

2.1 Subbasin Overview

Subbasin 03-01-02 at a Glance

Land and Water Area

| | |
|-------------|---------------------|
| Total area: | 494 mi ² |
| Land area: | 491 mi ² |
| Water area: | 3 mi ² |

Land Cover (percent)

| | |
|---------------------------------|-----|
| Forest/Wetland: | 65% |
| Cultivated Crop: | 32% |
| Surface Water: | <1% |
| Urban: | <1% |
| Pasture/ Managed Herbaceous: | 1% |

Counties

Hertford and Northampton

Municipalities

Como, Conway, Murfreesboro, Rich Square, Seaboard, Severn and Woodland

Monitored Waterbody Statistics

Aquatic Life:

| | |
|-------------------|---------|
| Total: | 99.3 mi |
| Total Supporting: | 49.6 mi |
| Total Not Rated: | 49.7 mi |

Recreation:

| | |
|-------------------|---------|
| Total: | 54.2 mi |
| Total Supporting: | 54.2 mi |

Subbasin 03-01-02 contains the Meherrin River and its tributaries, but much of the river’s catchment is in Virginia. Major tributaries to the Meherrin River include Potecasi and Kirbys Creeks. This subbasin is located in the Middle Atlantic Plain and the Southeastern Plain ecoregions and contains 494 square miles.

Significant natural heritage areas are located within the watershed, including the Meherrin River Swamp and Meherrin River Slopes and Swamp. Most of the land within this subbasin is forested, but cropland and pasture are also common. Aquatic habitats include streams that have been channelized and/or swamp areas that cease to flow during dry periods and are expected to have very low dissolved oxygen levels during low-flow periods. The northern part of the subbasin contains well-drained, loamy soils, while to the south there are poorly drained clay soils. These regional differences can have substantial effects on both the amount of direct runoff into streams and stream flows throughout the year.

Agriculture waste management is of particular concern in this subbasin. Efforts need to be taken to properly manage poultry application and to provide covered poultry litter storage. Maintaining adequate storage capacity in lagoons to accommodate for high rainfall events also needs to be improved upon. BMP inspections need to occur to ensure the BMPs are properly functioning and to identify areas requiring design improvements.

The largest municipalities in this subbasin include Murfreesboro and Rich Square. Each of these municipalities experienced a net decline in population over the 1990 to 2000 time period. Additional information regarding population and land use changes can be found in Chapter 8. There are no permitted wastewater dischargers in this subbasin, but there are nine permitted stormwater discharges. There are eight non-discharge facilities; four have had direct discharges resulting from storm events, run-off, or continued inability to comply with permit conditions. See Appendix III for a list of NPDES permits.

A map including the locations of the water quality monitoring stations is presented in Figure 4. Table 5 contains a summary of monitored waterbodies with their associated assessment unit numbers (AU#) and lengths, monitoring data types, locations and results, along with use support ratings for waters in the subbasin.

