Falling River Implementation Plan (Bacteria TMDL) Technical Report

Prepared for:
Virginia's Region 2000 Local Government Council
and
Virginia Department of Conservation and Recreation
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Submitted by

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Steering Committee Members

Working Group Members

Robert E. Lee Soil & Water Conservation District

Natural Resources Conservation Service

Campbell and Appomattox Counties

Region 2000 Local Government Council

Virginia Department of Environmental Quality (VADEQ)

Virginia Department of Conservation and Recreation (VADCR)

Local citizens and stakeholders in the Falling River watershed

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EXECUTIVE SUMMARY

Falling River was listed as impaired on Virginia's *1998 303(d) Total Maximum Daily Load Priority List and Report* (VADEQ, 1998) due to violations of the state's water quality standards for fecal coliform bacteria. This means that the stream does not support primary contact recreation including swimming, wading, and fishing due to an increased risk of illness or infection when coming in direct contact with the water. The fecal coliform bacteria standards at the time of impairment listings specified that in-stream fecal coliform levels must not exceed a single sample maximum of 1,000-cfu/100 mL or a geometric mean of 200-cfu/100 mL. As a result of the impairment listing, and court actions taken against the United States Environmental Protection Agency (EPA), a total maximum daily load (TMDL) study was developed for Falling River in 2004 (Louis Berger Group, Inc., 2004). This study established the reduction in fecal bacteria loads from the Falling River watershed (drainage basin) needed to restore it so that it would meet water quality standards for bacteria and fully support primary contact recreation.

Virginia law requires that an implementation plan be developed to show how fully supporting status for impaired waters can be achieved and the pollutant load reductions established in the TMDL study can thereby be met. In fulfilling the state's requirement for the development of a TMDL Implementation Plan (IP), a framework was established here for reducing fecal bacteria levels to achieve the water quality goals for the impaired streams.

Review of TMDL Development

The Louis Berger Group developed the fecal bacteria impairment TMDL report for Falling River, June 2004 (Louis Berger Group, 2004). Modeling conducted in support of the TMDL report considered fecal bacteria loads in runoff resulting from wildlife (*e.g.*, deer, raccoon, muskrat, beaver, turkey, goose, mallard, and wood duck), livestock (*e.g.*, beef, dairy and horse), and residential (*e.g.*, failing septic systems, straight pipes, dogs and cats) sources. Direct loads to the stream (including direct deposition from cattle and wildlife), uncontrolled discharges (failing septic systems and straight pipes), and permitted sources were also modeled. Both the *E. coli* geometric mean standard (126

cfu/100 mL) and the single sample maximum standard (235 cfu/100 mL) with an implicit Margin of Safety (MOS) were used as the water quality endpoint.

The Falling River TMDL shows that in order to meet the water quality standard for *E. coli*, all failing septic systems and straight pipes must be identified and corrected, and all livestock must be excluded from streams. A 98 percent reduction of bacteria coming from urban/residential and agricultural land uses is needed and a 50 percent reduction from direct wildlife loads will also be needed in order to meet the water quality standard.

Public Participation

The actions and commitments described in this document were drawn together through input from local citizens, local government representatives, Virginia Departments of Conservation and Recreation (VADCR), Environmental Quality (VADEQ), and Health (VDH); Virginia Cooperative Extension (VCE); Natural Resources Conservation Service (NRCS); the Robert E. Lee Soil and Water Conservation District (RELSWCD); MapTech, Inc, and other organizations. Every citizen and interested party in the watershed is encouraged to become involved in implementing the plan to help restore the health of Falling River.

Two public meetings were conducted to distribute information and gain feedback from the community. Active participation was solicited in smaller forums called working groups. These groups were comprised of stakeholders with similar concerns (*e.g.*, agricultural, residential, and governmental). Representatives from each working group participated in the steering committee, where input from the working groups was reviewed and decisions about the IP were made. Throughout the public participation process, a major emphasis was placed on discussing best management practices (BMPs), BMP specifications, locations of control measures, education, technical assistance, and funding.

Participants at the public meetings and members of the working groups and steering committee provided feedback regarding what should be included in the implementation plan. Most members of the working groups agreed that the cornerstone of the implementation plan should be cultivating public involvement and education, and

encouraging commitment and partnerships between the citizens in the watershed and government agencies in order to reduce fecal bacteria pollution in Falling River.

Assessment of Implementation Action Needs

The quantity or extent of pollution control measures, or BMPs, needed during implementation was determined through spatial analyses of land use, stream-networks, and the aerial photography available from USGS and USDA along with regionally appropriate data archived in the VADCR Agricultural BMP Database. Additionally, input from local agency representatives and community members were used to verify the analyses. Overall, the needs to meet the TMDL for the 15-year implementation period were identified and are shown in Table ES.1.

Table ES. 1 Agricultural, residential, and urban BMPs needed in the Falling River watershed.

Pollution Control Measure	Unit	Falling River
Agricultural		
Grazing Land Protection System (SL-6)	System	289
Stream Protection System (WP-2T)	System	15
Streamside Fence Maintenance	Linear ft	49,543
Improved Pasture Management	Acre	17,532
Manure Incorporation	Acre	7,092
Retention Ponds - Pasture	Acre - Treated	29,220
Vegetated Buffers - Cropland	Acres	25
Residential		
Septic Systems Pump-out	RB-1	5,055
Septic System Repair	RB-3	43
Septic System Installation/Replacement	RB-4	116
Alternative Waste Treatment System Installation	RB-5	8
Pet Waste Education Program	NA	1
Residential Pet Waste Composters	NA	2,163
Vegetated Buffers - Commercial Land	NA	1

Cost/Benefit Analysis

The costs of the above control measures were determined based on the cost of control measures previously installed through the Virginia Cost-Share Program in the Falling River watershed, and discussions with local agency representatives and working groups. The cost of technical assistance needed to implement the control measures was determined based upon discussions with working group members and technical assistance costs from both ongoing and previous implementation plans in similar watersheds. The

estimated total cost for ten years of implementation to install agricultural and residential pollution control measures in the Falling River watershed is $12,960,000 and $1,959,000 excluding technical assistance. The estimated total cost to provide technical assistance during implementation for Falling River watershed is expected to be $750,000. The total cost estimated for 15 years of implementation in the Falling River watershed is $15,670,000.

The primary benefit of implementation is cleaner waters in Virginia. Specifically, *E. coli* contamination in Falling River will be reduced to meet water quality standards. Table 5.9 indicates the cost efficiencies of the various practices being proposed in this IP. It is hard to gauge the impact that reducing *E. coli* contamination will have on public health, as most cases of waterborne infection are not reported or are falsely attributed to other sources. However, because of the reductions required, the incidence of infection from *E. coli* sources through contact with surface waters should be reduced considerably.

There are numerous secondary benefits of implementation. Streambank protection, provided through exclusion of livestock from streams, will also lead to improved aquatic habitat. The practices recommended in this document will provide economic benefits to landowners in addition to the anticipated environmental benefits. Specifically, alternative (clean) water sources, exclusion of cattle from streams, and intensive pasture management will improve profitability of farms, while private sewage system installation and maintenance will ultimately save homeowners money by preventing expensive fees and repairs. Keeping cattle in clean, dry areas has been shown to reduce the occurrence of mastitis (an infection of the mammary glands) and foot rot. The VCE (1998a) reports that mastitis costs producers $100 per cow annually in reduced quantity and quality of milk produced. On a larger scale, mastitis costs the U.S. dairy industry about $1.7 billion to $2 billion annually or 11 percent of total U.S. milk production. While the spread of mastitis through a dairy herd can be reduced through proper sanitation of milking equipment, mastitis-causing bacteria can be harbored and spread in the environment where cattle have access to wet and dirty areas.

Measurable Goals and Milestones for Attaining Water Quality Standards

Potential funding sources available during implementation were identified during IP development. Sources may include, but are not limited to:

- Virginia Agricultural Best Management Practices Cost-Share Program
- Virginia Agricultural Best Management Practices Tax Credit Program
- USDA Environmental Quality Incentives Program (EQIP)
- Virginia Revolving Loan Programs (Agricultural BMPs and onsite sewage disposal systems)
- USDA Wildlife Habitat Incentive Program (WHIP)
- Virginia Water Quality Improvement Fund

Implementation is scheduled to occur in two main stages. The first stage (first five years) involves implementation of the most cost-effective control measures. Once the measures included in this stage are implemented, it is expected that the violation rate of the *E. coli* water quality standard in this stream will be low enough to remove it from the state's impaired waters list. Stage II (next five years) describes the remainder of the control measures required to achieve the targeted pollutant load reductions and fully achieve the reductions called for in the TMDL study

Identification of critical areas to be targeted first for agricultural BMP installation was accomplished through analysis of land use, farm boundaries, stream network Geographic Information Systems (GIS) layers, and monitoring results. The subwatersheds were ranked by the ratio of animals per length of fence needed and by the combined failing septic systems and straight pipes loads estimated in each subwatershed.

Stakeholders and Their Role in Implementation

Implementation progress success will be determined by water quality monitoring conducted by VADEQ through the agency's monitoring program.

The Robert E. Lee Soil and Water Conservation District (RELSWCD) will be in charge of initiating contact with farmers and homeowners in the impaired watersheds to encourage the installation of agricultural and residential BMPs. This one-on-one contact will facilitate communication of the water quality problems and the pollution control measures needed. The RELSWCD staff will conduct outreach activities in the watershed

to garner the participation and community support necessary to obtain implementation milestones, and to make the community aware of the water quality impairments present in the Falling River watershed and how they may affect local residents. Such activities may include information exchange through newsletters, mailings, field days, organizational meetings, etc. The RELSWCD staff will work with appropriate organizations (such as VCE) to educate the public.

In the Commonwealth of Virginia, water quality problems are addressed through legislation, incentive programs, education, and legal actions. The agencies regulating activities that impact water quality in Virginia include: VADEQ, VADCR, Virginia Department of Agriculture and Consumer Services (VDACS), and VDH.

Achieving the goals of this IP (*i.e.*, improving water quality and removing these waters from the Section 303(d) list) is dependent on stakeholder participation – not only the agricultural community managing bacteria sources from livestock or repairing or replacing failing on-site residential sewage disposal systems, but also all citizens living in the watershed. It must be acknowledged first that there is a water quality problem, and changes must be made as needed in operations, programs, policies, and legislation to address the water quality degradation. Local citizens can become involved by picking up after their pets, properly maintaining their septic systems, becoming water quality monitoring volunteers and volunteering to distribute information and educate others at public events.

1. INTRODUCTION

1.1 Background

The detrimental effects of bacteria in food and water supplies have been documented repeatedly. On August 8, 1994, the Virginia Department of Health (VDH) was notified that campers and counselors at a Shenandoah Valley summer camp developed severe gastrointestinal illness. It was confirmed that *E. coli* 0157:H7, a type of fecal coliform bacteria commonly found in the intestines of humans and animals, was the causative agent (CDC, 1995).

In Franklin County, Virginia, a 1997 outbreak of illnesses involving three children was attributed to *E. coli* (0157:H7) in Smith Mountain Lake. The children came in contact with the bacteria while swimming in the lake, and a two-year-old child almost died as a result of the exposure (Roanoke Times, 1997a, 1997b, 1998b).

In August 1998, seven children and two adults at a day-care center in rural Floyd County were infected with *E. coli* (0157:H7). Upon investigation, two of the property's wells tested positive for total coliform (Roanoke Times, 1998a, 1998c). On June 6, 2000, Crystal Spring (Roanoke, Virginia's second largest water source) was shut down by the VDH for *E. coli* contamination (Roanoke Times, 2000).

These are not isolated cases. Throughout the United States, the Centers for Disease Control estimates that at least 73,000 cases of illnesses and 61 deaths per year are caused by *E. coli* 0157:H7 bacteria (CDC, 2001). Other fecal coliform (FC) pathogens (*e.g., E. coli* 0111) are responsible for similar illnesses. In addition, the presence of other bacterial and viral pathogens is indicated by the presence of FC. Whether the source of contamination is human or livestock waste, the threat of these pathogens appears more prevalent as both populations increase.

The Clean Water Act (CWA) that became law in 1972 requires that all U.S. streams, rivers, and lakes meet their state's water quality standards. The CWA also requires that states conduct monitoring to identify polluted waters for those that do not meet standards.

Through this required program, the state of Virginia has found that many stream segments do not meet state water quality standards for protection of the six beneficial uses: fishing, wildlife, swimming, shellfish, aquatic life, and drinking.

When streams fail to meet standards, Section 303(d) of the CWA and the U.S. Environmental Protection Agency's (EPA) Water Quality Management and Planning Regulation (40 CFR Part 130) both require that states develop a Total Maximum Daily Load (TMDL) for each pollutant. A TMDL is a "pollution budget" for a stream. That is, it sets limits on the amount of pollution that a stream can tolerate and still maintain water quality standards. In order to develop a TMDL, background concentrations, point source loadings, and non-point source loadings are considered. A TMDL accounts for seasonal variations and must include a margin of safety. Through the TMDL process, states establish water-quality based controls to reduce pollution and meet water quality standards.

Once a TMDL is developed and approved by the State Water Control Board (SWCB) and EPA, measures must be taken to reduce pollution levels in the stream. Virginia's 1997 Water Quality Monitoring, Information and Restoration Act (WQMIRA) states in section 62.1-44.19:7 that the "Board shall develop and implement a plan to achieve fully supporting status for impaired waters." The TMDL Implementation Plan (IP) describes pollution control measures such as the installation of best management practices (BMPs), to be implemented in a staged process.

Falling River (VAC-L34R-01) was listed as impaired on Virginia's *1998 303(d) Total Maximum Daily Load Priority List and Report* (VADEQ, 1998) due to violations of the state's water quality standards for fecal coliform (Figure 1.1). The impaired segment begins at the confluence of the North and South Fork Falling River and continues downstream to the Roanoke River confluence (17.92 miles). Originally there were four distinct impairments on the mainstem of the Falling River and they remained on the 2002 303(d) list. All four impaired segments on Falling River were combined into one for the 2004 305(b)/303(d) integrated report. Falling River was assessed as impaired for violations of the state's water quality standard for *E. coli* in the 2006 305(b)/303(d)

integrated report. Table 1.1 and Figure 1.2 show the land uses in the Falling River watershed.

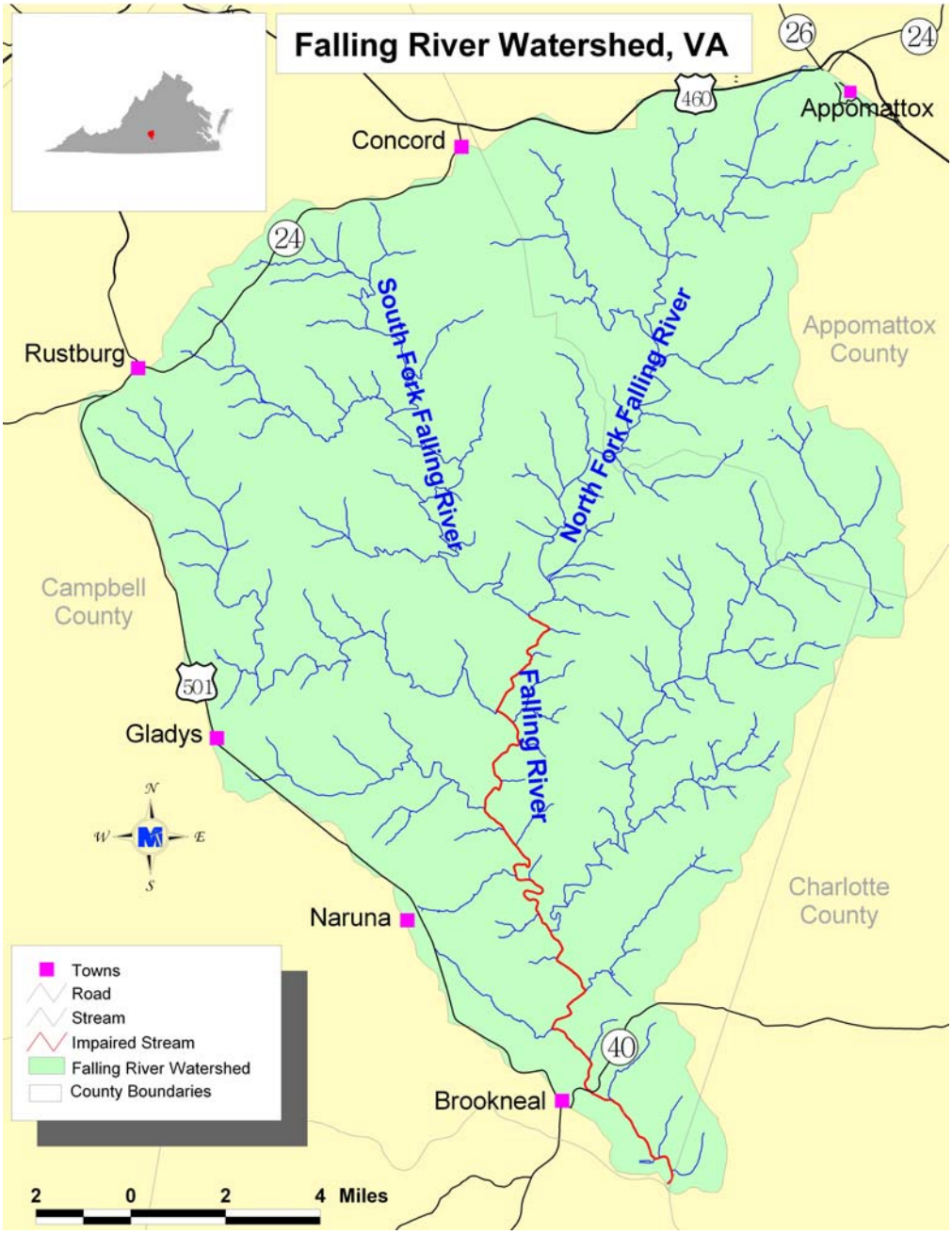

Figure 1.1 Location of the Falling River watershed and impaired segment.

Table 1.1 Spatial distribution of land use for the Falling River watershed.

Water	Developed	Barren	Woodland	Pasture/ Hay	Cropland	Wetlands	Total
(ac)	(ac)	(ac)	(ac)	(ac)	(ac)	(ac)	(ac)
833	1,509	3,465	101,528	38,377	4,337	1,147	151,196

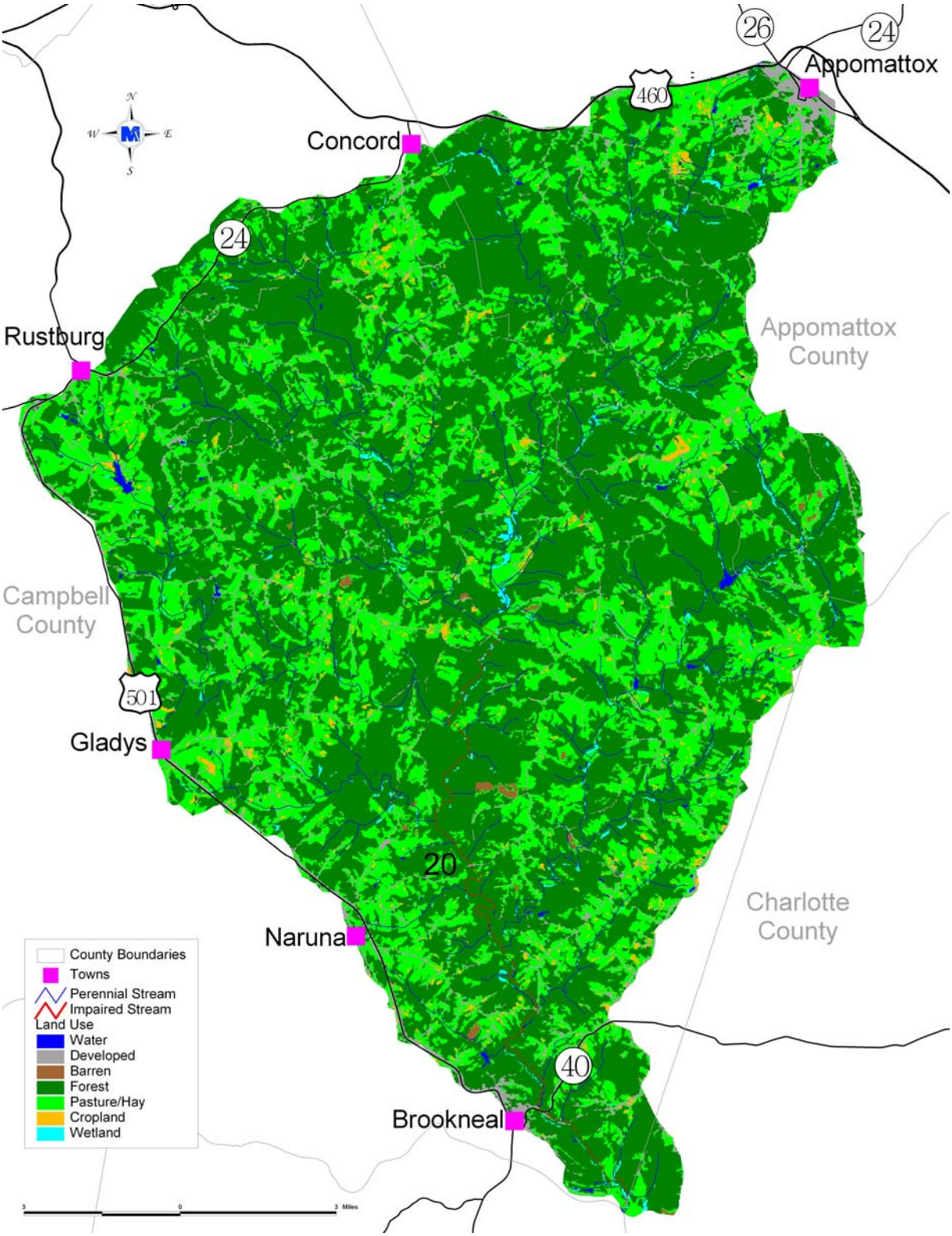

Figure 1.2 Land uses in the Falling River watershed.

