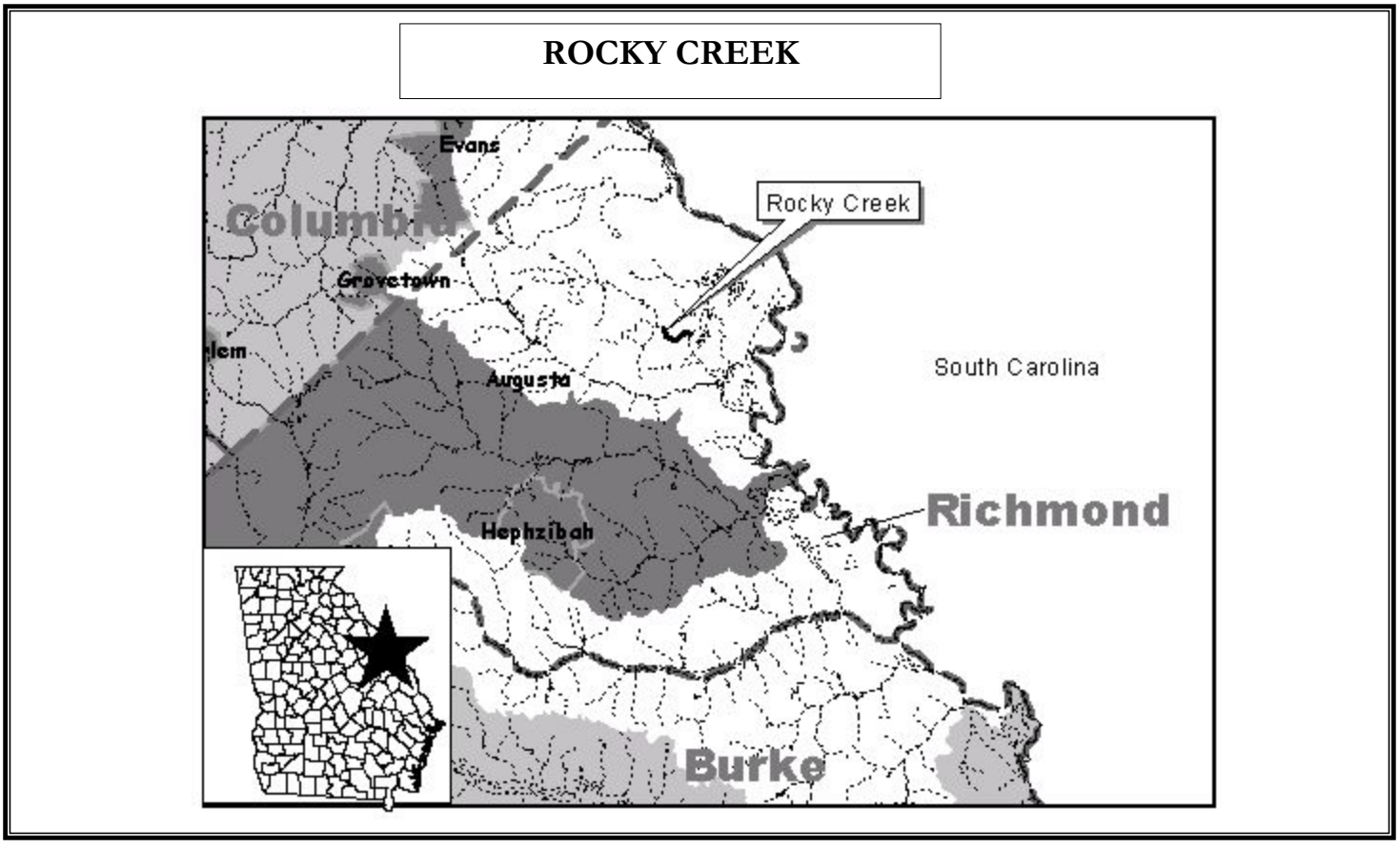
STATE OF GEORGIA

TMDL IMPLEMENTATION PLAN

ROCKY CREEK
(Fecal Coliform)

Prepared by
The Georgia Department of Natural Resources
Environmental Protection Division
Atlanta, GA

TMDL Implementation Plans are platforms for establishing a course of actions to restore the quality of impaired water bodies in a watershed. They are intended as a continuing process that may be revised as new conditions and information warrant. Procedures will be developed to track and evaluate the implementation of the management practices and activities identified in the plans. Once restored, appropriate management practices and activities will be continued to maintain the water bodies. The overall goal of the Plan is to define a set of actions that will help achieve water quality standards in the state of Georgia. This plan was originally prepared as an implementation inventory by the Central Savannah River Area RDC with a Section 604(b) Grant. TMDL load allocation information has been updated to reflect the approved TMDL.



Impaired Waterbody*	Impaired Stream Location	River Basin	Miles/Area Impacted	Partially Supporting/ Not Supporting
Rocky Creek	SR 56 to below New Savannah Road, Augusta	Savannah	2	Not Supporting

STATE OF GEORGIA

TMDL IMPLEMENTATION PLAN FOR: Rocky Creek (STREAM) Fecal Coliform (PARAMETER) RIVER BASIN: Savannah PLAN DATE: _____

Prepared by: Central Savannah River Area Regional Development Center Address: P. O. Box 2800 City: Augusta State: GA Zip: 30914 e-mail: spowell@csrardc.org Date Submitted to EPD: _____	Or Prepared By: _____ Address: _____ City:_____State: _____ Zip: _____ e-mail: _____ Date Submitted to EPD: _____

General Information

Obtain this information from the TMDL document or other information. When completed, this document will be a self-contained report independent of the TMDL document.

