Section B: Chapter 2

Yadkin-Pee Dee River Subbasin 03-07-02

Includes Mitchell River, Fisher River and Deep Creek Watersheds

2.1 Water Quality Overview

Subbasin 03-07-02 at a Glance

Land and Water

Total area:	822 mi^2
Stream miles:	715.9
Lake acres	134.9

Population Statistics

1990 Est. Pop.:	90,781 people
Pop. Density:	111 persons / mi^2

Land Cover (%)

Forest / Wetland:	59.4
Surface Water:	0.7
Urban:	1.2
Cultivated Crop:	6.5
Pasture / Managed Herbaceous:	32.2

This large subbasin contains the Yadkin River from Elkin to the confluence with Muddy Creek below Winston-Salem. Major tributaries include the Mitchell River and Fisher River in the northern portion of the subbasin, the Little Yadkin River in the eastern portion, and Deep Creek and Forbush Creek in the southern portion. The Ararat River (discussed in subbasin 03-07-03) also flows into this portion of the Yadkin River.

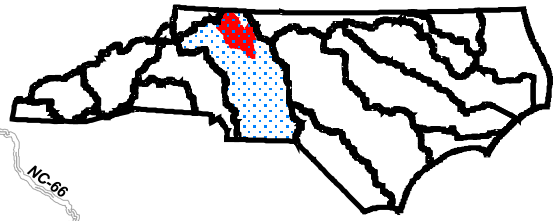
Local governments found within the subbasin are Elkin and Dobson in Surry County, Jonesville, Arlington, Boonville, East Bend and Yadkinville in Yadkin County, portions of Lewisville and Clemmons in Forsyth County, and King in Stokes County. Most of Pilot Mountain State Park is located in this subbasin in the Grassy Creek watershed and along the Yadkin River.

A map including the locations of NPDES discharges and water quality monitoring stations is presented in Figure B-2. Table B-3 contains a summary of monitoring data types, locations and results. Use support ratings for waters in this subbasin are summarized in Table B-4. Appendix I provides a key to discharge identification numbers. Refer to Appendix III for a complete listing of monitored waters and more information about use support ratings.

Approximately 60 percent of the land in this portion of the basin is forested, but a significant amount is also in use as cultivated cropland and pasture (38 percent). Estimated subbasin population is more than 100,000. Population is expected to increase substantially (24 to 32 percent) between 2000 and 2020 for all four counties that partially comprise the subbasin. There are 31 NPDES permitted discharges and 13 registered animal operations. Facilities with compliance or toxicity problems are discussed in following sections.

Water quality is generally good throughout the subbasin. No streams are considered Impaired, but most have some notable water quality impacts. Most streams in the Mitchell and Fisher River watersheds are classified Trout Waters. The Mitchell River watershed is also Outstanding Resource Waters and used for primary recreation. The Fisher River watershed is High Quality Waters (HQW) and used for drinking water supply. The Elkin Creek watershed is also WS-II and HQW.

Figure B-2 Yadkin-Pee Dee River Subbasin 03-07-02



Planning Branch
Basinwide Planning Program Unit
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Table B-3 DWQ Monitoring Locations, Bioclassifications and Notable Chemical Parameters (1998-2002) for Yadkin-Pee Dee River Subbasin 03-07-02