In developing this IP, elements from both state and federal guidance were incorporated and the recommended guidelines from Virginia's *Guidance Manual for Total Maximum Daily Load Implementation Plans* were followed. Specific state and federal requirements of an IP are described in chapter 2 of this document.

Once developed, the Virginia Department of Environmental Quality (VADEQ) will take TMDL implementation plans to the SWCB for approval as the plan for implementing the pollutant allocations and reductions contained in the TMDLs. Also, VADEQ will request SWCB authorization to incorporate the TMDL implementation plan into the appropriate Water Quality Management Plan (WQMP) in accordance with the CWA's Section 303(e). In response to a Memorandum of Understanding (MOU) between EPA and VADEQ, VADEQ also submitted a draft Continuous Planning Process to EPA in which VADEQ commits to regularly updating the WQMPs. Thus, the WQMPs will be, among other things, the repository for all TMDLs and TMDL implementation plans developed within a river basin.

1.2 Applicable Water Quality Standards

According to Virginia Water Quality Standard 9 VAC 25-260-5, the term 'water quality standards' means "provisions of state or federal law which consist of a designated use or uses for the waters of the Commonwealth and water quality criteria for such waters based upon such uses. Water quality standards are to protect the public health or welfare, enhance the quality of water and serve the purposes of the State Water Control Law (§62.1-44.2 et seq. of the Code of Virginia) and the federal Clean Water Act (33 USC §1251 et seq.)."

Virginia Water Quality Standard 9 VAC 25-260-10 (Designation of uses.) states:

A. All state waters, including wetlands, are designated for the following uses: recreational uses, e.g., swimming and boating; the propagation and growth of a balanced, indigenous population of aquatic life, including game fish, which might reasonably be expected to inhabit them; wildlife; and the production of edible and marketable natural resources, e.g., fish and shellfish.

D. At a minimum, uses are deemed attainable if they can be achieved by the imposition of effluent limits required under §§301(b) and 306 of the Clean Water Act and cost-effective and reasonable best management practices for nonpoint source control.

♦

G. The [State Water Quality Control] board may remove a designated use which is not an existing use, or establish subcategories of a use, if the board can demonstrate that attaining the designated use is not feasible because:

1. *Naturally occurring pollutant concentrations prevent the attainment of the use;*

2. *Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating state water conservation requirements to enable uses to be met;*

3. *Controls more stringent than those required by §§301(b) and 306 of the Clean Water Act would result in substantial and widespread economic and social impact.*

At the time Falling River was first designated as impaired, TMDLs were developed for fecal coliform bacteria based on the fecal coliform state water quality criterion. For a non-shellfish supporting waterbody to be in compliance with Virginia fecal coliform standard for contact recreational use, VADEQ specified the following criteria (Virginia Water Quality Standard 9 VAC 25-260-170):

A. General requirements. In all surface waters, except shellfish waters and certain waters addressed in subsection B of this section, the fecal coliform bacteria shall not exceed a geometric mean of 200 fecal coliform bacteria per 100 ml of water for two or more samples over a 30-day period, or a fecal coliform bacteria level of 1,000 per 100 ml at any time.

If the waterbody exceeded either criterion more than 10.5 percent of the time, the waterbody was classified as impaired and a TMDL was developed and implemented to bring the waterbody into compliance with the water quality criterion. Based on the sampling frequency, only one criterion was applied to a particular datum or data set (Virginia Water Quality Standard 9 VAC 25-260-170). If the sampling frequency was one sample or less per 30 days, the instantaneous criterion was applied; for a higher sampling frequency, the

geometric criterion was applied. The instantaneous fecal coliform water quality standard was modified in 2003 to a level of 400 colony-forming units (cfu) per 100 ml.

Sufficient fecal coliform bacteria standard violations were recorded at VADEQ water quality monitoring stations in the Falling River watershed to indicate that the recreational use designations were not being supported (VADEQ, 1998). Most of the VADEQ's ambient water quality monitoring is done on a monthly or quarterly basis. This sampling frequency does not provide the two or more samples within 30 days needed for use of the geometric mean part of the standard. Therefore, VADEQ used the 1,000 cfu/100 mL standard in the 1996, 1998 and 2002 303(d) assessments for the fecal coliform bacteria monitoring data. The 400 cfu/100 ml standard was used in the 2004 and 2006 Section 303(d) assessments for the fecal coliform bacteria monitoring data. A five-year time span was used for the 1998 - 2006 assessment periods.

1.3 Water Quality Standard Changes

Two regulatory actions related to the bacteria water quality standard in Virginia have been implemented. The first rulemaking pertains to the indicator species used to measure bacteria pollution. The second rulemaking is an evaluation of the designated uses as part of the state's triennial review of its water quality standards.

1.3.1 Indicator Species

The EPA recommended that all states adopt an *E. coli* or *enterococci* standard for fresh water and *enterococci* criteria for marine waters by 2003. The EPA is pursuing the states' adoption of these standards because there is a stronger correlation between the concentration of these organisms (*E. coli* and *enterococci*) and the incidence of gastrointestinal illness than with fecal coliform. *E. coli* and *enterococci* are both bacteriological organisms that can be found in the intestinal tract of warm-blooded animals. Like fecal coliform bacteria, these organisms indicate the presence of fecal contamination. The transition to the *E. coli* and *enterococci* standard began in 2003 and will be complete on or before June 30, 2008. For the 2006 305(b)/303(d) Water Quality Assessment Integrated Report the new standard was used to assess the bacteria data when sufficient *E. coli* data were present. The *E. coli* water quality standard has an instantaneous level of 235 colony-forming units (cfu) per 100 ml and

geometric mean of 126. colony-forming units (cfu) per 100 ml for two or more samples over a 30-day period.

1.3.2 Swimming Designated Use

All waters in the Commonwealth have been designated as "primary contact" for the swimming use regardless of size, depth, location, water quality or actual use. The *E. coli* bacteria standard is described in 9 VAC 25-260-170 and in Section 1.3.1 of this report. This standard is to be met during all stream flow levels and was established to protect bathers from ingestion of potentially harmful bacteria. However, many headwater streams are small and shallow during base flow conditions when surface runoff has minimal influence on stream flow. Even in pools, these shallow streams do not allow full body immersion during periods of base flow. In larger streams, lack of public access often precludes the swimming use.

Recognizing that all waters in the Commonwealth are not used extensively for swimming, Virginia has approved a process for re-designation of the swimming use for secondary contact in cases of: 1) natural contamination by wildlife, 2) small stream size, and 3) lack of accessibility to children, as well as due to widespread socio-economic impacts resulting from the cost of improving a stream to a “swimmable” status.

The re-designation of the current swimming use in a stream will require the completion of a Use Attainability Analysis (UAA). A UAA is a structured scientific assessment of the factors affecting the attainment of the use, which may include physical, chemical, biological, and economic factors as described in the Federal Regulations. The stakeholders in the watershed, the Commonwealth of Virginia and EPA will have an opportunity to comment on these special studies.

1.3.3 Wildlife Contributions

In some streams for which TMDLs have been developed, water quality modeling indicates that even after removal of all of the sources of *E. coli* (other than wildlife), the stream will not attain standards. TMDL allocation reductions of this magnitude are not realistic and do not meet EPA’s guidance for reasonable assurance. Based on the water quality modeling, Falling River will not be able to attain water quality standards without some reduction in

wildlife contribution. Virginia and EPA are not proposing reductions of wildlife to allow for the attainment of water quality standards. While managing over-populations of wildlife remains as an option to local stakeholders, the reduction of wildlife or changing a natural background condition is not the intended goal of a TMDL. In such a case, after demonstrating that the source of *E. coli* contamination is natural and uncontrollable by effluent limitations and BMPs, the state may decide to re-designate the stream's use for secondary contact recreation or to adopt site specific criteria based on natural background levels of *E. coli*. The state must demonstrate that the source of *E. coli* contamination is natural and uncontrollable by effluent limitations and BMPs through a UAA as described above. All site-specific criteria or designated use changes must be adopted as amendments to the water quality standards regulations. Watershed stakeholders and EPA will be able to provide comment during this process.

1.4 Project Methodology

The overall goal of this project was to begin the process of restoring water quality in the Falling River impaired segment.

The key components of the staged implementation plan are discussed in detail in the following sections: State and Federal Requirements for Implementation Plans, Review of TMDL Development, Process for Public Participation, Assessment of Needs, Measurable Goals and Milestones, and Implementation.

In fulfilling the state's requirement for the development of a TMDL IP, a framework has been established for reducing *E. coli* levels and achieving the water quality goals for the Falling River impaired segment for which TMDL allocations were developed. With successful completion of the IP, Virginia will be well on the way to restoring the impaired waters and enhancing the value of this important resource. Additionally, development of an approved IP will improve the localities' chances for obtaining monetary assistance during implementation.

2. STATE AND FEDERAL REQUIREMENTS FOR IMPLEMENTATION PLANS

There are a number of state and federal requirements and recommendations for TMDL IPs. The goal of this chapter is to clearly define what they are and explicitly state if the "elements" are a required component of an approvable IP or are merely a recommended topic that should be covered in a thorough IP. This chapter has three sections that discuss a) the requirements outlined by the WQMIRA that must be met in order to produce an IP that is acceptable and approvable by the Commonwealth, b) the EPA recommended elements of IPs, and c) the required components of an IP in accordance with Section 319 guidance.

2.1 State Requirements

The TMDL IP is a requirement of Virginia's 1997 Water Quality Monitoring, Information, and Restoration Act (§62.1-44.19:4 through 19:8 of the Code of Virginia), or WQMIRA. WQMIRA directs the SWCB to "develop and implement a plan to achieve fully supporting status for impaired waters." In order for IPs to be approved by the Commonwealth, they must meet the requirements as outlined by WQMIRA. WQMIRA requires that IPs include the following:

- date of expected achievement of water quality objectives,
- measurable goals,
- necessary corrective actions, and
- associated costs, benefits, and environmental impact of addressing the impairment.

2.2 Federal Recommendations

Section 303(d) of the CWA and current EPA regulations do not require the development of implementation strategies. The EPA does, however, outline the minimum elements of an approvable IP in its 1999 *Guidance for Water Quality-Based Decisions: The TMDL Process.*

The listed elements include:

- a description of the implementation actions and management measures,
- a time line for implementing these measures,
- legal or regulatory controls,
- the time required to attain water quality standards, and
- a monitoring plan and milestones for attaining water quality standards.

It is strongly suggested that the EPA recommendations be addressed in the IP, in addition to the required components as described by WQMIRA.

2.3 Requirements for Section 319 Fund Eligibility

The EPA develops guidelines that describe the process and criteria used to award CWA Section 319 nonpoint source grants to states. The guidance is subject to revision and the most recent version should be considered for IP development. The "Supplemental Guidelines for the Award of Section 319 nonpoint source grants to States and Territories in FY 2003" identifies the following nine elements that must be included in the IP to meet the 319 requirements:

1. Identify the causes and sources or groups of similar sources that will need to be controlled to achieve the load reductions estimated in the watershed-based plan;
2. Estimate the load reductions expected to achieve water quality standards;
3. Describe the NPS management measures that will need to be implemented to achieve the identified load reductions;
4. Estimate the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon to implement the watershed-based plan.
5. Provide an information/education component that will be used to enhance public understanding of the project and encourage the public's participation in selecting, designing, and implementing NPS management measures;
6. Provide a schedule for implementing the NPS management measures identified in the watershed-based plan;
7. Describe interim, measurable milestones for determining whether NPS management measures or other control actions are being implemented;

8. Identify a set of criteria for determining if loading reductions are being achieved and if progress is being made towards attaining water quality standards; if not, identify the criteria for determining if the watershed-based plan needs to be revised; and
9. Establish a monitoring component to evaluate the effectiveness of the implementation efforts.

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3. REVIEW OF TMDL DEVELOPMENT

The Louis Berger Group was contracted to develop an *E. coli* bacteria TMDL for the Falling River watershed. The TMDL was approved in 2004 by the EPA and is posted at www.deq.virginia.gov. Water quality monitoring and the *E. coli* load reductions called for in the TMDL study were reviewed to determine the water quality goals and associated pollutant reductions that would need to be addressed through the development of the implementation plan.

3.1 TMDL Water Quality Monitoring Results

Bacterial source tracking (BST) is intended to aid in identifying sources (*i.e.*, human, pet, livestock, or wildlife) of fecal contamination in water bodies. BST sampling provides us with a "snapshot" of sources of fecal contamination in a stream at a particular moment in time. While it is useful in gauging the influence of different fecal sources on water quality, it must not be considered as an exact determination of proportionate contributions of fecal bacteria from sources in a watershed. As part of the Falling River watershed TMDL development, BST sampling was performed at the DEQ long-term water quality monitoring stations (4AFRV002.78 and 4AFRV025.34). Samples were collected and analyzed on a monthly basis from December 2002 through November 2003.

The BST data indicates that *E. coli* bacteria from human, wildlife, pet and livestock were present in Falling River but the largest contributors were livestock followed by wildlife and pets. Figures 3.1 and 3.2 show the load-weighted averages for four source types at two monitoring stations in the Falling River watershed.

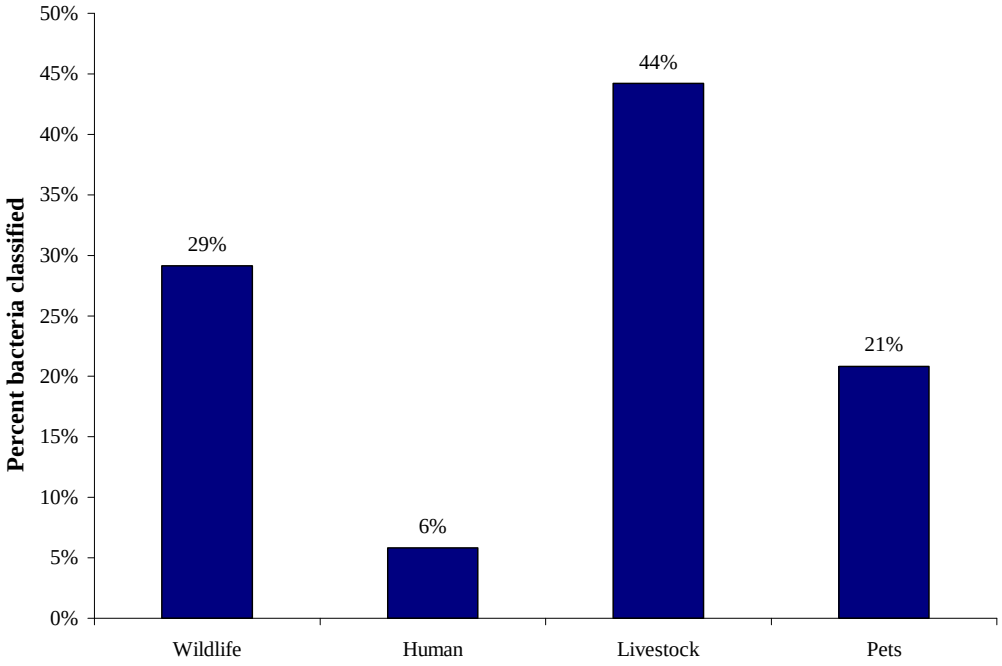

Figure 3.1 **Load weighted averages for *E. coli* concentrations and sources for Falling River at monitoring station, AFRV002.78 (VADEQ TMDL Study).**

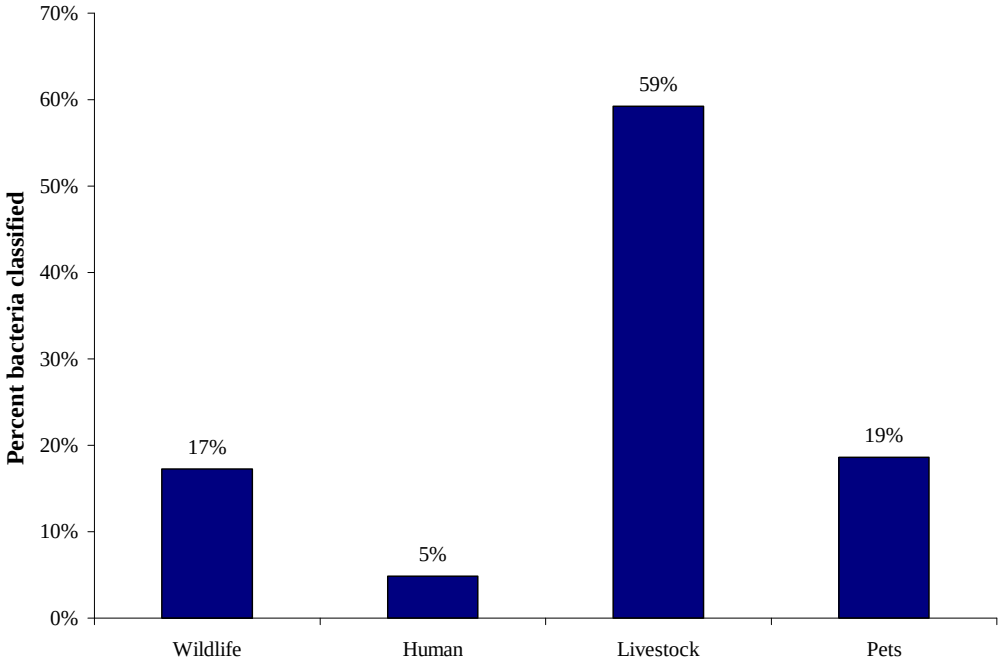

Figure 3.2 **Load weighted averages for *E. coli* concentrations and sources for Falling River at monitoring station, AFRV025.34 (VADEQ TMDL Study).**

3.2 Water Quality Modeling

In order to understand the implications of the load allocations determined during TMDL development, it is important to understand the modeling methods used in the analysis. The United States Geological Survey (USGS) Hydrologic Simulation Program - Fortran (HSPF) water quality model was used as the modeling framework to simulate hydrology and existing conditions and perform *E. coli* bacteria TMDL allocations in the Falling River watershed Seasonal variations in hydrology, climatic conditions, and watershed activities can be explicitly accounted for in the model.

3.2.1 *E. coli* Sources

Potential sources of *E. coli* considered in the TMDL development included both point source and nonpoint source contributions. Permitted point sources are shown in Table 3.1.

