

Chapter 4 - Catawba River Subbasin 03-08-33

Includes Dutchmans Creek and Mountain Island Lake

4.1 Water Quality Overview

Subbasin 03-08-33 at a Glance

Land and Water Area (sq. mi.)

Total area:	220
Land area:	216
Water area:	4

Population Statistics

1990 Est. Pop.:	47,301 people
Pop. Density:	219 persons/mi ²

Land Cover (%)

Forest/Wetland:	69%
Surface Water:	2%
Urban:	2%
Cultivated Cropland:	2%
Pasture/ Managed Herbaceous:	25%

Use Support Ratings

Freshwater Streams:

Fully Supporting:	147.5 mi.
Fully Supporting but Threatened:	0.0 mi.
Partially Supporting:	9.8 mi.
Not Supporting:	0.0 mi.
Not Rated:	10.1 mi.

Lakes:

Mountain Island Lake - Fully Supporting
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Dutchmans Creek, formed by the confluence of Leepers and Killian Creeks, is the largest watershed in this subbasin and flows into the Catawba River just downstream of Mountain Island Lake. Land use is primarily agricultural with recreational and residential use near the lake. The largest discharger in this subbasin is Charlotte-Mecklenburg Utilities (CMUD), with three discharges into McDowell Creek, a tributary of Mountain Island Lake. A map of this subbasin including water quality sampling locations is presented in Figure B-4. Biological ratings for these sample sites are presented in Table B-4.

Based on benthic macroinvertebrate data since 1992, Dutchmans, Killian, Gar and Leepers Creeks were rated either Good or Excellent (although these streams often carry a heavy sediment load).

McDowell Creek received a Poor fish community rating due to the effects of severe bank erosion and lack of suitable fish habitat. Previous benthos studies here also indicated water quality problems. The discrepancy between fish and macroinvertebrate ratings of Killian and Leepers Creeks may be due to the heavy sediment load and lack of fisheries habitat typical of streams in this area.

Additional data on fish community integrity for Mecklenburg County streams were collected (using slightly different methods and metrics) by the Mecklenburg County Department of Environmental

Protection (MCDEP) and Duke Energy.

Seven facilities in this subbasin currently monitor effluent toxicity in accordance with their NPDES discharge permit. Since 1995, all have consistently passed their self-monitoring 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. Only McDowell Creek is currently listed as impaired (partially supporting) in this subbasin. All other

