ROCKFISH RIVER WATERSHED TMDL IMPLEMENTATION PLAN TECHNICAL REPORT

Submitted to:

The Stakeholders of the Rockfish River Watershed

Prepared by:

Rockfish River IP Steering Committee

In Cooperation With:

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and

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List of Abbreviations

The following abbreviations are used throughout this document. To better aid the reader in comprehension of the document each abbreviation is defined here.

BMP – Best Management Practice
BSE – Biological Systems Engineering Department (Virginia Tech)
CPP – Continuing Planning Process
CREP – Conservation Reserve Enhancement Program
CRP- Conservation Reserve Program
CWA – Clean Water Act, the origin of the Total Maximum Daily Load Program
CWSRF – Clean Water State Revolving Fund
FTE – Full Time Equivalent
HSPF – Hydrological Simulation Program-FORTRAN
IP – Implementation Plan
LA – Load Allocation, the load allocated to nonpoint and background sources in the Total Maximum Daily Load Study
LIP – Landowner Incentive Program
MOS – Margin of Safety, a load that represents uncertainty in the modeling process
NPS – nonpoint source, referring to diffuse sources of pollution, such as from runoff
NRCS – Natural Resources Conservation Service
RR – Rockfish River
SWCB – State Water Control Board
SWCD –Soil and Water Conservation District
TMDL – Total Maximum Daily Load (Study)
USEPA – United States Environmental Protection Agency
VAC – Virginia Administrative Code
VCE – Virginia Cooperative Extension
VADCR – Virginia Department of Conservation and Recreation
VADEQ – Virginia Department of Environmental Quality
VDH – Virginia Department of Health
VDOF – Virginia Department of Forestry
VDOT – Virginia Department of Transportation
VPDES – Virginia Pollutant Detection and Elimination System
VT – Virginia Tech
WLA – Waste Load Allocation, the load allocated to point sources
WQIF – Water Quality Improvement Fund
WQMIRA – Water Quality Monitoring, Information and Restoration Act

1. INTRODUCTION

1.1. Background

In 1972, the US Congress enacted the Federal Water Pollution Control Act known as the "Clean Water Act" (CWA). The founding objective of that legislation is well defined in its opening paragraph,

"to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

The legislation covers a range of water quality efforts aimed at reaching this objective. Immediately relevant to this project are the requirements that states develop and promulgate water quality standards for waters within their jurisdictions. In section 303(d) of the Act, the federal government requires states to identify those water bodies not meeting the published water quality standards for any given pollutant. This list is often called the "303(d) list" or the "impaired waters list." Virginia's first impaired waters list was published and reported to the United States Environmental Protection Agency (USEPA) in 1994. Recently, the 303(d) list has been combined with the 305(b) water quality assessment report which describes the overall quality of a state's waters. Virginia publishes and submits this "305(b)/303(d) Integrated Report" to USEPA every two years.

Section 303(d) requires that, if a particular water body is listed as "impaired," the state must develop a "total maximum daily load" for any pollutant that exceeds water quality standards in that water body. The "total maximum daily load" or TMDL is essentially a "water pollution budget." A TMDL study defines the maximum amount of pollutant each source in the watershed can contribute to the water body, so that the water body remains in compliance with applicable water quality standards.

Virginia's 1997 Water Quality Monitoring, Information and Restoration Act 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." This means that after a TMDL is developed for an impaired water, an Implementation Plan (IP) must be developed and implemented with the goal of meeting the water quality standards for the water body. The purpose of the IP presented in this document is to characterize implementation actions that will achieve the water quality goals in the Rockfish River (RR) watershed.

1.2. Designated Use and the Applicable Water Quality Standard

According to 9 VAC 25-260-5 of Virginia's State Water Control Board Water Quality Standards, 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 and the federal Clean Water Act."*

The ’Designation of Uses’ of all waters in Virginia is defined in the Code of Virginia (9 VAC 25-260-10) (SWCB, 2011):

> *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.*

The applicable water quality criteria for fecal bacteria impairments are contained in Section 9 VAC 25-260-170. At the time the stream segments in the Rockfish River watershed were first placed on the 303(d) list, the criteria for bacteria included two parts: (1) the *Escherichia coli* (*E. coli*) bacteria concentrations for fresh water shall not exceed a geometric mean of 126 colony forming units (cfu) per 100 mL of water, and (2) the *E. coli* concentrations for freshwater shall not exceed 235 cfu per 100 mL at any time (single-sample criteria). If the water body exceeds the single sample maximum more than 10.5% of the time, the water body is classified as impaired and a TMDL must be developed and implemented to bring the water body into compliance with the water quality standard. If the sampling frequency is one sample or less per 30 days, the single-sample criterion is applied; for a greater sampling frequency, the geometric mean criterion is applied. Most of the ambient water quality monitoring conducted by VADEQ is done on a monthly or bimonthly 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 235 per 100 mL part of the standard in the assessment of the *E. coli* bacteria monitoring data.

The current bacteria standard for freshwater streams in Virginia declares that *E. coli* bacteria concentrations for freshwater shall not exceed a monthly geometric mean of 126 cfu per 100 mL. To ensure compliance with the standard, the bacteria TMDLs for the impaired stream segments of the RR watershed were developed to meet this *E. coli* criterion.

2. STATE AND FEDERAL REQUIREMENTS FOR TMDL IMPLEMENTATION PLANS

2.1. Background

Once a water body is listed as impaired and a subsequent TMDL study has been conducted, then the state, in conjunction with watershed stakeholders, must develop and implement a strategy that will limit the pollutant loadings to those levels allocated in the TMDL. Such a strategy, also known as an Implementation Plan (IP), must contain corrective actions that when implemented will reduce pollutant loadings to bring the water body into compliance with the relevant standard(s).

2.2. State Requirements

The State's Water Quality Monitoring, Information and Restoration Act (WQMIRA) directs the VADEQ to "develop and implement a plan to achieve fully supporting status for impaired waters." In order for an IP to be approved by the State Water Control Board, the IP must include the following required components, as outlined in WQMIRA:

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

2.3. Federal Recommendations

Section 303(d) of the CWA and current USEPA regulations do not require the development of implementation strategies, though their guidance clearly describes this as the next step leading to the attainment of water quality objectives. In its 1999 "Guidance for Water Quality-Based Decisions: The TMDL Process," USEPA recommends the following minimum elements for an approvable IP:

- 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.

These recommendations closely track the State's WQMIRA requirements.

2.4. Requirements for Section 319 Fund Eligibility

Beyond the regulatory requirements listed above, the CWA was amended in 1987 to establish the Nonpoint Source (NPS) Management Program in Section 319 of that act. Through that program, States, Territories, and Native American Tribes can receive grant monies for a variety of activities, including the restoration of impaired stream segments. Although there are several sources of money to help with the TMDL implementation process, Section 319 funds are substantial and most relevant to TMDL implementation. Therefore, the requirements to obtain these funds are discussed in this chapter. The Virginia Department of Conservation and Recreation (VADCR) strongly suggests that these USEPA recommendations be addressed in the IP (in addition to the required components as described by WQMIRA).

The USEPA develops guidelines that describe the process and criteria to be used to award CWA Section 319 NPS 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 from NPS management measures;
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 load reductions are being achieved and progress is being made towards attaining water quality standards, and if not, 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.

2.5. Staged Implementation

In general, the Commonwealth of Virginia intends for NPS pollutant TMDL reductions to be implemented in a staged or phased fashion. Staged implementation is an iterative process whereby management measures are implemented incrementally, initially targeting those sources and/or practices that are expected to produce the greatest water quality improvement. Staged implementation includes on-going monitoring to continuously assess progress toward attaining water quality standards. For example, a promising best management practice in agricultural areas of a watershed with a bacteria impairment is livestock exclusion from streams. This has been shown to be very effective in lowering bacteria concentrations in streams, by reducing the opportunity for cattle to defecate directly in the stream and by providing additional buffering in the riparian zone. This practice has the additional benefit of reducing stream bank erosion.

There are many benefits of staged implementation, including:

1. tracking water quality improvements as they occur;
2. providing a measure of quality control, given the uncertainties that exist in any implementation plan;
3. providing a mechanism for developing public support;
4. helping to ensure the most cost-effective practices are implemented initially; and
5. allowing for the evaluation of the adequacy of the TMDL in achieving the water quality standard.

With successful development and implementation of IPs, Virginia will be well on the way to restoring impaired waters and enhancing the value of this important resource. Additionally, development of an approved IP will improve a locality's chances for obtaining monetary assistance during implementation. Three nested bacteria TMDLs on the Rockfish River will be addressed in this IP, one for the North Fork Rockfish River, one for the South Fork Rockfish River, and one for the mainstem of the Rockfish River to the confluence with Davis Creek.

3. REVIEW OF THE ROCKFISH RIVER BACTERIAL TMDL STUDY

3.1. Background

A TMDL is calculated as follows:

$$TMDL = \sum WLA + \sum LA + MOS \quad (3.1)$$

where WLA is the waste load allocation (point sources), LA is the load allocation (NPSs), and MOS is the margin of safety. A TMDL study determines the TMDL for the pollutant and, after accounting for MOS, allocates that loading between point sources (WLA) and NPSs (LA).

This chapter reviews how the TMDLs were developed for the three impaired segments of Rockfish River watershed and the load allocations required to meet the TMDLs. The TMDLs are described in the 2011 TMDL report: *Bacteria Total Maximum Daily Load Development for Rockfish River, North Fork Rockfish River, and South Fork Rockfish River in Nelson County and Albemarle County, Virginia.*

3.2. Description of Impairments in the Rockfish River Watershed

As a result of monitoring performed by VADEQ, three stream segments in the Rockfish River watershed are currently listed on Virginia's 303(d) list of impaired waters. South Fork Rockfish River (VAV-H15R_RFS01A00) was first listed as "impaired", or not meeting water quality standards, due to violations of the bacteria standard in 2004. The Rockfish River (VAV-H16R_RKF02A00) and North Fork Rockfish River (VAV-H15R_RFN01A00) were listed as "impaired" in 2006 also due to violations of the bacteria standard. The impairments are summarized in Table 3-1 and Figure 3-1.

Table 3-1. Impaired segments in the Rockfish River watershed.

Stream	Original Listing Date	Instantaneous Bacteria Criterion at Time of Listing
South Fork Rockfish River (VAV-H15R_RFS01A00)	2004	235 cfu/100 mL (*E. coli*)
Rockfish River (VAV-H16R_RKF02A00)	2006	
North Fork Rockfish River (VAV-H15R_RFN01A00)	2006	

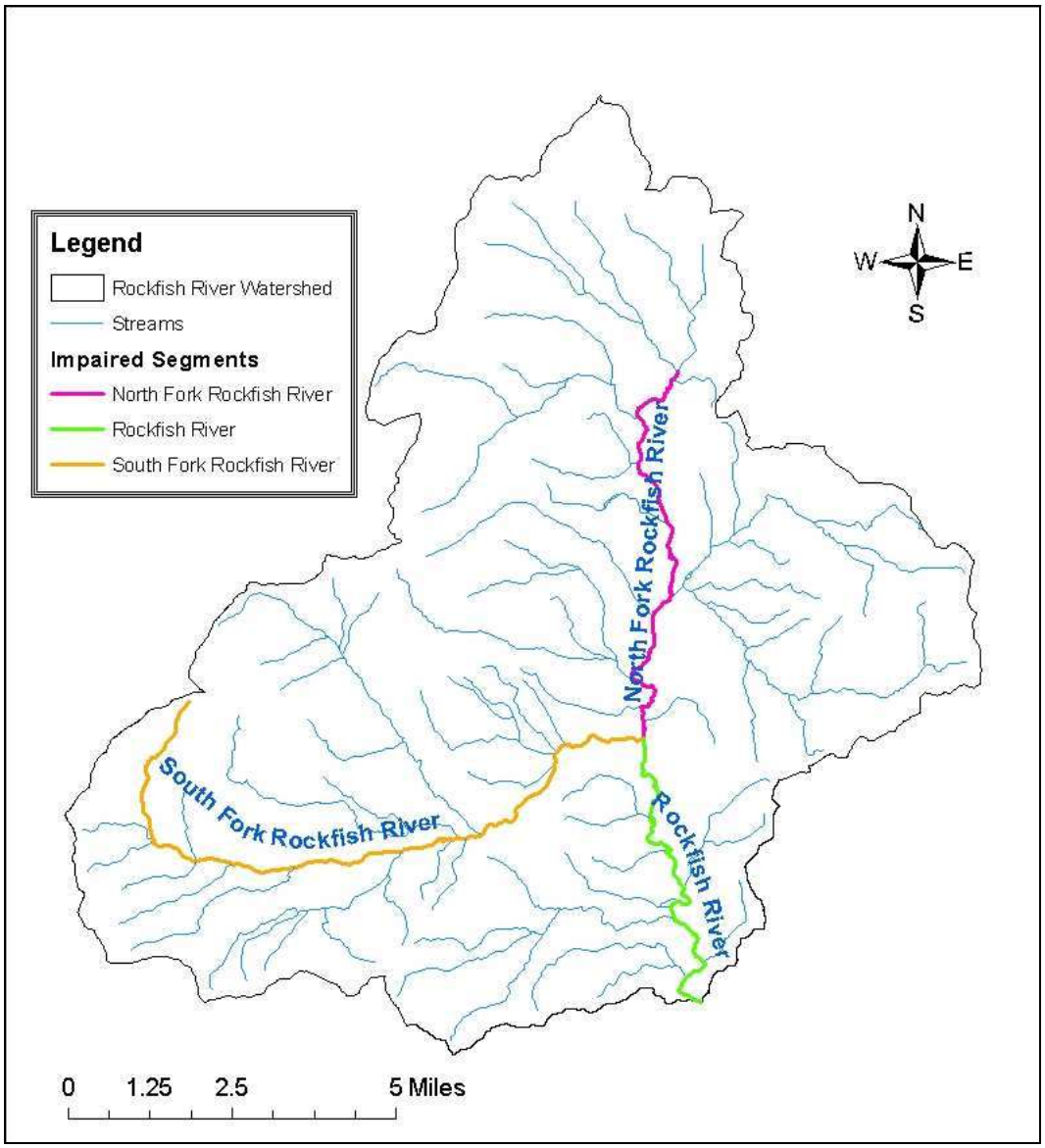

Figure 3-1. Impaired segments in the Rockfish River watershed.

3.3. Watershed Characteristics

The Rockfish River (H16) study area, including the North Fork and South Fork tributaries and the mainstem of the Rockfish River to the Davis Creek confluence, is located in Nelson County and Albemarle County. The study area is approximately 67,500 acres and is part of the James River Basin. Rockfish River flows into the James River at Howardsville. The James River flows into the Chesapeake Bay at Hampton Roads. The predominant land use in the Rockfish River study area is forest (84%), with additional land use in pasture (7%), cropland (3%), and developed areas (5%) (Figure 3-2).

