

Water Quality Improvement Plan

TYE RIVER, HAT CREEK, RUCKER RUN & PINEY RIVER



A plan to reduce bacteria in the water

Technical Document

June 17, 2014

Prepared by
VA Department of Environmental Quality

In Cooperation with
Local Stakeholders
Virginia Tech Biological Systems Engineering

This is a copy of the final report with website links removed. To receive the non-redacted copy, please refer to the VA DEQ website.

ACKNOWLEDGEMENTS

We would like to acknowledge the following organizations for their participation and support in the development of this plan:

Local landowners and stakeholders

Massie's Mill Ruritan Club

Nelson County

Thomas Jefferson Soil and Water Conservation District

Natural Resource Conservation Service

Chesapeake Bay Foundation

VA Department of Conservation and Recreation

1. INTRODUCTION

1.1 Background

The Clean Water Act (CWA) that became law in 1972 requires that all U.S. streams, rivers, and lakes meet their state's water quality standards. The CWA also requires that states conduct monitoring to identify polluted waters or those that do not meet standards. Through this required program, the state of Virginia has found that many streams do not meet state water quality standards for protection of the five beneficial uses: fishing, swimming, shellfish, aquatic life, and drinking.

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

Once a TMDL is developed, measures must be taken to reduce pollution levels in the stream. Virginia's 1997 Water Quality Monitoring, Information and Restoration Act (WQMIRA) states that the "Board shall develop and implement a plan to achieve fully supporting status for impaired waters". A TMDL Implementation Plan describes control measures, which can include the use of better treatment technology and the installation of best management practices (BMPs), to be implemented in order to meet the water quality goals established by the TMDL.

1.2 Designated Uses and Applicable Water Quality Standards

Water quality standards are designed to protect the public health or welfare, enhance the quality of water and serve the purposes of the State Water Control Law (§62.1-44.2 et

seq. of the Code of Virginia) and the federal Clean Water Act (33 USC §1251 et seq.).”

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

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.

1.2.1 Bacteria Water Quality Criterion (9 VAC 25-260-170)

In order to protect human health during primary contact recreation (e.g., swimming), the Commonwealth of Virginia has set limits on the amount of specific fecal bacteria in all state waters. The bacteria criterion for freshwater in place when Tye River, Rucker Run and Hat Creek were initially listed as impaired was based on fecal coliform. For a non-shellfish supporting water body to be in compliance with Virginia fecal coliform standard for contact recreational use, VADEQ specified the following criteria (Virginia Water Quality Standard 9 VAC 25-260-170):

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

If the waterbody exceeded either criterion more than 10% of the time, the waterbody was classified as impaired and a TMDL was developed and implemented to bring the waterbody into compliance with the water quality criterion. Based on the sampling frequency, only one criterion was applied to a particular datum or data set (Virginia Water Quality Standard 9 VAC 25-260-170). If the sampling frequency was one sample or less per 30 days, the instantaneous criterion was applied; for a higher sampling frequency, the geometric criterion was applied. The instantaneous fecal coliform water quality standard was modified in 2003 to a level of 400 colony forming units (cfu) per 100 ml.

Sufficient fecal coliform bacteria standard violations were recorded at VADEQ water quality monitoring stations to indicate that the recreational use designations were not

being supported in Tye River, Hat Creek, Rucker Run and Piney River (VADEQ, 2004, 2006, 2008). Most of the VADEQ's ambient water quality monitoring is done on a monthly or quarterly basis. This sampling frequency does not provide the two or more samples within 30 days needed for use of the geometric mean part of the standard. Therefore, VADEQ used the 400 cfu/100 mL standard in the 2004 Section 303(d) assessment for the fecal coliform bacteria monitoring data.

Studies have shown that there is a stronger correlation between the concentration of *E. coli* and the incidence of gastrointestinal illness than there is with fecal coliform (USEPA, 1986), so the state transitioned from a fecal coliform standard to an *E. coli* standard in 2008. All freshwaters were subject to the *E. coli* standard described below, and until June 30, 2008, the interim fecal coliform standard described below also applied to any sampling stations with fewer than 12 *E. coli* samples (State Water Control Board, 2006):

Interim Fecal Coliform Criterion: *Fecal coliform bacteria shall not exceed a geometric mean of 200 fecal coliform bacteria per 100 mL of water for two or more samples over a calendar month nor shall more than 10% of the total samples taken during any calendar month exceed 400 fecal coliform bacteria per 100 mL of water. This criterion shall not apply for a sampling station after the bacterial indicators described in subdivision 2 of this subsection [*E. coli* criterion] have a minimum of 12 data points or after June 30, 2008, whichever comes first.*

***Escherichia coli* Criterion:** *E. coli bacteria concentrations for freshwater shall not exceed a geometric mean of 126 counts per 100 mL for two or more samples taken during any calendar month and shall not exceed an instantaneous single sample maximum of 235 cfu/100mL.*

As a part of VADEQ's triennial review of water quality standards, revisions to the applicable bacteria standard were proposed in March 2008. The proposed revisions removed the interim fecal coliform criterion and revised the *E. coli* criterion to remove the instantaneous single sample maximum of 235 cfu/100ml. The revised criterion consists of only the *E. coli* geometric mean criterion of 126 cfu/100ml. Since this revised standard was approved by the State Water Control Board in October 2008, it was considered the applicable water quality standard for the development of the Tye River, Hat Creek, Rucker Run and Piney River bacteria TMDL (herein referred to as the Tye River TMDL). In addition to meeting the geometric mean criterion, the TMDL was also developed to meet the *E. coli* instantaneous target concentration of 235 cfu/100ml with a

violation rate of less than 10.5%. Meeting this target provided consistency with VADEQ assessment guidance (VADEQ, 2007).

1.3 Attainability of Designated Uses

All waters in the Commonwealth have been designated as "primary contact" for the swimming use regardless of size, depth, location, water quality or actual use. The bacteria standard described in Section 1.2 of this report is to be met during all stream flow levels and was established to protect bathers from ingestion of potentially harmful bacteria. However, many headwater streams are small and shallow during base flow conditions when surface runoff has minimal influence on stream flow. Even in pools, these shallow streams do not allow full body immersion during periods of base flow. In larger streams, lack of public access often precludes the swimming use.

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

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

In some streams for which TMDLs have been developed, water quality modeling indicates that even after removal of all of the sources of *E. coli* (other than wildlife), the stream will not attain standards. In such a case, after demonstrating that the source of *E. coli* contamination is natural and uncontrollable by effluent limitations and BMPs, the state may decide to re-designate the stream's use for secondary contact recreation or to adopt site specific criteria based on natural background levels of *E. coli*. All site-specific

criteria or designated use changes must be adopted as amendments to the water quality standards regulations. Watershed stakeholders and EPA will be able to provide comment during this process.

2. REQUIREMENTS FOR IMPLEMENTATION PLANS

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

2.1 State Requirements

The TMDL IP is a requirement of Virginia's 1997 Water Quality Monitoring, Information, and Restoration Act (§62.1-44.19:4 through 19:8 of the Code of Virginia), or WQMIRA. WQMIRA directs the SWCB to "develop and implement a plan to achieve fully supporting status for impaired waters." In order for IPs to be approved by the Commonwealth, they must meet the requirements as outlined by WQMIRA. WQMIRA requires that IPs include the following (VADEQ and VADCR, 2003):

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

2.2 Federal Recommendations

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

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

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

2.3 Requirements for Section 319 Fund Eligibility

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

1. Identify the causes and sources or groups of similar sources that will need to be controlled to achieve the load reductions estimated in the watershed-based plan;
2. Estimate the load reductions expected to achieve water quality standards;
3. Describe the NPS management measures that will need to be implemented to achieve the identified load reductions;
4. Estimate the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon to implement the watershed-based plan.
5. Provide an information/education component that will be used to enhance public understanding of the project and encourage the public’s participation in selecting, designing, and implementing NPS management measures;
6. Provide a schedule for implementing the NPS management measures identified in the watershed-based plan;
7. Describe interim, measurable milestones for determining whether NPS management measures or other control actions are being implemented;
8. Identify a set of criteria for determining if loading reductions are being achieved and if progress is being made towards attaining water quality standards; if not, identify the criteria for determining if the watershed-based plan needs to be revised; and
9. Establish a monitoring component to evaluate the effectiveness of the implementation effort.

3. REVIEW OF TMDL DEVELOPMENT

3.1 Background

Segments of Tye River (VAV-H13R_TYE01A00, VAV-H09R_TYE01A00) were listed as impaired on Virginia's 2006 Section 303(d) Report on Impaired Waters due to water quality violations of the *E. coli* standard. Piney River (VAV-H10R_PYN03A04, VAV-H10R_PYN02A00, VAV-H10R_PYN01A00), Hat Creek (VAV-H09R_HAT01A04), and Rucker Run (VAV-H13R_RKR01A00), all tributaries in the Tye River watershed, were also listed due to water quality violations of the *E. coli* and/or the fecal coliform standard on Virginia's 305(b)/303(d) Water Quality Assessment Integrated Report reports between 2004 and 2008. The Virginia Department of Environmental Quality (VADEQ) has described the impaired segments as presented in **Error! Reference source not found.**Figure 3.1 and **Error! Reference source not found.**Table 3.1.

Table 3.1 Impaired stream segments addressed in the Tye River TMDL implementation plan

Impaired Segment	Size	Initial Listing Year	Description
Hat Creek (VAV-H09R_HAT01A04)	9.58 miles	2004	extending from the headwaters downstream to its confluence with the Tye River
Tye River (VAV-H13R_TYE01A00, VAV-H09R_TYE01A00)	15.94 miles	2006	extending from its confluence with Piney River downstream to its confluence with the James River
Rucker Run (VAV-H13R_RKR01A00)	18.26 miles	2004	extending from the headwaters downstream to its confluence with the Tye River
Piney River (VAV-H10R_PYN03A04, VAV-H10R_PYN02A00, VAV-H10R_PYN01A00)	13.30 miles	2008	extending from a point 13.3 miles upstream of the Tye River downstream to its confluence with the Tye River

The Tye River and its tributaries (Hat Creek, Rucker Run and Piney River) are located primarily in Nelson County, Virginia with a portion of the Piney River watershed in Amherst County. All four watersheds are part of the James River Basin. There are 353

miles of streams in the watershed, which totals approximately 169,082 acres (264 miles²). Forest and pasture are the predominant land uses in the watershed (Table 3.2, Figures 3.2). According to the 2007 Census of Agriculture, the average farm in Nelson County is 158 acres, with over 60% of primary operators identifying their primary occupation as something other than farming. While the county ranked 4th in the state for the total sales of fruits, tree nuts and berries, the average net cash income for a farm in Nelson County was estimated at \$3,579 (USDA, 2007).