Table 3.1 Permitted point sources in the Falling River watershed.

Permit #	Facility Name	Design Flow (MGD)[1]	# of Connections[2]	Status
VA0020249	Appomattox_STP	0.170	356	Active
VA0022250	Town_of_Brookneal_Lagoon	0.082	1259	Active
VA0023396	DOC_Rustburg	0.028	0	Active
VA0023965	Rustburg_WWTP	0.200	105	Active
VA0068543	Thousand_Trails_Lynchburg_Preserve	0.040	0	Active
VA0084034	Brookneal_WTP	0.041	No *E.coli*	Active
VA0084034	Brookneal_WTP	0.001	No *E.coli*	Active
VA0089478	Gladys_Timber_Products	0.200	No *E.coli*	Active

[1]mgd – million gallons per day

[2]Number of connections is the number of households connected to the corresponding Wastewater treatment facility.

At the time that this TMDL was created, permitted point discharges that may contain pathogens associated with fecal matter were required to maintain *E. coli* concentrations below 126 cfu/100 mL. One method for achieving this goal is chlorination. Chlorine is added to the discharge stream flow at levels intended to kill off any pathogens. The monitoring method for ensuring the goal is to measure the concentration of total residual chlorine (TRC) in the effluent. If the concentration is high enough, pathogen concentrations, including *E. coli* concentrations, are considered reduced to acceptable levels. Typically, if

minimum TRC levels are met, *E. coli* concentrations are reduced to levels well below the 126 cfu/100 mL limit.

Both urban and rural nonpoint sources of *E. coli* bacteria were considered in water quality modeling. Sources included residential sewage treatment systems, land application of manure, livestock, wildlife, and domestic pets. Loads were represented either as land-based loads (where they were deposited on land and available for wash off during a rainfall event) or as direct loads (where they were directly deposited to the stream). Land-based nonpoint sources are represented as an accumulation of pollutants on land, where some portion is available for transport in runoff. The amount of accumulation and availability for transport vary with land use type and season. The model allows a maximum accumulation to be specified. The maximum accumulation was adjusted seasonally to account for changes in die-off rates, which are dependent on temperature and moisture conditions. Some nonpoint sources, rather than being land-based, are represented as being deposited directly to the stream (*e.g.*, animal defecation in stream, straight pipes). These sources are modeled similarly to point sources, as they do not require a runoff event for delivery to the stream.

3.2.2 *E. coli* Model Allocations

Several model runs were made investigating scenarios that would meet the *E. coli* water quality standards. The final load allocations are shown in Table 3.2. The TMDL study showed that violation rates of less than 10.5 percent of the 235 cfu/100ml water quality standard could not be reached without requiring some reductions to wildlife contributions.

The final allocation scenario calls for a 100 percent reduction of human sources (failed septic systems and straight pipes), 100 percent reduction from direct instream loading from livestock, an 70 percent reduction of the *E. coli* loading from forested land, a 98 percent reduction of the *E. coli* loading from agricultural and developed land uses and a 50 percent reduction from direct wildlife sources.

Table 3.2 Load reductions allocated during TMDL development for Falling River.

Failed Septic Systems and Straight Pipes	Direct Livestock	Nonpoint Sources*	Direct Wildlife*	Forest*
100%	100%	98%	50%	70%

*Direct deposition of waste into the stream from wildlife will not be explicitly addressed by this implementation plan and wildlife contributions to forested land won't be addressed either (gray in table 3.2)

3.3 Implications of TMDL and Modeling Procedure on Implementation Plan Development

The major implication in the development of this TMDL is that extreme reductions are required to achieve the water quality standard. All uncontrolled discharges, failing septic systems, leaking sewer lines, and overflows must be identified and corrected; all livestock must be excluded from streams, direct loads from wildlife to the stream must be significantly reduced, and nearly all of the urban and rural nonpoint sources must be reduced.

However, there are subtler implications as well. Implicit in the requirement for 100 percent correction of uncontrolled discharges is the need to maintain all functional septic systems. Wildlife direct deposition will not be explicitly addressed by this implementation plan. All efforts will be directed at controlling anthropogenic sources. See Section 1.3.3 in this report for a discussion of regulatory issues regarding wildlife.

This TMDL included straight pipes and failing septic systems in the total bacteria load to the streams. Using the 1990 and 2000 U.S. Census and the proximity of houses to perennial streams, the number of straight pipes (15) and failing septic systems (152) were estimated. In instances where currently available data were different than data in the TMDL report, the best available data were used to quantify corrective actions and develop cost estimates.

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4. PUBLIC PARTICIPATION

Public participation was an integral part of the TMDL Implementation Plan development, and is critical to promote reasonable assurances that the implementation activities will occur. Attendance was encouraged through letters and fliers sent to area residents; fliers posted throughout the watershed and in Cooperative Extension newsletters; and notices sent to the *Lynchburg News and Advance*, *Brookneal Union Star*, *Appomattox Times Virginian* and WSET-TV ABC 13. Notices were also submitted to the Greater Lynchburg Environmental Network (GLEN) e-mail list, posted on the Region 2000 Local Government Council Web site, and sent to all Board and Planning Commission members of Appomattox and Campbell Counties and RELSWCD Board members.

4.1 Public Meetings for the Falling River Watershed

The first public meeting was held at Campbell County Extension Office in Rustburg, Virginia on Sept. 25, 2007. The meeting was publicized in *Brookneal Union Star*, *Appomattox Times Virginian*, *Lynchburg News and Advance* and was attended by 24 people including citizens, government representatives and a consultant. Information delivered to the public at the meeting included a general description of the TMDL process, a more detailed description of TMDL development and IP development, and a solicitation for participation in working groups.

The final public meeting for Falling River will be held on April 3, 2008, in Rustburg, VA. The primary purpose of this meeting was to present the final TMDL Implementation Plan. A presentation was given describing the implementation plan using major components as an outline: Review of TMDL development, public participation, assessment of needs, cost/benefit analysis, and implementation. A draft implementation plan and presentation was distributed to attendees. In addition, informational pamphlets describing programs associated with the RELSWCD, VADCR, and VADEQ were made available. Maps with land use, topographic features, and analysis results were displayed and discussed after the presentation.

In addition to the public meetings, a steering committee and three specialized working groups (agricultural, residential and government) were assembled from communities of people with

common interests in improving water quality in the Falling River watershed. The working groups served as the primary arena for seeking public input on implementation actions to be included in the plan, associated costs and outreach methods. The steering committee reviewed reports from each of the working groups and helped to guide the overall development of the implementation plan. A representative of the Virginia Department of Conservation and Recreation (VADCR) attended each working group and steering committee meeting in order to facilitate the process and integrate information collected from the various communities. The minutes from each of the working groups and the steering committee are included in Appendix A.

The role of the Agricultural Working Group (AWG) was to review implementation from an agricultural perspective, identify any obstacles (and solutions) related to BMP implementation, and to provide estimates on the type, number, and costs of BMPs. The primary role of the Residential Working Group (RWG) was to discuss methods needed to reduce human and pet sources of bacteria entering Falling River, recommend methods to identify and correct or replace failing septic systems and straight pipes, and provide input on the BMPs to include in the plan. The goals of the Government Working Group (GWG) were to identify regulatory controls currently in place in the watershed that may help to improve water quality (*e.g.*, livestock stream access and sewer line connections), to identify existing programs and technical resources that may enhance implementation efforts, and to propose additional programs that would support implementation.

All meetings conducted during the course of the TMDL IP development are listed in Table 4.1. Individuals on local, state, and federal levels representing agricultural and residential/governmental interests devoted hundreds of work-hours to attending meetings.

Table 4.1 Meetings held pertaining to the Falling River TMDL Implementation Plan development.

Date	Meeting Type	Location	Attendance
9/25/2007	1st Public Meeting	Campbell County Extension Office Rustburg, VA	24
9/25/2007	1st Agricultural and 1st Residential Working Groups Meeting	Campbell County Extension Office Rustburg, VA	18
11/29/2007	1st Governmental and 2nd Residential Working Groups Meeting	Historic Court House Rustburg, VA	11
1/15/2008	2nd Agricultural Working Group	Campbell County Extension Office Rustburg, VA	10
2/21/2008	Steering Committee Meeting	Historic Court House Rustburg, VA	11
4/3/2008	Final Public Meeting	Campbell County Board Room Haberer Building Rustburg, VA	12

4.1.1 Agricultural Working Group for Falling River

The first meeting occurred on Sept. 25, 2007, at the Campbell County Extension Office in Rustburg, VA, following the first public meeting and was combined with the Residential Working Group. The members consist of farmers from the watershed, representatives from Robert E. Lee Soil and Water Conservation District, NRCS, VADEQ, VDH, Region 2000 Local Government Council and VADCR. Discussion focused on the current status of agriculture in the watershed, stream fencing and riparian buffer practices (e.g. SL-6 and WP-2T) for which financial assistance (cost share) is available through the state cost-share program, and the maintenance issues involved with these practices.

The second meeting took place on Jan. 15, 2008, at the Campbell County Extension Office Building in Rustburg, VA, ten individuals were in attendance. The group discussed the fencing estimates that had been prepared for Falling River and land-based BMP practices.

4.1.2 Residential Working Group for Falling River

The first Residential Working Group (RWG) meeting took place on Sept. 25, 2007, following the first public meeting and was combined with the Agricultural Working Group.

Discussion centered on the estimates of straight pipes and failing septic systems, possible cost-share programs, alternative waste treatment systems, and the costs for those systems.

The second RWG meeting was held on Nov. 29, 2007, in conjunction with the Governmental Working Group meeting at the Historic Court House in Rustburg, Va. The pet waste programs were discussed and the failing septic tank and straight pipe numbers were reviewed.

4.2 Governmental Working Group for Falling River

A single Governmental Working Group (GWG) was held with agency and local government representatives. Eleven people attended the Nov. 29, 2007, meeting, which was held at the Historic Court House in Rustburg, Va. In attendance were representatives from RELSWCD, VA Department of Environmental Quality (VADEQ), Natural Resources Conservation Service (NRCS), Campbell County, VA Department of Forestry (VADOF), and VADCR.

Key points from the working groups were discussed. Also discussed were the roles and responsibilities of the government agencies, regulatory controls, projected growth in the watershed and the implementation plans water quality monitoring.

4.3 Steering Committee

The purpose of the Steering Committee was to provide guidance on the content and presentation of the final IP and ensure that the working group recommendations were appropriately incorporated into the plan. The Steering Committee met on Feb. 21, 2008, at the Historic Court House in Rustburg, Va. The meeting was attended by 11 people, which included representatives from RELSWCD, VADCR, VDH, Campbell County and NRCS. A report summarizing key points and recommendations from each of the working groups was presented to the steering committee for review. Representatives from each of the working groups served on the steering committee in order to ensure that the reports adequately described working group recommendations and captured key points of discussion. The minutes from the working group and steering committee meetings and the reports be can found in Appendix A.

Following the discussion of these reports, the final public meeting presentation was reviewed for input and comment from the committee.

4.4 Summary

Varied opinions were voiced throughout the public participation meetings regarding the IP process. Most members of the working groups agreed that the cornerstone of the IP is cultivating public involvement and education and encouraging commitment and partnerships among the citizens and government agencies in the watershed in order to reduce fecal bacteria pollution. The participants deemed assertion to individual responsibility as a foundation for building partnerships among citizens, businesses, interest groups, and government agencies. They agreed it can also cultivate voluntary implementation and long-term support for reducing bacteria levels and restoring water quality in the Falling River watershed.

Corrective actions discussed for agricultural activities were fence exclusion, riparian buffer practices and other land based practices such as improved pasture management and manure incorporation into cropland. Residential corrective actions discussed were focused primarily septic system replacement and eliminating straight pipes. In addition pet waste programs can be very effective in reducing the amount of bacteria that enters a stream.

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5. ASSESSMENT OF IMPLEMENTATION POLLUTION CONTROL MEASURES

An important element of the TMDL IP is the encouragement of voluntary compliance with implementation actions by local, state, and federal government agencies, business owners, and private citizens. In order to encourage voluntary implementation, information was obtained on the types of actions and program options that can achieve the goals practically and cost-effectively.

5.1 Identification of Pollution Control Measures

Potential control measures or best management practices (BMPs), their associated costs and efficiencies, and potential funding sources were identified through review of the TMDL, input from working groups and the steering committee, and a literature review. Control measures were assessed based on cost, availability of existing funds, reasonable assurance of implementation, and water quality impacts. Measures that can be promoted through existing programs were identified, as well as those that are not currently supported by existing programs and their potential funding sources. The reasonable assurance of implementation of specific control measures was assessed through discussions with the working groups. Some control measures were indicated or implied by the modeled TMDL allocations while others were selected through a process of stakeholder review and analysis of effectiveness in these watersheds. These measures are discussed in sections 5.1.1 and 5.1.2 respectively.

5.1.1 Control Measures Implied by the TMDL

The allocations determined during the TMDL development dictate some of the control measures that must be employed during implementation. In order to meet the reductions in direct deposition from livestock, some form of stream exclusion is necessary. Fencing is the most obvious choice; however, the type of fencing, distance from the stream bank, and most appropriate management strategy for the fenced pasture are less obvious. The 100 percent reduction in loads from straight pipes, failing septic systems, sewer leaks, and sewer overflows is a pre-existing legal requirement as well as a result of this TMDL. This reduction indicates that all illicit discharges (*i.e.*, straight pipes and cross-connections) in the watershed should be corrected, and that all on-site sewage treatment systems (OSTS) (*e.g.*,

septic systems and alternative waste treatment systems) and sewer infrastructure must be maintained in proper working condition.

Any fencing installed through the use of state or federal cost-share programs should follow established NRCS specifications and be located 35 feet from the stream bank, at a minimum, as is specified in the Virginia cost-share programs.

An alternative water source will typically be required where pasture is fenced off from streams. The main criterion is that the system be dependable. Water systems alone (*i.e.*, with no streamside fencing) have been shown to reduce the amount of time cattle spend in the stream by as much as 50 to 80 percent. This is not a large enough reduction (*i.e.*, 100 percent) to reduce livestock direct deposition of bacteria in the stream as required by the TMDL. It is recommended that all fencing, even that which is installed solely at the landowner's expense, be placed at least 35 feet from the stream. The inclusion of a buffer helps to reduce bacteria, as well as sediment and phosphorus loads in runoff. The incorporation of effective buffers could reduce the need for more costly control measures.

Livestock exclusion is required to meet the goals in the IP and it has both environmental and economic benefits. From an environmental perspective, the best management scenario would be to exclude livestock from the stream bank 100 percent of the time and establish permanent vegetation in the buffer area. This prevents livestock from eroding the stream bank, provides a buffer for capturing pollutants in runoff from the pasture, and establishes (with the growth of streamside vegetation) one of the foundations for healthy aquatic life. From a livestock-production perspective, the best management scenario is one that provides the greatest profit to the farmer. Obviously, taking land (even a small amount) out of production is contrary to that goal. However, a clean water source has been shown to improve milk production and weight gain. Clean water will also improve the health of animals (*e.g.*, cattle and horses) by decreasing the incidence of waterborne illnesses and exposure to swampy areas near streams. Additionally, intensive pasture management, which becomes possible with an alternative water source, has been shown to improve overall farm profitability and environmental impact. From a part-time farmer's perspective, the best management scenario is one that requires minimal input of time. This would seem to

preclude intensive pasture management; however, those farmers who have adopted an intensive pasture-management system typically report that the additional management of the established system amounts to "opening a gate and getting out of the way" every couple of days. Additionally, the efficient use of the pasture often means that fewer supplemental feedings are necessary. Among both part-time and full-time farmers there are individuals who are hesitant to allow streamside vegetation to grow unrestricted because of aesthetic preferences or because they have spent a lifetime preventing this growth. However, given the reductions needed in pollutant (*i.e.*, fecal bacteria) delivery to the stream, a vegetated buffer will be needed. For planning purposes, it was assumed that a vegetated buffer would be established in conjunction with stream fencing. Correction of sewer overflows and leaks is an ongoing effort of the entities charged with the maintenance and operation of these systems. This was not identified as significant problem by the TMDL at this time. The options identified for correcting illicit discharges and failing septic systems included: repair of an existing septic system, installation of a septic system, and installation of an alternative waste treatment system.

Correction of sewer overflows and leaks is an ongoing effort of the entities charged with the maintenance and operation of these systems. This was not identified as significant problem by the TMDL at this time. The options identified for correcting illicit discharges and failing septic systems included: repair of an existing septic system, installation of a septic system, and installation of an alternative waste treatment system.

5.1.2 Control Measures Selected through Stakeholder Review

In addition to the control measures that were directly indicated by the TMDL, a number of measures are needed to control fecal bacteria from land-based bacteria sources. Various scenarios were developed and presented to working groups. All scenarios began with implementation of the measures indicated by the TMDL. Next, specific sources of fecal bacteria were addressed where highly economic practices were identified. For instance, a pet waste education program was specified in for the Falling River watershed to educate citizens on proper disposal of pet waste. Additionally, use of pet waste composters by homeowners will be promoted.

Beyond this level of control for the pollutants of interest, practices that require the control or treatment of runoff are the primary tools available. One additional BMP was improved pasture management. The improved pasture management BMP is considered an enhancement of a grazing land management system. Along with the infrastructure provided by a grazing land management system, improved pasture management includes:

- Maintenance of an adequate forage height (suggested 3-inch minimum grass height) during growing season.
- Application of lime and fertilizer according to soil test results.
- Mowing of pastures to control woody vegetation (except on streambanks).
- Distribution of manure through managed rotational grazing.
- Reseeding due to severe drought if necessary.

Currently, improved pasture management is not a BMP available through the Virginia Agricultural BMP Cost-Share program. However, it is eligible for funding when used in conjunction with the SL-6 grazing land protection practice and is considered an enhancement of this practice. Employing the pasture management practices listed above can produce significant economic gains to producers at a very low investment cost. The final set of control measures identified and the efficiencies used in this study to estimate needs are listed in Table 5.1. The control measures listed in Table 5.1 are divided into categories based on the method of load reduction. "Direct Reductions" are those that reduce the load of pollutant from a specific source to the stream itself or to the land. "Buffer" practices control pollutants through both a land conversion and treatment of runoff from an upstream area. "Runoff Treatment" measures are those that either treat runoff from a given land area (*e.g.*, retention ponds) or treat runoff based on changing the runoff-producing characteristics of the land (*e.g.*, improved pasture management).

Table 5.1 Potential control measure costs and efficiencies in removing *E. coli*.

Control Measure	Bacteria Removal Efficiency	Reference
Direct Reduction Efficiency		
Streamside Fencing	100%	1
Corrected Straight-pipe	100%	1
Repaired Septic System	100%	1
Pet Waste Education Program	75%	3
Pet Waste Composters	100%	1
Buffer Efficiency*		
Vegetated Buffer	50%	2,4
Runoff Treatment Efficiency		
Improved Pasture Management	50%	2,4
Loafing Lot Management.	40%	4
Manure Incorporation	90%	2
Retention Ponds	80%	4

*Buffer efficiencies shown here are applied to runoff from twice the buffer area upstream of the buffer. Additional reductions result from the conversion of land from its existing condition to the buffer area.

1 Removal efficiency is defined by the practice.

2 Commonwealth of Virginia. 2005. Chesapeake Bay Nutrient and Sediment Reduction Tributary Strategy. www.naturalresources.virginia.gov/Initiatives/TributaryStrategies/

3 Swann, C. 1999. A survey of residential nutrient behaviors in the Chesapeake Bay. Widener Burrows, Inc. Chesapeake Bay Research Consortium. Center for Watershed Protection. Ellicott City, MD. 112pp.

4 Bacteria efficiency estimated based on sediment and nutrient efficiency.

5.2 Quantification of Control Measures

The quantity of control measures recommended during implementation was determined through spatial analyses, modeling alternative implementation scenarios, as well as requests from Working Group members. Spatial analyses included the processing of data that included land use, census data, stream networks, and elevation, along with data archived from the VADCR Agricultural BMP Database and the TMDL development document. The map layers and archived data were combined to establish the number of control measures recommended overall, and in each subwatershed, where appropriate. Estimates of the amount of on-site treatment systems, sewer connections, streamside fencing and number of full livestock exclusion systems were made through these analyses. The quantities of additional control measures were determined through modeling alternative scenarios and applying the related reduction efficiencies to their associated loads.

