South Carolina Department of Health and Environmental Control
Total Maximum Daily Load Development for
Camp Creek CW-235
Fecal Coliform

August 17, 1999
Bureau of Water

D H E C
PROMOTE PROTECT PROSPER
South Carolina Department of Health
and Environmental Control

Camp Creek
03050103-080

BASIS FOR 303(d) LISTING

Introduction:

Levels of fecal coliform can be elevated in water bodies as the result of both point and nonpoint sources of pollution. 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 their water bodies that are not meeting designated uses under technology-based controls for pollution. 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 instream water quality conditions, so that states can establish water-quality based controls to reduce pollution from both point and nonpoint sources and restore and maintain the quality of their water resources (USEPA, 1991).

Problem Definition:

Waterbody Impaired:	Camp Creek
Water Quality Standards Being Violated:	Fecal Coliform
Pollutant of Concern:	Fecal Coliform
Water Classification:	Freshwaters

The impaired stream segment, Camp Creek, is classified Class Freshwater. Waters of this class are to be:

> "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)

Fecal Coliform Criteria:

> "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)

The water quality assessment published in the South Carolina Watershed Water Quality Management Strategy: Catawba Santee Basin (1996) was used for determining the stream

segment impairment and for listing the water on the South Carolina 1998 303(d) list. Waters in which less than or equal to 10 percent of the samples collected over a five year period are greater than 400 colonies/100 ml are considered to comply with South Carolina water quality standard for fecal coliform bacteria. Waters with greater than 10 percent of samples greater than 400 colonies/100 ml are considered impaired and listed for fecal coliform bacteria on South Carolina's 303(d) List. DHEC has data from one ambient monitoring station, CW-235, on Camp Creek at SC highway 97 in Lancaster County. This station shows recreational uses are not supported due to fecal coliform violations of the 400/100 ml standard. Thirty three percent of the samples in a five year period do not meet the fecal coliform standard.

TMDL TECHNICAL BASIS

Target Identification:

The target levels are the fecal coliform levels established in South Carolina's Water Quality Standards, Regulation 61-68. This TMDL will use criteria 'not to exceed a geometric mean of 175/100 ml', to allow an explicit margin of safety of 25/100 ml to ensure that the 200/100 ml standard will be met. This target of 175/100 ml as a geometric mean is expected also to satisfy the criterion, 'nor shall more than 10% of the total samples during any 30 day period exceed 400/100 ml.'

Based on a review of water quality assessments in South Carolina, over 75% of waters having a fecal coliform geometric mean of 175/100ml also meet the criterion "not more that 10% of samples exceed 400/100ml" (SCDHEC unpublished data). Most of the data in those assessments, however, reflect fecal coliform concentrations in areas that do not have sufficient best management practices (BMPs) in place. Thus, implementation of BMPs as described in this TMDL will likely achieve an even greater rate of compliance with the latter criterion since the BMPs are generally focused on reducing fecal loadings during runoff events, the condition most likely to result in an exceedence of the 400/100ml criterion.

Source Assessment:

General Sources of Fecal Coliform:

Both point and nonpoint sources may contribute fecal coliform to a given water body. Potential sources of fecal coliform are numerous, and often occur in combination. Nationwide, poorly treated municipal sewage comprises a major source of fecal coliform, but data presented below suggest this is not the case here. Urban storm water runoff, sanitary sewer overflows, and combined sewer overflows can be sources of fecal coliform. Rural storm water runoff can transport significant loads of fecal coliform from livestock pastures and animal feedlots. Wildlife can also contribute fecal coliform. Most sources of fecal coliform loads can be assigned to two broad classes: point source loads, and nonpoint source loads.

Point Sources in Camp Creek Watershed:

There are no point sources in Camp Creek watershed.

Nonpoint Sources in Camp Creek Watershed:

Due to the absence of point sources, nonpoint sources are believed to be the source of fecal coliform in this watershed. The land use in this watershed is 91% forested, 8% agricultural/grass land and 1% other.

Agricultural land can be a source of fecal coliform bacteria. Runoff from pastures, animal operations, the improper land application of animal wastes, and animals with access to creeks are all sources of fecal coliform. Agricultural Best Management Practices or BMPs such as buffer strips, alternative watering sources, fencing cattle out of creeks, and the proper land application of animal wastes reduce fecal coliform loading to waterbodies.

Fecal coliform also originate in forested areas. Generally the sources are wild animals such as deer, racoons, wild turkeys, water fowl, etc. Controls of these sources will be limited to land management BMPs, although forested areas are not specifically targeted in this TMDL.

