

# Chapter 5 - Cape Fear River Subbasin 03-06-05 Includes New Hope Creek, Northeast Creek and Jordan Reservoir

## 5.1 Water Quality Overview

### ***Subbasin 03-06-05 at a Glance***

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

Total area:	269
Land area:	251
Water area:	18

#### **Population Statistics**

1990 Est. Pop.:	102,058 people
Pop. Density:	407 person/mi <sup>2</sup>

#### **Land Cover (%)**

Forest/Wetland:	78.2
Surface Water:	8.2
Urban:	6.4
Cultivated Crop:	0.6
Pasture/ Managed Herbaceous:	6.6

#### **Use Support Ratings**

##### *Freshwater Streams:*

Fully Supporting:	52.5 mi.
Partially Supporting:	39.9 mi.
Not Supporting:	0.0 mi.
Not Rated:	122.4 mi.

##### *Lakes:*

B. Everett Jordon Reservoir - Fully Supporting
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This subbasin includes large sections of the City of Durham and Research Triangle Park. New Hope Creek and many of its tributaries are within the geological formation of the Triassic Basin, an area that covers about 1,100 square miles. The 7Q10 values are zero for all but the largest watersheds. A large percentage of land use within this subbasin is urban and built-up. A map of the subbasin, including water quality sampling locations, is presented in Figure B-5.

Biological ratings for these sample locations are presented in Table B-5. The current sampling resulted in impaired ratings for two 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 use support data.

There are eight permitted dischargers in the subbasin. Two facilities have permitted flows of greater than 1 MGD. These facilities discharge to Northeast Creek (Durham County Triangle WWTP) and New Hope Creek (South Durham Water Reclamation Facility) and have instream waste concentrations of 100% and 99.5%, respectively, under 7Q10 flow conditions. Elevated nutrient concentrations and depressed dissolved oxygen values have been recorded at both of these locations when compared to most other Haw River tributary locations. Median fecal coliform counts are above water quality criteria at both of these locations.

Both point and nonpoint sources have impacted streams in this highly urbanized subbasin. Streams in this subbasin are typical of the Triassic Basin with 7Q10 values of zero and poor instream habitat. For these reasons, most streams in this subbasin were not sampled because of low flow conditions or were not rated using benthic macroinvertebrate criteria.

Fish tissue samples were collected from two locations on Jordan Lake during 1998: Farrington arm and near the dam. Only one largemouth bass from the Farrington arm location had a mercury concentration exceeding EPA criteria.