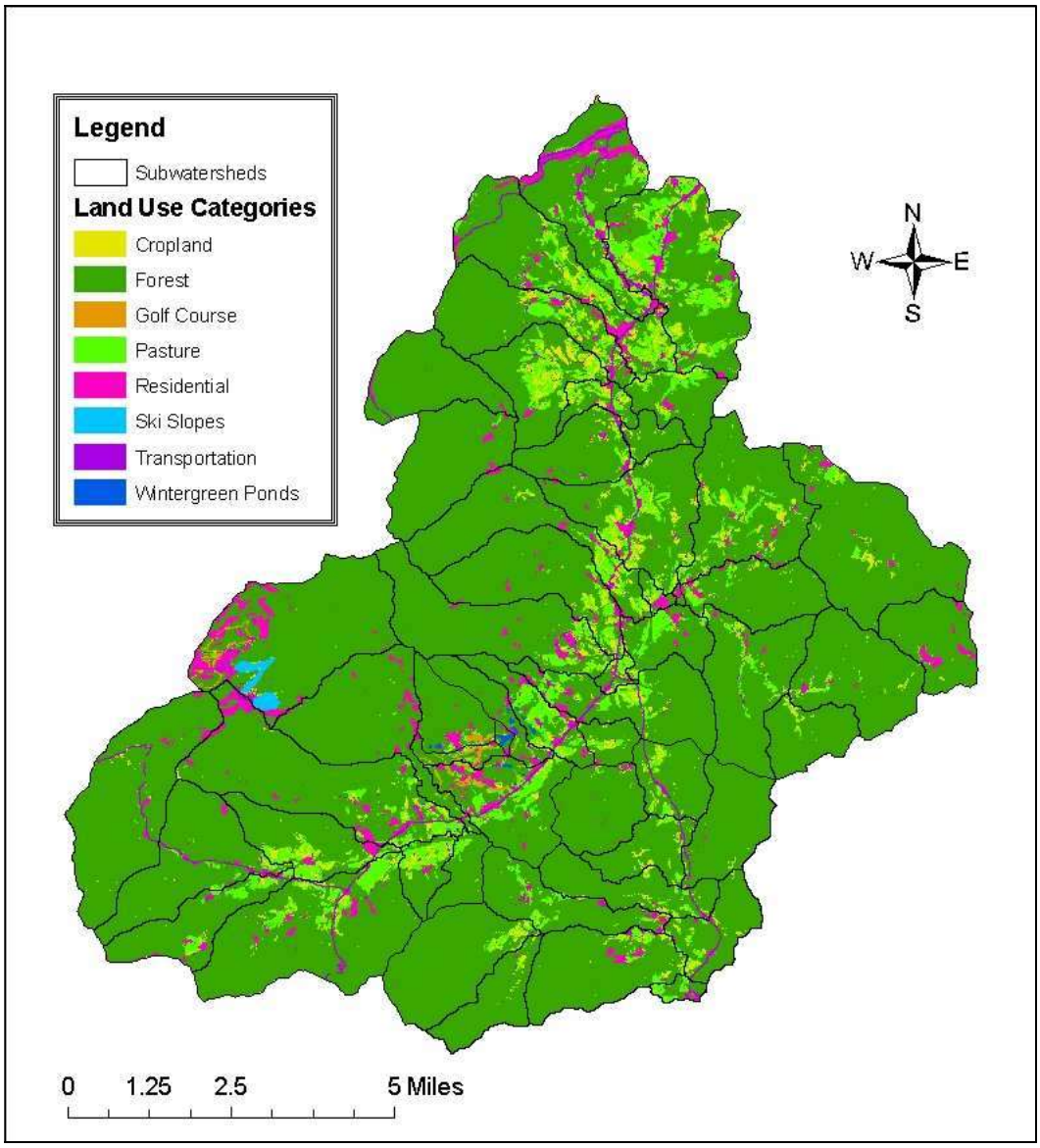

Figure 3-2. Land use distribution in the Rockfish River watershed.

3.4. Water Quality Monitoring

There are five water quality monitoring stations located in the Rockfish River study area (Table 3-2). Of these stations, one on South Fork Rockfish River (2-RFS001.000) and one on Rockfish River (2-RKF026.42) had enough data to be used for model calibration and validation. Monitoring data from station 2-RFN002.83, located on the North Fork Rockfish River, and station 2-STY000.40, located on Stoney Creek, were used to assist in the validation of the water quality model.

Table 3-2. Description of Monitoring Stations used in TMDL Development

Station ID	Stream Name	Station Description	Indicator Organism Measured	Number of Samples	Violation Rate	Period of Record
2-STY000.40	Stoney Creek	Rt. 151 Bridge at Wintergreen	*E. coli*	12	0%	2003 - 2005
2-TLR000.52	Taylor Creek	Off Rt. 633	Fecal Coliform	1	0%	2006
			E. coli	1	0%	
2-TLR000.05	Taylor Creek	Off Rt. 635	*E. coli*	6	83%	2009
2-RFS001.00	South Fork Rockfish River	Rt. 613 Bridge (Nelson Co.)	Fecal Coliform	42	24%	1991 - 2001
			E. coli	22	23%	2003 - 2010
2-RFN000.52	North Fork Rockfish River	Rt. 6 Bridge	*E. coli*	10	40%	2009 - 2010
2-RFN002.83	North Fork Rockfish River	Rt. 635 Bridge at Greenfield	*E. coli*	12	33%	2003 - 2005
2-RKF026.42	Rockfish River	Rt. 634 Bridge	Fecal Coliform	12	8%	1999 - 2001
			E. coli	12	25%	2003 - 2005

3.5. Water Quality Modeling

The Hydrological Simulation Program-FORTRAN (HSPF) was used to simulate the fate and transport of fecal coliform bacteria in the Rockfish River watershed. Modeling was conducted in phases. Output from the HSPF model was generated as an hourly time series and daily average time series of fecal coliform concentration at 55 sub-watershed outlets, including one corresponding to the monitoring station location in the Rockfish River watershed and one corresponding to the monitoring station location in the South Fork Rockfish River as discussed above.

The Expert System for Calibration of HSPF (HSPEXP) decision support software was used to develop a calibrated hydrologic HSPF input dataset for the RR watershed. Data for calibration were obtained from a USGS flow-monitoring station (USGS 02028500), located on the Rockfish River near Greenville, VA. The water quality component of HSPF was calibrated using observed fecal coliform data collected at station 2-RFS001.00 from February 1, 1996 to June 30, 2001 and at station 2-RFS001.00 from April 1, 1999 to June 30, 2001 .42 (Table 3-2).

While developing allocation scenarios, an implicit margin of safety (MOS) was used. Conservative assumptions, the use of a detailed watershed model (HSPF), and other considerations were used in developing the bacteria TMDL, such that an explicit MOS was not necessary.

3.6. Sources of Bacteria

To identify localized sources of fecal coliform, watersheds were divided into sub-watersheds (Figure 3-3) as follows: North Fork Rockfish, sub-watersheds 29 - 55; South Fork Rockfish, sub-watersheds 12 - 28; and mainstem Rockfish River, sub-watersheds 1-11. Potential sources of bacteria considered in the development of the TMDL included both point source and non-point source (NPS) contributions.

3.6.1. Point Sources

The TMDL WLA accounts for the portion of a receiving water's loading capacity that is allocated to one of its existing or future permitted point sources of pollution. Point sources of fecal coliform bacteria in Rockfish River watershed include all municipal and industrial plants that treat human waste and are issued individual permits by VADEQ, as well as private residences that fall under Virginia Pollutant Discharge Elimination System (VPDES) general permits. The point sources of bacteria in Rockfish River watershed are listed in Table 3-3, along with their permitted discharges and load allocations in the TMDLs. The WLA for each point source was set at the permitted load.

3.6.2. Nonpoint Sources

NPS pollution originates from diffuse sources on the landscape (e.g., agriculture and urban) and is strongly affected by precipitation events – runoff from rain or snowmelt. In some cases, a precipitation event is not required to deliver NPS pollution to a stream (e.g., direct deposition of fecal matter by wildlife or livestock and contamination from leaking sewer lines or straight pipes). NPSs were assessed during TMDL development through an extensive analysis of land use coupled with a consideration for delivery mechanisms (e.g., direct loadings to the stream or land-based loadings that require a precipitation event for delivery of the pollutants to the stream from pervious and impervious surfaces).

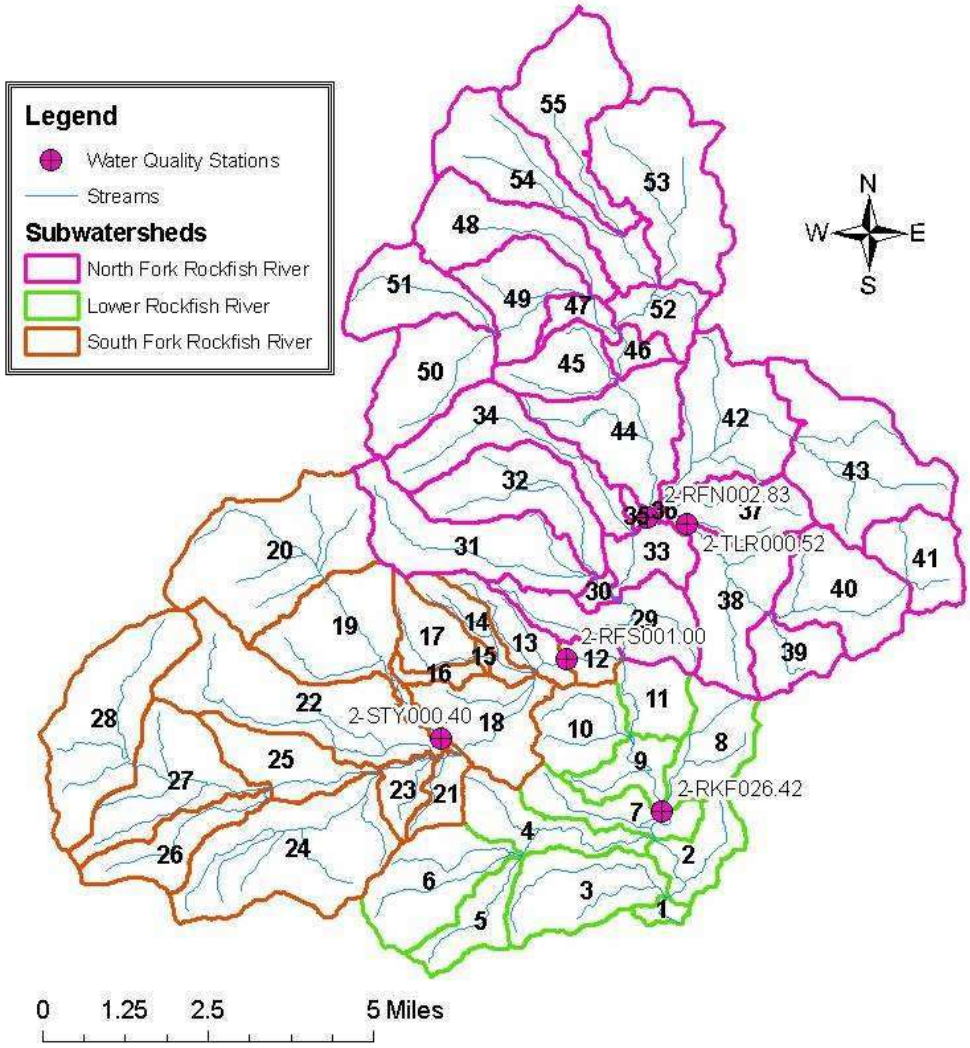

Figure 3-3. Sub-watersheds in the Rockfish River watershed.

Table 3-3. Permitted facilities discharging into the streams of the Rockfish River watershed.

Permit Number	Facility Name	Sub-water shed	Design Flow (mgd*)	Permitted *E. coli* Conc. (cfu/100 mL)	*E. coli* Load (cfu/year)
VA0031011	Wintergreen Mountain STP	28	0.300	126	5.23×10^{11}
VA0074047	Wintergreen Stoney Creek STP	14	0.120	126	2.09×10^{11}
VAG408331	Single Family Home	27	0.001	126	1.74×10^{9}
VAG408118	Single Family Home	34	0.001	126	1.74×10^{9}
VAG408370	Single Family Home	41	0.001	126	1.74×10^{9}

*million gallons per day

In general, wildlife contribute bacteria to all land uses and to streams via defecating directly in streams (direct deposit); livestock contribute bacteria to pasture areas and streams via direct deposit and indirectly to crop areas through manure application; humans contribute bacteria to residential areas via failing septic systems and to streams via straight pipes; and pets contribute bacteria directly to residential areas. The estimated NPS loads from each of the sources of bacteria are summarized in Table 3-4.

Table 3-4. Estimated annual fecal coliform loadings to the stream and the various land use categories for the Rockfish River watershed.

Source	Fecal coliform loading ($x10^{12}$ cfu/yr)	Percent of total loading
Direct loading to streams		
Livestock in stream	265	1%
Wildlife in stream	191	<1%
Straight pipes	20	<1%
Point Sources	1	<1%
Loading to land surfaces		
Cropland	148	<1%
Pasture	17,991	84%
Residential	1,807	8%
Forest	893	4%
Total	**21,316**	

3.7. TMDL Allocations and Load Reductions

Various pollutant reduction scenarios were evaluated to meet the state water quality standard for *E. coli*, the 30-day geometric mean target (126 cfu/100 mL), with zero violations (a requirement of the TMDL). An implicit MOS was used in these bacteria TMDLs by using conservative estimations of factors that would affect bacteria loadings in the watershed (e.g., animal numbers, production rates, contributions to the stream). These factors were estimated in such a way as to represent the greatest amount of bacteria from each source in the watershed.

The RR TMDLs call for reductions from agricultural and residential sources; however, no wildlife reductions are called for in the scenarios. The final allocation scenarios from each watershed are shown in Table 3-5. The TMDL equations, which include *E. coli* allocations for point (WLA) and non-point (LA) sources, are given in Table 3-6.

In addition to the final pollutant source reduction scenarios, a transitional (Stage 1) pollutant source reduction scenario was developed during the TMDL study, Table 3-7. The Stage 1

scenario allows a 10.5% violation rate of the applicable single-sample *E. coli* criterion, 235 cfu/100 mL, and reflects smaller pollutant source reductions from agricultural sources. Implementation of the Stage 1 scenario permits an evaluation of the modeling assumptions and the effectiveness of management practices.