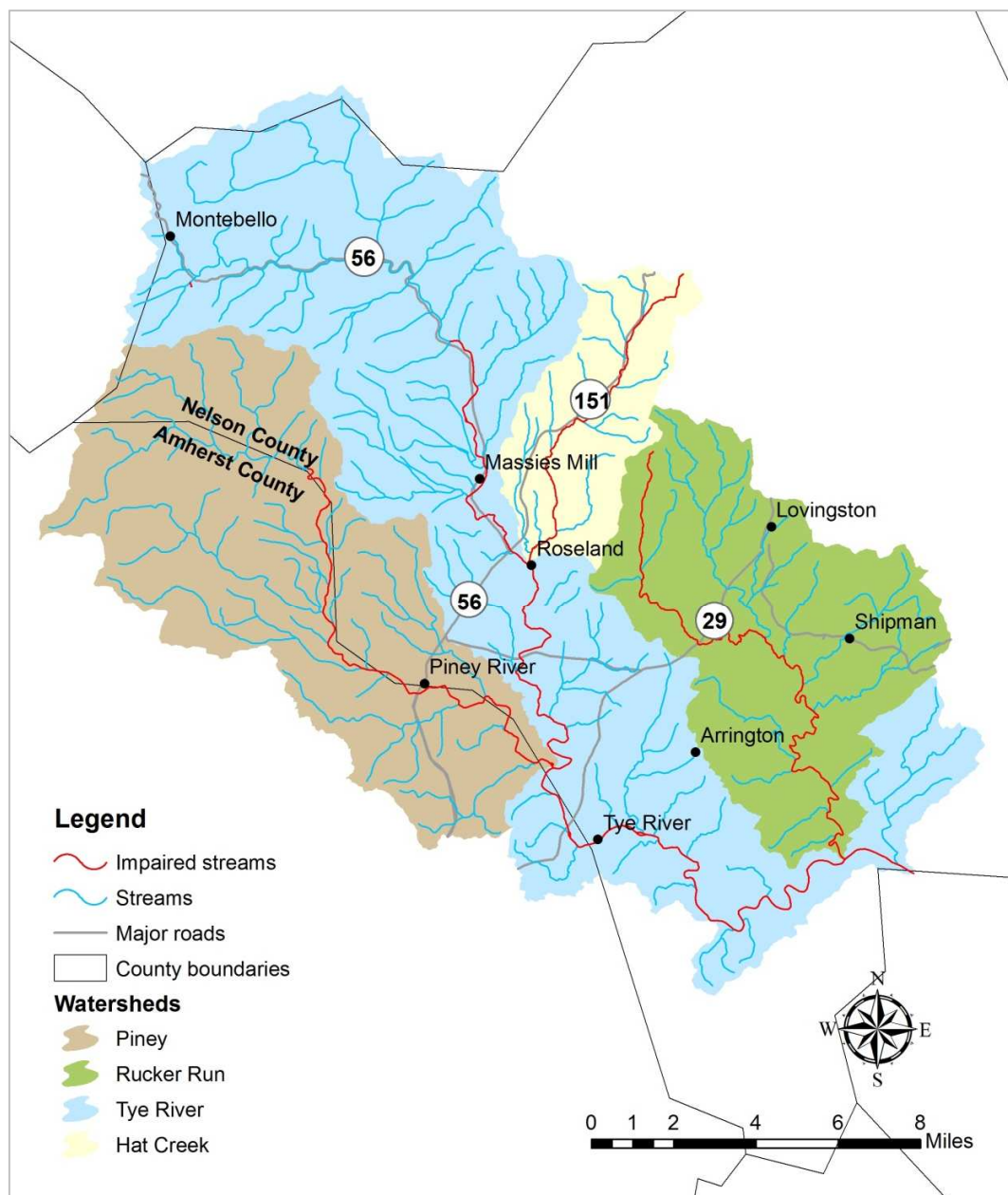


Figure 3.1 Location of the Tye River watershed and impaired stream segments.**Table 3.1** Land use acreages in the Hat Creek, Piney River, Rucker Run and Tye River watersheds. Table also shows percent total watershed acreage for each land use category.

Land use	Watershed: Acres (% total acreage)				TOTAL
	<i>Hat Creek</i>	<i>Piney River</i>	<i>Rucker Run</i>	<i>Tye River</i>	
Cropland	88 (0.7%)	174 (0.4%)	308 (1.0%)	331 (0.4%)	900 (0.5%)
Forest	8,614 (69.2%)	35,768 (79.0%)	24,189 (75.3%)	62,353 (78.7%)	130,925 (77.4%)
Hayland	700 (5.6%)	2,687 (5.9%)	2,382 (7.4%)	4,338 (5.5%)	10,107 (6.0%)
Pasture	2,381 (19.1%)	4,600 (10.2%)	3,243 (10.1%)	7,333 (9.3%)	17,557 (10.38%)
Residential	650 (5.2%)	1,986 (4.4%)	1,950 (6.1%)	4,747 (6.0%)	9,334 (5.5%)
Water	7 (0.00%)	47 (0.1%)	51 (0.2%)	154 (0.2%)	258 (0.1%)
TOTAL	12,440	45,263	3,426	79,256	169,081

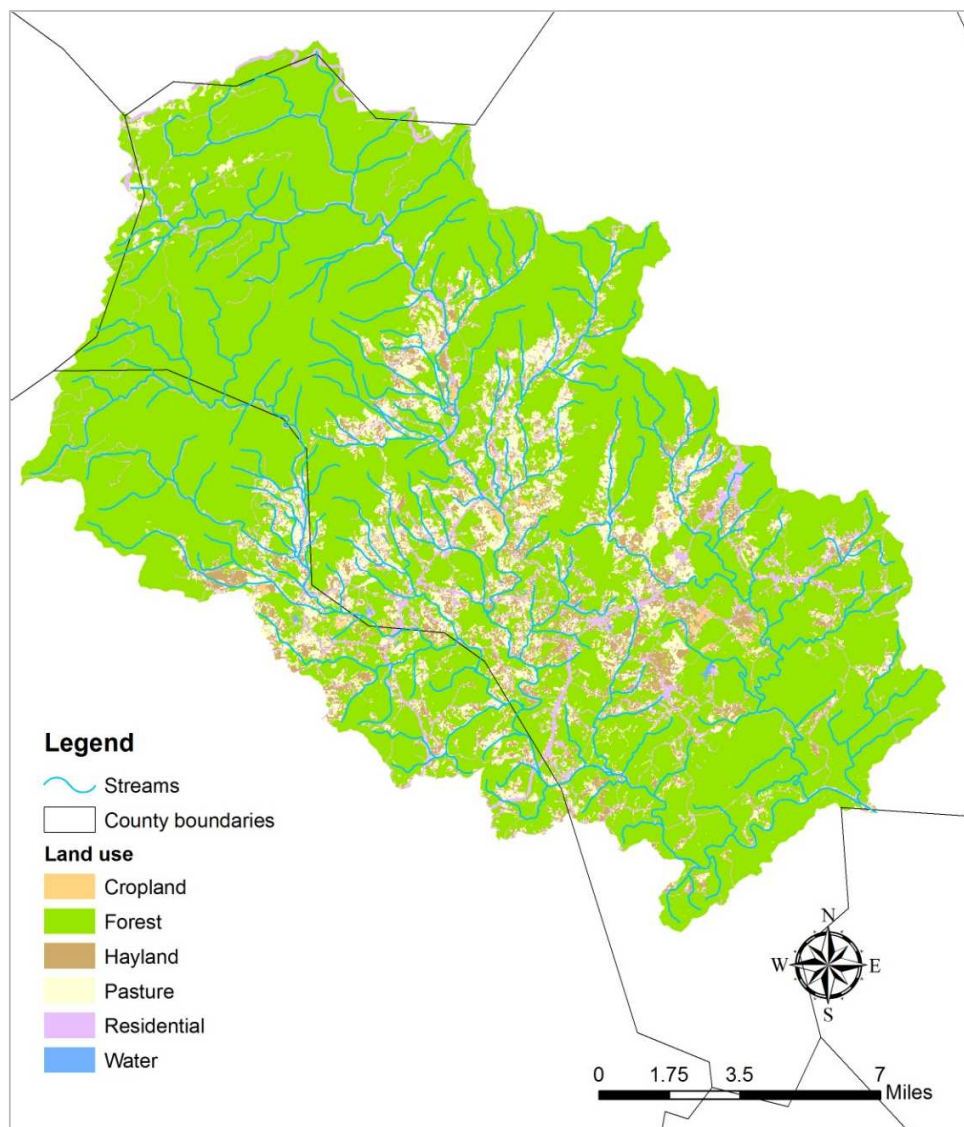


Figure 3.2 Land uses in the Tye River watershed.

Virginia Tech's Department of Biological Systems Engineering was contracted by the Virginia Department of Environmental Quality (VADEQ) to develop the TMDL for the Tye River and its tributaries in 2012 and the TMDL study was completed in September 2013 (VADEQ, 2013). This TMDL study includes several additional watersheds (Buffalo River, Turner Creek, Rutledge Creek and Mill Creek) in Amherst County that are not a part of this TMDL implementation plan. These watersheds were not included in order to keep the implementation plan at a scale that allows for comprehensive implementation and measurable water quality improvements. The TMDL study is posted at www.deq.virginia.gov.

3.2 Water Quality Monitoring Data

Data collected from six water quality monitoring stations along the Tye River and its tributaries were used to list these streams as impaired by fecal bacteria and to develop the bacteria TMDLs for the streams. Table 3.2 provides a summary of the data collected from these stations and Figure 3.3 shows the locations of the stations.

Table. 3.2 DEQ water quality monitoring stations in the Tye River watershed.

Station ID	Stream Name	Indicator Organism Measured	Number of Samples	Violation Rate	Period of Record
2-TYE000.30	Tye River	<i>E. coli</i>	16	13%	2005 - 2012
2-RKR000.20	Rucker Run	<i>E. coli</i>	13	23%	2010 - 2012
2-TYE008.77	Tye River	<i>E. coli</i>	24	21%	2004 - 2012
2-TYE020.67	Tye River	<i>E. coli</i>	57	15%	2002 - 2012
2-HAT000.14	Hat Creek	<i>E. coli</i>	25	40%	2007 - 2012
2-PNY005.29	Piney River	<i>E. coli</i>	91	31%	2002 - 2012

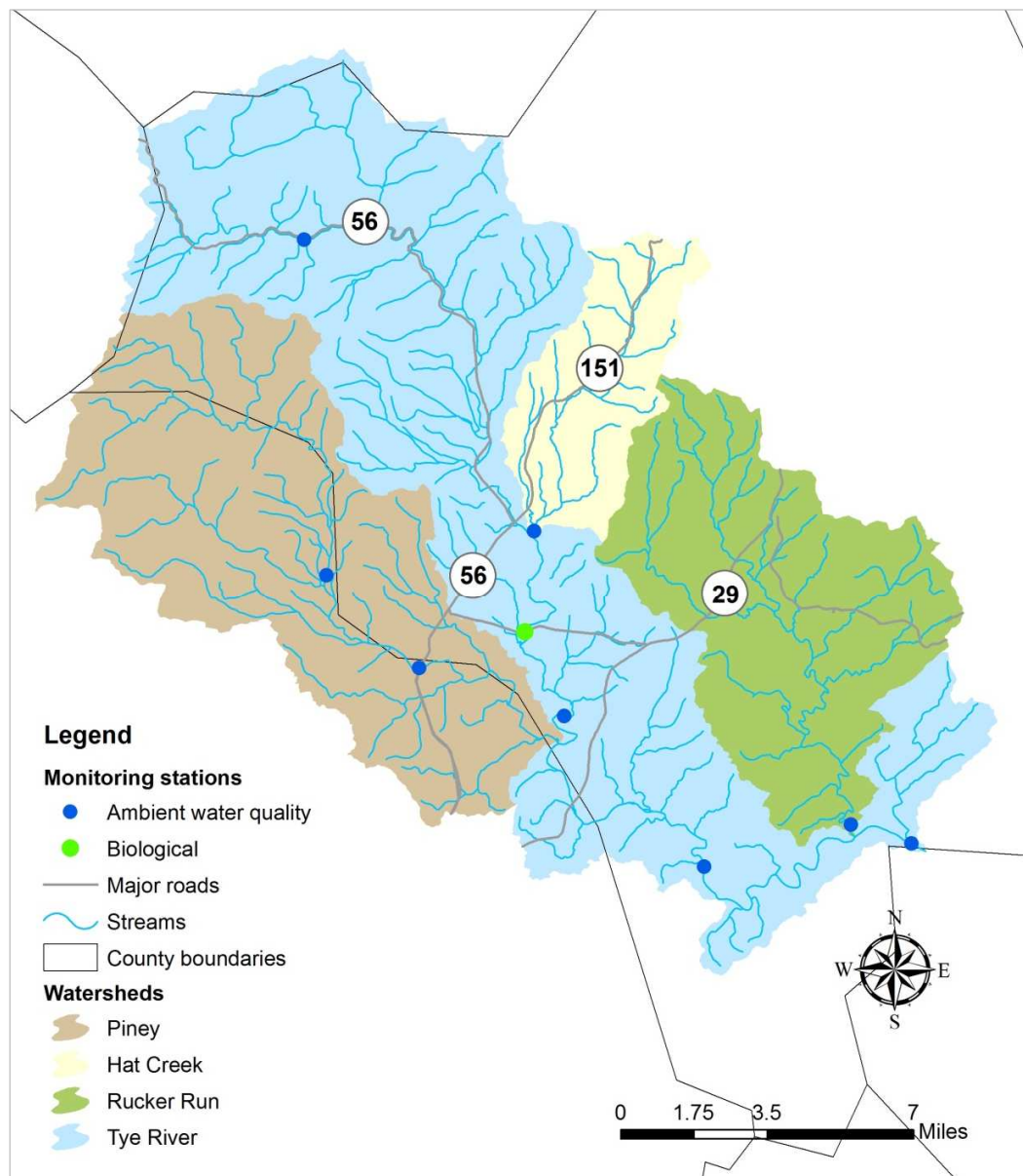


Figure 3.3 VADEQ monitoring stations in Tye River, Piney River, Hat Creek and Rucker Run

