Chapter 1 -
Catawba River Subbasin 03-08-30
Includes Catawba River Headwaters

1.1 Water Quality Overview

Subbasin 03-08-30 at a Glance

Land and Water Area (sq. mi.)

Total area:	526
Land Area:	516
Water Area:	10

Population

1990 Est. Pop.:	42,702 people
Pop. Density:	83 persons/mi^2

Land Cover (%)

Forest/Wetland:	87%
Water:	3%
Urban:	1%
Cultivated Crop:	1%
Pasture/ Managed Herbaceous:	8%

Use Support Ratings

Freshwater Streams:

Fully Supporting:	408.1 mi.
Fully Supporting but Threatened:	217.6 mi.
Partially Supporting:	5.3 mi.
Not Supporting:	0.0 mi.
Not Rated:	19.9 mi.

Lakes:

Lake James - Fully Supporting

This subbasin contains the headwaters of the Catawba River from its source near Old Fort to the confluence with Silver Creek in Burke County. Major tributaries include Curtis Creek, Buck Creek, Crooked Creek, Muddy Creek, the North Fork Catawba River and the Linville River. This subbasin also includes the entire watershed of Lake James. Approximately one-half of the subbasin is within the Pisgah National Forest. A map of this subbasin including water quality sampling locations is presented in Figure B-1. Overall biological ratings are presented in Table B-1.

The Catawba River flows generally eastward with the largest tributaries flowing south from mountainous headwaters. These northern tributaries are typically swiftly flowing, coldwater streams capable of supporting trout populations.

There are many high quality streams in this subbasin with 74% of the sites receiving a Good or Excellent rating using benthic macroinvertebrate data. Areas of highest water quality include the headwater segment of Mill Creek, Buck Creek/Little Buck Creek, the headwater segment of the North Fork Catawba River, Armstrong Creek and tributaries, Little Grassy Creek, and the lower segment of the Linville River. HQW streams in this subbasin include Jarrett Creek, portions of Mackey Creek, portions of Armstrong Creek, and the lower part of the Linville River.

Streams with the poorest water quality include Corpening Creek (draining urban areas of Marion). Recent fish and benthic macroinvertebrate collections (March 1998) also indicated severe water quality problems in lower Mackey Creek below the discharge from Metal Industries. These streams are impaired and are discussed further below.

