

Chapter 2 -

Roanoke River Subbasin 03-02-02

Includes a portion of the Dan and Mayo Rivers

2.1 Water Quality Overview

Subbasin 03-02-02 at a Glance

Land and Water Area

Total area:	231 mi ²
Land area:	229 mi ²
Water area:	2 mi ²

Population Statistics

1990 Est. Pop.:	19,588 people
Pop. Density:	86 persons/mi ²

Land Cover (%)

Forest/Wetland:	76.1
Surface Water:	0.8
Urban:	1.3
Cultivated Crop:	3.6
Pasture/ Managed Herbaceous:	18.2

This subbasin contains a ten-mile segment of the Dan River and the Mayo River in Stokes and Rockingham counties. Mayodan, Madison and Stoneville are the largest towns. Other streams include Big and Little Beaver Island Creeks, Hogans Creek and Jacobs Creek. A map of this subbasin including water quality sampling locations is presented in Figure B-2.

Bioclassifications for the 1999 sample locations are presented in Table B-4. Use support ratings for each applicable category in this subbasin are summarized in Table B-5. Refer to Appendix III for a complete listing of monitored waters and further information about use support ratings.

Most of the land in this portion of the basin is forested (76 percent), but a significant portion is also in use as cultivated cropland and pasture (22 percent). The estimated subbasin population, based on the 1990 census, is 19,588. Population is expected to increase by 28 percent in Stokes County and three percent in Rockingham County over a twenty-year period (1998 to 2018).

There are nine NPDES permitted dischargers in this subbasin, most of which are small wastewater treatment plants serving residential areas. One of these small wastewater treatment plants had problems with elevated BOD and ammonia in its discharge. The largest discharge is from the Town of Mayodan's WWTP to the Mayo River. Two facilities in this subbasin are required to monitor their effluent's toxicity: Mayodan WWTP and Stoneville WWTP. There were no indications of toxicity problems during the most recent review period.

Benthic macroinvertebrates in this subbasin were sampled under extreme low flow conditions in 1999. For larger streams affected by nonpoint source pollution, a sharp decline in flow may result in a higher bioclassification; smaller streams, however, might be adversely affected by extremely low flow.

Table B-4 DWQ Monitoring Locations and Benthic Macroinvertebrate Bioclassifications (1999) for Roanoke River Subbasin 03-02-02

Site	Stream	County	Road	Bioclassification
<i>Benthic Macroinvertebrates</i>				
B-1*	Mayo River	Rockingham	SR 1358	Good
B-5*	Mayo River	Rockingham	SR 2177	Good-Fair
<i>Ambient Monitoring</i>				
N1400000	Mayo River	Rockingham	SR 1358	N/A

* Historical data are available; refer to Appendix II.

Benthic macroinvertebrates were collected from two locations on the Mayo River in 1999. The most upstream location (near the NC/VA state line) has consistently received Good bioclassifications over five collections since 1986. The most downstream location (near the confluence with the Dan River), however, received a Good-Fair bioclassification in 1999, indicating a decline in water quality as the river flows through North Carolina. Water quality in the Mayo River is discussed further in Part 2.5 of this chapter.

Water chemistry samples are collected monthly from the Mayo River near the North Carolina/Virginia state line. These data have indicated good water quality with few violations of water quality standards. Although the geometric mean of fecal coliform bacteria samples was below the 200 colonies/100ml reference level, this station had elevated levels of fecal coliform compared to other monitoring locations in the Roanoke River basin. Turbidity was also slightly elevated.

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-5 Use Support Ratings Summary (1999) for Monitored and Evaluated¹ Freshwater Streams (miles) in Roanoke River Subbasin 03-02-02

Use Support Category	FS	PS	NS	NR	Total ²
Aquatic Life/ Secondary Recreation	85.5	0	0	45.8	131.3
Fish Consumption³	0	9.3	0	0	9.3
Primary Recreation	0	0	0	11.3	11.3
Water Supply	0	0	0	0	0

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

² 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.

³ These waters are impaired because of a statewide fish consumption advisory for bowfin. Refer to Section A, Part 4.8.4 for further information. Fish tissue monitoring in the Dan River is discussed in Chapter 3 of this section.