Figure 4 Chowan River Subbasin 03-01-02

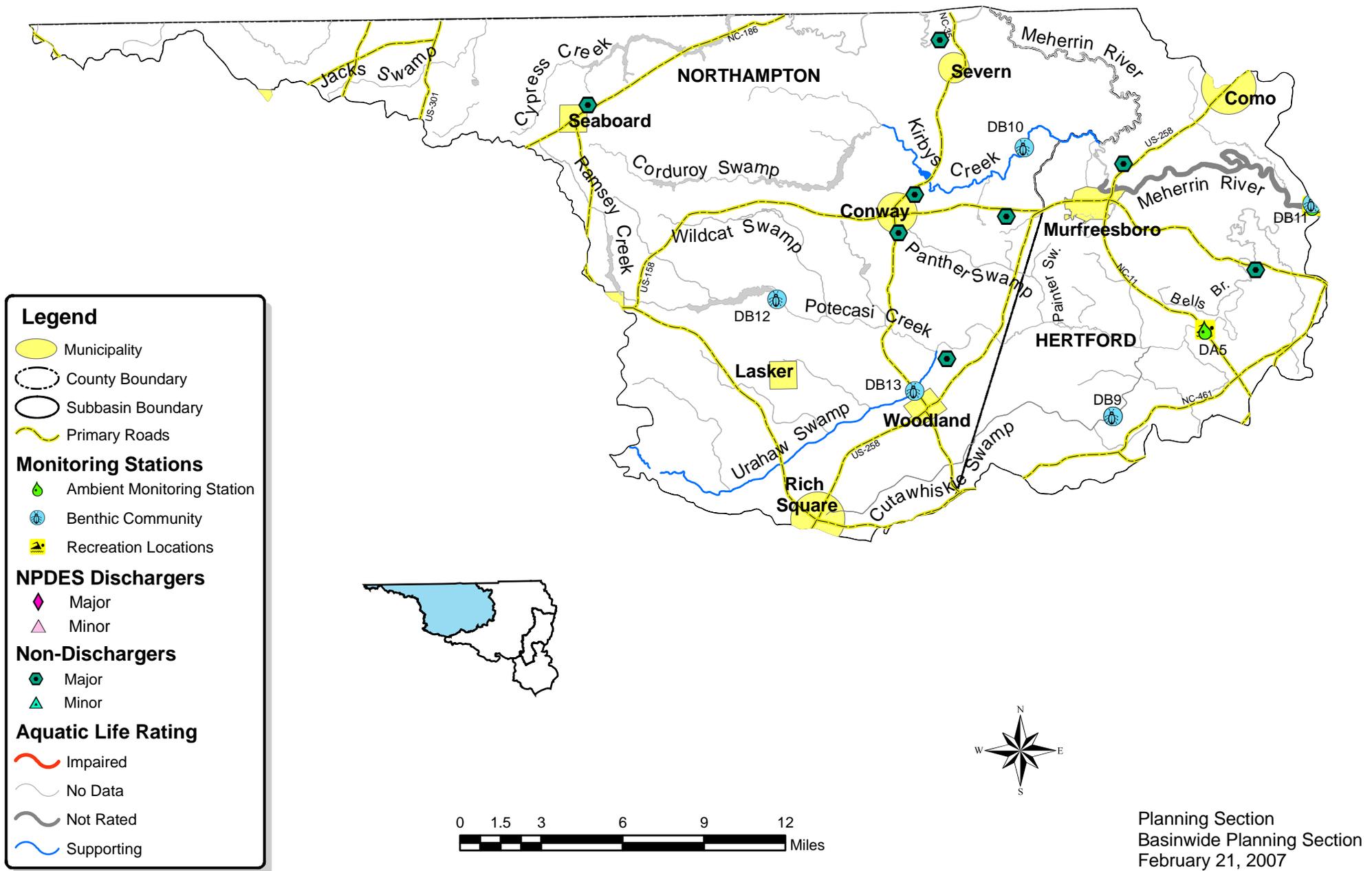


Table 5 CHO

Subbasin 03-01-02

| AU Number | Classification | Length/Area | | Aquatic Life Assessment | | | | Recreation Assessment | | | | | |
|--|----------------|-------------|----------|-------------------------|---------|--------|--------------------------|-----------------------|---------|--------|----------------------|---------------------|--------------------|
| | | | | AL Rating | Station | Result | Year/ Parameter % Exc | REC Rating | Station | Result | Stressors | Sources | |
| Cutawhiskie Swamp | | | | | | | | | | | | | |
| 25-4-8-8 | C;NSW | 17.0 | FW Miles | NR | | | | | | | | Habitat Degradation | Unknown |
| From source to Potecasi Creek | | | | | DB9 | NR | 2005 | | | | | | |
| | | | | | DB9 | NR | 2005 | | | | | | |
| Kirbys Creek | | | | | | | | | | | | | |
| 25-4-4 | C;NSW | 13.7 | FW Miles | S | | | | | | | | | |
| From source to Meherrin River | | | | | DB10 | M | 2005 | | | | | | |
| Meherrin River | | | | | | | | | | | | | |
| 25-4-(5) | B;NSW | 11.7 | FW Miles | NR+ | DA6 | NCE | | S | DA6 | NCE | | | |
| From a point 1.0 mile upstream from U.S. Highway 258 to Chowan River | | | | | DB11 | GF | 2005 | | | | | | |
| Potecasi Creek | | | | | | | | | | | | | |
| 25-4-8a | C;NSW | 21.5 | FW Miles | S | | | | S | | | | | |
| From source to Cutawhiskie Creek | | | | | DB12 | M | 2005 | | | | | | |
| 25-4-8b | C;NSW | 21.0 | FW Miles | NR | DA5 | CE | Low DO 25.4 | S | DA5 | NCE | Low pH | | Natural Conditions |
| From Cutawhiskie Creek to Meherrin River | | | | | DA5 | CE | Low pH 22 | | | | Low Dissolved Oxygen | | Natural Conditions |
| Urahaw Swamp | | | | | | | | | | | | | |
| 25-4-8-4 | C;NSW | 14.4 | FW Miles | S | | | | | | | | | |
| From source to Potecasi Creek | | | | | DB13 | M | 2005 | | | | | | |

Table 5 CHO

Subbasin 03-01-02

| AU Number | Classification | Length/Area | Aquatic Life Assessment | | | | Recreation Assessment | | | |
|------------------------|----------------|-------------------------------|-------------------------|-------------------|--------|---|-----------------------|---------|--------|-----------|
| | | | AL Rating | Station | Result | Year/ Parameter % Exc | REC Rating | Station | Result | Stressors |
| Description | | | | | | | | | | |
