

Chapter 9

Roanoke River Subbasin 03-02-09

Including: Roanoke River, Conoho Creek, Sweetwater Creek, Devils Gut, Hardison Mill Creek and Welch Creek

9.1 Subbasin Overview

Subbasin 03-02-09 at a Glance

Land and Water Area

Total area:	559 mi ²
Land area:	435 mi ²
Water area:	124 mi ²

Population Statistics

2000 Est. Pop.:	25,359 people
Pop. Density:	45 persons/mi ²

Land Cover (percent)

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

Counties

Halifax, Martin, Bertie, Washington, Edgecombe and Beaufort

Municipalities

Oak City, Hassell, Hamilton, Williamston, Jamesville and Plymouth

Monitored Stream Statistics

Aquatic Life

Total Streams:	116.4 mi
Total Supporting:	80.3 mi
Total Impaired:	17.8 mi
Total Not Rated:	18.3 ac

Recreation

Total Streams:	47.2 mi
Total Supported:	47.2 mi

This subbasin contains a very expansive floodplain ecosystem with many inlets and outlets. In addition, there is a complex distributary system at the mouth of the Roanoke River that may, during periods of low flow experience saltwater intrusion and tidal effects that extend more than halfway up the Roanoke River (Bales and others, 1993). Over 55,000 acres of land are owned either by US Fish and Wildlife Service, NC Wildlife Resources Commission or The Nature Conservancy. The area is mostly rural, consisting largely of forest and agricultural land. Martin County has an estimated growth of 0.6 percent by the year 2020 and Bertie County may decrease by 8 percent in population by 2020. For more information regarding population growth and trends, refer to Appendix I.

Several water quality improvement programs have been implemented in this subbasin. The NC Agriculture Cost Share Program (NCACSP), which helps reduce agricultural runoff by helping farmers implement best management practices, is one of these programs. The NCACSP provided \$431,084 towards implementing sediment and nutrient reduction practices and animal waste management within this subbasin. For more information on this and other programs, refer to watershed discussion throughout this chapter as well as in chapters 16 and 20.

Eight individual NPDES discharge permits are issued in this subbasin with a total permitted flow of 86 MGD, the largest permitted flow in the basin. Three facilities are required to conduct whole effluent toxicity (WET) testing. McMurray Fabrics Inc. had significant noncompliance for WET testing requirements in this assessment period. One individual stormwater permit is issued in this subbasin. Refer to Appendix VI for identification and more information on

individual NPDES permit holders. Six registered animal operations are located in this subbasin. Refer to Chapter 16 for more information regarding animal operations within this basin.

A map including the locations of NPDES discharges and water quality monitoring stations is presented in Figure 14. Table 11 contains a summary of assessment units and lengths, streams