Site	Stream	County	Road	Bioclassification or Noted Parameter[2]
Benthic Macroinvertebrate Community Monitoring				
B-1	Yadkin River[1]	Yadkin	US 21	Good
B-2	Yadkin River	Surry	SR 1003	Good
B-3	Elkin Creek[1]	Surry	NC 268	Good-Fair
B-4	Mitchell River[1]	Surry	SR 1330	Good
B-5	Mitchell River	Surry	SR 1001	Excellent
SSB-1	South Fork Mitchell R[1]	Surry	#1 SR 1316	Good-Fair
SSB-2	South Fork Mitchell R	Surry	#2 SR 1316	Good-Fair
	South Fork Mitchell R	Surry	SR 1301	Good
B-6	Snow Creek[1]	Surry	SR 1121	Good-Fair
B-9	Fisher River[1]	Surry	US 601	Good
B-7	Fisher River	Surry	NC 268	Good
B-8	Little Fisher River[1]	Surry	SR 1350	Good-Fair
	Little Beaver Creek[1]	Surry	NC 268	Not Impaired
B-10	Little Yadkin River[1]	Stokes	SR 1236	Good-Fair
B-11	Forbush Creek[1]	Yadkin	SR 1570	Good-Fair
B-12	Logan Creek[1]	Yadkin	SR 1571	Good
B-13	North Deep Creek[1]	Yadkin	SR 1510	Good-Fair
B-14	South Deep Creek[1]	Yadkin	SR 1733	Good-Fair
Fish Community Monitoring				
	Mitchell River[1]	Surry	SR 1330	Good
F-1	Fisher River	Surry	SR 1341	Excellent
F-2	Little Fisher River[1]	Surry	SR 1331	Good
F-3	Little Yadkin River[1]	Stokes	SR 1236	Excellent
F-4	North Deep Creek	Yadkin	SR 1605	Good-Fair
F-5	South Deep Creek	Yadkin	SR 1152	Good
Ambient Monitoring				
Q0810000	Yadkin River	Surry/Yadkin	Bus US 21	None
Q2020000	Little Yadkin River	Stokes	US 52	Turbidity
Q2040000	Yadkin River	Yadkin/Forsyth	SR 1605	Turbidity

Yadkin-Pee Dee River Basin Association Monitoring				
Q1065000	Mitchell River	Surry	SR 1001	None
Q1215000	Fisher River	Surry	NC 268	None
Q1350000	Yadkin River	Surry	SR 1003	Turbidity
Q2090000	North Deep Creek	Yadkin	SR 1605	Fecal coliform
Q2120000	North Deep Creek	Yadkin	SR 1510	None
Q2135000	South Deep Creek	Yadkin	SR 1733	None
Q2180000	Yadkin River	Davie/Forsyth	US 158	Turbidity

[1] Historical data of this type are available for this waterbody; refer to Appendix II. Sites may vary.
[2] Parameters are noted if in excess of state standards in more than 10 percent of samples collected within the assessment period (9/1996-8/2001).

For more detailed information on sampling and assessment of streams in this subbasin, refer to the *Basinwide Assessment Report - Yadkin-Pee Dee River Basin* (NCDENR-DWQ, June 2002), available from DWQ Environmental Sciences Branch at http://www.esb.enr.state.nc.us/bar.html or by calling (919) 733-9960.

Table B-4 Use Support Ratings Summary (2002) for Monitored and Evaluated Freshwater Streams (miles) and Lakes (acres) in Yadkin-Pee Dee River Subbasin 03-07-02

Use Support Category	Units	Supporting	Impaired	Not Rated	No Data	Total[1]
Aquatic Life/Secondary Recreation	miles	380.3	0.0	0.0	335.6	715.9
	acres	8.4	0.0	0.0	126.5	134.9
Fish Consumption	miles	715.9	0.0	0.0	0.0	715.9
	acres	134.9	0.0	0.0	0.0	134.9
Primary Recreation	miles	30.0	0.0	0.0	22.8	52.8
	acres	0.0	0.0	0.0	17.6	17.6
Water Supply	miles	301.5	0.0	0.0	0.0	301.5
	acres	81.7	0.0	0.0	0.0	81.7

[1] Total stream miles/acres assigned to each use support category in this subbasin. Column is not additive because some stream miles are assigned to more than one category.

2.2 Status and Recommendations for Previously Impaired Waters

This section reviews use support and recommendations detailed in the 1998 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 1998 Yadkin-Pee Dee River basin plan did not identify any Impaired waters in this subbasin.

2.3 Status and Recommendations for Newly Impaired Waters

In subbasin 03-07-02, no stream segments are Impaired based on recent DWQ monitoring (1998-2001); however, some impacts to water quality were observed. Refer to Part 2.5 below for further discussion of potential water quality problems.

2.4 Section 303(d) Listed Waters

No waters in this subbasin are listed on the state's draft 2002 303(d) list. Refer to Appendix IV for more information on the state's 303(d) list and listing requirements.