Implicit in the TMDL is the need to avoid increased delivery of pollutants from sources that have not been identified as needing a reduction, and from sources that may develop over time, as implementation proceeds. One potential for additional sources of the pollutants identified is future residential development. Care should be taken to monitor development and its impacts on water quality. Where residential development occurs, there is potential for additional pollutant loads from pet waste, failing septic systems, sewer line overflows and leaks.

5.2.1 Agricultural Control Measures

5.2.1.1 Livestock Exclusion BMPs

To estimate fencing requirements, the stream network was overlaid with land use. Stream segments that flowed through or adjacent to land use areas that had a potential for supporting cattle (*e.g.*, improved pasture) were identified. If the stream segment flowed through the land-use area, it was assumed that fencing was required on both sides of the stream, while if a stream segment flowed adjacent to the land-use area, it was assumed that fencing was required on only one side of the stream. These assumptions were further refined to examine Common Land Unit (CLU) data, size of resultant pasture, and existing BMPs. Due to limitations with the available GIS hydrology stream layers, only perennial streams were included in this process. Not every land-use area identified as pasture has livestock on it at any given point in time. However, it is assumed that all pasture areas have the potential for livestock access. A map of potential streamside fencing required for the Falling River watershed is shown in Figure 5.1. A total estimate of 624,109 feet of streamside fence would be required to exclude cattle from the streams.

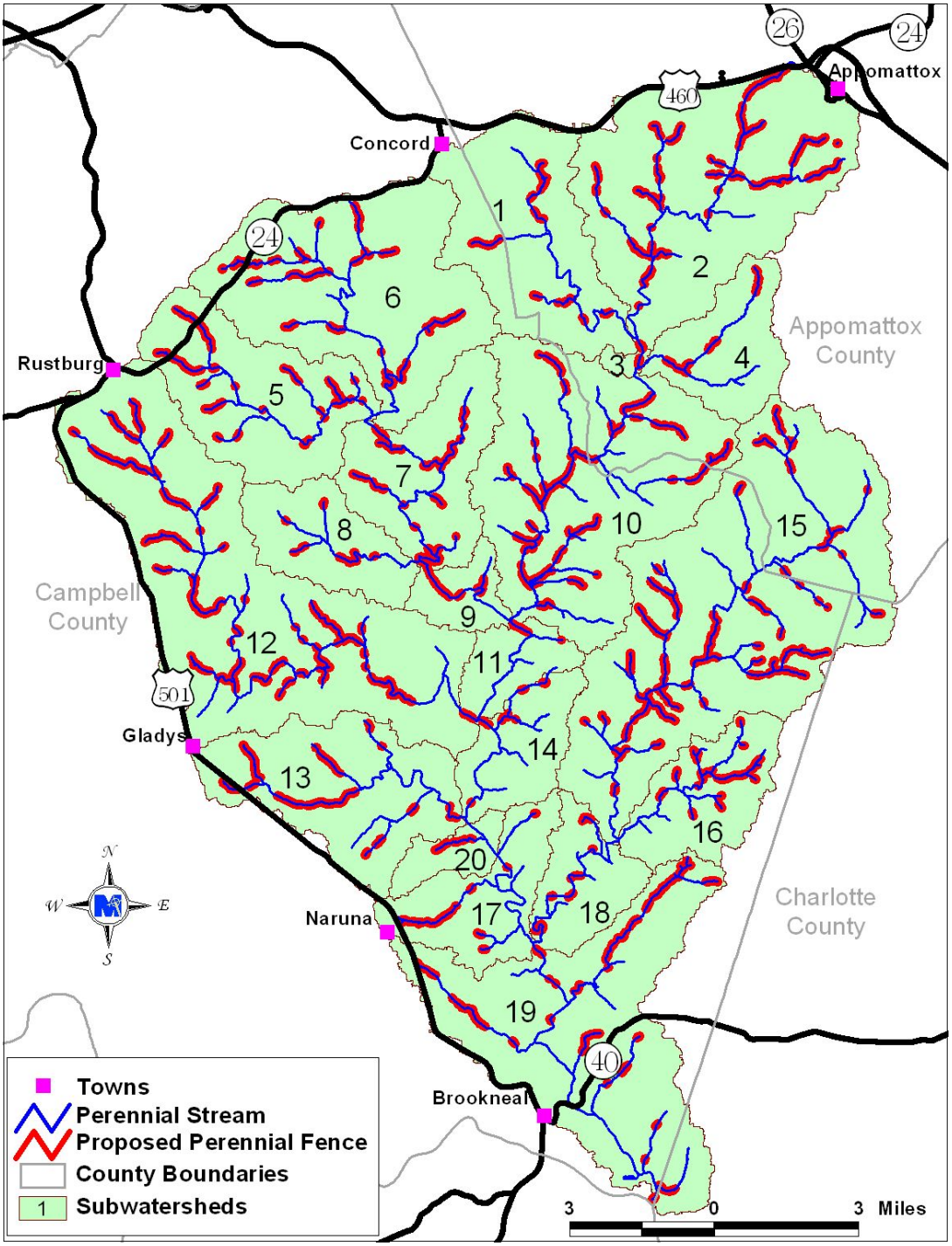

Figure 5.1 Potential streamside fencing for perennial streams in the Falling River watershed.

The VADCR Agricultural BMP Database was utilized to determine typical characteristics (*e.g.*, streamside fencing length per practice) of full livestock exclusion systems leading to

the quantification of the number of systems. The database was queried for information on Grazing Land Protection Systems (SL-6) and Stream Protection Systems (WP-2T) installed in the watershed. The SL-6 system includes streamside fencing, cross fencing, alternative watering system, and a 35-foot buffer from the stream. The WP-2T system includes streamside fencing, hardened crossings, and a 35-foot buffer from the stream. In TMDL implementation areas, the WP-2T and SL-6 practices are eligible. In cases where a watering system already exists, a WP-2T system is a more appropriate choice. The average streamside fencing length for an SL-6 system and WP-2T system in the Falling River watershed is 2,000 feet.

To establish the total number of full livestock exclusion systems necessary to achieve full implementation, the number of systems needed was calculated by dividing the potential pasture streamside fencing required by the average streamside fencing length per system. The breakdown of number of exclusions systems that are expected to be SL-6 or WP-2T is based on historical use of these practices in the Falling River watershed and input from the Agricultural Working Group. This IP focuses on fencing along perennial streams. The estimated fence requirements for each subwatershed were subtracted by the fence in place due to the existing SL-6 and WP-2T systems installled during and after the time of TMDL completion in each subwatershed. Table 5.2 shows the livestock exclusion requirements for Falling River.

It was estimated that 7.5 percent (49,543) of all fencing length installed would need to be replaced during the length of the project.

Table 5.2 Estimation of streamside fence and number of full exclusion systems required in the Falling River subwatersheds.

Sub-Watershed	Adjoining Pasture/Hay (Feet)	SL-6 Systems	WP-2T Systems
1	16,386	8	0
2	69,428	32	2
3	2,973	1	0
4	9,441	4	0
5	33,146	16	1
6	33,529	16	1
7	27,172	13	1
8	4,874	2	0
9	8,937	4	0
10	75,761	35	2
11	9,528	4	0
12	110,028	51	3
13	36,203	17	1
14	5,694	3	0
15	90,791	42	2
16	18,126	8	0
17	12,325	6	0
18	9,600	4	0
19	45,538	21	2
20	4,629	2	0
Totals	**624,109**	**289**	**15**

Values rounded to nearest integer

5.2.1.2 Land-Based BMPs

The Falling River TMDL recommends reductions to land-based bacteria loads. In order to meet these recommendations, the BMPs in Table 5.3 must be implemented. One category of practices that is expected to have a substantial impact on water quality improvement is improved pasture management. It is anticipated that this improved management will take the form of both rotational grazing systems and rotational loafing lot systems. In order to fully meet the TMDLs, retention ponds on pasture have been included in the list of agricultural land-based BMPs. While the inclusion of this BMP in the implementation plan will increase overall implementation costs, it will be effective in removing bacteria from pasture runoff. Retention ponds on pasture will not be necessary in order to achieve delisting, only to reach a 0 percent violation rate of the water quality standard.

Table 5.3 Agricultural land-based BMPs for Falling River.

Control Measure	Unit	Falling River
Improved Pasture Management	Acres	17,532
Loafing Lot Management	System	2
Manure Incorporation	Acre	7,092
Retention Ponds – Pasture	Acre - Treated	29,220
Vegetated Buffers – Cropland	Acres	25

5.2.2 Residential Control Measures

5.2.2.1 BMPs to Correct Failing Septic Systems and Straight Pipes

All straight pipes and failing septic systems must be identified and corrected during implementation since a 100 percent load reduction from these sources was deemed necessary to meet the TMDL goal. Table 5.4 shows the number of failing septic systems and straight pipes for each subwatershed.

The following BMPs have been identified to correct failing septic systems and straight pipes: septic system repairs, new septic system installation, and alternative waste treatment systems. The RWG estimated that at least 5 percent of the failing septic systems would need new alternative treatment systems installed. Of the remaining failing septic systems, 70 percent would be corrected with conventional septic systems and 30 percent would be septic system repairs. It was also decided that all of the straight pipe corrections would be with standard septic systems.

Sewer service is available in the Towns of Brookneal, Rustburg and Appomattox.

Table 5.4 Estimated residential waste treatment systems in the Falling River subwatersheds.

Subwatershed	Houses with Standard Septic Systems	Potential Failing Septic Systems	Potential Straight Pipes
1	158	5	0
2	737	22	2
3	2	0	0
4	77	2	0
5	340	10	2
6	493	14	2
7	185	7	0
8	145	4	0
9	46	1	0
10	323	10	2
11	56	2	0
12	821	24	2
13	275	9	2
14	49	2	0
15	389	12	2
16	144	4	0
17	170	5	0
18	141	4	0
19	458	14	1
20	46	1	0
Total	**5,055**	**152**	**15**

5.2.2.2 Land-Based BMPs

The Falling River TMDL recommends reductions to land-based sources, or nonpoint sources (NPS). In order to meet these recommendations, all the BMPs in Table 5.5 should be implemented in a staged approach to implementation as described in Chapter 6 of this document. In addition to these control measures, it was recognized that educational efforts would be vital to the successful implementation of these reduction goals. The pet waste education program includes a program addressing the benefits of cleaning up after pets. The program focuses on a combination of educational materials distributed to pet owners, and signage describing water quality concerns related to pet waste along with pet waste disposal bags and receptacles in areas of pet traffic. There are three public areas within the Town of Appomattox where signage and receptacles could be placed, Abbit Park (7,332 sq ft), Courtland Field (87,912 sq ft) and the Appomattox Town Park located near the high school.

Consideration should also be given to distributing pet waste information at camp grounds and picnic areas. In addition, pet waste composters are proposed to help eliminate pet waste in homeowner's yards instead of just in public places. This could be accomplished through partnerships with local stores selling pet food, the Campbell and Appomattox County Animal Shelters, and the Society for the Prevention of Cruelty to Animals (SPCA). There are a significant number of dogs in the watershed. For example in 2006, Campbell County issued 175 licenses for kennels that held between five to 20 dogs. An additional 25 kennel licenses were issued for facilities that held 21 to 50 dogs. It is proposed that information regarding the treatment and proper disposal of dog feces be provided by the County when licenses are reissued.

Table 5.5 All residential and urban BMPs recommended to meet the Falling River TMDL.

Residential Control Measure Description	VA Cost-Share Practice Number	Falling River
Septic Systems Pump-outs	RB-1	5,055
Failing Septic System Corrections:		
Septic System Repair	RB-3	43
Septic System Replacement	RB-4	101
Alternative Waste Treatment System Installation	RB-5	8
Straight Pipe Corrections:		
Septic System Installation	RB-4	15
Alternative Waste Treatment System Installation	RB-5	0
Pet Waste Education Program	NA	1
Residential Pet Waste Composters	NA	2,163
Vegetated Buffers – Commercial Land	NA	1

5.3 Technical Assistance and Education

Stakeholders agree that technical assistance and education is key to getting people involved in implementation. There must be a proactive approach to contact farmers and residents to articulate exactly what the TMDL means to them and what practices will help meet the goal of improved water quality. The working groups recommended several education/outreach techniques, which will be utilized during implementation. Outreach at county fairs has been successful in other watersheds in the past. There are also opportunities for joint events with the Virginia Cooperative Extension Service. It may also be possible to involve the local Ruritan and Rotary clubs. A program should be established to educate septic and alternative

waste system installers on the maintenance requirements expected of the homeowner. In addition, a pet waste education program will be developed.

The following tasks associated with agricultural and residential programs were identified:

Agricultural Programs

1. Make contact with landowners in the watershed to make them aware of implementation goals, cost-share assistance, and voluntary options that are beneficial.
2. Provide technical assistance for agricultural programs (*e.g.*, survey, design, layout, and approval of installation).
3. Develop educational materials and programs.
4. Organize educational programs (*e.g.,* County Fair, presentations at joint VCE events or club events).
5. Distribute educational materials (*e.g.,* informational articles in FSA or Farm Bureau newsletters, local media).
6. Handle and track cost-share.
7. Assess and track progress toward BMP implementation goals.
8. Coordinate use of existing agricultural programs and suggest modifications where necessary.

Residential Programs

1. Identify straight-pipes and failing septic systems (*e.g.*, contact landowners in older homes, septic pump-out program).
2. Handle and track cost-share.
3. Develop educational materials and programs.
4. Organize educational programs (*e.g.*, demonstration septic pump-outs, nutrient management, pet waste control).
5. Distribute educational materials (*e.g.*, informational pamphlets on TMDL IP and on-site sewage disposal systems).
6. Assess progress toward implementation goals.

The staffing needs to implement the agricultural and residential components of the plan were estimated based on discussions with stakeholders and the staffing levels used in similar projects. Staffing needs were quantified using full time equivalents (FTE), with one FTE being equal to one full-time staff member. It was determined that one residential FTE and one agricultural FTE would be needed to provide technical assistance in the watersheds for the first five years of implementation (Stage I). If Stage II is necessary one agricultural FTE will be necessary.

The RELSWCD is currently managing the agricultural program with a 0.5 FTE funded through the Virginia Water Quality Improvement Fund. Currently, there are no targeted state or federal funds to initiate the residential program, but the Virginia Department of Health has agreed to work with DCR in applying for some state grant funds.

5.4 Cost Analysis

5.4.1 Agricultural Control Measures

Streamside fencing through or adjacent to pasture with potential livestock access was translated and quantified into full livestock exclusion systems as described in Section 5.2.1.1. The costs for the SL-6 and WP-2T systems were estimated based on the cost of systems already in place in the Falling River watershed. The cost of an SL-6 system was estimated at $20,000 and the cost of a WP-2T system was estimated at $8,000. Through VADCR input, it was assumed that the costs for hardened crossings and improved pasture management (cross fencing) would be included in a SL-6 system.

The total cost of livestock exclusion systems includes not only the costs associated with fence installation, repair, and maintenance; but also the cost of taking land (*e.g.,* 35-foot buffer area) out of production. The cost of fence maintenance was identified as a deterrent to participation. Financial assistance possibilities for maintaining fences include an annual 25 percent tax credit for fence maintenance and conservation easements where the landowner is paid a percentage of the land value to leave it undisturbed. Additionally, the Stream Protection (WP-2T) cost-share practice will be available as part of the implementation project and provides an upfront incentive payment to maintain stream fencing. The cost per foot for streamside fence maintenance is estimated at $3.50/foot.

The remaining costs outlined in Table 5.6 were determined through literature review, analysis of the Virginia Agricultural BMP Database, and discussion with stakeholders. The number and type of practices that have been installed in each watershed were determined through discussions with local personnel and data from the Virginia Agricultural BMP Database.

Table 5.6 Agricultural control measure costs and needs.

Agricultural Control Measure	Unit	Cost per Unit	Units Needed
Grazing Land Protection System (SL-6)	System	$20,000	289
Stream Protection System (WP-2T)	System	$8,000	15
Streamside Fence Maintenance	Foot	$3.50	49,543
Improved Pasture Management	Acres	$154	17,532
Loafing Lot Management	System	$10,000	2
Manure Incorporation	Acres	$18	7,092
Vegetated Buffers - Cropland	Acres	$360	25
Retention Ponds – Pasture	Acres – Treated	$138	29,220

5.4.2 Residential Control Measures

Following recommendations from the RWG, it was assumed that approximately 10 percent of failing septic system corrections and straight pipe corrections would require new alternative treatment systems ($15,000/each). The majority of these corrections would be septic system repairs ($3,500/each) and new standard septic systems ($4,000/each).

The remaining costs outlined in Table 5.7 were determined through literature review, and discussion with stakeholders.

Table 5.7 Residential and urban control measure costs and needs.

Residential and Urban Control Measure	Unit	Cost per Unit	Units Needed
Septic Systems Pump-outs (RB-1)	System	$220	5,055
Septic System Repair (RB-3)	System	$3,500	43
Septic System Installation/Replacement (RB-4)	System	$4,000	116
Alternative Waste Treatment System Installation (RB-5)	System	$15,000	8
Pet Waste Education Program	System	$3,750	1
Pet Waste Composters	Composters	$50	2,163
Vegetated Buffers – Commercial Land	Acre	$360	1

5.4.3 Technical Assistance

It was determined by the working group members that it would require $50,000 to support the salary, benefits, travel, training, and incidentals for education of one technical FTE. With quantification analysis yielding a need for one agricultural technical FTE per year for the

watershed, the total potential cost to provide agricultural technical assistance during implementation is expected to be approximately $50,000 per FTE per year for 5 years. For residential technical assistance, one FTE will be needed with an expected annual cost of $50,000. Implementation can begin with one agricultural FTE and one residential FTE; BMP installation progress would then be tracked in order to determine if another residential FTE needs to be hired.

5.4.4 Total Estimated Costs

The total estimated costs for the implementation of BMPs in the Falling River watersheds is shown in Table 5.8. The technical assistance cost assumes that 2.0 FTEs are utilized for the watershed.

Table 5.8 Total estimated costs to meet the Falling River *E. coli* bacteria TMDL.

Agricultural BMPs ($)	Residential and Urban BMPs ($)	Technical Assistance ($)	Total Cost ($)
$12,960,000	$1,959,000	$750,000	$15,670,000

Cost figures are rounded to four significant digits.

5.5 Benefit Analysis

The primary benefit of implementation is cleaner waters in Virginia. Specifically, *E. coli* contamination in Falling River will be reduced to meet water quality standards. Table 5.9 indicates the cost efficiencies of the various practices being proposed in this IP. It is hard to gauge the impact that reducing *E. coli* contamination will have on public health, as most cases of waterborne infection are not reported or are falsely attributed to other sources. However, because of the reductions required, the incidence of infection from *E. coli* sources through contact with surface waters should be reduced considerably.

Table 5.9 Cost efficiencies of control measures in units removed per $1,000.

Control Measure	Bacteria (colonies)
Agricultural	Falling River
Grazing Land Protection System (SL-6), Stream Protection System (WP-2T) and Polywire Fencing (no cost share)	8.01E+12
Improved Pasture Management	2.15E+15
Loafing Lot Management	4.911E+09
Manure Incorporation	2.39E+14
Vegetated Buffers - Cropland	7.98E+11
Retention Ponds - Pasture	1.01E+11
Residential and Urban	
Septic System Repair (RB-3)	1.01E+11
Septic System Installation/Replacement (RB-4)	8.79E+10
Alternative Waste Treatment System Installation (RB-5)	2.30E+10
Pet Waste Education Program	6.88E+11
Pet Waste Composters	6.81E+15
Vegetated Buffers –Commercial Land	1.94E+08

An important objective of the implementation plan is to foster continued economic vitality and strength. This objective is based on the recognition that healthy waters improve economic opportunities for Virginians and a healthy economic base provides the resources and funding necessary to pursue restoration and enhancement activities. The agricultural and residential practices recommended in this document will provide economic benefits to the community, as well as the expected environmental benefits. Specifically, alternative (clean) water sources, exclusion of cattle from streams, improved pasture management, and private sewage system maintenance will each provide economic benefits to land owners. Additionally, money spent by landowners and state agencies in the process of implementing this plan will stimulate the local economy.