Table 3-5. Final pollutant source reduction scenarios for the Rockfish River watershed.

Impaired Watershed	Required Fecal Coliform Loading Reductions to Meet the *E coli* Standards,%					
	Livestock Direct Deposit	Loads from Pasture	Loads from Cropland	Straight Pipes	Loads from Residential Areas	Wildlife Direct Deposit
North Fork Rockfish River	100	25	0	100	73	0
South Fork Rockfish River	100	25	0	100	38	0
Rockfish River	100	10	0	100	71	0

Table 3-6. TMDL equations for the Rockfish River watershed.

Watershed	ΣWLA[†]	ΣLA	MOS[*]	TMDL
North Fork Rockfish River	23.12×10^{8}	18.00×10^{11}	--	18.02×10^{11}
South Fork Rockfish River	1.20×10^{10}	1.11×10^{12}	--	1.12×10^{12}
Rockfish River	1.58×10^{10}	3.44×10^{12}	--	3.46×10^{12}

[†]the WLA will be implemented in accordance with permitting regulations
[*]Implicit MOS

Table 3-7. Allocation scenarios for Stage 1 implementation for the impaired segments.

Impaired Watershed	Required Fecal Coliform Loading Reductions to Meet the Stage 1 Goal,%					% Violation of E. coli Single Sample Standard
	Cattle DD	Loads from Cropland	Loads from Pasture	Straight Pipes	Loads from Residential	
North Fork Rockfish River	55	0	25	100	73	10
South Fork Rockfish River	55	0	25	100	38	10
Rockfish River	30	0	10	100	71	9

4. PUBLIC PARTICIPATION

4.1. Introduction

An essential step in crafting a TMDL implementation plan and then implementing that plan is input from and engagement of a broad range of stakeholders (individuals, agencies, organizations, and businesses who have an interest in improving water quality and a familiarity with local conditions). Public participation involves a dialogue between local stakeholders and government agencies and a discussion of available resources that can be devoted to TMDL implementation, such as funding and technical support.

The stakeholders involved in developing the RR TMDL IP included a Steering Committee, Working Groups, and the general public. All meetings for both the Rockfish River bacteria TMDLs were held jointly in conjunction with these groups. The Steering Committee and two Working Groups (one focused on agricultural issues and another on residential issues) were comprised of representatives from VADEQ, VADCR, Thomas Jefferson Soil and Water Conservation District (SWCD), Natural Resources Conservation Service (NRCS), Virginia Department of Health (VDH), Virginia Cooperative Extension, and local watershed stakeholders. Public participation occurred via a series of Steering Committee and Working Group meetings, Table 4-1. These meetings, as well as additional public participation activities, are described in the following sections. Details from the Working Group and Steering Committee meetings are included in Appendix A.

Table 4-1. Rockfish River TMDL Implementation Planning Meetings

Meeting Date	Meeting Type
September 7, 2011	Final TMDL Public Meeting and IP Informational Kick-off Meeting
September 21, 2011	Agricultural and Residential Working Groups
October 25, 2011	Streambank Erosion Workshop
November 29, 2011	Agricultural and Residential Working Groups
January 31, 2012	Agricultural Working Group and Steering Committee Meetings
February 28, 2012	Steering Committee Meeting
May 16, 2012	Final Public Meeting

4.2. Synopsis of Rockfish River TMDL Implementation Planning Meetings

The first of two public-noticed public meetings for implementation planning occurred on September 7, 2011 at the Rockfish River Elementary School in Afton, Virginia. This public

meeting served as both the final TMDL meeting and the kick-off meeting for implementation planning and had an attendance of 22. The goals of the public meeting were:

- to present the bacteria TMDLs for North Fork Rockfish River, South Fork Rockfish River and mainstem Rockfish River, and the sediment TMDL for Taylor Creek;
- to provide a basic introduction to the process of implementing TMDLs;
- to engage the community through the Steering Committee and the Working Groups; and
- to explain the roles and responsibilities of each Working Group and the commitment needed for a successful process.

Working Groups were developed that included stakeholders with common interests and concerns about the implementation process. The Residential Working Group focused on residential issues, while the Agricultural Working Groups focused on agricultural issues. Each Working Group was charged with discussing, analyzing, and prioritizing potential bacteria and sediment pollutant source reduction corrective measures.

Working Group meetings occurred on September 21, 2011, November 29, 2011 and January 31, 2012. The Working Groups provided an opportunity for participants to give direct feedback about potential sources of problems and appropriate solutions to impairments. The goals of these meetings were:

- to review the IP purpose and development process;
- to update existing maps with respect to land use and bacteria sources;
- to identify locations of known or suspected water quality problems due to bacteria and sediment; and
- to identify corrective measures (BMPs and other approaches) for reducing bacteria and sediment loads.

Working Group input was then passed to the Steering Committee whose job it was to balance the interests and desires voiced in the Working Groups. Two Steering Committee meetings were held on January 31, 2012 and February 28, 2012. The goals of the Steering Committee meetings were:

- to present the Steering Committee with a summary of the Working Group meetings (January 31);
- to collect and refine input from the Steering Committee on the suite of corrective measures recommended by the Working Groups (both meetings); and
- to present and solicit feedback on the draft TMDL IP and plan the final public meeting (February 28).

One of the issues that was brought up during the TMDL development process and continued to be a concern during the implementation planning was the uniqueness of the Rockfish watershed with its steep slopes, historical flooding, and the resulting erodibility of the streambanks. A Streambank Erosion Workshop was held on October 25, 2011 to give a few short educational

presentations, review restoration experiences in other areas, and have an interactive discussion regarding how to help landowners in the Rockfish Watershed.

The second and final public meeting for Implementation Plan development occurred on May 16, 2012 at the Rockfish Valley Community Center Afton, Virginia, 60 stakeholders attended the meeting. The goals of the meeting were:

- to review the TMDL implementation planning process and the implementation chronology laid out in the TMDL IP;
- to introduce opportunities of assistance available to landowners for practices to reduce bacteria and sediment; and
- to solicit stakeholder feedback (a formal 30-day public comment period following the final public meeting).

5. IMPLEMENTATION ACTIONS

An important element of the TMDL implementation plan is to encourage voluntary implementation of control measures designed to reduce pollutant loads. To encourage voluntary implementation, information must be obtained on the types of control measures that can achieve the pollutant reduction goals specified in the TMDL as practically and cost-effectively as possible. In other words, control measures that provide “the biggest bang for the buck” are targeted.

5.1. Selection of Appropriate Control Measures

Potential control measures, their costs, and pollutant removal effectiveness estimates were identified through a review of the RR TMDL, through input from the TMDL IP Working Groups and Steering Committee, from a literature review, and from modeling. Because the RR watersheds contain a combination of agricultural and residential land uses, implementation actions to address the required pollutant reductions include a variety of control measures which target each pollutant source. Control measure selection was based on the ability to control specific pollutant sources, the required pollutant load reductions, the potential for cost-sharing, the likelihood of implementation by landowners, and stakeholder input. Pollutant sources fall into two basic categories: those contributing directly to the stream and those contributing indirectly to the stream from land sources via runoff. A list of potential control measures and their effectiveness values are listed in Table 5-1.

5.1.1. Control Measures for Direct Stream Sources

Control measures were needed to reduce pollutant sources that contribute directly to the stream, “Direct Stream Sources”. The Direct Stream Sources that need to be controlled in RR include livestock direct deposit and direct residential wastewater discharges (straight pipes). To meet the 100% reduction in direct deposits from livestock specified in the TMDL, some form of stream exclusion is necessary. The 100% reduction in bacteria loads from the direct residential wastewater discharges is a pre-existing legal requirement, further reinforced by the TMDL and this TMDL IP. Control measures used to address residential wastewater discharges include new septic systems or alternative on-site sewage treatment systems.

Table 5-1. Potential Control Measure Efficiencies for Bacteria.

Control Measures	Associated Cost-shared BMPs	Bacterial Reduction Effectiveness (%)	Effectiveness Source
Agricultural Control Measures			
Grass riparian buffers~	CP-21, WQ-1	40%	1
Forested riparian buffers~	CP-22, CRFR-3, FR-3	40%	1
Reforestation of erodible pasture	FR-1	simulated	2
Livestock exclusion fencing	LE-1T, LE-2T	100%	4
Livestock exclusion buffers	LE-1T, LE-2T	40%	1
Improved pasture management	SL-6T	30%	1
Hardened crossings*			
Alternative water systems*			
Loafing lot management system	WP-4B	40%	1
Prescribed grazing	SL-10T	30%	1
Barnyard runoff controls		40%	1
Continuous no-till system	SL-15A	70%	1
Cover crop	SL-8B	20%	1
Residential Control Measures			
Septic System pump-out	RB-1	5%	3
New Sewer hook-ups	RB-2	100%	4
Septic System repairs	RB-3	100%	4
New septic systems	RB-4	100%	4
New septic systems w/ pumps	RB-4P	100%	4
Alternative septic systems	RB-5	100%	4

~ Includes additional reductions from upstream runoff loads: buffers - 2x buffer area.
* Included as part of exclusion fencing systems (LE-1T, LE-2T, SL-6T).
1 - EPA-CBP sediment effectiveness, 2010. (Bacteria efficiency assumed equal to sediment efficiency.)
2 - Based on unit bacteria load from wildlife.
3 - EPA-CBP nutrient effectiveness, 2010. (Bacteria efficiency assumed equal to nutrient efficiency.)
4 - By definition.

5.1.2. Control Measures for Indirect Land Sources

Control measures were also needed to reduce pollutant sources that are distributed across the land surface, whose loads are then transported to streams via surface runoff, “Indirect Land Sources”. Control measures may reduce bacteria loads to the land surface, or may reduce bacteria transport via surface runoff by increasing infiltration, improving filtration, or causing deposition (reductions in flow velocity). The Indirect Land Sources that need to be controlled include runoff from pasture (livestock) and residential areas (failing septic systems). In addition to the control measures that were directly prescribed by the TMDL, the agricultural working group recommended that practices that reduce runoff from cropland also be included in the implementation strategy.

Appendix B provides a glossary of BMP and other control measure definitions. Appendix C contains a list of BMP codes and practice names.

5.2. Quantification of Control Measures by Pollutant Source

The extent of existing control measures previously implemented in the RR watersheds were quantified using the VADCR and USDA Conservation Reserve Enhancement Program (CREP) databases and from estimates provided by local citizens, NRCS, and the Thomas Jefferson SWCD. The initial list of control measures considered for the RR TMDL IP included those practices already installed in the watersheds, given that there is already some degree of acceptability for these types of control measures. An analysis was then performed to identify the maximum extent of each measure needed to meet the pollutant reduction goals. The initial list of control measures was supplemented with additional measures through discussions with stakeholders. The suite of control measures available to meet the TMDL bacteria reduction targets were identified through discussions with Working Group participants and quantified using a combination of GIS analysis and modeling, followed by spreadsheet analyses to calculate load reductions from each control measure as applied to each pollutant type and source category. This section provides a summary of the final set of control measures and extents needed to achieve the pollutant load reductions specified in the bacteria TMDLs.

Load reductions were based on bacteria source loads simulated for the TMDL studies and control measure effectiveness estimates.

5.2.1. Livestock Direct Deposit

Eliminating unrestricted livestock access to streams (100% livestock exclusion) is assumed to provide 100% reduction in livestock direct deposits. A GIS analysis was performed to delineate stream lengths adjacent to, or included in, pasture areas in the RR watersheds. NLCD and RESAC land use data layers were used for this analysis. Since RESAC data were also used for the determination of land use areas for TMDL modeling, these data were used to assess the relative position of pasture areas and streams for IP development. The National Hydrography Dataset (NHD) streams layer was used to represent streams and to classify them as either perennial or intermittent.

“Livestock exclusion fencing” is defined as fencing that meets VADCR or federal CREP (Conservation Reserve Enhancement Program) cost-share requirements with a minimum of a 10 ft. or 35 ft. buffer, while “voluntary fencing” is defined as poly-wire fencing with a narrower buffer width and decided upon by the landowner. The option of “voluntary fencing” was

discussed during the agricultural working group meetings. The agricultural working group decided that a combination of livestock exclusion fencing and voluntary fencing practices would be appropriate for the RR watersheds. Table 5-2 summarizes the total fencing needs estimated to achieve the 100% reduction in bacteria loads from livestock direct deposits in the RR watersheds, as specified in the TMDL.

Table 5-2. Stream Lengths and Total Stream Fencing Estimates.

Sub-basin	Stream Length (miles)	Stream Adjoining Pasture‡ (miles)	Estimated Livestock Exclusion Fencing Needed† (miles)	Existing or Approved BMP Stream-side Fencing (miles)×
North Fork Rockfish River	39	9	13	0.1
South Fork Rockfish River	28	3	6	0.5
Rockfish River*	21	2	3	1.4
Total	**88**	**14**	**22**	**2.0**

*Includes watershed area from confluence of South Fork RR and North Fork RR downstream to the Davis Creek confluence.
‡ May have pasture on one or both sides.
† Assumed no existing fencing.
× Estimated length of exclusion fencing – sources: VADCR BMP database, Agricultural Working Group.

Some applicable cost-shared BMPs for livestock exclusion in the RR watershed are the LE-1T (Livestock Exclusion with Riparian Buffers for TMDL Implementation), the LE-2T (Livestock Exclusion with Reduced Setback for TMDL Implementation), and the WP-2T (Stream Protection for TMDL Implementation) systems of practices. The LE-1T practice includes streamside fencing, cross fencing, alternative water system(s), hardened crossing(s) when needed, and a 35-ft buffer from the stream. The LE-2T practice is similar to the LE-1T practice, except the stream exclusion fencing must be placed a minimum of 10 feet from the stream and the cost-share rate is less than for LE-1T. The WP-2T practice is similar to the LE-1T practice, except it does not include an alternative watering system and the cost-share rate is less. The WP-2T system may be a suitable option where a watering system already exists.

Based on Agricultural Working Group discussions, it is expected that targeted implementation of the LE-2T systems will address the majority of the livestock exclusion fencing needs in the watershed (65%, length basis). The remaining fencing needs will be met through implementation of LE-1T practices (25%) and voluntary fencing (10%). This IP focuses on fencing along both perennial and intermittent streams because the TMDL requires stringent reductions of fecal bacteria from direct livestock and overland agricultural nonpoint sources.

However, highest priority should be given to livestock exclusion systems on perennial streams to achieve the most impact on reducing bacteria loads.

