

Section B: Chapter 11

Yadkin-Pee Dee River Subbasin 03-07-11

Includes a portion of the Rocky River and Coddle Creek

11.1 Water Quality Overview

Subbasin 03-07-11 at a Glance

Land and Water

Total area:	277 mi ²
Stream miles:	218.9
Lake acres:	21.7

Population Statistics

1990 Est. Pop.:	78,047 people
Pop. Density:	282 persons / mi ²

Land Cover (%)

Forest / Wetland:	60.9
Surface Water:	0.5
Urban:	6.1
Cultivated Crop:	3.0
Pasture / Managed Herbaceous:	29.4

This subbasin is comprised of the upper Rocky River watershed in primarily Mecklenburg and Cabarrus counties. Major tributaries include Coddle Creek, Clarke Creek, Mallard Creek and Reedy Creek. Portions of Mooresville, Cornelius, Huntersville, Kannapolis, Concord, Harrisburg and Charlotte are found within the subbasin.

A map including the locations of NPDES discharges and water quality monitoring stations is presented in Figure B-12. Table B-22 contains a summary of monitoring data types, locations and results. Use support ratings for waters in this subbasin are summarized in Table B-23. 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.

This subbasin is rapidly urbanizing, and land cover and population information become outdated quickly. Land cover information compiled between 1993 and 1995 describe more than 60 percent of the land as forested, nearly 30 percent as pasture or managed herbaceous land, and more than 6 percent as urban. The population in 1990 was estimated to be just over 78,000 people. Estimates of subbasin population have not yet been made for the 2000 census data; however, it is likely that population increased substantially over the ten-year period. Population is projected to increase 57 percent in Mecklenburg County and 53 percent in Cabarrus County between 2000 and 2020. There are 24 NPDES permitted discharges and three registered animal operations within this subbasin. Facilities with compliance or toxicity problems are discussed in following sections.

Water quality varies substantially across this subbasin, although most waters contain some water quality impacts. Coddle Creek, from its source in Iredell County to the City of Concord water supply intake, and its tributaries in the upper watershed are classified High Quality Waters.

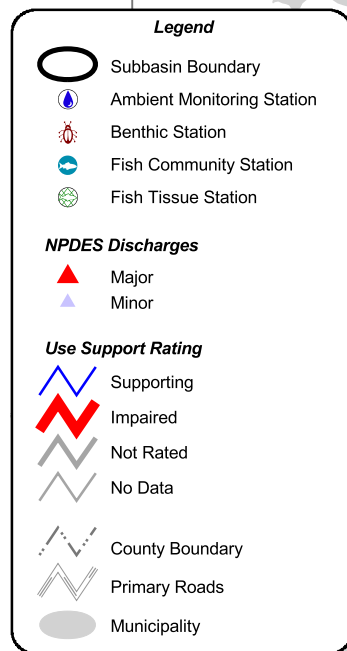


Table B-22 DWQ Monitoring Locations, Bioclassifications and Notable Chemical Parameters (1998-2002) for Yadkin-Pee Dee River Subbasin 03-07-11

Site	Stream	County	Road	Bioclassification or Noted Parameter ²
<i>Benthic Macroinvertebrate Community Monitoring</i>				
B-1	Rocky River ¹	Mecklenburg	SR 1608	Fair
SSB-1	Dye Branch ¹	Iredell	SR 1147	Not Rated
SSB-2	Dye Branch	Iredell	SR 1142	Poor
B-2	Coddle Creek ¹	Cabarrus	NC 49	Fair
<i>Fish Community Monitoring</i>				
	Rocky River ¹	Cabarrus	SR 1608	Poor
F-1	Mallard Creek ¹	Mecklenburg	SR 2467	Excellent
F-2	Reedy Creek ¹	Cabarrus	SR 1136	Good-Fair
<i>Ambient Monitoring</i>				
Q7330000	Rocky River	Mecklenburg	SR 2420	Turbidity, Fecal coliform
<i>Yadkin-Pee Dee River Basin Association Monitoring</i>				
Q7330000	Rocky River ³	Mecklenburg	SR 2420	Fecal coliform
Q7450000	Rocky River	Cabarrus	NC 29	Fecal coliform
Q7600000	Rocky River	Cabarrus	SR 1304	Turbidity, Fecal coliform
Q7780000	Rocky River	Cabarrus	SR 1132	None

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).