| Use Categories: | | Monitoring data type: | | Results: | | Use Support Ratings 2005: | | | | |
| AL - Aquatic Life | | DF - Fish Community Survey | | E - Excellent | | S - Supporting, I - Impaired | | | | |
| REC - Recreation | | DB - Benthic Community Survey | | G - Good | | NR - Not Rated | | | | |
| | | DA - Ambient Monitoring Site | | GF - Good-Fair | | NR*- Not Rated for Recreation (screening criteria exceeded) | | | | |
| | | DL- Lake Monitoring | | F - Fair | | ND-No Data Collected to make assessment | | | | |
| | | | | P - Poor | | NR+-Not Rated because draft criteria used for rating | | | | |
| | | | | 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

Fish Consumption Rating Summary

S m 49.6 FW Miles
 NR m 11.7 FW Miles
 NR m 38.0 FW Miles
 187.3 FW Miles

S m 54.2 FW Miles
 232.3 FW Miles

I e 286.5 FW Miles

There were five benthic macroinvertebrate samples collected in this subbasin during this assessment period. Overall, biological data shows little change in the benthic communities since the basin was last sampled in 2000; however, ambient monitoring shows that Potecasi Creek (AU# 25-4-8b) is not meeting water quality standards for dissolved oxygen or pH. Refer to the *2006 Chowan River Basinwide Assessment Report* (<http://www.ncwaterquality.org/esb/Basinwide/ChowanBASINWIDEFinal.pdf>) and Appendix I for more information on monitoring.

All waters in this subbasin have the supplemental classification of Nutrient Sensitive Waters (NSW) in addition to the primary classification of Class C or Class B. See Chapter 5 for more information on water classifications.

Waters in the following sections and in Table 5 are identified by an assessment unit number (AU#). This number is used to track defined segments in the water quality assessment database, list 303(d) Impaired waters, and to identify waters throughout the basin plan. The AU# 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 AU# and the DWQ index segment are the same.

2.2 Use Support Assessment Summary

All surface waters in the state are assigned a classification appropriate to the best-intended use of that water. Waters are regularly assessed by DWQ to determine how well they are meeting their best-intended use. Refer to Table 6 for a summary of use support for waters in subbasin 03-01-02.

