

December 10, 2009

## Memorandum

To: Andrea Leslie, NCEEP  
Through: Steve Kroeger, NCDWQ  
From: Cathy Tyndall, NCDWQ

**Subject: Fecal Coliform Bacteria Sample Results – Lower Creek Watershed, Catawba River Basin. HUC 030501010702 and 030501010703**

*Note: This memorandum represents the completion of Tasks 1 and 2 of the Follow-up Fecal Monitoring in the Lower Creek LWP Area Scope of Work. Catawba River Basin. HUC 030501010702 and 030501010703*

## Background

The NC Division of Water Quality (NCDWQ) conducted water quality sampling during the period February 2004 through April 2005 in Lower Creek and six of its tributaries to support the development of a Local Watershed Plan for Lower Creek by the NC Ecosystem Enhancement Program (NCEEP). Part of this sampling focused on fecal coliform bacteria contamination in some of the creeks; the results of this specific sampling effort are summarized in Table 1. Results showed that Abingdon Creek was the only site with three or more samples (i.e.  $N \geq 3$ ) in which results collected during baseflow conditions that had a geometric mean below 200 cfu/100 ml. All other sample locations with three or more samples had geometric means that exceeded 200 cfu/100 ml. Note, that the results used to calculate the geometric means results were collected as part of a general monitoring effort and do not represent five consecutive samples collected within a 30 day period.

The results collected by the NCDWQ during 2004 and 2005 were used in the Lower Creek Watershed Management Plan<sup>1</sup> (MACTEC and EEP, July 2006). This plan identified excessive fecal coliform bacteria as a key stressor in the Lower Creek watershed. The report stated that City of Lenoir's wastewater collection system had problems with sewer overflows and leaks and that the city had upgraded a large section of its main sewer interceptor along NC 18. A recent inquiry and subsequent email from the City of Lenoir stated that this sewer improvement project began in 2004 and was completed in 2005. The project cost approximately 2.4 million dollars and consisted of replacing a major outfall line composed of failing terracotta pipe with new ductile iron piping. Most of the line ran along NC 18 near Lower Creek and was up-sized as it was replaced. The installation included approximately 5,000 linear feet of 30-inch gravity ductile iron piping (Information is from an email written by Mack Edminston, City of Lenoir, Director, Public Utilities, October 12, 2009).

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<sup>1</sup> [http://www.nceep.net/services/lwps/Lower\\_Creek/Lower\\_Creek\\_Watershed\\_Management\\_Plan.pdf](http://www.nceep.net/services/lwps/Lower_Creek/Lower_Creek_Watershed_Management_Plan.pdf)