3.3 Water Quality Modeling

The Hydrologic Simulation Program – FORTRAN (HSPF) version 12 (Bicknell et al., 2005; Duda et al., 2001) was used to model fecal coliform transport and fate in the Tye River watershed. ArcGIS 10 GIS software was used to display and analyze landscape information for the development of input for HSPF. The HSPF watershed model simulates pollutant accumulation, die-off, and washoff according to the distribution of

land uses, soils, and geographic features in a watershed. HSPF then simulates the routing of water and pollutants through the stream channel network, considering instream processes such as die-off. In the Tye River bacteria TMDL, a source assessment of fecal coliform bacteria was performed for the watershed. Fecal coliform was then simulated as a dissolved pollutant using the HSPF model, and concentrations were translated to *E. coli* concentrations using VADEQ's translator equation (VADEQ, 2003).

To clearly identify sources of fecal coliform, each watershed was divided up into smaller subwatersheds (Figure 3.4). The sources and their respective fecal coliform contributions were identified for each smaller subwatershed based on land use and climate data, and human, livestock and wildlife populations. The HSPF model was then used to simulate the transport of these pollutant loads to the Tye River and its tributaries.

3.4 Bacteria Source Assessment

Potential sources of bacteria considered in the development of the TMDLs included both point source and nonpoint source contributions.

3.4.1 Point Sources

A TMDL's waste load allocation accounts for the portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution. Point sources of fecal coliform bacteria in the watersheds include all municipal and industrial plants that treat human waste, as well as private residences that fall under general permits. These point sources are required to maintain a fecal coliform discharge concentration no greater than 200 cfu/100mL. Virginia issues Virginia Pollutant Discharge Elimination System permits for point sources. The point sources of bacteria and sediment in the watersheds are listed in Table 3.4, along with their permitted discharges and load allocations in the TMDLs. The waste load allocation for each point source was set at the permitted load.

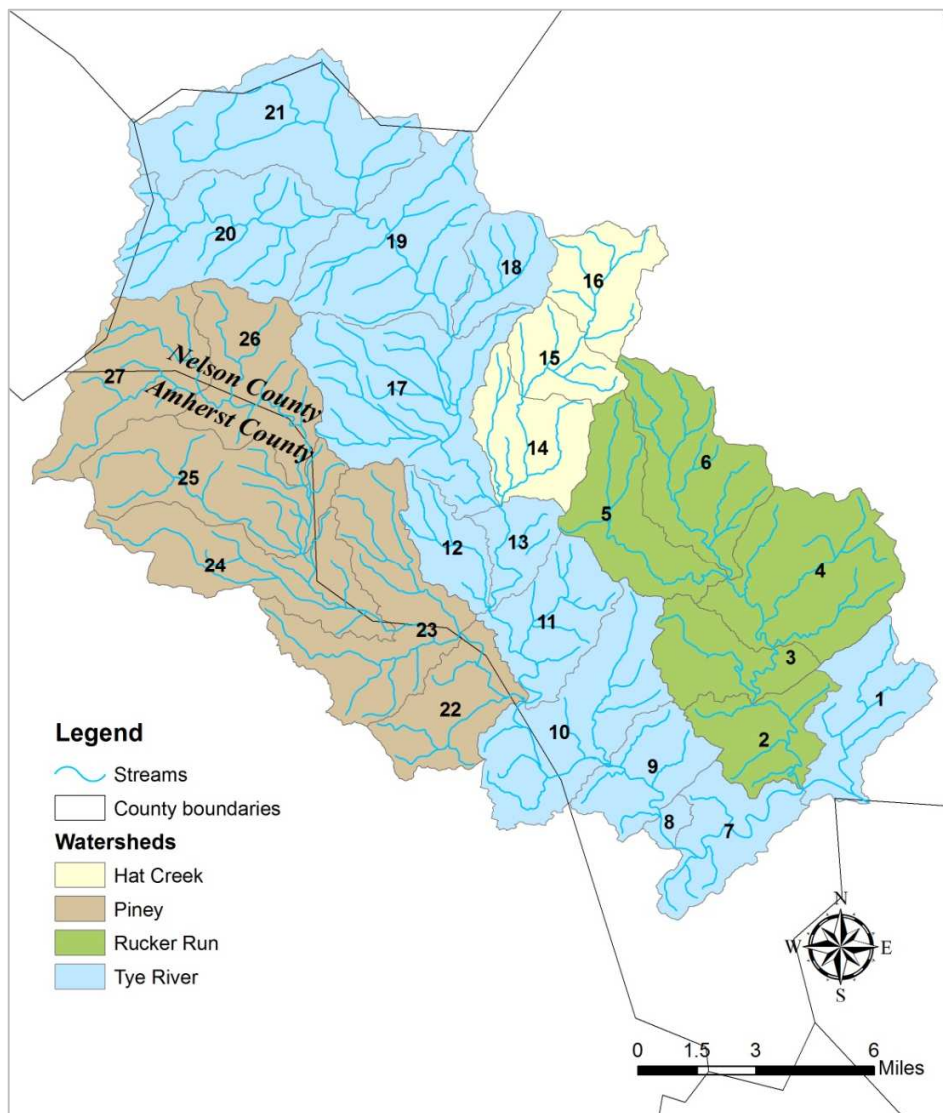


Figure 3.4 Subwatersheds used for TMDL development

Table 3.4 Permitted bacteria point sources in the Tye River watershed.

Permit Number	Facility Name	Sub-watershed	Design Flow (mgd ¹)	Permitted <i>E. coli</i> Conc. (cfu/100 mL)	<i>E. coli</i> Load (cfu/year)
VA0072991	Camp Blue Ridge STP	20	0.25	126	4.35×10^{11}
VA0091243	Montebello Fish Cultural Station	20	0.3875	126	6.75×10^{11}
VA0089729	Nelson County STP	11	0.22	126	3.83×10^{11}
VAG408143	Single Family Home	20	0.001	126	1.74×10^9

3.4.2 Nonpoint sources

Nonpoint source pollution originates from sources across the landscape (e.g., agriculture and urban land uses) and is delivered to waterbodies by rainfall and snowmelt. In some cases, a precipitation event is not required to deliver nonpoint source pollution to a stream (e.g., pollution from leaking sewer lines or livestock directly defecating in a stream). Nonpoint sources of bacteria in the watersheds included residential sewage treatment systems, land application of waste, livestock, wildlife, and domestic pets. Bacteria loads were represented either as land-based loads (where they were deposited on land and available for wash off during a rainfall event) or as direct loads (where they were directly deposited into the stream). Land-based nonpoint sources are represented as an accumulation of bacteria on the land, where some portion is available for transport in runoff. The amount of accumulation and availability for transport vary with land use type and season. The maximum accumulation was adjusted seasonally to account for changes in die-off rates, which are dependent on temperature and moisture conditions. Direct loads such as straight pipes are modeled similarly to point sources since they do not require a runoff event for delivery to the stream. Both point and non point sources of bacteria in the Tye River are summarized in Table 3.5.

Table 3.5 Annual fecal coliform bacteria load in the Tye River watershed by source.

Source		Annual Fecal Coliform Load (cfu/yr)	Percentage of Annual Load (%)
Land based sources	Cropland	2.37E+14	0.53%
	Pasture	4.12 E+16	92.68%
	Residential	1.61E+13	3.62%
	Forest	1.06E+15	2.39%
Direct sources	Permitted point sources	1.49E+12	0.00%
	Straight pipes	2.85E+13	0.06%
	Cattle in stream	2.15E+14	0.48%
	Wildlife in stream	1.04E+14	0.24%
TOTALS		5.62E+16	100%

3.5 TMDL Allocation Scenarios

3.5.1 Bacteria Allocation Scenario and TMDL Expression

The TMDL includes reduction scenarios needed to meet the *E. coli* water quality standard. In order to develop the TMDLs for *E. coli*, fecal coliform bacteria data collected in prior years from the streams needed to be converted to *E. coli* concentrations. VADEQ has developed a procedure to be followed in this situation. The needed modeling was conducted using fecal coliform loadings as the bacteria source in the watershed. Then an equation developed by VADEQ was used to convert the daily average fecal coliform concentrations output by the model to daily average *E. coli* concentrations. The equation is:

$$E. coli \text{ concentration} = 2^{-0.0172} \times (\text{FC concentration})^{0.91905}$$

where the bacteria concentrations (*E. coli* and FC) are in cfu/100 mL. After applying the equation to the output from the LSPC model, daily *E. coli* loads were determined by multiplying the daily concentrations by the average daily flow. The average annual load was determined by summing the daily loads and dividing by the number of years in the allocation period.

Different scenarios were evaluated to identify scenarios for implementation that meet the calendar-month geometric mean bacteria standard (126 cfu/100 mL for *E. coli*) with zero violations. The MOS (margin of safety) was implicitly incorporated into each TMDL by conservatively estimating several factors affecting bacteria loadings, such as animal numbers, production rates, and contributions to streams. A preferred scenario was selected by a technical advisory committee for each watershed during the TMDL development process (Table 3.9). The TMDLs for Tye River, Hat Creek, Rucker Run and Piney River were derived from the preferred reduction scenarios identified in the TMDL (Table 3.10). An implicit margin of safety is included in the TMDL equations.

Table 3.9 Fecal coliform reduction scenarios needed to meet the *E. coli* geometric mean standard

Watershed	Fecal Coliform Loading Reductions (%)						% Violation of <i>E. coli</i> standard (Geometric Mean)
	Livestock direct deposit	Pasture	Cropland	Straight pipes & failing septic	Residential	Wildlife direct deposit	
Tye River	70%	5%	5%	100%	0%	0%	0.00%
Hat Creek	99%	25%	5%	100%	0%	30%	0.00%
Rucker Run	99%	30%	5%	100%	0%	20%	0.00%
Piney River	90%	25%	5%	100%	0%	0%	0.00%

Table 3.10 TMDL equations for Tye River, Hat Creek, Rucker Run and Piney River expressed as an average annual and an average daily load.

Watershed	Wasteload Allocation (WLA)		Load Allocation (LA)		Margin of Safety (MOS)	TMDL	
	Annual (cfu/yr)	Daily (cfu/day) ¹	Annual (cfu/yr)	Daily (cfu/day)		Annual (cfu/yr)	Daily (cfu/day) ²
Tye River	1.33E+13	3.64E+10	5.75E+14	1.57E+13	Implicit	5.88E+14	1.57E+13
Hat Creek	6.02E+11	1.65E+9	2.86E+13	7.29E+11	Implicit	2.92E+13	7.31E+11
Rucker Run	1.32E+12	3.62E+9	6.47E+13	1.88E+12	Implicit	6.60E+13	1.89E+12
Piney River	2.44E+12	6.88E+9	1.20E+14	2.65E+12	Implicit	1.22E+14	2.66E+12

3.6 Implications of the TMDLs on the Implementation Plan

Based on the bacteria reductions developed for the TMDL, it is clear that significant reductions will be needed to meet the water quality standard for bacteria, particularly with respect to direct deposition from livestock. In addition, all uncontrolled discharges, failing septic systems, leaking sewer lines, and overflows must be identified and corrected.