Based on data from the VADCR Agricultural BMP database, 35 LE-1T practices and 9 LE-2T practices have been installed in neighboring counties (Appomattox, Augusta, and Buckingham). Of these, the average length and cost of an LE-1T system was 2,853 linear feet and $23,851, respectively. For an LE-2T system, the average length was 2,005 feet and average cost was $7,131. Using this information for this project, an LE-1T system was defined as having 2,800 feet of fencing and cost of $24,000. An LE-2T system was defined as having 2,000 feet of fencing and cost of $8,000. Voluntary fencing was estimated to cost $3.50 per linear foot.

5.2.2. Pasture

Runoff from pasture is a source of bacteria loads. Bacteria loads to pasture areas come from grazing livestock, the spreading of stored manure, and wildlife. After accounting for load reductions from currently installed control measures, load reductions resulting from filtering effects of buffers associated with livestock exclusion fencing were quantified. In addition, improved pasture management (SL-6T) was included on pasture acreage as a companion to livestock exclusion control measures. The SL-6T practice also includes a hardened pad for winter-feeding where applicable. Loafing lot management systems (WP-4B) for beef cattle are also beneficial to reduce bacteria loads. The control measures needed to meet TMDL load reductions for bacteria from pasture are shown in Table 5-3.

Table 5-3. Agricultural control measure quantities recommended for implementation.

Sub-basin	Livestock Exclusion Fencing			Pasture needing Improved Pasture Management (%)	Improved Pasture Management (acres)
	LE-1T Systems (linear feet)	LE-2T Systems (linear feet)	Voluntary Fencing (linear feet)		
North Fork Rockfish River	17,424	45,301	6,969	82	2,530
South Fork Rockfish River	7,350	19,110	2,940	82	1,147
Rockfish River*	2,577	6,701	1,031	33	145
Total	**27,351**	**71,112**	**10,940**	**78**	**3,822**

*Includes watershed area from confluence of South Fork RR and North Fork RR downstream to the Davis Creek confluence.

Table 5-4. Septic System wastewater control measures targeting estimated failing septic systems and straight pipes.

Sub-basin	Estimated Straight Pipes	Estimated Failing Septic Systems	Septic Tank Pump-out	Septic System Repair	Installation of Conventional Septic System	Installation of Alternative Waste Treatment System
North Fork Rockfish River	2	376	865	94	213	71
South Fork Rockfish River	5	172	495	43	99	35
Rockfish River*	0	69	175	17	39	13
Total	**7**	**617**	**1,535**	**154**	**351**	**119**

*Includes watershed area from confluence of South Fork RR and North Fork RR downstream to the Davis Creek confluence.

5.2.3. Cropland

Runoff from cropland is also a source of bacteria loads. Bacteria loads to the land come from the spreading of stored manure and from wildlife. Bacteria from manure can be reduced either by source reduction or filtering measures (buffers. It was noted during the agricultural working group meetings that if there is any conventional-till cropland receiving manure in the watershed, a continuous no-till system (SL-15A) should be implemented. Cover crops (SL-8A) should also be used in the watershed to maintain a vegetative cover on cropland over the winter.

5.2.4. Residential

According to the TMDL report, the estimated percentage of the total unsewered population with failing septic systems and straight pipes in the RR watersheds were 24.1% and 0.3%, respectively. The TMDLs call for the removal of all straight pipes in the impaired watersheds in order to meet the TMDL load reductions. Addressing failing septic systems will reduce the bacteria load from residential runoff. Based on discussions with the Virginia Department of Health (VDH) and during the residential working group meeting, it was assumed that 25% of failing septic systems could be repaired without installing a new system. Of those failing systems needing to be replaced, it was estimated that 25% would need to be replaced with alternative waste treatment systems because of soil and bedrock limitations in the watershed. Of the failing septic systems to be replaced with a conventional septic system, it was estimated that 10% of these would need to include a pump to lift the septic tank effluent to the drain field. Table 5-4 gives a summary of control measures estimated to remediate this source of bacteria. In addition to these control measures, an educational effort that targets septic system awareness and basic maintenance will be important for successful implementation.

Septic tank pump-outs were discussed at the Residential Working Group meeting. The consensus was that 60% of residents in unsewered houses would volunteer to schedule pump-outs if they were made aware of the necessity and benefits of septic pump-outs. The RB-1 (Septic Tank Pump-out) practice can be used as a first step in identifying failing septic systems in the watershed.

5.3. Technical Assistance Needs

Technical assistance is needed for design and installation of selected control measures, as well as for educational outreach. An average of one full-time-equivalent (FTE) employees per year for the first 10 years of implementation is needed to address agricultural issues. Residential technical assistance requires one FTE per year for the first 5 years. These estimates were

based on similar projects and experience and knowledge of the Steering Committee. Educational outreach will include strategies identified by stakeholders for facilitating installation and execution of implementation actions.

5.4. Education and Outreach

Staffs from the Thomas Jefferson SWCD and NRCS have already been contacting farmers in the watershed provide outreach, technical and financial assistance to farmers to encourage the installation of agricultural BMPs. The Agricultural Working Group were in favor of considering some type of flood insurance to allow landowners to replace stream exclusion fencing damaged or lost to flooding; funding flexible fencing practices which allow landowners to place livestock exclusion fencing where appropriate for the individual property (top of bank, 10 foot setback, etc.); educating landowners regarding natural stream channel movements; accounting for voluntary measures undertaken by landowners without cost-share; encouraging landowners who are feeding livestock next to a stream in wintertime to relocate their feeding operation and manure storage; facilitating neighbor-to-neighbor communication and interaction through field days, Ruritan and Rotary presentations and other methods.

The Residential Working Group suggested that an outreach campaign could be presented to or through organizations such as the Rockfish Valley Foundation, Ruritan Clubs, churches, schools, the Jefferson Board of Aging, and Habitat for Humanity to educate homeowners of the possibility of failing septic systems. The Nelson County Farmers' Market was also named as a venue for promoting the benefits of improving the water quality of the Rockfish River. Putting up information booths or sponsoring bingo night at local fire halls and schools was also suggested as an innovative outreach method. The school system was identified as a commonality where many homeowners and renters could be reached either through their children's school programs, "back to school" nights, Parent Teacher Association (PTA) service announcements and other methods. It was even thought that landowners could be reached through a "what goes down the drain" campaign to investigate their septic systems and drinking water systems at the same time.

5.5. Cost/Benefit Analysis

5.5.1. Costs

The extent/quantity of the agricultural and forestry control measures needed to meet the TMDL pollutant reductions are summarized in Table 5-5, together with their unit costs. Unit costs were estimated from the VADCR agricultural BMP database, from the 2008 USDA-NRCS BMP cost

list for Virginia, from literature values, and from discussions with the Steering Committee and Working Group. The total estimated cost for full implementation of agricultural control measures in the RR watersheds is $1,647,590.

The needed residential control measures and their costs are summarized in Table 5-6. Typical costs in the region show that a septic system repair costs an estimated $3,000, a conventional septic system is estimated at $8,000 with pump and $6,000 without a pump, and an alternative waste treatment system is estimated at $25,000 to replace a failing septic system or straight pipe. The total estimated cost for full implementation of residential control measures in the RR watersheds is $6,321,500.

Table 5-5. Total cost estimates for agricultural control measures in the Rockfish River watersheds.

Control Measure	Unit	Quantity	Cost/ Unit	Total
Livestock Exclusion – Riparian Buffers (LE-1T)*	system	10	$24,000	$240,000
Livestock Exclusion – Reduced Setback (LE-2T)*	system	37	$8,000	$296,000
Voluntary Fencing	linear feet	10,940	$3.50	$38,290
Improved Pasture Management	acre	3,822	$150	$573,300
Technical Assistance	person-years	10	$50,000	$500,000
Total		**–**	**–**	**$1,647,590**

* estimate includes BMP-defined components and component costs.

Table 5-6. Total cost estimates for residential control measures in the Rockfish River watersheds.

Control Measure	Estimated no. of systems needed	Cost/system	Total Cost
Septic Tank Pump-outs	1,535	$300	$460,500
Replacing Straight Pipes			
Conventional Septic System (with pump)	5	$8,000	$40,000
Alternative Waste Treatment System	2	$25,000	$50,000
Repairing Failing Septic Systems	154	$3,000	$462,000
Replacing Failing Septic Systems			
Conventional Septic System	346		
without pump	*309*	$6,000	$1,854,000
with pump	*35*	$8,000	$280,000
Alternative Waste Treatment System	117	$25,000	$2,925,000
Technical Assistance (person-years)	5	$50,000	$250,000
Total			**$6,321,500**

5.5.2. Benefits

It is hard to gage the impact that reducing fecal 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 fecal sources through contact with surface waters should be reduced considerably.

The primary benefit of implementation is improving water quality in Virginia by reducing the fecal contamination in the RR watersheds. Many of the control measures intended to reduce bacteria also increase infiltration, which will decrease peak flows downstream.

During implementation planning, it is important to recognize 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. In Nelson County, there is a renewed and focused interest in enhancing and marketing outdoor recreational opportunities. 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. Money spent by landowners and state agencies in the process of implementing this plan will stimulate the local economy.

A clean water source has been shown to improve weight gain and milk production in cattle. Fresh clean water is an essential requirement for healthy livestock, with healthy cattle consuming, on a daily basis, close to 10% of their body weight during winter and 15% of their body weight in summer. 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, 1998a). Some farmers have also noticed decreased leg injuries in livestock from crossing steep or muddy stream banks (Zeckoski *et al.*, 2007). 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. Installation of streamside fencing and well managed loafing areas will reduce the amount of time that cattle have access to wet, muddy areas.

Implementing 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, and consequently, improve the profitability of the operation. With feed costs typically responsible for 70 to 80% 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. Distributed off-stream waterers and cross-fencing can also improve forage utilization and manure nutrient distribution throughout a pasture (Zeckoski *et al.*, 2007). Another benefit is that, at any given time cattle are in a smaller area, facilitating inspection and handling. The agricultural BMPs recommended in this document will provide both environmental benefits and economic benefits to the farmer.

The residential pollutant control measures discussed herein 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 potentially carry. An improved understanding of on-site sewage treatment systems, including knowledge of what steps can be taken to keep them functioning properly, 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 in locations 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 in comparison to repairing or replacing an entire system. Additionally, if the repair/replacement and pump-out programs become available, they will benefit owners of private sewage (e.g., septic) systems, particularly low-income homeowners, 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. Additionally, income from maintenance of these systems should continue long after implementation is complete. 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.

6. MEASURABLE GOALS AND MILESTONES

6.1. Implementation Goals

The goals of TMDL implementation are to restore the water quality in the impaired stream segments in the RR watersheds so that they comply with water quality standards and to de-list these segments from the Commonwealth of Virginia's 303(d) List of Impaired Waters. Progress towards these goals can be assessed during the implementation process by tracking the number/type of control measures that are installed and programs or policies developed and executed (implementation actions) and continued water quality monitoring. Improvements in water quality will be measured through monitoring of bacteria concentrations throughout the watersheds.

6.2. Implementation Milestones and Water Quality Goals

The implementation of control measures will be accomplished in stages. In general, the Commonwealth intends that the needed control measures be implemented in a progressive process that first addresses the pollutant sources with the largest impact on water quality. This staged approach is based on meeting water quality goals over a fifteen-year period.

Once the implementation milestones and stages are established, the water quality improvement that should result from achieving each milestone can be predicted. The bacteria violations that result from each implementation milestone were estimated by using the modeling files that were developed during the TMDL process.

The TMDL lists an interim set of Stage 1 goals for bacteria load reductions and will serve as the first implementation milestone at the 5-year mark. These goals are summarized in Table 3-7. Implementation of Stage 1 control measures is expected to reduce the bacteria loadings from controllable sources so that violations of the single sample maximum *E. coli* criterion (235 cfu/100mL) are less than 10.5%.

Table 6-1 lists the control measures that are scheduled to be implemented in Stage 1. Local SWCD personnel have already started working with producers in the watersheds to install agricultural BMPs. The agricultural BMPs needed to achieve Stage 2 are summarized in Table 6-2. These 'Stage 2' control measures will be installed during the next 5-year period, following Stage 1. Table 6-3 shows the costs associated with Stage 1 and Stage 2 implementation efforts. The exceedances of the *E. coli* criteria at Stage 1 and Stage 2 are listed in Table 6-4.

Table 6-1. Control Measures to meet Stage 1 Implementation Milestones for Rockfish River.

Sub-basin	Streams‡ needing Fencing (%)	No. of Livestock Exclusion LE-1T systems	No. of Livestock Exclusion LE-2T systems	Voluntary Fencing (linear feet)	Improved Pasture Management (acres)	Septic Tank Pump-out	Replace Straight Pipes	Repair Failing Septic Systems	Replace Failing Septic Systems
North Fork Rockfish River	55	4	13	3,833	2,530	865	2	188	188
South Fork Rockfish River	55	2	6	1,617	1,147	495	5	86	86
Rockfish River*	30	1	2	310	145	175	-	35	34
Total		**7**	**21**	**5,760**	**3,822**	**1,535**	**7**	**209**	**208**

*Includes watershed area from confluence of South Fork RR and North Fork RR downstream to the Davis Creek confluence.
‡ Streams with pasture access.

Table 6-2. Rockfish River Stage 2 Agricultural Control Measures.

Sub-basin	Streams‡ needing Fencing (%)	No. of Livestock Exclusion LE-1T systems	No. of Livestock Exclusion LE-2T systems	Voluntary Fencing (linear feet)
North Fork Rockfish River	45	2	10	3,136
South Fork Rockfish River	45	1	4	1,323
Rockfish River*	70	0	2	721
Total		**3**	**16**	**5,180**

*Includes watershed area from confluence of South Fork RR and North Fork RR downstream to the Davis Creek confluence.
‡ Streams with pasture access.

Table 6-3. Staged Implementation Costs for Rockfish River.

Type of Control Measure		Implementation Costs		
		Stage 1	Stage 2	Total
Livestock Exclusion Measures				
	LE-1T systems	$168,000	$72,000	$240,000
	LE-2T systems	$168,000	$128,000	$296,000
	voluntary fencing	$20,160	$18,130	$38,290
Pasture Control Measures				
	improved pasture management	$573,300	-	$573,300
Residential Wastewater Control Measures				
	septic tank pump-out	$460,500	-	$460,500
	conventional septic systems	$2,174,000	-	$2,174,000
	alternative waste treatment systems	$2,975,000	-	$2,975,000
	septic system repairs	$462,000	-	$462,000
Technical Assistance				
	agricultural BMPs	$250,000	$250,000	$500,000
	residential BMPs	$250,000	-	$250,000
Total		$7,500,960	$468,130	$7,969,090

Table 6-4. Percent exceedances of the single sample maximum *E. coli* criterion (235 cfu/100mL) and the 30-day geometric mean criterion (126 cfu/100 mL) at Stage 1 and Stage 2 of implementation.

