

Chapter 8 -

Cape Fear River Subbasin 03-06-08

East and West Forks of the Deep River and Richland Creek

8.1 Water Quality Overview

Subbasin 03-06-08 at a Glance	
Land and Water Area (sq. mi.)	
Total area:	179
Land area:	177
Water area:	2
Population Statistics	
1990 Est. Pop.:	101,430 people
Pop. Density:	573 persons/mi ²
Land Cover (%)	
Forest/Wetland:	58.4
Surface Water:	1.7
Urban:	13.0
Cultivated Crop:	1.5
Pasture/ Managed Herbaceous:	25.4
Use Support Ratings	
<i>Freshwater Streams:</i>	
Fully Supporting:	28.3 mi.
Partially Supporting:	22.6 mi.
Not Supporting:	9.0 mi.
Not Rated:	41.4 mi.
<i>Lakes:</i>	
High Point Lake - Fully Supporting	
Oak Hollow Lake - Fully Supporting	

This subbasin is located in the piedmont and contains the City of High Point and portions of Greensboro and Randleman. A map of the subbasin, including water quality sampling locations, is presented in Figure B-8.

Biological ratings for these sample locations are presented in Table B-8. The current sampling resulted in impaired ratings for three streams 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.

Land use in the subbasin is a mixture of urban, residential and agriculture land use. Urban residential land use is increasing due to growth in both High Point (Richland Creek and Muddy Creek watersheds) and Greensboro (West Fork Deep River and Hickory Creek watersheds).

There are 21 small dischargers in this subbasin, but only two facilities with permitted flows greater than 1 MGD. High Point Eastside WWTP is permitted to discharge 16 MGD to Richland Creek, and the Randleman WWTP is permitted to discharge 1.7 MGD to the Deep River.

The High Point WWTP affects water quality in both Richland Creek and portions of the Deep River. Both of these streams, however, are also affected by urban runoff. Increased development in both High Point and Greensboro can be expected to have negative effects on the water quality of small streams in this subbasin.

Benthic macroinvertebrate data indicated stable water quality at most sites in the subbasin since 1993, although Richland Creek declined from Fair in 1993 to Poor in 1998. Low flow in Hickory Creek and Muddy Creek prevented any assessment of water quality changes at these sites during 1998. Long-term analysis of data has shown improvements at 3 sites on the Deep River associated with upgrades of wastewater treatment plants. The most substantial change occurred for the Deep River at Randleman: Poor in 1985, Fair in 1986 and 1987, Good-Fair in 1993 and 1998.

