

# Chapter 9 -

## Roanoke River Subbasin 03-02-09

Includes the lowest portion of the Roanoke River and tributaries

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### 9.1 Water Quality Overview

#### ***Subbasin 03-02-09 at a Glance***

##### **Land and Water Area**

Total area:	559 mi <sup>2</sup>
Land area:	435 mi <sup>2</sup>
Water area:	124 mi <sup>2</sup>

##### **Population Statistics**

1990 Est. Pop.:	58,886 people
Pop. Density:	135 persons/mi <sup>2</sup>

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

Forest/Wetland:	71.5
Surface Water:	2.4
Urban:	0.6
Cultivated Crop:	24.8
Pasture/ Managed Herbaceous:	0.8

This subbasin contains the lower 83 miles of the Roanoke River and tributaries including Conoho, Indian, Hardison Mill, Welch and Conaby Creeks. Municipalities include Hamilton, Williamston, Jamesville and Plymouth. A map of this subbasin including water quality sampling locations is presented in Figure B-9.

Bioclassifications for sample sites in this subbasin are presented in Table B-23. Use support ratings for each applicable category in this subbasin are summarized in Table B-24. Refer to Appendix III for a complete listing of monitored waters and further information about use support ratings.

This subbasin is located entirely within the coastal plain of North Carolina. Most of the land is forested (71 percent), but a significant amount is also used for agriculture (25 percent).

The lower Roanoke River is bordered by extensive floodplain forests. These "backswamps" are inundated during high flows when the river is full. Then, when the river level drops, water returns to the main channel through only a few connections, called "guts". Through the collected efforts of The Nature Conservancy, the US Fish and Wildlife Service, and the NC Wildlife Resources Commission, more than 34,000 acres of the floodplain have been brought into conservation ownership. With an additional 21,000 acres of Georgia-Pacific timberland under conservation management, an almost continuous corridor stretching from Hamilton to the Sound has been preserved (see Section C for more information).

There are nine NPDES permitted dischargers in the subbasin. The largest discharge is 82.5 MGD from Weyerhaeuser Company. Others include the Williamston WWTP and the Plymouth WWTP. All of three these discharges flow directly into the Roanoke River. The only facility in significant noncompliance during this review period was the Williamston WWTP. Four facilities are required to perform toxicity tests on their effluent. In the past, Liberty Fabrics has had the most problems, failing 42 percent of its tests. However, in 1999, none of these facilities failed a test.

