

## Chapter 6

### Roanoke River Subbasin 03-02-06

Including: Little Island Creek, Nutbush Creek and J.H. Kerr Reservoir

#### 6.1 Subbasin Overview

##### *Subbasin 03-02-06 at a Glance*

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

Total area:	329 mi <sup>2</sup>
Land area:	295 mi <sup>2</sup>
Water area:	34 mi <sup>2</sup>

###### **Population Statistics**

2000 Est. Pop.:	38,992 people
Pop. Density:	119 persons/mi <sup>2</sup>

###### **Land Cover (percent)**

Forest/Wetland:	75%
Surface Water:	6.4%
Urban:	1.1%
Cultivated Crop:	8.6%
Pasture/ Managed Herbaceous:	9%

###### **Counties**

Person, Granville, Vance and Warren

###### **Municipalities**

Stovall and Henderson

###### **Monitored Stream Statistics**

###### **Aquatic Life**

Total Streams:	61.8 mi/9690.1 ac
Total Supporting:	20.4 mi
Total Impaired:	13.4 mi
Total Not Rated:	28.0 mi/9690.1 ac

###### **Recreation**

Total Streams:	1.6 mi
Total Supporting:	1.6 mi

This subbasin contains many small to medium-sized headwater tributaries of John H. Kerr Reservoir. Granville County has the highest estimated population growth in the Roanoke River basin at 29 percent by the year 2020. Population increases of 22 percent, 16 percent and 17 percent are projected for Person, Vance and Warren counties, respectively. For more information regarding population growth and trends, refer to Appendix I.

Three individual NPDES discharge permits are issued in this subbasin with a total permitted flow of 6 MGD. The largest is Henderson Water Reclamation Facility (WRF). Refer to Appendix VI for identification and more information on individual NPDES permit holders. Two registered swine operations are located in this subbasin. Refer to Chapter 16 for more information regarding animal operations within this basin.

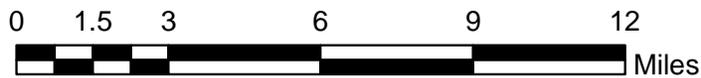
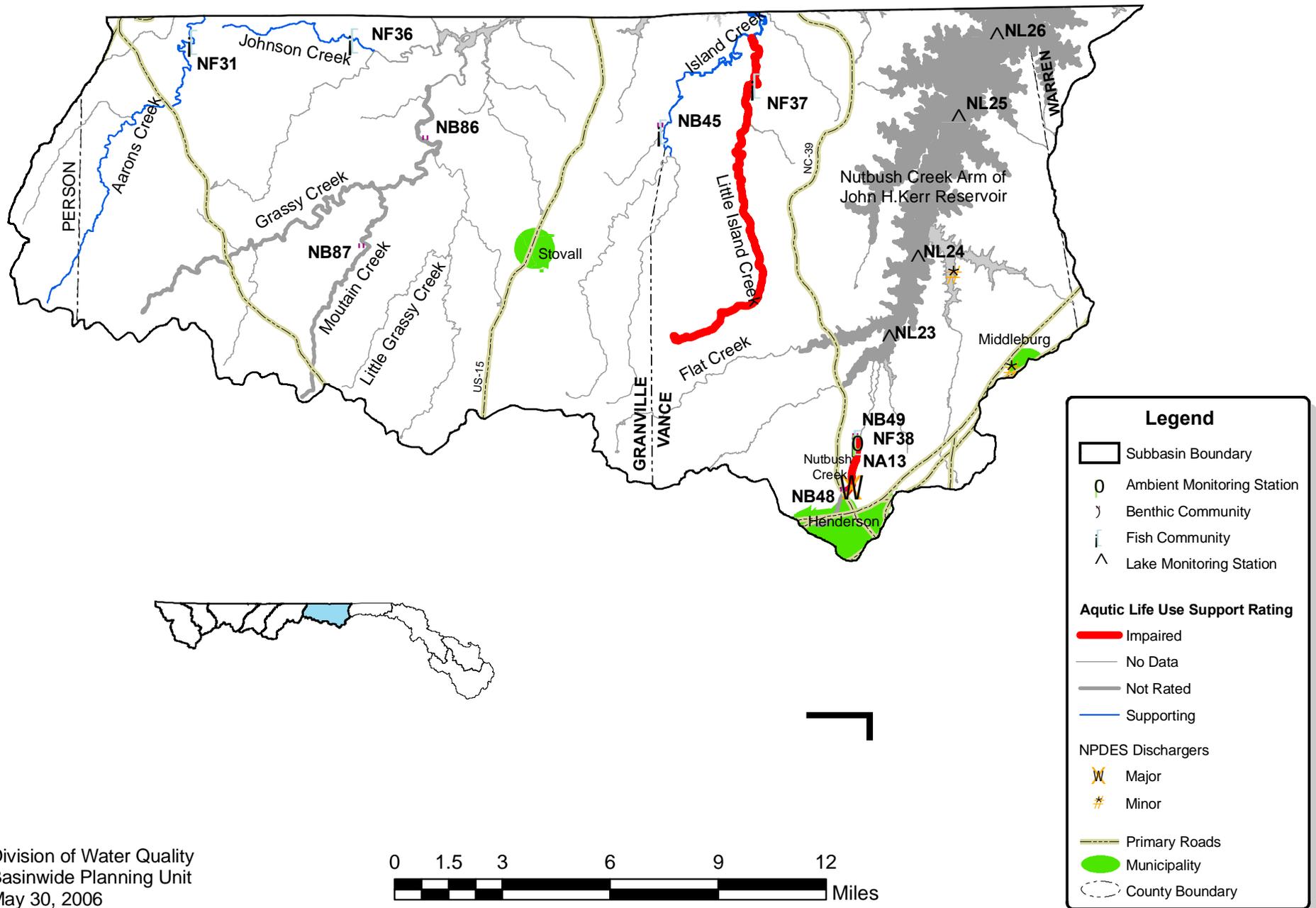
Several water quality improvement programs have been implemented in this subbasin. The NC Agriculture Cost Share Program (NCACSP), which helps reduce agricultural runoff by helping farmers implement best management practices, is one of these programs. The NCACSP provided \$881,669 towards implementing sediment and nutrient reduction practices, animal waste management, and livestock stream access elimination 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.

