continue to be monitored to assess impacts from upstream point and nonpoint sources. Increases in discharges of nutrients from point sources and increases in nutrients associated with development and agriculture should be carefully considered in light of past algal blooms in impoundments on the Deep River. Limits from the 1996 plan will continue to be recommended with the exception that new and expanding discharges ≥1 MGD will be given limits of BOD_5 = 5 mg/l and NH_3-N = 1mg/l. This is now considered BAT in North Carolina for this discharger category. Recommended limits for other facilities are as follows:

New and expanding discharges ≥1 MGD: BOD_5 = 5 mg/l, NH_3-N = 1mg/l, TP =1mg/l
New and expanding discharges <1 MGD: BOD_5 = 15 mg/l, NH_3-N = 4 mg/l
New and expanding discharges <1 MGD and ≥0.5 MGD: TP = 2mg/l