However, there are subtler implications as well. Implicit in the requirement for 100% correction of uncontrolled discharges is the need to maintain all functional septic systems. Wildlife direct deposition will not be explicitly addressed by this implementation plan. All efforts will be directed at controlling anthropogenic sources.

4. PUBLIC PARTICIPATION

Collecting input from the public on conservation and outreach strategies to include in the TMDL Implementation Plan was a critical step in this planning process. Since the plan will be implemented by watershed stakeholders on a voluntary basis, local input and support are the primary factors that will determine the success of this plan.

4.1 Public Meetings

A public meeting was held on the evening of November 7, 2013 at the Massie's Mill Ruritan Hall to kick off the development of the implementation plan. This meeting served as an opportunity for local residents to learn more about the problems facing the creeks and work together to come up with new ideas to protect and restore water quality in their community. This meeting was publicized through a press release published in local papers, email announcements, invitations mailed to riparian landowners, and signs and flyers posted throughout the watersheds. Approximately 60 people attended the meeting.

The meeting began with a brief presentation on existing water quality conditions in the streams and what types of actions and information could be included in the implementation plan to improve water quality. Following the presentation, attendees split up into two working groups: a residential group and an agricultural group. The working groups discussed how residential and agricultural land use practices are affecting the quality of these streams and then reviewed different land use management practices that could be included in the cleanup plan. TMDL staff from Virginia's Department of Environmental Quality facilitated these discussions.

The final public meeting was held on May 15, 2014 at the Massie's Mill Ruritan Hall. Approximately 35-40 people attended.

4.2 Agricultural Working Group

The role of the Agricultural Working Group was to review conservation practices and outreach strategies from an agricultural perspective, identify any obstacles (and solutions)

related to BMP implementation, and to provide estimates on the type, number, and costs of BMPs.

During their first meeting on November 7, 2013, the agricultural working group discussed the general state of agriculture in the watershed noting that there has not been much land use conversion from agriculture to commercial or residential development. The group also discussed the voluntary nature of the TMDL process and funding sources for BMP implementation (including 100% cost share for livestock exclusion in this watershed). The group discussed livestock exclusion practices and potential obstacles to participation, including fence maintenance costs and the 10-year commitment. It was noted that there are very few CREP participants in the watershed. DEQ staff described the Flexible Fencing Program available in the Shenandoah Valley and the group agreed something similar may work in Nelson County. Representatives from the Thomas Jefferson Soil and Water Conservation District (TJSWCD) discussed funding for alternative watering sources and the possibility for limited stream access. The benefits of exclusion were noted including reduced veterinary bills and increased production (weight gain and milk production). The 'costs' of cattle exclusion were noted including the need for proper planning to provide shade and to prevent long walks to waters resulting in weight loss. The group also discussed rotational grazing and how, even though there were not many farmers that have implemented this method, its practice was gaining popularity in the watershed. Refinement of the modeling work was suggested including identification of pasture on significant slopes and accurate counting of the number of cattle.

A second agricultural working group meeting was held at the Massie's Mill Ruritan Hall on December 12, 2013. The group reviewed summaries of the extent of BMP implementation that would be needed to remove the creeks from the impaired waters list and the current extent of the Tye River impairment (longer than presented in the TMDL study). The group discussed pasture scenarios to address bacteria coming from pasture land. Rotational grazing and improved pasture management systems were determined to be key components in the plan. Loafing lot management and waste storage systems was determine to be a minimal component since the cost share programs for this are typically

for larger herds (125 beef cattle) and farms in this watershed were much smaller (35-40 head per herd). In winter months, farmers in this watershed tend to combine these herds to one field and often feed them near the rivers and creeks for ease. These areas will then get very denuded and muddy. Permanent vegetation and tree plantings on these critical areas were discussed, including funding sources. The group agreed that pasture management was the most cost effective practice to pursue. The group also noted that while steep slopes in the watershed could result in concentrated flow, they only make up 1-2% of pasture land in the watershed. The group discussed targeting outreach and implementation efforts to those subwatersheds with the highest potential for contamination based on slope, riparian pasture, and number of livestock. Funding sources for fencing were discussed. DEQ reached out to the Chesapeake Bay Funders Network who expressed interest in implementing BMPs in this watershed. The group agreed that they were interested in working with this organization. Different fencing systems were discussed including the Stream Protection Practice. The inability to flash graze within the fenced areas is an obstacle to acceptance of livestock exclusion programs. Fencing livestock on a field by field basis may be more acceptable than excluding all streams on a farm. The group discussed the need for cropland management strategies and agreed that there is not a lot of cropland in the watershed and that 90% of is no till. The group agreed to exclude this practice from the plan but that cover crop use should be included. Involvement from the NRCS and SWCD was discussed including recognition of their limited staff resources. The group also discussed that payment was reliable once a farmer was accepted into one of their cost share programs. The group then discussed the results of the residential working group. Members of the group agreed to participate in citizen monitoring efforts and others recommended additional monitoring locations and potential sources of bacteria.

A third agricultural working group meeting was held at the Massie's Mill Ruritan Hall on February 20, 2013. The group reviewed the key points of the last meeting including the use of rotational grazing rather than more expensive waste storage facilities. DEQ staff reiterated that this process was voluntary and that public participation in the development of the Watershed Implementation Plan was crucial. The group reviewed the two proposed stages of the implementation plan and the timing of those two phases. The need for

adequate staffing was supported by the group; specifically, the group supported having one person do the outreach in order to establish trust with the public. The group recognized that there may be a need to have a different staff member addressing the residential implementation strategies. The group discussed what the timeframes should be assigned to each stage of the implementation plan. Concerns were expressed about the length of fencing required. DEQ staff explained that fencing estimates are conservative. Given adequate staffing, the group agreed that the Stage 1 should be projected to take ten years and that Stage 2 should take 5 more years, for a total of 15 years. The group agreed that failing septic systems should be addressed early on in Stage 1. The group discussed the impact of political changes and lawsuits could have on TMDL implementation and noted that the American Farm Bureau supports local action to address TMDLs. The group also discussed cost estimates for BMPs. The group was concerned about the competitive nature of some of the cost share programs but recognized that additional funding sources and funding for staff can be made available in the watershed. The group agreed that adequate staffing of NRCS and SWCD was critical to the success of the implementation plan.

4.3 Residential Working Group

The primary role of the Residential Working Group (RWG) was to discuss methods needed to reduce human and pet sources of bacteria entering the creeks, recommend methods to identify and correct or replace failing septic systems and straight pipes, and provide input on the BMPs to include in the plan.

At their first meeting on November 7th, the residential working group discussed septic system maintenance needs in the community. Participants felt that more education and outreach efforts are necessary to address septic system maintenance needs, specifically informational brochures distributed to home improvement and hardware stores. An Enviroscope at the Nelson Center and the Master Well Owner Network could be used to demonstrate and communicate the impacts of failing systems on water quality. Other outreach suggestions including sharing information at the annual Health Fair, targeted mailings, brochures provide by septic system contractors or plumbers, articles in the Blue Ridge Life and the Nelson Times, and displays at farmers markets. Participants were interested in discussing the cost of alternative systems. These are limited in the watershed

and can cost \$25,000. Detection of straight pipes was discussed by the group. The group agreed that highlighting the impact to water quality that straight pipes have is essential to encouraging landowner to correct these systems. The group recommended outreach strategies including church groups and identifying influential members of the community to reach out to home owners. The group does not recommend floating rivers to identify straight pipes. The group discussed a pump out program as a way to assist landowners with septic system maintenance. The group noted the average cost of pump out as being \$300. A similar project in Louisa County could be used as a model and the SWCD has a cost share program. The group discussed the estimates of failing septic systems and straight pipes and the number of repairs and replacements needed. The group agreed that the number of repairs versus replacements was good. The group agreed that the estimated number of straight pipes that would be replaced with alternate systems was too high, noting that there were not many of these in the watershed. Piney River and Lovington were identified as areas where residents could connect to public sewer systems.

A second residential working group meeting was held on January 23, 2014 at the Massie's Mill Ruritan Hall. The group discussed the opportunities to connect to public sewer. A representative of the Nelson County Service Authority reported that over 100 connections have been made as recently as 5 years ago and may have included some of the failing systems in the TMDL study. The line extends up Rt. 151 towards Lowesville and new households can connect to it now. Funding may become available for connections when the line is extended. The group agreed that extending sewer service up Piney River to Lowesville would help correct many failing systems. The group identified the areas between Lowesville and Woodson (including 500 homes built between 1930's and 1940's) and the concentrated development in Shipman as possible areas of concern for concentration of unsewered homes. Other hotspots identified include areas underlain by white clay from Roseland Rescue Squad to Amherst (about a mile from Colleen to Piney River) and the area upstream of Dickie Road. The group could not identify any opportunities to connect to public sewer in the Hat Creek watershed and recommended that the proposed connections be changed to zero in the plan. The group saw limited opportunities for sewer connections in the Rucker Run watershed and recommended additional monitoring to determine failing septic systems were a source in this watershed.

The group discussed the cost to connect to public sewer (\$5,000-\$12,000 depending if a pump is needed). The group agreed that pump out assistance would be an excellent outreach strategy and would encourage septic system maintenance. Other outreach strategies were also discussed. The group agreed that the outreach coordinator should emphasize the impact of the impairment on human health. In addition to the outreach strategies discussed at the first meeting, the group also identified the Blue Ridge Chapter of the Master Naturalists, Keep Nelson Beautiful, and the Virginia Cooperative Extension. The timeframes for the implementation were reviewed. The group discussed the benefits of shorter and longer timeframes and agreed that a 10 year timeline would be most appropriate.

4.4 Steering Committee

The Steering Committee met on April 3 at the Massie's Mill Ruritan Hall to discuss plans for the final public meeting and to review the draft implementation plan prior to the final public meeting on May 15, 2014. The group provided comments on the draft plan and helped to develop a final agenda for the meeting.

5. IMPLEMENTATION ACTIONS

An important part of the implementation plan is the identification of specific best management practices and associated technical assistance needed to improve water quality in the watersheds. Since this plan is designed to be implemented by landowners on a voluntary basis, it is necessary to identify management practices that are both financially and technically realistic and suitable for this particular community. As part of this process, the costs and benefits of these practices must be examined and weighed. Once the best practices have been identified for implementation, we must also develop an estimate of the number of each practice that would be needed in order to meet the water quality goals established during the TMDL study.

5.1 Identification of Best Management Practices

Potential best management practices, their associated costs and efficiencies, and potential funding sources were identified through review of the TMDL, input from the working groups, and literature reviews. Measures that can be promoted through existing programs were identified, as well as those that are not currently supported by existing programs and their potential funding sources. Some best management practices had to be included in order to meet the water quality goals established in the TMDL, while others were selected through a process of stakeholder review and analysis of their effectiveness in these watersheds. These measures are discussed in sections 5.1.1 and 5.1.2, respectively.

5.1.1 Control Measures Implied by the TMDL

The reductions in bacteria identified by the TMDL study dictated some of the control measures that must be employed during implementation in order to meet the pollutant reductions specified in the TMDL.

