

Chapter 17

Cape Fear River Subbasin 03-06-17

Including: Cape Fear River, Cape Fear River Estuary, Livingston Creek and Town Creek

17.1 Subbasin Overview

Subbasin 03-06-17 at a Glance

Land and Water Area

Total area:	547 mi ²
Land area:	498 mi ²
Water area:	49 mi ²

Population Statistics

2000 Est. Pop.:	78,348 people
Pop. Density:	143 persons/mi ²

Land Cover (percent)

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

Counties

Brunswick, Columbus, New Hanover and Pender

Municipalities

Bellville, Boiling Springs, Bolton, Carolina Beach, Caswell Beach, Kure Beach, Leland, Long Beach, Navassa, Northwest, Wilmington and Yaupon Beach

Subbasin 03-06-17 is in the coastal plain with slow-moving tannin stained tributary streams and the large Cape Fear River estuary and tidal creeks. Most of the watershed is forested with urban areas growing on the west side of the Cape Fear River in Brunswick County. Population is expected to grow by 140,000 people in counties with portions or all of their areas in this subbasin by 2020.

There are 41 individual NPDES wastewater discharge permits in this subbasin with a permitted flow of 99.9 MGD (Figure 20). The largest are International Paper (50 MGD), Progress Energy (3.5 MGD), New Hanover County WWTP (4 MGD), Northside WWTP (16 MGD) and Southside WWTP (12 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 17.3 for Impaired waters and in Section 17.4 for other waters.

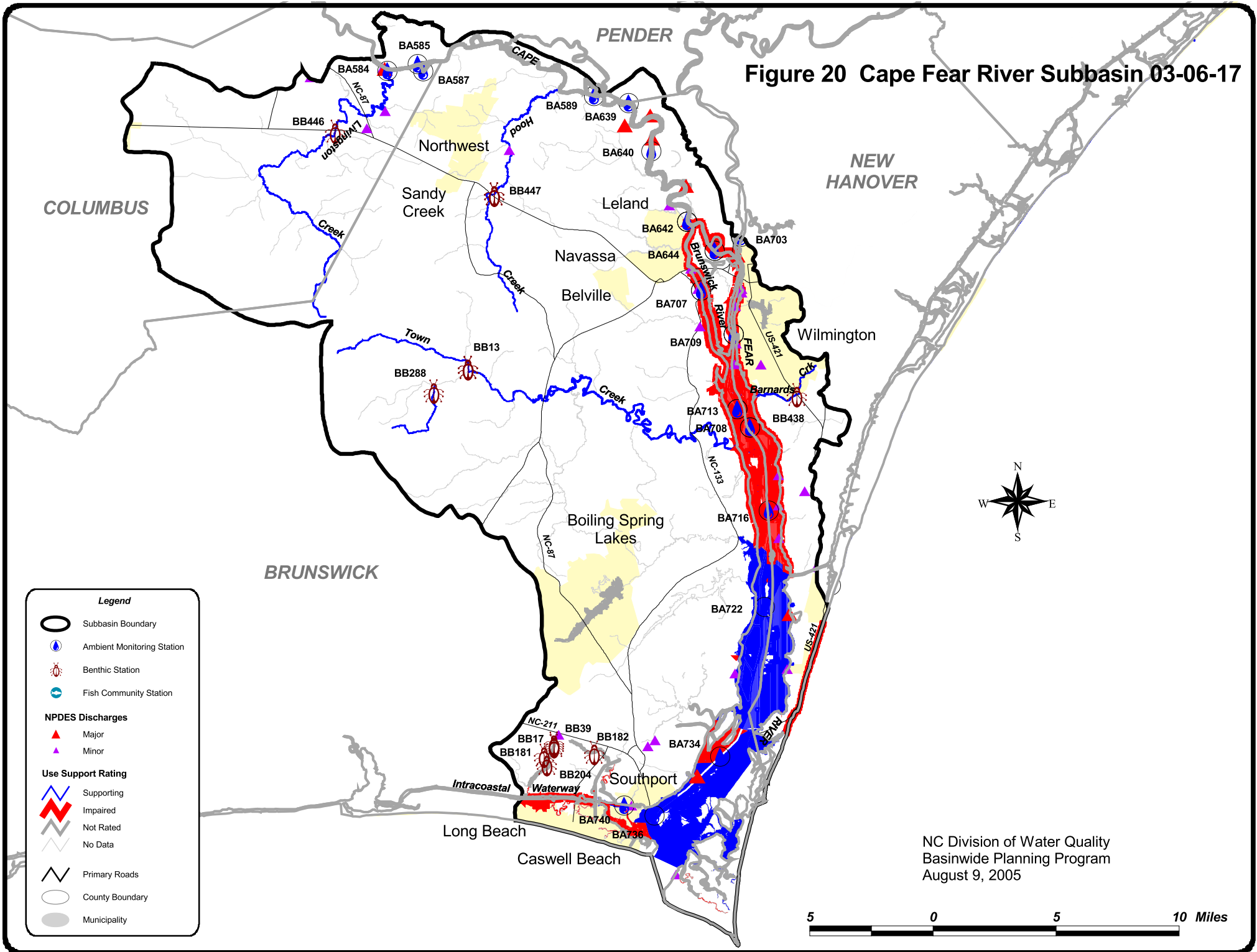
There are seven registered swine operations in this subbasin.

