

Section B - Chapter 5

Catawba River Subbasin 03-08-34

Irwin Creek, Long Creek, McAlpine Creek and Sugar Creek

5.1 Subbasin Overview

Subbasin 03-08-34 at a Glance

Land and Water Area

Total area:	324 mi ²
Land area:	317 mi ²
Water area:	7mi ²

Population Statistics

2000 Est. Pop.:	408,821 people
Pop. Density:	1,231 persons/mi ²

Land Cover (percent)

Forest/Wetland:	52%
Surface Water:	2%
Urban:	32%
Agriculture:	13%

Counties

Gaston and Mecklenburg

Municipalities

Belmont, Charlotte, Huntersville,
Matthews, Mint Hill, Mount Holly
and Pineville

This subbasin is in the Southern Outer Piedmont ecoregion and contains the Sugar Creek watershed, a portion of Lake Wylie, and much of the City of Charlotte metropolitan area. This is the most heavily urbanized region of the basin and the state, and its population is expected to increase over 30 percent by 2020 (Table A-6). Only 52 percent of the subbasin is forested – the smallest percentage of any of the subbasins.

There are currently over 50 NPDES permitted dischargers in this subbasin. The largest one is the Charlotte/Mecklenburg Utilities District, which discharges to Irwin Creek (15 MGD), McAlpine Creek (64 MGD), and Little Sugar Creek (20 MGD).

There are 30 facilities in this subbasin required to monitor effluent toxicity. Of these, six facilities have had more than one failing toxicity test since 1997: American Truetzschler, Inc. (12), Cousins Real Estate/Gateway Village (12), Duke Power/Allen 002 (3), First Union Commons (4), Hoechst Celanese/Dreyfus (2), and Unocal/Rhom and Haas Facility (5). Four other facilities had one failing test since 1997: (AquAir WWTP, Belmont WWTP, CMUD/Irwin Creek WWTP,

and CMUD/McAlpine Creek WWTP).

There were eight benthic macroinvertebrate community samples and four fish community samples (Figure B-5 and Table B-9) collected during this assessment period. One site improved; three sites remained the same; two sites had a lower bioclassification, and two sites were sampled for the first time during this assessment period. There are ten ambient monitoring stations located in this subbasin, both in North and South Carolina.

Based upon benthic macroinvertebrate data, McAlpine Creek and Sugar Creek (at SC 160) were given Fair bioclassifications in 1997 and 2002, while Sugar Creek at SR 1156 and Little Sugar Creek were given Poor bioclassifications. Both streams had been given Fair bioclassifications in 1997. These low bioclassifications are due to urban runoff, poor habitat, and may be influenced by wastewater discharges. The declines were attributed to the drought rather than significant declines in water quality.

