

Chapter 17 -

Cape Fear River Subbasin 03-06-17

Includes Town Creek, Smith Creek and the Brunswick River

17.1 Water Quality Overview

Subbasin 03-06-17 at a Glance

Land and Water Area (sq. mi.)

Total area:	547
Land area:	498
Water area:	49

Population Statistics

1990 Est. Pop.:	56,467 people
Pop. Density:	113 persons/mi ²

Land Cover (%)

Forest/Wetland:	74.7
Surface Water:	9.3
Urban:	4.1
Cultivated Crop:	7.6
Pasture/ Managed Herbaceous:	4.3

Use Support Ratings

Freshwater Streams:

Fully Supporting:	251.5 mi.
Partially Supporting:	3.8 mi.
Not Supporting:	0.0 mi.
Not Rated:	65.5 mi.

Estuarine Waters:

Fully Supporting:	16,314 ac.
Partially Supporting:	7,211 ac.
Not Supporting:	0.0 ac.
Not Rated:	925 ac.

Lakes:

Greenfield Lake - Not Rated
Boiling Springs Lake - Fully Supporting

This subbasin is located in the outer Coastal Plain and in estuarine regions of the basin. The subbasin contains the City of Wilmington and the Town of Southport. Most tributaries in this subbasin are backwater and slow moving or tidal. A map of the subbasin, including water quality sampling locations, is presented in Figure B-17.

Biological ratings for these sample locations are presented in Table B-17. The current sampling resulted in impaired ratings for one stream and 7,211 acres of impaired estuarine waters in this subbasin. A summary of use support ratings for estuarine waters is presented in Table A-32. 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.

Forest and agriculture are the primary land uses; however, Wilmington and surrounding suburban areas also contribute to nonpoint source pollution. There are 49 permitted dischargers in the subbasin; half of which discharge directly into the Cape Fear River. Ten of these are major dischargers (>1 MGD), with the largest dischargers being International Paper, Wilmington North Side WWTP and Wilmington South Side WWTP.

Benthic macroinvertebrate data indicated improved water quality at sites most affected by nonpoint sources during this low flow year. Excellent (using draft criteria) conditions were recorded from the Cape Fear River above International Paper. The Cape Fear River below the Federal Paper discharge showed no change in water quality since the last sampling. A Good-Fair rating was assigned to Livingston Creek, up from Fair in 1993. In the estuarine area, water quality has remained stable at Cape Fear River at Snows Marsh with only Moderate impacts.

