Chapter 4 -
Chowan River Subbasin 03-01-04
Includes Rockyhock Creek to Albemarle Sound

4.1 Water Quality Overview

Subbasin 03-01-04 at a Glance

Land and Water

Total area:	177 mi^2
Land area:	152 mi^2
Water area:	45 mi^2

Population Statistics

1990 Est. pop.:	10,146 people
Pop. density:	67 persons / mi^2

Land Cover (%)

Forest / Wetland:	41%
Surface Water:	25%
Urban:	<1%
Cultivated Crop:	31%
Pasture / Managed Herbaceous:	2%

This subbasin includes a small northwest portion of the Albemarle Sound, including Salmon Creek, Edenton Bay, Pembroke Creek and the west side of the mouth of the Chowan River, below US 17. A map including water quality sampling locations is presented as Figure B-4.

DWQ conducted ambient, phytoplankton and benthic sampling in this subbasin. Bioclassifications for these sample locations are presented in Table B-7. Table B-8 summarizes uses support ratings for subbasin 03-01-04. Refer to Appendix III for a complete listing of monitored waters and use support ratings.

This subbasin contains portions of the Chowan Game Land, a track managed by the Wildlife Resources Commission. This property is one of four publicly-owned conservation lands in the subbasin.

The subbasin population, based on 1990 census data, is 10,146. It has a population density at 67 persons/square mile, making it the most densely populated subbasin in the entire Chowan River basin. Edenton is the largest municipality in the subbasin with a population of 5,394. Between the years of 1990 and 2000, Edenton grew by approximately 2.4 percent.

Currently there are four NPDES minor permits and nine general permits. No facilities are required to conduct whole effluent toxicity testing under their permit conditions.

Benthic macroinvertebrate sampling indicated that the water quality in the Chowan River near Edenton has generally remained Good-Fair since 1983. A swamp sample at Eastmost Swamp, a tributary to Salmon Creek, did not indicate any major water quality problems. DWQ sampled Eastmost Swamp, a swamp stream that may receive rapid runoff from adjacent agricultural land. Data did not indicate that enrichment is a problem. However, habitat degradation was noted, including channelization and lack of pools.