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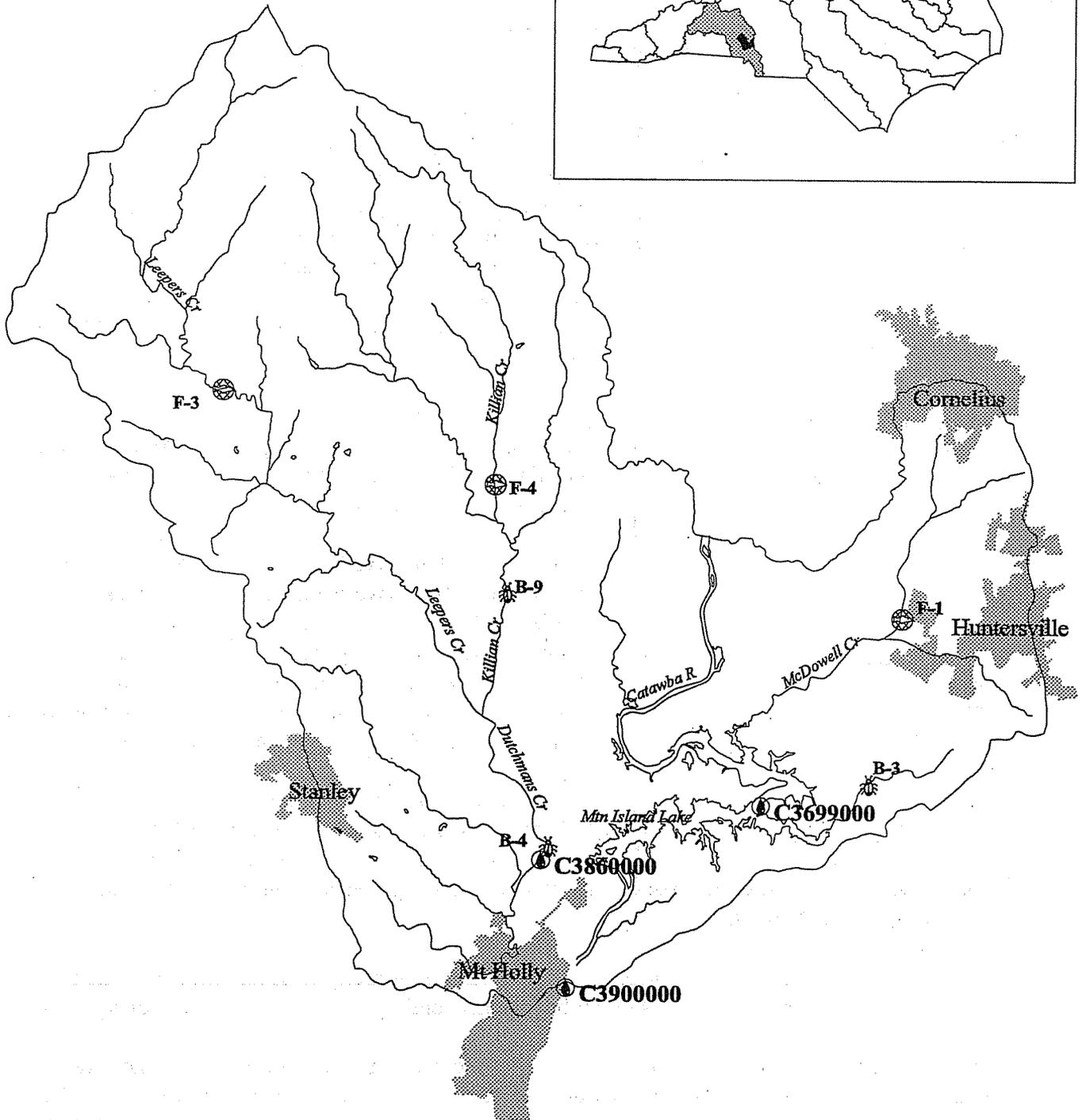
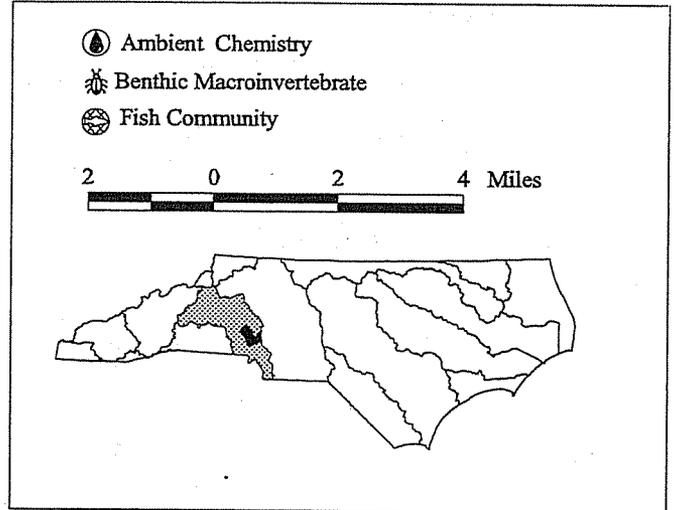


Figure B-4 Sampling Locations within Subbasin 03-08-33

sampling locations resulted in fully supporting ratings. Refer to Appendix III for a complete listing of monitored waters and use support ratings.