Cape Fear River 030605

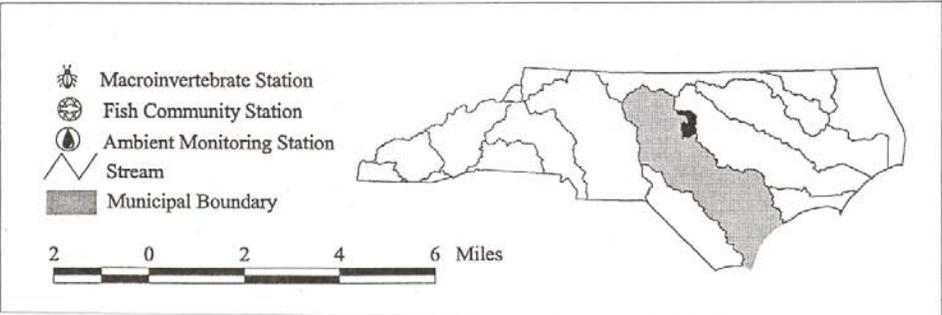
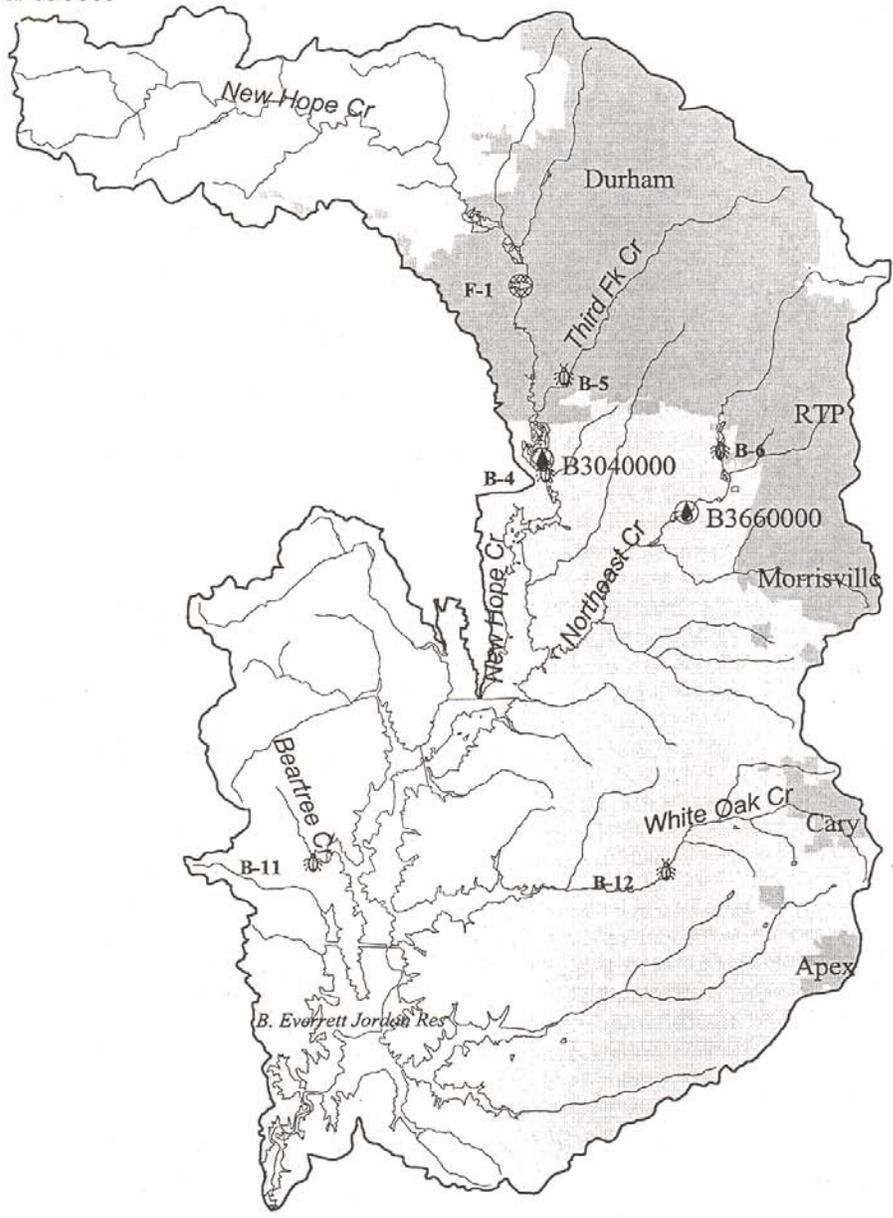


Figure B-5 Sampling Locations within Subbasin 03-06-05

Table B-5 Biological Assessment Sites in Cape Fear River Subbasin 03-06-05

<i>BENTHOS</i>				<i>Bioclassification</i>		
Site #	Stream	County	Location	1993	1998	
B-4	New Hope Creek	Durham	SR 1107	Not sampled	Fair (s)	
B-6	Northeast Creek	Durham	SR 1102	Not Rated (w)	Not rated (w)	
B-11	Beartree Creek	Chatham	SR 1716	Not Rated (w)	Not rated (w)	
B-12	White Oak Creek	Chatham	SR 1603	Not sampled	Not rated (w)	
<i>FISH</i>				<i>Bioclassification</i>		
Site #	Stream	County	Location	1994	1998	
F-1	New Hope Creek	Durham	SR 2220	no sample	Poor	
<i>FISH TISSUE</i>				<i>No. Samples Exceeding Criteria</i>		
Station	Description	Year Sampled	Total Samples	Metals	Organics	Comments
FT-1	Lake Jordan near Farrington	1998	24	1	0	EPA mercury limit exceeded in 1 bass sample
FT-2	Lake Jordan near Dam	1998	22	0	0	No samples exceeded criteria