Figure 14 Roanoke River Subbasin 03-02-09

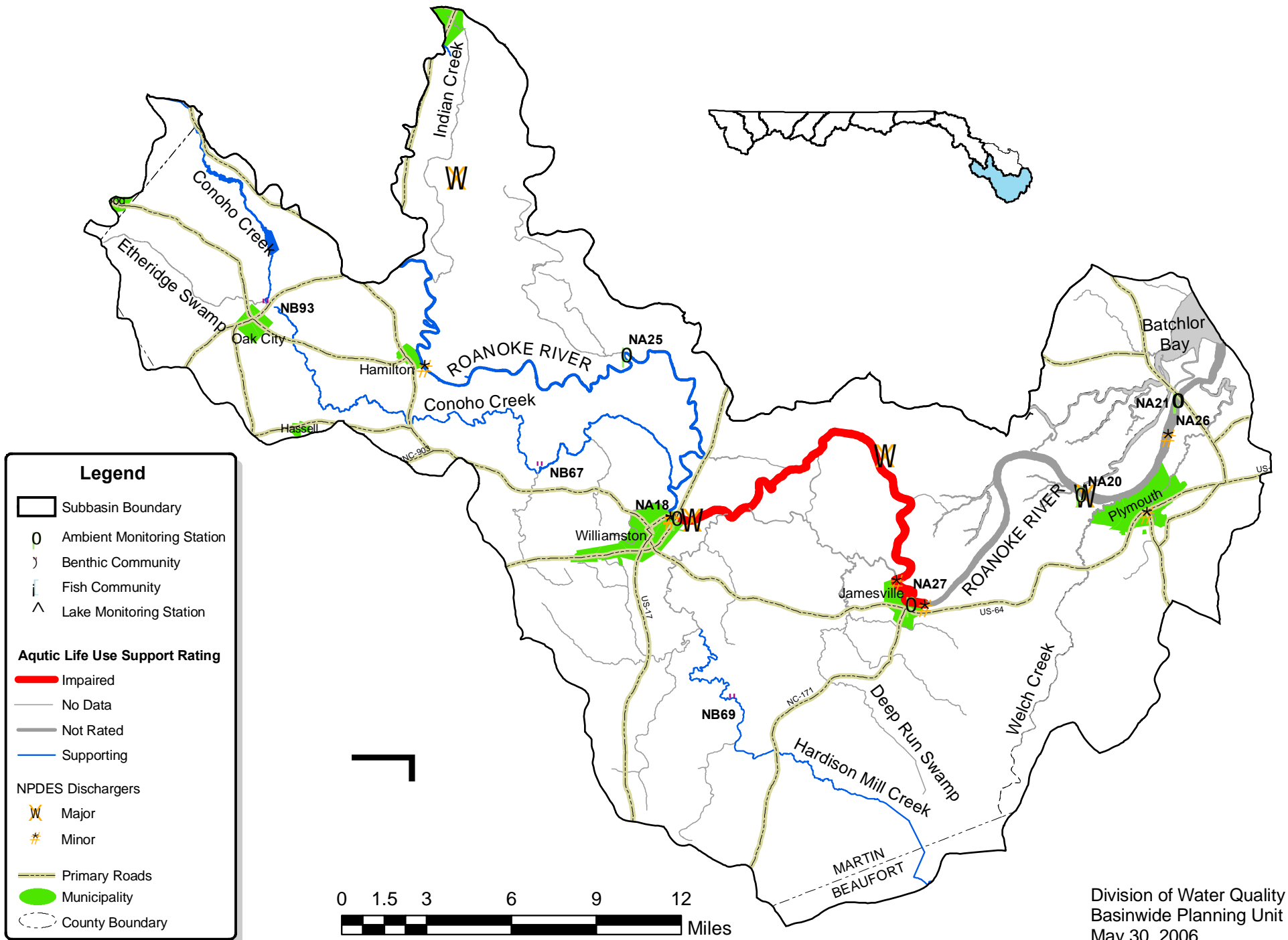


Table 11 ROANOKE Subbasin 03-02-09

AU Number	Classification	Length/Area	Aquatic Life Assessment				Recreation Assessment				
			AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result	Stressors	Sources
ALBEMARLE SOUND (Batchelor Bay)											
24	B;Sw	1,475.5 S Acres	ND								Dioxin
West of a line extending from a point of land 0.3 mile north of mouth of Morgan Swamp in a southerly direction to a point of land on the eastside of the mouth of Roanoke River											
Conoho Creek											
23-49a	C	24.5 FW Miles	S								ND
					NB93	M	2004				
23-49b	C	7.0 FW Miles	S								ND
					NB67	N	2004				
Hardison Mill Creek											
23-50-3	C	19.9 FW Miles	S								Habitat Degradation Unknown
					NB69	M	2004				
ROANOKE RIVER											
23-(26)b2	C	28.9 FW Miles	S		NA18	NCE			S	NA18	NCE
					NA25	NCE					
From subbasin 8/9 boundary to Hwy 17 Bridge in Williamston											
23-(26)b3	C	17.8 FW Miles	I		NA27	CE	Low DO 16.3		NR		Fecal Coliform Bacteria Dioxin Low Dissolved Oxygen WWTP NPDES WWTP NPDES Impoundment
From Hwy 17 bridge at Williamston to the 18 mile marker at Jamesville											
23-(53)	C;Sw	18.3 FW Miles	NR		NA20	NCE			S	NA20	NCE
					NA21	NCE				NA21	NCE
					NA26	NCE	Low DO 22.9				
From 18 mile marker at Jamesville to Albemarle Sound (Batchelor Bay)											

Table 11 ROANOKE Subbasin 03-02-09

AU Number	Classification	Length/Area	Aquatic Life Assessment				Recreation Assessment					
			AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result	Stressors	Sources	
Welch Creek												
23-55	C;Sw	13.3 FW Miles	ND					ND			Dioxin	WWTP NPDES
From source to Roanoke River												

