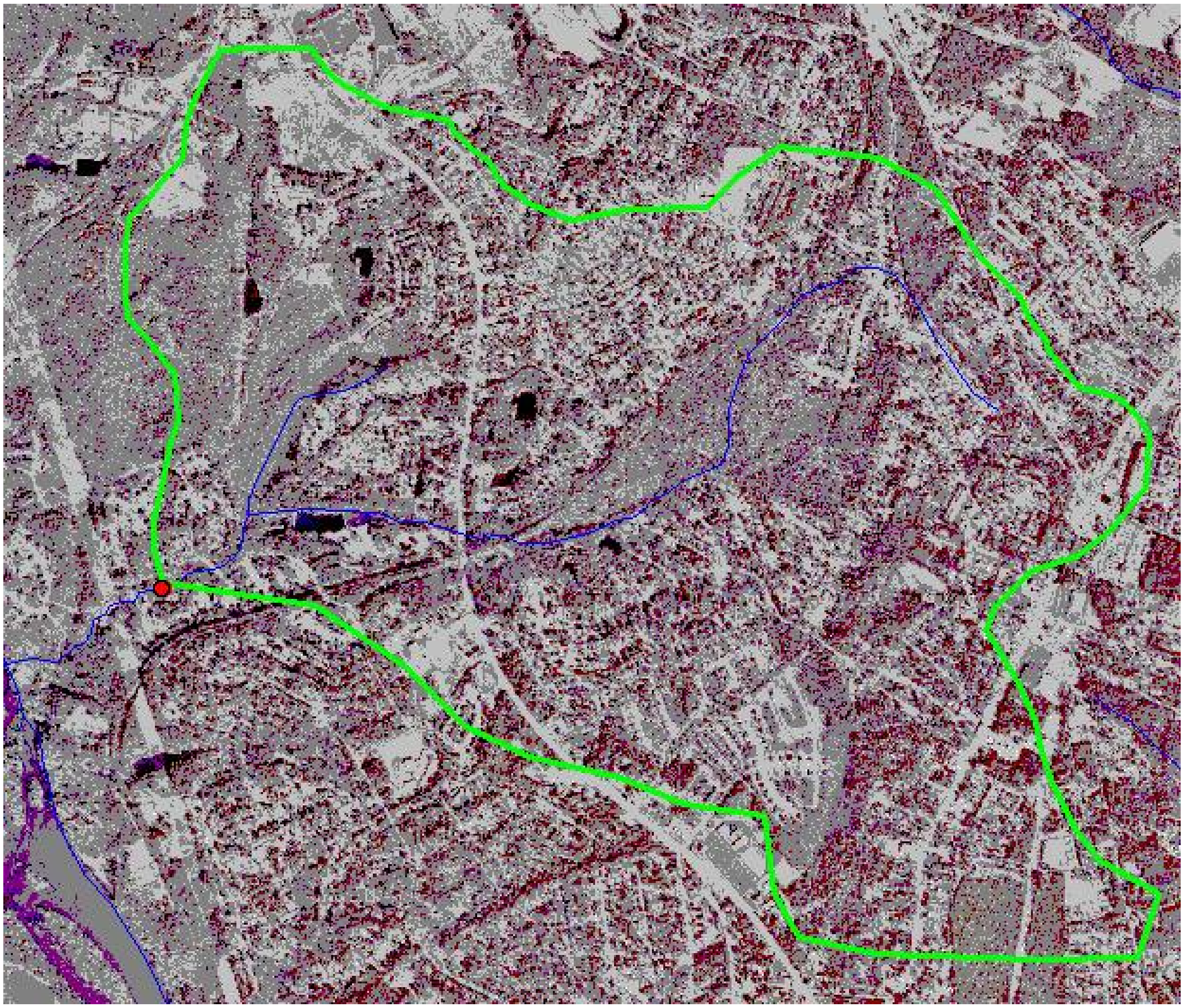
Total Maximum Daily Load Document: Pretty Run Creek
(Hydrologic Unit Code: 03060106-06-01) Station RS-04544
Fecal Coliform Bacteria, Indicator for Pathogens



November 27, 2006
Bureau of Water

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Abstract

A Total Maximum Daily Load (TMDL) has been developed for the Pretty Run Creek, which is a tributary of the Savannah River in Aiken County, SC. Pretty Run Creek was sampled in 2004 as a random station and has apparently never been sampled before. This urban creek, which is mostly in North Augusta, is listed on South Carolina's 2006 303(d) list of impaired waters, because 67 % of the samples exceeded the standard for fecal coliform bacteria of 400 cfu/100 ml. The likely sources of the fecal coliform bacterial pollution are urban runoff (including pets), leaking sewers, and failing septic systems.

The load-duration curve methodology was used to calculate the existing loads and the TMDL loads for the creek. Existing loads and TMDL loads are presented in Table Ab-1. In order to reach the target load for Pretty Run Creek, reduction in the existing load to the creek of 31 % will be necessary. Resources and several TMDL implementation strategies to bring about these reductions are suggested.

Table Ab-1. Total Maximum Daily Loads for the Pretty Run Creek.

Station ID	TMDL (cfu/day)	MOS (cfu/day)	WLA		LA (cfu/day)	Existing Load (cfu/day)	% Reduction to Meet Load Allocation[3]
			Continuous Sources[1] (cfu/day)	Intermittent Sources[2] (% Reduction)			
RS-04544	1.77E+10	8.84 E+08	NA	31 %	1.68 E+10	2.43 E+10	31%

Table Notes:

1 - WLA is expressed as total monthly average.

2 - Percent reduction applies to all NPDES-permitted stormwater discharges, including current and future MS4, construction and industrial discharges covered under permits numbered SCS & SCR. Stormwater discharges are expressed as a percentage reduction due to the uncertain nature of stormwater discharge volumes and recurrence intervals. Stormwater discharges are required to meet percentage reduction or the existing instream standard for pollutant of concern, whichever is less restrictive.

3 - Percent reduction applies to existing load; Where Percentage Reduction = (Existing Load-Load Allocation) / Existing Load

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INTRODUCTION

1.1 Background

Fecal coliform bacteria is widely used as an indicator of **pathogens** in surface waters and wastewater. Acute gastrointestinal illnesses affect millions of people in the United States and cause billions of dollars of costs each year (Gaffield et al, 2003). Of these illnesses many are caused by contaminated drinking water. Untreated stormwater runoff has been associated with a number of disease outbreaks, most notably the outbreak in Milwaukee that caused many deaths.

Though occurring at low levels from natural sources, the concentration of fecal coliform bacteria can be elevated in water bodies as the result of pollution. Sources of fecal coliform bacteria are usually diffuse or nonpoint source, such as stormwater runoff, failing septic systems, and leaking sewers. Occasionally, the source of the pollutant is a point source. Section 303(d) of the Clean Water Act and EPA's Water Quality Planning and Management Regulations (40 CFR Part 130) require states to develop total maximum daily loads (TMDLs) for water bodies that are not meeting designated uses under technology-based pollution controls. The TMDL process establishes the allowable loadings of pollutants or other quantifiable parameters for a water body based on the relationship between pollution sources and in stream water quality conditions so that states can establish water quality-based controls to reduce pollution and restore and maintain the quality of water resources (USEPA 1991).

1.2 Watershed Description

Pretty Run Creek in North Augusta (Aiken County) is a small urban stream (Figure 1). This area is in the Southeastern Plains Ecoregion of western South Carolina. Figure 2 shows the location of the watershed within Aiken County and South Carolina. Most of the watershed is in the City of North Augusta and is developed. Approximately 5100 people live in the watershed in 2200 households (2000 US Census). This TMDL concerns the portion of the watershed upstream of water quality station RS-04544. Information about the watershed is given in Table 1.

