Chapter 16
Cape Fear River Subbasin 03-06-16

Including: Cape Fear River, Harrison Creek, Turnbull Creek, Brown Creek and White Lake

16.1 Subbasin Overview

Subbasin 03-06-16 at a Glance

Land and Water Area

Total area:	438 mi²
Land area:	430 mi²
Water area:	8 mi²

Population Statistics

2000 Est. Pop.: 37,095 people
Pop. Density: 85 persons/mi²

Land Cover (percent)

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

Counties

Bladen, Columbus, Cumberland and Pender

Municipalities

Dublin, East Acadia, Elizabethtown, Tar Heel and White Lake

Subbasin 03-06-16 includes the Cape Fear River and many streams that drain coastal plain wetlands and bay lakes. Most of the watershed is forested with some agriculture present. Development is occurring in the Cumberland County portion of the subbasin. Population is expected to grow by 100,000 people in counties with portions or all of their areas in this subbasin by 2020; however, most of the growth is expected in portions of the county outside of this subbasin.

There are seven individual NPDES wastewater discharge permits in this subbasin with a permitted flow of 13.7 MGD (Figure 19). The largest are Smithfield Tarheel Plant (3 MGD), Alamac Knits (2.5 MGD) and Dupont (2 MGD). Refer to Appendix VI and Chapter 30 for more information on NPDES permit holders. There are also 50 registered swine operations in this subbasin.

There were five benthic community samples (Figure 19 and Table 19) collected during this assessment period. Data were also collected from 21 ambient monitoring stations including 12 MCFRBA (Appendix V) stations, three LCFRP (Appendix V) stations, four DWQ ambient stations and two shared stations. Three reservoirs were 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.

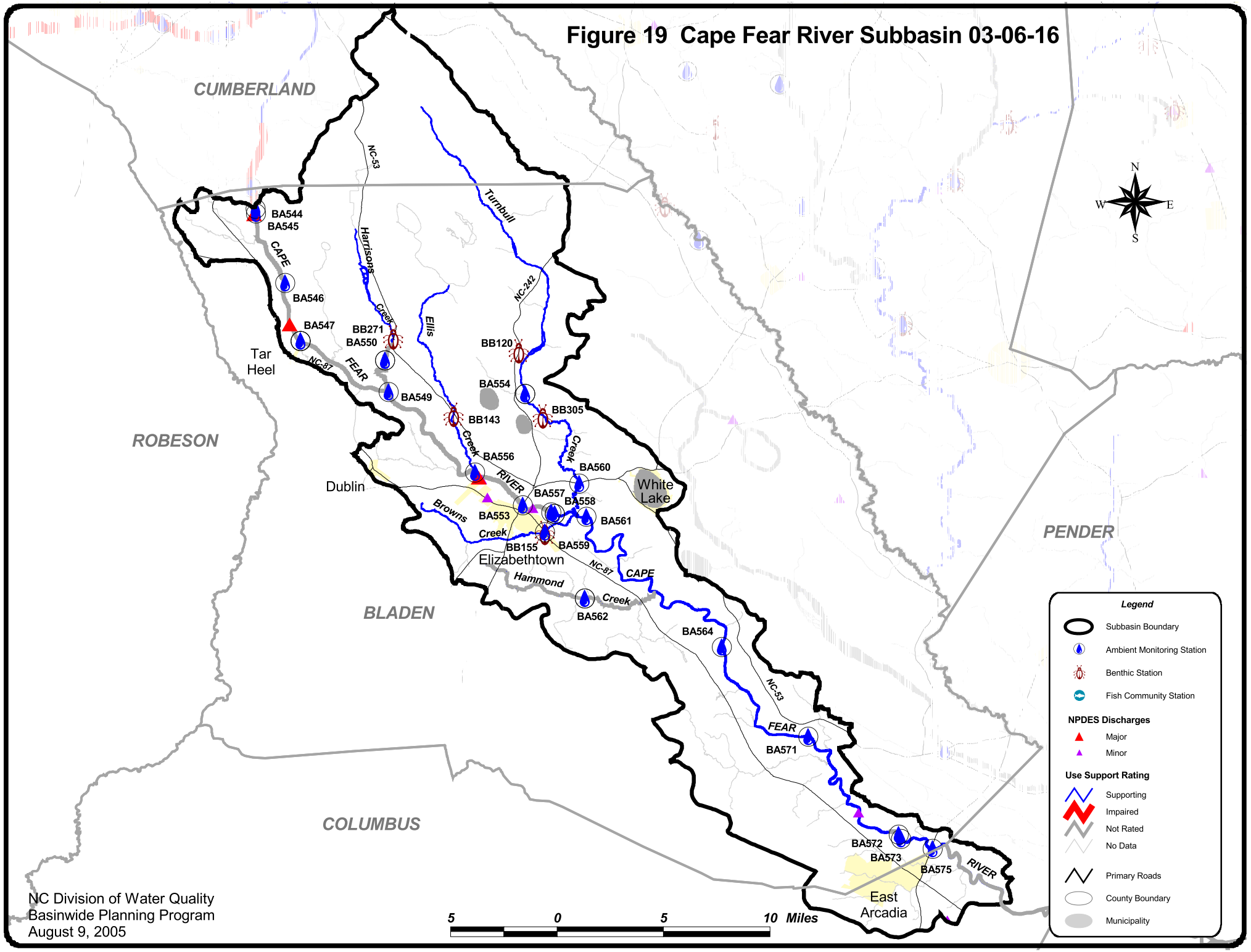
Figure 19 Cape Fear River Subbasin 03-06-16
CUMBERLAND
ROBESON
BLADEN
COLUMBUS
PENDER
Tar Heel
Dublin
Elizabethtown
White Lake
East Arcadia
BA544
BA545
BA546
BA547
BA549
BA550
BA553
BA554
BA556
BA557
BA558
BA559
BA560
BA561
BA562
BA564
BA571
BA572
BA573
BA575
BB120
BB143
BB155
BB271
BB305
CAPE FEAR RIVER
Harrisons Creek
Turnbull Creek
Ellis Creek
Browns Creek
Hammond Creek
NC-53
NC-87
NC-242
N
S
E
W
5 0 5 10 Miles
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 19 CAPE FEAR Subbasin 03-06-16