5.5.1 Agricultural Practices

A clean water source has been shown to improve weight gain and milk production in cattle. Fresh clean water is the primary nutrient for livestock with healthy cattle consuming, on a daily basis, close to 10 percent of their body weight during winter and 15 percent of their body weight in summer. Beef producers in several Virginia counties have reported weight gains in cattle after providing alternative water sources. Studies also show increased milk and butterfat production from dairy cattle ingesting water from a clean source (Zeckowski et

al, 2007). Many livestock illnesses can be spread through contaminated water supplies. For instance, coccidia can be delivered through feed, water and haircoat contamination with manure (VCE, 2000). In addition, horses drinking from marshy areas or areas where wildlife or cattle carrying Leptospirosis have access tend to have an increased incidence of moonblindness associated with Leptospirosis infections (VCE, 1998b). A clean water source can prevent illnesses that reduce production and incur the added expense of avoidable veterinary bills.

In addition to reducing the likelihood of animals contracting waterborne illnesses by providing a clean water supply, streamside fencing excludes livestock from wet, swampy environments as are often found next to streams where cattle have regular access. Keeping cattle in clean, dry areas has been shown to reduce the occurrence of mastitis and foot rot. The VCE (1998a) reports that mastitis costs producers $100 per cow in reduced quantity and quality of milk produced. On a larger scale, mastitis costs the U.S. dairy industry about $1.7 billion to $2 billion annually or 11 percent of total U.S. milk production. While the spread of mastitis through a dairy herd can be reduced through proper sanitation of milking equipment, mastitis-causing bacteria can be harbored and spread in the environment where cattle have access to wet and dirty areas. Installation of streamside fencing and well managed loafing areas will reduce the amount of time that cattle have access to these areas.

Taking the opportunity to instigate an improved pasture management system in conjunction with installing clean water supplies will also provide economic benefits for the producer. Improved pasture management can allow a producer to feed less hay in winter months, increase stocking rates by 30 to 40 percent and, consequently, improve the profitability of the operation. With feed costs typically responsible for 70 to 80 percent of the cost of growing or maintaining an animal, and pastures providing feed at a cost of 0.01 to 0.02 cents/lb of total digestible nutrients (TDN) compared to 0.04 to 0.06 cents/lb TDN for hay, increasing the amount of time that cattle are fed on pasture is clearly a financial benefit to producers (VCE, 1996). Standing forage utilized directly by the grazing animal is always less costly and of higher quality than the same forage harvested with equipment and fed to the animal. In addition to reducing costs to producers, intensive pasture management can boost profits by allowing higher stocking rates and increasing the amount of gain per acre. Another benefit is

that cattle are closely confined allowing for quicker examination and handling. In general, many of the agricultural BMPs recommended in this document will provide both environmental benefits and economic benefits to the farmer.

5.5.2 Residential Practices

The residential programs will play an important role in improving water quality since human waste can carry with it human viruses in addition to the bacterial and protozoan pathogens that all fecal matter can potentially carry. In terms of economic benefits to homeowners, an improved understanding of on-site sewage treatment systems, including knowledge of what steps can be taken to keep them functioning properly and the need for regular maintenance, will give homeowners the tools needed for extending the life of their systems and reducing the overall cost of ownership. The average septic system will last 20 to 25 years if properly maintained. Proper maintenance includes: knowing the location of the system components and protecting them (*e.g.,* not driving or parking on top of them), not planting trees where roots could damage the system, keeping hazardous chemicals out of the system, and pumping out the septic tank every 3 to 5 years. The cost of proper maintenance, as outlined here, is relatively inexpensive ($220/system) in comparison to repairing or replacing an entire system ($4,000 to $15,000/system). Additionally, the repair/replacement and pump-out programs will benefit owners of private sewage (*e.g.,* septic) systems by sharing the cost of required maintenance.

In addition to the benefits to individual landowners, the economy of the local community will be stimulated through expenditures made during implementation, and the infusion of dollars from funding sources outside the impaired areas. Building contractors and material suppliers who deal with septic system pump-outs, private sewage system repair and installation, fencing, and other BMP components can expect to see an increase in business during implementation. As will be discussed in greater detail in Chapter 8, a portion of the funding for implementation can be expected to come from state and federal sources. This portion of funding represents money that is new to the area and will stimulate the local economy. In general, implementation will provide not only environmental benefits to the community, but economic benefits as well, which, in turn, will allow for individual landowners to participate in implementation.

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6. MEASURABLE GOALS AND MILESTONES FOR ATTAINING WATER QUALITY STANDARDS

Given the scope of work involved with implementing these TMDLs, full implementation and de-listing from the Virginia Section 305(b)/303(d) list is expected within 15 years. Described in this section are funding sources, identification of milestones, timeline for implementation, targeting of control measures, and the roles of stakeholders during the process.

6.1 Milestones Identification

The end goals of implementation are restored water quality of the impaired waters and subsequent de-listing of the waters from the Commonwealth of Virginia's Section 305(b)/303(d) list within 15 years. Progress toward end goals will be assessed during implementation through tracking of control measure installations and continued water quality monitoring. Agricultural control measures will be tracked through the Virginia Agricultural Cost-Share Program.

Expected progress in implementation is established with two types of milestones: *implementation milestones* and *water quality milestones*. Implementation milestones establish the amount of control measures installed within certain timeframes, while water quality milestones establish the corresponding improvements in water quality that can be expected as the implementation milestones are met. The milestones described here are intended to achieve full implementation within 15 years.

Following the idea of a staged implementation approach, resources and finances will be concentrated on the most cost-efficient control measures first. For instance, the BST results for Falling River indicated that livestock are a significant source of fecal pollution in the stream. Concentrating on implementing livestock exclusion fencing within the first year may provide the highest return on water quality improvement with less cost to landowners. The Stage I goals for implementation will focus on correcting straight pipes and failing septic systems, implementing a pet waste control program, fencing cattle out of the stream, and improving pasture management. Stage II focuses on implementing retention ponds.

Implementation is anticipated to begin in April 2008, after which two milestones will be sought over the next 15 years (Table 6.1). The first milestone will be five years after implementation begins, whereby the more cost-efficient control measures will be installed, with significant reductions in bacteria anticipated. Table 6.2 presents a breakdown of the costs for Stage I. Following Stage I implementation, the steering committee should evaluate water quality improvements and determine how to proceed to complete implementation (Stage II). Costs for Stage II are presented in Table 6.3. Based on completing both implementation stages, the final milestone would be achieving the bacteria reductions required by the TMDL and this is anticipated by 2023.

Table 6.1 Stage I and Stage II implementation goals for Falling River.

Control Measure	Unit	Stage I	Stage II
Agricultural			
Grazing Land Protection System (SL-6)	System	289	0
Stream Protection System (WP-2T)	System	15	0
Manure Incorporation	Acres	7,092	0
Improved Pasture Management	Acres	17,532	0
Loafing Lot Management	System	2	0
Streamside Fence Maintenance	Feet	24,772	24,771
Waste Storage Facilities	System	0	0
Vegetated Buffers - Cropland	Acres	25	0
Retention Ponds - Pasture	Acres		29,220
Residential and Urban			
Septic Systems Pump-out Program (RB-1)	System	2,527	2,528
Septic System Repair (RB-3)	System	43	0
Septic System Installation/Replacement (RB-4)	System	116	0
Alternative Waste Treatment System Installation (RB-5)	System	8	0
Pet Waste Education Program	Program	1	ongoing
Residential Pet Waste Composters	Composter	2,163	0
Vegetated Buffers – Commercial Land	Acres	1	0

Table 6.2 Costs to implement Stage I (1st 5 years) for Falling River.

Agricultural BMPs ($)	Residential and Urban BMPs ($)	Technical Assistance ($)	Total ($)
$8,843,000	$1,403,000	$500,000	$10,750,000

Numbers are rounded to four significant digits.

Table 6.3 Costs to implement Stage II (years 6 - 10) for Falling River.

Agricultural BMPs ($)	Residential and Urban BMPs ($)	Technical Assistance ($)	Total ($)
$4,119,000	556,000	250,000	4,925,000

Numbers are rounded to four significant digits.

6.2 Timeline

Based on meeting the above milestones, a 15-year implementation plan timeline was formulated for the Falling River watershed (Figure 6.1). The timeline describes the needs for implementation in terms of completion of the agricultural and residential control measures. Table 6.4 shows the projected staged implementation costs for agricultural and residential control measures, including technical assistance.

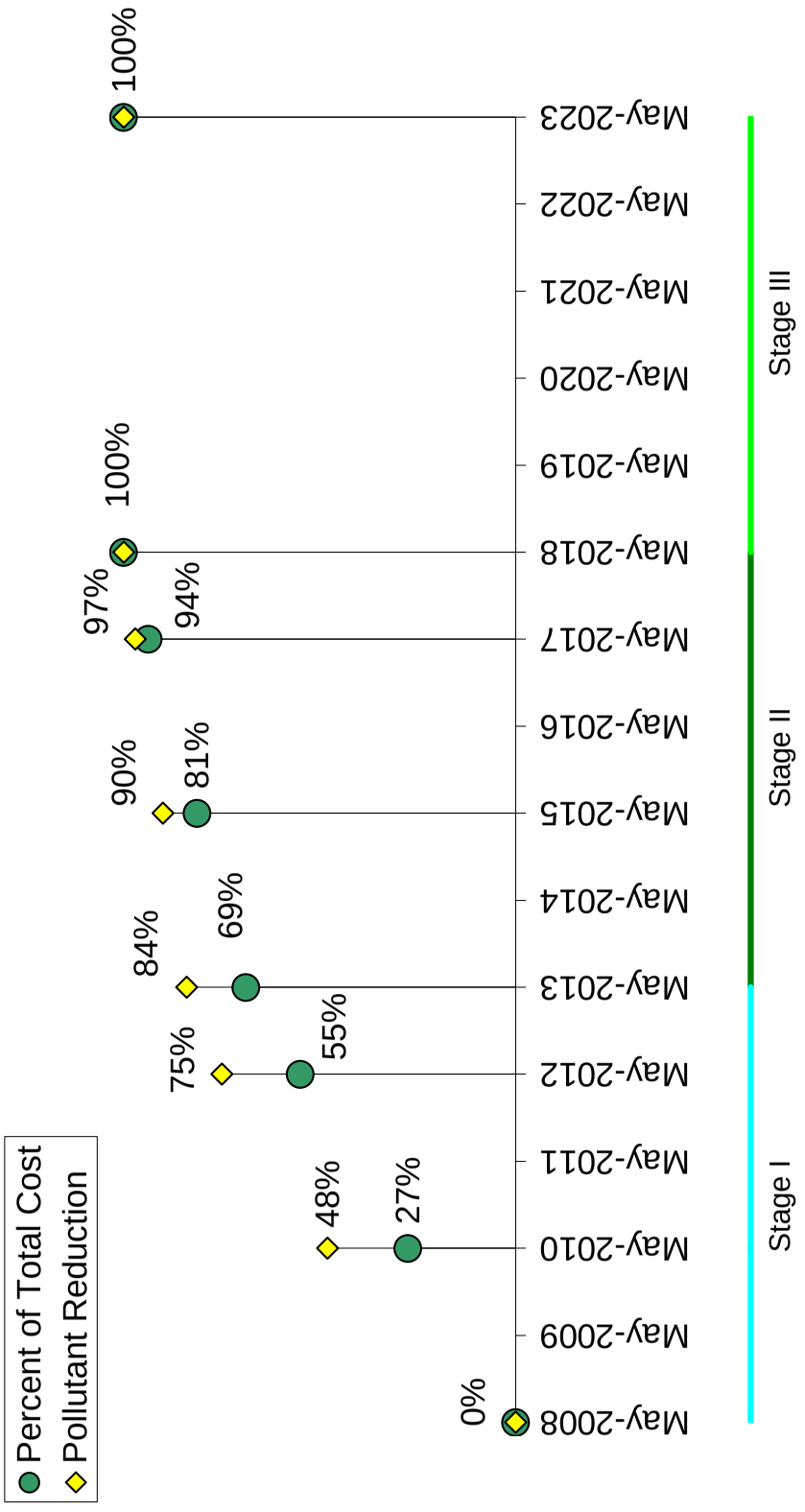

Figure 6.1 Timeline for implementation in the Falling River watershed.

Table 6.4 Timeline for implementation in the Falling River watershed.

Falling River Implementation Milestones	Existing	Year 1	Year 2	Stage I Year 3	Year 4	Year 5	Stage II Year 10
Cumulative Progress Toward BMP Installation							
Agricultural:							
Grazing Land Protection System (SL-6)	0%	20%	40%	60%	80%	100%	100%
Stream Protection System (WP-2T)	0%	20%	40%	60%	80%	100%	100%
Polywire Fencing (No Cost Share)		20%	40%	60%	80%	100%	100%
Streamside Fence Maintenance	0%	0%	0%	0%	0%	100%	100%
Improved Pasture Management	0%	18%	38%	58%	78%	98%	100%
Waste Storage Facilities/ Composting Bins	0%	0%	0%	0%	100%	100%	100%
Vegetated Buffers – Cropland							
Retention Ponds – Pasture	0%	0%	0%	0%	0%	0%	100%
Residential and Urban:							
Septic Systems Pump-out Program (RB-1)	0%	10%	20%	30%	40%	50%	100%
Septic System Repair (RB-3)	0%	20%	40%	60%	80%	100%	100%
Septic System Installation/Replacement (RB-4)	0%	20%	40%	60%	80%	100%	100%
Alternative Waste Treatment System Installation (RB-5)	0%	20%	40%	60%	80%	100%	100%
Pet Waste Education Program	0%	20%	40%	60%	80%	100%	100%
Residential Pet Waste Composters	0%	20%	40%	60%	80%	100%	100%
Vegetated Buffers – Commercial Land	0%	20%	40%	60%	80%	100%	100%
Residential Education Program	0%	100%	100%	100%	100%	100%	100%
Cumulative Progress Toward Bacteria Load Goal	0%	24%	48%	67%	75%	84%	100%
Bacteria Violations 235 cfu/100ml	36%	30%	22%	21%	20%	17%	0%
Cost (% of Total)	0%	13%	27%	40%	55%	69%	100%

6.3 Targeting

Implicit in the process of a staged implementation is targeting of control measures. Targeting ensures optimum utilization of resources. The Falling River watershed was divided into 20 subwatersheds (Figure 5.1). Targeting of critical areas for livestock fencing was accomplished through analysis of livestock population and the fencing requirements for each subwatershed. The subwatersheds were ranked in descending order based on the ratio of animals per fence length. If feasible, effort should be made to prioritize resources in the following order of subwatersheds in Table 6.5. For example, the RELSWCD should first initiate participation from farmers in subwatershed 12. The targeting priority list should be used to focus outreach promoting the cost-share programs available. Any interested parties should not be turned away if their farm is in a low ranking subwatershed.

Targeting of residential BMPs should be initiated in the order shown in Table 6.6. This order was derived from ranking the sum of loads from failing septic systems and straight pipes in each subwatershed. The subwatershed of highest priority for residential BMPs is 12.

One method of targeting in agricultural and residential areas involves considering the cost-efficiency of specific practices. Table 5.9 indicates the cost-efficiencies of the practices proposed in this IP. Practices with high cost-efficiencies, relative to other practices, will provide the greatest benefit per dollar invested.

Table 6.5 Targeting subwatershed order for streamside fencing in Falling River watershed.

Priority	Sub-watershed
1st	12
2nd	15
3rd	10
4th	2
5th	19
6th	13
7th	6
8th	5
9th	7
10th	16
11th	1
12th	17
13th	18
14th	11
15th	4
16th	9
17th	14
18th	8
19th	20
20th	3

Table 6.6 Targeting subwatershed order for human fecal bacteria sources in Falling River watershed.

Priority	Failing Septic System	Straight Pipes
1st	12	12
2nd	2	2
3rd	6	6
4th	19	15
5th	15	5
6th	5	10
7th	10	13
8th	13	19
9th	7	7
10th	1	1
11th	17	17
12th	8	8
13th	16	16
14th	18	18
15th	4	4
16th	11	11
17th	14	14
18th	9	9
19th	20	20
20th	3	3

7. STAKEHOLDERS AND THEIR ROLE IN IMPLEMENTATION

Achieving the goals of this effort (*i.e.*, improving water quality and removing these waters from the impaired waters list) is dependent upon stakeholder participation. Both the local stakeholders charged with implementation of control measures and the stakeholders charged with overseeing our nation's human health are key elements of a successful IP. The first step is to acknowledge that a water quality problem exists and realize that needed changes must be made in operations, programs, and legislation to address these pollutants. The RELSWCD is managing the implementation of the agricultural BMPs. VADCR staff will take the responsibility of working with the RELSWCD and other partners in tracking implementation efforts as well as organizing the steering committee for evaluations of implementation progress. The following sections in this chapter describe the responsibilities and expectations for the various components of implementation.

7.1 Integration with Other Watershed Plans

Each watershed in the state is under the jurisdiction of a multitude of individual, yet related, water quality programs and activities, many of which have specific geographic boundaries and goals. These include but are not limited to TMDLs, roundtables, Water Quality Management Plans, erosion and sediment control regulations, stormwater management, Source Water Protection Program, and local comprehensive plans. Coordination of the implementation project with these existing programs could result in additional resources and increased participation.

7.2 Monitoring

Improvements in water quality will be determined in the Falling River watershed through monitoring conducted by the VADEQ's ambient monitoring program. The monitoring data include bacteria, physical parameters (dissolved oxygen, temperature, pH, and conductivity), nutrients and suspended and dissolved solids. The VADEQ uses the data to determine overall water quality status. The water quality status will help gauge the success of implementation aimed at reducing the amount of bacteria in the streams of the Falling River watershed.

The VADEQ monitoring stations in the Falling River watershed are described in Table 7.1 and shown in Figure 7.1. Stations are monitored every other month within the monitoring period listed in Table 7.1. The station labeled 'trend' in sample frequency is the only station monitored continuously.

Up-to-date monitoring results are available to residents online at the department's Web site: http://gisweb.deq.virginia.gov/monapp/mon_query_form.cfm. Query information by selecting the watershed from the drop-down menu. Currently, no volunteer monitoring is occurring in the Falling River Watershed.