Table 1. Pretty Run Creek water quality monitoring site description.

Watershed	Station ID	Sampling Station Description	Drainage Area (hectares)	(acres)	Population
Pretty Run Creek	RS-04544	Pretty Run Creek at River Bluff Drive	693	1712	5123

Land use data for the watershed are from the NLCD 2001 database (Figure 3; Table 2). At the time of the data collection (2001), forest was the principal land use in the watershed - 48 %. Urban land uses accounted for most of the rest - 39 %. Transitional land was a distant third in percentage at 6%. Transitional land use suggests land being developed.

Examination of the sewer line database for this watershed shows that most of the watershed has sewer lines. Septic systems are likely rare in this watershed.

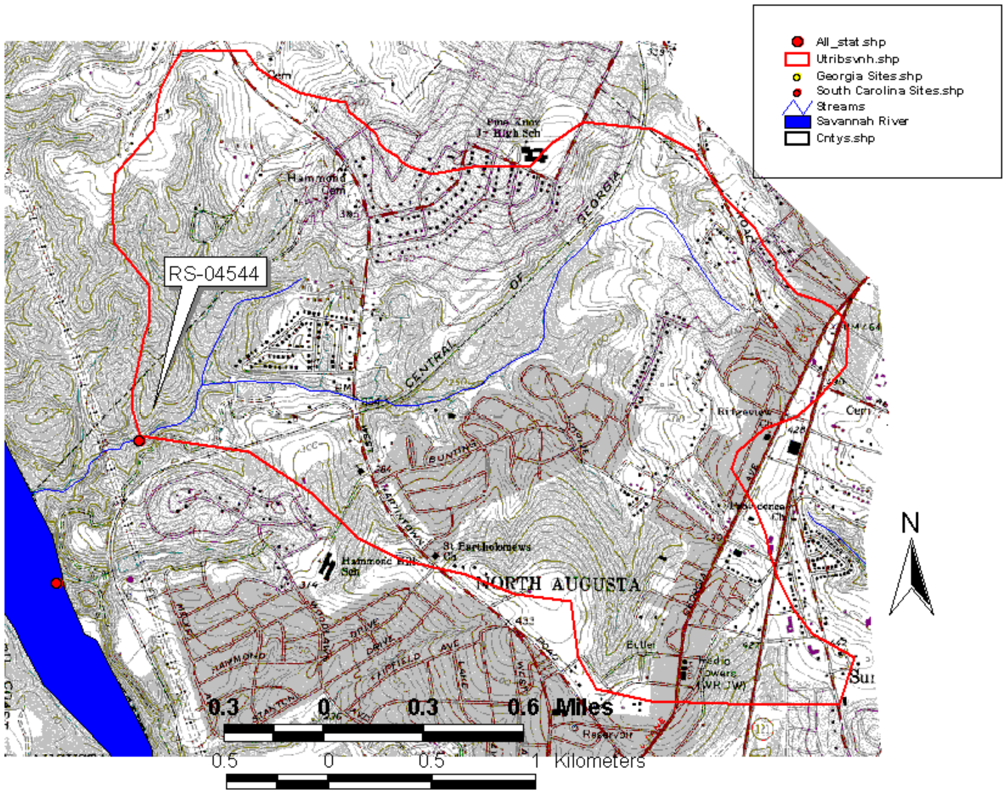

Figure 1. Map of Pretty Run Creek watershed, Savannah Basin.

1.3 Water Quality Standard

This Pretty Run Creek is designated as Class Freshwater. Waters of this class are described as follows:

> "Freshwaters suitable for primary and secondary contact recreation and as a source for drinking water supply after conventional treatment in accordance with the requirements of the Department. Suitable for fishing and the survival and propagation of a balanced indigenous aquatic community of fauna and flora. Suitable also for industrial and agricultural uses." (R.61-68)

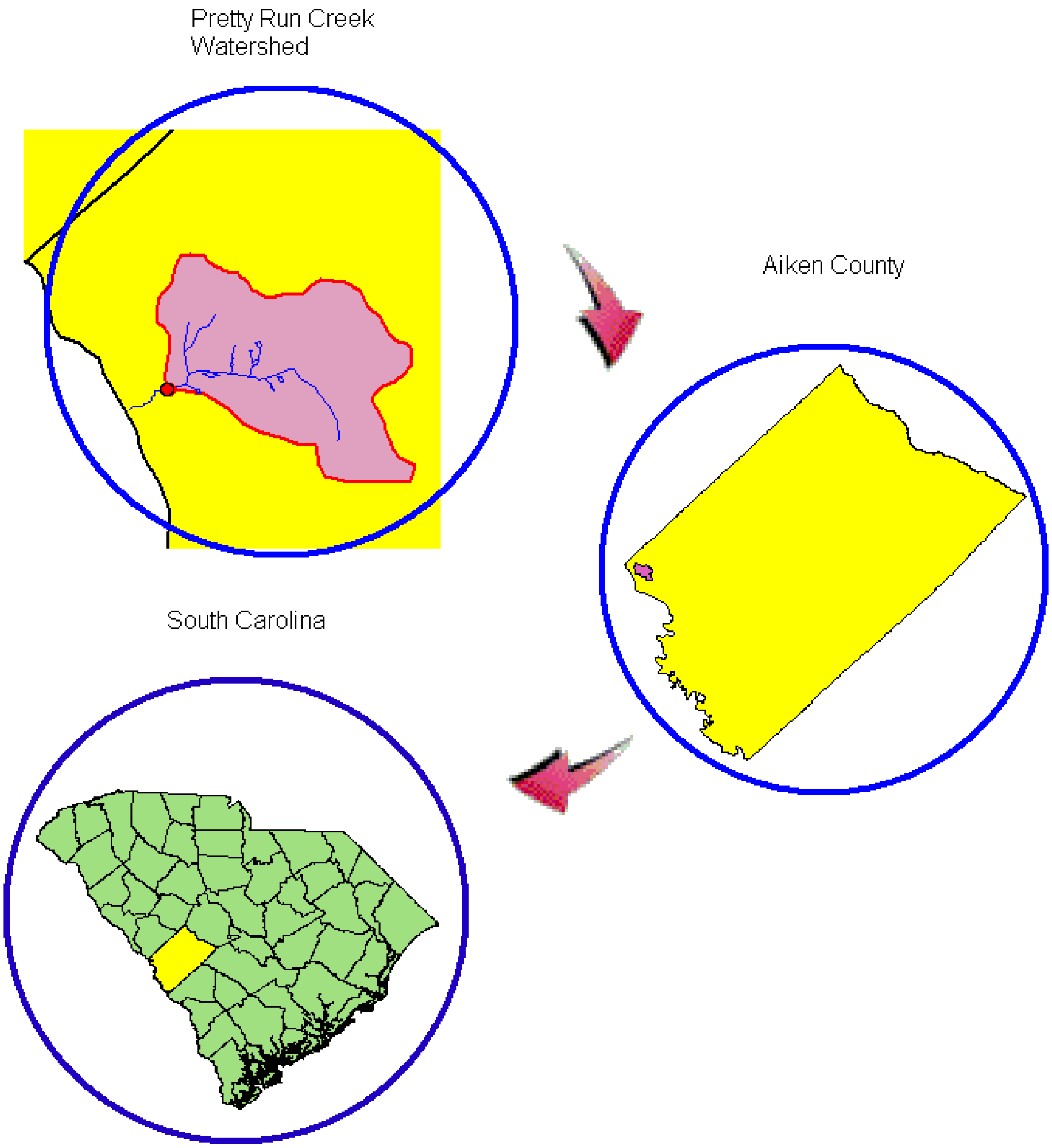

Figure 2. Location of Pretty Run Creek watershed in Aiken County, South Carolina.