Figure B-5 Catawba River Subbasin 03-08-34

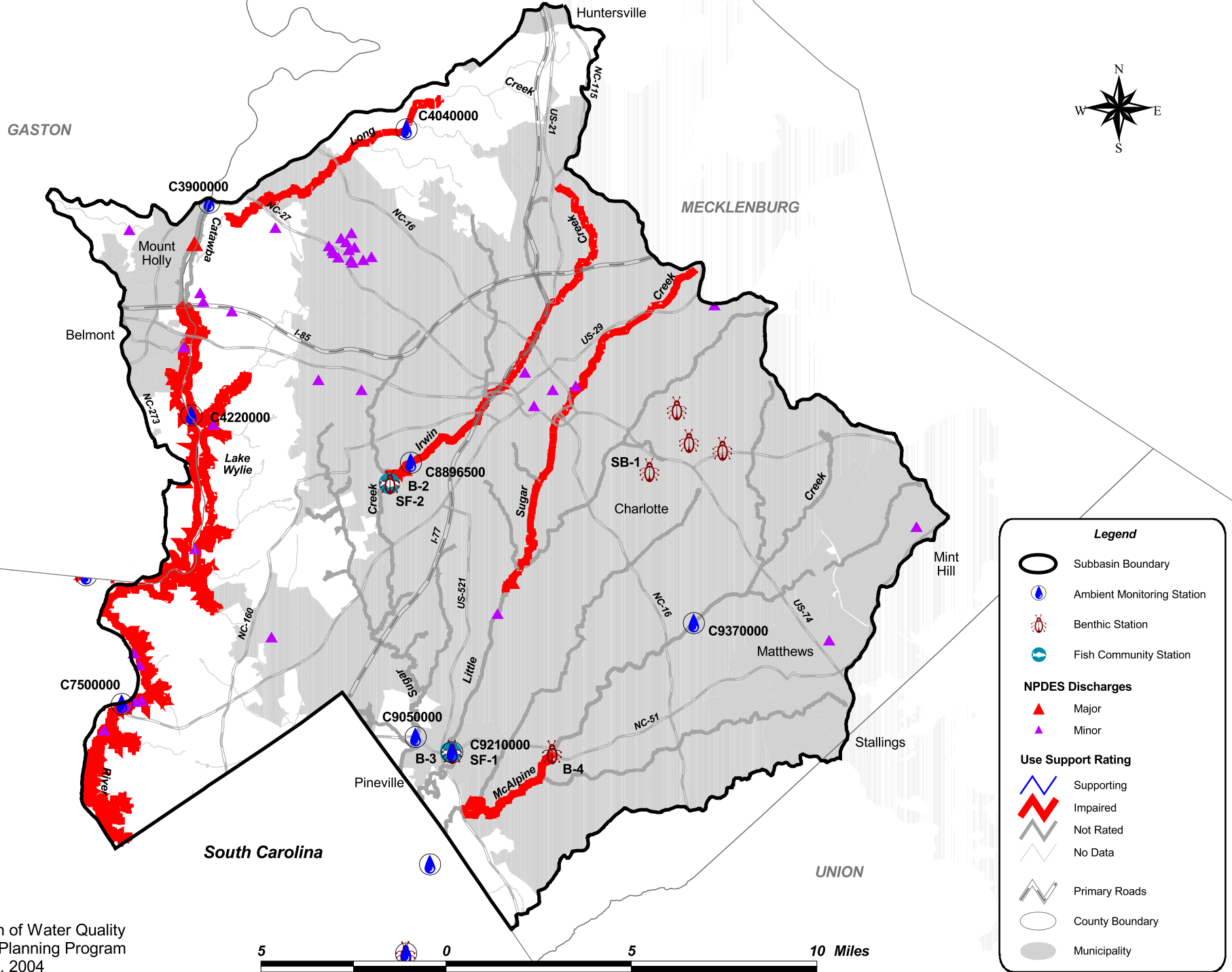


Table B-9 DWQ Assessment and Use Support Ratings Summary for Monitored Waters in Subbasin 03-08-34