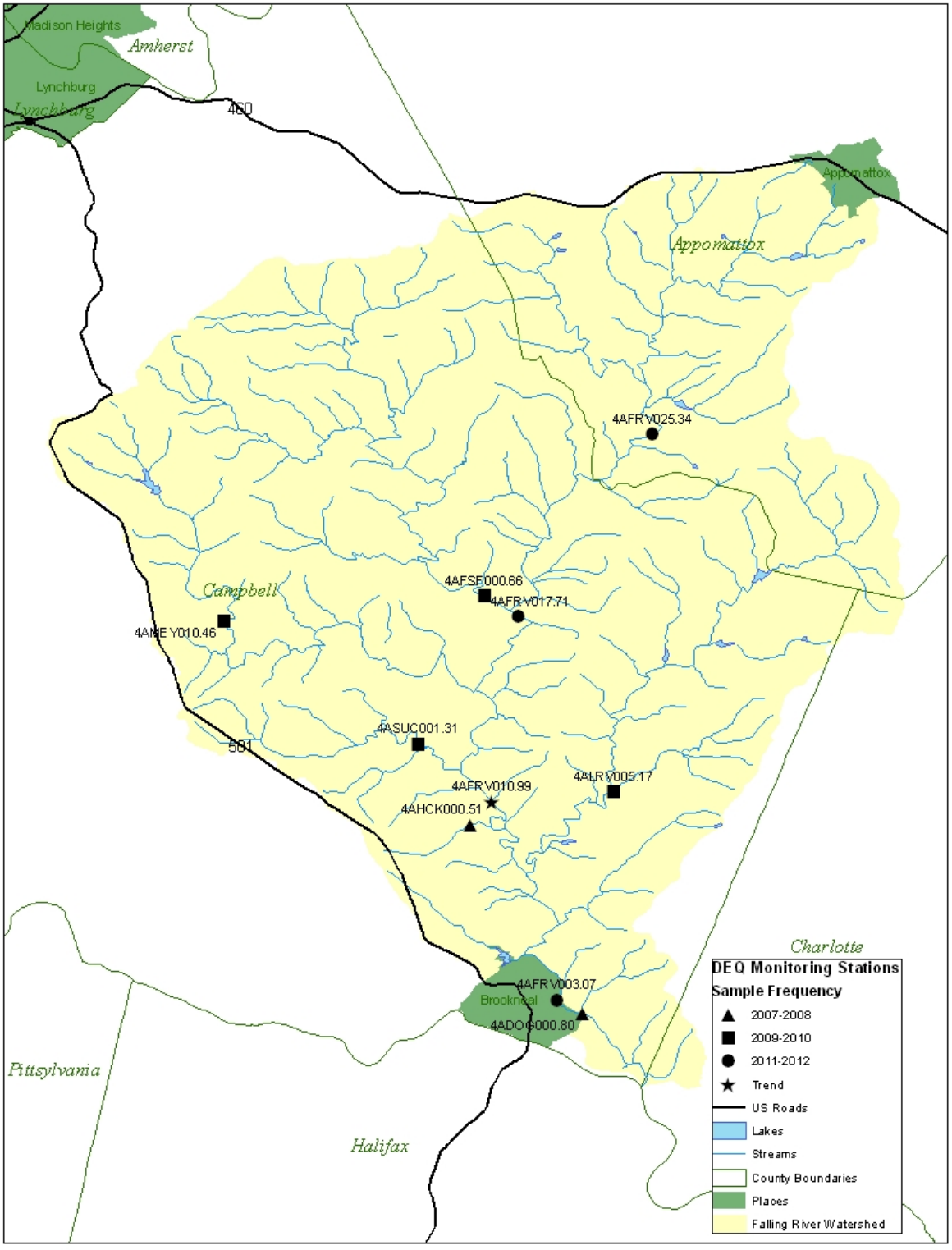

Figure 7.1 Location of monitoring stations in the Falling Creek watershed.

Table 7.1 Monitoring station IDs, station locations, and monitoring schedules for the Falling River VADEQ stations.

Station ID	Station Location	Monitoring Period
4ADOG000.80	Dog Creek at Route 600	2007-2008
4AHCK000.51	Hickory Creek at Route 641	2007-2008
4AFSF000.66	South Fork Falling River at Route 648 bridge	2009-2010
4ALRV005.17	Little Falling River at Route 618 bridge	2009-2010
4AMEY010.46	Mollys Creek at Route 654 bridge	2009-2010
4ASUC001.31	Suck Creek at Route 648	2009-2010
4AFRV025.34	Falling River at Route 650	2011-2012
4AFRV017.71	Falling River at Route 615	2011-2012
4AFRV003.07	Falling River at Route 40	2011-2012
4AFRV010.99	Falling River at Route 643	Trend – continual

7.3 Agricultural and Residential Education Programs

Education and outreach is a significant component of any TMDL implementation project. The RELSWCD will be in charge of initiating contact with residents and farmers to encourage the installation of BMPs. This one-on-one contact will facilitate communication of the water quality problems and the corrective actions needed. The district staff will conduct a number of outreach activities in the watershed to promote participation and community support to attain the IP milestones and to make the community aware of the TMDL requirements. Such activities will include information exchange through newsletters, mailings, field days, demonstrations, organizational meetings, etc. The staff will work with appropriate organizations such as VCE to educate the public. Grazing land or forage workshops possibly with the Virginia Forage and Grassland Council are venues to distribute agricultural education materials. Specific agricultural and residential outreach ideas are outlined in section 5.3.

A residential education program consisting of educational materials about pet waste and use of a pet waste composter program will be cost-effective options. If the Master Gardener program was involved, education materials could be handed out through them. The Cooperative Extension and the RELSWCD could also help distribute information on how citizens need to clean up after their pets.

7.3.1 Robert E. Lee Soil & Water Conservation District (SVWCD)

The RELSWCD is a local government entity providing soil and water conservation assistance to farmers and residents of Appomattox and Campbell Counties. During the implementation project, the RELSWCD will provide outreach, technical and financial assistance to farmers in the Falling River watershed through the Virginia Agricultural BMP Cost-Share and Tax Credit programs. Their responsibilities will include promoting implementation goals, available funding and the benefits of BMPs and providing assistance in the survey, design, layout, and approval of agricultural BMPs. Education and outreach activities are a significant portion of their responsibilities. Specific education and outreach methods recommended by the working groups are described in section 5.3 of this document. The RELSWCD is receiving technical assistance funding to support their duties.

7.4 Legal Authority

The EPA has the responsibility of overseeing the various programs necessary for the success of the CWA. However, administration and enforcement of such programs falls largely to the states. In the Commonwealth of Virginia, water quality problems are dealt with through legislation, incentive programs, education, and legal actions. Currently, there are four state agencies responsible for regulating activities that impact water quality in Virginia. These agencies are VADEQ, VADCR, VDH, and Virginia Department of Agriculture and Consumer Services (VDACS).

VADEQ has responsibility for monitoring waters to determine compliance with state standards, and for requiring permitted point dischargers to maintain loads within permit limits. It has the regulatory authority to levy fines and take legal action against those in violation of permits. Beginning in 1994, animal waste from confined animal facilities that hold in excess of 300 animal units (cattle and hogs) has been managed through a Virginia general pollution abatement permit. These operations are required to implement a number of practices to prevent surface and groundwater contamination. In response to increasing demand from the public to develop new regulations dealing with animal waste, the Virginia General Assembly passed legislation in 1999 requiring VADEQ to develop regulations for the management of poultry waste in operations having more than 200 animal units of poultry (about 20,000 chickens) (ELI, 1999). On Jan. 1, 2008, DEQ assumed regulatory oversight of

all land application of treated sewage sludge, commonly referred to as biosolids as a directed by the Virginia General Assembly in 2007. DEQ's Office of Land Application Programs within the Water Quality Division to manages the biosolids program. The biosolids program includes having and following nutrient management plans for all fields receiving biosolids, unannounced inspections of the land application sites, certification of persons land applying biosolids, and payment of a $7.50 fee per dry ton of biosolids land applied.

VADCR holds the responsibility for addressing nonpoint sources (NPS) of pollution. Historically, most VADCR programs have dealt with agricultural NPS pollution through education and voluntary incentive programs. These cost-share programs were originally developed to meet the needs of voluntary partial participation and not the level of participation required by TMDLs (near 100 percent). To meet the needs of the TMDL program and achieve the goals set forth in the CWA, the incentive programs are continually reevaluated to account for this level of participation. Although VADCR does not have regulatory authority over the majority of NPS issues addressed here, the department does administer the statewide stormwater management and permit program with the exception of industrial stormwater permitted by DEQ.

Through Virginia's Agricultural Stewardship Act (ASA), the Commissioner of Agriculture has the authority to investigate claims that an agricultural producer is causing a water quality problem on a case-by-case basis (Pugh, 2001). If deemed a problem, the Commissioner can order the producer to submit an agricultural stewardship plan to the local soil and water conservation district. If a producer fails to implement the plan, corrective action can be taken which can include a civil penalty of up to $5,000 per day. The Commissioner of Agriculture can issue an emergency corrective action if runoff is likely to endanger public health, animals, fish and aquatic life, public water supply, etc. An emergency order can shut down all or part of an agricultural activity and require specific stewardship measures. VDACS has only two staff members dedicated to enforcing the Agricultural Stewardship Act, and very little funding is available to support water quality sampling. The Agricultural Stewardship Act is entirely complaint-driven.

VDH is responsible for maintaining safe drinking water measured by standards set by the EPA. Their duties also include septic system regulation and, historically, regulation of biosolids land application on permitted farmland sites. Like VDACS, VDH's actions are complaint-driven. Complaints can range from a vent pipe odor that is not an actual sewage violation and takes very little time to investigate, to a large discharge violation that may take many weeks or longer to effect compliance. In relation to these TMDLs, VDH has the responsibility of enforcing actions to correct or eliminate failed septic systems and straight pipes.

State government has the authority to establish state laws that control delivery of pollutants to local waters. Local governments, in conjunction with the state, can develop ordinances involving pollution prevention measures. In addition, citizens have the right to bring litigation against persons or groups of people shown to be causing some harm to the claimant. The judicial branch of government also plays a significant role in the regulation of activities that impact water quality through hearing the claims of citizens in civil court and the claims of government representatives in criminal court.

The local governments can play a very active role in the implementation process. For example they could promote a septic system maintenance program. This could be done by handing out literature when individuals apply for a building permit. It is recommended that Campbell County adopt a reserve area for land parcels using on-site wastewater treatment of equal size to the approved on-site disposal system for use in the event the on-site disposal system fails. Further, the reserve area shown must be of equal capacity to the primary drainfield using the same technology as the primary system. Nothing shall be constructed within the reserve area. Campbell County could also play an active role in the proper disposal of pet waste. There are approximately 217 20-dog kennels and 44 50-dog kennels in Campbell and Appomattox Counties combined. When licenses for dog kennels are issued the owners should be required to produce a plan for the proper disposal of waste from the facility. Future subdivisions should be developed with sustainable growth practices that minimize or eliminate stormwater runoff.

7.5 Legal Action

The Clean Water Act Section 303(d) calls for the identification of impaired waters. It also requires that the streams be ranked by the severity of the impairment and that a Total Maximum Daily Load be calculated for that stream that would bring it back into compliance with the set water quality standard. Currently, TMDL implementation plans are not required in the Federal Code; however, Virginia State Code does incorporate the development of implementation plans for impaired streams. EPA largely ignored the nonpoint source section of the Clean Water Act until citizens began to realize that regulating only point sources was no longer maintaining water quality standards. Lawsuits from citizens and environmental groups citing EPA for not carrying out the statutes of the CWA began as far back as the 1970s and have continued until the present. In Virginia in 1998, the American Canoe Association and the American Littoral Society filed a complaint against EPA for failure to comply with provisions of §303d. The suit was settled by Consent Decree, which contained a TMDL development schedule through 2010. It is becoming more common for concerned citizens and environmental groups to turn to the courts for the enforcement of water quality issues.

In 1989, concerned residents of Castile in Wyoming County, New York filed suit against Southview Farm. Southview had around 1,400 head of milking cows and 2,000 total head of cattle. Tests on private wells determined that the water was contaminated with nitrates traced to irresponsible handling of animal wastes by Southview. In 1990, Southview was given a notice of violations under the Clean Water Act. Rather than change their farming practices or address the contaminated wells, they ignored the warning. In 1995, after court hearings and an appeal, the case was finally settled. Southview had to donate $15,000 to the Dairy Farms Sustainability Project at Cornell University, pay $210,000 in attorney fees for the plaintiff, and employ best management practices (Knauf, 2001).

On the Eastern Shore of Virginia, an aquaculture operation raising clams and oysters, brought suit against his neighbor, a tomato grower. The aquaculture operation owner claimed that the agricultural runoff created from the plasticulture operation carried pollutants which were destroying his shellfish beds. The suit was settled out of court in favor of the aquaculture operation owner.

Successful implementation depends on stakeholders taking responsibility for their role in the process. The primary role, of course, falls on the landowner. However, local, state and federal agencies also have a stake in ensuring that Virginia's waters are clean and provide a healthy environment for its citizens. An important first step in correcting the existing water quality problem is recognizing that there is a problem and that the health of citizens is at stake. Virginia's approach to correcting NPS pollution problems has been, and continues to be, encouragement of participation through education and financial incentives.

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8. FUNDING

The following practices are identified as vital to attaining the goals of the Falling River IP: SL-6 (Grazing Land Protection), WP-2T (Streambank Protection in TMDL areas), WP-4B (Loafing Lot Management System), WP-4 (Animal Waste Control Facility), RB-1 (Septic Tank Pump-Out), RB-3 (Septic System Repair), RB-4 (Septic Tank System Installation/Replacement), RB-5 (Alternative On-site Waste Treatment System), Improved Pasture Management, Residential Education Program. Potential funding sources available during implementation were identified during IP development. A brief description of the programs and their requirements is provided in this chapter. Detailed descriptions can be obtained from the SWCDs, VADCR, NRCS, and VCE. It is recommended that participants discuss funding options with experienced personnel at their local SWCD in order to choose the best option. Information on program description and requirements was provided from fact sheets prepared by Virginia State Technical Advisory Committee, VADEQ, VADCR, and Southeast Rural Community Assistance Project, Inc.

Federal Clean Water Act 319 Incremental Funds

Through Section 319 of the Federal Clean Water Act, Virginia is awarded grant funds to implement the nonpoint source programs. VADCR administers the money in coordination with the Nonpoint Source Advisory Committee (NPSAC) to fund watershed projects, demonstration and educational programs, nonpoint source pollution control program development, and technical and program staff. VADCR reports annually to the EPA on the progress made in nonpoint source pollution prevention and control.

Virginia Agricultural Best Management Practices Cost-Share Program

The cost-share program is funded with state and federal monies through local SWCDs. SWCDs administer the program to encourage farmers and landowners to use BMPs on their land to better control sediment, nutrient loss, and transportation of pollutants into our waters due to excessive surface flow, erosion, leaching, and inadequate animal waste management. Program participants are recruited by SWCDs based upon those factors which have a great impact on water quality. The objective is to solve water quality problems by fixing the worst problems first. Cost-share is typically 75 percent of the actual cost, not to exceed the local

maximum. The Virginia Water Quality Improvement Fund (WQIF) provides funding for this program, which is dependent upon a percentage of state surpluses.

Virginia Agricultural Best Management Practices Tax Credit Program

For all taxable years, any individual or corporation engaged in agricultural production for market and who has in place a soil conservation plan approved by the local SWCD, shall be allowed a credit against the tax imposed by Section 58.1-320 of an amount equaling 25 percent of the first $70,000 expended for agricultural best management practices by the individual. "Agricultural best management practices" are approved measures that will provide a significant improvement to water quality in the state's streams and rivers, and is consistent with other state and federal programs that address agricultural nonpoint source pollution management. Any practice approved by the local SWCD Board shall be completed within the taxable year in which the credit is claimed. The credit shall be allowed only for expenditures made by the taxpayer from funds of his or her own sources. The amount of such credit shall not exceed $17,500 or the total amount of the tax imposed by this program (whichever is less) in the year the project was completed, as certified by the Board. If the amount of the credit exceeds the taxpayer's liability for such taxable year, the excess may be carried over for credit against income taxes in the next five taxable years until the total amount of the tax credit has been taken. This program can be used independently or in conjunction with other cost-share programs on the stakeholder's portion of BMP costs. It is also approved for use in supplementing the cost of repairs to streamside fencing.

Virginia Agricultural Best Management Practices Loan Program

Loan requests are accepted through VADEQ. The interest rate is 3 percent per year and the term of the loan coincides with the life span of the practice. To be eligible for the loan, the BMP must be included in a conservation plan approved by the local SWCD Board. The minimum loan amount is $5,000; there is no maximum limit. Eligible BMPs include 23 structural practices such as animal waste control facilities, loafing lot management systems, and grazing land protection systems. The loans are administered through certain participating lending institutions.

Virginia Small Business Environmental Assistance Fund Loan Program

The Fund, administered through VADEQ, is used to make loans or to guarantee loans to small businesses for the purchase and installation of environmental pollution control equipment, equipment to implement voluntary pollution prevention measures, or equipment and structures to implement agricultural BMPs. The equipment must be needed by the small business to comply with the federal Clean Air Act, or it will allow the small business to implement voluntary pollution prevention measures. The loans are available in amounts up to $50,000 and will carry an interest rate of 3 percent, with favorable repayment terms based on the borrower's ability to repay and the useful life of the equipment being purchased or the life of the BMP being implemented. There is a $30 non-refundable application processing fee. The Fund will not be used to make loans to small businesses for the purchase and installation of equipment needed to comply with an enforcement action. To be eligible for assistance, a business must employ 100 or fewer people and be classified as a small business under the federal Small Business Act.

Virginia Water Quality Improvement Fund

This is a permanent, non-reverting fund established by the Commonwealth of Virginia in order to assist local stakeholders in reducing point and nonpoint nutrient loads to surface waters. Eligible recipients include local governments, SWCDs, and individuals. Grants for point sources are administered through VADEQ and grants for nonpoint sources are administered through VADCR. Most WQIF grants provide matching funds on a 50/50 cost-share basis. Successful applications are listed as draft/public-noticed agreements, and are subject to a public review period of at least 30 days. This fund was identified as a potential funding source for the riparian stream buffers on commercial land and pet waste composters that are included in the implementation plan.

Community Development Block Grant Program

The Department of Housing and Urban Development sponsors this program, intended to develop viable communities by providing decent housing and a suitable living environment and by expanding economic opportunities primarily for persons of low and moderate income. Recipients may initiate activities directed toward neighborhood revitalization, economic development, and provision of improved community facilities and services. Specific

activities may include public services, acquisition of real property, relocation and demolition, rehabilitation of structures, and provision of public facilities and improvements, such as new or improved water and sewer facilities.

Conservation Reserve Program (CRP)

Offers are accepted and processed during fixed signup periods that are announced by FSA. All eligible (cropland) offers are ranked using a national ranking process. If accepted, contracts are developed for a minimum of 10 and not more than 15 years. Payments are based on a per-acre soil rental rate. Cost-share assistance is available to establish the conservation cover of tree or herbaceous vegetation. The per-acre rental rate may not exceed the Commodity Credit Corporation's maximum payment amount, but producers may elect to receive an amount less than the maximum payment rate, which can increase the ranking score. To be eligible for consideration, the following criteria must be met: 1) cropland was planted or considered planted in an agricultural commodity for two of the five most recent crop years, and 2) cropland is classified as "highly-erodible" by NRCS. Eligible practices include planting these areas to trees and or herbaceous vegetation. Application evaluation points can be increased if certain tree species, spacing, and seeding mixtures that maximize wildlife habitats are selected. Land must have been owned or operated by the applicant for at least 12 months prior to the close of the signup period. The payment to the participant is up to 50 percent of the cost for establishing ground cover. Incentive payments for wetlands hydrology restoration equal 25 percent of the cost of restoration.

Conservation Reserve Enhancement Program (CREP)

This program is an "enhancement" of the existing USDA CRP Continuous Sign-up. It has been "enhanced" by increasing the cost-share rates from 50 percent to 75 percent and 100 percent, increasing the rental rates, and offering a flat rate incentive payment to place a permanent "riparian easement" on the enrolled area. Pasture and cropland (as defined by USDA) adjacent to streams, intermittent streams, seeps, springs, ponds and sinkholes are eligible to be enrolled. Buffers consisting of native, warm-season grasses on cropland, to mixed hardwood trees on pasture, must be established in widths ranging from the minimum of 30 percent of the floodplain or 35 feet, whichever is greater, to a maximum average of 300 feet. Cost-sharing (75 - 100 percent) is available to help pay for fencing to exclude livestock

from the riparian buffer, watering facilities, hardwood tree planting, filter strip establishment, and wetland restoration. In addition, a 40 percent incentive payment upon completion is offered and an average rental rate of $70/acre on stream buffer areas for 10-15 years. The state of Virginia will make an additional incentive payment to place a perpetual conservation easement on the enrolled area. The statewide goal is 8,000 acres.

The landowner can obtain and complete CREP application forms at the FSA center. The forms are forwarded to local NRCS and SWCD offices while FSA determines land eligibility. If the land is deemed eligible, NRCS and the local SWCD determine and design appropriate conservation practices. A conservation plan is written, and fieldwork begins, which completes the conservation practice design phase.

FSA then measures CREP acreage, conservation practice contracts are written, and practices are installed. The landowner submits bills for cost-share reimbursement to FSA. Once the landowner completes BMP installation and the practice is approved, FSA and the SWCD make the cost-share payments. The SWCD also pays out the state's one-time, lump sum rental payment. FSA conducts random spot checks throughout the life of the contract, and the agency continues to pay annual rent throughout the contract period.