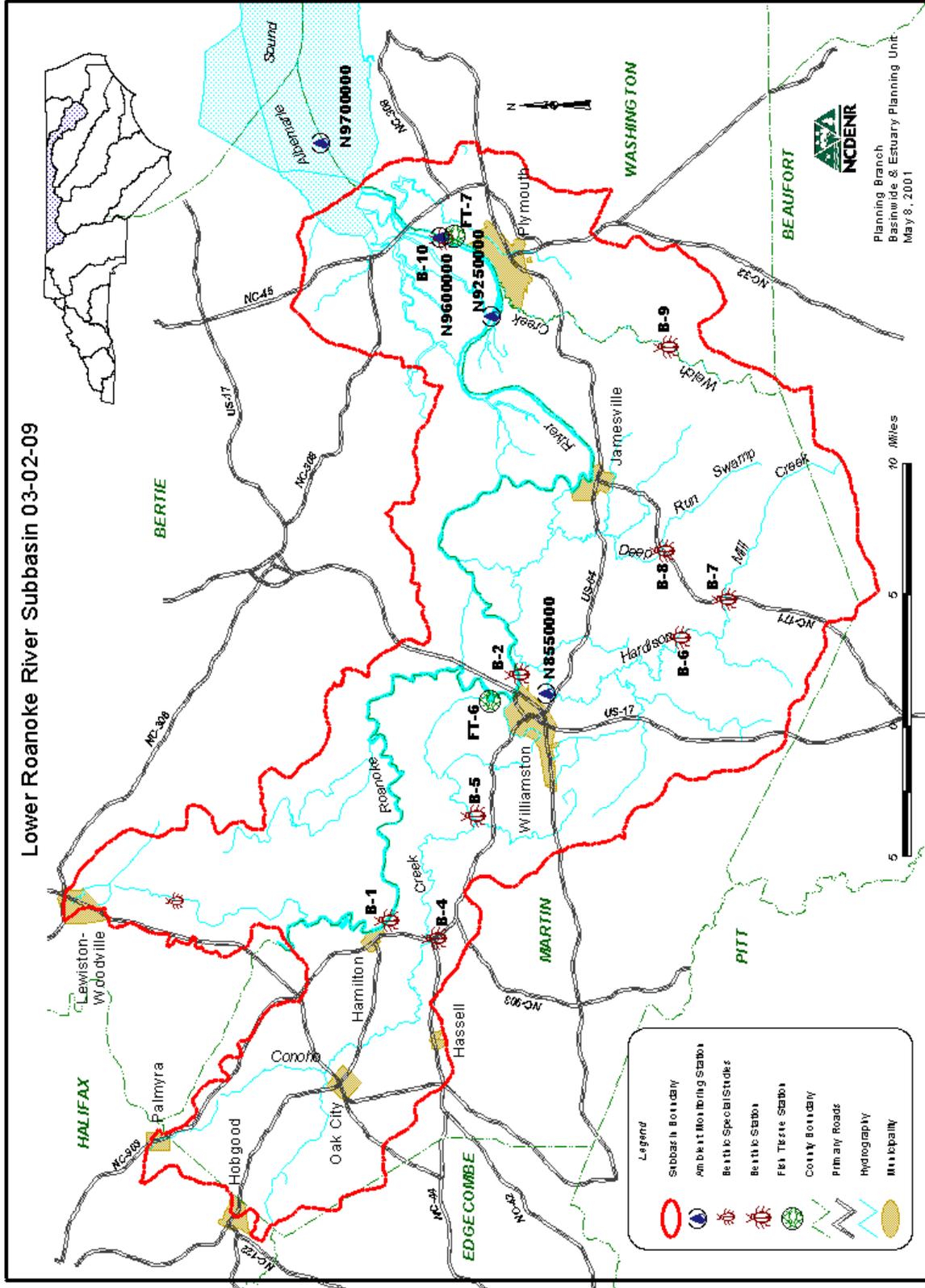


Figure B-9 Sampling Locations within Subbasin 03-02-09

Table B-23 DWQ Monitoring Locations and Benthic Macroinvertebrate Bioclassifications (1999) for Roanoke River Subbasin 03-02-09

Site	Stream	County	Location	Bioclassification
<b><i>Benthic Macroinvertebrates</i></b>				
B-1*	Roanoke River	Martin	NC 125/903	Good-Fair
B-2*	Roanoke River	Martin	Williamston	Good-Fair
B-4*	Conoho Creek	Martin	NC125/903	Not Rated
B-5	Conoho Creek	Martin	SR 1417	Not Rated
B-6	Hardison Mill Creek	Martin	NC 171	Not Rated
B-7	Hardison Mill Creek	Martin	SR 1528	Not Rated
B-8	Deep Run Swamp	Martin	NC 171	Not Rated
B-9	Welch Creek	Martin	SR 1522	Not Rated
B-10*	Roanoke River	Martin	NC 45	Not Rated
<b><i>Fish Tissue</i></b>				
FT-6	Roanoke River	Martin	Williamston	N/A
FT-7	Roanoke River	Martin	Near Plymouth	N/A
<b><i>Ambient Monitoring</i></b>				
N8550000	Roanoke River	Martin	Williamston	N/A
N9250000	Roanoke River	Martin	Above Plymouth	N/A
N9600000	Roanoke River	Bertie	Below Plymouth	N/A
N9700000	Albemarle Sound	Bertie	Batchelor Bay	N/A

\* Historical data are available; refer to Appendix II.

Extensive evaluation, conducted by DWQ, of swamp streams across eastern North Carolina suggests that different criteria should be used to assess the condition of water quality in these systems. Swamp streams are characterized by slower flow, lower dissolved oxygen, lower pH, and sometimes very complex braided channels and dark-colored water. DWQ has developed draft biological criteria that may be used in the future to assign bioclassifications to these streams (as is currently done for other streams and rivers across the state). However, DWQ believes that there has been insufficient sampling of reference swamp streams to assign these bioclassifications and use them for use support determinations in the Roanoke River basin. DWQ continues to work toward preparing these criteria for future use.

