# Chapter 16 -
# Cape Fear River Subbasin 03-06-16
## Includes Cape Fear River, Harrison Creek and Turnbull Creek

### 16.1 Water Quality Overview

***Subbasin 03-06-16 at a Glance***

**Land and Water Area (sq. mi.)**

| | |
|---|---|
| Total area: | 438 |
| Land area: | 430 |
| Water area: | 8 |

**Population Statistics**

| | |
|---|---|
| 1990 Est. Pop.: | 14,811 people |
| Pop. Density: | 34 persons / $mi^2$ |

**Land Cover (%)**

| | |
|---|---|
| Forest / Wetland: | 78.7 |
| Surface Water: | 2.5 |
| Urban: | 0.6 |
| Cultivated Crop: | 12.7 |
| Pasture / Managed Herbaceous: | 5.6 |

**Use Support Ratings**

*Freshwater Streams*:

| | |
|---|---|
| Fully Supporting: | 240.8 mi. |
| Partially Supporting: | 0.0 mi. |
| Not Supporting: | 8.5 mi. |
| Not Rated: | 11.8 mi. |

*Lakes*:

Jones Lake - Fully Supporting
Salters Lake - Fully Supporting
White Lake - Fully Supporting

This subbasin is located in the inner coastal plain and contains the City of Elizabethtown. The Cape Fear River in this subbasin is deep and slow moving, with two locks to aid in navigation. The Bladen Lakes State Park, which includes several natural lakes, is located in this subbasin. The streams and many of the natural bay lakes within this subbasin are tannin-stained or low pH blackwaters. Land use in the subbasin is mostly forest and marsh with some agriculture. A map of the subbasin, including water quality sampling locations, is presented in Figure B-16.

Biological ratings for these sample locations are presented in Table B-16. 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.

There are eight permitted dischargers in this subbasin, mostly near Elizabethtown. Four of the largest dischargers, Veeder-Root, Smithfield Foods Incorporated in Tar Heel, Alamac Knit Fabrics in Elizabethtown, and Dupont of Fayetteville, discharge into the Cape Fear River.

Of the 68 fish tissue samples analyzed since 1994, seven samples exceeded the EPA mercury limit. These samples were from bass, bowfin and catfish. Only one bowfin sample exceeded the FDA/NC mercury limit.

Of the five sites sampled in both 1993 and 1995 for benthos, three improved in bioclassification and the others remained the same. Two of the three Cape Fear River sites, the Cape Fear River near Duarte and the Cape Fear River near Kelly, increased from Fair to Good-Fair. The Cape Fear River at Elizabethtown remained the same (Good-Fair), as did Ellis Creek (Good-Fair). Harrison Creek also increased from Fair to Good-Fair between 1993 and 1995. Turnbull Creek, with a Good bioclassification, had the best water quality in this subbasin.