A map including the locations of NPDES discharges and water quality monitoring stations is presented in Figure 10. Table 8 contains a summary of assessment units and lengths, streams 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.

Five benthic macroinvertebrate community samples and four fish community samples (Figure 10 and Table 8) were collected during this assessment period. Data were collected from one ambient monitoring station and one fish tissue site. Refer to the *2005 Roanoke River Basinwide*

# Figure 10 Roanoke River Subbasin 03-02-06



**Table 8 ROANOKE Subbasin 03-02-06**

AU Number	Classification	Length/Area	Aquatic Life Assessment				Recreation Assessment			
			AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result	Stressors
Description										
<b>Aarons Creek</b>										
22-59	C	8.6 FW Miles	<b>S</b>					ND		
From source to North Carolina-Virginia State Line				NF31	G	2004				
<b>Grassy Creek (Grass Creek)</b>										
23-2-(1)	C	18.3 FW Miles	<b>NR</b>					ND		
From source to John H. Kerr Reservoir at Granville County SR 1431				NB86	NR	2004				
<b>Island Creek (Island Creek Reservoir)</b>										
23-4	C	6.4 FW Miles	<b>S</b>					ND	Habitat Degradation	Agriculture
From source to North Carolina-Virginia State Line, including that portion of Island Creek Reservoir in North Carolina below normal operating elevation				NB45	GF	2004			Habitat Degradation	Land Clearing
<b>Johnson Creek</b>										
23-2-7-(1)	C	5.3 FW Miles	<b>S</b>					ND	Habitat Degradation	Impoundment
From source to Little Johnson Creek				NF36	GF	2004				
<b>Little Island Creek (Vance County)</b>										
23-4-3	C	11.8 FW Miles	<b>I</b>					ND	Toxic Impacts	Land Clearing
From source to Island Creek Reservoir, Island Creek				NF37	P	2004			Habitat Degradation	Impoundment
<b>Mountain Creek</b>										
23-2-3	C	8.1 FW Miles	<b>NR</b>					ND		
From source to Grassy Creek				NB87	NR	2004				

**Table 8 ROANOKE Subbasin 03-02-06**

AU Number	Classification	Length/Area	Aquatic Life Assessment				Recreation Assessment			
			AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result	Stressors
<b>Nutbush Creek (Including Nutbush Creek Arm of John H. Kerr Reservoir below normal pool elevation)</b>										
23-8-(1)a	C	1.7 FW Miles	<b>NR</b>					ND		
From source to NC 39				NB48	NR	2004				
23-8-(1)b	C	1.6 FW Miles	<b>I</b>	NA13	NCE			<b>S</b>	NA13	NCE
From NC 39 to SR 1317				NB49	F	2004				
				NF38	F	2004				
<b>Nutbush Creek Arm of John H. Kerr Reservoir (below normal pool elevation 300 feet MSL or as this elevation may be adjusted by the Corps of Engineers)</b>										
23-8-(2)	B	9,690.1 FW Acres	<b>NR</b>	NL25	ID			ND		
				NL24	ID					
				NL23	ID					
				NL26	ID					
From Crooked Run to North Carolina-Virginia State Line										