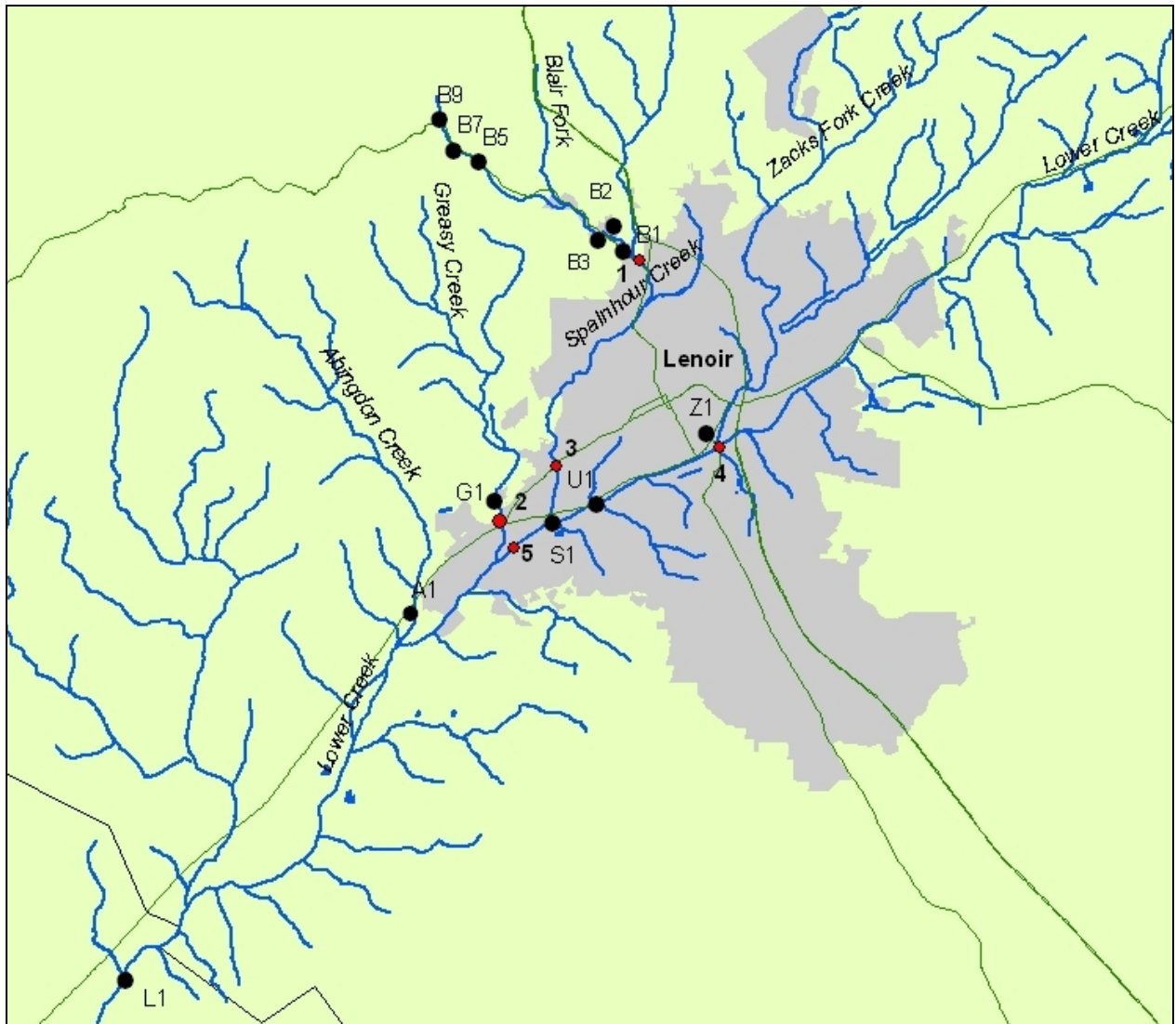
Table 1. Summary of Fecal Coliform Bacteria Results Representing Samples Collected During February 2004 through April 2005.<sup>A</sup>

Map Code	Location	Baseflow Samples			Baseflow and Stormflow Samples		
		N	Geometric Mean	%>400	N	Geometric Mean	%>400
A1	Abingdon Cr at SR 1927	3	124.8	-	6	566.1	33.3
B1	Blair Fork at SR 1525	1	700	100	4	2437.1	100
B2	Blair Fork at 1944 Valway	4	268.3	50	6	948.3	66.7
B3	Blair Fr. spring across 1944 Valway	1	1	-	1	1	-
B5	Blair Fr. below landfill at NC 90	1	260	-	1	260	-
B7	Landfill UT to Blair Fork at NC 90	2	5	-	2	5	-
B9	Blair Fork at NC 90 above landfill	1	280	-	1	280	-
G1	Greasy Cr at SR 1425	5	214.1	40	9	777	55.6
L1	Lower Cr at SR 1501	8	438.7	37.5	13	787.1	53.8
S1	Spainhour Cr below NC 18	5	851.1	80	10	1724.1	90
U1	UT to Lower Cr at NC 18	5	348.2	40	11	1123.7	72.7
Z1	Zacks Fork at US 321A	4	353.8	25	10	1953.3	70

<sup>A</sup> N = Number of Samples; Geometric means are in cfu/100ml; %>400 represents the proportion of results greater than 400 cfu/100ml.

In 2009, the NCDWQ was requested by the NCEEP to conduct 5x/30 sampling as a follow up to the sewer line improvements to document changes in the bacteria counts. The goal was to determine whether water quality standards are being met for fecal coliform bacteria. North Carolina Department of Environment and Natural Resources [Administrative Code](#) 15A NCAC 02B .0219 states that, “*fecal coliforms are not to exceed geometric mean of 200/100 ml (MF count) based on at least five consecutive samples examined during any 30-day period and not to exceed 400/100 ml in more than 20 percent of the samples examined during such period.*”

Five consecutive samples for fecal coliform bacteria were collected within a 30 day period between September 3, through September 29, 2009. A Quality Assurance Program Plan was not prepared for this project. Samples were collected in accordance with the standard operating procedures manual for physical and chemical monitoring (NCDWQ 2006) and with the quality assurance and quality control measures required by the NCDWQ Laboratory Section (<http://h2o.enr.state.nc.us/lab/qa.htm>). All samples met the NCDWQ’s Laboratory Section’s six-hour holding time and were collected at base flow conditions.