Cape Fear River 030617

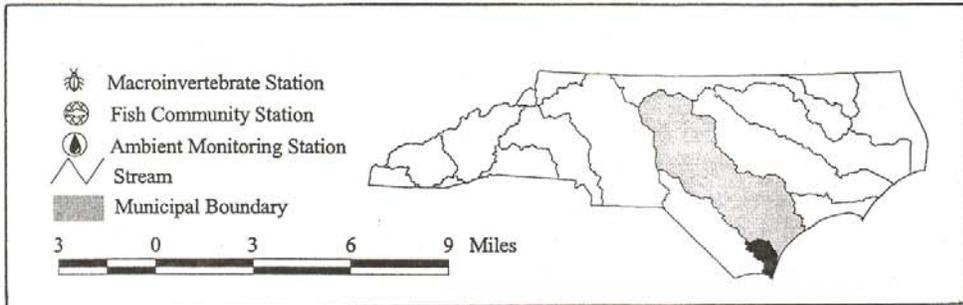
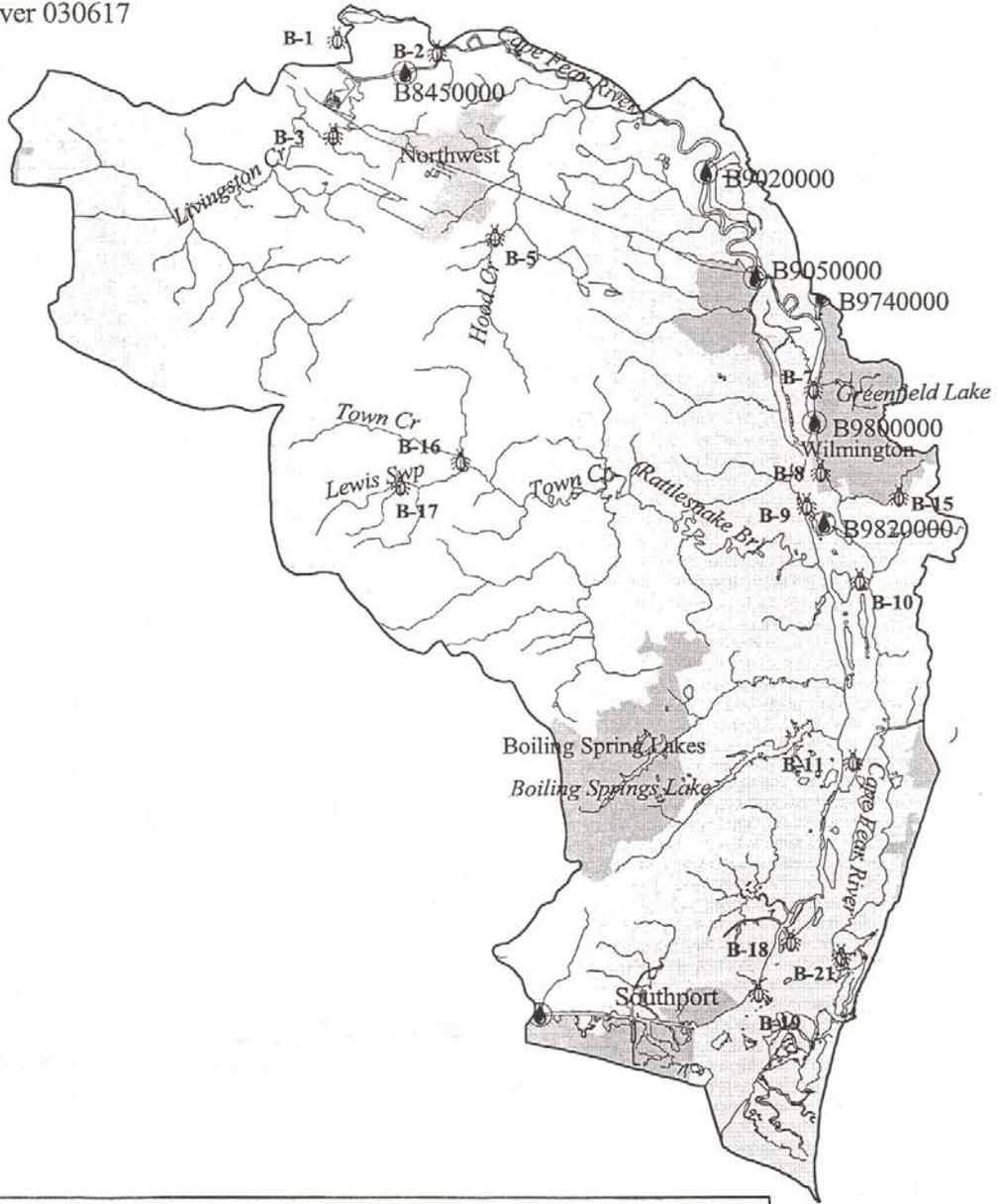


Figure B-17 Sampling Locations within Subbasin 03-06-17

Table B-17 Biological Assessment Sites in Cape Fear River Subbasin 03-06-17

<i>BENTHOS</i>				<i>Bioclassification</i>	
Site #	Stream	County	Location	1993	1998
B-1	Cape Fear River	Columbus	ab Federal Paper	Good-Fair	Excellent
B-2	Cape Fear River	Columbus	be Federal Paper	Fair	Fair
B-3	Livingston Creek	Columbus	US 74	Fair	Good-Fair
B-5	Hood Creek	Brunswick	US 74/76	no sample	Good
B-9	Barnards Creek	Brunswick	US 421	no sample	Fair-Good
B-10	Town Creek	Brunswick	ab SR 1413	no sample	Good-Fair
B-11	Lewis Swamp	Brunswick	SR 1410	no sample	Good-Excellent
B-18	Cape Fear River	Brunswick	Snows Marsh	Moderate	Moderate

<i>FISH TISSUE</i>				<i>No. Samples Exceeding Criteria</i>		
Station	Description	Year Sampled	Total Samples	Metals	Organics	Comments
FT-1	Cape Fear River at Riegelwood	1998	23	8	0	EPA mercury limit exceeded in 4 bowfin and 4 bass samples; FDA/NC mercury limit exceeded in 1 bass sample
FT-2	Livingston Creek near Acme	1998	20	11	0	EPA mercury limit exceeded in 11 samples of bass, bowfin, pickerel; FDA/NC mercury limit exceeded in 3 samples of bass and bowfin
FT-3	Cape Fear River below Riegelwood	1994	15	3	0	EPA and FDA/NC mercury limit exceeded in 3 bowfin samples

The highest incidence of elevated mercury in fish tissue was in Livingston Creek. Over half of the fish tested, including bass, bowfin and pickerel, had levels of mercury above EPA limits. Samples from the Cape Fear River near Riegelwood found lower, but still significant levels of mercury in bass and bowfin tissues.