**Table 8 ROANOKE Subbasin 03-02-06**

AU Number	Classification	Length/Area	Aquatic Life Assessment				Recreation Assessment			
			AL Rating	Station	Result	Year/ Parameter % Exc	REC Rating	Station	Result	Stressors
<b>Use Categories:</b>		<b>Monitoring data type:</b>		<b>Results:</b>		<b>Use Support Ratings 2005:</b>				
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						
<b>Miles/Acres</b>		m- Monitored		N- Natural		<b>Results</b>				
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**

S m 20.4 FW Miles  
 NR m 28.0 FW Miles  
 I m 13.4 FW Miles  
 NR m 9,690.1 FW Acres  
 ND 121.6 FW Miles  
 ND 731.0 FW Acres

**Recreation Rating Summary**

S m 1.6 FW Miles  
 ND 181.8 FW Miles  
 ND 10,421.1 FW Acres

**Fish Consumption Rating Summary**

I e 183.4 FW Miles  
 I e 10,421.1 FW Acres

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.

## **6.2 Use Support Assessment Summary**

Use support ratings were assigned for waters in subbasin 03-02-06 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 61.8 stream miles (33.7 percent) and 9,690 freshwater acres (93 percent) monitored during this assessment period in the aquatic life category. Of these, 13.4 stream miles (7.3 percent) are Impaired. In the recreation category 1.6 stream miles (0.9 percent) were monitored, these are classified as Supporting. Refer to Table 8 for a summary of use support ratings by category for waters in the subbasin 03-02-06.

## **6.3 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.

### **6.3.1 Nutbush Creek (AU#23-8-(1)a & b)**

#### 2001 Recommendations

DWQ will continue to work with the Town of Henderson's WWTP to correct remaining problems from their discharge and collection system. However, it is likely that aquatic life will remain impaired because of habitat degradation in the stream. Urban stormwater issues need to be addressed by the Town of Henderson. Best management practices to prevent further degradation by runoff from urban areas and construction sites should be installed. DWQ will continue to monitor the stream and work with local agencies to restore water quality.

### Current Status

Nutbush Creek [AU#23-8-(1)a], from source to NC39 (1.7 miles), is Not Rated for aquatic life due to a Not Rated benthic community bioclassification at site NB48. The stream could not be rated because it is too small and does not fit the criteria to assign a bioclassification. The benthic community is degraded however, and urban influences are of concern since the stream's origin is in Henderson making it difficult to sustain colonization of benthic communities. A lack of flow and low dissolved oxygen were also observed.

Nutbush Creek [AU#23-8-(1)b], from NC 39 to SR1317 (1.6 miles), is Impaired for aquatic life based on a fair fish and benthic community bioclassifications at concurrent sites NF38 and NB49. It is Supporting recreation because the fecal coliform bacteria screening criteria was not exceeded at site NA13 (also concurrent with sites NF38 and NB49). Sites NB49 and NF38 were sampled approximately 1.3 miles below the Henderson WRF. The specific conductance at NF38 was elevated at 467  $\mu\text{mhos/cm}$  in April 2004, and was the highest of any fish community sites in the basin. During the benthic community sampling at NB49 in June 2004, the conductivity was 501  $\mu\text{mhos/cm}$ ; in the summer of 1999 the conductivity was 601  $\mu\text{mhos/cm}$ . Likewise, the 50<sup>th</sup> percentile of specific conductance at site NA13 was 423  $\mu\text{mhos/cm}$ . Heavy filamentous algal growths were present on the bedrock in the lower reaches. The habitat reflected an abundance of sand, few riffles (the single riffle was bedrock), few pools, modest instream habitat (roots were abundant, however), and severely eroding, sparsely vegetated banks. The flow was moderate and the water was slightly turbid at the time of sampling. An elevated pH of 8.0 s.u. could also be traced to the WWTP, as the addition of lime is a component of the treatment process. Unlike other streams in this subbasin that may have reduced flow during dry periods, this stream keeps flowing because of the upstream discharge.

### 2006 Recommendations

DWQ will continue to monitor Nutbush Creek. DWQ is working to develop biocriteria for assigning bioclassifications to streams with watersheds that are less than 3 square miles. Nutbush Creek [AU#23-8-(1)b], will remain on the 303(d) list.