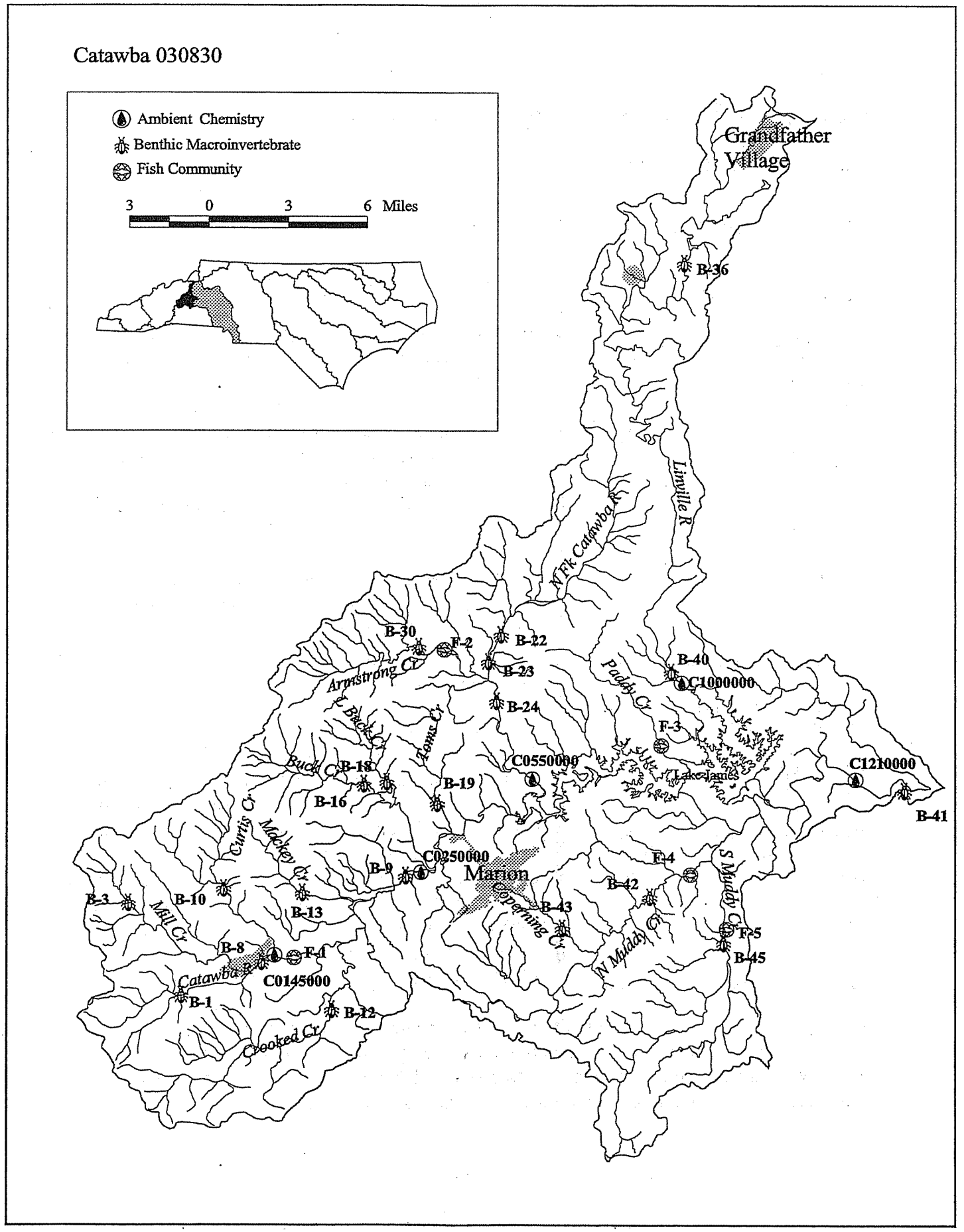


Figure B-1 Sampling Locations within Subbasin 03-08-30

Table B-1 Biological Assessment Sites in Catawba River Subbasin 03-08-30 (1997)

Site	Stream	County	Road	Rating
B-1	Catawba River	McDowell	SR 1274	Good-Fair
B-3	Mill Creek	McDowell	ab RR Bridge	Excellent*
B-8	Catawba River	McDowell	SR 1234	Good-Fair
B-9	Catawba River	McDowell	SR 1221	Good
B-10	Curtis Creek	McDowell	be Newberry Creek	Good
B-12	Crooked Creek	McDowell	SR 1135	Good
B-13	Mackey Creek	McDowell	SR 1453	Good
B-16	Buck Creek	McDowell	NC 80	Excellent
B-18	Little Buck Creek	McDowell	SR 1436	Excellent
B-19	Toms Creek	McDowell	SR 1434	Good
B-22	N Fork Catawba River	McDowell	SR 1573	Excellent
B-23	N Fork Catawba River	McDowell	SR 1560	Good
B-24	N Fork Catawba River	McDowell	be Sevier	Good
B-30	Armstrong Creek	McDowell	FS Rd	Excellent
B-36	Linville River	Avery	US 221	Good-Fair
B-40	Linville River	Burke	NC 126	Excellent
B-41	Catawba River	Burke	SR 1147	Good
B-42	North Muddy Creek	McDowell	SR 1750	Good
B-43	Corpening Creek	McDowell	SR 1819	Fair
B-45	South Muddy Creek	McDowell	SR 1764	Good-Fair
F-1	Catawba River	McDowell	SR 1110	Good-Fair
F-2	Armstrong Creek	McDowell	SR 1456	Good-Fair
F-3	Paddy Creek	Burke	NC 126	Good-Fair
F-4	North Muddy Creek	McDowell	SR 1760	Fair
F-5	South Muddy Creek	McDowell	SR 1764	Fair

Key:
B = Benthic Macroinvertebrate Sites
F = Fish Sites
* Small stream criteria

Streams with intensive agricultural or residential land use often had high turbidity and Good-Fair ratings based on either macroinvertebrate or fish collections. These include: South Muddy Creek, North Muddy Creek, Paddy Creek, lower Buck Creek, the upper Linville River and the headwaters of the Catawba River.

Trends in water quality over a period greater than 5 years could be assessed with macroinvertebrate data at nine sites in 03-08-30 (refer to Appendix II for sampling results). One

site in the headwaters of the Catawba River showed a decline in water quality (Excellent in 1983, Good-Fair in 1997), while four sites showed some improvement: Catawba River near Old Fort, Linville River near Briery Knob, Linville River near Nebo, and North Muddy Creek. Changes at the Catawba River and North Muddy Creek were associated with upgrades at wastewater treatment plants, while the upper Linville River appears to have recovered from the effects of a drawdown at an upstream golf course lake. Most of these improvements occurred prior to 1992. Fish samples indicated a long-term improvement (35 years) at North Muddy Creek.