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.

17.2 Impaired Waters

Portions of Livingston Creek, the Cape Fear River and estuarine areas were identified as impaired in the 1996 Cape Fear River Basinwide Water Quality Plan. Portions of the Cape Fear River and estuarine areas 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 17.3 and waters with other issues, recommendations or projects are discussed in Part 17.4.

Livingston Creek

Current Status

Livingston Creek (22.2 miles from source to Cape Fear River) was partially supporting (PS) in the upper segment and not supporting (NS) in the lower segment in the 1996 Cape Fear River Basinwide Plan. This stream is currently fully supporting (FS). The bioclassification improved from Fair to Good-Fair for 1993 to 1998. Livingston Creek is no longer on the 303(d) list. DWQ will continue to monitor this stream to determine the extent of impacts from both point and nonpoint sources.

Cape Fear River (near Neils Eddy Landing, International Paper)

Current Status

The Cape Fear River (near Neils Eddy Landing) was partially supporting (PS) in the 1996 plan. The Cape Fear River (3.8 miles near Neils Eddy Landing) is currently partially supporting (PS) according to recent DWQ monitoring because of an impaired biological community. The International Paper Board discharge and nonpoint source pollution are possible causes of impairment. This segment is on the state's year 2000 303(d) list (not yet EPA approved).

2000 Recommendations

The 303(d) list approach will be to resample for biological and chemical data to attempt to determine potential problem parameters. The International Paper discharge will also be monitored to determine the extent of impacts to this segment and other segments of the Cape Fear River in this subbasin. See Part 17.4 below for recommendations for the Cape Fear River mainstem that include this impaired section and the rest of the mainstem in this subbasin.

The Cape Fear River Estuary

Current Status

The Cape Fear River Estuary (5000 acres) was partially supporting (PS) in the 1996 plan because of low levels of dissolved oxygen (DO). This same area is currently partially supporting (PS) and is on the state's year 2000 303(d) list (not yet EPA approved). The cumulative impacts from WWTP discharges in the subbasin as well as nonpoint source pollution are suspected to be significant contributors to the impairment. Swamp water drainage may also be a source of low DO waters feeding into the estuary. Possible sources of nonpoint source pollution include marinas, canal systems and septic systems.

2000 Recommendations

See Part 17.4 below for recommendations for the Cape Fear River mainstem that include this impaired section and the rest of the mainstem in this subbasin.

Other Estuarine Waters in Subbasin 03-06-17

Current Status

There are 2,211 acres of impaired estuarine waters (Southport, Buzzard Bay, The Basin and the Cape Fear River) in the subbasin according to recent DWQ and DEH Shellfish Sanitation Section monitoring (not including 5,000 acres of Cape Fear River Estuary discussed above). These waters have been closed to shellfishing by the Division of Marine Fisheries (DMF) based on recommendations by Division of Environmental Health Shellfish Sanitation Section. DEH regulations specify closure of growing areas when fecal coliform bacteria levels exceed 14 colonies per 100 ml of water. These waters are on the state's year 2000 303(d) list (not yet EPA approved). Recommendations for improving water quality in these waters are discussed below. Refer to Table A-32 for overall use support ratings for estuarine areas and Figure A-16 for a map of DEH shellfish growing areas.

2000 Recommendations

In the Cape Fear River basin, there are a variety of activities that contribute to the degradation and impairment of shellfish waters. These include, but are not limited to, urban stormwater runoff, failing septic tanks, channelized waters, draining wetlands and marinas. Management of various land use activities is needed to decrease fecal coliform bacteria levels in shellfish growing areas, thereby, decreasing the acreage closed to harvesting.

Refer to Section A, Chapter 4, Part 4.14 for further recommendations regarding shellfish growing areas.

17.3 303(d) Listed Waters

There is one stream segment (3.8 stream miles) one lake and 7,211 acres of estuarine waters in the subbasin that are impaired and on the state's year 2000 303(d) list (not yet EPA approved). The Cape Fear River and impaired estuarine areas are discussed above. For information on 303(d) listing requirements and approaches, refer to Appendix IV.

17.4 Other Issues, Recommendations and Projects

Approximately 45% 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.

The Lower Cape Fear River Program

The Lower Cape Fear River Program maintains several sampling stations in this subbasin that are used along with DWQ ambient data to make use support determinations in this subbasin.

This data is also being used to support modeling in the Cape Fear River Estuary. Refer to Section C, Part 1.4.5 for more information on the program and the UNCW Center for Marine Sciences.