In subbasin 03-01-02, use support was assigned for aquatic life, recreation and fish consumption categories. Waters are Supporting, Impaired, Not Rated, and No Data in the aquatic life and recreation categories on a monitored or evaluated basis. Waters are Impaired in the fish consumption category on an evaluated basis based on fish consumption advice issued by the Department of Health and Human Services (DHHS).

Table 6 Summary of Use Support Ratings by Category in Subbasin 03-01-02

| Use Support Rating | Aquatic Life | Recreation |
|---|-----------------|-----------------|
| Monitored Waters | | |
| Supporting | 49.6 mi | 54.2 mi |
| Not Rated | 49.7 mi | 0 |
| Total | 99.3 mi | 54.2 mi |
| Unmonitored Waters | | |
| No Data | 187.3 mi | 232.3 mi |
| Total | 187.3 mi | 232.3 mi |
| All Waters** | 286.6 mi | 286.5 mi |
| * The noted percent Impaired is the percent of monitored mile/acres only. | | |
| **Total Monitored + Total Unmonitored = Total All Waters. | | |

For more information about use support determinations, refer to Appendix II or the *Supplemental Guide to North Carolina's Basinwide Planning: Support Document for Basinwide Water Quality Plans* found at DWQ's website:

<http://www.ncwaterquality.org/basinwide/SupplementalGuide.htm>. Appendix V provides definitions of the terms used throughout this basin plan.

2.3 Status and Recommendations of Previously and Newly Impaired Waters

The following waters were either identified as Impaired in the previous basin plan (2002) 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 AU#. Information regarding 303(d) listing and reporting methodology is presented in Chapter 11.

2.3.1 Potecasi Creek [AU# 25-4-8a and AU# 25-4-8b]

2002 Status

The entire length of Potecasi Creek (from source to the Meherrin River) was listed on the 2002 and 2004 303(d) list of impaired waters for aquatic life. Water quality standards for dissolved oxygen (DO) and pH were violated and potential sources included agricultural land use. DWQ recommended that Potecasi Creek be included in a Swamp Waters Study Plan to determine if the low DO and pH were associated with naturally occurring swamp conditions.

Current Status

Upper Potecasi Creek [AU# 25-4-8a], from source to Cutawhiskie Creek (21.5 miles), is Supporting in the aquatic life category due to a Moderate swamp benthic bioclassification at site DB12. This location was Not Rated when sampled in 2000. Both the 2000 and 2005 samples used the Swamp criteria. Unlike other swamp sites that have been channelized, Potecasi Creek exhibits natural channel morphology, intact riparian zones with a mature forest on either side, and a large percentage of the reach is available for benthic colonization. Potecasi Creek has a drainage area of 32 square miles at site DB12.

Lower Potecasi Creek [AU# 25-4-8b], from Cutawhiskie Creek to Meherrin River (21.0 miles), is Not Rated in the aquatic life category due to water quality standards violations at the ambient monitoring station DA5 that are likely due to natural swamp conditions. Site DA5 was sampled 59 times over the course of the five-year assessment period. Over 44 percent of the samples were below 5.0 mg/l and over 25 percent were below the 4.0 mg/l standard for dissolved oxygen. The pH was below the standard of 6.0 s.u. in 22 percent of the samples.

2007 Recommendations

DWQ recommends that the upstream portion of Potecasi Creek [AU# 25-4-8a] be removed from the 2008 303(d) list of impaired waters. Potecasi Creek [AU# 25-4-8b], from Cutawhiskie Creek to Meherrin River should remain on the 303(d) list for water quality standards violations for dissolved oxygen and pH, until it can be further determined that these conditions represent natural swamp drainage. Agriculture and intensive livestock operations are potential sources of water quality impacts and therefore BMPs need to be encouraged and implemented.

2.3.2 Bells Branch [AU# 25-4-8-10] and Painter Swamp [AU# 25-4-8-5]

2002 Status

Bells Branch, from source to Potecasi Creek (4.8 miles), and Painter Swamp, from source to Potecasi Creek (3.7 miles), were both listed on the 2002 and 2004 303(d) list of impaired waters for biological integrity. These are historic listings from 1998.