2.5 Status and Recommendations for Waters with Notable Impacts

Based on DWQ's most recent use support assessment, the surface waters discussed below are not Impaired. However, notable water quality impacts were documented. While these waters are not considered Impaired, attention and resources should be focused on them over the next basinwide planning cycle to prevent additional degradation or facilitate water quality improvement. A discussion of how impairment is determined can be found in Appendix III.

Although no action is required for these streams, voluntary implementation of BMPs is encouraged and continued monitoring is recommended. DWQ will notify local agencies and others of water quality concerns discussed below 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 agency contacts are listed in Appendix VI.

2.5.1 Elkin Creek

Elkin Creek is in Wilkes County and flows southeast into the Yadkin River at Elkin. The watershed is primarily agricultural; however, the low end is developed and road coverage is moderate throughout. Although the bioclassification did not change, four fewer benthic macroinvertebrate taxa were collected in 2001 when compared with 1996. Habitat degradation in the form of sedimentation and minimal riparian vegetation was noted. Further investigation into the causes and sources of these water quality impacts is needed before recommendations to improve water quality can be made.

2.5.2 South Fork Mitchell River

The South Fork Mitchell River flows southeast in Surry County from the Wilkes County line into the Mitchell River. The watershed is very similar to that of Elkin Creek (discussed above) except that the lower portion is mostly forested. The stream was sampled in three locations by DWQ in 1998. The uppermost two stations received Good-Fair bioclassifications; the lowest site received Good. The stream is rated Supporting.

South Fork Mitchell River Riparian Corridor Assessment

In 2001, the Surry Soil and Water Conservation District identified a need for a watershed assessment to prioritize future stream restoration projects. With an existing grant from Clean Water Management Trust Fund, staff were able to conduct an assessment of the South Fork Mitchell River riparian corrider. The assessment was conducted in 2002 to assess the morphological, riparian and aquatic habitat conditions of selected streams within the South Fork Mitchell River watershed and to determine potential restoration and preservation sites. Data were collected along 20 miles of stream within the South Fork Mitchell River watershed and provide specific information regarding the condition of the watershed and potential methods to improve water quality.

A significant portion of the streams within the South Fork Mitchell River watershed is incised and degraded primarily due to cattle access. For assessment purposes, the watershed was separated into five different management units: four subwatersheds and a section of the main stem of the South Fork Mitchell River. A total of 103 stream reaches, each approximately 1,000 feet in length, were assessed during the investigation. Based on the findings of this assessment, White Rock Creek is the most degraded stream in the South Fork Mitchell River watershed. The primary causes of degradation are channel modifications, both recent and historical, and agricultural land use practices. The North Prong subwatershed is primarily impacted by exotic vegetation. Brushy Fork is impacted to some degree by exotic vegetation and agricultural land use. Wood Branch was in the best condition of all the streams investigated during survey (Halley and Elmore, 2002).

Based on the best available data at the time of the investigation, it is estimated that approximately 13,000 tons of sediment are lost annually from the streambanks within the assessment area of the South Fork Mitchell River watershed. Bank height ratios exceeded 1.0 along 69 percent of the reaches surveyed, while 42 percent had bank height ratios exceeding 1.5. The length of exotic vegetation was recorded along the streambanks and totaled 8.8 miles (Halley and Elmore, 2002).

Section C contains more information about Surry County Soil and Water Conservation District programs and the South Fork Mitchell River Riparian Corridor Assessment beginning on page 301. The Piedmont Land Conservancy's Mitchell River Watershed Protection Plan also discusses the South Fork Mitchell River watershed. The Piedmont Land Conservancy is discussed beginning on page 295 of Section C.

2.5.3 Snow Creek

Snow Creek flows south into the Mitchell River near its confluence with the Yadkin River. The watershed is mostly forested with light road coverage; however, I-77 cuts across the headwaters. DWQ anticipated that the benthic macroinvertebrate bioclassification would remain the same or improve in Snow Creek due to reduced nonpoint source pollution as a result of the extended drought. However, the benthic macroinvertebrate community declined from Good in 1996 to Good-Fair in 2001. If the impacts were related to flow or weather, the pattern should be visible in other similarly-sized streams within the subbasin. Of the 18 sites sampled, only the Little Fisher River and Snow Creek declined in bioclassification between 1996 and 2001. A decrease in bioclassification was observed between 1996 (Good) and 2001 (Good-Fair). Sedimentation

and effects of scouring were observed, but instream habitat overall was fairly good. Topographical maps for this watershed are outdated, and it is possible that the area is seeing an increase in development that is impacting the watershed. There is one registered animal operation and no permitted discharges. Further investigation into the causes and sources of water quality impacts is needed before recommendations to improve water quality can be made.