Livestock Exclusion

In order to meet the bacteria reductions in direct deposition from livestock, some form of stream exclusion is necessary. Fencing is the most obvious choice; however, the type of fencing, distance from the stream bank, and most appropriate management strategy for the fenced pasture are less obvious. While it is recognized that farmers will want to

minimize the cost of fencing and the amount of pasture lost, the inclusion of a streamside buffer strip helps to reduce bacteria, sediment and nutrient loads in runoff. The incorporation of effective buffers (35 foot minimum width) could reduce the need for more costly control measures. From an environmental perspective, the best management scenario would be to exclude livestock from the stream bank 100% of the time and establish permanent vegetation in the buffer area. This prevents livestock from eroding the stream bank, provides a buffer for capturing pollutants in runoff from the pasture, and establishes (with the growth of streamside vegetation) one of the foundations for healthy aquatic life. From a livestock-production perspective, the best management scenario is one that provides the greatest profit to the farmer. Obviously, taking land (even a small amount) out of production is contrary to that goal. However, a clean water source has been shown to improve milk production and weight gain. Clean water will also improve the health of animals (*e.g.*, cattle and horses) by decreasing the incidence of waterborne illnesses and exposure to swampy areas near streams. State and federal conservation agencies including DCR and the Natural Resources Conservation Service have incorporated livestock exclusion practices into their agricultural cost share programs that offer farmers greater flexibility in fencing options. This flexibility allows farmers with limited pasture acreage to exclude livestock from the stream while not sacrificing a significant amount of land for grazing.

Septic Systems and Straight Pipes

The 100% reduction in loads from straight pipes and failing septic systems is a pre-existing legal requirement. The options identified for correcting straight pipes and failing septic systems included: repair of an existing septic system, installation of a septic system, and installation of an alternative waste treatment system. It is anticipated that a significant portion of straight pipes will be located in areas where an adequate site for a septic drain field is not available. In these cases, the landowner will have to consider an alternative waste treatment system.

5.1.2 Control Measures Selected through Stakeholder Review

In addition to the control measures that were directly prescribed by the TMDLs, a number of measures were needed to control fecal bacteria and sediment from land-based sources. Various scenarios were developed and presented to working groups. All

scenarios began with the best management practices that were prescribed by the TMDL such as livestock exclusion and eliminating straight pipes. Next, series of established best management practices were examined by the working groups, who considered both their economic costs and the water quality benefits that they produced. The majority of these practices are included in state and federal agricultural cost share programs that promote conservation. In addition, innovative and site specific practices suggested by local producers and technical conservation staff were considered

The final set of BMPs identified and the efficiencies used in this study to estimate needs are listed in Table 5.1.

Table 5.1 Best management practices and associated pollutant reductions

BMP Type	Description	Bacteria Reduction Efficiency	Reference
Direct deposit	Livestock exclusion from waterway	100%	1
Pasture	Streamside buffer (35 feet)	50%	2
	Improved pasture management	50%	2
	Permanent vegetative cover on critical areas	LU change	4
	Reforestation of highly erodible pasture/cropland	LU change	4
Cropland	Small grain cover crops	20%	3
	Continuous no-till	70%	3
Straight pipes and septic systems	Septic tank pumpout	5%	2
	Connection to public sewer	100%	1
	Septic system repair	100%	1
	Septic system replacement	100%	1
	Alternative waste treatment system	100%	1

References

1. Removal efficiency is defined by the practice
2. VADCR. 2003. Guidance manual for Total Maximum Daily Load Implementation Plans.
3. USEPA-CBP. 2006. Nonpoint source best management practices currently used in Scenario Builder for Phase 5.0 of the Chesapeake Bay Program Watershed Model. Revised 02/09/2011.

4. Effectiveness quantified through land use change in Generalized Watershed Loading Function (GWLF) model simulations.

5.2 Quantification of Control Measures

The quantity of control measures recommended during implementation was determined through spatial analyses, modeling alternative implementation scenarios, and using input from the working groups. Data on land use, stream networks, and elevation were used in spatial analyses to develop estimates of the number of control measures recommended overall, in each watershed, and within smaller subwatersheds. Data from the VADCR Agricultural BMP Database and the Thomas Jefferson SWCD showing where best management practices are already in place in the watersheds were considered when developing these estimates. In addition, census data were used in order to quantify septic system repairs and replacements needed in order to meet the reductions specified in the TMDL. Estimates of the amount of residential on-site waste treatment systems, streamside fencing and number of full livestock exclusion systems were made through these analyses. The quantities of additional control measures were determined through modeling alternative scenarios and applying the related pollutant reduction efficiencies to their associated bacteria loads.

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

5.2.1 Agricultural Control Measures

Livestock Exclusion BMPs

The TMDL reduction scenario shown in Table 3.9 on page 18 includes recommendations of a 70% reduction in direct deposition of manure in Tye River, a 90% reduction in Piney River and 99% reductions in Hat Creek and Rucker Run. In addition, a 5% reduction in bacteria from pasture is needed in Tye River, a 25% reduction in Hat Creek and Piney River, and a 30% reduction in Rucker Run in order to meet the bacteria TMDL, while a

5% reduction in bacteria from cropland is included in all of the watersheds. Consequently, this plan includes recommendations for livestock exclusion practices implemented in conjunction with improved pasture management and cropland BMPs. To estimate fencing needs, the perennial stream network was overlaid with land use using GIS mapping software (ArcView v.10.1). Stream segments that flowed through or were adjacent to land use areas that had a potential for supporting cattle (*e.g.*, pasture) were identified using 2011 VBMP Orthophotography and the 2011 National Hydrography Dataset (NHD) streams layer. If the stream segment flowed through the land-use area, it was assumed that fencing was needed on both sides of the stream. If a stream segment flowed adjacent to the land-use area, it was assumed that fencing was required on only one side of the stream. Not every land-use area identified as pasture has livestock on it at any given point in time. However, it is assumed that all pasture areas have the potential for livestock access. Following GIS analyses of fencing needs, the VADCR Agricultural BMP Database was queried to identify the amount of livestock exclusion systems already in place in the watershed. Any fencing installed was subtracted from the length of potential fencing in the watershed (Table 5.1). It was assumed that 50% of fencing for which the cost share contract period had expired was still in place. A map of potential streamside fencing required for streams in the watersheds is shown in Figure 5.1.

Table. 5.1 Livestock exclusion systems in the watershed tracked through the VADCR Agricultural BMP database: *July 1990 – September 2013*. NOTE: Table does not include data from systems that were not installed through government cost share programs. CRP and EQIP data were not available.

Subwatershed	Practice	Extent installed (linear ft)	Total # of practices
Rucker Run	Stream exclusion with grazing land management (SL-6)	5,975	6
	Streambank protection fencing (WP-2)	550	1
Tye River	Stream exclusion with grazing land management (SL-6)	30,506	30
	Streambank protection fencing (WP-2)	4,670	2
Hat Creek	Stream exclusion with grazing land management (SL-6)	2,773	7
Piney River	Stream exclusion with grazing land management (SL-6)	10,319	8
TOTALS		43,208	100

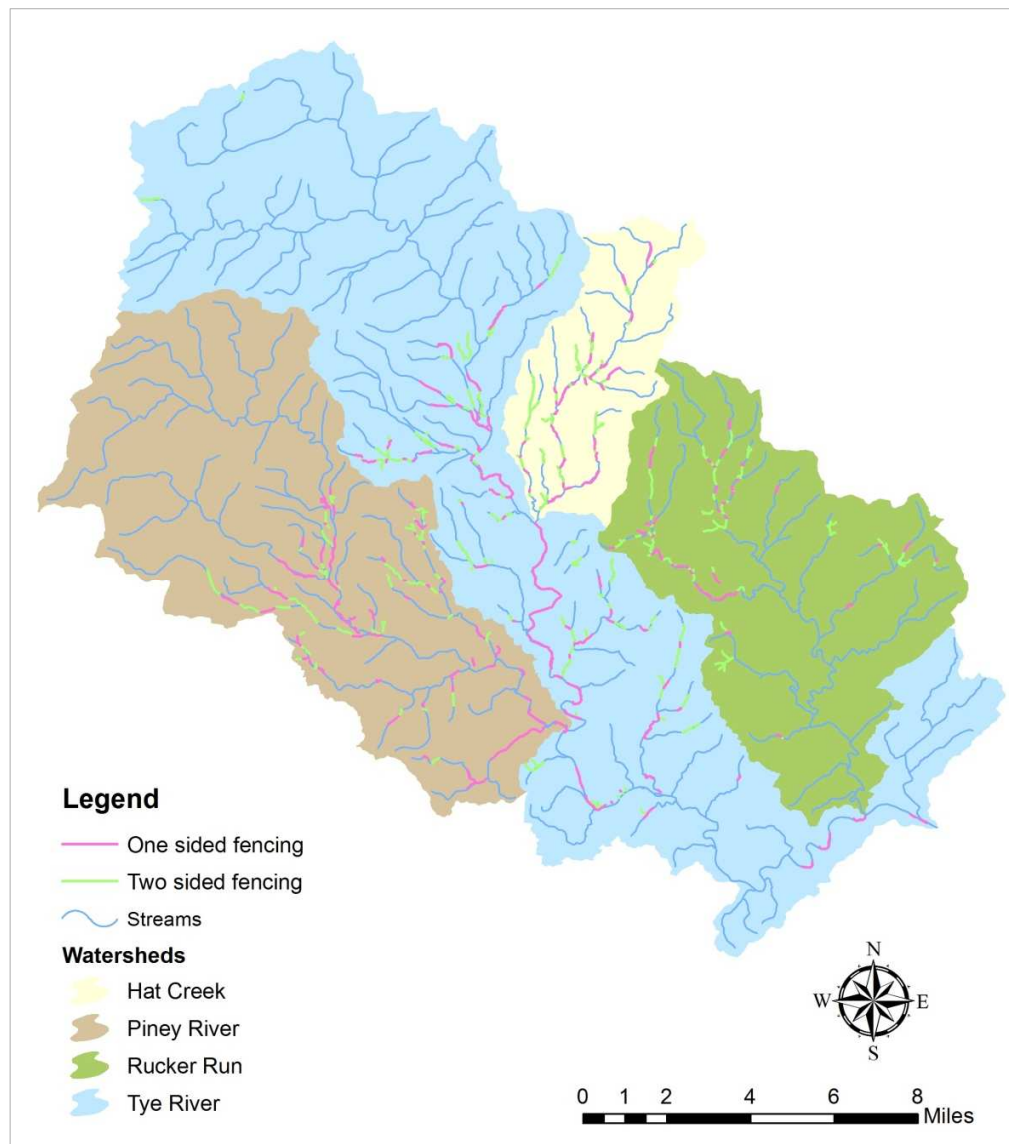


Figure 5.1 Potential stream exclusion fencing by subwatershed

It is expected that the majority of livestock exclusion fencing will be accomplished through the VA Agricultural BMP Cost Share Program and federal NRCS cost-share programs. Some applicable cost-shared BMPs for livestock exclusion in the programs are the SL-6T (Stream Exclusion with Grazing Land Management for TMDL Implementation Practice), the LE-1T (Livestock Exclusion with Riparian Buffers for TMDL Implementation), the LE-2T (Livestock Exclusion with Reduced Setback for TMDL Implementation), and CREP (the Conservation Reserve Enhancement Program). In order to determine the appropriate mix of these practices to include in the

implementation plan, tax parcel data was utilized in conjunction with local data from the VADCR Agricultural BMP Database to determine typical characteristics (e.g., streamside fencing length per practice) of livestock exclusion systems in the region. In addition, input was collected from the Agricultural Working Group, NRCS and the Thomas Jefferson SWCD regarding typical components of each system, associated costs, and preferred fencing setbacks. These characteristics were then utilized to identify the mix of fencing practices available through state and federal cost share programs to include in the implementation plan (Table 5.2).

The Stream Exclusion with Grazing Land Management for TMDL Implementation Practice (SL-6T) offers 75% cost share for off stream watering, establishment of a rotational grazing system, stream crossings, and stream exclusion fencing with a 35 foot setback (required). The LE-1T (Livestock Exclusion with Riparian Buffers for TMDL Implementation) is very similar to the SL-6T except that 85% cost share is provided and applicants may not receive funding to install hardened winter feeding pads. It was estimated that approximately 70% of fencing in the watershed would be installed using these practices.

The Livestock Exclusion with Reduced Setback Practice (LE-2T) only requires a 10 foot setback for stream fencing. Cost share is provided for stream fencing and cross fencing, stream crossings, and off stream waterers at a rate of 50%. It was estimated the 20% of livestock exclusion would be accomplished through the LE-2T practice.