Waterbody	Assessment Unit Number	DWQ Classification	Length / Area	Category	Data Type with Map Number and Data Results			Use Support Rating	
					Biological	Ambient	Other	2004	1998
CATAWBA RIVER (Lake Wylie below elevation 570)	11-(122)	WS-IV & B CA	601.1 ac.	AL		C3900000 nce C4220000 nce	L-1 ce	I	FS
CATAWBA RIVER (Lake Wylie below elevation 570) North Carolina portion	11-(123.5)	WS-V & B	3,418.5 ac.	AL		C7000000 nce C7400000 nce C7500000 nce	L-1 ce	I	FS
Irwin Creek	11-137-1	C	11.8 mi.	AL	B-2 F--97 B-2 P--02 SF-2 P--97 SF-2 P--02	C8896500 nce		I	PS
Little Sugar Creek	11-137-8b	C	5.5 mi.	AL	B-3 F--97 B-3 P--02 SF-1 F--97 SF-1 GF--02	C9210000 nce		I	PS
Long Creek	11-120-(2.5)	WS-IV	11.3 mi.	AL		C4040000 ce		I	PS
McAlpine Creek (Waverly Lake)	11-137-9a	C	8.5 mi.	AL		C9370000 nce		NR	PS
McAlpine Creek (Waverly Lake)	11-137-9c		4.6 mi.	AL	B-4 F--97 B-4 F--02			I	PS
Sugar Creek	11-137a	C	0.3 mi.	AL	B-1 F--97 B-1 F--02	C8896500 nce		I	PS
Sugar Creek	11-137b		10.9 mi.	AL		C9050000 nce		NR	PS
CATAWBA RIVER (Lake Wylie below elevation 570)	11-(122)	WS-IV & B CA	601.1 ac.	REC		C4220000 nce		S	
CATAWBA RIVER (Lake Wylie below elevation 570) North Carolina portion	11-(123.5)	WS-V & B	3,418.5 ac.	REC		C3900000 nce		S	-
Irwin Creek	11-137-1	C	11.8 mi.	REC		C8896500 ce		NR	-
Little Sugar Creek	11-137-8b	C	5.5 mi.	REC		C9210000 ce		NR	-
Long Creek	11-120-(2.5)	WS-IV	11.3 mi.	REC		C4040000 ce		NR	-

Table B-9 DWQ Assessment and Use Support Ratings Summary for Monitored Waters in Subbasin 03-08-34

Waterbody	Assessment Unit Number	DWQ Classification	Length / Area	Category	Data Type with Map Number and Data Results			Use Support Rating	
					Biological	Ambient	Other	2004	1998
McAlpine Creek (Waverly Lake)	11-137-9a	C	8.5 mi.	REC		C9370000 ce		NR	-
Sugar Creek	11-137a	C	0.3 mi.	REC		C8896500 ce		NR	-
Sugar Creek	11-137b	C	10.9 mi.	REC		C9050000 ce		NR	-

Assessment Unit Number - Portion of DWQ Classified Index where monitoring is applied to assign a use support rating.

Use Categories: AL - Aquatic Life REC - Recreation	Monitoring data type: F - Fish Community Survey B - Benthic Community Survey SF - Special Fish Community Study L - Lakes Assessment	Bioclassifications: E - Excellent G - Good GF - Good-Fair F - Fair P - Poor	Use Support Ratings 2004: S - Supporting, I - Impaired, NR - Not Rated
		Ambient Data nce - no criteria exceeded ce - criteria exceeded	Use Support Ratings 1998: FS - fully supporting PS - partially supporting, NS - not supporting

ambient monitoring stations as well. Refer to *2003 Catawba River Basinwide Assessment Report* at <http://www.esb.enr.state.nc.us/bar.html> and Section A, Chapter 3 for more information on monitoring.

Waters in Part 5.3 are identified by assessment unit number (AU#). This number is used to track defined segments in the water quality assessment database, 303(d) Impaired waters list, and the various tables in this basin plan. The assessment unit number 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 assessment unit and the DWQ index segment are the same.

Use support ratings are summarized in Part 5.2 below. Recommendations, current status and future recommendations for waters that were Impaired in 1999 and newly Impaired waters are discussed in Part 5.3 below. Water quality issues related to the entire subbasin are discussed in Part 5.4. Refer to Appendix III for use support methods and more information on all monitored waters.

5.2 Use Support Assessment Summary

Use support ratings in subbasin 03-08-34 were assigned for aquatic life, fish consumption, recreation and water supply. All water supply waters are Supporting on an Evaluated basis based on reports from DEH regional water treatment plant consultants. Refer to Table B-10 for a summary of use support ratings by use support category for waters in the subbasin.