There were eight benthic community samples (Figure 20 and Table 20) collected during this assessment period. Data were also collected from 17 ambient monitoring stations including nine LCFRP (Appendix V) stations, two DWQ ambient stations and four shared stations. Two reservoirs were also monitored. Refer to the 2003 *Cape*

Fear River Basinwide Assessment Report at <http://www.esb.enr.state.nc.us/bar.html>.

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 20 Cape Fear River Subbasin 03-06-17



Legend

- Subbasin Boundary
- Ambient Monitoring Station
- Benthic Station
- Fish Community Station
- NPDES Discharges**
- Major
- Minor
- Use Support Rating**
- Supporting
- Impaired
- Not Rated
- No Data
- Primary Roads
- County Boundary
- Municipality



NC Division of Water Quality
 Basinwide Planning Program
 August 9, 2005

Table 20 CAPE FEAR Subbasin 03-06-17

AU Number	Classification	Length/Area		Aquatic Life Assessment				Recreation Assessment			Shellfish Harvesting				
				AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result	SH Rating	GA Status	Stressors	Sources	
Description															
Allen Creek (Boil)															
18-85-1-(1)	B Sw	331.6	FW Acres	NR	BL37	NCE	Low pH	100	ND						
From source to Boiling Springs Lake Dam															
Atlantic Ocean															
99-(2)	SB	5.6	Coast Miles	ND					NR*	S-14	NCE	Enterrococcus	Stormwater Outfal		
The waters of the Atlantic Ocean contiguous with that portion of the Cape Fear River Basin that extends from the eastern edge of the Lumber River Basin to the eastern end of Bald Head Island															
99-(3)b	SB	4.7	Coast Miles	ND					I	S-18	NCE	Enterrococcus	Stormwater Outfal		
The waters of the Atlantic Ocean contiguous to that portion of the Cape Fear River Basin from S. Fort Fisher Blvd. Along Kure Beach to the subbasin 17/24 boundary.															
Bald Head Creek															
18-88-8-4	SA HQW	79.9	S acres	ND					ND			I	PRO	Fecal Coliform Bacteria	Unknown
From source to Cape Fear River															
Barnards Creek															
18-80	C Sw	3.9	FW Miles	S					ND						
From source to Cape Fear River															
Bay Creek															
18-88-8-3-1	SA HQW	80.6	S acres	ND					ND			S	APP		
From source to Cape Creek															