Mercury Advisories

DWQ sampling in 1994 and 1998 noted mercury in fish tissue at levels greater than EPA limits and FDA/NC limits. Mercury in fish tissue is not exclusive to the Cape Fear River basin. In recent years, elevated levels of mercury in some fish species have been noted in other coastal areas. This issue is discussed further in Section A, Chapter 4, Part 4.8.4.

1999 Hurricanes

In September and October 1999, three hurricanes made landfall near the mouth of the Cape Fear River. Although streams throughout the basin were impacted, the streams in the lower Cape Fear River subbasins were severely impacted. The extent of water quality problems and recovery of ecosystems in this subbasin will not be known for some time. See Section A, Chapter 4, Part 4.11 for information on Hurricane Fran in 1996.

Greenfield Lake

Greenfield Lake is owned by the City of Wilmington and was built before 1750. Originally a cypress swamp, the lake was impounded to provide water for milling and irrigation for the Greenfields Plantation that surrounded it. The city encompasses the lake and its watershed. Greenfield Lake is currently swampy and cypress-filled. The City of Wilmington no longer dredges the lake, but is treating the aquatic macrophytes with chemicals and grass carp. In the summer of 1998, there was a fish kill in Greenfield Lake following a rainfall event. Significant beds of submerged filamentous algae and floating mats of duckweed (*Lemna* sp.) and watermeal (*Wolffia* sp.) were observed at nuisance levels in the lake in 1998. The filamentous algae in the lake also appeared to be worse in 1998, as compared with previous years, while the clarity of the water in the lake appeared to have improved in the past few years. Greenfield Lake is currently not rated (NR) but is on the state's year 2000 303(d) list (not yet EPA approved) because of aquatic weeds and nutrient enrichment.

Cape Fear River from Lock and Dam #1 to the lower Cape Fear River Estuary

1996 Recommendations

Because of documented water quality problems related to low dissolved oxygen (DO) in the Cape Fear River below Lock and Dam #1, all new and expanding discharges will be required to complete an engineering alternatives and economic analysis. If no other alternatives are found to be feasible, then a detailed evaluation of the potential impact of the discharge will be required and recommended summer permitted limits will be as follows:

New and expanding municipal/domestic discharges <1 MGD: BOD₅ = 12 mg/l, NH₃-N = 2 mg/l
New and expanding municipal/domestic discharges ≥1 MGD: BOD₅ = 5 mg/l, NH₃-N = 2mg/l
New industrial discharges: BOD₅ = 5 mg/l, NH₃-N = 2 mg/l
Expanding industrial discharges: best available technology or BOD₅ = 5 mg/l, NH₃-N = 2 mg/l

It was also recommended that Arcadian and Wilmington Northside WWTP change from Whole Effluent Toxicity test procedure to 24-hour acute toxicity test at 90% effluent concentration. These discharges are now using this toxicity test.

2000 Recommendations

The impaired segments are discussed above in Part 17.2. The 303(d) list approach will be to develop a TMDL for this segment of the Cape Fear River because of low dissolved oxygen (DO) levels. A TMDL is currently under development in cooperation with the Lower Cape Fear River Program (Section C, Chapter 1, Part 1.4.5) and the interested stakeholders. Because of the nature of the river/estuary system in this portion of the Cape Fear River basin, addressing water quality issues must not be limited to problems detected in impaired segments alone. Until an EPA approved TMDL to address low DO is in place to guide wasteload allocation decisions in this portion of the Cape Fear River and Cape Fear River Estuary, recommended summer limits for oxygen consuming wastes for new and expanding discharges will be as follows:

New and expanding municipal/domestic discharges <1 MGD: BOD₅ = 5 mg/l, NH₃-N = 2 mg/l
New and expanding municipal/domestic discharges ≥1 MGD: BOD₅ = 5 mg/l, NH₃-N = 1mg/l
New industrial discharges: BOD₅ = 5 mg/l, NH₃-N = 2 mg/l
Expanding industrial discharges: site specific best available technology or
BOD₅ = 5 mg/l, NH₃-N = 2 mg/l

Because this segment of the Cape Fear River and Cape Fear River Estuary is impaired and on the state's year 2000 303(d) list (not yet EPA approved), issuance of permits for new and expanding discharges that would further increase the load of oxygen-consuming waste into these waters will be carefully considered on a case by case basis.

For information on model development in this segment of the Cape Fear River estuary, see Section A, Chapter 4, Part 4.6.

Coastal Urban and Recreation BMP Demonstration Project

This project will evaluate and implement BMPs to protect coastal waters impaired by development. For more information on this project, refer to Section C, Chapter 1, Part 1.5.4.