Sub-basin	Stage 1		Stage 2	
	Single Sample	Geometric Mean	Single Sample	Geometric Mean
North Fork Rockfish River	10	32	2	0
South Fork Rockfish River	10	27	1	0
Rockfish River	9	35	2	0

Implementation milestones establish the fraction of implementation actions to be taken within certain timeframes. Water quality goals establish the corresponding improvements in water quality that can be expected as the implementation milestones are achieved. Stage 3, the final 5-years of the 15-year implementation period, is used to measure the improvement in water quality as implementation practices reach full maturation.

Many implementation activities are already underway in the watersheds. These activities are strongly supported and the recommendation from the RR TMDL IP Steering Committee is a continuation of those efforts that are complementary to this plan. Implementation of bacteria control measures that also reduce sediment and nutrient loads are encouraged, as this reduces

the need for additional sediment and nutrient control measures that may be called for under the Chesapeake Bay TMDL.

The working groups also support prioritizing the placement of implementation practices to critical areas during Stage 1 to achieve the greatest impact in water quality in the shortest amount of time. Watershed inventory and modeling efforts suggest prioritizing North Fork Rockfish River sub-watersheds 34, 49, and 53; and South Fork Rockfish River sub-watersheds 23 and 25 for livestock exclusion practices. Bacterial loads from residential sources located close to a stream are highest in South Fork Rockfish River sub-watersheds 13, 22, 26, and 27; mainstem Rockfish River sub-watershed 8; and North Fork Rockfish River sub-watersheds 41 and 45.

Monitoring will begin after BMPs have been established and serves to document progress towards goals and to provide a mechanism for evaluating the effectiveness of the implementation actions for achieving intended water quality goals. The benefits of staged implementation are 1) as stream monitoring continues, it allows for water quality improvements to be recorded as they are being achieved; 2) it provides a measure of quality control, given the uncertainties which exist in any implementation plan; 3) it provides a mechanism for developing public support; 4) it helps to ensure that the most cost-effective practices are implemented initially; and 5) it allows for the evaluation of the adequacy of the TMDL in achieving the water quality standard.

6.3. Reasonable Assurance

Public participation is an integral part of the IP development and is critical in gaining support for both the voluntary implementation activities that are being planned. During the public participation process, the major stakeholders in the watershed and a wide variety of local conservation agency personnel were involved in Working Groups and public meetings, and provided additional information through email and phone conversations. This participation by the major watershed stakeholders provides a reasonable assurance that the public was contributing to the TMDL process and had input into the selection of management and implementation practices recommended by this IP.

The RR TMDL IP Steering Committee formed during development of the implementation plan will continue to provide oversight for implementation as needed, with guidance provided by agency members of VADEQ and VADCR, ensuring continuity of leadership and vision. Funding for implementation measures to improve water quality in the RR watersheds is currently being

provided through VADCR. TMDL Conservation Technicians are already on staff in the Thomas Jefferson SWCD to assist agricultural producers in implementing BMPs. The TMDL Conservation Technicians have agreed to take responsibility for promoting both agricultural and residential implementation practices within the watersheds.

Implementation to address the bacteria impairments on RR will be carried out primarily through the use of voluntary BMPs and education. While available cost-share programs will be utilized to the extent possible to provide incentives to targeted watershed stakeholders, it is recognized that it may be necessary in some instances to raise the level of incentives to 100% to ensure participation by some stakeholders. Grant funding will be sought to provide this additional incentive, which is expected to increase participation from specific targeted stakeholders that would otherwise be reticent to participate.

Taken together, all of these planning components comprise a reasonable assurance that implementation will progress as planned and will lead to restoration of water quality in Rockfish River.

6.4. Implementation Tracking

Tracking of agricultural and residential practices will be done by the Thomas Jefferson SWCD through the existing BMPCSP tracking maintained by VADCR. Tracking information will include the locations and numbers of practices installed in the watershed. Strategies to facilitate implementation, such as educational programs and other outreach activities will also be tracked. The RR TMDL IP Steering Committee will continue to provide oversight and direction as needed during implementation.

6.5. Water Quality Monitoring

Virginia's 1997 Water Quality Monitoring, Information and Restoration Act requires that TMDL IPs include measurable goals and milestones for attaining water quality standards. Implicit in those milestones is the requirement of a method to measure progress. Water quality improvement will be evaluated through water quality monitoring conducted by VADEQ. VADEQ will monitor four locations in the watersheds (Table 6-5, Figure 6-1). These ambient watershed stations will be sampled once a month through Stage 2 and Stage 3 of the project. VADEQ will collect water quality data at each station, including, but not be limited to, the following parameters: *E. coli* bacteria, temperature, dissolved oxygen, and specific conductance. In addition to the ambient monitoring, biological monitoring will also be conducted at station 2-

TLR000.52 to in the fall or spring of each year. The Steering Committee also discussed the possibility of adding additional monitoring stations through the DEQ Citizen Nomination process.

Table 6-5. VADEQ Monitoring Stations in the Rockfish River Watersheds.

VADEQ Station ID	Stream Name	Station Location
2-TLR000.05	Taylor Creek	Off Rt. 635
2-RFS001.00	South Fork Rockfish River	Rt. 613 Bridge (Nelson Co.)
2-RFN000.52	Rockfish River, North Fork	Rt. 6 Bridge
2-RKF026.42	Rockfish River	Rt. 634 Bridge

6.6. Evaluation of Progress

During each periodic evaluation of implementation progress on RR, a reassessment of implementation priorities will be made by the Steering Committee to readjust and fine-tune the targeting approach in concert with the staged implementation approach. Periodic re-evaluation is especially critical during these times of economic uncertainty, where increasing energy prices and fluctuating market prices are bound to affect stakeholders in the agricultural sector and their willingness to commit resources for conservation, especially if they are struggling to maintain their viability as a farming enterprise.

If reasonable progress toward implementing the management practices is not demonstrated, the Steering Committee will consider additional implementation actions. If it is demonstrated that reasonable and feasible management measures have been implemented for a sufficient period of time and TMDL targets are still not being met, the TMDL will be reevaluated and revised accordingly. If after five years the Steering Committee determines that load reductions are being achieved as management measures are implemented, then the recommended appropriate course of action would be to continue management measure implementation and compliance oversight. If it is determined that all proposed control measures have been implemented, yet the TMDL is not achieved, further investigations will be made to determine whether: 1) the control measures are not effective; 2) bacteria loads are due to sources not previously addressed; or 3) the TMDL is unattainable.

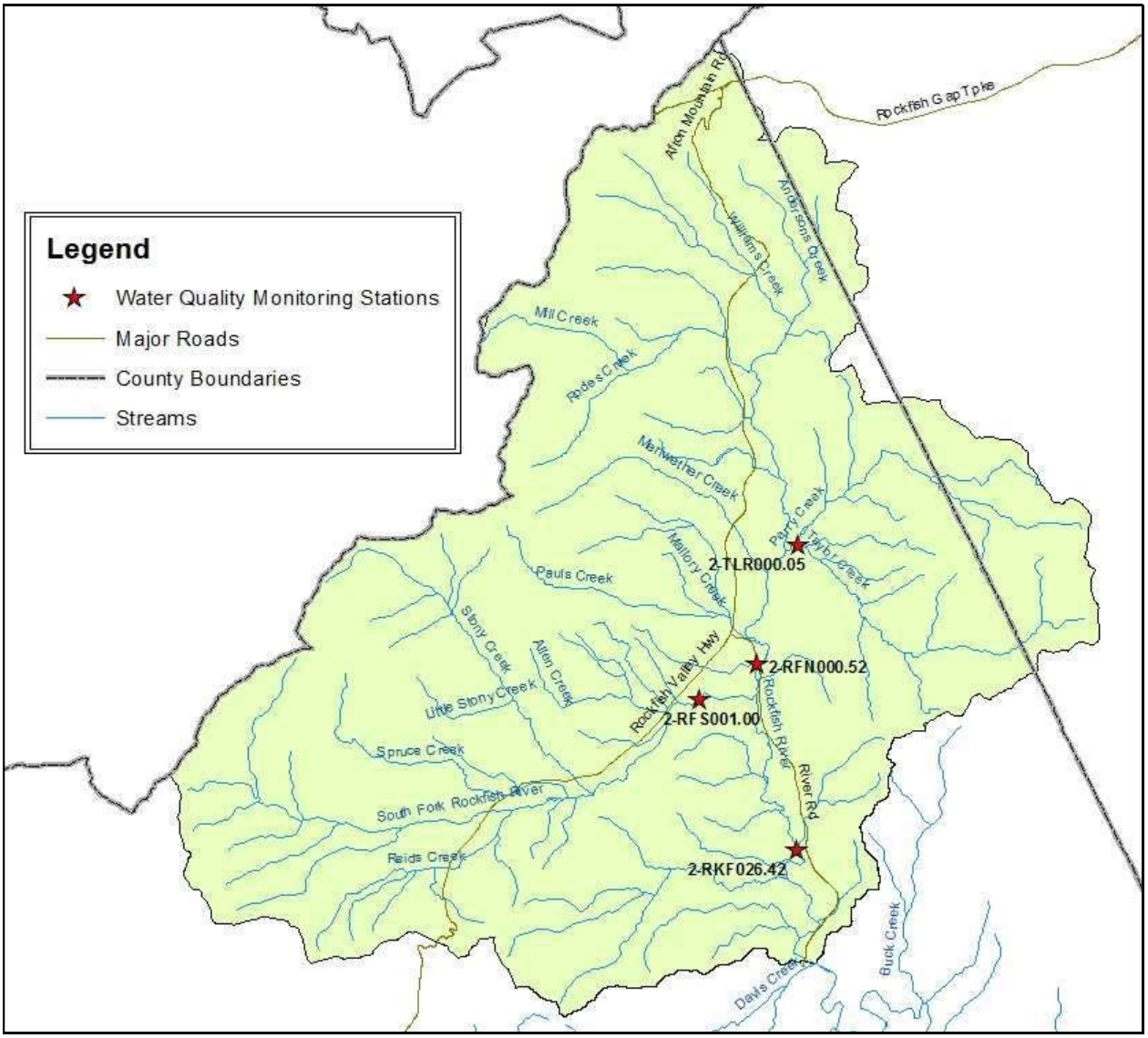

Figure 6-1. Location of Rockfish River TMDL Implementation Monitoring Stations.

7. STAKEHOLDERS' ROLES AND RESPONSIBILITIES

Stakeholders are individuals who live or have land management responsibilities in the watershed, including government agencies, businesses, private individuals, and special interest groups. Stakeholder participation and support is essential for achieving the goals of this TMDL effort (i.e., improving water quality and removing streams from the impaired waters list). The purpose of this chapter is to identify and define the roles of the stakeholders who will work together to put the IP into practice. The roles and responsibilities of some of the major stakeholders are described below.

7.1. Federal Government

United States Environmental Protection Agency (USEPA): USEPA 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. The U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) is the federal agency that works hand-in-hand with US citizens to conserve natural resources on private lands. NRCS assists private landowners with conserving their soil, water, and other natural resources. Local, state and federal agencies and policymakers also rely on the expertise of NRCS staff. NRCS is also a major funding stakeholder for impaired water bodies through CREP and the Environmental Quality Incentive Program (EQIP).

United States Fish and Wildlife Service: The USFWS is interested in supporting local water quality and habitat improvement projects for the recovery of the Roanoke logperch (Percina rex), Roanoke bass (Ambloplites cavifrons) and other aquatic species. Service interests include such activities as riparian fencing and alternate watering systems, riparian buffer establishment and removal of impediments to fish passage, including dam removals.

7.2. State Government

In the Commonwealth of Virginia, water quality problems are dealt with through legislation, incentive programs, education, and legal actions. Currently, there are five state agencies responsible for regulating and/or overseeing statewide activities that impact water quality in the Rockfish River watersheds.

Virginia Department of Environmental Quality (VADEQ): The State Water Control Law authorizes the State Water Control Board to control and plan for the reduction of pollutants

impacting the chemical and biological quality of the State's waters resulting in the degradation of the swimming, fishing, shell fishing, aquatic life, and drinking water uses. For many years the focus of VADEQ's pollution reduction efforts was the treated effluent discharged into Virginia's waters via the VPDES permit process. The TMDL process has expanded the focus of VADEQ's pollution reduction efforts from the effluent of wastewater treatment plants to the NPS pollutants causing impairments of the streams, lakes, and estuaries. The reduction tools are being expanded beyond the permit process to include a variety of voluntary strategies and BMPs.

VADEQ is the lead agency in the TMDL process. The Code of Virginia directs VADEQ to maintain a list of impaired waters and develop TMDLs for these waters. VADEQ administers the TMDL process, including the public participation component, and formally submits the TMDLs to USEPA and the State Water Control Board for approval. VADEQ is also responsible for implementing point source WLAs, assessing water quality across the state, and conducting water quality standard related actions. The Code also requires the development of IPs for the TMDLs. VADEQ is providing funding for the development of the RR IP.

Virginia Department of Conservation and Recreation (VADCR): VADCR is authorized to administer Virginia's NPS pollution reduction programs in accordance with §10.1-104.1 of the Code of Virginia and §319 of the CWA. USEPA requires much of the §319 grant monies be used for the development of TMDLs. Because of the magnitude of the NPS component in the TMDL process, VADCR is a major participant in the TMDL process. VADCR has a lead role in the development of IPs to address correction of NPSs contributing to water quality impairments. VADCR also provides available funding and technical support for the implementation of NPS components of IPs. The staff resources in VADCR's TMDL program focus primarily on providing technical assistance and funding to stakeholders to develop and carry out IPs, and support to VADEQ in TMDL development related to NPS impacts. VADCR staff will also be working with other state agencies, Soil and Water Conservation Districts, and watershed groups to gather support and to improve the implementation of TMDL plans through utilization of existing authorities and resources.

Virginia Department of Agriculture and Consumer Services (VDACS): The VDACS 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. 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 may include civil penalties. 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.

Virginia Department of Health (VDH): The VDH is responsible for maintaining safe drinking water measured by standards set by the USEPA. Like VDACS, VDH is complaint driven. Their duties also include regulation of septic systems, straight pipes, and biosolids land application. For TMDLs, VDH has the responsibility of enforcing actions to correct failed septic systems and/or eliminate straight pipes (Sewage Handling and Disposal Regulations, 12 VAC 5-610-10 et seq.).