South Carolina's standard for fecal coliform in Freshwater is:

"Not to exceed a geometric mean of 200/100 ml, based on five consecutive samples during any 30 day period; nor shall more than 10% of the total samples during any 30 day period exceed 400/100 ml."(R.61-68).

Primary contact recreation is not limited to large streams and lakes. Even streams that are too small to swim in, will allow small children the opportunity to play and immerse their hands and faces. Essentially all perennial streams should therefore be protected from pathogen impairment.

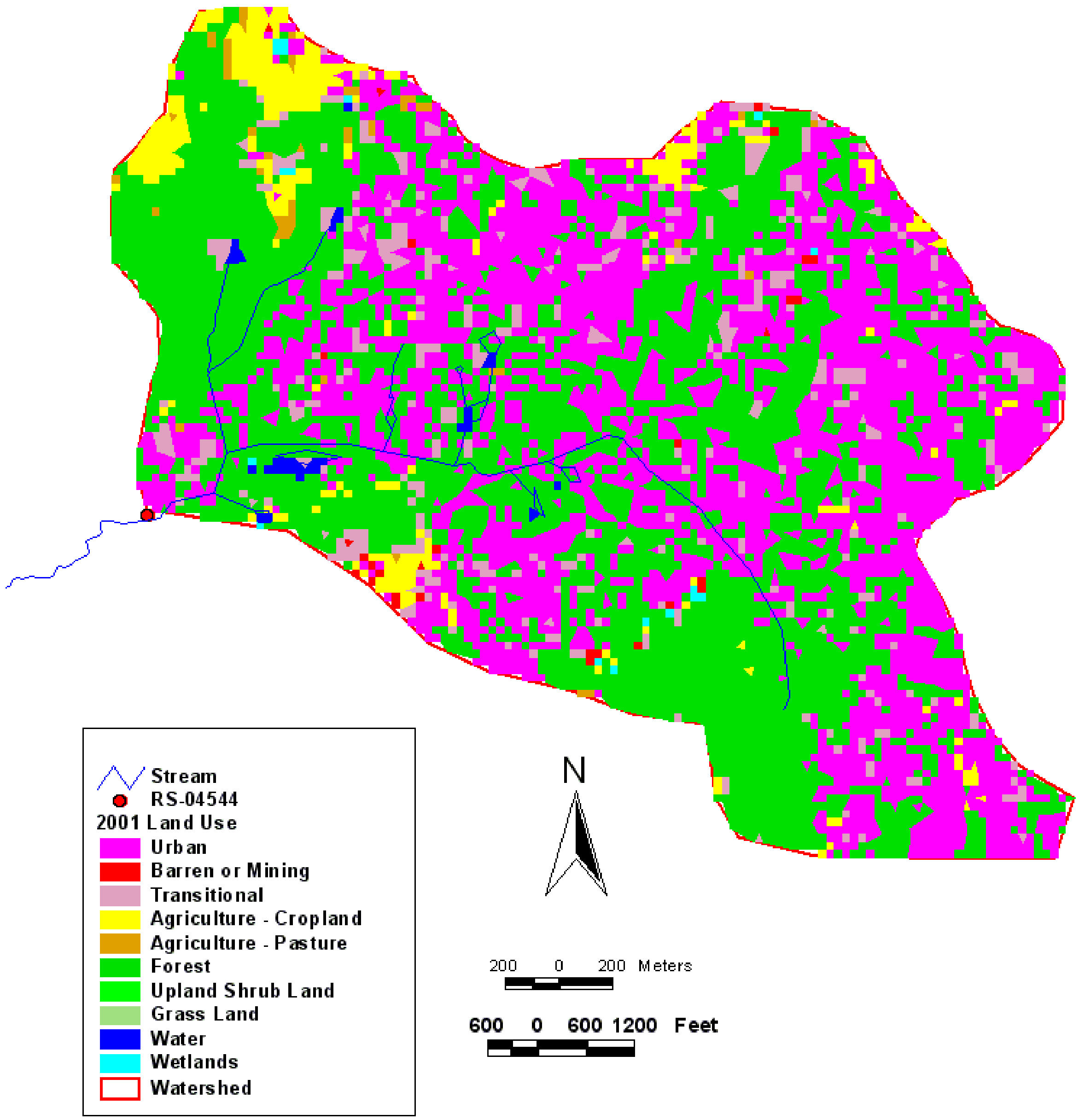

Figure 3. Map showing land uses in Pretty Run Creek watershed in 2001.

Table 2. 2001 land uses in Pretty Run Creek watershed at RS-04544.

Land Use Group	Land Use Class	Area		
		Hectares	Acres	Percent
Water		3.2	8	0.5%
	Low Intensity Residential	193.1	477	
	High Intensity Residential	41.9	104	
	Commercial/Industrial	36.9	91	
Urban		**272.0**	**672**	**39.2%**
Barren or Mining	Bare Rock/Sand/Clay	2.7	7	
Transitional		**41.8**	**103**	**6.0%**
	Deciduous Forest	38.4	95	
	Evergreen Forest	213.2	527	
	Mixed Forest/Shrubland	85.1	210	
Forest		**336.7**	**832**	**48.5%**
	Pasture/Hay	4.6	11	
	Urban/Recreational Grasses	3.6	9	
Agricultural Grasslands		8.2	20	1.2%
Agricultural Cropland	Row Crops	27.5	68	4.0%
	Woody Wetlands	1.5	4	
	Emergent Herbaceous Wetlands	0.1	0	
Wetlands		1.6	4	0.2%
Totals		**693.7**	**1714**	**100.0%**

2.0 WATER QUALITY ASSESSMENT

The water quality monitoring station on Pretty Run Creek (Table 1 and Figure 1) is a random site sampled during 2004. An assessment of the water quality data from this site for the 2006 303(d) list indicated that it was impaired for recreational use. Waters in which no more than 10% of the samples collected over a five year period are greater than 400 fecal coliform counts or cfu/100 ml are considered to comply with the South Carolina water quality standard for fecal coliform bacteria. Waters with more than 10 percent of samples greater than 400 cfu/100 ml are considered impaired for fecal coliform bacteria and placed on South Carolina's 303(d) list. Descriptive statistics for the data at this location is provided in Appendix A Table A-1. All of the data is provided in Appendix A Table A-2. The percentage of samples exceeding the standard of 400 cfu/100ml during 2004 was 67 %. The geometric mean for fecal coliform bacteria in Pretty Run creek was 433 cfu/100 ml.

There appears to be little relationship between fecal coliform bacteria and precipitation in this creek (Figure 4). As would be expected if precipitation did not affect fecal coliform counts there was little relationship between turbidity and fecal coliform bacteria (Figure 5). Therefore the sources of fecal coliform bacteria in Pretty Run Creek would appear to be continual and not precipitation-event related. Likely sources in this urbanized watershed are failing urban runoff, septic systems, illicit discharges, and leaking sewers.