Based on benthic macroinvertebrate data, the biological community in the Roanoke River has been assigned Good-Fair bioclassifications from the upper end of this subbasin to below Williamston. These data represent a slight decline compared to communities observed upstream. The lowest section of the river, above and below Plymouth, has experienced a mild temporary estuarine influence in some years, but is still regarded as a lower coastal plain freshwater river.

Macroinvertebrate data from the river below Plymouth has suggested good water quality in this section of the river, even though no bioclassification can be assigned.

All the tributaries in this subbasin are swampy and may experience periods of very little or no flow. The lower portion of Conoho Creek was found to represent nearly natural swamp conditions, while the upper portion of Conoho Creek, the upper and lower portions of Hardison Mill Creek, and Welch Creek suggested water quality or habitat problems. The most severe problems were observed in Deep Run Swamp, an area of intensive agricultural land use. These streams are discussed in more detail in Part 9.5.1 and 9.5.2.

Water chemistry samples are collected monthly from sites on the Roanoke River near Williamston and above and below Plymouth. These data have not indicated any major water quality problems in these areas, with the exception of elevated ammonia nitrogen concentrations below Plymouth (median = 0.075 mg/l).

Fish tissue samples were collected by DWQ from two sites on the Roanoke River in 1995 and 1999. Eight bowfin from the river near Williamston had mercury concentrations greater than FDA consumption criteria in 1995. In 1999, 15 of 24 samples (63 percent) of bowfin, largemouth bass and white catfish had mercury concentrations greater than EPA and FDA criteria (0.6 and 1.0 µg/g, respectively). Mercury concentrations were somewhat lower near Plymouth: four of seven (57 percent) bowfin collected in 1995 had high mercury concentrations. In 1999, four (three largemouth bass and one chain pickerel) out of 22 samples (18 percent) had concentrations which exceeded consumption criteria. The Roanoke River and Welch Creek are impaired because of fish consumption advisories and are discussed in following sections.

For more detailed information on sampling and assessment of streams in this subbasin, refer to the *Basinwide Assessment Report - Roanoke River Basin* (DENR-DWQ, May 2000), available from DWQ Environmental Sciences Branch at <http://www.esb.enr.state.nc.us/bar.html> or by calling (919) 733-9960.

Table B-24 Use Support Ratings Summary (1999) for Monitored and Evaluated<sup>1</sup> Freshwater Streams (miles) in Roanoke River Subbasin 03-02-09

Use Support Category	FS	PS	NS	NR	Total <sup>2</sup>
<b>Aquatic Life/ Secondary Recreation</b>	72.8	0	0	198.3	271.1
<b>Fish Consumption</b>	0	25.3	13.3	0	38.6
<b>Primary Recreation</b>	0	0	0	11.3	11.3
<b>Water Supply</b>	0	0	0	0	0

<sup>1</sup> For the fish consumption use support category, only monitored stream miles are presented.

<sup>2</sup> Total stream miles assigned to each use support category in this subbasin. Column is not additive because some stream miles are assigned to more than one category.

## 9.2 Status and Recommendations for Previously Impaired Waters

This section reviews use support and recommendations detailed in the 1996 basinwide plan, reports status of progress, gives recommendations for the next five-year cycle, and outlines current projects aimed at improving water quality for each water. The 1996 Roanoke River basin plan identified two impaired streams and a portion of the Albemarle Sound in this subbasin. These waters are discussed below.