The WP-2T system includes streamside fencing, hardened crossings, and a 35-ft buffer from the stream. This practice includes an up-front cost share payment of 50 cents per linear foot of fence installed to assist in covering anticipated fencing maintenance costs. In cases where a watering system already exists, a WP-2T system is a more appropriate choice. Despite the additional payment for maintenance costs, this practice is seldom used because it does not provide cost share for the installation of a well, this was reflected in the number of systems noted in the Ag BMP Database in Nelson County. Consequently, it was estimated that only 5% of fencing in the watersheds would be accomplished using the WP-2T practice.

Fencing through the Conservation Reserve Enhancement Program (CREP) was also included in implementation scenarios. Based on input from NRCS and SWCD staff, it was determined that landowners who are willing to install fencing with a larger setback often decide to use CREP due to the higher incentive and rental payments. Consequently, it was estimated that 5% of fencing would be installed through this federal program.

Table 5.3 Stream fencing needs summary

Sub-watershed	Total potential fencing	Fencing inst. to date (ft)	Fencing still needed (ft)	Fencing still needed (miles)
Tye River: 70% Exclusion Goal				
1	1,817	0	1,272	0.24
7	6,754	1,913	3,389	0.64
8	0	0	0	0
9	4,754	0	3,328	0.63
10	60,614	0	42,430	8.04
11	58,281	7,627	35,458	6.72
12	15,806	15,806	0	0
13	26,234	1,320	17,440	3.30
17	116,077	792	80,700	15.28
18	16,580	4,473	8,475	1.61
19	0	0	0	0
20	5,108	1,397	2,598	0.49
21	2,074	0	1,452	0.27
Subtotals	314,099	33,328	196,542	37
Rucker Run: 99% Exclusion Goal				
2	1,212	0	1,200	0.23
3	15,797	528	15,116	2.86
4	25,436	3,099	22,114	4.19
5	60,101	1,754	57,764	10.94
6	53,512	1,144	51,844	9.82
Subtotals	156,058	6,525	148,038	28
Hat Creek: 99% Exclusion Goal				
14	74,647	528	73,378	13.90
15	42,939	1,981	40,548	7.68
16	11,826	0	11,708	2.2
Subtotals	129,412	2,509	125,634	24
Piney River: 90% Exclusion Goal				
22	21,833	1,122	18,640	3.53
23	79,193	990	70,383	13.33

24	59,919	6,484	48,092	9.11
25	37,119	465	32,989	6.25
26	3,370	3,370	0	0
27	0	0	0	0
Subtotals	201,434	12,431	170,104	32
TOTALS	801,003	54,792	640,315	121

Table 5.3 Estimate of full streamside exclusion fencing systems needed by subwatershed

Sub-watershed	SL-6T fencing		LE-2T fencing		WP-2T fencing		CREP fencing	
	Linear feet	Systems	Linear feet	Systems	Linear feet	Systems	Linear feet	Systems
Tye River								
1	890	0.23	254	0.14	64	0.05	64	0.02
7	2,372	0.62	678	0.38	169	0.14	169	0.05
8	0	0.00	0	0.00	0	0.00	0	0.00
9	2,329	0.61	666	0.37	166	0.14	166	0.05
10	29,701	7.82	8,486	4.71	2,121	1.77	2,121	0.62
11	24,820	6.53	7,092	3.94	1,773	1.48	1,773	0.52
12	0	0.00	0	0.00	0	0.00	0	0.00
13	12,208	3.21	3,488	1.94	872	0.73	872	0.26
17	56,490	14.87	16,140	8.97	4,035	3.36	4,035	1.19
18	5,933	1.56	1,695	0.94	424	0.35	424	0.12
19	0	0.00	0	0.00	0	0.00	0	0.00
20	1,818	0.48	520	0.29	130	0.11	130	0.04
21	1,016	0.27	290	0.16	73	0.06	73	0.02
Subtotals	137,578	36	39,308	22	9,827	8	9,827	3
Rucker Run								
2	840	0.22	240	0.13	60	0.05	60	0.02
3	10,581	2.78	3,023	1.68	756	0.63	756	0.22
4	15,480	4.07	4,423	2.46	1,106	0.92	1,106	0.33
5	40,434	10.64	11,553	6.42	2,888	2.41	2,888	0.85
6	36,291	9.55	10,369	5.76	2,592	2.16	2,592	0.76
Subtotals	103,626	27	29,608	16	7,402	6	7,402	2
Hat Creek								
14	51,364	13.52	14,676	8.15	3,669	3.06	3,669	1.08
15	28,384	7.47	8,110	4.51	2,027	1.69	2,027	0.60
16	8,195	2.16	2,342	1.30	585	0.49	585	0.17
Subtotals	87,944	23	25,127	14	6,282	5	6,282	2
Piney River								
22	13,048	3.43	3,728	2.07	932	0.78	932	0.27
23	49,268	12.97	14,077	7.82	3,519	2.93	3,519	1.04
24	33,664	8.86	9,618	5.34	2,405	2.00	2,405	0.71
25	23,092	6.08	6,598	3.67	1,649	1.37	1,649	0.49
26	0	0.00	0	0.00	0	0.00	0	0.00
27	0	0.00	0	0.00	0	0.00	0	0.00
Subtotals	119,072	31	34,021	19	8,505	7	8,505	3
TOTALS	448,220	118	128,063	71	32,016	27	32,016	9

Land Based Agricultural BMPs

In order to meet the bacteria and sediment reductions outlined in the TMDLs, best management practices to treat land-based sources of the pollutants must also be included in implementation efforts. Table 5.9 provides a summary of land based agricultural BMPs by watershed needed to achieve water quality goals.

Riparian Buffers

For modeling purposes, it was assumed that a typical vegetative buffer would be able to receive and treat runoff from an area two times its width. For example, a buffer that was 35 feet wide and 1,000 feet long would treat runoff from an area that was 70 feet wide and 1,000 feet long. Once you move beyond two times the buffer width, it was assumed that the runoff would be in the form of channelized flow rather than the sheet flow that a buffer can trap. The 100-foot buffers were paired with livestock exclusion projects accomplished through CREP so that landowners could maximize financial incentives for taking the larger portion of pasture out of production.

Grazing Systems and Improved Pasture Management

Establishment of rotational grazing systems for cattle was recommended in conjunction with livestock exclusion projects. The majority of fencing programs will provide cost share for the establishment of cross fencing and alternative watering sources in order to establish these systems. In cases where livestock exclusion is not necessary, improved pasture management was prescribed. Like a grazing system, improved pasture management allows a farmer to better utilize grazing land and associated forage production. Improved pasture management includes:

- Implement a current nutrient management plan
- Maintain adequate soil nutrient and pH levels
- Manage livestock rotation to paddock subdivisions to maintain minimum grazing height recommendations and sufficient rest periods for plant recovery
- Maintain adequate and uniform plant cover ($\geq 60\%$) and pasture stand density
- Locate feeding and watering facilities away from sensitive areas
- Manage distribution of nutrients and minimize soil disturbance at hay feeding sites by unrolling hay across the upland landscape in varied locations

- Designate a sacrifice lot/paddock to locate cattle for feeding when adequate forage is not available in the pasture system. Sacrifice lot/paddock should not drain directly into ponds, creeks or other sensitive areas and should not be more than 10% of the total pasture acreage.
- Chain harrow pastures to break-up manure piles after livestock are removed from a field at least twice a year to uniformly spread the manure load, or manage manure distribution through rotational grazing

Cropland Management Practices

A series of cropland management practices are included to control cropland runoff contributing bacteria to the streams. Continuous no-till is a practice that is becoming widely adopted in the region. By reducing tillage of the soil, farmers are able to conserve valuable soil and fertilizer and increase organic matter, which is an important factor in determining soil quality. Cover crops are planted on an annual basis in order to prevent soil erosion following harvest of crops like corn and soybeans when the soil would typically be left exposed.

Table 5.9 Land based agricultural BMPs needed to reach the TMDL

Land use	BMP	Acres				
		Tye River	Rucker Run	Hat Creek	Piney River	TOTAL
Pasture	Improved pasture management	731	1,533	783	2,023	5,070
	Permanent vegetation on critical areas	0	33	47	46	126
	Reforestation of highly erodible pasture	0	33	24	0	57
	Riparian buffers	150	113	96	130	489
Cropland	Continuous no-till	180	450	50	30	710
	Cover crops (annual acreage)	70	330	45	0	445

5.2.2 Residential Control Measures

Failing Septic Systems and Straight Pipes

All straight pipes and failing septic systems must be identified and corrected during implementation based on preexisting legal requirements. Table 5.11 shows the estimated

number of failing septic systems and straight pipes by watershed. The number of potential straight pipes in the Tye River watershed was estimated in the Tye River TMDL using 2010 U.S. Census Bureau block demographics. The number of failing septic systems in the watershed was estimated based on the age of homes and standard failure rates for septic systems of that age. Homes with septic systems were broken into three age categories (prior to 1970, 1970-1989, or after 1989) based on 2010 census block group data. The percentage of homes within each age category was calculated for each census block group and these percentages were applied to the homes in each subwatershed based on the block group that had the greatest coverage of the subwatershed. Septic system failure rates for houses pre-1970, 1970-1989, and post- 1989 were assumed to be 40%, 20%, and 3%, respectively. In sub-watersheds 12, 13, 22 and 23 the failure rate was assumed to be higher based on stakeholder advice (50% of old houses, 30% of middle-aged houses). Based on these failure rates, there is an estimated 625 failing septic systems in the Tye River, Rucker Run, Hat Creek and Piney River watersheds (DEQ, 2013).

Straight pipe numbers and potential locations were estimated in consultation with watershed stakeholders. The proximity of homes to the stream and their age were also considered in development of these estimates. Based on this criterion, it was estimated that there are 25 straight pipes in the watersheds.

Table 5.11 Failing septic systems and straight pipes in the watersheds

Watershed	Total Septic Systems	Estimated Failing Septic Systems	Estimated Straight Pipes
Tye River	1,453	266	10
Rucker Run	761	131	2
Hat Creek	254	98	5
Piney River	694	130	8
TOTAL	3,162	625	25

Based on data collected from several existing septic system cost share programs in nearby counties (Augusta and Rockingham), it was estimated that 50% of failing septic systems could be corrected with a repair, the remaining 50% would need to be replaced. Of the systems that need to be replaced, a portion will require alternative waste treatment

systems due to the geology present at the site, or a lack of space necessary for a conventional drainfield. Table 5.12 shows a breakdown of the septic system and straight pipe replacements based on input from the Nelson County Health Department. Based on existing conditions in the watersheds, it was estimated that approximately 30% of septic system replacements would be done with alternative waste treatment systems, 66% could be done using conventional septic systems, and the remaining 2% could be corrected by connecting the home to public sewer (except for in the Hat Creek watershed where there are no known opportunities to connect to public sewer). Because homes with straight pipes are more likely to have conditions that do not allow for installation of a conventional drainfield (older homes, smaller lots, home is located close to the stream), it was estimated that only 50% of straight pipes in the watershed could be corrected with the installation of a conventional system. Of the remaining straight pipes, it was estimated that 47% would need to be replaced with an alternative waste treatment system, while 3% could be corrected with a connection to public sewer. A septic tank pumpout program was also discussed as a good way to heighten local awareness of septic system maintenance needs and to locate failing septic systems. Such a program could be implemented on a limited basis, targeting homes in close proximity to the creeks. The estimates shown in Table 5.12 are based on pumping out septic tanks for 25% of households in each watershed.

Table 5.12 Repairs and replacements of failing septic systems and straight pipes

Watershed	Septic system repair	Connect to public sewer	Replace with conventional system	Replace with alternative system	Septic tank pumpout
Tye River	133	6	93	45	363
Rucker Run	66	3	44	21	33
Hat Creek	49	0	37	17	25
Piney River	65	3	47	23	33
TOTAL	312	12	156	106	454

5.3 Technical Assistance and Education

In order to get landowners involved in implementation, it will be necessary to initiate education and outreach strategies and provide technical assistance with the design and installation of various best management practices. There must be a proactive approach to

contact farmers and residents to articulate exactly what the TMDL means to them and what practices will help meet the goal of improved water quality. The working groups recommended several education/outreach techniques, which will be utilized during implementation.