Trends in water quality over a five-year period could be assessed at 20 sites, with the majority of these (16) showing no significant change in bioclassification. Three sites showed a decline associated with a soybean oil spill into Swannanoa Creek. A more recent sampling (1999) in Swannanoa Creek showed improvements, and the creek appears to have recovered (rated Excellent) from the soybean oil spill. A decline at Mackey Creek might be associated with nonpoint source runoff.

Benthos ratings for the Catawba River below Old Fort improved from Fair in 1985 to Excellent in 1992. Improvements in water quality were associated with the closing of the Old Fort finishing plant and improvements to effluent quality at the Old Fort WWTP. The Pleasant Gardens site has improved from Good-Fair to Good during this same time period, but this station still has elevated levels of turbidity and suspended solids, especially during times of high flow. This pattern suggests that nonpoint source runoff may be affecting this portion of the Catawba River.

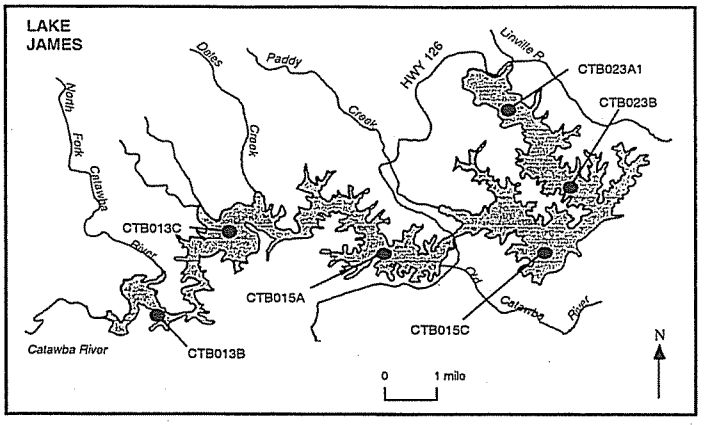
Eight facilities monitor effluent toxicity, including five dischargers with a permitted flow greater than 0.5 MGD. Consistent problems were observed only at Metal Industries (discharging to Mackey Creek), but most facilities have failed at least one test during the last five years. The Marion-Corpening Creek WWTP had more severe problems in 1997, failing five self-monitoring toxicity tests.

Biological and chemical monitoring data are used to develop use support ratings. These ratings are used to prioritize DWQ activities towards protecting and restoring waters in the basin. A complete listing of use support ratings for this subbasin can be found in Appendix III.

Lake James Assessment

COUNTY:	Burke /McDowell	**CLASSIFICATION:**	WS-IV, WS-V B Tr
SURFACE AREA:	6510 acres (2635 hectares)	**MEAN DEPTH:**	46 feet (14 meters)
VOLUME:	$36.9 \times 10^6 m^3$	**WATERSHED:**	380 mi^2 (984 km^2)
SHORELINE:	150 Miles	**RETENTION TIME:**	228 days

Lake James is owned by Duke Energy. The Catawba River, the North Fork of the Catawba River, and the Linville River are the major tributaries of Lake James. Lake James is hydrologically divided into two units: the Catawba River section and Linville River section. These units are connected by a man-made canal located at the NC 126 bridge. The watershed is



primarily forested and is characterized by rolling hills. The waters of Lake James are used to generate electricity at the Bridgewater Hydroelectric Plant and for recreational purposes. Lake James was most recently monitored in June, July and August 1997 and was found to be oligotrophic on the days it was sampled.

Increasing development pressures within the lake's watershed, particularly along the shoreline, may pose a threat to the water quality of Lake James. An increase in the number of septic tanks within the watershed and recreational boating activities on the lake are viewed as potentially damaging to the lake's water quality (The Charlotte Observer, October 13, 1993).

For more detailed information on water quality in this subbasin, refer to the *Basinwide Assessment Report - Catawba River Basin - August 1998,* available from the DWQ Environmental Sciences Branch at (919) 733-9960.

1.2 Prior Basinwide Plan Recommendations (1995) and Achievements

1.2.1 Impaired Waters

The 1995 Catawba River Basinwide Plan identified only Corpening Creek as impaired in this subbasin.

Corpening Creek

Approximately 4.7 miles of Corpening Creek was listed as impaired due to nonpoint sources and the Marion WWTP, based on biological data collected in 1990. The 1995 plan recommended that efforts to address water quality issues in the Corpening Creek watershed should concentrate on nonpoint source pollution reduction, and several recommendations were made to address urban stormwater pollution. Corpening Creek drains a highly urban portion of Marion. The water quality problems seen in the creek are typical of urban streams.