³ This site duplicates a DWQ ambient monitoring station.

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-23 Use Support Ratings Summary (2002) for Monitored and Evaluated Freshwater Streams (miles) and Lakes (acres) in Yadkin-Pee Dee River Subbasin 03-07-11

Use Support Category	Units	Supporting	Impaired	Not Rated	No Data	Total ¹
Aquatic Life/Secondary Recreation	miles	41.5	53.0	0.0	124.4	218.9
	acres	5.1	0.0	0.0	16.6	21.7
Fish Consumption²	miles	152.5	66.4	0.0	0.0	218.9
	acres	21.7	0.0	0.0	0.0	21.7
Primary Recreation	miles	0.0	0.0	0.0	0.0	0.0
	acres	0.0	0.0	0.0	0.0	0.0
Water Supply	miles	29.4	0.0	0.0	0.0	29.4
	acres	7.8	0.0	0.0	0.0	7.8

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 These waters are impaired based on fish consumption advice issued for three species of freshwater fish due to mercury contamination. Refer to page 104 of Section A for details.

11.2 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 identified two Impaired waters in this subbasin. The upper Rocky River and Coddle Creek are discussed below.

11.2.1 Rocky River (9.2 miles from source to SR 2420)

1998 Recommendations

The 1998 basin plan discusses impacts to the upper Rocky River from toxicity failures at the Mooresville WWTP discharge and oxygen-consuming wastes from several other major discharges. A dissolved oxygen model was developed for the river and the plan discusses the results of model predictions. Recommendations for Mallard Creek and the Rocky River above Mallard Creek were for any new or expanding NPDES permitted discharges to receive Best Available Technology limits for BOD and ammonia. Below Mallard Creek, the model will be used to evaluate specific scenarios, but discharges to this section could likely receive less stringent limits than those upstream. There is also a recommendation for DWQ to review the dissolved oxygen limit for the Mooresville WWTP, should the facility be expanded. Local efforts to reduce nonpoint source pollution, particularly from developing areas, were also recommended.

Status of Progress

No new discharges or expansions of existing discharges were requested over the previous five-year cycle. One large industrial facility in the watershed which contributed waste to the Mooresville WWTP closed, nearly eliminating toxicity problems with that discharge. The Mooresville WWTP had only a few minor compliance problems between 1998 and 2001, most

of which were resolved quickly. However, there is a significant amount of developed area in the headwaters of the Rocky River and the Dye Branch watershed.

DWQ collected benthic macroinvertebrate, fish community and water chemistry samples from the upper Rocky River at SR 2420 between 1998 and 2001. The stream again received Fair and Poor bioclassifications. Habitat is poor with excessive amounts of sedimentation and bank erosion.

The geometric mean of fecal coliform samples collected from the Rocky River at SR 2420 (433 colonies/100ml) indicates that the stream may not be suitable for primary recreation. In addition, fecal coliform concentrations were greater than 400 colonies/100ml in more than 33 percent of samples from this site. The Rocky River is not currently classified for primary recreation (Class B). However, the stream was historically placed on the 303(d) list for fecal coliform and a TMDL has already been developed by DWQ.

2002 Recommendations

DWQ's fecal coliform TMDL for the upper Rocky River was approved by the EPA in 2002. Sources of fecal coliform in the upper Rocky River watershed include urban sources in the Mooresville area, livestock grazing and manure application on agricultural lands, residual waste application from the Mooresville WWTP, the Mooresville WWTP discharge, and wildlife. The Coliform Routing and Allocation Program was utilized to simulate instream fecal concentrations and to allocate the fecal coliform loads to the various sources. In order for water quality standards for fecal coliform to be met in the upper Rocky River, a nonpoint source load reduction of 20-33 percent under dry weather conditions and 80-91 percent under wet weather conditions must be met. The model estimates that the Mooresville WWTP typically contributes a small portion of the fecal coliform load to the watershed. However, a significant portion of the fecal coliform load is due to runoff from the Mooresville area.