Linkage Between Numeric Targets and Sources:

The land use in this watershed indicate that the major sources of fecal coliform are from forested areas and agricultural areas. Wildlife is the source of fecal coliform in forested lands. The primary means for directly controlling fecal coliform from forested lands would include relocating or killing wildlife. These are not acceptable management alternatives. On the other hand, acceptable BMPs exist for agricultural lands that are successful in reducing fecal coliform levels in adjacent waterbodies. Therefore, this TMDL will allocate load reductions to agricultural lands.

The loading from forested lands will be considered background conditions. The geometric mean of fecal coliform concentrations in waterbodies flowing through forested areas in South Carolina during all flow conditions is estimated to be 30 colonies/100 ml (SCDHEC unpublished data). The 30 colonies/100 ml observed in South Carolina falls well within the range reported by Schueler, 1999 of 10 to 100 colonies/100 ml of fecal coliform from forested lands.

Data Availability and Analysis:

Watershed Characteristics:

Camp Creek is a tributary to Cedar Creek Reservoir and located in the Catawba River Basin in watershed unit 03050103-080. Camp Creek watershed is located in Lancaster County. The watershed considered for TMDL development is 25,608 acres in the Piedmont region.

Landuse

Landuse	Acres	Percentage
Forest	23,295	91.0%

Ag/grass	1990	7.8%
Scrub/shrub	284	1.1%
Other	39	0.1%

Existing Data:

Fecal Coliform: South Carolina Department of Health and Environmental Control monitors water chemistry on Camp Creek at watershed ambient monitoring station CW-235 once a month for one year of every five years. Existing data from this monitoring station is available through STORET and included in the appendix. The geometric mean of fecal coliform using the most current data available (1998) is 291 colonies/100ml.

Flow data: Flow information for Camp Creek was estimated using the relationship between runoff and area utilized by Bloxham (1979).

$$Qa = \frac{\text{Runoff in in/yr} * \text{Drainage area in square miles}}{13.58}$$

$$Qa = \frac{13*40}{13.58} = 38.29 \text{ cfs}$$

The average annual flow for Camp Creek is calculated as 38.29 cfs.

Critical Conditions:

Novotny & Olem find statistically lower fecal coliform counts in cold weather urban runoff samples than in warmer weather urban runoff (1994). To substantiate this, winter and summer fecal coliform values were compared at ambient water quality monitoring stations in the Piedmont Region in South Carolina impacted by nonpoint sources. This analysis reveals similar or higher values in the summer than the winter. Therefore, summer months (May-October) are generally considered critical conditions. This can be explained by the nature of storm events in the summer versus the winter. Thunderstorms are typical in the summer months. This pattern of rainfall allows for the accumulation and washing off of fecal coliforms into the streams resulting in spikes of fecal coliform concentrations. In the winter, long slow rain events are the norm. This pattern of rainfall does not allow for the high build-up of coliform that characterizes the summer. Rather, coliform are washed into the stream at a more even rate. This, coupled with the increased winter flows that provide more dilution, usually results in lower fecal coliform concentrations.

In this watershed, the fecal coliform geometric means for warm weather months and for a full year are similar. Since the annual data set includes more data than the warm weather data set, the fecal coliform geometric mean for a full year of data will be used as the current condition in this TMDL.

Load Calculations:

Using the observed geometric mean of 291 colonies/100 ml and the average annual flow calculated above, the current loading at CW-235 is 2.73E+11 colonies/day:

Fecal Coliform * Qa * Factor = Loading

Where fecal coliform = # colonies/100ml
Qa = average annual flow in cfs
factor = conversion factor = 24468984
Loading = # colonies fecal coliform/day

The allowable load (geometric mean of 200 colonies/100 ml) during average annual flow is 1.87E+11.

Assuming the flow attributable to forest lands is proportional to the percent forest land use, the loading from forest lands was calculated using the background level of 30 colonies/100ml. This loading is calculated as 2.81E +10 colonies/day. Therefore, the load attributable to agricultural lands must be 2.45E+11 colonies/day. This translates to a current in-stream concentration attributable from agricultural lands of 2,893 colonies/100ml. This concentration falls well within the range reported by Doran et al, 1981 of 1.20E+2 to 1.30E+6 colonies/100 ml for fecal coliform from agricultural lands.