Table 20 CAPE FEAR Subbasin 03-06-17

AU Number	Classification	Length/Area		Aquatic Life Assessment				Recreation Assessment			Shellfish Harvesting			
				AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result	SH Rating	GA Status	Stressors	Sources
Description														
Beaverdam Cree														
18-88-9-1-(0.5)	SC Sw HQ	1.0	S acres	NR						ND				
From source to mouth of Polly Gully Creek					BB17	NR	1999							
					BB204	NR	1999							
					BB39	NR	1999							
18-88-9-1-(1.5)	SA HQW	11.3	S acres	ND						ND		I	PRO	Fecal Coliform Bacteria Unknown
From mouth of Polly Gully Creek to Intracoastal Waterway														
Bowensville Cree														
18-88-6	SA HQW	5.2	S acres	ND						ND		S	APP	
From Muddy Slough to Cape Fear River														
Brunswick River														
18-77	SC	743.7	S acres	I	BA707	CE	Low DO	14.3		S	BA707	NCE		Low pH Unknown
From source to Cape Fear River					BA707	CE	Low pH	19.6						Low Dissolved Oxygen Unknown
Burriss Cree														
18-88-8-2-3	SA HQW	12.7	S acres	ND						ND		S	APP	
From Muddy Slough to Buzzard Bay														
Buzzard Bay														
18-88-8-2	SA HQW	578.1	S acres	ND						ND		S	APP	
Entire Basin														
Cape Cree														
18-88-8-3	SA HQW	198.4	S acres	ND						ND		S	APP	
From source to Cape Fear River														

Table 20 CAPE FEAR Subbasin 03-06-17

AU Number	Classification	Length/Area		Aquatic Life Assessment				Recreation Assessment			Shellfish Harvesting			
				AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result	SH Rating	GA Status	Stressors	Sources
Description														
CAPE FEAR RI														
18-(63)a	C Sw	3.8	FW Miles	NR	BA585	NCE			S	BA585	NCE		Chlorophyll a	Unknown
					BA587	NCE	Chlor a	33.3		BA587	NCE			
From raw water supply intake at Federal Paper Board corporation (Riegelwood) to Bryant Mill Creek														
18-(63)b	C Sw	18.5	FW Miles	NR	BA589	NCE	Low DO	8.8	S	BA589	NCE		Low Dissolved Oxygen	Unknown
					BA639	NCE	Low DO	13.8		BA639	NCE			
					BA640	NCE	Low DO	11		BA640	NCE			
From Bryant Mill Creek to upstream mouth of Toomers Creek														
18-(71)a	SC	5,616.7	S acres	I	BA642	CE	Low DO	42.9	S	BA642	NCE		Turbidity	Unknown
					BA642	CE	Low pH	38.5		BA644	NCE		Low pH	Unknown
					BA642	NCE	Turbidity	8.8		BA708	NCE		Low Dissolved Oxygen	Unknown
					BA644	CE	Low DO	37.1		BA709	NCE			
					BA644	CE	Low pH	37.1		BA713	NCE			
					BA708	CE	Low DO	16.4		BA716	NCE			
					BA708	CE	Low pH	10.4						
					BA709	CE	Low DO	29.5						
					BA709	CE	Low pH	20.5						
					BA713	CE	Low DO	23.2						
					BA713	CE	Low pH	19.6						
					BA716	CE	Low DO	10.4						
From upstream mouth of Toomers Cr. to a line across the river Between Lilliput Creek and Snows Cut														
18-(71)b	SC	7,856.7	S acres	S	BA722	NCE			S	BA722	NCE			
										S-44	NCE			
From a line across the river between Lilliput Creek and Snows Cut to a line across the river from Snows Point to Federal Marsh														

Table 20 CAPE FEAR Subbasin 03-06-17

AU Number	Classification	Length/Area		Aquatic Life Assessment				Recreation Assessment			Shellfish Harvesting		Stressors	Sources
				AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result	SH Rating	GA Status		
18-(87.5)a	SA HQW	769.2	S acres	S	BA734	NCE		S	S-43 BA734	NCE NCE	I	PRO	Fecal Coliform Bacteria	Unknown
Prohibited area north of Southport Restricted Area and west of ICWW in Cape Fear River														
18-(87.5)b	SA HQW	4,784.2	S acres	S	BA734	NCE		S	BA734	NCE	S	APP		
Approved area east of ICWW in Cape Fear River														
18-(87.5)c	SA HQW	322.6	S acres	ND				ND			I	PRO	Fecal Coliform Bacteria	Unknown
Prohibited area south of Southport Restricted Area														
18-(87.5)d	SA HQW	17.7	S acres	ND				ND			I	PRO	Fecal Coliform Bacteria	Impervious Surface
Prohibited area east of ICWW in Cape Fear River														
Cedar Creek														
18-88-8-2-4	SA HQW	105.1	S acres	ND				ND			S	APP		
From Cape Fear River to Buzzard Bay														
Coward Creek														
18-88-9-2-5-1	SA HQW	5.9	S acres	ND				ND			I	PRO	Fecal Coliform Bacteria	Unknown
From source to Molasses Creek														
Deep Creek														
18-88-8-3-1-1	SA HQW	31.0	S acres	ND				ND			S	APP		
From source to Bay Creek														
Denis Creek														
18-88-9-2-3	SA HQW	34.2	S acres	ND				ND			I	PRO	Fecal Coliform Bacteria	Unknown
From source to Intracoastal Waterway														