Significant Stakeholders

Identify local governments, agricultural organizations or significant land holders, commercial forestry organizations, businesses and industries, and local organizations including environmental groups with a major interest in this water body.

TMDL ID (to be entered by EPD)	SAV0000007	Name/Organization	**See Attached List of Stakeholders in Appendix A**					
Water body name	Rocky Creek	Address						
HUC basin name	Savannah	City		State		Zip		
HUC number	030601060502	Phone				e-mail		
Primary county	Richmond	Name/Organization						
Secondary county	None	Address						
Primary RDC	CSRA	City		State		Zip		
Secondary RDC	None	Phone				e-mail		
Water body location	Hwy 56 to below New Savannah Rd	Name/Organization						
		Address						
Miles or area impacted	2 miles	City		State		Zip		
Parameter addressed in plan	Fecal coliform	Phone				e-mail		
Water use classification	Fishing	Name/Organization						
Degree of impairment	Partially supporting use ☐	Address						
	Not supporting use ■	City		State		Zip		
Date TMDL approved by EPA	February 28, 2001	Phone				e-mail		
Impairment due to: Urban Runoff, Municipal Facility	Point sources ☐	Name/Organization						
	Nonpoint sources ☐	Address						
	Both ■	City		State		Zip		
Point source-Form A; Nonpoint source-Form B; Both-Form A+B+C		Phone				e-mail		

If more, add to comments on last page.

FORM B

SUMMARY OF ALLOCATION MODEL RESULTS FROM TMDL DOCUMENT (existing load, target TMDL, and needed reduction)

EXISTING LOAD	TARGET TMDL	NEEDED REDUCTION
1016 cfu/100 ml*	200 cfu/100 ml	80% (816 cfu/100 ml)

*Based on modeling performed in 1997

I. IDENTIFY **NONPOINT SOURCE** CATEGORIES AND SUBCATEGORIES OR INDIVIDUAL SOURCES WHICH MUST BE CONTROLLED TO IMPLEMENT LOAD ALLOCATIONS:

List major nonpoint sources contributing to impairment including those identified in TMDL document.

SOURCE	DESCRIPTION OF CONTRIBUTION TO IMPAIRMENT	RECOMMENDED LOAD REDUCTION (FROM TMDL)
Wildlife	Large number of wildlife in the area	
Storm sewer	Stormwater runoff from surrounding urban land uses	
Sanitary/ Storm Sewer	Isolated leakage along the sewer line is possible	
Septic Tank	Older septic tank systems could be leaking or refuse could be dumped illegally after septic tanks are pumped out	

II. DESCRIBE ANY REGULATORY OR VOLUNTARY ACTIONS INCLUDING MANAGEMENT MEASURES OR OTHER CONTROLS BY GOVERNMENTS OR INDIVIDUALS THAT WILL HELP ACHIEVE THE LOAD ALLOCATIONS IN THE TMDL:

Existing or required regulatory actions

RESPONSIBLE GOVERNMENT, ORGANIZATION OR ENTITY	NAME OF REGULATION/ORDINANCE	DESCRIPTION	ENACTED OR PROJECTED DATE (mm/yy)	STATUS
Augusta-Richmond County	Wetlands Protection Ordinance	Establishes boundaries around wetlands within the county and limits types and density of development to protect water quality and habitats within these areas	November 1998	Active
Augusta-Richmond County	Groundwater Recharge Area Protection Ordinance	Limits density and types of land uses in groundwater recharge areas, including waste disposals and septic tank drainfields, to protect groundwater quality	November 1998	Active

Existing or required regulatory actions (Continued)

RESPONSIBLE GOVERNMENT, ORGANIZATION OR ENTITY	NAME OF REGULATION/ORDINANCE	DESCRIPTION	ENACTED OR PROJECTED DATE (mm/yy)	STATUS
Augusta-Richmond County	Water Supply Watershed Protection Ordinance	Limits types and density of development that would impair the water supply watershed.	November 1998	Active
Georgia DNR, EPD	Savannah River Basin Management Plan	Program to protect, enhance, and restore the waters of the Savannah River Basin by monitoring, regulating, allocating, and managing land uses in the river basin.	Mid-2001	Ongoing
Augusta-Richmond County Utilities/EPD/ Citizens Advisory Group/ Technical Advisory Committee	Central Savannah River Area Source Water Assessment	A study of 10 intakes in the Savannah River basin to determine levels and causes of pollution, and development of action plan to protect source water	Results expected October 2001	Underway
Augusta-Richmond County Utilities Dept/ EPD/ Citizens Advisory Group/ Technical Advisory Committee	Watershed Assessment	Sampling and water quality assessment focusing only on Richmond County waters	Results expected January 2002	Underway
Augusta-Richmond County	Sanitary Sewer Maintenance	Measures are taken to ensure that spills and leaks are addressed as soon as they are detected.	1993	Active
Augusta-Richmond County	Stormwater Management Ordinance	Storm water management program that encompasses water quality monitoring, engineering controls, comprehensive land planning, and public participation, required by MS4 Permit.	1993	Active
Augusta-Richmond County	Tree Ordinance and Illustrated Guide	Protects surface and groundwaters through tree preservation, leading to slowed stormwater flow, on public rights-of-way in Richmond County	1997	Active
Augusta-Richmond County	Soil Erosion and Sedimentation Control Ordinance	Establishes 25-foot buffer around all state waters	Amended January 1999	Active