(w) Winter collection (s) Summer collection

## 5.2 Impaired Waters

Portions of New Hope Creek, Northeast Creek, Third Fork Creek and White Oak Creek were identified as impaired in the 1996 Cape Fear River Basinwide Water Quality Plan. Portions of New Hope Creek and Northeast Creek are currently rated impaired according to recent DWQ monitoring. Current status of each stream 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 5.3 and waters with other issues, recommendations or projects are discussed in Part 5.4.

### New Hope Creek

#### 1996 Recommendations

New Hope Creek (20.7 miles from I-40 to SR 1107) was not supporting (NS) in the 1996 Cape Fear River Basinwide Water Quality Plan. The stream receives a large discharge from South Durham Water Reclamation Facility. The instream waste concentration was 99% during summer low flow conditions. The stream was subject to low dissolved oxygen (DO). The upstream segments receive wastewater from smaller discharges that reduce the instream DO prior to the WWTP. It was recommended that upon expansion from 10 to 20 MGD, the WWTP should meet advanced tertiary treatment of 5 mg/l BOD<sub>5</sub> and 1 mg/l NH<sub>3</sub>-N. It was also recommended that smaller discharges into zero flow streams above the WWTP connect to regional treatment facilities.

### Current Status

The South Durham Water Reclamation Facility has expanded to 20 MGD with permitted limits of 5 mg/l BOD<sub>5</sub> and 2 mg/l NH<sub>3</sub>-N and 2 mg/l TP. The instream waste concentration is 100% during summer low flow conditions. Some of the small discharges in the area have connected to regional facilities. However, because of insufficient DWQ staffing, more regionalization of wastewater treatment has not been pursued. New Hope Creek (25 miles from Sandy Creek to SR 1107) is currently partially supporting (PS) according to recent DWQ monitoring because of an impaired biological community. Instream habitat degradation associated with urban nonpoint sources and the South Durham Water Reclamation Facility discharge is a possible cause of impairment. Manganese and fecal coliform bacteria are also noted as problem parameters in the lower segment. New Hope Creek is on the state's year 2000 303(d) list (not yet EPA approved).

### 2000 Recommendations

New Hope Creek is in heavily urbanized areas of Durham and should benefit from the existing city stormwater program (see Section A, Chapter 4, Part 4.7.1 and Section C, Chapter 1, Part 1.5.1). DWQ will work with the stormwater program, where possible, to improve water quality in these streams. DWQ is currently studying New Hope Creek to determine the extent and possible sources of fecal coliform bacteria contamination. DWQ also encourages further efforts to connect small discharges in this watershed to a regional facility. The South Durham Water Reclamation Facility is in compliance with current permitted limits. Permit limits may be reevaluated after modeling efforts are completed to address the NSW strategy for Jordan Reservoir/Haw River (see Section A, Chapter 4, Part 4.4).

The 800-acre New Hope Creek Riparian buffer and greenway trail system is protecting this stream from rapid commercial and residential development in this watershed. For more information on this project, refer to Section C, Chapter 1, Part 1.5.1.

The North Carolina Wetlands Restoration Program and Duke University received a grant of \$582,500 to collaborate on the restoration of degraded streambanks and riparian areas of Sandy Creek, within the New Hope Creek watershed. The project will treat stormwater runoff within the 25-acre project watershed adjacent to the University Campus. Treatment methods will include the installation of twelve biofiltration areas to receive and attenuate runoff from parking and trail areas, and a structure to create an instream stormwater wetland and support the restoration of degraded streambanks. The Wetland Program at Duke University will monitor water quality at 15 sites in the project area to determine the success of the project design.