## **6.3.2 Little Island Creek [AU# 23-4-3]**

### Current Status and 2006 Recommendations

Little Island Creek, from source to Island Creek, Island Creek Reservoir (11.8 miles), is Impaired for aquatic life based on a Poor fish community bioclassification at site NF37. The fish community species diversity was low and habitat score was also low. This site and the lower part of the adjacent Island Creek watershed encompass the defunct Tungsten Queen Mine, an inactive hazardous site (NCDENR's Division of Waste Management, NCD082362989). The mine ceased operations in 1971 but at one time was one of the largest tungsten mines in the country. The tailings (sands) in Little Island Creek appeared to be similar to those at the tungsten mine and may have similar contaminant metals of concern including lead, arsenic, antimony, cadmium and zinc. Currently, the area including the tailings (sands) is under a remedial action by the Inactive Hazardous Site Branch of Superfund (Keith Snavley, DWM, pers. com., February 14, 2005). Like other streams in this subbasin, it is probable that the flow in this stream becomes very reduced during dry periods. Recolonization of the fish community from downstream sources is hindered by the barrier of the backwaters of Island Creek Reservoir.

These three factors -- flow, recolonization sources, and potential impacts from the abandoned tailings – may all play a role in the fish community.

It was recommended that this creek be resampled to verify the 2004 results and to identify, if possible, the factors causing the low fish community rating. However, due to drought conditions in 2005 and 2006 a re-evaluation could not be done. DWQ will reassess this watershed during the next basinwide assessment period. Little Island Creek will be added to the 303(d) list of Impaired waters.

## **6.4 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.

### **6.4.1 Island Creek [AU# 23-4]**

#### *Current Status and 2006 Recommendations*

Island Creek, from source to North Carolina-Virginia State Line, including that portion of Island Creek Reservoir in North Carolina below normal operating elevation (6.4 miles), is Supporting aquatic life based on a Good-Fair benthic community bioclassification at site NB45. Riparian areas were intact (though narrow on the right bank), instream habitat included a variety of types, and the substrate was a good mix of gravel, cobble, and boulders. However, riffles were infrequent and moderately embedded and pools were infrequent. Banks were severely eroded with sparse vegetation, the channel appeared filled in with sediment in places, and the stream was only partially shaded. The land use is predominantly agriculture and it is recommended that local agencies work with landowners to install BMPs to improve riparian zones and the overall water quality in Island Creek.

### **6.4.2 Nutbush Creek Arm of J.H. Kerr Reservoir (below normal pool elevation 300 feet MSL or as this elevation may be adjusted by the Corps of Engineers) [AU# 23-8-(2)]**

#### *Current Status*

Arm of J.H. Kerr Reservoir (Nutmash Creek), from Crooked Run to North Carolina-Virginia State Line (9,690.1 acres), is Not Rated due to insufficient samples taken from sites NL23, NL24, NL25 and NL26. DWQ monitored Nutbush Arm of Kerr Reservoir in June, July, and August of 2004. Moderate nutrient and chlorophyll *a* levels were found. Assessment of parameters related to biological productivity indicated moderate biological productivity and mesotrophic status. The reservoir has historically rated either mesotrophic or slightly eutrophic (biologically productive) in historical water quality sampling. Some high dissolved oxygen

saturation values were found in 2004 indicating algal activity, although no visible algal blooms or chlorophyll *a* water quality standards violations were found.

One largemouth bass and two golden redhorse sucker samples were collected from the Nutbush Creek arm of Kerr Lake during 2003 and analyzed for pesticide and PCB contaminants. The samples were collected as part of an ongoing statewide organics assessment. All samples contained trace amounts of DDE, a DDT metabolite, but concentrations were well below US EPA, US FDA, and State of North Carolina criteria. The golden redhorse sucker samples also contained trace amounts of chlordane and tetrabromodiphenyl ether (a PCB-like contaminant) however, the concentrations were below any level of concern.

## **6.5 Additional Water Quality Issues within Subbasin 03-02-06**

The following section discusses issues that may threaten water quality in the subbasin that are not specific to particular streams, lakes or reservoirs. The issues discussed may be related to waters near certain land use activities or within proximity to different pollution sources.

### **6.5.1 Significant Ecological Indicator**

#### Aarons Creek (AU# 22-59)

Aarons Creek, from source to North Carolina-Virginia State Line is Supporting aquatic life due to a Good fish community bioclassification at site NF31. From the confluence of Crooked Fork (just upstream of NC 96) to the NC/VA state line, is considered to be an Aquatic Habitat Site of regional significance because of the presence of four species of rare freshwater mussels in the creek (Sarah McRae, Natural Heritage Program, pers. com. February 15, 2005). At this crossing, the instream, riparian, and watershed characteristics are of high quality and qualified the site as a new fish community regional reference site. It is possible that the flow in this stream becomes very reduced during dry periods and this may have caused the lower than expected fish community score and bioclassification.