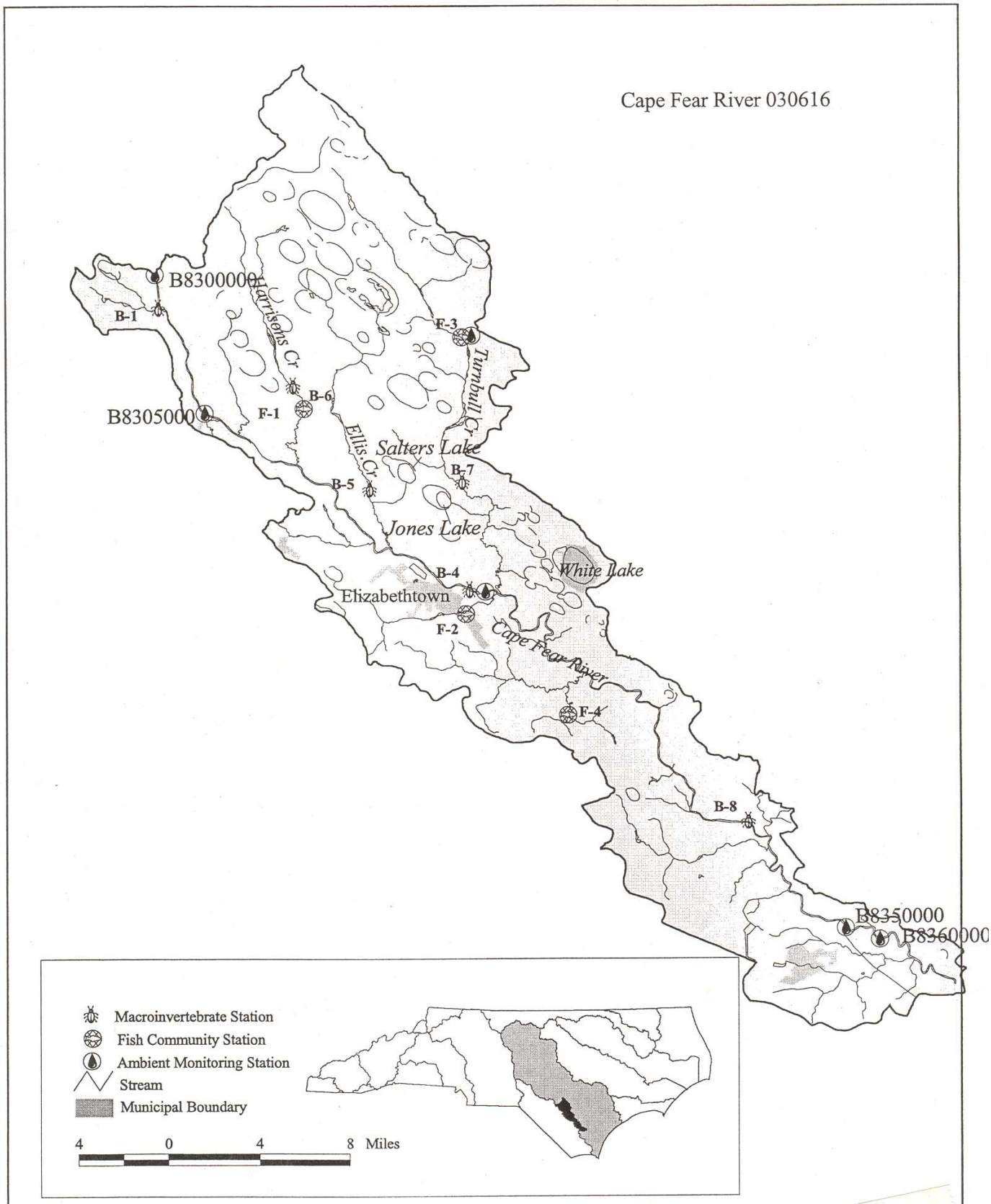


Figure B-16 Sampling Locations within Subbasin 03-06-16

Table B-16 Biological Assessment Sites in Cape Fear River Subbasin 03-06-16

| ***BENTHOS*** | | | | ***Bioclassification*** | |
|---|---|---|---|---|---|
| **Site #** | **Stream** | **County** | **Location** | **1993** | **1998** |
| B-1 | Cape Fear River | Bladen | SR 1355 nr Duarte | Fair | Good-Fair |
| B-4 | Cape Fear River | Bladen | nr Elizabethtown | Good-Fair | Good-Fair |
| B-5 | Ellis Creek | Bladen | NC 53 | Good-Fair | Good-Fair |
| B-6 | Harrison Creek | Bladen | SR 1318 | Fair | Good-Fair |
| B-7 | Turnbull Creek | Bladen | SR 1511 | no sample | Good |
| B-8 | Cape Fear River | Bladen | SR 1730 nr Kelly | Fair | Good-Fair |

| ***FISH*** | | | | ***Bioclassification*** | |
|---|---|---|---|---|---|
| **Site #** | **Stream** | **County** | **Location** | **1994** | **1998** |
| F-1 | Harrison Creek | Bladen | SR 1318 | Good-Fair | Good-Fair |
| F-2 | Browns Creek | Bladen | NC 87 | Poor | Poor |
| F-3 | Turnbull Creek | Bladen | NC 242 | no sample | Fair |
| F-4 | Whites Creek | Bladen | SR 1704 | no sample | Good |

| ***FISH TISSSUE*** | | | | ***No. Samples Exceeding Criteria*** | | |
|---|---|---|---|---|---|---|
| **Station** | **Description** | **Year Sampled** | **Total Samples** | **Metals** | **Organics** | **Comments** |
| FT-1 | Cape Fear River at Elizabethtown | 1994 | 21 | 2 | 0 | EPA mercury limit exceeded in 1 bass/1 bowfin samples |
| | | 1995 | 8 | 3 | 0 | EPA mercury limit exceeded in 3 bowfin samples; FDA/NC mercury limit exceeded in 1 bowfin sample |
| | | 1998 | 19 | 1 | 0 | EPA mercury limit exceeded in 1 bass sample |
| FT-2 | Cape Fear at Lock and Dam 3 | 1998 | 10 | 0 | 0 | No samples exceeded criteria |
| FT-3 | Cape Fear at Lock and Dam 2 | 1998 | 10 | 01 | 0 | EPA mercury limit exceeded in 1 catfish sample |

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.

## 16.2 Impaired Waters

Portions of Turnbull Creek and Harrisons Creek were identified as impaired in the 1996 Cape Fear River Basinwide Water Quality Plan. Browns Creek is 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 16.3 and waters with other issues, recommendations or projects are discussed in Part 16.4.

**Turnbull Creek**

*Current Status*

Turnbull Creek (27.8 miles from source to Cape Fear River) was partially supporting (PS) in the 1996 plan. Turnbull Creek is a swamp water with a naturally low pH. This stream is currently fully supporting (FS) according to recent DWQ monitoring and no longer on the state's 303(d) list. Streams in this watershed are subject to erosion and instream habitat degradation. Agricultural BMPs are encouraged to reduce potential for adverse impacts.