Table B-10 Summary of Use Support Ratings by Use Support Category in Subbasin 03-08-34

Use Support Rating	Aquatic Life	Fish Consumption	Recreation	Water Supply
Monitored Waters				
Supporting	0	0	4,019.6 ac	0
Impaired	39.5 mi 4,019.6 ac.	0	0	0
Not Rated	35.2 mi	0	48.3 mi	0
Total	74.8 mi 4,019.6 ac	0	48.3 mi 4,019.6 ac	0
Unmonitored Waters				
Supporting	0	0	0	30.4 mi 4,019.6 ac
Impaired	0	246.8 mi 4,019.6 ac	0	0
Not Rated	93.2 mi	1.0 mi	0	0
No Data	79.8 mi	0	199.5 mi.	0
Total	173.0 mi	247.8 mi 4,019.6 ac	199.5 mi 4,019.6 ac	30.4 mi 4,019.6 ac
Totals				
All Waters	247.8 mi 4,019.6 ac	247.8 mi 4,019.6 ac	247.8 mi 4,019.6 ac	30.4 mi 4,019.6 ac

Note: All waters include monitored, evaluated and waters that were not assessed.

5.3 Status and Recommendations of Previously and Newly Impaired Waters

The following waters were identified in the 1999 basin plan as Impaired or are newly Impaired based on recent data. The current status and recommendations for addressing these waters are presented below. These waters are identified by assessment unit number (AU#). Refer to the overview above for more information on AUs.

5.3.1 The Sugar Creek Watershed Including: Irwin Creek [AU# 11-137-1] Little Sugar Creek [AU# 11-137-8] McAlpine Creek [AU# 11-137-9a and 11-137-9c] Sugar Creek [AU# 11-137a and 11-137b]

1999 Recommendations

These four streams and their smaller tributaries collectively drain the metropolitan center of Charlotte in Mecklenburg County. The watershed receives large amounts of both point and nonpoint pollution from the urban areas, severely impacting stream health in each of the streams. Similar habitat conditions are found at all sample sites within this watershed, sand/silt substrate,

severe bank erosion, and disturbed or nonexistent riparian vegetation. Elevated levels of both fecal coliform bacteria and turbidity indicate impairment by urban runoff and wastewater discharges in all four streams. In the 1999 plan, DWQ noted they would work closely with Mecklenburg County and the City of Charlotte during the development of a TMDL and implementation plan for this watershed.

Current Status and 2004 Recommendations

Impairment for Sugar Creek = 11.2 mi.; Irwin Creek = 11.8 mi.; Little Sugar Creek = 5.5 mi.; and McAlpine Creek = 4.6 mi.

Water quality in general has remained low but stable over the last planning cycle. In 2002, declines were noted on Sugar Creek (B-2) and Little Sugar Creek (B-3), but this decline was most likely due to the severe drought. The Irwin Creek site is showing a slight trend of lowered conductivity since the middle 1990s. Conversely, McAlpine Creek at SR 3356 showed slightly elevated conductivity trends since the middle 1990s. In addition, McAlpine Creek at SR 3356 had slightly elevated levels of $\text{NO}_2 + \text{NO}_3\text{-N}$ and ammonia since the early 1990s. Sugar Creek at NC 51 has had slightly elevated levels in $\text{NO}_2 + \text{NO}_3\text{-N}$, while other nutrients have decreased notably since the early 1980s. Dissolved oxygen concentrations have steadily increased since the late 1960s at this site. Sugar Creek at SC 160 has shown elevated trends in $\text{NO}_2 + \text{NO}_3\text{-N}$ and dissolved oxygen since the late 1980s, while ammonia and total Kjeldahl nitrogen have dramatically decreased since the late 1970s.

Many streams in this watershed are also Impaired within South Carolina. Recreational or aquatic life uses on Steele, Sugar and McAlpine Creeks are Impaired because of fecal coliform bacteria or copper violations and appear on South Carolina's Draft 2003 303(d) List (SCDEHC, 2002). North Carolina is subject to an interstate TMDL developed by South Carolina and will therefore cooperate on its development.

Fecal Coliform Bacteria TMDL

In response to a high level of government and citizen interest in a fecal coliform TMDL, a stakeholder group was formed in 1999. The stakeholder group, lead by the Mecklenburg County Department of Environmental Protection (MCDEP) and the DWQ, took a very active role in every stage of the TMDL development process. MCDEP has a well-developed and respected water quality management program and was able to take the lead role in both the source assessment and model development.