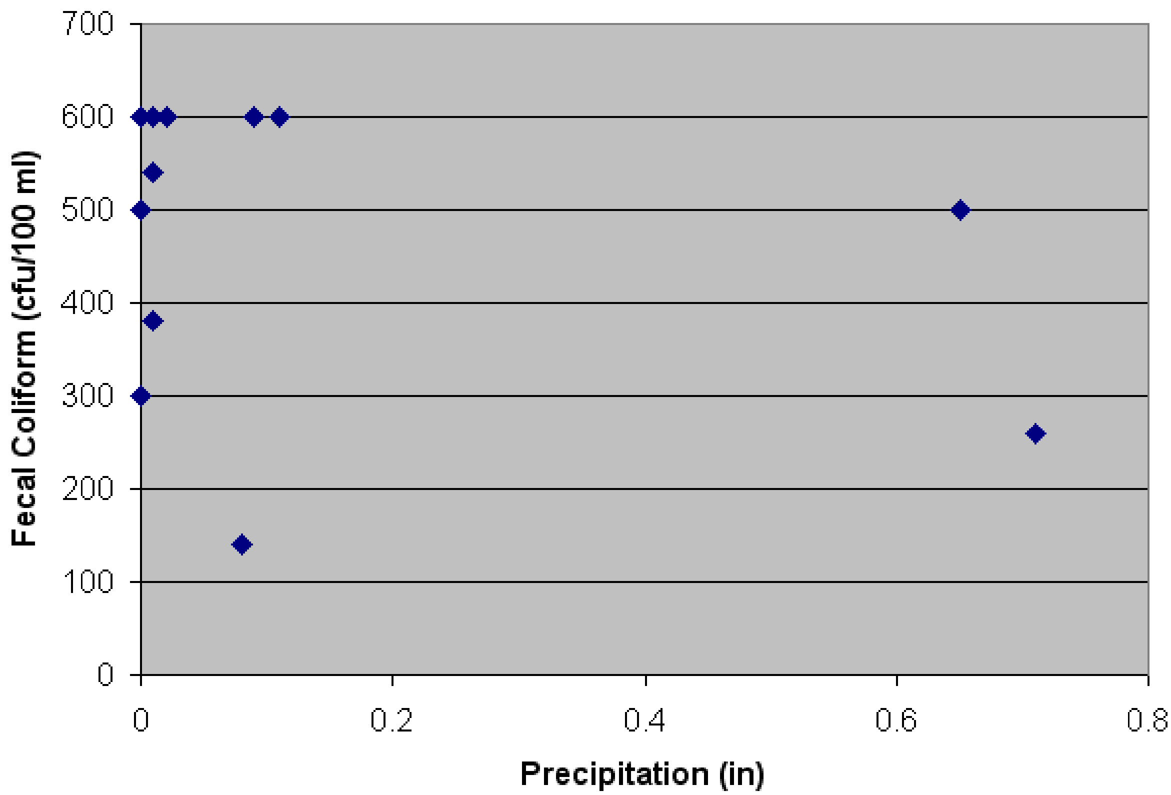

Figure 4. Plot of the relationship between precipitation (measured at Aiken) and fecal coliform bacteria in Pretty Run Creek.

As would be expected in stream where there was no apparent relationship between precipitation and fecal coliform bacteria, there is no apparent relationship between fecal coliform concentrations and turbidity (Figure 6). The lack of a correlation between fecal coliform concentrations and either precipitation or TSS suggests that most of the exceedences of the fecal coliform standard are due to continual sources as leaking sewers, illicit discharges, or failing septic systems. Urban runoff and sewer overflows are less likely to be significant sources.

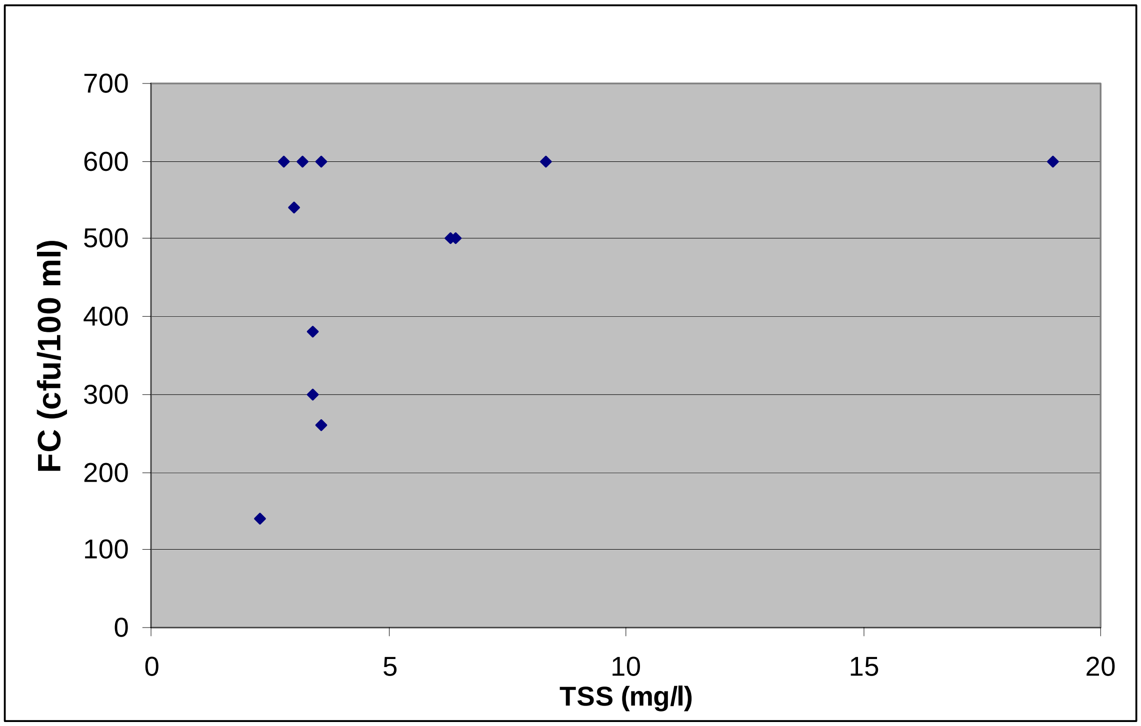

Figure 5. Plot of the relationship between turbidity and fecal coliform bacteria in Pretty Run Creek.

3.0 SOURCE ASSESSMENT AND LOAD ALLOCATION

Fecal coliform bacteria are used by the State of South Carolina as the indicator for pathogens in surface waters. Pathogens, which are usually difficult to detect, cause disease and make full body contact recreation in lakes and streams risky. Indicators such as fecal coliform bacteria, enteroccoci, or E. *Coli* are easier to measure, have similar sources as pathogens, and persist a similar or longer length of time in surface waters. These bacteria are not in themselves usually disease causing.

There are many sources of pathogen pollution in surface waters. In general these sources may be classified as point and nonpoint sources. With the implementation of technology-based controls, pollution from point sources, such as factories and wastewater treatment facilities, has been greatly reduced. These point sources are required by the Clean Water Act to obtain a NPDES permit. In South Carolina NPDES permits require that dischargers of sanitary wastewater must meet the state standard for fecal coliform at the point of discharge. Municipal and private sanitary wastewater treatment facilities may occasionally be sources of pathogen or fecal coliform bacteria pollution. However, if these facilities are discharging wastewater that meets their permit limits, they are not causing the impairment. If one of these facilities is not meeting its permit limits, enforcement of the permit limit is required. A TMDL is not necessary for this purpose. Pathogen or fecal coliform TMDLs are therefore essentially nonpoint source TMDLs even though the TMDL may include a wasteload allocation for a point source.

3.1 Point Sources

3.1.1 Continuous Point Sources

There is no NPDES discharger or point source in this small watershed.

The City of North Augusta has a sewage collection system within the watershed. Sewage collection systems typically are placed adjacent to waterways. At these locations, there is a potential for collection system leaks which could result in elevated instream concentrations of fecal coliform bacteria. Sanitary sewer overflows (SSOs) are also a potential source, particularly after periods of intense rainfall. This source is associated with infrequent events, limited in duration and likely to have an insignificant long-term impact on recreational use. Identified collection system and/or SSO problems are addressed by SCDHEC through compliance and enforcement mechanisms.