Use Categories:	Monitoring data type:	Results:	Use Support Ratings 2005:
AL - Aquatic Life	NF - Fish Community Survey	E - Excellent	S - Supporting I - Impaired
REC - Recreation	NB - Benthic Community Survey	G - Good	NR - Not Rated
	NA - Ambient Monitoring Site	GF - Good-Fair	NR*- Not Rated for Recreation (screening criteria exceeded)
	NL- Lake Monitoring	F - Fair	ND-No Data Collected to make assessment
		P - Poor	
		NI - Not Impaired	
Miles/Acres	m- Monitored	N- Natural	Results
FW- Fresh Water	e- Evaluated	M - Moderate	CE-Criteria Exceeded > 10% and more than 10 samples
		S-Severe	NCE-No Criteria Exceeded
			ID- Insufficeint Data Available

Aquatic Life Rating Summary				Recreation Rating Summary			
S	m	80.3	FW Miles	S	m	47.2	FW Miles
NR	m	18.3	FW Miles	NR	e	17.8	FW Miles
I	m	17.8	FW Miles	ND		1,475.5	S Acres
ND		1,475.5	S Acres	ND		245.7	FW Miles
ND		194.3	FW Miles				

Fish Consumption Rating Summary			
I	m	1,475.5	S Acres
I	m	49.4	FW Miles
I	e	261.3	FW Miles

monitored, monitoring data types, locations and results, along with use support ratings for waters in this subbasin. Refer to Appendix IX for more information about use support ratings.

Benthic community biocriteria for swamp streams have been developed since the previous basinwide plan (2001). Where appropriate, those criteria were applied to sites Not Rated in the 2001 basin plan (Conoho Creek and Hardison Mill Creek). Three benthic macroinvertebrate community samples (Figure 14 and Table 11) were collected during this assessment period. Data were also collected from one ambient monitoring station. Refer to the *2005 Roanoke 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.

9.2 Use Support Assessment Summary

Use support ratings were assigned for waters in subbasin 03-02-09 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 waters are Supporting on an evaluated basis based on reports from DEH regional water treatment plant consultants.

There were 116.4 stream miles (37.5 percent) monitored during this assessment period in the aquatic life category. Of these, 17.8 stream miles (5.7 percent) are Impaired and 80.3 stream miles (25.8 percent) were Supporting. In the recreation category, all 47.2 monitored stream miles (15.2 percent) were Supporting. There were also 49.4 stream miles (15.9 percent) and 1,475.5 saltwater acres (100 percent) that were Impaired on a monitored basis in the fish consumption category for dioxin contamination. All surface waters within this basin are Impaired on an evaluated basis for mercury based on an advice by NC Department of Health and Human Services. Refer to Table 11 for a summary of use support ratings by category for waters in the subbasin 03-02-09.

9.3 Status and Recommendations of Previously and Newly Impaired Waters

The following waters were either identified as Impaired in the previous basin plan (2001) 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 2008 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#). Information regarding 303(d) listing and reporting methodology is presented in Appendix VII.

9.3.1 Roanoke River [AU# 23-(26)b3 & 23-(53)], Welch Creek [AU# 23-55], Albemarle Sound (Batchelor Bay)[AU# 24]

2001 Recommendations

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 due to dioxin concentrations.

Current Status

The Roanoke River [AU# 23-(26)b3], from Hwy 17 bridge at Williamston to the 18 mile marker at Jamesville (17.8 miles), is Impaired for aquatic life based on the dissolved oxygen standard violation at site NA27. A US Geological Survey (USGS) conducted a study entitled, "Relations Among Floodplain Water Levels, Instream Dissolved-Oxygen Conditions, and Streamflow in the Lower Roanoke River, North Carolina, 1997-2001" (USGS Water-Resources Investigations Report 03-4295). Data from this study indicated that from September 1999 through August 2004, 16.3 percent of the samples taken were below the continuous monitoring dissolved oxygen standard for the daily average of 5 mg/l. This section of the Roanoke River will be placed on the 2008 303(d) list.

McMurray Fabrics Inc. had significant noncompliance for their Whole Effluent Toxicity (WET) testing requirements in this assessment period. DWQ is working with the facility to rectify the problem. The facility will continue to conduct WET testing per their permit requirements.