TMDL Development:

Total maximum daily loads (TMDLs) comprise the sum of individual wasteload allocations (WLAs) for point sources, and load allocations (LAs) for both nonpoint sources and natural background levels for a given watershed. In addition, the TMDL must include a margin of safety (MOS), either implicitly or explicitly, that accounts for the uncertainty in the relation between pollutant loads and the quality of the receiving water body. Conceptually, this definition is denoted by the equation:

$$TMDL = \sum WLAs + \sum LAs + MOS$$

The TMDL is the total amount of pollutant that can be assimilated by the receiving water body while achieving water quality standards. TMDLs establish allowable water body loadings that are less than or equal to the TMDL and thereby provide the basis to establish water-quality-based controls.

For some pollutants, TMDLs are expressed on a mass loading basis (e.g., pounds per day). For bacteria, however, TMDLs can be expressed in terms of organism counts (or resulting concentration), in accordance with 40 CFR 130.2(l).

Margin of Safety:

There are two basic methods for incorporating the MOS (USEPA, 1991): 1) implicitly

incorporate the MOS using conservative model assumptions to develop allocations, or 2) explicitly specify a portion of the total TMDL as the MOS; use the remainder for allocations.

The MOS is explicit in this TMDL process by establishing a target TMDL level of 175 colonies/ 100 ml. This level is below the state standard of 200 colonies/ 100 ml.

Since there are no contributing point sources and the MOS is included, this TMDL comprises solely the load allocations from nonpoint sources and natural conditions.

TMDL

TMDL calculation:

The target level of fecal coliform is 175 colonies/100ml. This equates to a loading of 1.64E+11 colonies per day. The load from agricultural lands plus the load from forest lands must equal the target loading of 1.64E+11 colonies per day. Realistically only one land use, agriculture, in this watershed is appropriate for fecal coliform reductions. Therefore, the loading attributable to the forested lands, 2.81E+10, assuming average flow from forest lands and a background level of 30 colonies/100ml, is subtracted from the target load of 1.64E+11 colonies per day to obtain a target load from agricultural lands of 1.36E+11 colonies per day. At an average flow of 38.29 cfs, this loading equates to an in-stream concentration from agricultural lands of 145 colonies/100ml.

Allocation of Load:

The existing load of 2.73E+11 colonies/day must be reduced by 40% to obtain the TMDL of 1.64E+11 colonies/day (loading at 175 colonies/ 100 ml).

An allocation strategy that will allow the target TMDL of 175 colonies/100ml to be maintained is as follows:

44% reduction in fecal coliform loading and/or resultant in-stream concentrations from agricultural/grass land uses.

Camp Creek Land Use	**Current Loading**	**% Reduction**	**Final Loading**
Forest (Background)	2.81E+10	0%	2.81E+10
Agriculture/Grass	2.45E+11	44%	1.36E+11
Total	*2.73E+11*	*40%*	*1.64E+11*

Implementation Strategy:

As discussed in the Implementation Plan for Achieving Total Maximum Daily Load Reductions From Nonpoint Sources for the State of South Carolina, 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 Camp Creek watershed. Local sources of nonpoint source education include Clemson Extension Service, the Natural Resource Conservation Service (NRCS) and the South Carolina Department of Natural Resources. Clemson Extension Service offers a 'Farm-A-Syst' package to farmers. Farm-A-Syst allows the farmer to evaluate practices on their property and determine the nonpoint source impact they may be having. It recommends best management practices (BMPs) to correct nonpoint source problems on the farm. NRCS can provide cost share money to land owners installing BMPs. SCDHEC employs a nonpoint source educator who can also provide BMP information.

SCDHEC's nonpoint source program has identified Camp Creek as a priority stream in the fall 1998 and spring 1999 section 319 grant guidance for fecal coliform reduction projects. This guidance was sent to Lancaster county officials. 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 Camp Creek.

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.

References

Bloxham, William M. 1979. Low-Flow Frequency and Flow Duration of South Carolina Streams. S.C. Water Resources Commission. Report Number 11.

Doran, J.W., J.S. Schepers, and N.P. Swanson. 1981. Chemical and Bacteriological Quality of Pasture Runoff. *J. Soil Water Conserv.* May-June:166-171.

Metcalf & Eddy, Inc. 1979. Wastewater Engineering: Treatment Disposal Reuse. McGraw Hill, New York.

Novotny, Vladimir. Olem, Harvey. 1994. Water Quality Prevention, Identification, and Management of Diffuse Pollution. Van Nostrand Reinhold, New York.