2.5.4 Little Fisher River

Although there is a significant amount of forested land in the Little Fisher River watershed, there is also a large amount of land being used for agriculture, especially along tributaries. I-77 also crosses this watershed, and there is an increasing amount of developed area near its intersection with NC 89. Tributaries that seem to be the most impacted are Beaverdam, Ring and Wood Creeks. DWQ anticipated that the benthic macroinvertebrate bioclassification would remain the same or improve on the Little Fisher River due to reduced nonpoint source pollution as a result of the extended drought. However, the benthic macroinvertebrate community declined from Good in 1996 to Good-Fair in 2001. If the impacts were related to flow or weather, the pattern should be visible in other similarly-sized streams within the subbasin. Of the 18 sites sampled, only the Little Fisher River and Snow Creek declined in bioclassification between 1996 and 2001. There are no permitted discharges and only one registered animal operation in the watershed. Further investigation into the causes and sources of these water quality impacts is needed before recommendations to improve water quality can be made.

The Little Fisher River watershed (03040101 090020) is one of 55 watersheds in the Yadkin-Pee Dee River basin that has been identified by the Wetlands Restoration Program as an area with the greatest need and opportunity for stream and wetland restoration efforts. This watershed will be given higher priority than a nontargeted watershed for the implementation of NCWRP restoration projects. Refer to page 278 in Section C for details.

2.5.5 Little Yadkin River

The Little Yadkin River flows southeast mostly in Stokes County into the Yadkin River just below its confluence with the Ararat River. This watershed is mostly in agricultural land use; however, development on Danbury and Crooked Run Creeks is moderate. Benthic macroinvertebrates have received Good-Fair or Good bioclassifications over 14 samples at three locations since 1987. However, the population of King increased by 47 percent between 1990 and 2000. Population is expected to continue increasing in these Winston-Salem suburbs. Local programs that focus on nonpoint source pollution reduction will be essential to protecting and improving water quality. King is required to obtain an NPDES permit for municipal stormwater systems under the Phase II stormwater rules. Refer to Section A, page 37 for details.

2.5.6 Yadkin River (from Fisher River to Muddy Creek)

Elevated turbidity measurements were documented over the five-year assessment period at three monitoring stations on the Yadkin River within this subbasin. Although the river is not considered Impaired, impacts are evident. The watershed above this reach of river is large and many different land uses disturb sediment, creating turbidity associated with rainfall events. However, the majority of this assessment period has been under drought conditions and, with a

corresponding reduction in nonpoint source pollution, the anticipated outcome would be a reduction in turbidity. No declining trend was detectable. There are four permitted sand dipping and 12 permitted sand dredging operations in this reach of the Yadkin River.

2.5.7 North Deep Creek

The North Deep Creek watershed contains two municipalities, Boonville and Yadkinville. Land use is primarily agricultural, with the exception of these two developed areas and the US 601 corridor between them. Above the Yadkinville WWTP the stream is impacted by habitat degradation, primarily sedimentation, elevated turbidity and high concentrations of fecal coliform (a pathogen indicator). There are four registered animal operations in this portion of the watershed and several smaller operations on first order tributaries. This upper site (SR 1605) was one of only four other sites in the basin where no darters were collected.

Downstream (SR 1510) the stream is in better condition in terms of habitat. Turbidity is still elevated at this location and conductivity is high due to the WWTP upstream. Further investigation into the causes and sources of water quality impacts, particularly in the upper half of the watershed, is needed before recommendations to improve water quality can be made.