Existing or required regulatory actions (Continued)

RESPONSIBLE GOVERNMENT, ORGANIZATION OR ENTITY	NAME OF REGULATION/ORDINANCE	DESCRIPTION	ENACTED OR PROJECTED DATE (mm/yy)	STATUS
Augusta-Richmond County	Greenspace Plan	A Plan to protect a minimum of 20 % of natural greenspace in Richmond County by targeting preservation of natural resources including rivers and creeks.	November 2000	Active

Existing voluntary actions

RESPONSIBLE ORGANIZATION OR ENTITY	NAME OF ACTION	DESCRIPTION	ENACTED OR PROJECTED DATE (mm/yy)	STATUS
Citizens of Richmond County	Local Sierra Club Chapter	Group of citizens interested in protection of water bodies and other environmental concerns.	Ongoing	
Citizens of Richmond County	Savannah RiverKeeper, Inc.	Citizen group protecting water quality of Savannah River watershed	Ongoing	
Metro Augusta Clean and Beautiful, Jefferson Co. Clean and Beautiful, Columbia Co. Clean and Beautiful, Augusta Dive Club	Rivers Alive annual volunteer river clean up	A statewide event that targets cleanups across all waterways in the State of Georgia including streams, rivers, lakes, and wetlands. The mission of Rivers Alive is to create awareness of and involvement in the preservation of Georgia's water resources.	September, October	Annual
Southeastern Natural Sciences Academy	Phinizy Swamp Nature Park - Educational Outreach	Offers teacher orientation, field trips, and other educational opportunities for children and adults at the 1100 acre swamp.	Ongoing	

Additional recommended regulatory or other measures which should be implemented to reduce the loads of the TMDL parameter

ENTITY/ORGANIZATION RESPONSIBLE	NAME OF PROPOSED REGULATION/ORDINANCE/ OTHER	DESCRIPTION	ENACTED OR PROJECTED DATE (mm/yy)	STATUS
Citizens of Richmond County, Fort Discovery/ Richmond County Board of Education	Adopt-A-Stream Program (ECO Partners)	A Georgia Department of Natural Resources, Environmental Protection Division, program designed to raise awareness about water quality through the public's support and action in monitoring and protecting water resources.	TBA	TBA
Richmond County Schools/ Metro Augusta Clean and Beautiful	Enviroscape	A program to be implemented in the schools that educates children of the effects of stormwater runoff. The program provides training for teachers, also.	TBA	TBA
Richmond County School System	River Kids Program	A statewide curriculum incorporated into the School System to exchange data and ideas.	TBA	TBA
Richmond County or Other Interested Environmental Group	Septic Tank Survey	A survey should be conducted in the Butler Creek Drainage Basin to determine the number and location of homes using septic tanks.	TBA	TBA
Richmond County	Septic to Sewer Incentive Program	An educational and/or incentive program to encourage conversion of septic tank to Richmond County's sewer system.	TBA	TBA
Richmond County	Public Education Program on Septic Tank Issues	TV/radio/print ads explaining importance of repairing leaky septic tanks and properly maintaining septic tanks	TBA	TBA
Augusta-Richmond County	Georgia Stormwater Management Manual	County should adopt this manual developed by the Atlanta Regional Commission to address water quality by establishing BMPs and other development measures.	TBA	TBA
Augusta-Richmond County officials	Water Environment Federation training and involvement	WEF holds annual WEFTEC conference with workshops and technical sessions on water quality and wastewater treatment; also holds various other public training and information sessions throughout the year	TBA	TBA
Citizens of Augusta-Richmond County	Join or start a chapter of the Izaak Walton League of America	Organization concerned with environmental protection and conservation. Programs directed by IWLA include the Outdoor Ethics Program and Save Our Streams Program.	TBA	TBA

Additional recommended regulatory or other measures which should be implemented to reduce the loads of the TMDL parameter (Continued)

ENTITY/ORGANIZATION RESPONSIBLE	NAME OF PROPOSED REGULATION/ORDINANCE/ OTHER	DESCRIPTION	ENACTED OR PROJECTED DATE (mm/yy)	STATUS
Fort Discovery, County Board of Education	Teltrain Educational Program	Satellite program broadcasted by the National Science Center at Fort Discovery. Program is geared towards middle school children, and focuses on science, math, and technology subjects.	TBA	TBA
Richmond County School System	Participate in Spirit Creek Educational Forest	Currently trains teachers on monitoring and testing methods using Spirit Creek as a training ground; program could expand to include fecal coliform testing	TBA	TBA

III. SCHEDULE FOR IMPLEMENTING MANAGEMENT MEASURES OR OTHER CONTROL ACTIONS:

These **must be implemented within five years** of when the implementation plan is accepted by EPA.