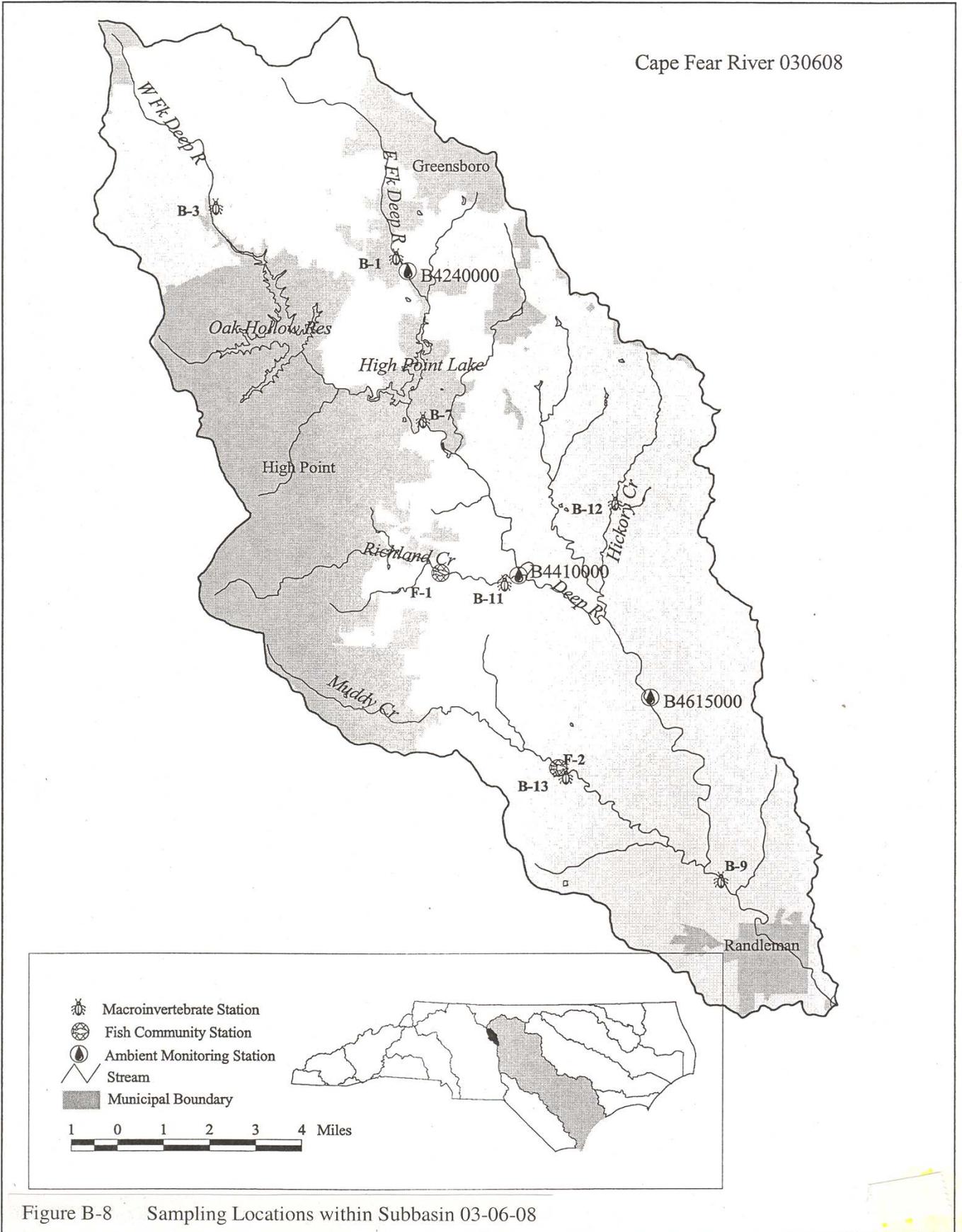


Figure B-8 Sampling Locations within Subbasin 03-06-08

Table B-8 Biological Assessment Sites in Cape Fear River Subbasin 03-06-08

BENTHOS				Bioclassification		
Site #	Stream	County	Location	1993	1998	
B-1	East Fork Deep River	Guilford	SR 1541	Fair	Fair	
B-3	West Fork Deep River	Guilford	SR 1850	Good-Fair	Good-Fair	
B-9	Deep River	Randolph	US 220 Bus	Good-Fair	Good-Fair	
B-11	Richland Creek	Guilford	SR 1145	Fair	Poor	
B-12	Hickory Creek	Guilford	SR 1131	Fair	Not Rated	
B-13	Muddy Creek	Randolph	SR 1929	Good-Fair	Not Rated	
FISH				Bioclassification		
Site #	Stream	County	Location	1994	1998	
F-1	Richland Creek	Guilford	SR 1154	no sample	Poor	
F-2	Muddy Creek	Randolph	SR 1929	Fair	Poor	
FISH TISSUE				No. Samples Exceeding Criteria		
Station	Description	Year Sampled	Total Samples	Metals	Organics	Comments
FT-1	Muddy Creek nr Glenola	1994	4	0	0	No samples exceeded criteria
FT-2	Oak Hollow Lake	1998	18	2	0	EPA mercury limit exceeded in 2 bass 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.

8.2 Impaired Waters

Portions of Richland Creek, Deep River and Hickory Creek were identified as impaired in the 1996 Cape Fear River Basinwide Water Quality Plan. Portions of Richland Creek, Deep River and East Fork Deep River 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 8.3 and waters with other issues, recommendations or projects are discussed in Part 8.4.