Figure B-4 Chowan River Subbasin 03-01-04

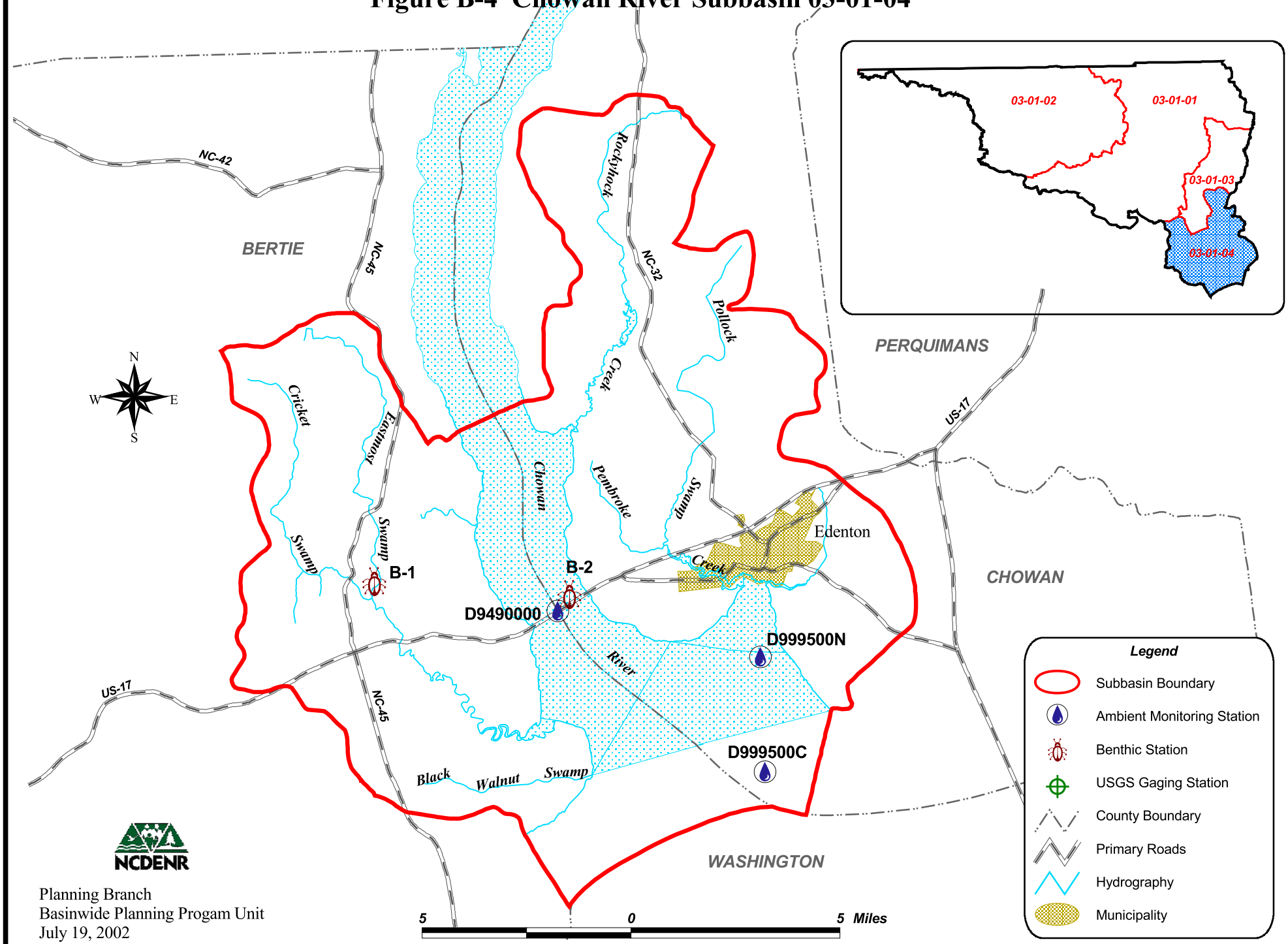

Table B-7 DWQ Monitoring Locations and Benthic Macroinvertebrate Bioclassifications (2000) for Chowan River Subbasin 03-01-04

Site	Stream	County	Location	Bioclassification
Benthic Macroinvertebrates				
B-1	Eastmost Swamp	Bertie	SR 1361	Not Rated
B-2	Chowan River	Chowan	US 17	Good-Fair
Ambient Monitoring				***Problem Parameter***
D9490000	Chowan River	Bertie	at Edenhouse	None observed
D999500C	Albemarle Sound	Chowan	near Edenton mid channel	None observed
D999500N	Albemarle Sound	Chowan	near Edenton north shore	None observed
D999500S •	Albemarle Sound	Chowan	near Edenton south shore	None observed

• Station not shown on map.

* Refer to Section A, Part 3.3 for more information on fish community and benthic macroinvertebrate bioclassifications.

Table B-8 Use Support Ratings Summary (2000) for Monitored and Evaluated[2] Freshwater Streams (Miles) in Chowan River Subbasin 03-01-04

Use Support Category	FS	PS	NS	NR	Total[1]
Aquatic Life/ Secondary Recreation[2]	7.8 miles *	0	0	68.1 miles	75.9 miles
Primary Recreation	7.8 miles	0	0	17.3 miles	25.1 miles

* 15,600.4 acres of Albemarle Sound – FS.

[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 because of a regional fish consumption advisory. Refer to Section A, Part 4.3 for further information.

In comparing 1995-2000 data to 1980-1994 data, algal blooms have experienced a steady decline in frequency and intensity. Only two blooms of nuisance blue-green algae were reported from 1990-1994, while only one blue-green bloom occurred during 1995-2000. Throughout the last five-year sampling period, phytoplankton biovolumes were relatively low. High biovolumes occurred in August 1999 and July 2000.