Table 20 CAPE FEAR Subbasin 03-06-17

AU Number	Classification	Length/Area		Aquatic Life Assessment				Recreation Assessment			Shellfish Harvesting			
				AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result	SH Rating	GA Status	Stressors	Sources
Dutchman Creek														
18-88-9-3-(2.5)	SA HQW	75.8	S acres	ND				ND			I	PRO	Fecal Coliform Bacteria	Unknown
From CP&L Discharge Canal to Intracoastal Waterway														
Dutchman Creek														
18-88-9-3-3	SA HQW	78.3	S acres	ND				ND			I	PRO	Fecal Coliform Bacteria	Unknown
From Intracoastal waterway to Dutchman Creek														
Dutchman Creek														
18-88-9-3-(4)	SA HQW	37.9	S acres	ND				ND			I	PRO	Fecal Coliform Bacteria	Unknown
That section of Dutchman Creek within a line beginning at a point of marsh at the junction of Dutchman Creek and Elizabeth River and running due north to a point of marsh														
Elizabeth River														
18-88-9-2-(1)	SA HQW	83.5	S acres	ND				ND			I	PRO	Fecal Coliform Bacteria	Unknown
That section of Elizabeth River exclusive of the Elizabeth River Shellfishing Area														
Elizabeth River S														
18-88-9-2-(2)	SA HQW	205.6	S acres	ND				ND			I	PRO	Fecal Coliform Bacteria	Unknown
That section of Elizabeth River within a line beginning at the mouth of Molasses Creek and running northeast to a point of marsh at the junction of Elizabeth River and Du														
Fishing Creek														
18-88-8-4-1	SA HQW	7.9	S acres	ND				ND			I	PRO	Fecal Coliform Bacteria	Unknown
From source to Bald Head Creek														

Table 20 CAPE FEAR Subbasin 03-06-17

AU Number	Classification	Length/Area		Aquatic Life Assessment				Recreation Assessment			Shellfish Harvesting				
				AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result	SH Rating	GA Status	Stressors	Sources	
Description															
Greenfield Lake															
18-76-1	C Sw	75.3	FW Acres	NR	BL36	NCE			ND				Chlorophyll a	MS4 NPDES	
Entire Lake												Fecal Coliform Bacteria	MS4 NPDES		
Hood Creek															
18-66	C Sw	13.8	FW Miles	S					ND						
From source to Cape Fear River					BB447	M	2003								
					BB447	GF	1999								
					BB447	GF	1998								
Intracoastal Wat															
18-88-9a	SA HQW	222.6	S acres	ND					S	S-41	NCE	I	PRO	Fecal Coliform Bacteria	Unknown
From Channel Marker F1, R. "22" to Dutchmans Creek outlet channel															
18-88-9b	SA HQW	96.6	S acres	I	BA740	CE	Low DO	11.1	I	S-42	CE	I	PRO	Fecal Coliform Bacteria	Unknown
From Dutchmans Creek outlet channel to mouth of Cottage Creek												Enterrococcus	Unknown		
												Low Dissolved Oxygen	Unknown		
Jump and Run C															
18-88-9-3-2	SC Sw	1.0	S acres	NR					ND						
From source to Dutchman Creek					BB182	NR	1999								
Lewis Branch															
18-81-2-2	C Sw	3.8	FW Miles	S					ND						
From source to Lewis Swamp					BB288	N	2003								