These calculations are the first step in reducing fecal coliform concentrations in the upper Rocky River watershed. Many of the BMPs employed to implement the TMDL will likely help reduce habitat degradation in the watershed as well. Nonpoint source pollution is the primary source of impairment in this uppermost portion of the Rocky River. Mooresville will likely be required by DWQ to obtain a NPDES permit for municipal stormwater systems under the Phase II stormwater rules. Refer to page 37 of Section A, Chapter 2 for details. Local actions are needed to reduce sedimentation, turbidity and fecal coliform contamination and to promote the production of instream habitat by restoring riparian vegetation throughout the watershed.

Water Quality Improvement Initiatives

The Rocky River watershed is one of three priority areas in the Yadkin-Pee Dee River basin under the USDA Environmental Quality Incentives Program (EQIP). EQIP provides technical, educational and financial assistance to farmers and ranchers to address soil, water and related natural resource concerns on their lands. Refer to page 274 in Section C for details.

The upper Rocky River watershed (03040105 010010) is currently the focus of a Local Watershed Planning Initiative by the NC Wetlands Restoration Program (NCWRP) in partnership with local governments and resource agencies. In addition, it is one of 55 watersheds in the Yadkin-Pee Dee River basin that has been identified by NCWRP 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.

11.2.2 Dye Branch (4.4 miles from source to Rocky River)

1998 Recommendations

The 1998 basin plan discusses impacts to the upper Rocky River from toxicity failures at the Mooresville WWTP discharge and oxygen-consuming wastes from several other major discharges. There is also a recommendation for DWQ to review the dissolved oxygen limit for the Mooresville WWTP, should the facility be expanded. Local efforts to reduce nonpoint source pollution were also recommended.

Status of Progress

One large industrial facility in the watershed which contributed waste to the Mooresville WWTP closed, nearly eliminating toxicity problems with that discharge. The Mooresville WWTP had only a few minor compliance problems between 1998 and 2001, most of which were resolved quickly. However, there is a significant amount of developed area in the headwaters of the Rocky River and the Dye Branch watershed.

DWQ sampled two sites on Dye Branch, above and below the WWTP in 2001; the stream continues to be rated Impaired, based on these data. Above the WWTP, little instream habitat was observed. Heavy sedimentation was noted. Although the stream at this location could not be assigned a bioclassification due to reduced flow as a result of the extended drought, serious impacts are evident. Downstream, more instream habitat is present, but the stream again received a Poor bioclassification. A strong chlorine odor was noted by biologists.

2002 Recommendations

Further investigation into the causes and sources of these water quality impacts is needed before specific recommendations to improve water quality can be made. However, nonpoint source pollution, primarily from stormwater runoff in and around Mooresville, is likely a significant factor. Mooresville will likely be required by DWQ to obtain an NPDES permit for municipal stormwater systems under the Phase II stormwater rules. Refer to page 37 of Section A, Chapter 2 for details.

Water Quality Improvement Initiatives

The upper Rocky River watershed, including Dye Branch, (03040105 010010) is currently the focus of a Local Watershed Planning Initiative by the NC Wetlands Restoration Program (NCWRP) in partnership with local governments and resource agencies. In addition, it is one of 55 watersheds in the Yadkin-Pee Dee River basin that has been identified by NCWRP 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.

11.2.3 Coddle Creek (13.7 miles from just above NC 73 to Rocky River)

1998 Recommendations

The 1998 basin plan discusses implementation of a recent minimum instream flow requirement for Lake Howell upstream of this Impaired segment. The Town of Concord was encouraged to take actions to reduce impacts of stormwater runoff in the immediate watershed, and general recommendations for reducing nonpoint source pollution were also given.

Status of Progress

DWQ again sampled Coddle Creek just upstream of its confluence with the Rocky River in 2001. The benthic macroinvertebrate community again received a Fair bioclassification. Little instream habitat was available and sedimentation was noted.

2002 Recommendations

DWQ plans to conduct further investigation into the causes and sources of the biological impairment of Coddle Creek during this basinwide planning cycle. However, nonpoint source pollution, largely from stormwater runoff in and around Concord and Kannapolis, is likely a significant factor. Cabarrus and Mecklenburg counties, as well as Concord and Kannapolis, are required to obtain NPDES permits for municipal stormwater systems under the Phase II stormwater rules. Refer to page 37 of Section A, Chapter 2 for details.

Water Quality Improvement Initiatives

The Coddle Creek watershed (03040105 020010) is one of 55 watersheds in the Yadkin-Pee Dee River basin that has been identified by the NC Wetlands Restoration Program (NCWRP) 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.