DWQ did not collect fish tissue samples in this basin. However, high concentrations of metals (especially copper) have been reported (Riggs et al., 1993) for some sites in Edenton Bay near marinas. This study determined the concentrations and distributions of heavy metals and phosphorus pollutants associated with organic-rich muds in the Albemarle estuarine system. The temporal impacts of agriculture, urbanization and industry were determined, as were the interrelationships between sediment/water column interactions and resultant chronic effects of heavy metals on the estuarine system.

The Division of Environmental Health's Recreational Waters Testing Program conducts sampling on the Chowan River at the Mount Gould Lodge site. There were no advisories posted for this sampling site. Therefore, the 0.2 miles (1.4 acres in radius) of the Class SB waters around the site are fully supporting their primary recreation use.

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

4.2 Status and Recommendations for Previously Impaired Waters

The 1997 Chowan River Basinwide Plan identified one segment of the Chowan River impaired in this subbasin. This section reviews use support and recommendations detailed in the 1997 basinwide plan, reports status of progress, gives recommendations for the next five-year cycle, and outlines current projects aimed at improving water quality for these stream segments.

4.2.1 **Chowan River** (14.5 miles from Colerain to US Highway 17 at Edenhouse)

1997 Recommendations

The 1997 basin plan identified the mainstem of the Chowan River as impaired due to nutrient concerns. In an effort to address the excess nutrient concerns, DWQ recommended that United Piece Dye Works (UPDW) submit the results of their study on the bioavailability of nitrogen in the river. In addition, the state recommended that UPDW continue annual studies on nitrogen bioavailability to determine the changes in nitrogen when different dyes are used. Finally, the 1997 plan recommended that UPDW perform an economic feasibility report on the costs of reducing total nitrogen from 20 mg/l to 3 mg/l.

Status of Progress

UPDW submitted their economic feasibility report to DWQ in 1997. This information will be informative during the NPDES permit reissuance process. DWQ reissued the NPDES permit in1998 with total nitrogen (TN) mass limits (based on 5.5 mg/l and HB 515 requirements) beginning after January 1, 2003. Until that time, UPDW has a TN limit of 20 mg/l. Preliminary feedback indicated that UPDW may seek a variance to the TN mass limit based on bioavailability issues. However, as of January 2001, DWQ has not received any additional information to support a variance. This segment of the Chowan River is currently fully supporting.

2002 Recommendations

If UPDW seeks a variance on the new total nitrogen mass limits, DWQ should foster an interoffice discussion to ensure that the NPDES staff, regional water quality staff, modeling staff and basinwide planning staff are fully abreast of the proposal and variance ramifications on water quality.

4.3 Status and Recommendations for Newly Impaired Waters

No additional stream segments were rated as impaired in this subbasin based on recent DWQ monitoring (1995-2000).

4.4 Other Issues and Recommendations

The surface waters discussed in this section are fully supporting designated uses based on recent DWQ monitoring; however, these 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.

4.4.1 Projected Population Growth

Growth management within the next five years will be imperative 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 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, Part 4.4 for more information about urbanization and development and recommendations to minimize impacts to water quality.

4.4.2 NPDES Facilities

The Town of Edenton treats its wastewater in a lagoon/land application wastewater treatment plant that is currently under a Special Order by Consent (SOC) issued by the state. The SOC requires expansion of the wastewater treatment plant or reduction of flow by collection system structural improvements.

The Chowan County Water Plant at Valhalla discharges saline backwash to a nearby unlined DOT borrow pit. The public has informed DWQ that the local groundwater is getting saltier due to the discharge. Chowan County is working towards rerouting the discharge point to below the nearby millpond and directly discharging the saline effluent. DWQ recommends a full permit review because of the change in the discharge location. DWQ will work with the local landowners, county and Division of Water Resources regarding the discharge permit location.