### **Northeast Creek**

#### 1996 Recommendations

Northeast Creek (13 miles from source to Jordan Reservoir) was partially supporting (PS) in the 1996 plan. The stream receives a large discharge from the Durham County-Triangle WWTP. The instream waste concentration was 99% during summer low flow conditions, and the stream was subject to low dissolved oxygen (DO). Because of low summer flows, it was recommended that no new discharges be allowed.

### Current Status

No new discharges have been permitted into this stream. There was a 1.6 million-gallon sewage spill from Durham County-Triangle WWTP in 1997. Northeast Creek (14.9 miles from source to New Hope Creek arm of Jordan Reservoir, 3 segments) is currently partially supporting (PS) according to recent DWQ monitoring data because of an impaired biological community. Instream habitat degradation associated with urban nonpoint sources and the Durham County Triangle WWTP is a possible cause of impairment. Manganese, fecal coliform bacteria and low dissolved oxygen (DO) are also noted as problem parameters. Northeast Creek is on the state's year 2000 303(d) list (not yet EPA approved).

### 2000 Recommendations

Northeast Creek is in heavily urbanized areas of Durham and Research Triangle Park and should benefit from the existing 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 streams. Durham County Triangle WWTP is in compliance with current permitted limits. Permit limits may be reevaluated after modeling efforts are completed to address the NSW strategy for Jordan Reservoir/Haw River (see Section A, Chapter 4, Part 4.4).

## **Third Fork Creek**

### Current Status

Third Fork Creek (4.5 miles from source to Jordan Reservoir) was not supporting (NS) in the 1996 plan. An impaired biological community and turbidity related to development in the watershed were the causes of impairment. New biological information has determined that the previous rating was inappropriate because of the small size of the stream. Third Fork is currently not rated.

### 2000 Recommendations

DWQ will continue to monitor the impacts of land development on streams in this watershed. The 303(d) list approach will be to resample this stream to obtain updated use support information.

## **White Oak Creek**

### Current Status

White Oak Creek (0.4 miles from NC 751 to New Hope River Arm of Jordan Reservoir) was identified as partially supporting (PS) in the 1996 basinwide plan because of an impaired biological community. White Oak Creek is currently not rated (NR). Based on new biological information, it was determined that the previous biological rating was inappropriate. This stream is not on the state's year 2000 303(d) list (not yet EPA approved).

### **5.3 303(d) Listed Waters**

There are three streams (49 stream miles) in the subbasin that are impaired and on the state's year 2000 303(d) list (not yet EPA approved). New Hope Creek, Northeast Creek and Third Fork Creek are on the list and are addressed above. For information on 303(d) listing requirements and approaches, refer to Appendix IV.

### **5.4 Other Issues, Recommendations and Projects**

Approximately 60% 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.

#### **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.

#### **Jordan Reservoir**

B. Everett Jordan Reservoir is currently supporting its designated uses. There are currently no public health advisories for swimming, fish consumption or drinking water use. Aquatic weeds are not currently a significant issue. The water treatment plant using the Jordan Reservoir as a raw water source has had (1995, 1996) some experiences with taste and odor issues as a result of noxious algal growth. However, these treatment concerns are not currently a problem according to the water plant operators. Recent DWQ evaluations of water quality, however, continue to show concerns for water quality standards. Water quality standards related to eutrophication are not consistently achieved. Continued growth in the drainage basin is likely to increase runoff and increase delivery of nutrients and sediment to the reservoir.

B. Everett Jordan Reservoir receives discharges from many large municipal facilities via the Haw River, Morgan Creek, New Hope Creek and Northeast Creek. The cumulative effect of the discharges increases the potential for water quality problems associated with excessive nutrients. Because the facilities in the Jordan watershed are increasing flow capacity in response to population growth, steps will need to be taken to prevent water quality degradation in Jordan Reservoir from both point and nonpoint sources. Refer to Section A, Chapter 4, Part 4.4 for updates on the Jordan Reservoir Nutrient Sensitive Waters Strategy.