The Town of Williamston WWTP has had chronic problems exceeding their discharge limits for fecal coliform bacteria and total suspended solids. They have had civil penalties levied in excess of \$70,000 over the past several years. The town was issued an SOC for fecal coliform in February 2006. They are required to upgrade their chlorination and dechlorination system by December 2007. They paid an upfront SOC penalty of \$5,000.

The Roanoke River [AU# 23-(53)] from the 18 mile marker at Jamesville to Albemarle Sound (Batchelor Bay) (18.3 miles), is not rated for aquatic life due to inconclusive data available in the swamp area. Dissolved oxygen was below the standard for the daily average of 5 mg/l in 22.95 percent of the samples taken at USGS site NA26 (swamp water area). This section of the Roanoke River is supporting for recreation because the fecal coliform bacterial screening criteria was not exceeded at sites NA20 and NA21.

The Town of Plymouth were awarded a nearly \$2 million dollar grant from the NC Clean Water Management Trust Fund. The Plymouth sewer system has experienced a large amount of groundwater infiltration, which is overburdening lift stations after heavy rain events. Sewer lines and possibly waterlines will be replaced or repaired using funds from this grant. This project is divided into two phases. Construction on phase I is projected to start in January 2007 and will result in the replacement of sewer and waterlines. Phase II will involve slip lining of sewer pipes and manhole replacement. Phase II construction should start in January 2008.

It is noted that severe bank erosion is occurring on the Roanoke River. River flows are managed for flood control by the US Army Corp of Engineers and for hydropower generation by private

industries. These managed flows are not similar to natural seasonal flow conditions and subsequently extends the length of time flooding occurs on the floodplain and in backswamps. In addition, frequent managed high flows at bankfull heights further accelerate river bank erosion. The Federal Energy Regulatory Commission (FERC) re-licensing requirements for Dominion North Carolina Power (Dominion) are be discussed in Section 9.5 (Additional Water Quality Issues).

Dioxin Fish Consumption Advisory

These same areas of the Roanoke River (from Hwy 17 bridge [AU# 23-(26)b3] to the Albemarle Sound [AU# 23-(53)]) (36.1 miles total) as well as Albemarle Sound (Batchelor Bay) [AU# 24] from west of a line extending from a point of land 0.3 miles north of mouth of Morgan Swamp in a southerly direction to a point of land on the eastside of the mouth of Roanoke River (1,475.5 saltwater acres) and Welch Creek [AU# 23-55], from the source to Roanoke River (13.3 miles), is Impaired for fish consumption based on an advisory from the NC Department of Health and Human Services' (DHHS) for dioxin in carp and catfish.

The Albemarle Sound, from Bull Bay to Harvey Point, west to mouth of the Roanoke River and to the mouth of the Chowan River to the US Hwy 17 Bridge, is also Impaired for fish consumption under this same dioxin advisory.

The fish consumption impairments are due to the fish consumption advisory posted in October 2001 for carp and catfish. It is advised that carp and catfish from these waters may contain low levels of dioxins. Women of childbearing age and children should not eat any carp or catfish from these areas. All other persons should eat no more than one meal per person per month of carp and catfish from these areas. Swimming, boating, and other recreational activities present no health risks and are not affected by this advisory. For more information regarding fish consumption advisories, call (919) 707-5900 or visit the NC DHHS Division of Public Health website at <http://www.schs.state.nc.us/epi/fish/current.html>.

2006 Recommendations

DWQ, in cooperation with Weyerhaeuser Company, will continue to monitor the lower Roanoke River and Welch Creek and will work closely with the DHHS to lift the advisory when there is no longer a risk to human health from consumption of fish. The EPA approved a dioxin TMDL in 1996. Discussions between multiple state and federal agencies regarding alternative dioxin clean up options have ensued. Such alternatives look at site remediation and testing, removal and capping of the dioxin contaminant in Welch Creek.

9.4 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 were documented for these waters during this assessment. Attention and resources should be focused on these waters to prevent additional degradation and facilitate water quality improvements. DWQ will notify local agencies of these water quality concerns and work with them to conduct further assessments and to locate sources of water quality protection funding. Additionally, education on local water quality issues and voluntary actions are useful tools to prevent water quality problems and to promote restoration efforts. Nonpoint source program agency contacts are listed in Appendix VIII.