IMPLEMENTATION ACTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Form stakeholders group	x				
Organize implementation work with stakeholders and local officials to identify remedial measures and potential funding sources	x*	x*	x*	x*	x*
Identify sources of TMDL parameter	x	x	x	x	x
Develop management programs to control runoff including identification and implementation of BMPs (Phase I): Agriculture	X**	x	x	x	x
Forestry	x**	x	x	x	x
Urban	x**	x	x	x	x
Mining					
Organize and implement education and outreach programs***		x	x	x	x
Detect and eliminate illicit discharges***	x	x	x	x	x
Evaluate additional management controls needed***	x	x	x	x	x
Monitor and evaluate results***	x	x	x	x	x
Reassess TMDL allocations		x	x	x	x
Provide periodic status reports on implementation of remedial activities	x	x	x	x	x
If needed, begin process for Phase II (next 5 years) and subsequent phases					x

*New remedial measures and potential funding sources will continue to be evaluated during the implementation period.
**Programs and BMPs will be implemented as possible and as necessary throughout the 5-year period.
*** Already required as part of the MS4 Permit

IV. PROJECTED ATTAINMENT DATE AND BASIS FOR THAT PROJECTION:

The projected attainment date is 10 years from acceptance of the implementation plan by EPA.

V. MEASURABLE MILESTONES:

- Number of management controls and activities already implemented ____15____

- Number of management controls and activities proposed in five-year work program ____11____

- Number of management controls and activities actually implemented in five-year work period _____(to be completed after 5 years)

- Stream sampled to identify areas of concern See monitoring plan

- Other _____ _____

- Other _____ _____

VI. MONITORING PLAN:

Monitoring data that placed stream on 303(d) list will be provided if requested.

Describe previous or current sampling activities or other surveys to detect sources or to measure effectiveness of management measures or other controls.

ORGANIZATION	**TIME FRAME**	**PARAMETERS**	**PURPOSE**	**STATUS**
Parsons Engineering Science, Inc./Augusta-Richmond County	2001-present	Fecal Coliform	Water quality monitoring for Richmond County Watershed Assessment	Results expected early 2002 (**see preliminary results in Appendix B)**

Describe any planned or proposed sampling activities or other surveys. (Scheduled EPD sampling can be found in the Basin Planning document.)

ORGANIZATION	TIME FRAME	PARAMETERS	PURPOSE	STATUS
EPD			basin planning	Plan is under development
Augusta-Richmond County	2001 until problem is resolved. Samples should represent the warm and cool season and should be taken on both dry and post-rain days.	Fecal coliform	To monitor levels of fecal coliform and to determine success of plan implementation.	Current monitoring should continue*

*Updated monitoring schedule should be developed upon completion of Central Savannah River Area Source Water Assessment and Richmond County Watershed Assessment.

VII. CRITERIA TO DETERMINE WHETHER SUBSTANTIAL PROGRESS IS BEING MADE:

- % concentration or load change (monitoring program)- Goal of a 98% reduction in loading and/or resultant concentrations from urban runoff and municipal facility land uses and nonpoint sources

- Categorical change in classification of the stream (delisting the stream is the goal)

- Regulatory controls or activities installed (ordinances, laws)

- Best management practices installed (agricultural, forestry, urban) upon determination of appropriate and necessary practices.

COMMENTS

A local Sierra Club chapter has expressed concern about the number of new power plants proposed in the State of Georgia. The power plants may extract more water from the impaired water bodies than they return, which would raise the concentration of fecal coliform in the impaired sections.

Rocky Creek Fecal Coliform Bacteria

TMDL Implementation Plan

BACKGROUND

The two-mile segment of Rocky Creek from Highway 56 to below New Savannah Road in Augusta, Georgia has a beneficial water use classification of fishing and is currently listed as an impaired water body. The degree of impairment is classified as a non-supporting use and the TMDL for this segment of Rocky Creek is set at a target level of 200 cfu/100 ml of water, a level that will allow the water body to achieve water quality standards necessary for the beneficial use classification of fishing.

A Total Maximum Daily Load (TMDL) is a calculation of the maximum amount of a pollutant, from both point and non-point source loading, that a water body can receive and still meet water quality standards. The Clean Water Act, Section 303, establishes the water quality standards and TMDL programs. TMDLs are the implementation of rules included in Section 303(d) of the Clean Water Act of 1972. The resulting inventory of impaired streams and water bodies – called the 303(d) list – provides a basis for decisions related to restoring water quality. Although some TMDLs are aimed at managing all sources of pollution which affect beneficial uses of water, the focus of the implementation plan discussed here relates primarily to non-point water sources, including contamination from diffuse sources such as agricultural and urban runoff.

Methods of measuring pathogens directly are costly and time-consuming. In most cases, indicator organisms are used instead of analyzing the pathogens themselves. These indicator organisms, or coliforms, are bacteria that also occur in human and animal waste, but generally are not pathogens themselves. In contrast to pathogens, the coliforms are easy to collect and count, and often provide at least an indication of whether or not fecal matter has entered the water body. The downside of using indicator organisms like coliforms is that coliform tests are generally nonspecific;

they do not distinguish between human and other animal coliform. However, at present, this is our most feasible source of indication due to cost restraints and availability of specific testing equipment.