- 9.2.1 Welch Creek** (13.3 miles from source to Roanoke River)  
**Roanoke River** (28.5 miles from Williamston to the Albemarle Sound)  
**Albemarle Sound** (2,586 acres from Bull Bay to Harvey Point)

### 1996 Recommendation(s)

The 1996 basin plan listed Welch Creek and the Roanoke River from Williamston down to and including the Albemarle Sound as partially supporting due to a fish consumption advisory for dioxin. Weyerhaeuser Company operates a facility at the mouth of Welch Creek and originally it discharged directly to the stream. In the 1980s, it was recognized that dioxin, a carcinogenic by-product of the chlorine bleaching process, was accumulating in fish tissue. In 1988, improvements were made and the discharge was relocated to the Roanoke River. Weyerhaeuser is required by DWQ to provide extensive monitoring in the Roanoke River. The recommendation was to review this data to monitor the decline of dioxin in fish tissue.

### Status of Progress

These waters remain impaired (Welch Creek – not supporting; Roanoke River and Albemarle Sound – partially supporting) because of fish consumption advisories for dioxin. No fish should be consumed from Welch Creek. Data collected by Weyerhaeuser Company indicate a decline in dioxin concentrations. Shellfish are not covered by this advisory.

### 2001 Recommendation(s)

DWQ, in cooperation with Weyerhaeuser Company, will continue to monitor the lower Roanoke River and Welch Creek and will work closely with the Department of Health and Human Services' Division of Public Health to lift the advisory when there is no longer a risk to human health from consumption of fish. For more information regarding fish consumption advisories, call (919) 733-3816 or visit the NC DHHS Division of Public Health website at <http://www.schs.state.nc.us/epi/fish/current.html>.

## 9.3 Status and Recommendations for Newly Impaired Waters

The majority of the lower Roanoke River in North Carolina was rated as impaired based on fish consumption advisories. This section outlines the potential causes and sources of impairment and provides recommendations for improving water quality.

### **9.3.1 Roanoke River** (138.7 miles from the Roanoke Rapids dam to the Albemarle Sound)

#### Current Status

The Roanoke River, from the Roanoke Rapids dam to the Albemarle Sound, is impaired because of a statewide fish consumption advisory due to high levels of mercury in bowfin (blackfish). Bowfin with levels of mercury that exceed consumption criteria were collected by DWQ in the Roanoke River near Williamston and Plymouth in 1995 and 1999. Because of these advisories, this portion of the river is only partially supporting the fish consumption use support category. (Note: This is not a new advisory, but improved use support methodology now bases impairment for the fish consumption use support category on fish consumption advisories.)

#### 2001 Recommendation(s)

DWQ will continue to monitor fish tissue in the Roanoke River and will work to identify sources of mercury. Given the global scale of mercury cycling, it may be difficult for DWQ to recognize significant reductions of mercury in fish over the short-term. The NC Department of Environment and Natural Resources (DENR) has established a Mercury Task Force that includes staff from DWQ, Division of Air Quality, Hazardous Waste, Pollution Prevention and Wildlife Resources. In addition, DWQ has established an internal Water Quality Section Work Group to stay abreast of mercury issues. Section A, Part 4.8 provides more details about mercury.

## **9.4 Section 303(d) Listed Waters**

Currently in this subbasin, there are no waters listed on the state's year 2000 §303(d) list. The Roanoke River and Welch Creek, along with all other waters in the basin, will be added to the state's §303(d) list of impaired waters in 2002 based on fish consumption advisories. Refer to Appendix IV for more information on the state's §303(d) list and listing requirements.

## **9.5 Other Issues and Recommendations**

The surface waters discussed in this section are fully supporting designated uses (or not rated) based on recent DWQ monitoring; however, data revealed some impacts to water quality. Although no action is required for these streams, voluntary implementation of BMPs is encouraged and continued monitoring is recommended. DWQ will notify local agencies of water quality concerns regarding these waters and work with them to conduct further monitoring and to locate sources of water quality protection funding. Nonpoint source program agency contacts are listed in Appendix VI.

### **9.5.1 Hardison Mill Creek Deep Run Swamp**

As was mentioned previously, the benthic macroinvertebrate communities of these two streams were sampled, but not rated by DWQ, in 1999 because of their swampy nature. However, significantly less diverse aquatic communities were observed in these streams than in other Roanoke River basin swamp stream communities. The headwaters of both streams are extensively channelized leading to severe habitat degradation in several miles of stream in these watersheds. Refer to Section A, Part 4.4 for further information and recommendations.