Environmental Quality Incentives Program (EQIP)

This program was established in the 1996 Farm Bill to provide a single voluntary conservation program for farmers and landowners to address significant natural resource needs and objectives. This program replaces the Agricultural Conservation Program (ACP) and the Water Quality Incentive Program (WQIP). Approximately 65 percent of the EQIP funding for the state of Virginia is directed toward “Priority Areas.” These areas are selected from proposals submitted by a locally led conservation work group. Proposals describe serious and critical environmental needs and concerns of an area or watershed, and the corrective actions they desire to take to address these needs and concerns. The remaining 35 percent of the funds are directed toward statewide priority concerns of environmental needs. EQIP offers 5- to 10-year contracts to landowners and farmers to provide 75 percent cost-share assistance, 25 percent tax credit, and or incentive payments to implement conservation practices and address the priority concerns statewide or in the priority area. Eligibility is

limited to persons who are engaged in livestock or agricultural production. Eligible land includes cropland, pasture, and other agricultural land in priority areas, or land that has an environmental need that matches one of the statewide concerns.

Wildlife Habitat Incentive Program (WHIP)

The Wildlife Habitat Incentive Program (WHIP) is a voluntary program for landowners and land users who want to develop or improve wildlife habitat on private agriculture-related lands. Participants work with NRCS to prepare a wildlife habitat development plan. This plan describes the landowner's goals for improving wildlife habitat and includes a list of practices and a schedule for installation. A 10-year contract provides cost-share and technical assistance to carry out the plan. In Virginia, these plans will be prepared to address one or more of the following high priority habitat needs: early grassland habitats that are home to game species such as quail and rabbit as well as other non-game species like meadowlark and sparrows; riparian zones along streams and rivers that provide benefits to aquatic life and terrestrial species; migration corridors which provide nesting and cover habitats for migrating songbirds, waterfowl and shorebird species; and decreasing natural habitat systems which are environmentally sensitive and have been impacted and reduced through human activities. Cost-share assistance of up to 75 percent of the total cost of installation (not to exceed $10,000 per applicant) is available for establishing habitat. Applicants will be competitively ranked within the state and certain areas and practices will receive higher ranking based on their value to wildlife. Types of practices include: disking, prescribed burning, mowing, planting habitat, converting fescue to warm season grasses, establishing riparian buffers, creating habitat for waterfowl, and installing filter strips, field borders and hedgerows. For cost-share assistance, USDA pays up to 75 percent of the cost of installing wildlife practices.

Wetland Reserve Program (WRP)

This program is a voluntary program to restore and protect wetlands on private property. The program benefits include providing fish and wildlife habitat, improving water quality, reducing flooding, recharging groundwater, protecting and improving biological diversity, and furnishing recreational and esthetic benefits. Sign-up is on a continuous basis. Landowners who choose to participate in WRP may receive payments for a conservation

easement or cost-share assistance for a wetland restoration agreement. The landowner will retain ownership but voluntarily limits future use of the land. The program offers landowners three options: permanent easements, 30-year easements, and restoration cost-share agreements of a minimum 10-year duration. Under the permanent easement option, landowners may receive the agricultural value of the land up to a maximum cap and 100 percent of the cost of restoring the land. For the 30-year option, a landowner will receive 75 percent of the easement value and 75 percent cost-share on the restoration. A 10-year agreement is also available that pays 75 percent of the restoration cost. To be eligible for WRP, land must be suitable for restoration (formerly wetland and drained) or connect to adjacent wetlands. A landowner continues to control access to the land and may lease the land for hunting, fishing, or other undeveloped recreational activities. At any time, a landowner may request that additional activities be added as compatible uses. Land eligibility is dependent on length of ownership, whether the site has been degraded as a result of agriculture, and the land's ability to be restored. Restoration agreement participants must show proof of ownership. Easement participants must have owned the land for at least one year and be able to provide clear title.

Southeast Rural Community Assistance Project (SE/R-CAP)

The mission of this project is to promote, cultivate, and encourage the development of water and wastewater facilities to serve low-income residents at affordable costs and to support other development activities that will improve the quality of life in rural areas. Staff members of other community organizations complement the SE/R-CAP central office staff across the region. They can provide (at no cost to a community): on-site technical assistance and consultation, operation and maintenance/management assistance, training, education, facilitation, volunteers, and financial assistance. Financial assistance includes $1,500 toward repair/replacement/installation of a septic system and $2,000 toward repair/replacement/installation of an alternative waste treatment system. Funding is only available for families making less than 125 percent of the federal poverty level. The federal poverty threshold for a family of four is $20,650 (2007 US Dept. of Health and Human Services Guidelines).

National Fish and Wildlife Foundation

Offers are accepted throughout the year and processed during fixed signup periods. The signup periods are on a year-round, revolving basis, and there are two decision cycles per year. Each cycle consists of a pre-proposal evaluation, a full proposal evaluation, and a Board of Directors' decision. An approved pre-proposal is a pre-requisite to the submittal of the full proposal. Grants generally range between $10,000 and $150,000. Payments are based on need. Projects are funded in the U.S. and any international areas that host migratory wildlife from the U.S. Grants are awarded for the purpose of conserving fish, wildlife, plants, and their habitats. Special grant programs are listed and described on the NFWF website (http://www.nfwf.org). If the project does not fall into the criteria of any special grant programs, the proposal may be submitted as a general grant if it falls under the following guidelines: 1) it promotes fish, wildlife and habitat conservation, 2) it involves other conservation and community interests, 3) it leverages available funding, and 4) project outcomes are evaluated. A pre-proposal that is not accepted by a special grant program may be deferred to the general grant program.

Clean Water State Revolving Fund

EPA awards grants to states to capitalize their Clean Water State Revolving Funds (CWSRFs). The states, through the CWSRF, make loans for high-priority water quality activities. As loan recipients make payments back into the fund, money is available for new loans to be issued to other recipients. Eligible projects include point source, nonpoint source and estuary protection projects. Point source projects typically include building wastewater treatment facilities, combined sewer overflow and sanitary sewer overflow correction, urban stormwater control, and water quality aspects of landfill projects. Nonpoint source projects include agricultural, silvicultural, rural, and some urban runoff control; on-site wastewater disposal systems (septic tanks); land conservation and riparian buffers; leaking underground storage tank remediation, etc. Estuary protection projects include all of the above point and nonpoint source projects, as well as habitat restoration and other unique estuary projects.

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APPENDIX A

Working Group and Steering Committee Minutes and Reports

Falling River TMDL Implementation Plan Development

1st Agricultural and Residential Combined Working Group Meeting

September 25, 2007
Campbell County Extension Office

Meeting Summary

Theresa Buckles from the Department of Conservation and Recreation ran the joint working group meeting. She explained the differences in the two primary livestock exclusion practices. For example the WP-2T practice will repay the farmer to replace damaged fence in a TMDL watershed if he reapplies. The group was asked what they thought about financial constraints to participating in cost share programs. One response was more cost share on the cost of drilling a well. One of the more recent wells dug in the area was 600 hundred feet deep. Someone suggested that the cost share for a well be on a per foot basis. The group was then asked about the cultural constraints to participating in cost share programs. The primary concern was the fear of losing control over the property. Theresa noted that these practices were voluntary. Don Yancey from the NRCS told the group that the only obligation the landowner had was to maintain the practice for its design life (10 years). If the landowner decides to quit farming or do something else with land he still must maintain the practice or repay a portion of the cost share. Responsibility for the cost share can be transferred to a new owner if the property is sold. One farmer asked if cost share was available to re-establish sod destroyed by drought on steeper grades to prevent erosion. Don Yancey from the NRCS said that the only program available was EQUIP which was a 50% cost share program. Rod Bodkin briefly discussed the fencing length figures and average costs for the SL6 and WP-2T practices. David Sandman from the RELSWCD thought the costs might be a little low. Updated cost figures will be provided at the second working group meeting.

Residential waste treatment information was obtained from the local health department representatives. The costs provided were:

Conventional System Installation	$4,000
Alternative Waste Treatment System	$15,000
Repair of Septic System	$3,500
Septic Tank Pump-out	$220

The number of straight pipes was probably a little high. The health department felt that the number of estimated straight pipes from the census data could be reduced by 95%. Straight pipes aren't a significant issue in central Virginia. It is likely that the people filling out the census forms either didn't understand the question or had gray water discharges.

Falling River TMDL Implementation Plan Development

2nd Agricultural Working Group Meeting
Campbell County Extension Office Building, Rustburg VA
January 15, 2007

Attendees

Krystal Coxon, VA Department of Conservation, James Puckett, Jr., Farmer and Robert E Lee Soil and Water Conservation District (RELSWCD), Dave Sandman, RELSWCD, Don Yancey, Natural Resources Conservation Service (NRCS), Amanda Gray, VA Department of Environmental Quality (DEQ), Paula Nash, DEQ, Arthur Turner, Farmer, Jim O'Hara, Resident, Brandon Schmitt, Farmer, Kelly Hitchcock, Local Government Council

Meeting Summary

1. Introductions

   Krystal Coxon welcomed everyone and provided an opportunity for introductions. Coxon noted that she was the new DCR representative for the Falling River project.

2. Review Falling River Implementation Plan development

   Coxon provided a general overview of the IP plan, the primary goal, the role of the working groups, and lastly a summation of actions to date. Coxon noted that this meeting would provide the bulk of information that would be summarized and transmitted to the Steering Committee for consideration and inclusion into the final draft that would be presented to the public for comment.

3. Review of September 25, 2007 meeting

   Kelly Hitchcock reviewed the minutes of the September 25, 2007 meeting. Key points of the meeting highlighted included the concern of loss of control over land under the 10 year life of the cost share practice; the possibility of increased interest if, as with the EQUIP program, the cost-share program could assist with reseeding on slopes outside of the fenced areas in draught condition years; and the question of intermittent streams.

4. Discussion of Agricultural Best Management Practices

   Review of handout and Discussion of Practices and Costs

   The Working Group reviewed the Falling River TMDL IP Stage I and Stage II BMP Tables, provided by Rod Bodkin, MapTech. Coxon noted that comments about each of the elements noted on the handout were important to discuss and consider as these would represent the practices submitted to the Steering Committee for inclusion into the IP.

   Table I – Fencing Requirements:

   To assist in understanding the handout and practice reference, Don Yancey provided an overview of the various practices including:

- SL-6 – this practice is to enhance vegetated cover to pasture land and provide stream exclusion. Within this practice there can be fencing along a stream or pond, there can be cross-fencing, there can be installation of pressurized water systems. The fence must be at least 35 feet from the stream or water source. Must have a stream or pond that is accessible by cattle to qualify for this cost share program. There is no minimum amount of fencing along a stream necessary to allow for incorporation of other practices included.

- WP-2T – this practice is essentially the SL-6 program without the inclusion of a water system. Don and Dave noted that this practice is not used as much in this watershed because the SL-6 is most often applicable.

Hitchcock referred the group to the email that was provided by Bodkin relating to the justification for the cost estimates. The email from Rod noted that the cost estimates were based on a combination of cost estimates provided by Dave Sandman and a DCR database cost estimate. It was also noted that the average fence length was based on the realization that current SL-6 practices in the Falling River watershed included considerable cross-fencing and that for the purposes of the TMDL – stream side exclusion was the practice focus.

Sandman noted that he could provide the feed of stream exclusion fencing if it was needed. It was agreed that Dave would provide Rod with the current stream exclusion fencing primarily as a means to confirm Rod's method for coming up with the total of 304 total fencing projects.

ACTION: Dave Sandman provides Bodkin with the total feet of stream exclusion fencing within Falling River. It was felt that any changes from the provided Table I estimates would be needed only if the stream side exclusion estimates varied greatly from the numbers that Dave provides Rod.

Other than this one item, the group in general was comfortable with the Table I, Stage I Fencing Estimates.

Table I – Agricultural Land Based Requirements

When viewing this section of Table I there were few table elements that needed further explanation before a definitive response to the information. Namely, it was noted that more information on the type of practices included under "Improved Pasture Management" was needed. Primary Questions generated were:

1. To what does the "system" unit of Grazing Land Protection System (SL-6) refer?

ACTION: Ask Bodkin to explain what is referred to as "system" in the grazing land protection system.

2. What specific practices are included within Improved Pasture Management?

   - It appeared to the group that the cost would imply that reseeding was included within the general "Improved Pasture Management". Further, if reseeding was included within this practice, it was felt that $108 per unit (being an acre) was a bit low. It was noted that currently EQUIP was providing $120/acre to reseed. It was also noted

that if you consider lime/fertilizer/ and reseeding the cost could be low; especially if you included herbicide cost of approximately $25/acre for weeds.

- Lastly it was noted that for hay and pasture land the current fertilizer rate for medium and low rates was between $75 and $100/acre.

ACTION: Request from Bodkin what practices are included within Improved Pasture Management. If the practice includes reseeding, consider increasing the per unit cost to match current EQUIP rates.

4. Loafing Management

It was noted that this estimate was based on the fact that there was not too much use of this practice within the watershed. The use of a hardened loaf or feed area was not very typical for the practices in Falling River. It was felt the estimate provided in the table was sufficient.

5. Manure Incorporation

Most crop land where incorporation was used is associated with dairy farming. It was felt that the cost was sufficient and was close to the $14/acre for disking shown through the FSA, if this estimate was for dairy only. However the following summarized concerns and questions for the numbers if bio-solids or poultry are a component of the estimates:

- Are these 7,092 units from within included cost share programs and if so, what are the cost share programs.

- For manure incorporation is this just an estimate for dairy farmer or does this include chicken and potential bio-solid incorporation.

- Who are we talking about utilizing this practice?

- If numbers shown do include bio-solids and chicken, the $18/unit may be too low. This concern on the $18 for this method is based on the cost associated with recycling, applying and hauling of bio-solids that had an estimate by a participant at $20/acre.

- If you are just directing this estimate to dairy within falling river the cost is good but acreage may be too high.

ACTION: Ask Bodkin to explain what is defined within the acreage number. What practices are assumed?

6. Vegetated Buffer

Dave indicated that current programs that provide for vegetated buffer include EQUIP and the BMP program. There was another question from the table in this area related again to the unit component. The question was:

- Does the unit number refer to acres just around cropland and not around streams? The answer to this question would determine what program this practice would be associated with.

- Example would be Woodland Buffer Practice – FR3 of planting trees in creek bottoms and streams. Depending on the practice the cost can have a high variation. It was noted that Hardwood Trees could be as much as $700 to $800 per acre versus pine at approximately $75 to $100 per acre.

ACTION: Request Bodkin to better define the practices and cost associated with Vegetated Buffer.

Table 2 – Stage II preliminary agricultural cost for falling River

There was discussion about the cost and practices associated with Table 2. It was noted by Paula Nash that in work on another TMDL the use of Retention Ponds within the rural areas was seen as a last resort practice and not generally received well. Both Nash and Amanda Gray of DEQ noted that those items shown within Table 2 referred to the Stage II measures and thus were those practices that resulted in zero violations of the TMDL and in effect was a plan requirement. It was noted that Stage II were those practices that represent implemented in the final five years of plan implementation.

Participants noted that this was not a practical solution with the Falling River watershed except under very steep slopes and very special circumstances.

This table and the total cost generated discussion by Jim O'Hara, local resident, on the cost of all the practices and concern of where the money to implement the practices.

It was also noted by Gray that she questioned the clarity of the unit designation. She questioned if the table could show the number of ponds necessary to build versus the number of acres treated by the ponds.

ACTION: Ask Bodkin to review Table 2 to consider the unit designation for the retention ponds or to better define the unit numbers.

Additional Ideas for IP by Agricultural Group

Coxon asked the Agricultural Working Group if there were any other practices or observations that should be added to or articulated in the Falling River IP.

The following summarizes items that it was felt should be addressed in the plan:

- It was noted that there is some concern for the smaller farmers that the 35 feet distance on the sides of streams, especially intermittent streams, is sometimes a hard sale;

- Incorporate within the plan the suggestion that reseeding be included as allowable cost within the cost share during draught conditions; Yancey noted that the inclusion of this practice within the Table I – Pasture Management was part of this question. Did those numbers assume this.

- Show education examples to overcome some of the cultural constraints on utilizing these BMPs. Coxon mentioned providing copies of the BMP manual that was developed by DCR.

It was noted that Hitchcock will develop the meeting minutes and provide Rod a summation of the questions generated from the meeting. A final summation of what will be presented to the Steering Committee will be provided to all Agricultural Group Members for review and comment.

ACTION: Hitchcock develops meeting minutes and distribute all correspondences to the Agricultural Working Group members.

5. Representation on the Steering Committee

Coxon noted that it was important to have a representative from the Agricultural Group on the Steering Committee to be able to respond to any generated questions that would arise from the practice suggestions. It was agreed that James Puckett, Jr would serve as the Agricultural Working Group Steering Committee representative.

ACTION: James Puckett attends and represent the Agricultural Working Group at the Falling River IP Steering Committee meeting.

6. Steering Committee Meeting

It was noted that the Steering Committee meeting would be held in the later part of February. An exact meeting location and time would be provided to the group.

7. Falling River IP Public Meeting

Coxon reminded the group that the draft plan and public meeting would be held in the first week of April. The public meeting would begin the 30-day comment period for the plan.

ACTION: Hitchcock provides members information on all upcoming dates.

Falling River TMDL Implementation Plan Development
2nd Residential and Government Working Group Meeting
Historic Courthouse Building, Rustburg VA
November 29, 2007

Attending

Krystal Coxon, DCR, Glen Stanley, Campbell County Utilities, Brian Stokes, Campbell County, Don Yancy, NRCS – Robert E. Lee District, Ruby Shipman, Campbell County Health Dept., Tom Saxton, Campbell County Health Dept., Amanda Gray, DEQ-SCRO, Paula Nash, DEQ-SCRO, Fred T. Dilella, DEQ-SCRO, Charles Lunsford, DCR, Kelly Hitchcock, Local Government Council

Meeting Summary

1. Introductions

Kelly Hitchcock began the meeting by providing a brief overview of the Falling River IP and the purpose of the pending meeting. Following the brief overview, introductions were provided by all attending the meeting.

Charles Lunsford, DCR, provided a more detailed overview of the task of the Governmental Working Group and its role in providing recommendations and suggestions for implementation task to be included within the Falling River IP. Specifically, the Working Group will provide recommended actions to the IP Steering Committee. He noted that there is typically only one Governmental Working Group meeting.

Some of the key elements to be achieved during the meeting were:

- Identify and expand information on "non-agricultural" programs in the area. to include – sewer needs or expansion plans, connection ordinances, etc.;
- Identify regulatory controls that are in place or being considered for implementation;
- Identify key growth and development areas within the watershed; and
- Identify a member of the Governmental Working Group to represent the group and the proposed recommendations to the IP Steering Committee.

2. Overview of County/Regional Programs

<u>On-site Sewage Disposal Systems –</u>

Programs -

Charles asked about programs in the county that deal with failed septic systems or locate straight pipes.

Tom Saxon noted that the County does not sanction looking for problems and thus the program is to respond only to registered complaints. He noted that they do not normally see many straight pipes but when they do they are usually not located in an area with direct discharge into the river.

Tom Saxon did mention that a survey was undertaken in the Otter River Watershed where approximately 35 homes were provided a survey. As a part of the program a brochure was provided to the families that described what to do and how to determine if they had a septic problem. He noted that within the area that was surveyed approximately 15% of the lots had what could be considered straight pipe systems.

Roles and Responsibilities-

It was agreed that a statement similar to the following be included within the report to the IP Steering Committee:

"Campbell County's septic and straight pipe system oversight is a complaint driven system." It was further noted by Ruby Shipmen that not only is the system a complaint driven system but if a neighbor suspects a problem with another neighbor, the suspected property owner must provide permission to access the property to check the system. Without the permission to inspect the system, little can be done to address the complaint.

It was noted that all septic system permits are now being recorded on a map that was provided by DEQ. The map is divided by watersheds and provides a mechanism to see where permits and possible problems develop.

Program grants -

Charles questioned if there were any grant programs underway that were addressing sewer line extension, septic tank pump outs or replacement, etc.

- The only specific grant noted was that associated with the Otter River project. This is the program that funded the 35 home survey noted earlier. There were no other known grant programs.