11.3 Status and Recommendations for Newly Impaired Waters

A larger portion of the Rocky River within this subbasin was rated Impaired based on recent DWQ monitoring (1998-2001). This section outlines the potential causes and sources of impairment and provides recommendations for improving water quality.

11.3.1 Rocky River (24.9 miles from SR 2420 to confluence with Reedy Creek)

Current Status

DWQ did not conduct any biological surveys in this segment of the Rocky River over the most recent assessment period. However, turbidity exceeded water quality standards in 13 percent of samples at two stations. In addition, benthic macroinvertebrate sites upstream and downstream of this segment received Fair bioclassifications in 2001. Coddle Creek is Impaired and flows into this segment of river, and the Charlotte-Mecklenburg Utilities District (CMUD) WWTP in the lower part of Mallard Creek also affects the Rocky River in this location. The CMUD Mallard Creek WWTP was in significant noncompliance for total suspended solids and fecal coliform bacteria over the most recent review period.

2002 Recommendations

DWQ will continue to work with all NPDES discharges in this reach of river to maintain compliance. In addition, new or expanding major NPDES permitted discharges above Mallard Creek will receive Best Available Technology limits for BOD (5 mg/l) and ammonia (1 mg/l); minor discharges will receive 5 mg/l for BOD and 2 mg/l for ammonia. Below Mallard Creek, DWQ's dissolved oxygen model will be used to evaluate specific scenarios, but discharges to this section could receive less stringent limits than those upstream.

The geometric means of fecal coliform samples collected from two stations between 1998 and 2001 from this portion of the Rocky River (243 and 300 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. No portion of the Rocky River is currently classified for primary recreation (Class B).

Further investigation into the causes and sources of these impacts is needed before specific recommendations to improve water quality can be made. However, nonpoint source pollution, largely from stormwater runoff in and around municipalities, is likely a significant factor. Cabarrus and Mecklenburg counties, as well as Davidson, Kannapolis, Concord and Harrisburg, are required to obtain NPDES permits for municipal stormwater systems under the Phase II stormwater rules. [The City of Charlotte currently holds an NPDES permit for municipal stormwater systems under the Phase I stormwater rules, but modifications will be made to include additional elements of the Phase II permits.] Refer to page 37 of Section A, Chapter 2 for details.

Water Quality Improvement Initiatives

The Rocky River watershed is one of three priority areas in the Yadkin-Pee Dee River basin under the USDA Environmental Quality Incentives Program (EQIP). EQIP provides technical, educational and financial assistance to farmers and ranchers to address soil, water and related natural resource concerns on their lands. Refer to page 274 in Section C for details.

The Rocky River watershed (03040105 010030) is one of 55 watersheds in the Yadkin-Pee Dee River basin that has been identified by the NC Wetlands Restoration Program (NCWRP) 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.

11.4 Section 303(d) Listed Waters

Currently, portions of four waters in this subbasin are listed on the state's draft 2002 303(d) list. The upper Rocky River is listed for fecal coliform, turbidity and biological impairment. Coddle Creek, Dye Branch and Clarke Creek are listed for biological impairment. In the future, the portion of the Rocky River that appears on the list for turbidity will likely increase due to more

recent data indicating impairment. The Rocky River, Coddle Creek and Dye Branch are discussed above; Clarke Creek is discussed below. Appendix IV contains more information on the state's 303(d) list and listing requirements.

11.5 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.

11.5.1 Clarke Creek

DWQ has never sampled Clarke Creek; however, it was historically placed on the 303(d) list based on observations of heavy sedimentation. Portions of the City of Huntersville lie in the headwaters of the Clarke Creek watershed. Between 1990 and 2000, the population of Huntersville increased from 3,023 people to 24,960 people and population growth in the area will likely continue over the next 10 to 20 years. As resources allow, DWQ will sample Clarke Creek over the next basinwide planning cycle.

The Clarke Creek watershed (03040105 010020) is one of 55 watersheds in the Yadkin-Pee Dee River basin that has been identified by the NC Wetlands Restoration Program (NCWRP) 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.