**Figure 1. Sampling Locations in the Lower Creek LWP area during 2004-2005 (black dots coded with a letter and a number) and the 5x30 Sample Locations (red dot with a number).**

**Table 2. Sites where 5 samples were collected in a 30 day period in 2009.**

Map Number	Waterbody	Location	Current classification	Stream Index #	Latitude	Longitude
1	Blair Fork	Collettesville Rd at Baptist Church	C	11-39-3-1	35.9350	81.5450
2	Greasy Cr	SR 1425 (Old Harper Road)	C	11-39-4	35.8960	81.5680
3	Spainhour Cr	NC Business 18 (Harper Avenue)	C	11-39-3	35.9040	81.5590
4	Zacks Fork	At Golf Club off Norword St	C	11-39-1	35.9080	81.5290
5	Lower Cr	At Complex Dr. off Morganton Blvd	C	11-39-(0.5)	35.8910	81.5660

**Table 3. . Fecal coliform results from the 5 Samples in 30 days.** Samples were collected during September 2009

Map Number	Waterbody	Concentration (cfu/100ml)					Proportion (%) > 400	Geometric Mean (cfu/100ml)
		Sept. 3	Sept. 4	Sept. 14	Sept. 15	Sept 29		
1	Blair Fork	410 <sup>A</sup>	920	380	380	920	60	550
2	Greasy Creek	340 <sup>A</sup>	1200	440	580	1000	80	636
3	Spainhour Creek	1100	640	1800	2600	1100	100	1294
4	Zacks Fork	830	1300 <sup>A</sup>	930	830	760	100	913
5	Lower Creek	1000	520	700	580	8700 <sup>B</sup>	100	1129

<sup>A</sup> Results were assigned the B4 data qualifier by the NCDWQ Laboratory Section. "Filters have counts of both >60 or 80 and <20. Reported value is a total of the counts from all countable filters reported per 100 ml."

<sup>B</sup> Results were assigned the B3 data qualifier by the NCDWQ Laboratory Section. "Countable membranes with more than 60 or 80 colonies. The value reported is calculated using the count from the smallest volume filtered and reported as a greater than ">" value.

See: [http://h2o.enr.state.nc.us/lab/documents/QualifierCodes\\_05052008.pdf](http://h2o.enr.state.nc.us/lab/documents/QualifierCodes_05052008.pdf)

## RESULTS

All five 2009 sites had geometric means greater than the water quality standard of 200 cfu/100ml (Table 2). Spainhour Creek had the highest geometric mean (1294 cfu/100 ml) followed by Lower Creek (1129 cfu/100 ml). In Spainhour Creek and Lower Creek, 100% of the samples collected were over 400 cfu/100 ml. Overall, the 2009 geometric means are considerably higher

than the baseflow geometric means from 2004 and 2005. The 2009 samples were collected during summer months when water temperatures are higher and fecal coliform bacteria counts would also tend to be higher.

## References

NCDWQ 2006. Intensive Survey Unit Standard Operating Procedures Manual: Physical and Chemical Monitoring. Version 1.3. December 2006.

See: <http://h2o.enr.state.nc.us/esb/documents/PHYSICAL-CHEMICAL%20SOP.pdf>

MACTEC Engineering & Consulting, Inc. 2006. *Lower Creek Watershed Management Plan*. MACTEC Engineering & Consulting, Inc. 3301 Atlantic Ave. Raleigh, NC 27604.

MACTEC Project 6470-05-0953

See: [http://www.nceep.net/services/lwps/Lower\\_Creek/Lower\\_Creek\\_Watershed\\_Management\\_Plan.pdf](http://www.nceep.net/services/lwps/Lower_Creek/Lower_Creek_Watershed_Management_Plan.pdf)

**Hyperlinks:** All hyperlinks were accessed on December 10, 2009.

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