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AU Number	Classification	Length/Area		Aquatic Life Assessment				Recreation Assessment			Shellfish Harvesting			
				AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result	SH Rating	GA Status	Stressors	Sources
Description														
Livingston Creek														
18-64	C Sw	21.8	FW Miles	S	BA584	NCE	Low DO	S	BA584	NCE		Low Dissolved Oxygen	Unknown	
From source to Cape Fear River					BB446	GF	2003							
Middle Creek														
18-88-5	SA HQW	10.8	S acres	ND				ND			S	APP		
From Muddy Slough to Cape Fear River														
Molasses Creek														
18-88-9-2-5	SA HQW	1.0	S acres	ND				ND			I	PRO	Fecal Coliform Bacteria	Unknown
From source to Elizabeth River														
Muddy Slough														
18-88-7	SA HQW	1.0	S acres	ND				ND			S	APP		
Entire Slough														
Piney point Cree														
18-88-9-2-4	SA HQW	11.5	S acres	ND				ND			I	PRO	Fecal Coliform Bacteria	Unknown
From source to Denis Creek														
Shellbed Creek														
18-88-4	SA HQW	1.0	S acres	ND				ND			S	APP		
From Muddy Slough to Cape Fear River														
Southport Restri														
18-88-3.5	SC	715.3	S acres	S	BA736	NCE		S	BA736	NCE				
Beginning at a point on the west bank of the Cape Fear River 1000 yards upstream of Price Creek, thence in an easterly direction to the eastern border of the Lower Cape F														

Table 20 CAPE FEAR Subbasin 03-06-17

AU Number	Classification	Length/Area		Aquatic Life Assessment				Recreation Assessment			Shellfish Harvesting		Stressors	Sources
				AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result	SH Rating	GA Status		
Description														
Still Creek														
18-88-8-2-2	SA HQW	32.5	S acres	ND					ND			S	APP	
From Muddy Slough to Buzzard Bay														
The Basin														
18-88-8-1	SA HQW	384.0	S acres	ND					S	S-18a	NCE	S	APP	
Entire Basin														
Town Creek (Rat														
18-81	C Sw	32.1	FW Miles	S					ND					
From source to Cape Fear River														
					BB13	NR	1999							
					BB13	N	1999							
					BB13	NR	1998							

Table 20 CAPE FEAR Subbasin 03-06-17

AU Number	Classification	Length/Area	Aquatic Life Assessment			Recreation Assessment			Shellfish Harvesting			
			AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result	SH Rating	GA Status	Stressors
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			GA Status- DEH SS Growing Area Status				

Aquatic Life Rating Summary

Recreation Rating Summary

Fish Consumption Rating Summary

S	m	14,125.4	S acres
NR	m	2.0	S acres
I	m	6,457.0	S acres
S	m	75.4	FW Miles
NR	m	22.3	FW Miles
NR	m	406.9	FW Acres
ND		2,859.2	S acres
ND		215.4	FW Miles
ND		844.5	FW Acres
ND		22.8	Coast Mile

S	m	21,092.3	S acres
I	m	96.6	S acres
S	m	44.1	FW Miles
NR*	m	5.6	Coast Mile
I	m	4.7	Coast Mile
ND		2,254.6	S acres
ND		269.1	FW Miles
ND		1,251.5	FW Acres
ND		12.5	Coast Mile

I	m	35.9	FW Miles
I	e	23,443.5	S acres
I	e	277.3	FW Miles
I	e	1,251.5	FW Acres
I	e	22.8	Coast Mile

17.2 Use Support Assessment Summary

Use support ratings were assigned for waters in subbasin 03-06-17 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 (1.6 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.

In the aquatic life category, 97.8 stream miles (31.2 percent), 407 freshwater acres (32.5 percent), and 20,592 estuarine acres (87.8 percent) were monitored during this assessment period. There were 6,457 estuarine acres (27.5 percent) identified as Impaired in this category.

In the recreation category, 21,188.9 estuarine acres (90.4 percent), 44.1 freshwater miles (14.1 percent), and 10.3 coastline miles (45.2 percent) were monitored during the assessment period. There were 96.6 estuarine acres (<1 percent) and 4.7 coastline miles (20.6 percent) identified as Impaired in this category.