**Harrisons Creek**

*Current Status*

Harrisons Creek (27.4 miles from source to Cape Fear River) was partially supporting (PS) in the 1996 plan. Harrisons Creek is a swamp water with a naturally low pH. This stream is currently fully supporting (FS) according to recent DWQ monitoring and no longer on the state's 303(d) list. Streams in this watershed are subject to erosion and instream habitat degradation. Agricultural BMPs are encouraged to reduce potential for adverse impacts.

**Browns Creek**

*Current Status*

Browns Creek (8.5 miles from source to Cape Fear River) is not supporting (NS) according to recent DWQ monitoring because of an impaired biological community. Urban nonpoint sources and sanitary sewer overflows from the City of Elizabethtown are possible sources of impairment. This stream is on the state's year 2000 303(d) list (not yet EPA approved).

*2000 Recommendations*

Local initiatives are needed to improve water quality in Browns Creek. DWQ encourages development of a land use plan that protects water quality in this stream.

Sanitary sewer overflows have not been a continuing problem for the City of Elizabethtown. Three overflows coincided with DWQ monitoring and may have affected the rating. Continued monitoring is recommended to determine if Browns Creek is recovering from the sewer overflows and to determine the nature of nonpoint sources. The 303(d) list approach for these two streams will be to resample for biological and chemical data to attempt to determine potential problem parameters.

## 16.3 303(d) Listed Waters

Browns Creek (8.5 stream miles) is the only impaired stream in this subbasin and is on the state's year 2000 303(d) list (not yet EPA approved). Browns Creek is discussed above. For information on 303(d) listing requirements and approaches, refer to Appendix IV.

## 16.4 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.

Approximately 1% of the waters in this subbasin are impaired by nonpoint source pollution (mostly urban). 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.

**The Lower Cape Fear River Program**

The Lower Cape Fear River Program maintains five sampling stations in this subbasin that are used along with DWQ ambient data to make use support determinations in this subbasin. Refer to Section C, Part 1.4.5 for more information on the program and the UNCW Center for Marine Sciences.

**The Middle Cape Fear River Basin Association (MCFRBA)**

The Middle Cape Fear River Basin Association (MCFRBA) started sampling at seven stations in this subbasin (30 stations total) in July 1998. This data will be used to give a higher resolution picture of water quality conditions in the Cape Fear River mainstem and Rockfish Creek. The data will also 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.

**Cape Fear River from Lock and Dam #3 to Lock and Dam #1**

A field-calibrated QUAL2E model developed during the first basinwide planning cycle indicated that assimilative capacity for oxygen-consuming wastes had been reached in the Cape Fear River from Erwin to Lock and Dam #3. It was recommended that new and expanding discharges conduct engineering alternatives and economic analyses. If no alternatives were feasible, then limits would be required as follows:

New and expanding municipal/domestic discharges <1 MGD: $BOD_5$ = 12 mg/l, $NH_3$-N = 2 mg/l
New and expanding municipal/domestic discharges ≥1 MGD: $BOD_5$ = 5 mg/l, $NH_3$-N = 2mg/l
New industrial discharges: $BOD_5$ = 5 mg/l, $NH_3$-N = 2 mg/l

Expanding industrial discharges: best available technology or $BOD_5$ = 5 mg/l, $NH_3$-N = 2 mg/l

*2000 Recommendations*

Limits recommended in the 1996 plan were made to protect dissolved oxygen (DO) levels in the river. These limits will continue to be recommended with the exception that new and expanding municipal/domestic discharges ≥1 MGD will be given limits of $BOD_5$ = 5 mg/l and $NH_3$-N = 1mg/l. This is now considered BAT for this discharger category. Recommended limits for other facilities are as follows:

New and expanding municipal/domestic discharges <1 MGD: $BOD_5$ = 12 mg/l, $NH_3$-N = 2 mg/l
New and expanding municipal/domestic discharges ≥1 MGD: $BOD_5$ = 5 mg/l, $NH_3$-N = 1mg/l
New industrial discharges ≥1 MGD: $BOD_5$ = 5 mg/l, $NH_3$-N = 1 mg/l
New industrial discharges <1 MGD: $BOD_5$ = 5 mg/l, $NH_3$-N = 2 mg/l
Expanding industrial discharges: site specific best available technology or
$BOD_5$ = 5 mg/l, $NH_3$-N = 2 mg/l

The Middle Cape Fear River Basin Association (MCFRBA) and DWQ continue to collect data in this segment of the Cape Fear River. There are indications that algal productivity influences dissolved oxygen (DO) dynamics in this segment of the Cape Fear River.

DWQ will be reviewing the exisiting QUAL2E model for the Cape Fear River mainstem (from Buckhorn Dam to Lock and Dam #1) to determine if improvements in the calibration can be made.

**Suggs Mill Pond Land Acquisition**

The WRC acquired 9,000 acres of land in the Bladen Lakes Management Region. Refer to Section C, Chapter 1, Part 1.5.4 for more information on this project.