9.4.1 Conoho Creek [AU# 23-49a & 23-49b]

Current Status and 2006 Recommendations

Conoho Creek [AU# 23-49a], from source to Martin Co. 1417 below Beaverdam Creek (24.5 miles) and [AU#23-49b] from Martin Co. 1417 to Roanoke River (7.0 miles), is Supporting aquatic life based on Moderate Stress and Natural benthic community bioclassifications at sites NB93 and NB67. Riparian areas were intact at site NB93 and considering the range of Moderate Stress scores, this site nearly scored a Natural. The downstream site NB67 scored Natural likely due to the larger drainage area (increased flow and dilution of impacts), which may contribute to the better benthic community bioclassification. DWQ will continue to monitor Conoho Creek.

9.4.2 Hardison Mill Creek [AU# 23-50-3]

Current Status and 2006 Recommendations

Hardison Mill Creek, from source to Sweetwater Creek (19.9 miles), is Supporting aquatic life based on a Moderate Stress benthic community bioclassification at sites NB69. A large clear cut area on the right bank and adjacent riparian zone was noted. Actual cutting was in progress during the sampling effort. Microhabitats were also lacking at this site. DWQ will continue to monitor Hardison Mill Creek.

9.5 Additional Water Quality Issues within Subbasin 03-02-09

9.5.1 Indian Creek [AU# 23-47]

Water Quality Initiatives

The NCEEP is facilitating the transfer of the Roquist Pocosin tract from the NC Department of Transportation to the Wildlife Resource Commission. The tract provides water quality protection to Indian Creek (AU# 23-47). This will be discussed in more detail in section 10.5.1.

9.5.2 Roanoke River [AU # 23-(26)b2]

Current Status

Roanoke River, from subbasin 03-02-08/-09 boundary to Hwy 17 bridge in Williamston (28.9 miles), is Supporting aquatic life due to DWQ and USGS concurrent ambient monitoring at sites NA18 and NA25. During this assessment period, no benthic or fish community sites were sampled on the Roanoke River due to resource constraints and high flows.

This section of the Roanoke River is also Supporting recreation because the fecal coliform bacterial screening criteria was not exceeded at site NA18.

DWQ as well as other state and federal agencies are extensively involved with Dominion Power's Federal Energy Regulatory Commission (FERC) new license requirements to conduct several studies including monitoring and reporting of water quality conditions in the Roanoke River and upstream reservoirs.

A comprehensive Section 216 study was initiated to study the potential impacts John H Kerr dam has on the lower Roanoke River. The relationship between river flow, floodplain water level,

and instream dissolved oxygen (DO) concentrations are important but poorly understood for the lower Roanoke River. Flooding and floodplain inundation of this area no longer follows a natural seasonal pattern, but are instead primarily governed by upstream reservoir releases.

The objective of the proposed study is to provide the flow and water quality modeling tools that can be used to assess the effects of changes in John H. Kerr operations on Roanoke River flows; duration, extent, depth, and timing of floodplain inundation; DO levels in the river; and intrusion of brackish water from Albemarle Sound upstream into the river. These objectives will be met by performing the following tasks:

- (1) review existing data and develop a hydrologic and water quality monitoring plan to support modeling,
- (2) review existing modeling frameworks for the Roanoke River,
- (3) implement the hydrologic and water quality monitoring program,
- (4) develop, calibrate, and test hydrodynamic models that are capable of simulating upstream and downstream movement of water, as well as the storage and release of water from the floodplains,
- (5) develop, calibrate, and test unsteady water quality models that simulate DO dynamics in the main channel and the floodplain and accounts for the effects of brackish water intrusion from Albemarle Sound on flow and DO processes, and
- (6) apply these models to determine effects of selected water management scenarios on downstream flows, floodplain inundation, and DO.

As of August 2006, task 1 and 2 have been completed and task 3 (monitoring) has been initiated. The hydrodynamic modeling activities are proposed to begin concurrently with data collection. The entire project is scheduled to be complete by mid-2008.

The study will provide policy makers and water resource managers in North Carolina and Virginia with the tools and data that are essential to assessing management strategies for maintaining and enhancing Roanoke River water quality and riparian habitat. The flow and transport model for the Roanoke River can be used to assess the effects of flow management scenarios on dissolved-oxygen in the river.