11.5.2 Mallard Creek

The fish community in the headwaters of Mallard Creek received an Excellent bioclassification in 2001. However, further downstream, the Charlotte-Mecklenburg Utilities District, Mallard Creek WWTP was in significant noncompliance for total suspended solids and fecal coliform over the most recent review period. This watershed is rapidly developing between the cities of Charlotte and Concord, and the lower portion of the stream is currently not rated. As resources allow, DWQ will sample Mallard Creek below the WWTP discharge over the next basinwide planning cycle. Local actions are needed to reduce the effects of nonpoint source pollution, particularly from stormwater runoff. The City of Concord, as well as Mecklenburg and Cabarrus counties, are required to obtain NPDES permits for municipal stormwater systems under the Phase II stormwater rules. Refer to page 37 of Section A, Chapter 2 for details.

The Mallard Creek watershed (03040105 010040) is one of 55 watersheds in the Yadkin-Pee Dee River basin that has been identified by the NC Wetlands Restoration Program (NCWRP) 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.

11.5.3 Reedy Creek McKee Creek

The Reedy Creek watershed contains a few developed areas, but is mostly forested. However, there are nine small NPDES permitted discharges from private wastewater treatment plants. DWQ sampled this stream for the first time in 2001 and it received a Good-Fair bioclassification. Severe bank erosion and large volumes of sand were noted by biologists. There was no riffle habitat at the sampling location. It appears that the wastewater treatment plants throughout the watershed are not cumulatively impacting water quality in Reedy Creek. Local actions are needed to reduce the effects of nonpoint source pollution, particularly from new development, and to restore riparian habitat throughout the watershed.

DWQ has completed a fecal coliform TMDL for McKee Creek, a tributary to Reedy Creek, and Clear Creek, the only tributary to McKee. In addition to two NPDES discharge facilities, the study revealed that sources of fecal coliform in the McKee and Clear Creek watersheds include urban sources from Mecklenburg County, livestock grazing and manure application on agricultural lands, on-site wastewater (i.e., septic systems), and wildlife. A mass balance approach, combined with Load-Duration curves, was used to calculate the allowable fecal coliform load to each creek. In order for the water quality target to be met, nonpoint sources of pollution in the watershed must be reduced by 29 percent.

These calculations are the first step in reducing fecal coliform concentrations in the watershed. Many of the BMPs employed to implement the TMDL will likely help reduce habitat degradation in the watershed as well. In addition, Mecklenburg County is required to obtain a NPDES permit for municipal stormwater systems under the federal Phase II stormwater rules. Refer to page 37 of Section A for details.

The Reedy Creek watershed (03040105 010050) is one of 55 watersheds in the Yadkin-Pee Dee River basin that has been identified by the NC Wetlands Restoration Program (NCWRP) 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.

11.6 Additional Water Quality Issues within Subbasin 03-07-11

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.

11.6.1 Projected Population Growth

From 2000 to 2020, the estimated population increase for Mecklenburg County is 57 percent and for Cabarrus County is 53 percent. Growth management within the next five years will be imperative, especially in and around urbanizing areas and along highway corridors, 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.

11.6.2 NCWRP Local Watershed Planning Initiative

At present, the NC Wetlands Restoration (NCWRP) Program Local Watershed Planning project for the lower Yadkin-Pee Dee region is focused on the upper Rocky River and Clarke Creek watersheds in subbasin 03-07-11. Watershed protection issues within these two local watersheds include: aquatic habitat degradation due to sedimentation and stormwater flows; fecal coliform contamination; stream impacts from roadway construction and new development; and protection of high quality wetland and riparian buffer parcels. A group of local and regional resource agency professionals (primarily from Cabarrus, Iredell and Mecklenburg counties) forms the core of the local stakeholder team working with NCWRP and its consultants on this effort. The group expects to have a Local Watershed Plan drafted up for the two watersheds, including specific recommendations and strategies for watershed protection and improvement, by the summer of 2003. Refer to page 278 in Section C for details about the NCWRP.

Beginning in early 2003, four additional local watersheds (Coddle Creek, Mallard Creek, Reedy Creek, and a segment of the Rocky River) are being added to the NCWRP Local Watershed Planning project in the lower Yadkin-Pee Dee region. Together with the upper Rocky River and Clarke Creek watersheds, these local watersheds extend to the full boundaries of subbasin 03-07-11, which forms the entire drainage system of the upper Rocky River. The watershed assessments and local watershed plan development should be completed by the fall of 2004.