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

Agricultural Programs

- Make contact with landowners in the watersheds to make them aware of implementation goals, cost-share assistance, and voluntary options that are available to agricultural producers interested in conservation
- Provide technical assistance for agricultural programs (*e.g.*, survey, design, layout, and approval of installation).
- Work with VA Cooperative Extension to host field days and farm tours. Highlight practices that benefit water quality but also offer potential financial benefits to farmers.
- If progress is not being made within the first stage of implementation, consider conducting cold calls to farms to share information about cost share programs.
- Develop educational materials & programs, provide examples of similar projects that have been successful
- Locate funds for a “Flexible Fencing Program” modeled after the program implemented in the Shenandoah Valley. Explore opportunities to partner with the Chesapeake Bay Funders Network or other organizations to secure private funds to support the program.
- Organize educational programs (*e.g.*, County Fair)
- Handle and track cost-share
- Assess and track progress toward BMP implementation goals
- Coordinate use of existing agricultural programs and suggest modifications

Residential Programs

- Identify straight-pipes and failing septic systems (*e.g.*, contact landowners in older homes, septic pump-out program)
- Handle and track cost-share
- Organize educational programs (*e.g.*, septic system maintenance workshop)
- Partner with the Blue Ridge Medical Center to conduct outreach on human health impacts of exposure to *E. coli* and associated pathogens, work with the epidemiologist on staff at the center.
- Partner with VA Cooperative Extension’s Master Well Owner Network to conduct a clinic on well safety and potential drinking water contamination from failing septic systems

- Distribute educational materials (*e.g.*, informational pamphlets on TMDL IP and on-site sewage disposal systems). Locations for distribution include: Southern States, Ace Hardware, and Colleen Feed and Seed
- Set up an Enviroscape at the Nelson Center
- Work with the Department of Health to distribute the short articles they publish on septic system maintenance
- Publish articles with information on programs available to correct failing septic systems and straight pipes in the newspaper. Provide updates on implementation progress.
- Distribute informational brochures to septic system contractors and plumbers to hand out to customers
- Partner with Nelson and Amherst County Community Development and Habitat for Humanity to identify and eliminate straight pipes in the watershed
- Identify and reach out to absentee property owners with renters in case they are not aware of the presence of straight pipes on their rental properties.
- Assess progress toward implementation goals

In addition, several ongoing community events were identified as excellent opportunities to conduct general outreach on water quality and BMP implementation including:

- Farmers markets (Amherst and Nelson County)
- County fairs (Amherst and Nelson County)
- Nelson County Kite Festival (April)
- Piney River Mini Triathlon (April)
- The Nelson Downriver Race (April, on Tye River)
- Nelson County Community Day (April)

A critical component in the successful implementation of this plan is the availability of knowledgeable staff to work with landowners on implementing conservation practices. While this plan provides a general list of practices that can be implemented in the watershed, property owners face unique management challenges including both design challenges and financial barriers to implementation of practices. Consequently, technical assistance from trained conservation professionals is a key component to successful BMP implementation. Technical assistance includes helping landowners identify suitable BMPs for their property, designing BMPs and locating funding to finance implementation.

The staffing level needed to implement the agricultural and residential components of the plan was estimated based on discussions with stakeholders and the staffing levels used in similar projects. Staffing needs were quantified using full time equivalents (FTE), with

one FTE being equal to one full-time staff member. Thomas Jefferson SWCD staff shared information on staff time spent implementing the Rockfish River TMDL Implementation Plan, which is also located in Nelson County. One position has been created for this effort. A comparative analysis of the two watersheds and BMPs needed to meet TMDL goals was performed. Based on this analysis and discussions with the working groups, it was determined that 1.5 FTEs would be needed to provide the technical assistance needed for agricultural and residential implementation. The Thomas Jefferson SWCD has staff currently working in Nelson, Albemarle, Fluvanna and Louisa Counties, while the Robert E Lee SWCD covers Amherst, Appomattox, Campbell Counties and the City of Lynchburg. Consequently, outreach and technical assistance with design and implementation of a portion of agricultural BMPs included in the implementation plan could be handled by existing staff at the SWCDs. However, in order to fully achieve agricultural BMP implementation goals within the timeline established in Chapter 7 of this plan, an additional FTE will be required at one of the SWCDs. A second half time position will be needed for a residential coordinator to conduct outreach and work with landowners to address failing septic systems and straight pipes in the watersheds. This position could be housed at one of the SWCDs or at Nelson or Amherst County.

6. COSTS AND BENEFITS

6.1 Agricultural BMPs

The costs of agricultural best management practices included in the implementation plan were estimated based on data for Nelson and Amherst Counties from the VADCR Agricultural BMP Database, the NRCS and Thomas Jefferson SWCD cost lists for BMP components, and considerable input from Thomas Jefferson SWCD and NRCS staff.

The total cost of livestock exclusion systems includes not only the costs associated with fence installation, repair, and maintenance, but also the cost of developing alternative water sources for SL-6T, LE-1T, LE-2T, and CREP. The cost of fence maintenance was identified as a deterrent to participation. Financial assistance possibilities for maintaining fences include an annual 25% tax credit for fence maintenance, and an upfront incentive payment on \$0.50 per linear foot to maintain stream fencing as part of the WP-2T practice. Typically the average cost of fence maintenance is significantly higher. In developing the cost estimates for fence maintenance shown in Table 6.1, a figure of \$3.50/linear foot of fence was used. It was estimated that approximately 10% of fencing would need to be replaced over the 15 year timeline of this project.

The majority of agricultural practices recommended in the implementation plan are included in state and federal cost share programs. These programs offer financial assistance in implementing the practices and may also provide landowners with an incentive payment to encourage participation. Consequently, both the potential cost to landowners and the cost to state and federal programs must be considered. Table 6.1 shows total agricultural BMP costs by watershed.

6.2 Residential Septic BMPs

The costs of recommended residential BMPs were estimated using input from the Nelson County Health Department and the residential working group (Table 6.2).

Total BMP implementation costs are shown in Table 6.3. In Table 6.4, implementation costs are shown for two stages of implementation. These stages and the associated timeline are explained in greater detail in Chapter 7, Section 7.1.

Table 6.1 Agricultural BMP implementation costs by watershed

Practice	Cost share code	Units	Unit cost	Cost by Watershed				
				Tye River	Rucker Run	Hat Creek	Piney River	TOTAL
Livestock exclusion with riparian buffers	CREP	system	\$47,380	\$136,942	\$103,147	\$87,537	\$118,521	\$446,147
	WP-2T	system	\$8,500	\$69,608	\$52,430	\$44,495	\$60,245	\$226,778
	SL-6T/LE-1T	system	\$38,505	\$1,394,064	\$1,050,035	\$891,125	\$1,206,543	\$4,541,767
Livestock exclusion with reduced setback	LE-2T	system	\$27,305	\$596,281	\$449,130	\$381,160	\$516,073	\$1,942,643
Exclusion fence maintenance (20 yrs)	N/A	feet	\$3.50	\$68,789	\$51,813	\$43,972	\$59,536	\$224,110
Improved pasture management	EQIP (529,512)	acres	\$100	\$73,100	\$135,300	\$78,300	\$202,300	\$507,000
Permanent vegetation on critical areas	SL-11	acres	\$1,200	\$0	\$39,000	\$56,400	\$55,200	\$150,600
Reforestation of erodible pasture	FR-1	acres	\$130	\$0	\$4,225	\$3,120	\$0	\$7,345
Continuous no-till	SL-15A	acres	\$100	\$18,000	\$45,000	\$5,000	\$3,000	\$71,000
Cover crops	SL-8B	acres	\$30	\$2,100	\$9,900	\$1,350	\$0	\$13,350
TOTAL ESTIMATED COST				\$2,358,883	\$1,957,980	\$1,592,459	\$2,221,418	\$8,130,740

Table 6.2 Residential septic BMP implementation costs by watershed

Practice	Cost share code	Units	Unit cost	Cost by Watershed				
				Tye River	Rucker Run	Hat Creek	Piney River	TOTAL
Septic tank pumpouts	RB-1	pumpout	\$300	\$108,975	\$9,825	\$7,350	\$9,750	\$135,900
Connection to public sewer	RB-2	system	\$9,000/ \$12,000*	\$50,580	\$24,120	\$0	\$34,080	\$108,780

Septic system repair	RB-3	repair	\$3,000	\$399,000	\$196,500	\$147,000	\$195,000	\$937,500
Septic system replacement	RB-4	system	\$6,500	\$452,303	\$215,621	\$183,560	\$228,638	\$1,080,121
Septic system replacement w/pump	RB-4P	system	\$8,000	\$185,560	\$88,460	\$69,680	\$93,800	\$437,500
Alternative waste treatment system	RB-5	system	\$25,000	\$1,115,000	\$514,750	\$426,250	\$581,500	\$2,637,500
TOTAL ESTIMATED COST				\$2,311,418	\$1,049,276	\$833,840	\$1,142,768	\$5,337,301

*\$12,000 connection cost applied only to Piney River watershed

Table 6.3 Total BMP implementation costs by watershed

BMP Type	Cost by Watershed				TOTAL
	Tye River	Rucker Run	Hat Creek	Piney River	
Agricultural	\$2,358,883	\$1,957,980	\$1,592,459	\$2,221,418	\$8,130,740
Residential	\$2,311,418	\$1,049,276	\$833,840	\$1,142,768	\$5,337,301
TOTAL	\$4,670,301	\$3,007,256	\$2,426,299	\$3,364,186	\$13,468,041

Table 6.4 Phased BMP implementation costs by watershed.

Phase	Cost by Watershed				TOTAL
	Tye River	Rucker Run	Hat Creek	Piney River	
Phase 1 (Yrs 1-8)	\$2,285,393	\$2,163,318	\$1,910,369	\$2,052,773	\$8,411,853
Phase 2 (Yrs 8-15)	\$2,656,288	\$973,311	\$626,065	\$1,448,595	\$5,704,260
TOTAL	\$4,670,300	\$3,007,256	\$2,426,299	\$3,364,185	\$13,468,041

6.5 Technical Assistance

Technical assistance costs were estimated for one full time and one half time position using a cost of \$60,000/position per year. This figure is based on the existing staffing costs included in the Virginia Department of Environmental Quality's grant agreement with the Thomas Jefferson Soil and Water Conservation District for the Rockfish River watershed. Based on the 15 year timeline of this plan (described in great detail in the Implementation Timeline section of this plan), this would make the total cost of technical assistance approximately \$1.35M. When factored into the cost estimate for BMP implementation shown in Table 6.3, this would make the total cost of implementation approximately \$14.8M.

6.6 Benefit Analysis

The primary benefit of implementing this plan will be cleaner water in the Tye River and its tributaries. Specifically, *E. coli* contamination in the creeks will be reduced to meet water quality standards. It is hard to gage the impact that reducing *E. coli* contamination will have on public health, as most cases of waterborne infection are not reported or are falsely attributed to other sources. However, because of the reductions required, the incidence of infection from *E. coli* sources through contact with surface waters should be reduced considerably.

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

6.6.1 Agricultural Practices

It is recognized that every farmer faces unique management challenges that may make implementation of some BMPs more cost effective than others. Consequently, costs and benefits of the BMPs recommended in this plan must be weighed on an individual basis. The benefits highlighted in this section are based on general research findings. Additional economic costs and benefits analyses of these practices at the local level was identified as a much needed outreach tool by the steering committee and agricultural working group.

Restricting livestock access to streams and providing them with clean water source has been shown to improve weight gain and milk production in cattle (Zeckoski et al., 2007). Studies have shown that increasing livestock consumption of clean water can lead to increased milk and butterfat production and increased weight gain (Landefeld et al, 2002). Table 6.5 shows an example of how this can translate into economic gains for producers. Fresh clean water is the primary nutrient for 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, 1998b). A clean water source can prevent illnesses that reduce production and incur the added expense of avoidable veterinary bills.