Virginia Department of Forestry (VADOF): The VADOF has prepared a manual to inform and educate forest landowners and the professional forest community on proper BMPs and technical specifications for installation of these practices in forested areas. Forestry BMPs are directed primarily to control erosion. For example, stream-side forest buffers provide nutrient uptake and soil stabilization, which can benefit water quality by reducing the amount of nutrients and sediments that enter local streams. VADOF's BMP program is voluntary.

Another state entity with responsibilities for activities that impact water quality in the Rock-fish River watersheds is the Virginia Cooperative Extension (VCE). VCE is an educational outreach program of Virginia's land grant universities (Virginia Tech and Virginia State Univer-sity), and apart of the national Cooperative State Research, Education, and Extension Service , an agency of the United States Department of Agriculture. VCE is a product of cooperation among local,state, and federal governments in partnership with citizens. VCE offers educati-onal programs and technical resources for topics such as crops, grains, livestock, poultry, dairy, natural resources, and environmental management. VCE has published sev-eral publications that deal specifically with TMDLs.

7.3. Regional and Local Government

Regional and local government groups work closely with state and federal agencies throughout the TMDL process; these groups possess insights about their regional and local community that may help to ensure the success of TMDL implementation. These stakeholders have knowledge about a community's priorities, how decisions are made locally, and how the watershed's

residents interact. Some local government groups and their roles in the TMDL process are listed below.

Thomas Jefferson SWCD: Soil and Water Conservation Districts (SWCDs) are local units of government responsible for the soil and water conservation work within their boundaries. The districts' role is to increase voluntary conservation practices among farmers, ranchers and other land users. District staff work closely with watershed residents and have valuable knowledge of local watershed practices.

Nelson and Albemarle Counties: County government staff members work closely with state agencies to develop and implement TMDLs in concert with their comprehensive plans. They may also help to promote education and outreach to citizens, businesses and developers to introduce the importance of the TMDL process.

7.4. Businesses, Community Groups, and Citizens

While successful implementation depends on stakeholders taking responsibility for their role in the process, the primary role falls on the local groups that are most affected; that is, businesses, community watershed groups, and citizens. Virginia's approach to correcting non-point source pollution problems continues to be encouragement of participation through education and financial incentives; that is, outside of the regulatory framework. If, however, voluntary approaches prove to be ineffective, it is likely that implementation will become less voluntary and more regulatory.

Community Watershed Groups: (Rockfish Valley Foundation, Friends of the Rockfish, etc.) Local watershed groups offer a meeting place for river groups to share ideas and coordinate preservation efforts and are also a showcase site for citizen action. Watershed groups also have a valuable knowledge of the local watershed and river habitat that is important to the implementation process.

Citizens and Businesses: The primary role of citizens and businesses is simply to get involved in the TMDL process. This may include participating in public meetings, assisting with public outreach, providing input about the local watershed history, and/or implementing BMPs to help restore water quality.

Community Civic Groups: Community civic groups take on a wide range of community service including environmental projects. Such groups include the Ruritan, Farm Clubs, Homeowner

Associations and youth organizations such as 4-H and Future Farmers of America. These groups offer a resource to assist in the public participation process, educational outreach, and assisting with implementation activities in local watersheds.

Animal Clubs/Associations: Clubs and associations for various animal groups (e.g., beef, equine, poultry, swine, and canine) provide a resource to assist and promote conservation practices among farmers and other land owners, not only in rural areas, but in urban areas as well, where pet waste has been identified as a source of bacteria in water bodies.

8. INTEGRATION WITH OTHER WATERSHED PLANS

Each watershed within the state is under the jurisdiction of a multitude of individual yet related water quality programs and activities, many of which have specific geographical boundaries and goals. These include, but are not limited to, Total Maximum Daily Loads, water quality management plans (WQMPs), sediment and erosion control regulations, stormwater management (SWM), Source Water Assessment Program (SWAP), and local comprehensive plans.

8.1. Continuing Planning Process

According to Perciasepe (1997) the continuing planning process (CPP) established by Section 303(e) of the CWA provides a good framework for implementing TMDLs, especially the NPS load allocations. Under the Section 303(e) process, states develop and update statewide plans that include TMDL development and adequate implementation of new and revised water quality standards, among other components. The water quality management regulations at 40 CFR 130.6 require states to maintain WQMPs that are used to direct implementation of key elements of the continuing planning process, including TMDLs, effluent limitations, and NPS management controls. These state WQMPs are another way for states to describe how they will achieve TMDL load allocations for NPSs. The CPP in Virginia is implemented in various state programs, all aimed toward achieving and maintaining the state water quality standards. Virginia Code Sections 62.1-44.15(10) & (13), 62.1-44.17:3, and 62.1-44.19:7 give the Virginia State Water Control Board (Board) the duty and authority to conduct the CPP in Virginia. Under the authority of Virginia Code Section 10.1-1183, VADEQ serves as the administration arm of the Board. Virginia WQMPs consist of initial plans produced in accordance with Sections 208 and 303(e) of the CWA and approved updates to the plans. Currently, Virginia has a total of 18 WQMPs developed under Sections 208 and 303(e). Many of these plans are outdated, and efforts are underway to update them. The updated plans will serve as repositories for all TMDLs approved by USEPA and adopted by the Board, as well as IPs approved by the Board.

8.2. Watershed and Water Quality Management Planning Programs in Virginia

TMDLs – TMDLs are the maximum amount of pollutant that a water body can assimilate without surpassing state water quality standards. TMDLs are developed for water bodies that are listed on a state's 303(d) list, known as the "Impaired Waters List." The TMDL develops a waste load allocation for point sources and a load allocation for NPSs and incorporates a "margin of safety" in defining the assimilation capacity of the water body. The IP outlines strategies to meet the allocations.

This project watershed is within the Chesapeake Bay Watershed Implementation Plan drainage area. Most BMPs that address bacteria reduction will also help reduce nutrients and sediment from entering the waterways. With overlapping BMP implementation goals, coordination between lead agencies and the documentation of work completed is important.

WQMPs – Water Quality Management Plans (WQMPs) are produced and updated by VADEQ in accordance with Sections 208 and 303(e) of the CWA as outlined in the CPP section above. These plans will be the repository for TMDLs and TMDL IPs.

SWM – Stormwater Management (SWM) programs are implemented according to the Virginia Stormwater Management Law and Virginia Stormwater Management Regulations (VSWML&R). These statutes are specifically set forth regarding land development activities to prevent water pollution, stream channel erosion, depletion of ground water resources, and more frequent localized flooding to protect property values and natural resources. SWM programs operated according to the law are designed to address these adverse impacts and comprehensively manage the quality and quantity of stormwater runoff on a watershed-wide basis. VADCR oversees regulated activities undertaken on state and federal property, while localities have the option to establish a local program to regulate these same activities on private property in their jurisdiction.

SWAP – Section 1453 of the 1986 Amendments of the Safe Drinking Water Act (SDWA) requires each state to develop a Source Water Assessment Plan (SWAP) that will delineate the boundaries of the assessment areas from which public water systems receive drinking water using hydrogeologic information, water flow, recharge, and discharge and other reliable information. The VDH is the primary agency for drinking water and is therefore responsible for

SWAP. In Virginia, all 187 surface water intakes serving 151 public waterworks have completed surface water assessments. All 4,584 ground water source assessments, serving nearly 4,000 public waterworks, were completed by the end of 2003.

Local Comprehensive Plans – (Nelson and Albemarle Counties) Virginia state law requires all local governments have an adopted comprehensive plan. Typical topics addressed in a comprehensive plan include the analysis of population change, land use and trends, natural and environmental features, transportation systems, and community facilities and services. Local comprehensive plans should be referred to in the TMDL development process as well as TMDL implementation, especially for urbanized watersheds.

9. POTENTIAL FUNDING SOURCES

Chesapeake Bay Watershed Initiative – This initiative was authorized in the 2008 Farm Bill for 2009-2012. It provides technical and financial assistance to producers to implement practices that reduce sediment and nutrients to help protect and restore the Chesapeake Bay. Priority has been given to the Shenandoah and Potomac River Basins and selected watersheds that have impaired streams due to high levels of nutrients and sediment. Producers who live in an NRCS high priority Chesapeake Bay watershed receive additional consideration in the funding ranking process.

Clean Water State Revolving Fund – USEPA 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, NPS, 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. NPS projects include agricultural, silviculture, rural, and some urban runoff control; on-site wastewater disposal systems (septic tanks); land conservation and riparian buffers; leaking underground storage tank remediation, etc.

Conservation Reserve Enhancement Program – The Conservation Reserve Enhancement Program (CREP) is a voluntary land retirement program that helps agricultural producers protect environmentally sensitive land, decrease erosion, restore wildlife habitat, and safeguard ground and surface water. CREP is an offshoot of the country's largest private-lands environmental improvement program -- the Conservation Reserve Program (CRP). Like CRP, CREP is administered by USDA's Farm Service Agency (FSA). CREP addresses high-priority conservation issues of both local and national significance, such as impacts to water supplies, loss of critical habitat for threatened and endangered wildlife species, soil erosion, and reduced habitat for fish populations such as salmon. CREP is a community-based, results-oriented effort centered on local participation and leadership. CREP contracts require a 10- to 15-year commitment to keep lands out of agricultural production. A federal annual rental rate, including an FSA state committee-determined maintenance incentive payment, is offered, plus cost-share of up to 50 percent of the eligible costs to install the practice.

Environmental Quality Incentives Program – The USDA Natural Resources Conservation Service's Environmental Quality Incentives Program (EQIP) was established to provide a voluntary conservation program for farmers and ranchers to address significant natural resource needs and objectives. EQIP offers financial and technical help to assist eligible participants install or implement structural and management practices on eligible agricultural land.

EPA Section 319 Grant Incremental Funds – Through Section 319 of the Federal CWA, Virginia is awarded grant funds to implement NPS programs. The VADCR administers the money annually on a competitive grant basis to fund watershed projects, demonstration and educational programs, NPS pollution control program development, and technical and program staff including TMDL Implementation.

Landowner Incentive Program (Non-Tribal) – The U.S. Fish and Wildlife Service's Landowner Incentive Program (LIP) grant program provides competitive matching grants to states, territories, and the District of Columbia to establish or supplement landowner incentive programs. LIP is a grant-based voluntary cost-share program administered by Virginia Department of Game and Inland Fisheries. These programs provide technical and financial assistance to private landowners for projects that protect and restore habitats of listed species or species determined to be at-risk. LIP projects will likely involve activities such as the restoration of marginal farmlands to wetlands, the removal of exotic plants to restore natural prairies, a change in grazing practices and fencing to enhance important riparian habitats, instream structural improvements to benefit aquatic species, road closures to protect habitats and reduce harassment of wildlife, and acquisition of conservation easements. Although not directly eligible for these grants, third parties such as nonprofit organizations may benefit from these funds by working directly with their states to see if either grants or partnering opportunities are available. Private landowners within the James River Basin (including the Rockfish River, and all tributaries) are eligible for program benefits.

National Fish and Wildlife Foundation – Grant proposals for this funding are accepted throughout the year and processed during fixed sign up periods. 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. Grants generally range between $10,000 and $150,000. 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. If the project does not fall into the criteria of any special grant programs, a 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.

Nelson County Community Development Foundation – Operated through the Thomas Jefferson Planning District Commission, this foundation assists local income and distressed homeowners with "funds, personnel and other assistance for the development of housing, health, water and wastewater facilities, education, recreation and economic development". The Foundation has worked with a number of homeowners to rehabilitate straight pipes and failing septic systems.

Southeast Rural Community Assistance Project (Southeast RCAP) – 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 Southeast RCAP 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.

Virginia Aquatic Resources Trust Fund (VARTF) – The Virginia Aquatic Resources Trust Fund is administered in partnership with The Nature Conservancy in Virginia, the VADEQ, and the United States Army Corps of Engineers Norfolk District. The Trust Fund helps make large-scale conservation possible. The program is able to implement large-scale watershed efforts that restore, enhance, and protect water quality through cost-effective, ecologically preferable projects.

Virginia Agricultural Best Management Practices Cost-Share Program – The Virginia Agricultural Best Management Practices (BMPs) Cost-Share Program provides funds to help install conservation practices that protect water and make farms more productive. Funding availability varies by SWCD. The state provides SWCDs with funds to target areas with known water quality needs. Areas with the greatest need receive the greatest funding. The cost-share program supports using various practices in conservation planning to treat animal waste, cropland, pastureland and forested land. Some are paid for at a straight per-acre rate. Others are cost-shared on a percentage basis up to 85 percent. In some cases, USDA also pays a percentage. In fact, the cost-share program's practices can often be funded by a combination of

state and federal funds, reducing the landowner's expense to less than 30 percent of the total cost. Cost-share funds are also available for approved innovative BMP demonstration projects intended to improve water quality.

Virginia Agricultural Best Management Practices Loan Program – The Virginia Agricultural Best Management Practices Loan Program provides a source of low interest financing which will encourage the use of specific best management practices which reduce or eliminate the impact of Agricultural Nonpoint Source (NPS) pollution to Virginia's waters. VADEQ's Virginia Ag BMP loan program is a subset of the parent Virginia Clean Water Revolving Loan Fund (VCWRLF) loan program and is intended to create a continuing source of low interest financing that will be available to Virginia's agricultural producers to assist them in their efforts to reduce agricultural non-point source pollution. Unlike other assistance programs, the Ag BMP loan program is not dependent on legislative appropriations for its fund availability. All repayments of principle and interest from previous Ag BMP loans are returned to the Fund and used to provide additional loans to other Virginia farmers. In addition to the revenue available from repayments, VADEQ will request that the State Water Control Board (SWCB) consider making additional funding set-asides from the VCWRLF revenue as deemed necessary in order to meet Virginia's agricultural non-point source pollution reduction needs.

Virginia Agricultural Best Management Practices Tax Credit Program - For all taxable years, any individual or corporation, who is engaged in agricultural production for market and who has in place a soil conservation plan approved by the local SWCD, is allowed a credit against the tax imposed by Section 58.1-320 of an amount equaling 25% of the first $70,000 expended for agricultural best management practices by the individual. The amount of the credit cannot exceed $17,500 or the total amount of the tax imposed by this program (whichever is less) in the year the project was completed. 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 Environmental Endowment – The Virginia Mini-Grant Program supports community-based efforts to strengthen environmental education and to promote stewardship of Virginia's waterways. Preference is given to modest local projects. Public and private schools (K-12) and nongovernmental, nonprofit community organizations in Virginia are eligible to apply for one-year Mini-Grant awards up to $5,000. Local, state, and federal government agencies and programs are not eligible.