Richland Creek

1996 Recommendations

Richland Creek (9.1 miles at SR 1145 near High Point) was partially supporting (PS) in the 1996 plan. The stream receives a discharge from the High Point Eastside WWTP (16 MGD) which

has reported occurrences of dissolved oxygen (DO) below the daily average standard of 5.0 mg/l. This discharge has also been associated with water quality problems in downstream impoundments on the Deep River. It was recommended that High Point Eastside WWTP be issued limits of BOD₅ = 5 mg/l and NH₃-N = 2 mg/l.

Current Status

High Point Eastside WWTP has passed recent toxicity tests, and DO levels below the standard have not been detected at the ambient station below the facility. Richland Creek (9.0 miles from source to Deep River) is currently not supporting (NS) according to recent DWQ monitoring because of an impaired biological community. Instream habitat degradation associated with High Point urban nonpoint sources and High Point Eastside WWTP is a possible source of impairment. Richland Creek is on the state's year 2000 303(d) list (not yet EPA approved).

2000 Recommendations

High Point Eastside WWTP is undergoing an upgrade. High Point will be required to develop ordinances or modify existing water supply ordinances to protect riparian areas and implement stormwater management plans. The upgrades to the WWTP should reduce the potential for algal blooms that have been observed in downstream impoundments on the Deep River. See Section A, Chapter 4, Part 4.5 for more details regarding Randleman Reservoir. Local efforts to identify and eliminate the effects of nonpoint source pollution and stormwater surges in this watershed would help to reduce the potential for impairment to the biological community. The 303(d) list approach for Richland Creek will be to resample for biological and chemical data to attempt to determine potential problem parameters. A TMDL will be developed to address high levels of fecal coliform bacteria.

The Piedmont Triad Water Authority has secured CWMTF grant money to protect 100 acres of riparian buffers along Richland and Muddy Creeks for the protection of water quality in the proposed Randleman Reservoir. For more information on this project, refer to Section C, Chapter 1, Part 1.5.2.

Deep River

1996 Recommendations

The Deep River (15.8 miles downstream of Richland Creek) was partially supporting (PS) in the 1996 plan. Because of water quality problems downstream of High Point in the Deep River, it was recommended that advanced tertiary limits be issued to new and expanding major discharges. 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. If surface discharge was the most feasible option, then permit limits no less stringent than BOD₅ = 15 mg/l and NH₃-N = 4 mg/l were to be applied.

Current Status

No new or expanding discharges have been permitted in this segment of the Deep River. (Refer to discussion on the Randleman Reservoir in Section A, Chapter 4, Part 4.5.) The lower 2.3 miles of the Deep River in this subbasin are no longer impaired according to recent DWQ monitoring. Portions of the Deep River (11 miles from High Point dam to SR 1921 in Randolph County) are currently partially supporting (PS) according to recent DWQ monitoring because of an impaired biological community. Pollution associated with urban nonpoint sources in Greensboro and High Point are possible causes of impairment. Fecal coliform bacteria are a noted problem parameter for 6.8 miles of the Deep River from SR 1113 to SR 1921. The Deep River is on the state's year 2000 303(d) list (not yet EPA approved).

2000 Recommendations

The City of Greensboro has a stormwater program as part of Phase I of the NPDES stormwater program. The Deep River is downstream of developed areas in Greensboro and should benefit from the city stormwater program (see Section A, Chapter 4, Part 4.7.1). DWQ will work with the stormwater program, where possible, to improve water quality in these creeks. Refer to Section A, Chapter 4, Part 4.5 for information on ordinances related to stormwater and the proposed Randleman Reservoir.

The 303(d) list approach for the upper portions of the Deep River will be to resample for biological and chemical data to attempt to determine potential problem parameters. A TMDL will be developed to address high levels of fecal coliform bacteria in the Deep River from SR 1113 to SR 1921.

Hickory Creek

Current Status

Hickory Creek (4.5 miles from source to Deep River) was partially supporting (PS) according to DWQ monitoring data from 1993 because of an impaired biological community. Instream habitat degradation associated with agricultural nonpoint sources is a possible cause of impairment. Hickory Creek is currently not rated (NR) according to recent DWQ monitoring because of low flow conditions. The lower portion of Hickory Creek will be inundated by the Randleman dam project (See Section A, Chapter 4, Part 4.5 for more details regarding Randleman Reservoir). Hickory Creek 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.