In the shellfish harvesting category, 8,286.1 estuarine acres (100 percent) were monitored during the assessment period. There were 2,061.6 estuarine acres (24.8 percent) identified as Impaired in this category.

17.3 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.

For Impaired Class SA waters presented below, refer to Chapter 27 for more information and recommendations on shellfish harvesting use support. All waters identified as Impaired in the shellfish harvesting category 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.

17.3.1 Atlantic Ocean [99-(2) and (3)b]

Current Status

These segments of the Atlantic Ocean were not individually identified in the 2000 basin plan, and no specific recommendations were made in the 2000 basin plan.

The Atlantic Ocean [99-(3)b] from the subbasin boundary to South Fort Fisher Boulevard (4.7 coastline miles) is Impaired for recreation because of permanent postings of swimming advisories and the 18 known storm drains that periodically discharge onto the beach in this segment. Segment 99-(2) is Not Rated for recreation because of the presence of storm drains that periodically discharge into these waters, although no criteria were exceeded at sites S-14 and S-15.

17.3.2 Bald Head Creek [AU# 18-88-8-4]

Current Status

Bald Head Creek from source to the Cape Fear River (79.9 acres) is Impaired for shellfish harvesting because this segment is classified by DEH SS (Chapter 27) as prohibited in growing area B-2. Bald Head Creek will be added to the 303(d) list of Impaired waters.

17.3.3 Beaverdam Creek [AU# 18-88-9-1-(0.5) and (1.5)]

Current Status

Beaverdam Creek [18-88-9-1-(0.5)] from source to Polly Gully Creek (1 mile) is Not Rated for aquatic life because benthic community ratings could not be assigned at sites BB17, BB39 and BB204 in 1999. The watershed was studied in 1999 to evaluate the effects of ditching associated with the St. James Plantation development. Large amounts of silt in the creek promoted a shift toward silt tolerant species. The Brunswick WTP discharge provided permanent flow and increased the pH of the stream above what would be natural for streams in this area. A surprisingly pollution intolerant benthic community was present in some areas of the watershed.

Beaverdam Creek [18-88-9-1-(1.5)] from Polly Gully Creek to ICWW (11.3 acres) is Impaired for shellfish harvesting because this segment is classified by DEH SS (Chapter 27) as prohibited in growing area B-1.

2005 Recommendations

DWQ will continue to monitor Beaverdam Creek. It is recommended that further development in this area avoid ditching and use BMPs to prevent further siltation of streams in this watershed. Segment 18-88-9-1-(1.5) will be added to the 303(d) list of Impaired waters.

17.3.4 Cape Fear River Estuary Brunswick River [AU#18-77] Cape Fear River [AU#18-(63)a and b, (71)a and (71)b] Cape Fear River [AU#18-(87.5)a, c and d]

2000 Recommendations

The 2000 basinwide plan recommended that a TMDL be developed for dissolved oxygen and that the TMDL be used to guide wasteload allocations for new and expanding discharges. Refer to Chapter 30 for information on NPDES permitting.

Current Status

The Brunswick River [18-77] from source to the Cape Fear River (743.7 acres) is Impaired for aquatic life because the dissolved oxygen standard was violated in 14.3 percent of samples at site BA707. The dissolved oxygen standard for SC classified waters is 5 mg/l. The pH standard was

also below the standard in 19.6 percent of samples. The low pH may be associated with swamp drainage from the Black and Northeast Cape Fear Rivers. Clairmont Shopping Center (NC0058599) had significant violations of ammonia permit limits during the last two years of the assessment period as well.

The Cape Fear River [18-(63)a] from International Paper intake to Bryant Mill Creek (3.8 miles) is Impaired on a monitored basis in the fish consumption category.