The geometric means of fecal coliform samples collected from two stations between 1998 and 2001 from North Deep Creek (423 and 197 colonies/100ml) indicate that the stream may not be suitable for primary recreation. Fecal coliform concentrations were greater than 400 colonies/100ml in more than 20 percent of samples from each site as well. Current methodology requires additional bacteriological sampling for streams with a geometric mean greater than 200 colonies/100ml or when concentrations exceed 400 col/100ml in more than 20 percent of samples. However, these additional assessments are prioritized such that, as monitoring resources become available, the highest priority is given to those streams where the likelihood of full-body contact recreation is greatest. North Deep Creek is not currently classified for primary recreation (Class B).

2.5.8 South Deep Creek

Notable water quality impacts are currently limited to the lower portion (below Yadkinville) of the South Deep Creek watershed. US 421 cuts across this portion of the watershed and has recently been widened, possibly impacting the stream. US 21 and US 601 also cross through the watershed and an increase in development is likely. Moderate habitat degradation was observed by DWQ staff, primarily in the form of streambank erosion. Turbidity was also elevated.

The geometric mean of fecal coliform samples collected near Yadkinville between 1998 and 2001 from South Deep Creek (268 colonies/100ml) indicates that the stream may not be suitable for primary recreation. Fecal coliform concentrations were greater than 400 colonies/100ml in more than 20 percent of samples from each site as well. Current methodology requires additional bacteriological sampling for streams with a geometric mean greater than 200 colonies/100ml or when concentrations exceed 400 col/100ml in more than 20 percent of samples. However, these additional assessments are prioritized such that, as monitoring resources become available, the highest priority is given to those streams where the likelihood of full-body contact recreation is greatest. South Deep Creek is not currently classified for primary recreation (Class B). Local

actions are needed to reduce sedimentation, turbidity and fecal coliform and to promote the production of instream habitat by restoring riparian vegetation throughout the watershed.

In the upper portion of the watershed, the Town of Yadkinville plans to expand water supply withdrawals from South Deep Creek to a capacity of 5.5 MGD and develop off-stream storage to draw from during periods of low flow. An instream flow study established a flow target of 15 cfs below the intake. An agreement between the NC Division of Water Resources and the town establishes a withdrawal limit of 1.7 cfs when streamflow is less than or equal to the 7Q10 (8.4 cfs). The town can withdraw up to the 5.5 MGD capacity when streamflow exceeds 8.4 cfs.

Also in the South Deep Creek watershed, the Yadkin County Soil and Water Conservation District and the Yadkin County Board of Commissioners are sponsoring a proposal for an impoundment upstream of Cranberry Creek. The dam will be subject to the NC Dam Safety Law and will be required to provide a minimum flow of 4.0 cfs (equal to the 7Q10 flow). All permits have been secured and design is underway. The Town of Yadkinville received a Clean Water Management Trust Fund grant in 1997 to acquire a riparian buffer around the reservoir.

2.6 Additional Water Quality Issues within Subbasin 03-07-02

The previous parts discussed water quality concerns for specific stream segments. This section discusses water quality issues related to multiple watersheds within the subbasin. Information found in this section may be related to concerns about things that threaten water quality or about plans and actions to improve water quality.

2.6.1 NPDES Discharges

Fifteen of the 31 NPDES discharges had a few permit violations over the two-year review period (September 1999 - August 2001). Two facilities are in significant noncompliance. The Davie County Shady Grove Elementary which discharges into Carter Creek at the southeastern tip of the subbasin is significantly noncompliant for ammonia and BOD. The Yadkin County Starmont High School is noncompliant for ammonia. Five facilities are required to monitor effluent toxicity. The Town of Boonville WWTP experienced problems meeting its whole effluent toxicity limit from the beginning of 1995 through the end of 1999. Many of the failures were associated with high residual chlorine levels in the effluent. The facility has only had one failure since November 1999. This improvement in effluent toxicity is likely due to better management of chlorine levels during the disinfection process that began in mid-1999. The facility has since implemented ultraviolet light disinfection, effectively eliminating problems associated with residual chlorine.

2.6.2 Projected Population Growth

From 2000 to 2020, the estimated population growth for Yadkin County is 32 percent, Stokes County – 31 percent, Forsyth County – 26 percent, and Surry County – 24 percent. Growth management within the next five years will be imperative, especially in and around urbanizing areas, in order to protect or improve 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.