3.1.2 Intermittent Point Sources

The City of North Augusta and Aiken County has been designated as Municipal Separate Storm Sewer Systems or MS4s under NPDES Phase II Stormwater rules. Most of this watershed is within the North Augusta MS4 and two small areas appear to be in the Aiken County MS4 (Figure 6). These permitted sewer systems will be treated as point sources in the TMDL calculations below. Runoff from developed land that is collected by storm sewers and discharged untreated into streams is potentially a major source of fecal coliform bacteria to this small creek. Construction activities may also be a source of fecal coliform and are covered by the NPDES Storm Water Construction General Permit from DHEC (SCR100000). Where the construction has the potential to affect water quality of a water body with a TMDL, the Storm Water Pollution Prevention Plan (SWPPP) for the site must address any pollutants of concern and adhere to any wasteload allocations in the TMDL. This small watershed is primarily residential and is unlikely to have any industrial sites that are covered by the NPDES Storm Water Industrial General Permit (SCR000000).

3.2 Nonpoint Sources

3.2.1 Wildlife

In this suburban watershed, wildlife (mammals and birds), which is a source of fecal coliform bacteria, can be a significant contributor of fecal coliform bacteria. Wildlife in this area typically includes deer, squirrels, raccoons, and other mammals as well as a variety of birds. Wildlife wastes are carried into nearby streams by runoff following rainfall or deposited directly in streams. Waterfowl also may be a significant contributor of fecal coliform bacteria in this watershed because there appear to be several ponds (See Figure 4 aerial photo), which often provide a desirable habitat for geese and ducks.

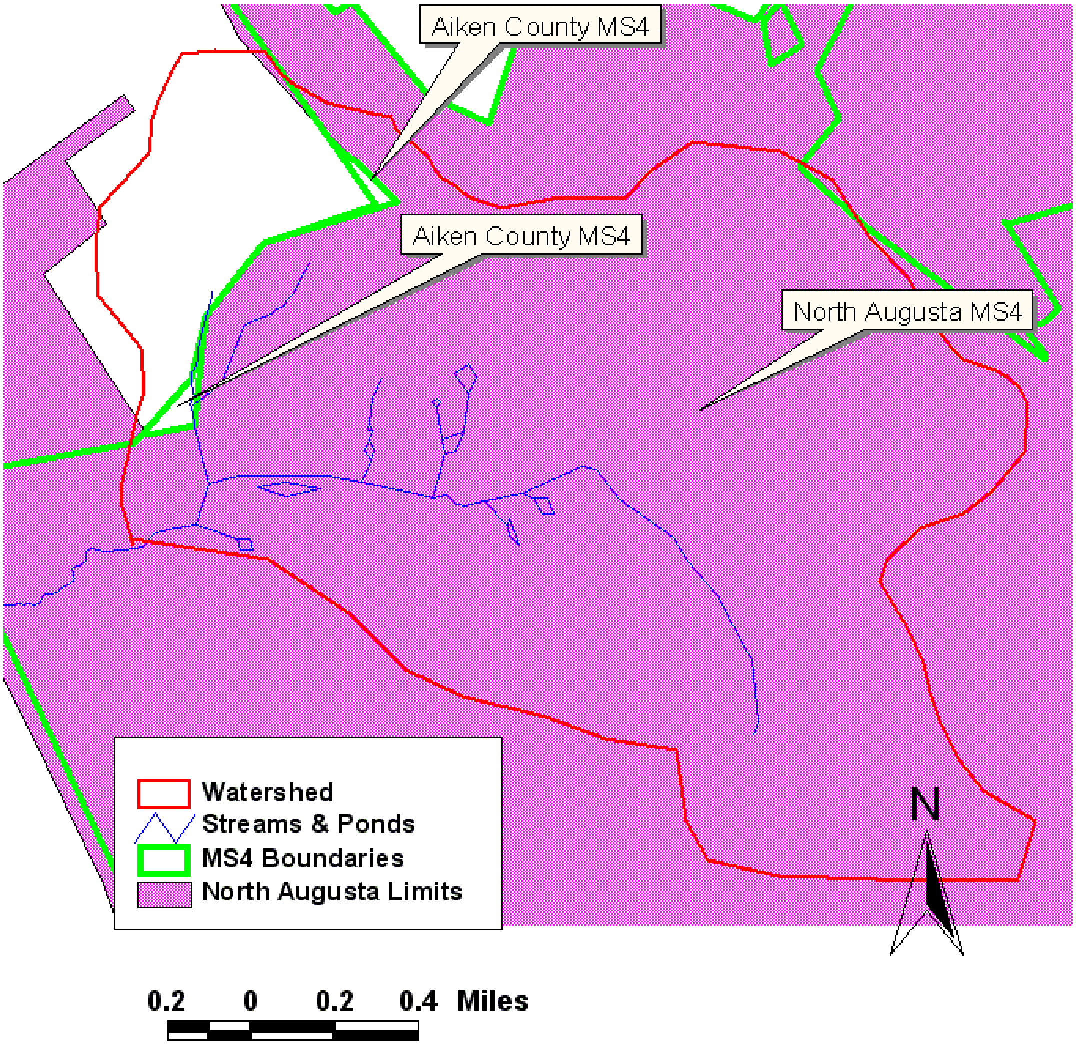

Figure 6. Map of Pretty Run Creek watershed showing areas designated as MS4s.

3.2.2 Leaking Sanitary Sewers and Illicit Discharges

This small watershed has numerous sewer lines (Figure 7). The creek is crossed in several places by sewer lines and sewer lines are adjacent to the creek in others. A leak in one of the sewer lines near the creek would likely reach the creek. Direct pipes from homes are also a possible source. Since the high fecal coliform counts are unrelated to stream flow, continual sources such as these are the most likely.

3.2.3 Failing Septic Systems

Because this small watershed is crisscrossed with sewer lines, septic systems are probably rare. However there may be a small number of septic systems from homes built prior to sewer lines being extended here. Older septic systems are more likely to fail if they have not been properly maintained. Failing or improperly functioning systems may leak sewage unto the land surface where it can reach nearby streams. Observed 'dry' weather fecal coliform violations indicate the likelihood of continual sources such as failing septic systems.

3.2.4 Urban Nonpoint Sources

As previously mentioned, the City of North Augusta and Aiken County have been designated as Municipal Separate Storm Sewer Systems or MS4s under NPDES Phase II Stormwater rules. The high percentage of impervious surfaces in built-up areas tends to increase runoff and reduce infiltration. The additional runoff compared to undeveloped land increases the amount of pollutants that are carried into streams. Dogs, cats, and other domesticated pets are the primary source of fecal coliform deposited on the urban landscape. There are also 'urban' wildlife, squirrels, raccoons, pigeons, and other birds, all of which contribute to the fecal coliform load.