The end result of this stakeholder effort was a comprehensive fecal coliform TMDL that received approval in March 2002. The TMDL addresses all identifiable sources of fecal coliform pollution including, but not limited to, wastewater treatment plants, sanitary sewer overflows, stormwater runoff, failing septic systems, and background wildlife contributions. The TMDL study indicated that excluding stormwater runoff, the primary contributors of fecal coliform pollution in this watershed are point sources (WWTP, etc.) and direct input nonpoint sources (failing septic systems). Table B-11 presents a summary of the TMDL and describes the necessary reductions in fecal coliform contamination in the Sugar Creek watershed. Loading reductions are defined for both point and nonpoint sources.

Table B-11 Summary of Sugar Creek Watershed Fecal Coliform TMDL

Critical Conditions	Site-specific critical conditions occurred during periods of low streamflow coinciding with high fecal coliform loads from both the SSOs and the WWTPs.	
Seasonality	All seasons addressed.	
Development Tools	Watershed model, BASINS Versions	
Supporting Documents	<i>Fecal Coliform Total Maximum Daily Load for the Irwin, McAlpine, Little Sugar and Sugar Creek Watersheds, Mecklenburg County</i> , and references listed in report.	
TMDL(s)	Waterbody	TMDL (cfu/100ml)
	Sugar Creek	8.4×10^{12}
	Irwin Creek	7.7×10^{12}
	Little Sugar Creek	9.4×10^{12}
	McAlpine Creek downstream of Sardis Road	1.1×10^{13}
	McAlpine Creek upstream of Sardis Road	6.8×10^{12}
Loadings	<p><i>Sugar Creek watershed:</i></p> <p>Point sources 7.4×10^{12} col/100ml (63% reduction)</p> <p>Nonpoint sources 8.9×10^{11} col/100ml (58% reduction)</p> <p><i>Irwin Creek watershed:</i></p> <p>Point sources 7.0×10^{12} col/100ml (60% reduction)</p> <p>Nonpoint sources 7.3×10^{11} col/100ml (62% reduction)</p> <p><i>Little Sugar Creek watershed:</i></p> <p>Point sources 6.7×10^{12} col/100ml (43% reduction)</p> <p>Nonpoint sources 2.6×10^{12} col/100ml (19% reduction)</p> <p><i>McAlpine Creek watershed (downstream):</i></p> <p>Point sources 7.8×10^{12} col/100ml (70% reduction)</p> <p>Nonpoint Sources 3.2×10^{12} col/100ml (28% reduction)</p> <p><i>McAlpine Creek watershed (upstream):</i></p> <p>Point sources 7.8×10^{12} col/100ml (32% reduction)</p> <p>Nonpoint sources 5.9×10^{11} col/100ml (68% reduction)</p>	

The MCDEP, Charlotte Mecklenburg Utilities, and Charlotte Mecklenburg Storm Water Services can accomplish implementation of the TMDL cooperatively. Local coordination, oversight and reporting for the TMDL should be the responsibility of the MCDEP. Each of the three programs has currently funded efforts dedicated to reducing fecal coliform levels in Charlotte's streams, and these efforts can be augmented to fulfill the requirements of the TMDL Implementation Strategy.

Phosphorus Load Reduction Strategy

In the summer of 2001, the South Carolina Department of Health and Environmental Control (SCDHEC) filed a Petition for a Contested Case in the North Carolina Office of Administrative Hearings regarding the renewal of the Charlotte Mecklenburg Utilities Department (CMUD) McAlpine Creek wastewater treatment plant. The primary complaint on the part of SCDHEC was that the permit was renewed without a phosphorus limit. Nearly all of South Carolina's municipal dischargers to the mainstem Catawba River (upstream of Lake Wateree) have been given phosphorus limits, generally equivalent to 1 mg/l. The McAlpine Creek WWTP permit had a phosphorus optimization study special condition that stipulated preparatory requirements for the facility to ready itself for the upcoming phosphorus TMDL.