Table B-4 Biological Assessment Sites in Catawba River Subbasin 03-08-33 (1997)

Site	Stream	County	Road	Rating
B-3	Gar Creek	Mecklenburg	SR 2074	Good
B-4	Dutchmans Creek	Gaston	SR 1918	Excellent
B-9	Killian Creek	Lincoln	SR 1511	Good
F-1	McDowell Creek	Mecklenburg	SR 2136	Poor
F-3	Leepers Creek	Lincoln	NC 73	Good-Fair
F-4	Killian Creek	Lincoln	NC 73	Fair

Key:

B = Benthic Macroinvertebrate Sites

F = Fish Sites

Mountain Island Lake Assessment

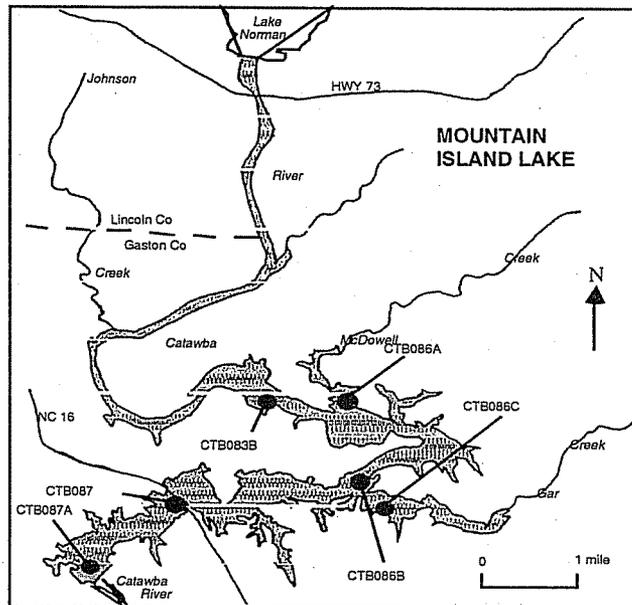
COUNTY:	Gaston/Mecklenburg	CLASSIFICATION:	WS-IV B CA
SURFACE AREA:	3235 acres (1309 hectares)	MEAN DEPTH:	16 feet (5 meters)
VOLUME:	71.0 x10 ⁶ m ³	WATERSHED:	1860 mi ² (4817 km ²)
SHORELINE:	61 miles	RETENTION TIME:	12 days

Mountain Island Lake is owned by Duke Energy and is formed by the drainage of Lake Norman into the Catawba River. The lake was filled when construction on the Mountain Island Hydroelectric Station was completed in 1924. Mountain Island is a relatively small and narrow lake. The drainage area is characterized by very hilly terrain of which approximately half is forested; one-fourth is agricultural; and the remainder is urban. The waters of Mountain Island Lake are used as a water supply for the City of Charlotte and by Duke Energy to generate electricity at both the Riverbend Steam Station and the Mountain Island Station located at the dam. The lake is classified as WS-IV from Cowans Ford Dam to the water intake at the River Bend Steam Station, and as WS-IV and Class B water from the water intake to the Mountain Island Dam.

Mountain Island Lake was most recently sampled in June, July and August 1997 and was determined to be oligotrophic. The lake was previously sampled by DWQ in 1981, 1982, 1986, 1992, 1995 and 1996. Mountain Island Lake was mesotrophic the first three years it was sampled, then oligotrophic in both 1992 and 1995.

In 1991 and 1992, a decrease in water quality in the McDowell Creek arm of Mountain Island Lake, downstream of the McDowell Creek WWTP, was observed by the Mecklenberg County Department of Environmental Protection (MCDEP). In response to concerns regarding the

decrease in water quality in the McDowell Creek arm of Mountain Island Lake and at the request of MCDEP, DWQ conducted a joint study with MCDEP from May 13 through October 13, 1994 to address nutrient contributions from the McDowell Creek WWTP. Results of this study are discussed further in Part 4.2.1 below.



For more detailed information on water quality in subbasin 03-08-33, refer to the *Basinwide Assessment Report - Catawba River Basin - August 1998*, available from the DWQ Environmental Sciences Branch at (919) 733-9960.

4.2 Prior Basinwide Plan Recommendations (1995) and Achievements

4.2.1 Impaired Waters

The 1995 basinwide plan identified two waters in this subbasin as impaired. Each of these waters is discussed further below.