AU Number	Classification	Length/Area	Description	Aquatic Life Assessment						Recreation Assessment				Stressors	Sources
				AL Rating	Station	Result	Parameter	Year/ % Exc		REC Rating	Station	Result			
Browns Creek (Cross Pond)															
18-45	C	10.5 FW Miles	From source to Cape Fear River	S	BA559 BB155	NCE M	Low pH 2003	12.5		S	BA559	NCE			
CAPE FEAR RIVER															
18-(26)d	C	21.3 FW Miles	From Lock and Dam 3 to NC 41	NR	BA544 BA545 BA546 BA547 BA549 BA553 BA556	NCE NCE NCE NCE NCE NCE NCE	Chlor a Low DO 	57.1 7.14 		S	BA544 BA545 BA546 BA547 BA549 BA553 BA556	NCE NCE NCE NCE NCE NCE NCE	Chlorophyll a	Unknown
18-(26)e	C	1.8 FW Miles	From NC 41 to Browns Creek	NR	BA557 BA558	NCE NCE	Chlor a Chlor a	10 42.9		S	BA557 BA558	NCE NCE	Chlorophyll a	Unknown
18-(26)f	C	10.0 FW Miles	From Browns Creek to mouth of Hammond Creek	S	BA561	NCE				S	BA561	NCE			
18-(49)	WS-V	8.1 FW Miles	From mouth of Hammond Creek to mouth of Drunken Run (near mile 53)	S	BA564	NCE				S	BA564	NCE			
18-(53.5)	WS-IV	12.0 FW Miles	From mouth of Drunken Run (near mile 53) to a point 0.6 mile upstream of Lock #1 near Acme	S	BA571	NCE				S	BA571	NCE			
18-(58.5)	WS-IV CA	0.8 FW Miles	From a point 0.6 mile upstream of Lock #1 near Acme to Lock #1 (City of Wilmington water supply intake)	NR	BA572	NCE	Low pH	10.6		S	BA572	NCE	Low pH	Unknown
18-(59)	WS-IV Sw	7.7 FW Miles	From US Corps of Engineers Lock #1 near Acme to a point 0.5 mile upstream of raw WSI at Fed. Paper Board Corp. (Riegelwood)	S	BA573 BA575	NCE NCE				S	BA573 BA575	NCE NCE			
Ellis Creek															
18-44	C	11.8 FW Miles	From source to Cape Fear River	S	BB143	GF	2003			ND					