The purpose of this plan is to reduce or eliminate the pollutants contained in the runoff flowing into Rocky Creek.

EXISTING FECAL COLIFORM MONITORING DATA

The modeling performed by EPD that ultimately resulted in Rocky Creek's inclusion on the 303(d) list of impaired water bodies was completed in 1997. The levels indicated in the TMDL document are based on a model run for 1997 using the "calibrated" fecal and flow parameters. This model run resulted in a fecal coliform 30 day geometric mean of 1016 cfu/100 ml. This is 816 cfu/100 ml above the target level of 200 cfu/100 ml. A two-mile segment of Rocky Creek stretching from Highway 56 to New Savannah Road (see Appendix C) was found to be not supporting its fishing use classification due to the unacceptably elevated levels of fecal coliform bacteria (see Appendix D). This conclusion was based only on modeling, not testing, however.

LAND USES

The land surrounding the impaired portion of Rocky Creek contains a variety of land uses. Industrial sites, junkyards, undeveloped open space, and single family residences make up the majority of the land uses. Some of these residences are on septic tanks, but they do have access to a municipal sanitary sewer system. There are no permitted point sources of pollution flowing directly into the impaired segment of Rocky Creek.

There are no widespread agricultural or animal farming operations in the subwatershed. The major contributors to the fecal coliform problem appear to be stormwater runoff from surrounding urban land uses and other impervious surfaces,

and possibly leaky sewer pipes or septic systems in the residential areas of the watershed. Wildlife populations in the undeveloped areas near Rocky Creek may play a role in the problem as well.

STAKEHOLDER MEETINGS

To look into the problem further, local stakeholders were advised of the problem. These stakeholders were notified through contact with the involved county officials, and through an advertisement published in the Augusta Chronicle newspaper. A meeting of the stakeholders was held both August 2, 2001 and August 6, 2001 to gather information about possible causes of the problem.

This meeting was conducted by Shelby Powell, CSRA RDC Regional Planner and Mary Huffstetler, CSRA RDC Transportation Planner. At the meeting, the goal of this plan was explained to the stakeholders, and stakeholders were invited to comment on ideas of sources of pollution and offer suggestions to reduce or prevent increases in fecal coliform bacteria. The main concern of stakeholders at the meeting was the wildlife population in the undeveloped land surrounding the creek. Other stakeholders pointed out the existence of a sewer line that runs along the impaired segment of Rocky Creek. It was recommended that the sewer line be inspected for leaks. Stakeholders also expressed concern that some of the single-family residences in the area may not be tapped on to the municipal sewer system, and leaky or old septic systems could be to blame for the problem as well.

Stakeholders also pointed out the necessity for specific testing to determine whether or not the fecal coliform was of a human or animal origin. A concern for the domestic animal populations in the area, as well as wild birds and other wild animals, was expressed.

The stakeholders were invited on September 6, 2001 to an advertised public meeting to view the draft implementation plan. Several minor changes to language and

terminology used in the plan were suggested, but overall the stakeholders were receptive to the implementation plan's ability to meet TMDL goals.

EXISTING REGULATORY AND VOLUNTARY MEASURES

Augusta-Richmond County has already taken some regulatory measures to ensure clean water in Rocky Creek[1]. In November 1998, the County adopted ordinances to protect wetlands, water supply watersheds, and groundwater recharge areas. The Wetlands Protection Ordinance protects wetlands in Richmond County from alterations that will significantly affect or reduce their primary functions for water quality, floodplain and erosion control, groundwater recharge, aesthetic nature, and wildlife habitat. This protection is achieved through land use controls on lands surrounding wetlands. Since there are several wetlands areas on the land in the Rocky Creek watershed, this ordinance inherently protects the water quality in Rocky Creek. The floodplain control measures contained in the ordinance also serve to indirectly control fecal coliform bacteria levels because of the direct correlation between fecal coliform bacteria levels and flow rates. Less unnatural flooding and water diversion means lower flow rates, and therefore, lower fecal coliform levels. It should also be noted, however, that the wildlife dwelling in the wetlands may contribute to the increased fecal coliform levels.

The Groundwater Recharge Area Protection Ordinance protects lands within recharge areas by limiting the number and density of septic tank drainfields, hazardous waste storage, disposal, and handling facilities, and chemical storage facilities. Some of the types of development regulated by this ordinance directly relate to fecal coliform levels. Thus, the enforcement of this ordinance keeps fecal coliform levels lower in groundwater recharge areas.

[1] All Augusta-Richmond County ordinances discussed in this plan can be found on the Internet at www.co.richmond.ga.us/planz.

The Water Supply Watershed Protection ordinance protects drinking water sources in Richmond County through buffer requirements and land use controls. For instance, impervious surface is limited in the water supply watershed area, decreasing the flow of stormwater discharge. Also, restrictions are placed on land uses involving handling hazardous waste or materials.

Georgia is in the process of implementing a watershed approach to water resource management through River Basin Management Planning. River basin planning is the foundation for implementation of water protection strategies in Georgia. This approach provides the framework and schedule for actions to address the waters on the Georgia 303(d) list. The basin planning program is based on legislation in 1992 (O.C.G.A. 12-5-520) by the Georgia Assembly, which calls for EPD to develop river basin management plans for each of the major river basins in Georgia. The Savannah River Basin Management Plan is scheduled to be adopted in 2001.