Schueler, Thomas R., ed. 1999. Microbes and Urban Watersheds: Concentrations, Sources, and Pathways. *Watershed Protection Techniques.* April 1999:3-1.

South Carolina Department of Health and Environmental Control. 1998. Implementation Plan for Achieving Total Maximum Daily Load Reductions From Nonpoint Sources for the State of South Carolina.

South Carolina Department of Health and Environmental Control. 1997. Watershed Water Quality Management Strategy: Catawba and Santee River Basins. Technical Report No. 002-96.

United States Environmental Protection Agency. 1991. Guidance for Water Quality-Based Decisions: The TMDL Process, Office of Water, EPA 440/4-91-001.

Public Participation

The public notice on pages 13 and 14 was sent on July 9, 1999 to a mailing list of over 300 individuals statewide interested in water quality issues. In addition, the notice was sent to local organizations and county officials in Lancaster with a possible interest in this TMDL.

The public notice on page 15 was published in the Anderson Independent Mail, Charleston Post and Courier, State, Greenville News, Rock Hill Herald, and Camden Chronicle newspapers on July 9, 1999.

Comments Received and Responsiveness Summary

Comments were received from the Southern Environmental Law Center (SELC), the South Carolina Department of Natural Resources (SC DNR), the Sierra Club South Carolina Chapter, and the South Carolina Department of Parks, Recreation & Tourism (SC PRT).

The comments are enclosed in Appendix B. A summary of the comments and DHEC's response are found in the Responsiveness Summary on page 15.

PUBLIC NOTICE

NOTICE OF AVAILABILITY OF PROPOSED TOTAL MAXIMUM DAILY LOADS
FOR WATERS AND POLLUTANTS OF CONCERN IN THE STATE OF SOUTH CAROLINA

July 9, 1999

Section 303(d)(1)(C) of the Clean Water Act (CWA), 33 U.S.C. § 1313(d)(1)(C), and EPA's implementing regulation, 40 C.F.R. § 130.7(c)(1), require the establishment of total maximum daily loads (TMDLs) for waters identified as impaired pursuant to § 303(d)(1)(A) of the CWA. Each of these TMDLs is to be established at a level necessary to implement applicable water quality standards with seasonal variations and a margin of safety, accounting for uncertainty concerning the relationship between effluent limitations and water quality. At this time, the South Carolina Department of Health and Environmental Control (SC DHEC) has developed proposed TMDLs for the following § 303(d)(1)(A) waters:

Unnamed Tributary to Catawba River, York County
Camp Creek, Lancaster County
Beaverdam Creek, Oconee County
Brushy Creek, (in Enoree drainage) Greenville County
Middle Tyger River, Greenville County
Catawba River, Chester and Lancaster Counties
Wateree River, Kershaw County
Saluda River, Lexington County

More information about these TMDLs can be found in the chart on the back of this page. SC DHEC is proposing to establish these as final TMDLs.

Persons wishing to comment on these proposed TMDLs or to offer new data regarding the proposed TMDLs are invited to submit the same in writing no later than August 9, 1999 to the South Carolina Department of Health and Environmental Control, Bureau of Water, 2600 Bull Street, Columbia, South Carolina 29201, ATTENTION: Ms. Ann Lackey. Ms. Lackey's telephone number is 803-898-4213. Her E-Mail address is lackeyae@columb32.dhec.state.sc.us.

The proposed TMDLs and the administrative record, including technical information, data, and analyses supporting the proposed TMDLs, may be reviewed and copied at 2600 Bull Street, Columbia, South Carolina between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday, or are available by writing, calling, or e-mailing Ms. Lackey at the address above.

After review of comments, the proposed TMDLs will be sent to EPA for approval shortly after August 9, 1999.

Please bring the foregoing to the attention of persons whom you believe will be interested in this matter.

July 9, 1999

Notice of availability of proposed TMDLs for the following waters and pollutants of concern:

Waterbody	Upstream of Station	Pollutant of Concern	County	Watershed Unit	Action Necessary for Waterbody to Meet Applicable Water Quality Standards
Unnamed Trib to Catawba River at SC highway 161	CW-221	fecal coliform	York	03050103-010	19% reduction in fecal coliform from urban land
Camp Creek	CW-235	fecal coliform	Lancaster	03050103-080	44% reduction in fecal coliform from agricultural/grass lands
Beaverdam Creek	SV-345	fecal coliform	Oconee	03060102-150	55% reduction in fecal coliform from agricultural/grass lands
Brushy Creek	BE-009	fecal coliform	Greenville	03050108-010	73% reduction in fecal coliform from urban land
Middle Tyger River	B-148	fecal coliform	Greenville	03050107-040	68% reduction in fecal coliform from agricultural/grass lands
Catawba River (downstream of Great Falls Reservoir Dam)	CW-174	dissolved oxygen	Chester/ Lancaster	03050103-010	Increase dissolved oxygen concentration in discharge from facility to meet applicable standard
Wateree River (downstream of Lake Wateree Dam)	CW-019, CW-214	dissolved oxygen	Kershaw	03050104-030	Increase dissolved oxygen concentration in discharge from facility to meet applicable standard
Saluda River (downstream of Lake Murray Dam)	S-152	dissolved oxygen	Lexington	03050109-210	Increase dissolved oxygen concentration in discharge from facility to meet applicable standard

NOTICE OF AVAILABILITY OF PROPOSED TMDLS

FOR WATERS AND POLLUTANTS OF CONCERN IN SC

The South Carolina Department of Health and Environmental Control (DHEC) has developed a proposed total maximum daily load (TMDL) for fecal coliform bacteria for each of the following waterbodies: Unnamed tributary to Catawba River (York County), Camp Creek (Lancaster County), Beaverdam Creek (Oconee County), Brushy Creek (Greenville County), and Middle Tyger River (Greenville County). DHEC has also developed a proposed TMDL for dissolved oxygen downstream of dams for each of the following waterbodies: Cawtaba River (downstream of Great Falls Reservoir Dam), Wateree River (Lake Wateree Dam), and Saluda River (Lake Murray Dam). These TMDLs have been developed in accordance with Section 303(d) of the Clean Water Act, and SCDHEC is now proposing to establish them as final TMDLs.

Persons wishing to offer comments or new data regarding these proposed TMDLs may submit data and comments in writing no later than August 9, 1999 to Anne Runge, DHEC, Bureau of Water, 2600 Bull Street, Columbia, SC 29201. For more information, please contact Ms. Runge at (803) 898-3701 or visit our website at www.state.sc.us/dhec/eqpubnot.htm.

July 9, 1999

Responsiveness Summary
Responses to comments on Fecal TMDLs
(Summarized comments are in italics, respondent is in parentheses)

Middle Tyger River, Camp Creek, Beaverdam Creek TMDLs:
1) *Respondent questions the assumption that no fecal coliform contamination originates from forested land. Forestry activities, including land clearing, cultivating, and harvesting, can generate non-point source pollution, particularly if carried out without using Best Management Practices.* (SELC)

Estimates of fecal coliform bacteria loading from forested lands were made using SC DHEC water quality monitoring data from forested areas. As stated in the TMDLs, the estimates used are consistent with the typical values of loadings from forested areas seen in the literature and in other studies.

2) *Agricultural land is treated as a single source of fecal loadings, without assessing individual contributions from intensive livestock operations. Monitoring data pinpointing the locations of major contribution areas or sources within the watershed are not provided. These data are necessary to develop an adequate implementation strategy*. (SELC)

The implementation of these TMDLs will include education about and installation of best management practices that reduce fecal coliform loadings from agricultural lands. These BMPs, to be implemented to the extent possible under voluntary programs such as the Section 319 program and agricultural cost-sharing programs, will be focused on lands that are likely sources of fecal coliform loadings, including the intensive livestock operations and land application sites mentioned by the respondent. As any livestock operation or land application site that does not have adequate BMPs in place is a probable source of fecal coliform bacteria, such implementation measures will reduce fecal loadings to the waterbodies.

3) *The TMDLs do not provide "reasonable assurance" that nonpoint sources of fecals will be adequately addressed by the measures identified, as required by EPA guidance. No statement specifying when implementation actions by DHEC or other agencies will occur is provided. No information or commitments are provided regarding future monitoring and steps to be taken if impairment is not resolved*. (SELC)

EPA guidance acknowledges that in watersheds impaired solely by nonpoint sources, the primary implementation mechanism will be the Section 319 program and other state or federal assistance programs such as cost-sharing and incentive programs (Robert Perciasepe memo, 1997). As these are all voluntary programs, they involve a process of landowners, agencies, or organizations submitting and receiving approval for project proposals to implement appropriate practices. This project development and evaluation process, which will target fecal sources in these watersheds, will take place after TMDL approval by EPA has been granted. According to EPA guidance (1991), implementation of the TMDL is to take place after the state has obtained EPA approval.

Commitment and funding for implementing these BMPs will thus be arranged after TMDLs have been approved.