Table 19 CAPE FEAR Subbasin 03-06-16

AU Number / Description	Classification	Length/Area		Aquatic Life Assessment						Recreation Assessment				Stressors	Sources
				AL Rating	Station	Result	Parameter	Year/ % Exc		REC Rating	Station	Result			
Hammond Creek															
18-50	C	11.4	FW Miles	**NR**	BA562	NCE	Low DO	8.9		**S**	BA562	NCE		Low pH	Unknown
					BA562	NCE	Low pH	14.3						Low Dissolved Oxygen	Unknown
From source to Cape Fear River															
Harrisons Creek (Little Alligator Swamp)															
18-42a	C	9.9	FW Miles	**S**						ND					
From source to 0.3 miles downstream of SR 1318					BB271	GF	2003								
18-42b	C	4.8	FW Miles	**NR**	BA550	NCE	Low pH	89.8		**NR***	BA550	NCE		Fecal Coliform Bacteria	Unknown
From 0.3 miles downstream of SR 1318 to Cape Fear River														Low pH	Unknown
Jones Lake															
18-46-7-1	B	214.1	FW Acres	**NR**	BL31	NCE	Low pH	100		ND				Low pH	Unknown
From source to Lake Drain															
Salters Lake															
18-44-4	C	315.4	FW Acres	**NR**	BL30	NCE	Low pH	100		ND				Low pH	Unknown
Entire lake and connecting stream to Ellis Creek															
Turnbull Creek															
18-46	C	31.6	FW Miles	**S**	BA554	NCE	Low DO	13.8		**S**	BA554	NCE		Low pH	Unknown
					BA554	NCE	Low pH	100			BA560	NCE		Low Dissolved Oxygen	Unknown
					BA560	NCE	Low pH	100							
From source to Cape Fear River					BB120	NR	1999								
					BB305	GF	2003								
White Lake															
18-46-8-1	B	1,063.8	FW Acres	**NR**	BL32	NCE	Low pH	100		ND				Low pH	Unknown
From source to Lake Drain															

Table 19 CAPE FEAR Subbasin 03-06-16

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	101.5	FW Miles
NR	m	40.1	FW Miles
NR	m	1,593.2	FW Acres
ND		131.4	FW Miles
ND		917.6	FW Acres

Recreation Rating Summary

S	m	115.1	FW Miles
NR*	m	4.8	FW Miles
ND		153.1	FW Miles
ND		2,510.8	FW Acres

Fish Consumption Rating Summary

I	m	31.8	FW Miles
I	e	241.2	FW Miles
I	e	2,510.8	FW Acres

16.2 Use Support Assessment Summary

Use support ratings were assigned for waters in subbasin 03-06-16 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 (82.7 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 141.6 stream miles (51.9 percent) and 1,593.2 freshwater acres (63.5 percent) monitored during this assessment period in the aquatic life category. There were no stream miles identified as Impaired in this category.

16.3 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.

16.3.1 Browns Creek [AU#18-45]

2000 Recommendations
The 2000 basinwide plan recommended that Browns Creek be resampled using the 303(d) approach and that local initiatives were needed to address water quality.

Current Status
Browns Creek from source to the Cape Fear River (10.5 miles) is Supporting aquatic life because of a Moderate benthic community rating at site BB155. No intolerant species were found at site BB155. The low pH (12.5 percent below standard) at site BA559 is likely from natural swamp drainage. Browns Creek is Impaired on a monitored basis in the fish consumption category.

2005 Recommendations
DWQ will continue to monitor the Browns Creek watershed. This creek will be evaluated to determine if a supplemental Sw classification is warranted. Browns Creek will remain on the 303(d) list because of the fish consumption impairment.

16.4 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.

16.4.1 Cape Fear River [AU#18-(26)d and (58.5)]

Current Status and 2005 Recommendations
The Cape Fear River [18-(26)d] from Lock and Dam 3 to NC 41 (21.3 miles) is Not Rated for aquatic life because Alamac Knits (NC0003522) had significant violations of pH permit limits during the last two years of the assessment period. This facility ceased discharging in 2003. Dissolved oxygen was also below 4 mg/l in 7 percent of samples at site BA547. The NPDES compliance process will be used to address the significant permit violations noted above. Chlorophyll *a* exceeded the standard in 57 percent of samples collected at BA544; however, not enough samples were collected to assign a use support rating. This segment is Impaired on a monitored basis in the fish consumption category and will be added to the 303(d) list of Impaired waters. The segment just upstream of Lock and Dam 3 is Impaired and is discussed in Chapter 15.

The Cape Fear River [18-(58.5)] just above Lock and Dam 1 (0.8 miles) is Not Rated for aquatic life because pH was below the standard in 11 percent of samples collected at site BA572. The low pH is likely from swamp streams that drain into the Cape Fear River in this subbasin. DWQ will determine if a supplemental classification of Sw is warranted for this segment. The Cape Fear River below Lock and Dam 1 is Class C Sw.