2.2 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 waterbody. The 1996 Roanoke River Basinwide Plan did not identify any impaired stream segments in this subbasin.

2.3 Status and Recommendations for Newly Impaired Waters

The Dan River, from the confluence with Jacobs Creek to a point just downstream of Matrimony Creek in subbasin 03-02-03, is rated partially supporting based on recent DWQ monitoring (1995-1999). This section outlines the potential causes and sources of impairment and provides recommendations for improving water quality.

2.3.1 Dan River (14.2 miles from Jacobs Creek to Matrimony Creek)

Current Status

The turbidity standard (50 NTU) was exceeded at the Dan River near Wentworth (N2300000) ambient monitoring station in 18 percent of 55 samples collected from 1995 to 1999. Results of data collected from this station are discussed more thoroughly in Section A, Chapter 3. All particles in the water that may scatter or absorb light, including suspended sediment, aquatic organisms and organic particles such as pieces of leaves, contribute to turbidity. Therefore, all types of nonpoint source pollution have the potential to increase turbidity concentrations. Construction in the Madison/Mayodan area, agricultural activities, suspended sediment loading from upstream in both the Dan and the Mayo Rivers, as well as permitted instream mining operations are all potential sources.

2001 Recommendations

DWQ will work with the Division of Land Resources to evaluate and reduce turbidity from permitted instream mining operations in the Dan River. As permits are renewed, monitoring upstream and downstream of mining operations and instream BMPs (such as those used by the NC Department of Transportation during bridge construction) could be required. Refer to Section A, Chapter 4 for further discussion and recommendations about instream mining operations and other potential sources of nonpoint source pollution in the watershed. In addition, 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.

2.4 Section 303(d) Listed Waters

Currently in this subbasin, no waterbodies are listed on the state's year 2000 §303(d) list. A portion of the Dan River, discussed above, will likely be added to the list in 2002. Refer to Appendix IV for more information on the state's §303(d) list and listing requirements.

2.5 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. Additionally, education on local water quality issues is always a useful tool to prevent water quality problems and to promote restoration efforts. Nonpoint source program agency contacts are listed in Appendix VI.

2.5.1 Mayo River

As was noted in the overview of monitoring data, a decline in biological integrity was observed in the Mayo River between the upper sampling station near the NC/VA state line and the lower sampling station near the confluence with the Dan River at Mayodan. The lower site declined to Good-Fair under low flow conditions in 1999. Two of the most common pollutants in runoff associated with livestock grazing in riparian areas (with direct access to streams) are bacteria and sediment. Failing septic systems and problems with wastewater treatment plants can also cause high levels of fecal coliform bacteria.

There are several discharges between the two Mayo River monitoring stations; however, records did not indicate significant compliance or toxicity problems with these discharges over the past five years. There is one permitted instream mining operation in this section of the Mayo River. Urban/construction and agricultural runoff are likely contributing to this decline in water quality as well. DWQ will continue to monitor water quality in the Mayo River. Section A, Chapter 4 contains general recommendations for development, construction, stormwater and agricultural best management practices, as well as instream mining activities.

2.5.2 Projected Population Growth

Stokes County is projected to receive the largest population increase of the sixteen counties in the NC portion of the Roanoke River basin. From 1998 to 2018, the estimated population growth for Stokes County is 28 percent and Rockingham County is three percent. Growth management within the next five years will be imperative, especially in and around urbanizing areas, in order to maintain good water quality in this subbasin. Growth management can be defined as the application of strategies and practices that help achieve sustainable development in harmony with the conservation of environmental qualities and features of an area. On a local level, growth management often involves planning and development review requirements that are designed to maintain or improve water quality. Refer to Section A, Chapter 4 for more information about urbanization and development and recommendations to minimize impacts to water quality.

2.5.3 NPDES Discharges

As was mentioned in this chapter's overview, one facility experienced problems complying with NPDES permit limits over the most recent two-year review period: Bethany Elementary School. Rockingham County upgraded the WWTP at Bethany Elementary in 1998 to a recirculating sand filter system with ultraviolet disinfection. This facility is currently in full compliance (Russell, June 7, 2001).