East Fork Deep River

Current Status

The East Fork Deep River (7.1 miles from source to High Point Lake) is currently partially supporting (PS) according to recent DWQ monitoring because of an impaired biological community and violations of the state turbidity standard. Instream habitat degradation associated with urban nonpoint sources is a possible cause of biological impairment. Fecal coliform bacteria are also noted as a problem parameter. High turbidity may be from road construction activities in the watershed. The East Fork Deep River is on the state's year 2000 303(d) list (not yet EPA approved).

2000 Recommendations

The City of Greensboro has a stormwater program as part of Phase I of the NPDES stormwater program. East Fork Deep River is downstream of developed areas in Greensboro and should benefit from the city stormwater program (see Section A, Chapter 4, Part 4.7.1). DWQ will work with the stormwater program, where possible, to improve water quality in these creeks. Refer to Section A, Chapter 4, Part 4.5 for information on ordinances related to stormwater and the proposed Randleman Reservoir.

The 303(d) list approach for the upper portions of the East Fork Deep River will be to resample for biological and chemical data to attempt to determine potential problem parameters. A management strategy will be developed to address high turbidity in East Fork Deep River. A TMDL will be developed to address high levels of fecal coliform bacteria.

8.3 303(d) Listed Waters

There are 4 stream segments (31.6 stream miles) in the subbasin that are impaired and on the state's year 2000 303(d) list (not yet EPA approved). Segments of Richland Creek, Deep River, Hickory Creek and East Fork Deep River are discussed above. For information on 303(d) listing requirements and approaches, refer to Appendix IV.

8.4 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 50% 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.

Segments of the Deep River and its headwater tributaries, downstream of impaired segments, may be affected by urban runoff that has the potential to degrade water quality and instream habitat. These waters receive runoff from the cities of High Point and Greensboro. Water quality in the Deep River could be improved by reducing urban runoff.

High Point Lake (also known as City Lake) is used for a water supply and recreation. Urban/residential areas and pasture/row crop farms dominate the watershed. The two arms of the lake are fed by the East Fork Deep River and the West Fork Deep River. There have been frequent public complaints of taste and odor problems from processed drinking water taken from this lake related to algal blooms. To reduce this problem, the water treatment plant currently treats the raw water to reduce algae-related taste and odor problems. Typical diurnal effects (dissolved oxygen and pH) related to algal activity are observed in High Point Lake and a winter bloom was observed. This winter bloom was investigated and was believed to have been caused by the use of fertilizer in the watershed as a deicer during a winter ice storm. Water clarity has decreased since 1984 and is associated with two current highway construction activities (one for I-40 and the other the Hwy 73/74 Bypass) and algal blooms. There have been no reports of stressed or dead fish in the lake and no problems with nuisance levels of aquatic macrophytes.

Oak Hollow Lake (also known as High Point Reservoir) is used for boating, fishing and swimming. The watershed is characterized by urban, residential and some agricultural land uses. Two 18-hole golf courses adjoin the lake. Conditions in Oak Hollow Lake are similar to those in High Point Lake. There have been frequent public complaints of taste and odor problems from processed drinking water taken from this lake related to algal blooms. To reduce this problem, the water treatment plant currently treats the raw water to reduce algae-related taste and odor problems, and a destratification system (forced air) is in place in the mainstem of the lake to help improve the dissolved oxygen levels in the lake. Water clarity has decreased since 1984 and is associated with increasing urban development and highway construction (the Hwy 73/74 Bypass under construction will cross over Oak Hollow Lake) and algal blooms.

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.

Muddy Creek

The lower portion of Muddy Creek will be inundated by the Randleman Reservoir. Refer to Section A, Chapter 4, Part 4.5 for information on ordinances related to stormwater and the proposed Randleman Reservoir.

Although Muddy Creek was not rated (NR) during recent sampling, there have been indications of high fecal coliform bacteria and some noted problems with aquatic habitats.