16.4.2 Beaverdam Creek [AU# 18-61-4]

Current Status and 2005 Recommendations
Beaverdam Creek from source to Cape Fear River (6.7 miles) was not assessed during this assessment period, but is in a watershed that has experienced growth along the NC 87 corridor.

Water Quality Initiatives
In 2003, Sandyfield received a $161,000 CWMTF (Chapter 34) grant to purchase 43 wetland acres along Beaverdam Creek.

16.4.3 Hammond Creek [AU#18-50]

Current Status and 2005 Recommendations
Hammond Creek from source to the Cape Fear River (11.4 miles) is Not Rated for aquatic life because pH was below the standard in 14 percent of samples collected at site BA562. The low pH is likely from swamp stream drainage. DWQ will determine if a supplemental classification of Sw is warranted for this segment.

16.4.4 Harrisons Creek (Little Alligator Swamp) [AU#18-42b]

Current Status and 2005 Recommendations
Harrisons Creek from downstream of SR 1318 to the Cape Fear River (4.8 miles) is Not Rated for aquatic life because pH was below the standard in 90 percent of samples collected at site

BA550. The low pH is likely from swamp stream drainage. DWQ will determine if a supplemental classification of Sw is warranted for this segment. The upstream segment is Supporting aquatic life because of a Good-Fair benthic community rating at site BB271. Intolerant species were found at this site suggesting good water quality in Harrisons Creek.

16.4.5 Jones Lake [AU#18-46-7-1]

Current Status and 2005 Recommendations
Jones Lake (214.1 acres) is Not Rated for aquatic life because pH was below the standard during summer 2003 lake monitoring. However, not enough samples were collected to assign a use support rating. The low pH is likely from swamp stream drainage. DWQ will determine if a supplemental classification of Sw is warranted for this lake. DWQ will also determine if increased monitoring efforts in this lake are warranted to better assess water quality.

16.4.6 Little Singletary Lake [AU#18-44-2-1]

Current Status and Water Quality Initiatives
Little Singletary Lake (626 acres) was not assessed for use support determination. In 1999, the NC Wildlife Resources Commission received a $1,810,406 CWMTF (Chapter 34) grant to acquire 9,740 acres around this lake.

16.4.7 Mulford Creek [AU#18-47]

Current Status and Water Quality Initiatives
Mulford Creek from source to the Cape Fear River (2 miles) was not assessed for use support determination. In 2001, the NC Division of Forest Resources received a $345,000 CWMTF (Chapter 34) grant to acquire 273 acres of riparian wetland along Mulford Creek. The overall project included 777 acres.

16.4.8 Salters Lake [AU#18-44-4]

Current Status and 2005 Recommendations
Salters Lake (315.4 acres) is Not Rated for aquatic life because pH was below the standard during summer 2003 lake monitoring. However, not enough samples were collected to assign a use support rating. The low pH is likely from swamp stream drainage. DWQ will determine if a supplemental classification of Sw is warranted for this lake. DWQ will also determine if increased monitoring efforts in this lake are warranted to better assess water quality.

16.4.9 Suggs Mill Pond [AU#18-44-1]

Current Status and Water Quality Initiatives
Suggs Mill Pond (200.3 acres) was not assessed for use support determination. In 1997, the NC Wildlife Resources Commission received a $2,250,500 CWMTF (Chapter 34) grant to acquire 9,740 acres around the Suggs Mill Pond Complex.

16.4.10 Turnbull Creek [AU#18-46]

Current Status and 2005 Recommendations
Turnbull Creek from source to the Cape Fear River (31.6 miles) is Supporting aquatic life because of a Good-Fair benthic community rating at site BB305. Intolerant species were found, suggesting good water quality in Turnbull Creek. Dissolved oxygen exceeded the standard in 14 percent of samples at site BA554, and pH was below the standard in 100 percent of samples collected at sites BA554 and BA560. The low pH and low dissolved oxygen are likely from swamp stream drainage. DWQ will determine if a supplemental classification of Sw is warranted for this segment.

Water Quality Initiatives
In 1999, the Cape Fear RC&D received an $18,550 CWMTF grant to purchase a no-till drill to make available to farmers in this watershed (Chapter 34).

16.4.11 White Lake [AU#18-46-8-1]

Current Status and 2005 Recommendations
White Lake (1,063.8 acres) is Not Rated for aquatic life because pH was below the standard during summer 2003 lake monitoring. However, not enough samples were collected to assign a use support rating. The low pH is likely from swamp stream drainage. DWQ will determine if a supplemental classification of Sw is warranted for this lake. DWQ will also determine if increased monitoring efforts in this lake are warranted to better assess water quality.