2007 Recommendations

Bells Branch and Painter Swamp will be recommended for removal from the 2008 303(d) list of impaired waters because the waters were likely inappropriately labeled as impaired for biological integrity in previous 303(d) lists of impaired waters. Bells Branch and Painter Swamp were not sampled during the last assessment period and a review of DWQ biological data reflects no previous sampling of these waterbodies has occurred.

2.4 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. The current status and recommendations for addressing these waters are presented below, and each is identified by an AU#. Nonpoint source program agency contacts are listed in Appendix IV.

2.4.1 Meherrin River [AU# 25-4-(5)]

The Meherrin River, from a point 1.0 mile upstream from U.S. Highway 258 to the Chowan River (11.7 miles), is Not Rated[†] in the aquatic life category. A Good-Fair benthic bioclassification at site DB11 was issued based on draft Coastal B criteria. Coastal B rivers are defined as waters in the coastal plain that are deep (nonwadeable), freshwater systems with little or no visible current under normal or low flow conditions. Other characteristics may include an open canopy, low pH and low DO. Boat sampling is required for these waters. Any bioclassifications derived from sampling data should be considered draft and not used for use support decisions; therefore the Meherrin River is Not Rated (BAU, July 2006). No criteria were exceeded for water quality standards at the ambient monitoring station DA6.

Since 1983, the Meherrin River has been sampled eight times, seven of which were during the summer basinwide sampling period. Over the years, several rare or unusual species have been collected; however, species collected in 2005 indicate that slow-moving or stagnant conditions may persist during long periods of the year.

This sampling site is located at the Meherrin River at SR 1175, upstream of the NC DOT ferry operation. It has a drainage area of 143 square miles and the habitat is mostly forested with few breaks in the riparian zone. The substrate consisted of 70 percent sand and 30 percent silt and other fine particles.

2007 Recommendations

DWQ will work with other agency staff to determine if current conditions represent natural conditions related to swamp drainage or flows, or if there are land use impacts that need to be addressed. The Town of Severn non-discharge facility (WQ0003299) has had noncompliance issues that may be impacting surface water quality. Additional research of possible surface and ground water interactions is recommended.

2.4.2 Urahaw Swamp [AU# 25-4-8-4]

Urahaw Swamp, from source to Potecasi Swamp (14.4 miles), is Supporting in the aquatic life category due to a Moderate swamp benthic bioclassification at site DB13. This site was first sampled in 2000 when it also received a Moderate bioclassification. An increase in the biotic index in 2005, however, indicates that there are more pollution tolerant species residing in the swamp.

Urahaw Swamp joins Potecasi Creek near Woodland, approximately 1.5 miles downstream of NC 35. The drainage area of the swamp at NC 35 is 55 square miles. Riparian vegetation was noted as absent from one side of the stream. South of NC 35, the habitat appears to be in a more pristine condition. Benthic substrate consists of an even mixture of sand and silt.

2.4.3 Cutawhiskie Swamp [AU# 25-4-8-8]

Cutawhiskie Swamp, from source to Potecasi Creek (17.0 miles), is Not Rated in the aquatic life category due to Not Rated bioclassifications at site DB9. Cutawhiskie Creek was sampled twice in 2005, once in February during swamp sampling period and once in August during the summer basinwide sampling period. The stream was rated based on swamp criteria in the past (1995), but due to its transitional nature (from Coastal A to Swamp), a Not Rated bioclassification was assigned until additional data can be collected from this site.

Cutawhiskie Creek has been sampled five times, during February and August 1995, in February 2000 and during February and August 2005. Each time, the swamp has been Not Rated. During the most recent sampling, the biotic index indicates that there is a fairly pollution tolerant macroinvertebrate community in Cutawhiskie Swamp.

This sample site has a drainage area of 36 square miles. The riparian zone is lacking adequate tree cover needed to prevent streambank erosion. Incised channels with a lack of pools and turbid waters were found at this site during the February sampling.