McDowell Creek Arm of Mountain Island Lake

At the time of the 1995 basinwide plan, Mecklenburg County and DWQ were in the midst of a study to monitor and document nutrient loading throughout the McDowell Creek watershed and the impact of nutrients on the McDowell Creek Arm of Mountain Island Lake. The study was designed to address nutrient contributions by the McDowell Creek WWTP operated by Charlotte-Mecklenburg Utilities (CMUD). Sampling stations were located above and below the WWTP discharge. Preliminary results of this study indicated that the CMUD McDowell Creek WWTP was the largest contributor of nutrients to the McDowell Creek arm of Mountain Island Lake. Finalized results of the study were to be included in this revised plan.

The basinwide plan also identified other lesser sources of nutrient contributions upstream of the facility (cattle, dairy and row crop agriculture, along with land clearing activities associated with residential and commercial development).

Status of Progress

Although high nutrient levels were found in McDowell Creek due to the discharge from the McDowell Creek WWTP, problematic algal bloom conditions were not generally found in the McDowell Creek arm of the lake. The current NPDES permit sets nutrient limits of 10 mg/l total nitrogen and 1 mg/l total phosphorus effective upon expansion above 3.5 MGD. The facility will complete expansion construction in 1999 and be subject to the nutrient limits. CMUD is currently experimenting with various biological nutrient removal modes in anticipation of the forthcoming nutrient limits. These process changes should result in significant reductions in nutrient loading. McDowell Creek is listed as impaired and recommendations are presented in Part 4.3.1 and 4.3.2.

Unnamed Tributary to Fites Creek

This stream segment was listed as impaired due to impacts from the Parkdale Mill discharge to a zero flow segment of the stream. Additional monitoring was recommended to determine if the stream has improved.

Status of Progress

This stream was not resampled because it is a zero flow stream, and the discharges have been removed.

4.2.2 Other Recommendations

Mountain Island Lake Study

DWQ and Mecklenburg County were conducting a two-year study of nutrient loading in the McDowell Creek watershed and the eutrophic response in Mountain Island Lake. Preliminary data suggested that the CMUD McDowell Creek WWTP discharge was the largest source of nutrients to this arm of the lake. This facility was to be required to implement nutrient removal upon major modification or expansion.

Status of Progress

For further discussion of this study, see Part 4.2.1, McDowell Creek Arm of Mountain Island Lake and Part 4.3.1 below.

4.3 Current Priority Issues and Recommendations

4.3.1 Monitored Impaired Waters

McDowell Creek is rated as impaired based on the most recent DWQ data available. The creek is also on the state's year 2000 (not yet EPA approved) 303(d) list (see Part 4.3.2).

McDowell Creek

The entire length of McDowell Creek (approximately 9.8 miles) is rated partially supporting due to nonpoint sources. During the 1997 sampling, it was noted that streambank erosion was extensive; there were no snags or riffles; and well-defined pools were rare and had been filled in with sediment. Because of such habitat alteration, the fish community was classified as Poor at the sampling site at SR 2136. The section of creek below the fish sampling station was also rated as impaired based on a 1990 benthos sampling and the heavily urbanized watershed of the creek.

1999 Recommendation(s)

Charlotte-Mecklenburg Utilities (CMUD) has recently completed an upgrade of the WWTP discharging into McDowell Creek. CMUD has added additional monitoring sites downstream of the discharge to assess reductions in nutrient loading to the creek. Preliminary data show a significant reduction of phosphorus as a result of this upgrade.

McDowell Creek may be suitable for local actions under the Mecklenburg County Surface Water Improvement and Management (SWIM) program (see Section C for more information) to address the nonpoint source contributions to degradation. Given the highly urbanized nature of the watershed, it will be challenging and costly to conduct enough mitigative activities in the watershed to result in measurable improvements. DWQ will work in cooperation with Mecklenburg County, where possible, to develop management strategies for stream restoration.

4.3.2 303(d) Listed Waters

The entire length of McDowell Creek is on the state's year 2000 (not yet EPA approved) 303(d) list and is discussed above. Refer to Appendix IV for more information on 303(d) listing methodology and requirements.