The Cape Fear River [18-(63)b] from Bryant Mill Creek to Toomers Creek (18.5 miles) is Not Rated because dissolved oxygen was below 4 mg/l in 11 and 13.8 of samples collect at sites BA640 and BA639. This segment is classified as C Sw, which acknowledges natural characteristics of swamps such as low pH. Also, BASF (NC0059234) had significant violations of biological oxygen demand permit limits, and Leland Industrial Park WWTP (NC0065676) had significant violations of total suspended solids permit limits during the last two years of the assessment period. BASF is under a special order of consent (SOC# S0314) that expires in August 2005.

The Cape Fear River [18-(71)a] from Toomers Creek to Snows Cut (5,616.7 acres) is Impaired for aquatic life because the dissolved oxygen standard was violated in 42.9, 37.1, 16.4, 29.5, 23.2 and 10.4 percent of samples collected at sites BA642, BA644, BA708, BA709, BA713 and BA716. The dissolved oxygen standard for SC waters is 5 mg/l. The pH standard was also below the standard in 38.5, 37.1, 10.4, 20.5 and 19.6 percent of samples at the same sites. The low pH may be associated with swamp drainage from the Black and Northeast Cape Fear Rivers. The segment of the Cape Fear River upstream of this area has a supplemental classification of Sw that acknowledges that swamp streams may have lower dissolved oxygen and pH.

The Cape Fear River [18-(71)b] from Snows Cut to Federal Marsh (7,856.7 acres) is Supporting aquatic life because no criteria were exceeded at site BA722, although Kure Beach WWTP (NC0025763) had significant violations of total suspended solids permit limits during the last two years of the assessment period.

The Cape Fear River [18-(87.5)a, c and d] from Polly Gully Creek to ICWW (11.3 acres) is Impaired for shellfish harvesting because these segments are classified by DEH SS (Chapter 27) as prohibited in growing areas B-1 and B-4. Segment 18-(87.5)a is Supporting aquatic life and recreation because no criteria were exceeded at sites BA722 and S-43. Segment 18-(87.5)b is Supporting shellfish harvesting and aquatic life because this area is approved and no criteria were exceeded at site BA734.

2005 Recommendations

DWQ is developing a TMDL to address the low dissolved oxygen in these segments. TMDL targets and allocations will be addressed as part of the process. Modeling efforts will include a watershed model of the Northeast Cape Fear River and hydrodynamic and water quality modeling of the estuary. The TMDL is scheduled to be submitted to EPA in late 2005. Until the TMDL is approved by EPA, new and expanding discharges will be carefully considered on a case-by-case basis. The NPDES compliance process will be used to address the significant permit violations noted above. Refer to Chapter 30 for information on NPDES permitting and Chapter 37 for information on the modeling and monitoring efforts.

Segments 18-(71)a and 18-77 will remain on the 303(d) list of Impaired waters replacing the Cape Fear (DEH Area) B10 listing. Segments 18-(63)a and 18-(87.5)a, c and d will be added to the list.

Water Quality Initiatives

In 2005, a NOAA grant was used to implement BMPs at the Carolina Beach State Park Marina. The BMPs included two rain gardens to treat runoff from parking lots and two inlet slip filters to filter sediment, oils and grease from runoff.

17.3.5 Coward Creek [AU# 18-88-9-2-5-1]

Current Status

Coward Creek from source to the Cape Fear River (5.9 acres) is Impaired for shellfish harvesting because this segment is classified by DEH SS (Chapter 27) as prohibited in growing area B-1. Coward Creek will be added to the 303(d) list of Impaired waters.

17.3.6 Dennis Creek [AU# 18-88-9-2-3] and Piney Point Creek [AU# 18-88-9-2-4]

Current Status

Dennis Creek and Piney Point Creek south of the ICWW (45.7 acres) are Impaired for shellfish harvesting because these segments are classified by DEH SS (Chapter 27) as prohibited in growing area B-1. These creeks will be added to the 303(d) list of Impaired waters.

17.3.7 Dutchman Creek [AU# 18-88-9-3-(2.5)], Dutchman Creek Outlet Channel [AU# 18-88-9-3-3], and Dutchman Creek Shellfish Area [AU# 18-88-9-3-(4)]

Current Status

Dutchman Creek, the Outlet Channel and Shellfish Area north of the ICWW (192 acres) are Impaired for shellfish harvesting because these segments are classified by DEH SS (Chapter 27) as prohibited in growing area B-1. These creeks will be added to the 303(d) list of Impaired waters.