Virginia Open-Space Lands Preservation Trust Fund – Farmland, forest land, and open spacel and are important to our heritage in Virginia. These lands are under increasing pressure from urban development in parts of the Commonwealth. The 1997 Virginia General Assembly created a new fund (Va. Code Sections 10.1801-2) to assist landowners with the costs of conveying conservation easements and the purchase of all or part of the value of the easements. The fund is operated by the Virginia Outdoors Foundation. Conservation easements preserve farmland, forestland, and natural and recreational areas by restricting intensive uses, such as development and mining, which would alter the conservation values of the land. An easement is a voluntary legal agreement between a landowner and a public body or conservation group in which the parties agree to protect the open-space and natural resource values of the land. Each easement is tailored to reflect the conservation values of the property and is recorded in the local courthouse as a permanent part of the property records. Easements do not grant public access to a landowner's property. Costs that the fund may reimburse include legal costs, appraisal and other costs, and all or part of the easement's value. To be eligible, the easement must be perpetual in duration.

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 loans are available in amounts up to $50,000 and will carry an interest rate of 3%, 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. 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 – The purpose of the Virginia Water Quality Improvement Act of 1997 (WQIA) is to restore and improve the quality of state waters and to protect them from impairment and destruction for the benefit of current and future citizens of the Commonwealth of Virginia (Section 10.1-2118 of the Code of Virginia). The purpose of the fund is to provide water quality improvement grants to local governments, soil and water conservation districts and individuals for point and nonpoint source pollution prevention, reduction and control programs (Section 10.1-2128.B. of the Code of Virginia). Nonpoint source pollution is a significant cause of degradation of state waters. The Virginia Department of

Environmental Quality (VADEQ) is responsible for administering point source grants and the Virginia Department of Conservation and Recreation (VADCR) administers nonpoint source grants. WQIF funds are provided, in accordance with the guidelines, to help stimulate nonpoint source pollution reduction through the Virginia Agricultural Best Management Practices Cost-share Program and water quality improvement projects. VADCR staff provides technical assistance, as well as financial assistance. During implementation in the RR watersheds, standards, specifications, cost-share, and tax credits for practices under the Virginia Agricultural BMP Cost-share Program will be followed for funding eligibility.

Wildlife Habitat Incentive Program (WHIP) – WHIP is a voluntary program for landowners who want to develop or improve wildlife habitat on private agricultural 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. Cost-share assistance of up to 75% of the total cost of installation (not to exceed $10,000 per applicant) is available for establishing habitat. 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.

Wetland and Stream Mitigation Banking – Mitigation banks are sites where aquatic resources such as wetlands, streams, and streamside buffers are restored, created, enhanced, or in exceptional circumstances, preserved expressly for the purpose of providing compensatory mitigation in advance of authorized impacts to similar resources. Mitigation banking is a commercial venture which provides compensation for aquatic resources in financially and environmentally preferable ways. Not every site or property is suitable for mitigation banking. Wetlands and streams are complex systems, and their restoration, creation, enhancement, or preservation often requires specialized ecological and engineering knowledge. Likewise, the mitigation banking process requires experience to efficiently navigate. Mitigation banks are required to be protected in perpetuity, to provide financial assurances, and long term stewardship. The mitigation banking processes is overseen by the Inter-Agency Review Team (IRT) consisting of several state and federal agencies and chaired by DEQ and Army Corps of Engineers. For more information, contact the Army Corps of Engineers or VADEQ's Virginia Water Protection Program.

Wetland Reserve Program (WRP) – This program is a voluntary program to restore and protect wetlands on private property. 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. 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.

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APPENDIX A. STEERING, WORKING GROUP, AND PUBLIC MEETING SUMMARIES

Notes on the Ag Working Group Meeting: Rockfish River/Taylor Creek
September 21, 2011

Karen Kline, VT-BSE, described the quantification of stream lengths and fencing needs in each of the modeled subwatersheds.

Kory Kirkland, USDA-NRCS, stated that most livestock producers in the watershed do not participate in USDA programs, although he felt sure that they knew what was available.

Nesha McRae, DCR, discussed two livestock exclusion practices (LE-1T requiring a 35-ft setback and LE- 2T with a 10-ft setback) that would be applicable in this watershed. However, she did state that these practices must be included in the IP in order to become eligible practices. The SL-6B practice, Alternative Water System in pasture, was also discussed. A 25% tax credit is available for this practice.

Kory characterized the pastures in the watershed as having higher stocking densities than optimal, poorer management, but with a mixture of grasses that may allow for longer useful grazing periods.

Nesha asked about the possibility that some of the land designated as pasture is actually hay fields.

In delineating intermittent streams, NRCS distinguishes (in the field) between seasonal and storm flow. Those intermittent streams that only run during storm flow are not recommended for livestock exclusion. VT should look for a way to try and reduce the length of intermittent streams included in the IP. In Smith Creek, this was done by only including 30% of the intermittent stream length. The Ag Working Group will review and discuss maps of the intermittent streams, their locations in the watersheds and decide what is appropriate with this additional information at the next meeting.

For pasture management, there is a new limited state BMP for prescribed grazing, SL-10T, similar to the NRCS 528 practice, that would pay $25/ac over a 3-yr period up to a maximum of 125 acres per farm. The practice is currently limited to two demonstration projects, but could be included in this IP in case the Rockfish watershed becomes eligible.

The sediment reductions called for in Taylor Creek can be met primarily with the same practices and extents of livestock exclusion and pasture management called for in the Stage I reductions for bacteria. Additional pro-active plans for forest harvesting and construction BMPs should be included in the IP to minimize effects from these land uses, when they are present in the watershed. Kory and Taylor Pippins, TJSWCD, will assist in reviewing efficiency and cost estimates associated with the various recommended BMPs to be considered for the IP.

A suggestion was made regarding residential practices that a demonstration rain garden be installed somewhere in the watershed, such as a local feed or seed store, the farmer's market, a farm auction site, or community center. Some additional cost-shared practices that could be sold to farmers and landowners would be those dealing with wildlife habitat, such as WHIP, or those that limit access for the livestock instead of excluding them all together. A question was raised about conservation easements in the watershed, and that data will be included in the IP.

Various suggestions were made for organizations to include in outreach efforts, including VCE, Ruritan Clubs, the Rockfish Valley Foundation, key farmers, Farm Bureau, and peer-to-peer farmer networks, possibly starting with Shannon Farms and other farmers who have attended previous local steering committee (LSC) or public meetings for these TMDLs. The Farmer's Market was also named as a resource that could be used to educate producers as well as consumers.

Notes on the Residential Working Group Meeting: Rockfish River/Taylor Creek September 21, 2011

Karen described the procedure for estimating human and pet populations, and procedures used to estimate numbers of suspected straight pipes and failing septic systems.

A discussion ensued about how straight pipes and failing septic systems could be identified and reported to VDH. Tom Eick, VDH-Nelson County, responded that anyone can submit an anonymous tip, and that he would then investigate. He said he would be glad to investigate any set of potential locations that we might be able to provide based on age of house and proximity to streams. Stream walk data are also available from a local group, and a local riverkeeper could also be requested to investigate straight pipe evidence from suspected locations. If identified, VDH would work with problem system to remedy the problem and to locate available sources of funding to assist owners.

The group estimated that a septic system pump out in this area costs approximately $300, a conventional septic system to replace a failing septic system or straight pipe costs approximately $5,000 to $6,000, and an alternative septic system (a practice becoming more and more common) costs approximately $25,000 to $30,000. A list of licensed sewage handlers was distributed.

VDH mentioned several sites relevant to our discussion. Homes along the Beech Grove Road area are also older and near to the stream and may have potential for a group solution. Many older homes have limited acreage or poor soils. In general, homes on sites less than an acre with a failed system and close to a stream represent very difficult fixes, especially since VDH has 50 ft setback requirements from the streambank. Neighborhood shared systems could be a useful tool for low-income communities in the watershed.

While considered to be a minimal source of the bacteria problem, pet waste may be an issue near areas of concentrated pets, such as in private kennels and in homes offering pet sitting services.

Outreach possibilities included presentations to older citizens at the community center and PTA meetings. Mention was made of including education of elementary school students as a way of engaging their parents. Two local periodicals include Nelson County Life and Rural Nelson that may be used for educational descriptions of opportunities available through the IP. The Residential Working Group would like to see at “at-risk” prioritization map of subwatersheds where homes are located in close proximity to the streams or where homes are on average older, and therefore more at-risk to have failing septic systems.

It was proposed that a brochure could be developed to educate area residents of any funding available to help with the replacement or repair of failing septic systems. Mike LaChance, Cooperative Extension, suggested that the brochure include information regarding the link between failing septic systems and private well water quality. Local Virginia Master Well Owners may be willing to distribute the brochures at the Nelson County food bank.

A discussion also developed around the topic of petitioning the Board of Supervisors to acknowledge the importance of water quality for tourism and scenic values in the area, and that one way of achieving improved water quality would be to fence livestock out of streams. Perhaps the TJSWCD could introduce DEQ and/or representatives of the Local Steering Committee could give the board regular updates on the status of the project and make appropriate presentations to the board at some point. The challenge being to have local pressure applied for this type of change, since incentives have not worked in the past, and the threat of regulation does not effectively motivate local change.

Rockfish Streambank Erosion Workshop
October 25, 2011

Notes

- Who will write the plan? DEQ and contractor (VATECH) and SWCD would like to review
- Concerned that ag land will be sold if farmers are required to implement costly practices
- Flooding every 3-4 month, washing out fencing
- Regulations already in place for some things, does it matter if people get on board w/ TMDL?
- Concern is not now but 5 yrs from now (will regulations come?)
- What about impact of straight pipes? These should be a high priority
- EPA visits to farms in Rockingham County are a concern, question about what can be regulated NOW? (Livestock exclusion?)
- There are reduced setback fencing practices (10 ft)
- Landowners have responsibility to provide clean water, we live upstream of the bay

Barriers

- No money to do practices – slim profit margin
- Not enough assistance in cost-share
- Desire to keep Nelson County rural
- Other sources more important (straight pipes, Wintergreen)
- Flooding issues
- Future regulation increase
- Too much regulation now

Ideas

- Increase cost-share—both higher $$ and higher %age
- Decrease population and regulation
- How to make farming productive
- Perhaps have experimental farm restoration/practices (Shannon Farm?)
- Host Farm tours to see fencing/restoration in action (TJSWCD?)
- Alternative fencing exhibits/ideas – voluntary BMPs (top of bank)
- Assistance with fencing maintenance
- Include money for streambank restoration – cooperation w/ cost-share and DGIF programs

Rockfish TMDL - IP Agricultural Working Group Meeting
November 29, 2011

Tara Sieber (DEQ) opened the meeting at the Rockfish Valley Community Center with introductions and a review of "where we've been" with the Rockfish TMDL and IP process. Karen Kline (VT-BSE) began by noting the revisions made to the TMDL. She then reviewed the animal numbers and took questions on how these numbers were developed. The group decided that priority should be placed on perennial streams when livestock exclusion cost-share money is distributed by if interested and able, landowners would be encouraged to preserve intermittent streams as well. Nesha McRae (DCR) suggested using aerial photography to estimate how many farms have both perennial and intermittent streams and use this as the estimated percentage for the IP.

When discussing the prioritization of subwatersheds for cost-share programs, the group wanted to be sure that high prioritization was NOT in narrow alleys with steep slopes because these landowners do not have pasture land to spare. One participant volunteered his experience with stream fencing, including 1-strand electric wire, no setbacks, and 10-12 stream crossings. The group worried about "biting off too much to chew at once", and discussed how to outreach in priority subwatersheds, including staged implementation. Lower priorities were placed on subwatersheds 2 and 1 on the Rockfish River because there was not much livestock in those areas.

After much discussion, the group agreed that more landowners would probably be interested in smaller setback. Nesha cautioned to leave some room for interested landowners to take advantage of the larger cost-shares (and money for wells and pipes) and voluntary flex fencing. The final figures were as follows: 65% 10 ft buffer, 25% 35 ft buffer and 10% voluntary flex fencing.

A participant was interested in the "Fair Market Value" of work done by landowners as part of cost-share projects. VT-BSE will check with the TJSWCD and NRCS. The group discussed the reductions on Taylor Creek, led by Gene Yagow (VT-BSE).

Nesha recommended adding some cropland programs in the Implementation Plan because funding can only support items in the IP. Karen said she would add some cover crops, filter strips and conservation tillage, which the group said would be acceptable to landowners.

Pasture management will be the topic at the next Ag Working Group meeting. Tara wondered when would be best to meet again; the group decided that mid-January at 10am would be best. Tara asked the group for a volunteer to represent the Ag Working Group's discussions and concerns at the Steering Committee meeting, and Martha Warring stood up. The Steering Committee meetings are open to all, and everyone is welcome to attend, give some input for the public meeting and review some final documents.

Rockfish TMDL - IP Residential Working Group Meeting
November 29, 2011

Tara opened the meeting at the Wintergreen Real Estate Office with introductions and a review of "where we've been" with the Rockfish TMDL and IP process. Karen Kline (VT-BSE) then reviewed the revisions made to the TMDL. The group then moved to discuss the prioritization and septic system numbers. A participant asked about the proximity of septics to the stream and how this impacts the amount of bacteria loading into the stream. The group agreed that outreach is going to be an essential piece of improving septic systems. The group also discussed how to gain access to streams to do streamwalks, which many participants thought would be helpful in locating straight pipes.

The group also reviewed signs of failing septic systems, including always-wet land, very green grass, and waste backing up into the house. Nesha McRae (DCR) shared that in other areas septic pump-outs have helped with the identification of failing septics and can be a key part of maintenance lessons. However, DCR prefers to apply grant money to repair and replacement of failing systems, not pump-outs. The group discussed asking companies to bundle neighborhood pump-outs for a discount. Another idea is having a "Two-Tier Approach" – asking for assistance for low-income families and giving very little assistance to middle class families (like $25).

One participant suggested that an outreach campaign could be built on the lesson "It's going to be expensive if your septic system fails". But first, the group agreed, a homeowner needs to find out if the septic system worked. Outreach ideas discussed included: Nelson County Life article, county website, communication to local organizations – Ruritans, churches, Wintergreen, conduct a "spring cleaning" campaign. Another attendee suggested that the group broaden the idea "what goes down the drain" campaign.

Karen reviewed some assumptions for the Implementation Plan. The group decided that 60% of the septic systems would be pumped-out for 5 years. Repairs, replacements and Alternative Waste Treatment systems will be based on numbers and BPJ of VDH.

The group concluded with another round of outreach brainstorming, including reaching out to elderly care/home health companies and the Jefferson Area Board of Aging for homeowners who may not be living with a functioning septic system. Also, Habitat for Humanity, the local schools and Senior Centers may be great placed to distribute information.