Another project underway involving water quality is the Central Savannah River Area (CSRA) Source Water Assessment. The Augusta Utilities Department is responsible for coordinating this effort, and is working with consulting firm Parsons Engineering Science, Inc. This study includes determining levels and sources of pollution, and the development of an action plan to protect source waters in the CSRA. This study involves several counties in the CSRA region. Some results from this project are expected in October 2001. The action plan developed as part of this project will be useful in determining what measures need to be taken lower fecal coliform levels in Rocky Creek.

The consulting firm is also working on a Watershed Assessment for Richmond County. This study involves some water quality testing for parameters such as fecal coliform and dissolved oxygen. The complete results of this study are not yet available, but are expected in early 2002 (see Appendix B for preliminary testing results). These results will play a major role in determining a water quality monitoring schedule for Rocky Creek.

Augusta-Richmond County is already required to monitor its sewer system as part of the MS4 Permit held by the County. This permit requires the County to maintain the sewer system; manage stormwater through water quality monitoring, engineering controls, land planning, and public participation; and implement educational programs throughout the County. Enforcement of this ordinance will help instances of fecal coliform from leaky sewer pipes to a minimum.

The Tree Ordinance adopted by Augusta-Richmond County in 1997 also assists with water quality efforts. This ordinance protects groundwater and surface water by allowing stormwater to be filtered through trees. All trees on rights-of-way in Richmond County are protected by the ordinance.

The County's Soil Erosion and Sedimentation Control Ordinance was last amended in January 1999. This ordinance is beneficial to water quality because of the requirement of BMPs, silt traps, and sediment basins during land-disturbing activities. The ordinance also established a 25-foot buffer of natural and undisturbed land along all state waters. This ordinance helps to retard stormwater flow, thus reducing sedimentation of streams. Slower stormwater flow with less sediment results in less fecal coliform bacteria being carried and deposited into Rocky Creek.

Augusta-Richmond County adopted its Community Greenspace Program in November 2000. This plan focuses on preservation of natural, undisturbed areas of the county through grant money awarded by the State of Georgia. Many of the areas targeted for protection under this plan are downstream from the impaired portion of Rocky Creek. However, there is undeveloped land surrounding the impaired portion of the creek that may be considered in the future as part of the greenspace plan. These protected greenspaces will inherently protect the water quality in their watersheds. Again, greenspaces will slow stormwater flow, allowing the fecal coliform concentration to be lower in Rocky Creek.

Many citizens in Richmond County take an active interest in water quality and other environmental issues through various volunteer organizations. The local chapter

of the Sierra Club is very active in Richmond and Columbia Counties. The Sierra Club currently has over 600,000 members nationally. The mission of the Sierra Club is as follows: explore, enjoy, and protect the wild places of the earth; practice and promote the responsible use of the earth's ecosystems and resources; educate and enlist humanity to protect and restore the quality of the natural and human environment; and use all lawful means to carry out these objectives. The local chapter of the club serves to educate other citizens and officials and arouses further interest in clean water. The Sierra Club could take an active role in helping implement the strategies identified in this plan.

A new volunteer activist group has formed recently in the area. The Savannah Riverkeeper, Inc. is a part of the national Riverkeepers program. This group is concerned with protecting the water quality of the Savannah River watershed. The group's efforts will be mainly concentrated around the Augusta area, which will be beneficial in terms of the water quality of streams and creeks flowing into the Savannah River. This group should also take an active role in the implementation of strategies identified in this plan.

The educational outreach at the Southeastern Natural Sciences Academy's Phinizy Swamp Nature Park is targeted at area teachers and students. The park offers teacher orientation, field trips for students, and other educational opportunities for area citizens. This program could focus on the fecal coliform problem in Rocky Creek, since the creek runs through the swamp. This resource is invaluable to the area, and should be utilized appropriately during the implementation phase of this plan.

Metro Augusta Clean and Beautiful works each year in conjunction with the Jefferson and Columbia County Clean and Beautiful organizations to conduct the Rivers Alive annual volunteer river clean-up. This statewide event occurs annually in September or October. Georgia's rivers are targeted for cleaning by the volunteers in the community. The mission of this program is to create awareness of and involvement in preserving Georgia's waters. Although this type of clean-up effort does not directly reduce the level of fecal coliform bacteria in the water, it does bring attention to the

issue of water quality. This event should be used to raise awareness of specific pollutants in the water, such as fecal coliform bacteria, and solutions to the pollution problems.

RECOMMENDED REGULATORY AND VOLUNTARY MEASURES

Implementation of measures to address the TMDL involves the cooperation of all landowners and land users in the watershed; therefore, broad awareness and involvement are very important to the success of the implementation plan. The creation of more voluntary activist groups and voluntary actions on the part of the County government could help to reduce the loading of fecal coliform bacteria in Rocky Creek as well as in other water bodies throughout the county. The existing volunteer activist groups should also broaden their focus to include public education and awareness of impaired water bodies in the area, and ways ordinary citizens can be involved in cleaning the water in their area. For instance, the County government could initiate an educational campaign on issues of septic tanks. A public education program in the form of television advertisements, radio announcements, and print advertisements should explain the importance of septic tank maintenance and repair. The advertisements should describe methods used to determine if a septic tank is leaking, and the proper steps in repairing the system. This would be a proactive approach to reducing potential fecal coliform loading from leaky septic tanks.