17.3.8 Elizabeth River [AU# 18-88-9-2-(1)], Elizabeth River Shellfishing Area [AU# 18-88-9-2-(2)] and Molasses Creek Shellfish Area [AU# 18-88-9-2-5]

Current Status

Elizabeth River, Shellfish Area and Molasses Creek south of the ICWW (290.1 acres) are Impaired for shellfish harvesting because these segments are classified by DEH SS (Chapter 27) as prohibited in growing area B-1. These creeks will be added to the 303(d) list of Impaired waters.

17.3.9 Fishing Creek [AU# 18-88-8-4-1]

Current Status

Fishing Creek from source to Bald Head Creek (7.9 acres) is Impaired for shellfish harvesting because this segment is classified by DEH SS (Chapter 27) as prohibited in growing area B-1. Fishing Creek will be added to the 303(d) list of Impaired waters.

17.3.10 Intracoastal Waterway (ICWW) [AU#18-88-9a and b]

2000 Recommendations

This segment of the ICWW was not individually identified in the 2000 basin plan, but was considered Not Supporting because it was closed to shellfish harvesting. No specific recommendations were made in the 2000 basin plan.

Current Status

The Intracoastal Waterway [18-88-9a] from channel marker F1 to Dutchmans Creek Outlet Channel (226.6 acres) is Impaired for shellfish harvesting because this segment is classified by DEH SS (Chapter 27) as prohibited in growing area B-1. This segment is Supporting recreation because no criteria were exceeded at site S-41.

The Intracoastal Waterway [18-88-9b] from Dutchmans Creek Outlet Channel to Cottage Creek (96.6 acres) is Impaired for aquatic life because the dissolved oxygen standard was violated in 11 percent of samples at site BA740. The dissolved oxygen standard for SC classified waters is 5 mg/l. This segment is also Impaired for shellfish harvesting and recreation because this segment is classified by DEH SS (Chapter 27) as prohibited in growing area B-1 and because of permanent swimming advisories at site S-42.

2005 Recommendations

DWQ and DEH will continue to monitor the ICWW and work with local governments to identify sources of bacteria and oxygen-consuming materials. This segment of the ICWW 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.

17.3.11 Town Creek [AU# 18-81]

Current Status and 2005 Recommendations

Town Creek from source to the Cape Fear River (32.1 miles) is Supporting aquatic life because of a natural benthic community rating at site BB13. A sample in November 1999, after three hurricanes, indicated the benthic community was not severely impacted by the storms. Town Creek is Impaired on a monitored basis in the fish consumption category and will be added to the 303(d) list of Impaired waters.

Water Quality Initiatives

In 2000, the NC Coastal Land Trust received a \$305,000 CWMTF grant to acquire 260 acres conservation easements along Town Creek, with an additional 320 acres of donated conservation easements included in the project. In 2001, the NC Coastal Land Trust received a \$277,000 CWMTF grant to acquire 115 acres conservation easements along Town and Russell Creeks, with an additional 135 acres of donated conservation easements included in the project. In 2002, the NC Coastal Land Trust received a \$2,095,000 CWMTF grant to acquire 638 acres along Town Creek (See Chapter 34 for more information on all projects).

17.4 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.

17.4.1 Greenfield Lake [AU# 18-76-1]

Current Status and 2005 Recommendations

Greenfield Lake (75.3 acres) is Not Rated for aquatic life because data from UNCW indicates elevated fecal coliform bacteria levels and chlorophyll *a* levels. There are also indications that dissolved oxygen levels are below the water quality standard and the lake has problems with aquatic weeds. In 2003, almost 75 percent of the surface was covered with aquatic weeds, though no water quality standards were violated during DWQ lake monitoring.

17.4.2 Southport Restricted Area [AU# 18-88-3.5]

Current Status and 2005 Recommendations

The Southport Restricted Area, on the west bank of the Cape Fear River from Price Creek to Southport (715.3 acres), is Not Rated for aquatic life on an evaluated basis because the ADM Southport Plant (NC0027065) had significant violations of total settleable solids permit limits during 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.