The meeting ended as Tara thanked the group for their input and asked if anyone was interested in representing the Residential Working Group on the Steering Committee. Some people expressed interest in attending the SC meeting. The Steering Committee meetings are open to all, and everyone is welcome to attend, give some input for the public meeting and review some final documents.

Notes from the Ag Working Group Rockfish River TMDL Implementation Plan
January 31, 2012

Tara Sieber, DEQ, welcomed everyone to the meeting and began by recapping where the TMDL process for the Rockfish currently stands, and the purpose of the meeting today. Attendees also wanted to hear updates from the Residential Working Group and the work done to reduce the contributions from straight pipes and failing septic systems. Karen Kline, VT-BSE, started reviewing the necessary reductions from agricultural lands to meet the TMDL. The discussions, while trying to focus on pasture land improvements that could be made to reduce bacteria contributions, also came back to the related topic of stream exclusion. A number of barriers to fencing implementation were discussed including narrow pastures, flooding, soil erosion, lack of funding, slim profit margins, etc. Attendees asked if money could be made available within the CREP program for long-term maintenance. Kory Kirkland from NRCS and Taylor Pippins from TJSWCD were in attendance to discuss the lack of enrollment in the federal and state cost-share programs. Several participants spoke up and stated that they had fenced off portions of their streamside lands and never received money, but their efforts should still be counted with the estimates of work already done. Discussions focused on how to account for all work completed towards the goals.

Another participant brought up monitoring, and that discussion was continued after the general Ag Working Group meeting. It was decided that folks from the Rockfish would submit a proposal to the DEQ Citizen Nomination process for two additional stations – one on the South Fork and one on the North Fork. These stations would gather additional data to help focus implementation efforts.

Karen redirected the conversation to MPs for Pasture land and the actions that landowners would consider placing on their property. The group decided that manure storage could work on a limited basis for certain landowners who feed next to the stream. However, retention ponds would not work, and critical area stabilization would have some limited application. For Cropland BMPs, Nesha McRae (DCR), recommended including money for cover crops, no-till and filter strip/grass buffers, but Kory stated that everyone was already doing no-till. It was agreed to keep funding for no-till in, just to have funding as a possibility.

Gene Yagow, VT-BSE, reviewed Taylor Creek sediment BMPs. Although most of the progress towards this goal will be made through bacteria BMPs for the entire watershed, there is a very small amount of reductions additionally that will need to be met. Gene recommended Erosion and Sediment Control on construction sites and forest harvesting areas, Barnyard controls, and critical area stabilization. Nesha questioned these practices and stated that in the past, it has been difficult to get developers to commit to additional E&S controls (beyond the regulations). In her experience, it may be better to do a critical area stabilization on residential land or some sort of enhanced E&S project. Another idea put forward was rain gardens on residential or agricultural lands in the watershed.

Tara ended the meeting by inviting folks to stay to review existing stream exclusion with Karen, or to discuss monitoring stations and efforts with her. Tara also reminded the group that everyone was invited to stay for the Steering Committee meeting which would begin at 12.15, which would review the Clean-up document, next steps and the public meeting.

Notes from the Steering Committee Meeting Rockfish River TMDL Implementation Plan January 31, 2012

Tara Sieber, DEQ, welcomed everyone to the meeting, asked folks to introduce themselves and began by recapping where the TMDL process for the Rockfish currently stands, and the various findings of the Agricultural and Residential Working Groups. She also stated the purpose of the Steering Committee, which was to review the process thus far, provide input for the TMDL IP document, and plan the final public meeting.

Karen Kline, VT-BSE, began the discussions regarding data needs, including new updated information on BMPs and cost-share in order to gauge success. Discussions ranged from voluntary practices to federal work done in the watersheds to components of practices. Kory Kirkland, NRCS, stated that he hadn't worked on a project in the watershed for at least a year, if not longer, and had no current practices on the ground. Karen asked the group about constructing a timeline – whether it should be in 5, 7 or 2 year increments. Many participants worried about keeping energy and focus for those periods of time, but eventually agreed on a 5 year timeline. Gene Yagow, VT-BSE, stated that this is an iterative process, which will take re-evaluation and possibly redirection. Nesha McRae, DCR, also shared with the group that DCR is re-evaluating its 5 yr funding schedule and is now on a 2.5 yr timeline with the possibility of refunding. The group kept to the 5 yr timeline.

A participant offered the currently dormant Friends of the Rockfish group as a move-through committee for re-evaluation and reporting requirements. The FOR group has money and a website that can be used to distribute information but no current direction. Nesha shared the experience of the Hays and Moffett Creeks IP project which has an annual progress update, with reporting to its interested stakeholders. Taylor Pippins, TJSWCD, said that the District is currently trying to record all voluntary BMPs within its 5 county area as part of the Chesapeake Bay TMDL effort. It may help to tie voluntary BMP reporting within the Rockfish IP to the larger regional effort.

Tara went on to describe the current DEQ monitoring going on in the Rockfish River watershed, which includes 4 stations – 1 on the North Fork, 1 on the South Fork, 1 on Taylor Creek and 1 on the mainstem of the Rockfish. The group discussed adding two more stations – one on each fork – as part of the Citizen Nomination program DEQ features every year. Peter Agelasto and Tara will work together with others' input to determine two sites to include in the CitNom application. Gene stated that he thought more monitoring could be done around these sites to assist in the efforts to find "hot spots" and direct implementation of BMPs. Another participant asked if Wintergreen Resort could be asked to do more monitoring. Tara stated that all voluntary monitoring would be helpful to complete the entire picture, fill in the gaps, etc.

Several other topics came up for the group to discuss. Several attendees thought it may be helpful to have DEQ present the plan to the Nelson County Board of Supervisors. Tara stated she would work with folks to figure that out. Another participant stated that this is helpful to understand in conjunction with the Region 2000 Water Plan, which was completed with assistance from the Region 2000 Planning District Commission. Karen reviewed other parts of the IP document and asked for edits and revisions; the document is in draft form and will need some work. Tara asked if the group would like to meet again before the public meeting; the answer was YES! The Steering Committee will meet again on February 28th at Noon (working lunch again) at the RVCC. Thanks to all who participated.

Rockfish River and Taylor Creek Local Steering Committee Meeting Notes
February 28, 2012

Wording may be needed to describe how to address identifying suspected straight pipes and failing septics so that implementation measures can be targeted.

The process of working with the homeowner – fines and jail vs. financial support to work on addressing the issue – was raised. It appears there are some local funds available through the Nelson County Community Development Foundation (George Creigher) for repair of failing septics and replacing straight pipes, especially with lower income folks.

Comments were made to emphasize the economic benefits of BMPs wherever possible.

Martha stated that any logging operation, whatever size, may not cause sediment to enter any stream. Many sawmills now require their logging contractors to be certified through the Sharp Loggers program. Although some cost-sharing is available to loggers through VDF for bridges and stabilization of stream crossings, for most BMPs, no cost share is available. The primary cost for the Forest Harvesting BMP, therefore, is for VDF technical assistance. We need to change the budget to reflect this.

How many landowners are we talking about? For livestock fencing, Nelson County parcel data could be overlain with streams with riparian pastures to generate a list of landowners, if that data can be obtained.

Gene suggested that a kmz layer of such stream segments could be generated for the FOR web site, and used as a basis for landowners reporting which segments already had stream fencing. Tim Padalino with County Planning said he could manage updating such a layer. (However, in talking with Karen later, she pointed out the problems we have had in the past with the NLCD pasture areas being exactly where they say they are. We use them more as a statistical representation of the sub-watersheds, but in reality the NLCD data often fit poorly with aerial imagery. We could possibly try re-doing this overlay with the NASS cropland data layer to see if this looks any better.)

The Public Meeting will be set for Wednesday, May 16th. Suggestions for displays included the groundwater model and Enviroscape, the Gaining Ground DVDs, especially portions that deal with livestock exclusion, and grazing management, and the video clip of the veterinarian talking about herd health.

APPENDIX B. GLOSSARY OF BMP AND OTHER CONTROL MEASURE DEFINITIONS

Alternative water system: A structural practice that will provide an alternative water source for livestock to discourage animal access to streams. Cost-sharing and/or tax credits may apply to construction or deepening of wells; development of springs or seeps, including fencing of the area where needed, to protect the development from pollution by livestock; construction or repair of dugouts, dams, pits, or ponds; and the installation of pipelines, storage facilities, cisterns, troughs and artificial watersheds.

Barnyard runoff controls: This practice consists of gutters and downspouts to redirect runoff from heavy use area protection around a facility.

Continuous no-till system: Planting crops every year without disturbing the soil through tillage.

Cover crop: A fall-seeded grass or legume crop planted after the harvest of corn or soybeans to maintain a vegetative cover over the winter.

Critical area stabilization: Establishing permanent vegetation on sites that have or are expected to have high erosion rates, and on sites that have physical, chemical or biological conditions that prevent the establishment of vegetation with normal practices. This practice is used in areas with existing or expected high rates of erosion or degraded sites that usually cannot be stabilized by ordinary conservation treatment.

Fencing: A constructed barrier to livestock, wildlife or people. Standard or conventional (barbed or smooth wire), suspension, woven wire, or electric fences shall consist of acceptable fencing designs to control the animal(s) or people of concern and meet the intended life of the practice.

Forest harvesting practices: These forest management practices reduce sediment loading to nearby water bodies through management of road and trail construction; harvesting and log removal activities; and harvest site preparation.

Hardened crossing: A controlled stream crossing for livestock and/or farm machinery in order to prevent streambed erosion and reduce sediment.

Improved pasture management: This practice consists of a series of measures to improve vegetative cover on, and reduce bacteria loading from, pasture areas and may include soil testing, application of lime and fertilizer based on soil testing results, maintenance of a 3-inch minimum grass height through the growing season except for droughts, mowing to control woody vegetation, and chain-harrowing to break-up manure piles after livestock are moved from field.

Livestock exclusion: Excluding livestock from areas where grazing or trampling will cause erosion of stream banks and lowering of water quality by livestock activity in or adjacent to the water. Limitation is generally accomplished by permanent or temporary fencing. In addition, installation of an alternative water source away from the stream has been shown to reduce livestock access.

Livestock exclusion fencing: This practice consists of installing fencing, both temporary and stream exclusion (permanent), for grazing distribution and to restrict stream access in connection with newly developed watering facilities. State and federal cost-sharing requires that the stream exclusion fence be placed a minimum of 35 feet away from the stream, except as designed in areas immediately adjacent to livestock crossings and controlled hardened accesses.

Livestock exclusion buffers: In the implementation plan, this term is used to differentiate the filtering benefits of the buffer, as opposed to the removal of livestock and their directly deposited bacteria loads from the stream. Removal of the livestock has an immediate effect in removing bacteria loads, while the buffer mitigates loading from surface runoff during storm events.

Loafing lot management system: This practice consists of preventing manure and sediment runoff from areas exposed to heavy livestock traffic from entering nearby water corridors and streams.

Reforestation of pasture or cropland: This practice consists of planting trees (hardwoods and/or conifers) on land currently used as cropland or pastureland in order to make a permanent land use conversion to forest, so as to more effectively control the soil and nutrient loss from surface runoff, thus improving water quality. As part of the practice, a permanent vegetative cover is to be established on gullied or eroded areas and shall be maintained until trees provide a protective canopy.

Riparian forest buffer: A protection method used along streams to reduce erosion, sedimentation, and the pollution of water from agricultural nonpoint sources. An area of trees and shrubs 35 – 300 feet wide located up gradient, adjacent, and parallel to the edge of a water feature.

Riparian grass buffer: Grass filter strips are vegetative buffers that are located along the banks of water courses to filter runoff, anchor soil particles, and protect banks against scour and erosion. The strips also improve water quality by filtering out fertilizers, pesticides, and microorganisms that otherwise might reach waterways. In addition, grass filter strips along streams serve as environmental corridors.

Septic system pump out: This preventative control measure consists of periodic maintenance of septic tank systems by having the tank pumped to remove solids and to inspect the septic tank. This practice also allows for the identification of systems which are not functioning properly. The practice also may include inspection of the distribution box to determine if the effluent is being properly distributed to the drainfields and the system is functioning in accordance to design.

Septic system repair: This measure consists of the correction of a malfunctioning on-site sewage disposal system to remove the presence of raw or partially treated sewage on the ground's surface, or in adjacent ditches or waterways, or in ground water.

Septic system, alternative: An alternative on-site waste treatment system is needed to correct a malfunctioning on-site sewage disposal system or to replace an identified straight pipe in situations where the installation/replacement of a septic tank system cannot be permitted. Alternative systems may include the following: aerobic treatment units, low pressure distribution systems, drip distribution systems, sand filters, elevated sand mounds, constructed wetlands, peat filters, vault privies, incinerator toilets, and composting toilets.

Septic system, new: This control measure consists of the installation of a septic tank system to replace an identified straight pipe which delivers sewage directly to a stream, pond, lake, or river or an installation to correct a malfunctioning on-site sewage disposal system. Cost-sharing may include the pump out and removal of solids from the malfunctioning septic tank, the installation of a septic tank and subsurface drainfield components, and the re-stabilization of disturbed areas by planting seed.

Septic system, new with pump: Same as for a new septic system, with the inclusion of a pump as a primary component to move waste to a higher elevation.

Sewer hookup, new: This practice consists of connecting a malfunctioning on-site sewage disposal system to public sewer, or replacing an identified straight pipe by a connection to public sewer. Cost-sharing may be authorized for the connection fee, which is the fee allowing the dwelling to be connected to the public sewer system, for the construction cost associated with connecting the dwelling to a sewer line, for re-stabilization of disturbed areas, and for the pump-out and removal of solids from the septic tank.

APPENDIX C. BMP CODES AND PRACTICE NAMES

CP-21: CREP filter strip (rental only)
CP-22: CREP riparian forest buffer (rental only)
CRFR-3: CREP riparian forest buffer
FR-1: Reforestation of erodible crop and pastureland
FR-3: Woodland buffer filter area
LE-1T: Livestock exclusion with riparian buffers
LE-2T: Livestock exclusion with reduced setback
RB-1: Septic tank pump out
RB-2: Connection of malfunctioning On-site Sewage Disposal System or straight pipe to public sewer
RB-3: Septic tank system repair
RB-4: Septic tank system installation/replacement
RB-4P: Septic tank system installation/replacement with pump
RB-5: Alternative on-site waste treatment system
SL-6T: Stream exclusion with grazing land management
SL-8B: Small grain cover crop for nutrient management and residue management
SL-10T: Pasture management
SL-15A: Continuous no-till system
WP-4B: Loafing lot management system
WQ-1: Grass filter strips