The county could also conduct a septic tank survey to determine the number of septic tanks in the area, as well as the age and functionality of the septic tanks. This would help to identify problem areas of the county where septic leakage or overflow could be contributing to the fecal coliform problem. Where appropriate or feasible, some incentives could even be offered to encourage septic tank users to tap on to the sanitary sewer system. Also, by identifying leakage in septic tanks and sewer lines early, more can be done to correct the problem, thus reducing fecal coliform levels from these

sources. This is especially important for the Rocky Creek area, since it is possible that many of the residences in the area are not currently utilizing the city sewer system.

The County Board of Education can also get involved in the process of reducing fecal coliform bacteria by including educational programs in the curricula of local schools. The River Kids program has been successful in some Columbia County, Georgia schools, where children take water samples and learn how to keep water bodies clean as a part of their regular schoolwork (see Appendix E). Introducing water quality issues to children at a young age, and following up with the program through middle school and high school can lead to long-term action and dedication on the part of the citizens of Augusta.

Another educational opportunity exists in the Enviroscape program (see Appendix F). This program has several curricula that focus on issues such as general water quality and nonpoint source pollution, among others. This program involves teacher training and models for use in the classroom. The program provides teachers with a hands-on, fun approach for educating children about water quality. This would be beneficial in teaching children the value of keeping an entire watershed clean at an early age.

The Spirit Creek Educational Forest is located in Richmond County[2]. This site trains teachers on monitoring and testing methods for a variety of parameters. The site does not currently have testing equipment for fecal coliform bacteria, but would be willing to obtain the necessary equipment if there was an interest in the community for such a program. The program uses Spirit Creek as a model for hands-on teacher training. The teachers can then carry their knowledge into other streams in the area, and teach students the value of water quality testing and monitoring with hands-on projects.

The National Science Center's Fort Discovery hosts a satellite television program called "Teltrain" that is used in middle school classrooms around the nation (see Appendix G). This program frequently focuses on science issues, and could be used as

[2] To participate in this program, call Cathy Black at (706) 790-2351.

a vehicle to raise water quality awareness in area schools. This program could be used in conjunction with the River Kids program, the Enviroscape program, the Spirit Creek Educational Forest program, or other hands-on lessons focusing on water quality.

August-Richmond County could also explore the Adopt-a-Stream program. The citizens of Wilkes and McDuffie Counties have joined forces with the County school systems and Fort Discovery to participate in the Adopt-a-Stream program. The Georgia Adopt-A-Stream maintains four underlying principles: to increase public awareness of the state's non-point source pollution and water quality issues, to provide citizens with the tools and training to evaluate and protect their local waterways, to encourage partnerships between citizens and their local government, and to collect quality baseline water quality data. This program raises public awareness about water quality issues in addition to gaining action from volunteers to monitor and protect water resources within the county. Some monitoring is done through the Adopt-a-Stream program. The Richmond County Board of Education could join in this effort, by encouraging a focus on fecal coliform monitoring in the science curricula of area schools.

The Water Environment Federation (WEF) offers training and an annual WEFTEC conference (see Appendix H). The conference offers training workshops and technical sessions on a wide variety of water quality topics, including TMDL issues, monitoring for water quality, watershed management, and stormwater management. WEF also offers various workshops and sessions throughout the year. These training sessions could be beneficial to city and county officials that deal with water quality issues, as well as teachers who wish to incorporate some environmental aspects into their lessons. Involvement with this organization could bring about awareness of water quality and give county officials tools to implement some strategies to ensure clean water throughout the county.

Another organization with water quality focus is the Izaak Walton League of America (IWLA) (see Appendix I). This organization focuses on environmental resource conservation and preservation. Their Save Our Stream (SOS) program is a grassroots

river conservation program focusing on citizen involvement in watershed protection. The IWLA also sponsors the Outdoor Ethics Program, which encourages responsible enjoyment of the outdoors. The County governments should support any efforts at involvement in either of these programs by citizens or public officials. The more awareness of the water quality problems there is in the community, the more likely it is that a solution to the problem can be reached.

Augusta-Richmond County should adopt the Georgia Stormwater Management Manual as a policy for local development. This manual was developed by the Atlanta Regional Commission to address water quality by addressing BMPs and other development measures. The manual contains three sections: one on policy issues, one on technical and design standards, and one on rules and regulations. This manual, although still in draft form, would be beneficial in regulating stormwater flow in developing areas of the county. Slower stormwater flow results in lower fecal coliform levels.

The most important recommendation for reducing the levels of fecal coliform is that the creek must be monitored consistently. Any of the above programs could be tied to water quality monitoring by school groups, concerned citizen groups, or county officials. The level of fecal coliform must be initially measured before any other action is taken to determine the severity of the problem. This knowledge will allow the county and citizens to focus on the recommended programs that would be most useful.