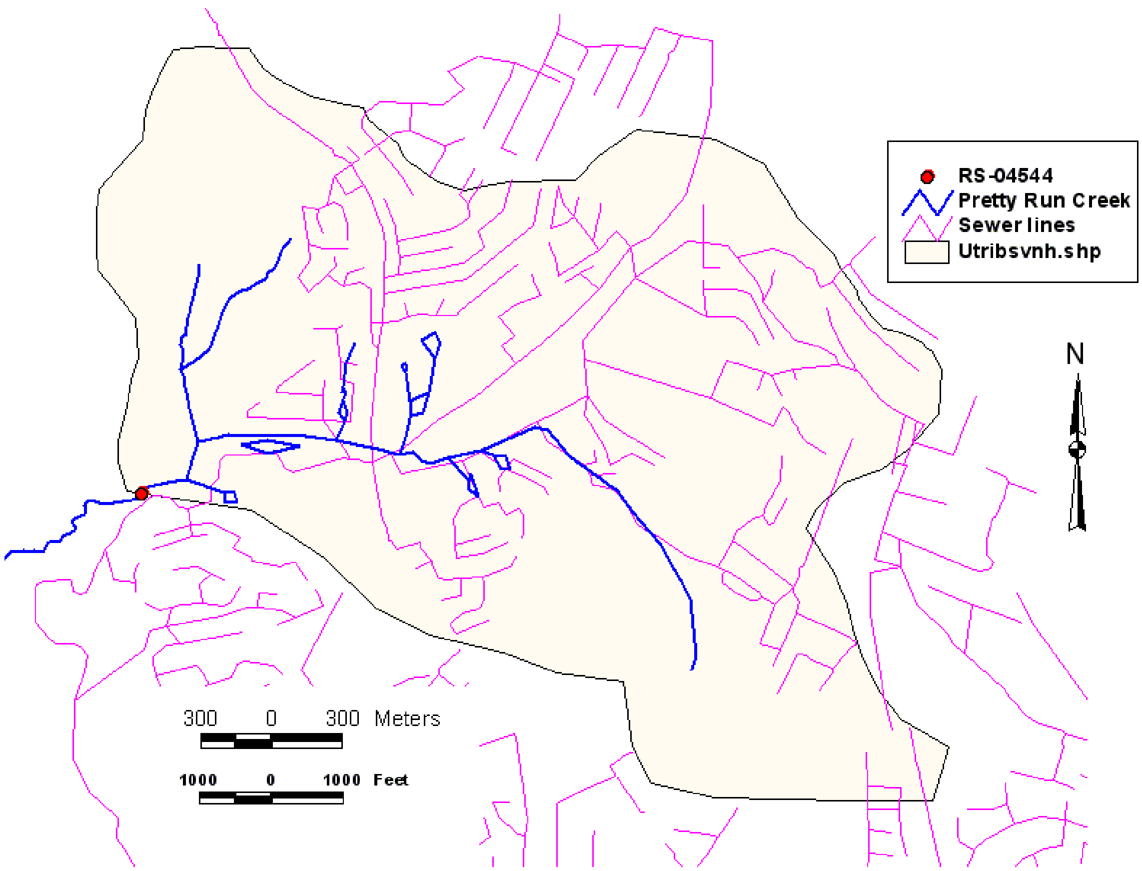

Figure 7. Map of Pretty Run Creek watershed showing location of sanitary sewer lines.

4.0 LOAD-DURATION CURVE METHOD

Load-duration curves were developed as a method of developing TMDLs that applies to all hydrologic conditions. The load-duration curve method uses the cumulative frequency distribution of stream flow and pollutant concentration data to estimate the existing and the TMDL loads for a water body. Development of the load-duration curve is described in this chapter.

The load-duration curve method depends on an adequate period of record for flow data. Usually small streams are not gauged and one must estimate the flow from a similar nearby stream. Pretty Run Creek is not gauged. A larger sized stream on Fort Gordon, just west of the Savannah River, Butler Creek, has been gauged (USGS 02196835). The difference in drainage areas (Butler Creek 10.5 mi^2; Pretty Run Creek 2.7 mi^2) is larger than is preferred. However, the creeks are not far apart and have similar land uses. The Butler Creek gauge operated from March 28, 2001 through April 1, 2001 and from October 1, 2001 through September 30, 2005. The mean daily flows from Butler Creek (http://sc.water.usgs.gov/) were used to generate the flow-duration curve for station RS-04544 on Pretty Run Creek.

The flow at RS-04544 was estimated by multiplying the measured daily flow rates from the USGS gauge by the ratio of the upstream drainage area to that of the ambient water quality monitoring site (0.2571). The flows were ranked from low to high and the values that exceed certain selected percentiles determined. The load-duration curve was generated by calculating the load from the observed fecal coliform concentrations, the flow rate that corresponds to the date of sampling, and a conversion factor. The load was plotted against the appropriate flow recurrence interval to generate the curve (Figure 8). A target line was created by calculating the allowable load from the flow and the appropriate fecal coliform standard concentration in the same manner (Table D-2). Sample loads above this line are violations of the standard, while loads below the line are in compliance.

The water quality target was set at 380 cfu/100ml for the instantaneous criterion, which is five percent lower than the water quality criteria of 400 cfu/100ml. A five percent explicit Margin of Safety (MOS) was reserved from the water quality criteria in developing the load-duration curves. The instantaneous criterion was targeted as a conservative approach and should be protective of both the instantaneous and 30-day geometric mean fecal coliform bacteria standards.

A trend line was determined for sample loads that exceeded the standard at RS-04544. The trend line for this station was an exponential function (Figure 8). The r^2 (coefficient of determination or a measure of variance explained by the regression equation) for RS-04544 is 0.8737. The existing load to the creek at RS-04544 was calculated from the mean of all loads that were roughly between the 10 % and 90 % flow recurrence intervals (Table D-1). The exponential trend line matched their respective target line better than the alternatives.

The TMDL load is calculated from the target line. Load values at 5 % occurrence intervals along the target line from 10 to 90 % were averaged. The Load Allocation (LA) values are derived from the 380 cfu/100ml water quality target, which includes the explicit Margin of Safety. Calculations for both existing and TMDL loads are provided in Appendix D.

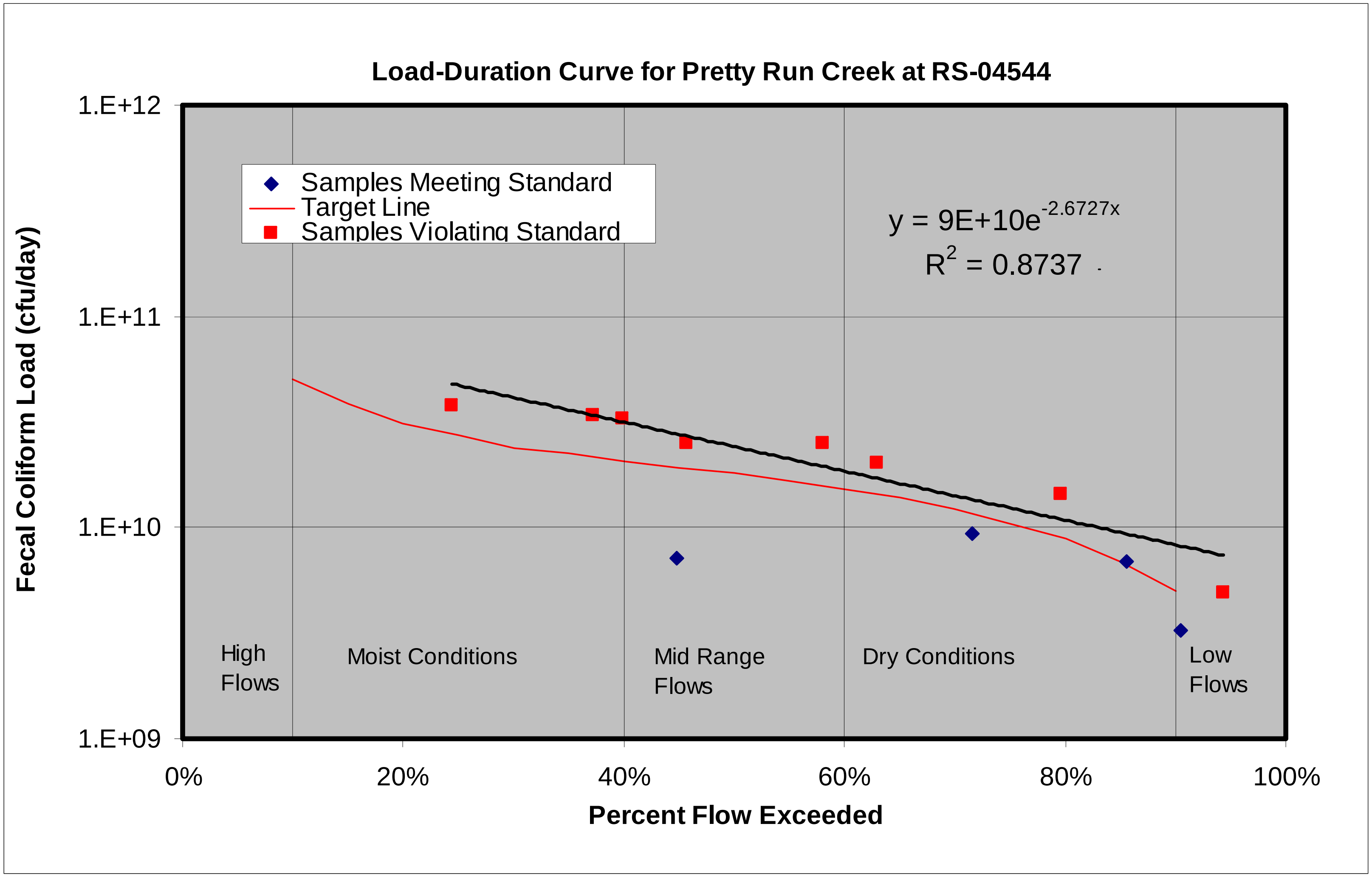

Figure 8. Load-Duration Curve for Pretty Run Creek.