Status of Progress

DWQ has relied on existing nonpoint source control programs and the actions of local governments to correct water quality degradation in Corpening Creek. Corpening Creek is still rated as impaired, and recommendations for improving water quality can be found in Part 1.3.

1.3 Current Priority Issues and Recommendations

1.3.1 Monitored Impaired Waters

Mackey Creek and Corpening Creek were given an impaired use support status based on the most recent DWQ data available. These creeks are also on the state's year 2000 (not yet EPA approved) 303(d) list (see Part 1.3.2 below).

Mackey Creek

Mackey Creek, from US 70 to the Catawba River (0.6 miles), is rated partially supporting due to impacts from Metal Industries discharge. Metal Industries has had consistent problems meeting its toxicity limits.

1999 Recommendation(s)

DWQ is working with this discharger while they make process improvements to assure permit limits are met in the future. DWQ has a Special Order by Consent (SOC) on Metals Industries. The facility has plans to remove the discharge entirely in the future. DWQ will also develop a TMDL for Mackey Creek (see Part 1.3.2 below).

Corpening Creek

Corpening Creek, from source to junction with North Muddy Creek (4.7 miles), is listed partially supporting due to nonpoint sources, urban impacts and the Marion WWTP. Growth around Marion is impacting the creek, and the Marion WWTP had several toxicity test failures in 1997.

1999 Recommendation(s)

There is not enough information available to determine what efforts might be needed to restore Corpening Creek. A more in-depth watershed study should be conducted to identify the land use activities and streambank problems that are causing degradation of this creek. There is currently not enough staff available at the state level to make this commitment. Local projects aimed at identifying sources of pollution and necessary actions would be very useful to DWQ and various funding agencies. It may be possible to use projects such as the Lower Creek Watershed Project (referred to in subbasin 03-08-31) as a model.

The Town of Marion was experiencing toxicity problems as a result of discharges to their system. The town successfully addressed the toxicity issue through their pretreatment program and has been in compliance.

DWQ will conduct further monitoring to better determine problem parameters on Corpening Creek (see Part 1.3.2 below).

1.3.2 303(d) Listed Waters

Two waters in this subbasin (Mackey Creek and Corpening Creek) are listed on the state's year 2000 (not yet EPA approved) 303(d) list (see Appendix IV for more information). Mackey Creek and Corpening Creek are currently impaired and are discussed above.

1.3.3 Other Recommendations

Lake James

Development in the watershed of Lake James has the potential to increase pollutant loading to the lake through both point and nonpoint sources. Due to these concerns, two water quality studies are currently underway to assess the impacts of land use changes on the lake.

The WPCOG received an EPA 205(j) grant to model the effects of land use changes on water quality in Lake James. The study includes the collection of data to characterize pollutant loading rates to the lake and modeling the response of the lake to these loadings. The Lake James response model will be completed prior to issuing the next basinwide plan and results of the study will be included in the next basinwide plan. For more information on the study, contact Mike Struve of WPCOG at (828) 322-9191.

Duke Power has initiated a modeling study of Lake James. This study will attempt to: 1) quantify the extent of point and nonpoint loading from the watershed to the lake under various land use and land cover practices; and 2) assess the impact of this loading on reservoir and tailrace water quality. The proposed modeling effort will predict nutrient cycling, dissolved oxygen and algae levels on the lake. This modeling effort will develop tools to evaluate effects of changing land use, point source dischargers and weather on water quality of the lake. Duke Power will incorporate data through 1999 into the model, and results of the study will be incorporated into the next revision of the basinwide plan.

For more information on this study, contact Bill Foris of Duke Power at (704) 875-5262.

Muddy Creek Watershed

The 98-square mile watershed of Muddy Creek is in Burke and McDowell counties. Muddy Creek is formed by the confluence of North Muddy Creek and South Muddy Creek just upstream of the confluence of Muddy Creek and the Catawba River. This watershed shows evidence of nonpoint source problems. Although waters in this watershed are not considered to be impaired, the watershed experiences significant sediment loads due to eroding streambanks and stream blockages. Duke Power has been collecting data on sediment loads in the North and South Muddy Creeks and estimate that between 14,000 – 23,000 tons per year of sediment enter the Catawba River from the Muddy Creek watershed under typical streamflow conditions. North Muddy Creek is estimated to contribute about 80% of this load. This watershed is in need of

focused restoration activities. Refer to Section C, Chapter 1 for more information on a multi-partner restoration initiative currently underway.

The City of Morganton uses the Catawba River as its primary drinking water source. Reduction in the sediment load from the Muddy Creek watershed will likely result in lower treatment costs for the city and significantly reduce the sediment loading to Lake Rhodhiss.