SCHEDULE FOR IMPLEMENTING MANAGEMENT MEASURES

In order to establish an effective TMDL implementation plan, an implementation schedule must be carefully adhered to. A stakeholder group for the drainage basin of the impaired portion of Rocky Creek has been established. This group has been instrumental in the identification of potential sources of fecal coliform in the Rocky Creek area and in the development of potential measures to reduce or eliminate the excessive levels of fecal coliform present in the creek. A stakeholder group of

landowners, government officials, environmental activists, and other concerned citizens has been identified to help pinpoint the problem and to help implement identified solutions and monitoring schedules.

During the first year, this group of stakeholders must actively work together to continue to identify remedial measures and potential funding sources necessary to implement these remedial measures. Initial management controls and any necessary best management practices or environmental protection measures must be established and initial implementation must begin in the first year. Monitoring and status reports of any improvement or worsening of the fecal coliform levels must be started within the first year. The monitoring must be strictly adhered to in order to gauge the level of fecal coliform in the water so that goals for reduction can be set and met.

After the stakeholders and community leaders have a firm grasp on the current fecal coliform levels based on the water quality monitoring schedule outlined in this plan, the rest of the community can get involved. The educational programs in the schools and throughout the community must be implemented as soon as possible during the second year of the plan. Management programs, best management practices, monitoring and evaluation of data, and periodic status reports must continue throughout the five-year implementation plan. Continuous evaluation, analysis, and reporting results are all imperative to the success of the implementation of the TMDL. If the fecal coliform levels do not fall below the target TMDL level, a more rigorous implementation plan should be developed in the final year of this five-year implementation period.

MONITORING PLAN

Water quality monitoring is the most critical component in determining the success of the implementation plan. Monitoring helps determine compliance with regulations, major sources of loading, and the effect of the regulatory and voluntary measures implemented in the drainage basin. Water quality monitoring provides

quantitative evidence of the success or failure of the implemented voluntary and regulatory measures. No two watersheds are alike; therefore, the actual monitoring of the particular watershed through water sampling and analysis, rather that relying on computer model data, is critical to determining the fecal coliform levels actually present in the impaired water body.

Levels of fecal coliform in Rocky Creek will be monitored by standard periodic grab sampling. Augusta-Richmond County should develop a definitive sampling schedule, including sampling points and dates, as well as funding sources. This sampling schedule can be created after the results of the CSRA Source Water Assessment and Watershed Assessment are complete. Sampling should be scheduled, at a minimum, biannually. Samples should be taken once a week for an entire month in order to obtain the 30-day geometric mean. Samples should be obtained at least once during the summer season (May through October) and once during the winter season (November through April) each year to provide a complete inventory of the conditions in the impaired segment of Rocky Creek. Additional supplementary sampling points may be utilized by voluntary water quality monitoring organizations.

FUNDING SOURCES

There are currently several funding sources available for the county to engage in a stable monitoring schedule. Section 319(h) grants from Section 319(h) of the Clean Water Act may be available for use by the county. Other matching grants may be available through the Environmental Protection Agency's Office of Water for both non-point source mitigation and water quality testing. Appendix J contains details regarding this and other possible funding sources for the implementation of this plan. Further research into possible funding sources should be continually conducted over the five-year implementation period. Both county officials and the stakeholder group should conduct this research.

CRITERIA TO DETERMINE PROGRESS

Progress on the implementation plan will be determined through quantitative analysis of water quality sampling results. Periodic monitoring will show the trends of fecal coliform levels throughout the five-year period. The number of regulatory controls or best management practices implemented in the Rocky Creek drainage basin will also serve as a measure of progress. The implementation plan will be ultimately deemed successful if, at the end of the five-year implementation period, the fecal coliform levels in Rocky Creek are below the target levels recommended in the TMDL document and the stream is removed from the 303(d) list.

CONCLUSION

The most important aspect of the implementation of the TMDL for fecal coliform is a strictly adhered-to, effective monitoring schedule. This monitoring schedule is necessary to provide a starting point for fecal coliform reduction. None of the strategies recommended in this plan should be implemented without first obtaining data that allows a firm grasp on the current state of the fecal coliform problem. The problem is likely stormwater runoff, undetected septic or sewer leakage, and wildlife in the area. Measures such as a septic tank survey and sewer line survey could identify possible problem areas.

It is important for the stakeholder group to stay involved in the process of cleaning the water and lowering the fecal coliform levels. This group should coordinate efforts with the groups involved in the Source Water Assessment and the Richmond County Watershed Assessment. The findings published in those studies should be used to revise or update any recommendations listed in this plan.

The local government needs to begin following a strict testing schedule to monitor the levels of fecal coliform bacteria over the next five years. The testing cycle

should be performed at least biannually over a five-year period. The testing should follow EPD standards. One testing cycle should include testing specifically designated testing points one day a week for an entire month (or other 30-day period) to gain a 30-day geometric mean. By using designated testing sites officials should be able to identify areas of Rocky Creek with higher concentrations of fecal coliform bacteria, and use this data to determine other possible sources of the bacteria loading.

If the recommended regulatory and voluntary actions are carried out and the monitoring schedule is adhered to, the level of fecal coliform bacteria should be at an acceptable level prior to the conclusion of the five-year implementation period. Hopefully Rocky Creek will be removed from the 303(d) impaired water list at the conclusion of this implementation period.