5.0 DEVELOPMENT OF TOTAL MAXIMUM DAILY LOAD

A total maximum daily load (TMDL) for a given pollutant and water body is comprised of the sum of individual wasteload allocations (WLAs) for point sources, and load allocations (LAs) for both nonpoint sources and natural background levels. In addition, the TMDL must include a margin of safety (MOS), either implicitly or explicitly, to account for the uncertainty in the relationship between pollutant loads and the quality of the receiving water body. Conceptually, this definition is represented by the equation:

$$\text{TMDL} = \Sigma\ \text{WLAs} + \Sigma\ \text{LAs} + \text{MOS}$$

The TMDL is the total amount of pollutant that can be assimilated by the receiving water body while still achieving water quality standards. In TMDL development, allowable loadings from all pollutant sources that cumulatively amount to no more than the TMDL must be established and thereby provide the basis to establish water quality-based controls.

For most pollutants, TMDLs are expressed as a mass load (e.g., kilograms per day). For bacteria, however, TMDLs are expressed in terms of number (#), cfu, or organism counts (or resulting concentration), in accordance with 40 CFR 130.2(l).

5.1 Critical Conditions

This TMDL is based on the flow recurrence interval between 20 % and 80 %. This encompasses 60 % of flows in Pretty Run Creek. Only flows that are characterized as ‘High’ or ‘Low’ flows in Figure 7 are not included in the analysis. For these TMDLs critical conditions are this range of the flow recurrence interval.

5.2 Wasteload Allocation

The wasteload allocation (WLA) is the portion of the TMDL allocated to point sources (US EPA, 1999).

5.2.1 Continuous Point Sources

There are no continuous point sources in this watershed.

5.2.2 Intermittent Point Sources

Intermittent point sources include all NPDES-permitted stormwater discharges, including current and future MS4, construction and industrial discharges covered under permits numbered SCS & SCR. The City of North Augusta and adjacent urbanized areas in Aiken County are designated as MS4s. The reduction percentages in this TMDL apply also to the fecal coliform waste load attributable to those areas of the watershed which are covered or will be covered under NPDES MS4 (Municipal Separate Storm Sewer System) permits. Compliance by an entity with responsibility for the MS4, with the terms of its individual MS4 permit will fulfill any obligations it has towards implementing this TMDL. Stormwater discharges are expressed as a percentage reduction instead of a numeric loading due to the uncertain nature of stormwater discharge volumes and recurrence intervals. Stormwater discharges are required to meet the percentage reduction or the existing instream standard for the pollutant of concern, whichever is less restrictive. The percent reduction applied is the same as that applied to the existing load, 31 %.

5.3 Load Allocation

The Load Allocation applies to the nonpoint sources of fecal coliform bacteria and is expressed both as a load and as a percent reduction. The load allocation for Pretty Run Creek is 1.68 E+10 cfu/day or a reduction of 31 %.

5.4 Existing Load

The existing loads were calculated from the trend lines of observed values that exceeded the water quality standard and were roughly between the 10 and 90 % recurrence limits. Loadings from all sources are included in this value: urban runoff, cattle-in-streams, leaking sewers, and failing septic systems. The existing load for RD-04544 on Pretty Run Creek is provided in Table 3.

5.5 Margin of Safety

The margin of safety (MOS) may be explicit and/or implicit. The explicit margin of safety is 5 % of the TMDL or 20 counts/ 100ml of the instantaneous criterion of 400 cfu/100 ml. Values of the MOS for RS-04544 are given in Table 3.

5.6 TMDL

For most pollutants, TMDLs are expressed as a mass load (e.g., kilograms per day). For bacteria, however, TMDLs are expressed in terms of cfu or organism counts (or resulting concentration), in accordance with 40 CFR 130.2(l). The resulting TMDL should be protective of both the instantaneous, per day, and geometric mean, per 30-day, criteria.

The target loading value is the load to the creek that it can receive and meet the water quality standard. It is simply the TMDL minus the MOS. Values for each component of the TMDL for Pretty Run Creek is provided in Table 3.

Table 3. TMDL components for Pretty Run Creek.

Station ID	TMDL (cfu/day)	MOS (cfu/day)	WLA		LA (cfu/day)	Existing Load (cfu/day)	% Reduction to Meet Load Allocation[3]
			Continuous Sources[1] (cfu/day)	Intermittent Sources[2] (% Reduction)			
RS-04544	1.77E+10	8.84 E+08	NA	31 %	1.68 E+10	2.43 E+10	31%

Table Notes:

1 - WLA is expressed as total monthly average.

2 - Percent reduction applies to all NPDES-permitted stormwater discharges, including current and future MS4, construction and industrial discharges covered under permits numbered SCS & SCR. Stormwater discharges are expressed as a percentage reduction due to the uncertain nature of stormwater discharge volumes and recurrence intervals. Stormwater discharges are required to meet percentage reduction or the existing instream standard for pollutant of concern, whichever is less restrictive.

3 - Percent reduction applies to existing load; Where Percentage Reduction = (Existing Load-Load Allocation) / Existing Load

6.0 IMPLEMENTATION

As discussed in the *Implementation Plan for Achieving Total Maximum Daily Load Reductions From Nonpoint Sources for the State of South Carolina* (SCDHEC,1998), South Carolina has several tools available for implementing this nonpoint source TMDL. Specifically, SCDHEC's animal agriculture permitting program addresses animal operations and land application of animal wastes. In addition, SCDHEC will work with the existing agencies in the area to provide nonpoint source education in the Pretty Run Creek watershed. Local sources of nonpoint source education and assistance include the City of North Augusta, Aiken County, the Natural Resource Conservation Service (NRCS), the Aiken County Soil and Water Conservation Services, and the South Carolina Department of Natural Resources.

SCDHEC is empowered under the State Pollution Control Act to perform investigations of and pursue enforcement for activities and conditions, which threaten the quality of waters of the state. In addition, other interested parties (universities, local watershed groups, etc.) may apply for section 319 grants to install BMPs that will reduce fecal coliform loading to Pretty Run Creek. TMDL implementation projects are given highest priority for 319 funding.

The iterative BMP approach as defined in the general storm water NPDES MS4 permit is expected to provide significant implementation of this TMDL. Discovery and removal of illicit storm drain cross connection is one important element of the storm water NPDES permit. Public nonpoint source pollution education is another.

In addition to the resources cited above for the implementation of this TMDL in the Pretty Run Creek watershed, Clemson Extension has developed a Home-A-Syst handbook that can help rural homeowners reduce sources of NPS pollution on their property. This document guides homeowners through a self-assessment, including information on proper maintenance practices for septic tanks. SCDHEC also employs a nonpoint source educator and Watershed Manager who can assist with distribution of these tools as well as provide additional BMP information.