Agricultural Programs -

There was a brief overview of agricultural programs. It was noted that the Agricultural Working Group provides the primary review of programs but it was important to consider any additional programs or information.

Don Yancy noted that David Sandman was in charge of implementing the TMDL program within the Falling River Watershed. Don indicated that the program has been successful and that almost all of the original allocated funds had been utilized for fence and water system installation.

Don also noted that there were currently some regular Best Management Practices, BMP, funds remaining. There is however little EQIP funds utilized within the TMDL area. Don questioned the future outlook, with the completion of the TDML IP, of CREP funds being made available to farmers in the Falling River watershed. The answer to this is yes. Currently this Federal Program that provides 90% cost share is not available to the Falling River watershed area. It was noted that the CREP program is the most attractive of the cost share/BMP programs.

Charles provided an overview of the Water Quality Improvement Fund allocation of $5.2 million dollars for BMP implementation within 8 Soil and Water Conservation Districts with impaired waters where TMDLs have been developed. It is these funds that provided the part –time staff position held by David Sandman and the cost share funds for the fencing and water sources within the Falling River watershed. Charles also noted that he believes, through discussion with DCR, that there may be some reserve money from the original funds that might be available to initiate further BMP installation.

It was noted by Charles that the fencing program was voluntary but did come with an expectation of continued use. Charles noted there was considerable discussion within DCR on programs or options to ensure that BMPs are maintained beyond the 10 year required oversight (*e.g.*, riparian buffers). Lastly, Charles provided a copy of a good publication that provides a positive review of general watershed protection activities that can be taken by homeowners and farmers. The publication "Steamside Livestock Exclusion" provides an overview of the beneficial results of stream bank protection from a monetary perspective.

Pets-

Charles led the discussion about the estimated contribution of pets to the TMDL. He noted that in some areas of the watershed, the pet contribution was above that of people (meaning septic/straight pipe contribution) but still below the primary source of cattle.

He noted that the largest opportunity to address pet waste is through education. Charles asked if there were known hunting clubs or kennels in the watershed; he noted they can often be the source of concentrated pet waste and that they may not employ good pet waste removal.

Brian Stokes noted that the County does require a permit for kennel operations. He was however uncertain as what is permitted (i.e. how may dogs is defined as a kennel operation) and was uncertain if permits were required relative to waste disposal.

Charles noted that some kennels simply use existing of septic systems that are not designed to handle the load level. He indicated that one method that can be employed is to take the solids and apply lime. It was noted that a good implementation activity would be to see if there was a list of permitted kennels and develop a brochure that could be sent to show good waste practices. Brian Stokes indicated that he will check the kennel permitting process and requirements and check how many and how far the permit records go. He will provide his findings to Kelly who will then send them to Rod Bodkin and Krystal Coxon.

ACTION: Brian Stokes reviews the Campbell County policy and procedure on kennel permitting. Brian will also look at number of permits and how far the records go.

Charles then talked further about what should and can be done to address the pet loading from a residential/county/watershed level. When reviewing the TMDL report the watershed was shown to have an estimated 3,700 dogs. Charles indicated within the IP there needed to be procedures and cost estimates for addressing this load contributor.

Some key implementation elements used in other IPs are primarily education. Education activities had a general estimate of an approximately 70% success rate. These educational messages related to leaving buffers along creeks and streams, utilizing pet compost devices, and implementing "pick up after pet" programs.

Charles asked what methods would be best utilized in the Falling River Watershed.

Some items noted were:

- Installing a Pet Waste Station at parks located in the watershed. One possible park is in the Town of Appomattox.
- Looking at Pet Waste Station within private camp grounds.
- Creating and distributing brochures to families;
- Installing Placement of Pet Waste Stations at schools where folks go to walk dogs.

ACTION: Kelly finds out the names and locations of parks, and private and public camping areas in the watershed.

Education and Outreach -

Charles noted that this area was a vital step in assuring the TMDL goals are met. Some activities suggested included:

- Contacting local schools and utilizing the local FFA for creating educational material and teaching this generation the connection to the water resources.
- Looking into possibly working with the local school system or individual school to develop a "meaningful watershed experience" element within the educational elements.

ACTION: Kelly and Krystal research the "meaningful watershed experience" program.

ACTION: Kelly obtain names of contacts for the local FFA programs in the CC and Appomattox schools and extension agency.

3. Proposed Roles and Responsibilities of Government Agencies in Plan Implementation

Charles Lunsford provided an overview of agencies that had oversight or had programs that could contribute to or had impact upon IP implementation.

Federal

- EPA/NRCS – role in utilizing 319 funds. EPA Office in Philadelphia oversees non-point source element. It was noted that Falling River actually fell under State funds.

State

- VDAX

- Agricultural Stewardship program
- Virginia Department of Health – permits side
- DEQ – monitoring
- Cooperative Extension – key education role
- DCR – numerous programs

Local

The local control is a key element that is unique to each IP. This area includes ordinances, elements of comprehensive plans, etc. One concern or interest from DCR is how local initiatives can assist in assuring that the various cost-share programs, septic system upgrades, etc. can be maintained over time. Essentially – how are the positive gains of BMPs maintained over time.

Discussion on current regulations relating to lot sizes and long-term viability of septic systems developed. It was noted by Tom Saxton that currently Campbell County only requires a 50% additional reserve drain field for new septic systems. He noted that with this could result in serious problems in the future – what will families do in 15 to 20 years when they need the new drain field. Charles Lunsford indicated that he thought a second drain field was the requirement and that possibly other ordinances that required a second drain field should be reviewed.

ACTION: Kelly work with Campbell County Dept. of Health in obtaining examples of ordinances that require lot size or subdivisions with a 100% reserve for a drainfield of a septic system. The GWG recommended that there be a recommendation in the IP that Campbell County adopt such an ordinance.

4. Regulatory Controls

Charles asked if there were any particular local regulatory controls. Once again the county noted that septic failures were complaint-driven and only acted upon with ability to prove problem. Once a problem is found the only recourse currently is through legal action.

Charles noted that there may be some State regulation in the future that will allow the Dept. of Health to change the code for alternative systems that would allow penalties for failure to comply civil actions. This would allow localities the ability to impose fines.

Brian Stokes noted that currently there are no real regulatory ordinances. However, he did note that localities such as Campbell may need to adopt stormwater management ordinances in the future as a component of population growth. Currently the county does not have a stormwater management ordinance.

5. Projected Growth

Charles asked the group about projected growth within the watershed. Brian Stokes indicated that it is anticipated that the Falling River Watershed will remain primarily rural for some time. He did mention that a new waterline is being installed along 460 to Concord. The new line, which will service needs for the school, is anticipated to be installed in 2009. There will be a small treatment plant for the school.

Brian, Tom, and Glen Stanly noted that there are three primary sewage treatment systems in the watersheds – each located on the outer limits – being:

- Brookneal;
- Town of Appomattox; and
- Rustburg.

Charles asked if it was anticipated that any of these systems would be expanded outside of their current service area to a degree that should be looked at by Map Tech. It was agreed by participant that expansion beyond current homes served was not likely. Charles asked if within the current service are of the system if there might be homes that are within the service area but not connected. It was believed that if so, it would be a negligible number.

6. Monitoring During Implementation

Amanda Gray of DEQ provided an overview of the DEQ monitoring, both current and past, within the Falling River Watershed. She provided a watershed map and monitoring station information. Stations monitored during the TMDL study; ambient stations – sampled every other month for 2 years (change and are part of a six year rotation); Trend stations – sampled every other month continuously, and biological stations were noted.

Charles questioned which of the stations shown would be monitored over time. Amanda indicated the sampling strategy and indicated that DEQ could alter their strategy to match BMP implementation activity. She noted that 2007 is year one in the six year sampling rotation.

After some discussion, it was agreed for the purposes of the IP and the pending public meeting, the watershed with the seven primary sampling stations and the corresponding table would provide necessary information.

A summation of the monitoring program and the corresponding map will be provided to Rod Bodkin/Map Tech for inclusion into the IP.

ACTION: Krystal Coxon develops the monitoring write-up and provides it to Map Tech.

Charles then asked if any known citizen monitoring was taking place in the watershed. There was no known citizen monitoring.

7. Government Working Group Output to Steering Committee

Charles reminded the group that the information from this discussion would be compiled into a report that would be provided to the IP Steering Committee. Charles indicated that he, Kelly, and Krystal would work to compile information from the meeting and develop the report. Charles noted that there needed to be one member from the Governmental Working Group that would be responsible for sharing with and serving on the Steering Committee as the representative for the group. It was agreed that Brian Stokes would serve as the Steering Committee member on behalf of the Governmental Working Group.

ACTION: Brian Stokes serve as an IP Steering Committee member as a representative from the Government Working Group. He will provide an overview of the recommendations and report developed from the group.

8. Meeting adjourned

Falling River TMDL Implementation Plan Development

Steering Committee Meeting

Historic Courthouse, Rustburg, Virginia

February 21, 2008

Attendees:

Amanda Gray DEQ – South Central Regional Office, Paula Nash DEQ – South Central Regional Office, Dave Sandman Robert E. Lee Soil and Water Conservation District Don Yancey Natural Resources Conservation Service, Paul Harvey Campbell County, Johnnie Roark Appomattox County, Chad Miller Appomattox County, Thomas MasonCampbell County Health Department, Tom Saxton Campbell County Health Department, Ruby Shipman Campbell County Health Department, Brian Stokes Campbell County, Rod Bodkin MapTech, Inc., Krystal Coxon Virginia Department of Conservation and Recreation, Kelly Hitchcock Region 2000 Local Government Council.

1. Welcome and introduction

Krystal Coxon, DCR, welcomed and thanked participants for attending the meeting. Coxon noted the role of the Steering Committee and provided a brief overview of the TMDL implementation process to date.

2. Working Group Reports

Coxon noted that each of the working groups held meetings to review TMDL data and to consider and develop actions and strategies for the implementation plan to reduce bacteria in the watershed. At this point each of the three working groups, Agricultural, Residential, and Governmental reports that summarize activities and suggestions from each group was provided.

<u>Governmental Working Group Report</u> – overview provided by Brian Stokes, Campbell County

Brian Stokes referred the Steering Committee to the written report that was provided. He noted the key role of the Governmental Group was to review and suggest actions that can be taken by local government to assist in meeting the water quality goals and then provided a summation of the topics discussed and determinations by the working group.

Key topics noted by Stokes included:

- The fact that within Falling River septic and straight pipe oversight is a complaint-driven process. Further ability to review and inspect is based on permission to inspect;
- Currently Campbell County records current septic system permits on a physical watershed delineated map that was provided by DEQ. It was noted there was a

mistake on the Governmental Report that indicated the County currently recorded the septic system permits on a GIS-based map. This is incorrect. It was however, noted that developing a GIS-based system that would record permits was a suggestion for a future action by Campbell County and the working group suggested as a suggestion within the IP;

- Currently there is no grant-based program in place to address failing septic or straight pipes in Campbell County or watershed;

- Stokes noted a number of the local agencies and activities related to Agriculture;

- Stokes noted that there had been a suggestion of utilizing the local FFA and school programs to provide information about Agricultural and land-use actions to protect the watershed;

- The ability to provide information along with kennel permits was an action that was noted as an activity that could have a big benefit to reducing bacteria levels in the watershed. Stokes noted that there were substantial kennel permits in the area. It was noted that the ability to mark permits on a similar GIS-based map as suggested for septic permits was a possible IP suggestion action;

- The use of pet waste management stations within public areas and possibly private parks was noted as a suggested action;

- Stokes provided a summation of local, state, and regional agencies and the roles and responsibilities they provide in assisting with TMDL implementation;

- It was noted that a key role of the local government was in the ability to develop ordinances that can have direct impact on TMDL implementation. Within Campbell County, Stokes noted there is currently no stormwater management ordinance but noted future state action may change that and that there has been some local interest in looking at options. Further, the ability of the County to consider stronger septic system drainfield reserve requirements could be considered;

  During this portion of the report, it was noted by Tom Saxton, Campbell County Health Dept. that currently the County does not require more than 50 percent reserve and that in some soil types, per state code, requires no reserve. Further, Krystal Coxon noted that examples of ordinance changes that are used in other areas to require 100 percent drain field reserve were provided as an inclusion in the plan if agreed upon by the Steering Committee.

- Brian provided a summation of noted future growth within the watershed that could have impact on the watershed. It was noted that the main area of potential growth would be along the U.S. Route 24 area where the waterline extension to Concord could have growth impacts along that corridor.

- Lastly, it was noted that currently other than DEQ monitoring, there was no known additional monitoring in the watershed.

Krystal Coxon noted that in discussion with Charles Lunsford of DCR that there has traditionally been available Water Quality Improvement Funds, WQIF, that have provided for opportunities related to septic system repairs, pump out programs, removal of straight pipes, etc. Krystal noted that while DCR and DEQ were committed to TMDLs there needed to be leadership and participation on the local level and that these WQIF and possible other funds provided that ability. She noted that she would provide detailed information about these funds and any other funds as they became available. Ruby Shipman of the Campbell County Health Department agreed to lead the effort in applying for grant funds related to septic systems. Lastly, Coxon asked the group if there were any additional comments or changes to the Governmental Working Group report.

<u>Agricultural Working Group Report</u> – provided by Don Yancey who was standing in for James Puckett Jr.

Don provided an overview of the key elements noted from the Agricultural Working Group.

Points from the report included:

- Some obstacles within the cost share program provide challenges for local farmers to participate. Most of those challenges revolve around education needs, cost concerns, and a fear of loosing control of land;

- It was noted that some of the concern with loss of control of land was that there is some confusion between the difference of a cost-share, 10-year standard commitment and elements of the permanence of conservation easements. Thus, increased education was noted as a key factor in making this distinction;

- One possible suggestion noted by the working group was the possibility of the state best management practices cost-share program to have a different cost system for wells. It was noted with the dropping of the water table, the cost of wells can be quite high. Currently the program has a fixed well match rate. It was suggested that there possibly be a per foot well installation cost-share option beyond a certain depth. Yancey noted that within the NRCS program they have gone to a by the foot installation cost-share calculation;

- Another possible concern and suggestion for the program would be the possibility of reseeding cost assistance within the BMP cost-share program. It was noted this suggestion was made as a result of the drought and the fact that even with the fencing, with no ground cover to stop runoff the fencing would not be enough. the Agricultural Working Group suggested that reseeding be added within the SL-6 practice under the condition of grazing management and only under approved or recognized drought conditions;

  Yancey noted that reseeding is available as a practice within the EQUIP program; however currently EQUIP funds were not available within the Falling River watershed.

  Coxon noted that CREP funds are available now, but future funding will depend on congressional appropriation of those funds. If the CREP funds continue to be available, the Falling River watershed will be eligible to receive funding for projects. She noted

that she or Don Yancey will provide more information about those possibilities in the future as they are made available.

- Yancey noted that education was a key element to implementation of the cost-share program. He also noted that the area had good participation in general. He noted that currently all of the funds available through the work that Dave Sandman, Robert E. Lee Soil and Water Conservation District, is involved in had been allocated, but the District can request additional funds from DCR at any time..

Yancey noted there may need to be some further education on the use of rotational grazing as a protection practice.[

Residential Working Group Report – provided by Krystal Coxon

Krystal Coxon noted that each of the Residential Working Group meetings was combined with one of the other work groups. She also noted that a number of the key items noted within the report were considered within the other groups as well. The issues primarily dealt with failing septic systems, straight pipes, and pet waste.

Key issues highlighted from the report include:

- The interest and difficulty associated with identification and program implementation of septic system and straight pipe systems;

- It was noted that initial information from the Steve Simpson of the Health Department noted limited incidence of straight pipes in the watershed. However, it was noted by Tom Saxon and Ruby Shipman of the Campbell County Health Department that there are probably a few more failing systems that can in effect provide a similar loading as a straight pipe than possibly suggested. It was agreed that ten systems would be incorporated within the IP;

- Shipman noted that conversations at the working group meeting noted that it could possibly be assumed that 15 percent of homes older than 30-40 years could have failing septic systems;

- Coxon noted the opportunity to utilize pet waste composters and disposal systems in the area and noted some of the locations suggested by the working group. She also noted that a locality or group could consider pet waste disposal projects and outreach for grant funding. She noted that one possible grant opportunity might be utilization of the 319 mini grants. Coxon indicated that currently the status of these funds is unknown, but she will provide information as it becomes available and stressed that these funds had been utilized in targeted watershed like the Falling River.

Coxon asked for any comments on this report

3. Review of Draft Implementation Plan – Rod Bodkin, MapTech Inc.

Rod Bodkin provided an overview of the justification within Virginia for the development of the TMDL IP. Further, he provided an overview of the key elements that will be included within the full TMDL IP. He noted that given the complexity, length, and usability of the full document, an

executive summary of the report is developed and provided for review and comment and is the standard document developed for public use.

Bodkin reviewed the TMDL IP executive summary and provided a summation of each of the primary components within the short summary document. Some comments noted during the meeting included:

- The need to increase the potential straight pipe number for the IP, under Table 4 page 15, to 10 instead of one. Bodkin noted that he would be more comfortable with this increase and noted that the reduction to one was based on discussions at the first public meeting. It was noted by Coxon that now was the time to consider all the additions and implications of the plan because funding for implementation assistance from possible grants and programs is based on the information within these plans. After discussion it was agreed to increase the number to 10 potential straight pipe fixes within the watershed.

- It was also noted on page 15 by Tom Saxton that there is also a small play park in Appomattox near the High School that could be added to this section.

Coxon requested that each Steering Committee member take the executive summary home, review it, and provide any comments to Hitchcock by March 3, 2008. She realized that the committee needs time to review the document and could not provide all their comments during the meeting.

4. Review of Public Meeting Presentation – Rod Bodkin, MapTech Inc.

Rod Bodkin provided an overview of the power point presentation that will be provided during the public meeting. The Steering Committee reviewed the presentation and provided the following comments:

- It was noted that there needed to be clear understanding of what was meant by Stage I and Stage II implementation;

- On the Slide that showed the Stage I, first five year costs, there was some concern in showing the actual dollar amount associated with the practices. It was questioned if this slide could not mention the number of practices that would be needed. Rod indicated that DCR has in the past requested that the actual estimated costs be provided;

- To assist with making a transition to the public seeing the costs it was agreed to move a slide forward behind this section to include information about the work that Dave Sandman, RELSWCD and other local programs that are now taking place;

- Gray indicated that she found the Staged Timeline slide very beneficial in placing a visual element to the time and value of the Stage I activities in meeting the TMDL goals;

- It was noted it would be beneficial to allow the mention of the DEQ monitoring program during the slide on Tracking Achievements. Amanda Gray or Paula Nash of DEQ agreed to talk about monitoring and to include information on opportunities for citizen monitoring;

- Amanda Gray noted she would provide an updated map to incorporate in the presentation;

- On the What's Next slide, it was agreed that only Kelly's name and contact information would be provided;

- On the Questions slide it was felt that both Krystal and Kelly would be kept as contact for questions, but that there should be added to this slide information about the Region 2000 and DEQ Web sites for copies of the Draft IP;

- Lastly, the last slide should include the Appomattox County Planning Department.

Coxon noted that members of the Steering Committee were provided a lot of information and requested that they review the executive summary and power point presentation and provide any comments to Kelly by Monday, March 3, 2008.

5. Final Public Meeting

Krystal Coxon informed the Steering Committee that the final **Public Meeting would be held on Thursday, April 3, 2008** in the evening. It was agreed that is should begin at 6:30 p.m. A venue for the location had not been secured at the time of the meeting. Kelly Hitchcock will be responsible for finding a location and ensuring that publicity and outreach are provided.

Coxon talked about promotion of the meeting and noted that in order to ensure broad opportunity for input, she and Hitchcock developed a concept for providing short information sessions to local governments, non-profits, environmental groups, etc. Coxon passed a sheet around and asked members if they would assist in providing information to various groups or suggesting contacts.

It was agreed that Hitchcock would develop press releases and submit those to local papers, Web sites, and email lists. Fliers will be passed out and placed in locations around Appomattox and Campbell County. Coxon and Hitchcock will coordinate flier distribution and group contact arrangements and provide to the Steering Committee members.

6. Meeting adjourned