In January 2002, SCDHEC, DWQ and CMUD reached an agreement on the terms of the phosphorus limits at the McAlpine treatment plant and expanded the permitting strategy to include the WWTPs on Sugar, Irwin and Twelvemile Creeks (in Union County). The final settlement agreement includes four main points: phosphorus limits at all three CMUD facilities, a bubble limit, a mass cap, and a TMDL. The phosphorus limit corresponds to 1 mg/l at the permitted flows calculated on a 12-month rolling average. The bubble limit refers to a mass limit for total phosphorus that applies to the combined discharge of all three CMUD plants. This type of limit allows CMUD operational flexibility with regard to phosphorus removal. In order to be protective of water quality in the downstream lakes, SCDHEC requested a maximum combined limit to ensure optimized plant operation at all times. The maximum limit corresponds to a concentration limit of 2 mg/l at maximum permitted flow. In addition, the agreement includes a provision that will include DWQ and all affected NC entities in the TMDL process.

5.3.2 Long Creek [AU# 11-120-(2.5)]

Current Status and 2004 Recommendations

The Long Creek watershed drains north central Mecklenburg County between Charlotte and Huntersville. Approximately 11.3 miles of Long Creek (from a point 0.6 mile downstream of Mecklenburg County SR 2074 to a point 0.4 mile upstream of Mecklenburg County SR 1606) are rated Impaired due to turbidity and exceedances of the manganese water quality standard. Ambient data from the current assessment period indicate that the turbidity readings remain in violation of the state standard. Fecal coliform concentrations are also above the state standard, but Long Creek is not used for primary recreation. There are no NPDES discharges to this stream, suggesting that impairment is likely a result of urban runoff, construction and agriculture in the watershed. This evaluation is based on chemical monitoring data because DWQ does not have biological monitoring locations on Long Creek at this time.

In 2002, Mecklenburg County entered into a partnership with the NCDOT and the NC Division of Land Quality regarding the I-485 construction project through the Long Creek watershed. NCDOT funded staff and resources for the development, monitoring and maintenance of 15 continuous automated monitoring sites located throughout the watershed, which automatically download water quality data to a website every 15 minutes and alert staff regarding elevated turbidity levels. In 2003 and 2004, the network detected several sedimentation problems that were quickly corrected thus preventing significant downstream water quality impacts. The program has been extremely successful and NCDWQ encourages similar programs and partnerships when the opportunity arises in other watersheds.

Long Creek suffers from the impacts of rapid urbanization. Please refer to Section A, Chapter 4, Part 4.13 for a detailed discussion on DWQ's approach to and recommendations for this issue.

5.3.3 Lake Wylie [AU# 11-(122) and 11-(123.5)]

The area covered by Lake Wylie overlaps the boundaries of subbasins 03-08-34, 03-08-36 and 03-08-37. Therefore, a detailed discussion on Lake Wylie can be found in Section A, Chapter 4, Part 4.7.3. Because of chlorophyll *a* standard violations, algal blooms, and dissolved oxygen percent saturation values greater than 120 percent, Lake Wylie (4,019.6 acres, NC portion) is Impaired by eutrophication. Data collected by the Mecklenburg County Water Quality Program support these findings.

5.4 Additional Water Quality Issues within Subbasin 03-08-34

Water Quality Threats to Streams in Urbanizing Watersheds

Subbasins in and around the Greater Charlotte Metropolitan Area are experiencing rapid growth as new homes and businesses replace old farms and forests. This development places intense pressure on the sensitive stream communities within those basins. In order to prevent aquatic habitat degradation and Impaired biological communities, protection measures should be put in place immediately. Refer to Section A, Chapter 4, Part 4.13 for a description of urban stream water quality problems and recommendations for reducing impacts and restoring water quality.