Using existing authorities and mechanisms, these measures will be implemented in these watersheds in order to bring about the required reductions in fecal coliform bacteria loading to Pretty Run Creek and tributaries. DHEC will continue to monitor, according to the basin monitoring schedule, the effectiveness of implementation measures and evaluate stream water quality as the implementation strategy progresses.

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APPENDIX A Fecal Coliform Data

Table A-1 Fecal coliform data for Pretty Run Creek in North Augusta (2004).

Date	**FC (cfu/100 ml)**
01/08/2004	140
02/24/2004	500
03/30/2004	600
04/15/2004	500
05/11/2004	380
06/02/2004	260
07/06/2004	600
08/03/2004	600
09/21/2004	600
10/14/2004	300
11/01/2004	540
12/02/2004	600

Table A-2 Statistics for fecal coliform data for Pretty Run Creek in North Augusta (2004).

Mean	468
Geometric Mean	433
Minimum	140
Maximum	600

APPENDIX B Calculation of Existing and TMDL Loads

Table B-1 Calculation of existing loads.

Existing Load Calculation:

Equation: $y = 9E+10e^{-2.6727x}$

% Exceeded	Load (cfu/day)
90%	8.12E+09
85%	9.28E+09
80%	1.06E+10
75%	1.21E+10
70%	1.39E+10
65%	1.58E+10
60%	1.81E+10
55%	2.07E+10
50%	2.37E+10
45%	2.70E+10
40%	3.09E+10
35%	3.53E+10
30%	4.04E+10
25%	4.61E+10
20%	5.27E+10
Mean	2.43E+10

Table B-2. Calculation of TMDL load.

	Load Allocation	
Target FC Conc:		**380**
% Exceeded	**Flow (cfs)**	**Load (cfu/day)**
20%	3.34	3.11E+10
25%	2.92	2.72E+10
30%	2.57	2.39E+10
35%	2.42	2.25E+10
40%	2.22	2.06E+10
45%	2.07	1.93E+10
50%	1.94	1.81E+10
55%	1.80	1.67E+10
60%	1.63	1.52E+10
65%	1.49	1.39E+10
70%	1.31	1.22E+10
75%	1.13	1.05E+10
80%	0.95	8.85E+09
85%	0.75	6.95E+09
90%	0.54	5.02E+09
Average		**1.68E+10**

Table B-3 Calculation of Percent Reduction

Percent Reduction			
= (Existing Load - Load Allocation) / Existing Load			
31.0%			

APPENDIX C Flow-Duration Curve

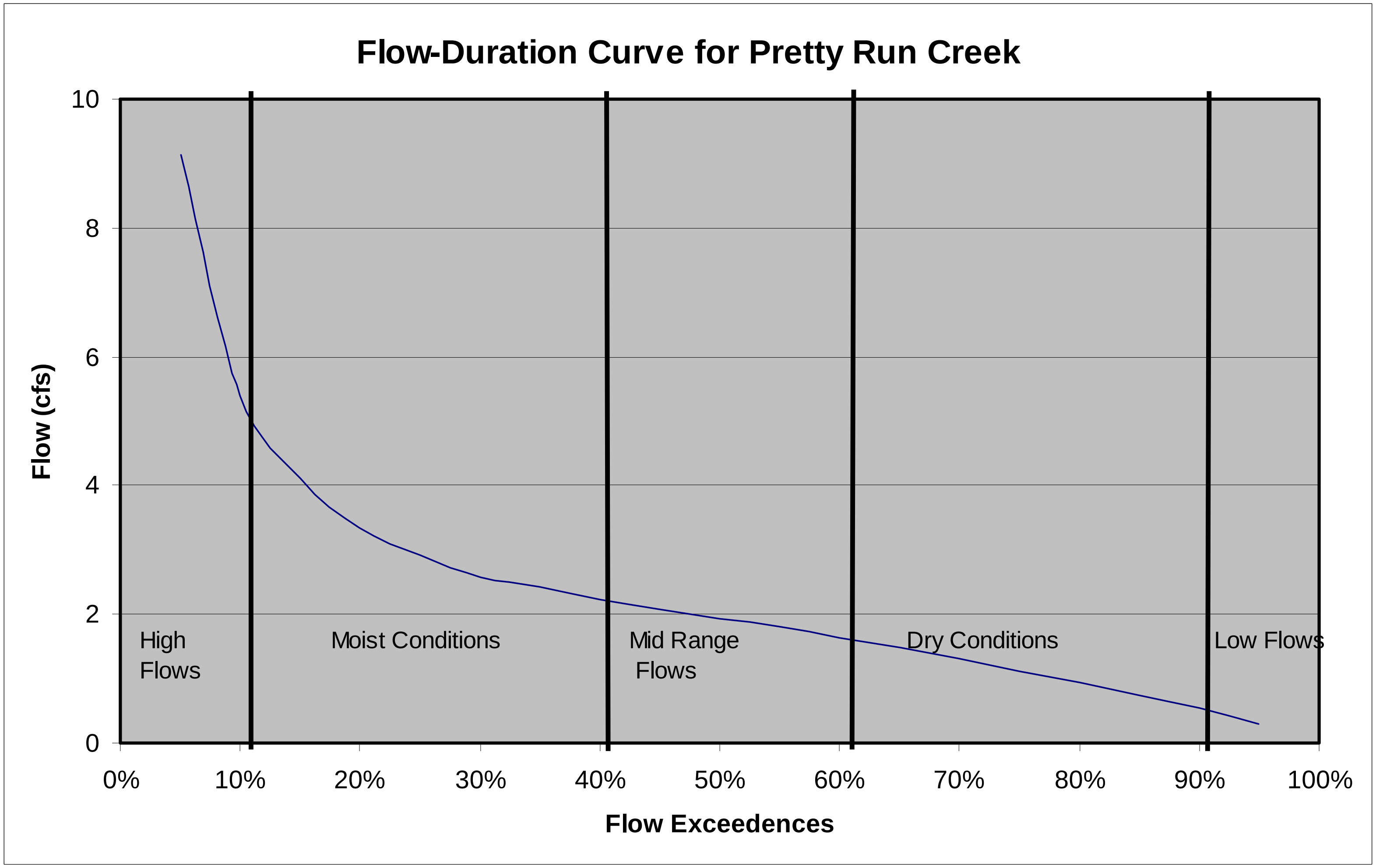

Figure C-1 Flow-Duration curve for Pretty Run Creek

APPENDIX D Public Participation

Notice of Availibility Of Initial Draft TMDL
Pretty Run Creek
Aiken County

Pollutant of Concern: Fecal Coliform Bacteria. Pretty Run Creek Watershed: Hydrologic unit 030601060601. A Map of this watershed is available on the Internet at: www.scdhec.gov/water/shed/sav_main.html.
Persons wishing to submit views and information on this draft total maximum daily load are invited to make these submissions in writing no later than 5:00pm Monday, October 23 2006, to: S.C. Dept. of Health and Environmental Control, Bureau of Water, 2600 Bull St, .Columbia, S.C. 29201, Attn: Matt Carswell, or via e-mail to carsweme@dhec.sc.gov. Persons may also contact Mr. Wayne Harden at Hardencw@dhec.sc.gov. The purpose of TMDLs is to calculate the amount of pollutant reduction necessary for an impaired waterbody to achieve and maintain water quality standards. Comments will be considered in development of the final draft TMDL and addressed in a responsiveness summary to be provided to all commenters. Copies of individual TMDLs can be obtained from the Bureau of Water web site: http://www.scdhec.gov/water/ or by calling, writing, or e-mailing at the address above. Section 303(d)(1) of the Clean Water Act (CWA), 33 U.S.C. §1313(d)(1)(C), and the implementing regulation of the US Environmental Protection Agency (EPA, 40 C.F.R. § 130.7(c) (1), require the establishment of TMDL for waters identified as impaired.