As is stated in the TMDLs, DHEC will continue to monitor water quality in these waters according to the basin monitoring schedule in order to evaluate use support and the effectiveness of implementation measures.

Brushy Creek and Unnamed tributary to Catawba River TMDLs:

1) *The TMDLs do not adequately identify the location of the causes of the impairment. Respondent submits that TMDLs should specifically describe additional monitoring work to pinpoint the primary sources of the contamination*. (SELC)

Fecal coliform is present in all sources of urban runoff including streets, lawns, parking lots, commercial and residential rooftops, and storm water drains (Schueler, Thomas R., ed. 1999. Microbes and Urban Watersheds: Concentrations, Sources, and Pathways. *Watershed Protection Techniques.* April 1999:3-1). It is difficult if not impossible to isolate all the contributing sources of fecal coliform in urban watersheds. However, the Municipal Separate Storm Sewer System (MS4) permit for Greenville County (to be public noticed in September 1999) and the MS4 Phase II permit for Rock Hill (Phase II regulations to be published in the Federal Register in November 1999) will require the identification of illicit discharges to the storm sewer system, a potential major contributor of fecal coliform. Language has been added to the Unnamed Tributary to the Catawba River TMDL discussing the MS4 permit for Rock Hill.

2) *The TMDLs do not provide "reasonable assurance" that nonpoint sources of fecals will be adequately addressed by the measures identified, as required by EPA guidance. No statement specifying when implementation actions by DHEC will occur is provided. No information or commitments are provided regarding future monitoring and steps to be taken if impairment is not resolved*. (SELC)

EPA guidance acknowledges that in watersheds impaired solely by nonpoint sources, the primary implementation mechanism will be the Section 319 program and other state or federal assistance programs such as cost-sharing and incentive programs (Robert Perciasepe memo, 1997). As these are all voluntary programs, they involve a process of landowners, agencies, or organizations submitting and receiving approval for project proposals to implement appropriate practices. This project development and evaluation process, which will target fecal sources in these watersheds, will take place after TMDL approval by EPA has been granted. According to EPA guidance (1991), implementation of the TMDL is to take place after the state has obtained EPA approval. Commitment and funding for implementing these BMPs will thus be arranged after TMDLs have been approved.

In addition to voluntary measures, both of the watersheds will be subject to (MS4) permits. These permits for Greenville County and Rock Hill will require the identification and removal of illicit

discharges to the storm sewer system, a potential major contributor of fecal coliform. MS4 permits will also require the development and implementation of a public education program about storm water and how citizens can reduce storm water pollution. Language has been added to the Unnamed Tributary to the Catawba River TMDL discussing the MS4 permitting program.

As is stated in the TMDLs, DHEC will continue to monitor water quality in these waters according to the basin monitoring schedule in order to evaluate use support and the effectiveness of implementation measures.

Other Comments on all five Fecal TMDLs

1) *Respondent commends DHEC on TMDLs and believes implementation of the strategies will make waters safe for recreation. (SC DNR)*

No response necessary.

2) *Respondent has reviewed TMDLs and administrative record and has no questions, comments, or additional information to offer. (Sierra Club - SC Chapter)*

No response necessary.

3) *Respondent supports DHEC's effort to establish TMDLs and believes they are consisted with recommendations in Lower Saluda River Corridor Plan and the Catawba River Corridor Plan. (SC PRT)*

No response necessary.

Appendix A

Data

Water Quality Data for CW-234

STATION	DATE	TIME	DEPTH	31616 FEC COLI MFM-FCBR /100ML		
CW-235	921110	1030		410	@	remark codes
CW-235	921215	1010		420	@	@ no code
CW-235	930105	1320		2600	J	J estimated
CW-235	930202	1050		160	@	L greater than
CW-235	930324	935		330	@	
CW-235	930428	950		70	J	
CW-235	930505	1426		5100	@	
CW-235	930601	1055		260	J	
CW-235	930728	930		80	J	
CW-235	930826	1440		160	J	
CW-235	930930	1420		340	@	
CW-235	931028	945		350	@	
CW-235	980302	1430		100	J	
CW-235	980402	1015		1200	J	
CW-235	980513	1450		180	@	
CW-235	980602	1426		220	@	
CW-235	980707	1025		140	@	
CW-235	980810	1415		1100	@	
CW-235	980915	1108		320	@	
CW-235	981027	1350		220	@	

geo mean all years	325
geo mean 93	350
geo mean 98	291

Appendix B

Public Comments Received