Table 6.5 Example of increased revenue due to installing off-stream waterers (Surber et al., 2005)

Typical calf sale weight	Additional weight gain due to off-stream waterer	Price	Increased revenue due to off stream waterer
500 lbs/calf	5% or 25 lbs	\$0.60 per lb	\$15/calf

In addition to reducing the likelihood of animals contracting waterborne illnesses by providing a clean water supply, streamside fencing excludes livestock from wet, swampy environments as are often found next to streams where cattle have regular access. Keeping cattle in clean, dry areas has been shown to reduce the occurrence of mastitis

and foot rot. The VCE (1998a) reports that mastitis costs producers \$100 per cow in reduced quantity and quality of milk produced. On a larger scale, mastitis costs the U.S. dairy industry about \$1.7 billion to 2 billion annually or 11% of total U.S. milk production. While the spread of mastitis through a dairy herd can be reduced through proper sanitation of milking equipment, mastitis-causing bacteria can be harbored and spread in the environment where cattle have access to wet and dirty areas. Installation of streamside fencing and well managed loafing areas will reduce the amount of time that cattle have access to these areas.

Taking the opportunity to implement an improved pasture management system in conjunction with installing clean water supplies will also provide economic benefits for the producer. Improved pasture management can allow a producer to feed less hay in winter months, increase stocking rates by 30 to 40 % 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. In addition to reducing costs to producers, intensive pasture management can boost profits by allowing higher stocking rates and increasing the amount of gain per acre. Another benefit is that cattle are closely confined allowing for quicker examination and handling. In general, many of the agricultural BMPs recommended in this document will provide both environmental benefits and economic benefits to the farmer.

6.6.2 Residential Practices

The residential programs will play an important role in improving water quality, since human waste can carry with it human viruses in addition to the bacterial and protozoan pathogens that all fecal matter can potentially carry. In terms of economic benefits to homeowners, an improved understanding of on-site sewage treatment systems, including knowledge of what steps can be taken to keep them functioning properly and the need for

regular maintenance, will give homeowners the tools needed for extending the life of their systems and reducing the overall cost of ownership. The average septic system will last 20 to 25 years if properly maintained. Proper maintenance includes: knowing the location of the system components and protecting them (*e.g.*, not driving or parking on top of them), not planting trees where roots could damage the system, keeping hazardous chemicals out of the system, and pumping out the septic tank every 3 to 5 years. The cost of proper maintenance, as outlined here, is relatively inexpensive (\$225) in comparison to repairing or replacing an entire system (\$6,000 to \$22,500). Additionally, the repair/replacement and pump-out programs 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. As will be discussed in greater detail in Chapter 9, 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.

6.6.3 Watershed Health and Associated Benefits

Focusing on reducing bacteria in the Tye River watershed will have associated watershed health benefits as well. Reductions in streambank erosion, excessive nutrient runoff, and water temperature are additional benefits associated with streamside buffer plantings. In turn, reduced nutrient loading and erosion and cooler water temperatures improves habitat for fisheries, which provides associated benefits to anglers and the local economy. Riparian buffers can also improve habitat for wildlife such as ground-nesting quail and other sensitive species. Data collected from Breeding Bird Surveys in Virginia indicate

that the quail population declined 4.2% annually between 1966 and 2007. Habitat loss has been cited as the primary cause of this decline. As a result, Virginia has experienced significant reductions in economic input to rural communities from quail hunting. The direct economic contribution of quail hunters to the Virginia economy was estimated at nearly \$26 million in 1991, with the total economic impact approaching \$50 million. Between 1991 and 2004, the total loss to the Virginia economy was more than \$23 million from declining quail hunter expenditures (VDGIF, 2009). Funding is available to assist landowners in quail habitat restoration (see Chapter 9).

7. MEASUREABLE GOALS AND MILESTONES

Given the scope of work involved with implementing this TMDL, full implementation and de-listing from the Virginia Section 305(b)/303(d) list could be expected within 15 years provided that full funding for technical assistance and BMP cost share were available. Described in this section are a timeline for implementation, water quality and implementation goals and milestones, and strategies for targeting of best management practices.

7.1 Milestone Identification

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

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

Following the idea of a staged implementation approach, resources and finances will be concentrated on the most cost-efficient control measures and areas of highest interest first. For instance, the TMDL study indicated runoff from pasture contributes approximately 93% of the total bacteria load in Tye River. Concentrating on implementing pasture management practices within the first several years may provide the highest return on water quality improvement with less cost to landowners. Implementation has been divided up into two stages: 2015-2022 and 2023-2029. Tables 7.1 - 7.4 show implementation and water quality improvement goals for *E. coli* bacteria for each watershed in each implementation stage.

Table 7.1a Staged implementation goals for Tye River

BMP Type	Description	BMP code	Units	Stage 1	Stage 2
Direct deposit	Livestock exclusion with riparian buffers	CREP	feet	1,404	8,423
		SL-6T/LE-1T		19,654	117,924
		WP-2T		1,404	8,423
	Livestock exclusion with reduced setback	LE-2T		5,615	33,693
Pasture	Improved pasture management	EQIP (529,512)		731	0
	Riparian buffers	CREP, SL-6T, WP-2T		21	129
	Permanent vegetation on critical areas	SL-11		0	0
	Reforestation of erodible pasture	FR-1		0	0
Cropland	Continuous no-till	SL-15A	acres	90	90
	Cover crops	SL-8B		35	35
Residential septic	Septic tank pumpouts	RB-1	pumpout	345	18
	Connection to public sewer	RB-2	connection	5	1
	Septic system repair	RB-3	repair	106	27
	Septic system replacement	RB-4	system	63	7
	Septic system replacement with pump	RB-4P		21	2
	Alternative waste treatment	RB-5		33	11
Average annual <i>E. coli</i> load (cfu/yr) (Existing= 7.94 x 10 ¹⁴ cfu/yr)				6.67x10 ¹⁴	6.28x10 ¹⁴
% Violation of the Single Sample <i>E. coli</i> standard (235 cfu/100mL) Existing condition = 10.2%				6.5%	4.93%
% Violation rate of the Geometric Mean <i>E. coli</i> standard (126 cfu/100mL)				10.42%	6.25%

Table 7.1b Percent of land use receiving BMP by stage in Tye River

BMP Type	Description	BMP code	Stage 1	Stage 2
Direct deposit	Livestock exclusion with riparian buffers	CREP	1%	3%
		SL-6T/LE-1T	6%	42%
		WP-2T	1%	3%
	Livestock exclusion with reduced setback	LE-2T	2%	12%
Pasture	Improved pasture management	EQIP (529,512)	10%	0%

	Riparian buffers	CREP, SL-6T, WP-2T	0.30%	2%
	Permanent vegetation on critical areas	SL-11	0%	0%
	Reforestation of erodible pasture	FR-1	0%	0%
Cropland	Continuous no-till	SL-15A	2%	2%
	Cover crops	SL-8B	1%	1%
Residential septic	Septic tank pumpouts	RB-1	24%	1%
	Connection to public sewer	RB-2	2%	0.02%
	Septic system repair	RB-3	40%	10%
	Septic system replacement	RB-4	22%	3%
	Septic system replacement with pump	RB-4P	7%	1%
	Alternative waste treatment	RB-5	11%	4%

Table 7.2a Staged implementation goals for Rucker Run

BMP Type	Description	BMP code	Units	Stage 1	Stage 2
Direct deposit	Livestock exclusion with riparian buffers	CREP	feet	4,860	2,542
		SL-6T/LE-1T		68,038	35,589
		WP-2T		4,860	2,542
	Livestock exclusion with reduced setback	LE-2T		19,439	10,168
Pasture	Improved pasture management	EQIP (529,512)		1,242	291
	Riparian buffers	CREP, SL-6T, WP-2T		74	39
	Permanent vegetation on critical areas	SL-11		32.5	0
	Reforestation of erodible pasture	FR-1		32.5	0
Cropland	Continuous no-till	SL-15A	acres	225	225
	Cover crops	SL-8B		165	165
Residential septic	Septic tank pumpouts	RB-1	pumpout	31	2
	Connection to public sewer	RB-2	connection	2	0
	Septic system repair	RB-3	repair	52	13
	Septic system replacement	RB-4	system	30	3

	Septic system replacement with pump	RB-4P		10	1
	Alternative waste treatment	RB-5		15	5
Average annual <i>E.coli</i> load (cfu/yr) (Existing=1.20 x 10¹⁴)				8.26x10¹³	6.90x10¹³
% Violation of the Single Sample <i>E. coli</i> standard (235 cfu/100mL) Existing condition = 19.16 %				9.58%	4.11%
% Violation rate of the Geometric Mean <i>E. coli</i> standard (126 cfu/100mL)				16.67%	6.25%

Table 7.2b Percent of land use receiving BMP by stage in Rucker Run

BMP Type	Description	BMP code	Stage 1	Stage 2
Direct deposit	Livestock exclusion with riparian buffers	CREP	3%	2%
		SL-6T/LE-1T	46%	24%
		WP-2T	3%	2%
	Livestock exclusion with reduced setback	LE-2T	13%	7%
Pasture	Improved pasture management	EQIP (529,512)	38%	9%
	Riparian buffers	CREP, SL-6T, WP-2T	2%	1%
	Permanent vegetation on critical areas	SL-11	1%	0%
	Reforestation of erodible pasture	FR-1	1%	0%
Cropland	Continuous no-till	SL-15A	8%	8%
	Cover crops	SL-8B	6%	6%
Residential septic	Septic tank pumpouts	RB-1	24%	1%
	Connection to public sewer	RB-2	2%	0%
	Septic system repair	RB-3	40%	10%
	Septic system replacement	RB-4	22%	3%
	Septic system replacement with pump	RB-4P	7%	1%
	Alternative waste treatment	RB-5	11%	4%

Table 7.3a Staged implementation goals for Hat Creek

BMP Type	Description	BMP code	Units	Stage 1	Stage 2
Direct	Livestock exclusion with	CREP	feet	4,759	1,523
		SL-6T/LE-1T		66,624	21,320

deposit	riparian buffers	WP-2T		4,759	1,523
	Livestock exclusion with reduced setback	LE-2T		19,035	6,091
Pasture	Improved pasture management	EQIP (529,512)		783	0
	Riparian buffers	CREP, SL-6T, WP-2T		73	23
	Permanent vegetation on critical areas	SL-11		47	0
	Reforestation of erodible pasture	FR-1		24	0
Cropland	Continuous no-till	SL-15A	acres	25	25
	Cover crops	SL-8B		23	22
Residential septic	Septic tank pumpouts	RB-1	pumpout	23	1
	Connection to public sewer	RB-2	connection	0	0
	Septic system repair	RB-3	repair	39	10
	Septic system replacement	RB-4	system	25	3
	Septic system replacement with pump	RB-4P		8	1
	Alternative waste treatment	RB-5		13	4
Average annual <i>E.coli</i> load (cfu/yr) (Existing=5.97 x 10 ¹³				3.59x10 ¹³	3.16x10 ¹³
% Violation of the Single Sample <i>E. coli</i> standard (235 cfu/100mL) Existing condition = 25.94%				9.79%	5.06%
% Violation rate of the Geometric Mean <i>E. coli</i> standard (126 cfu/100mL)				16.67%	8.33%

Table 7.3b Percent of land use receiving BMP by stage in Hat Creek

BMP Type	Description	BMP code	Stage 1	Stage 2
Direct deposit	Livestock exclusion with riparian buffers	CREP	4%	1%
		SL-6T/LE-1T	52%	17%
		WP-2T	4%	1%
	Livestock exclusion with reduced setback	LE-2T	15%	5%
Pasture	Improved pasture management	EQIP (529,512)	33%	0%
	Riparian buffers	CREP, SL-6T, WP-2T	3%	1%
	Permanent vegetation on critical areas	SL-11	2%	0%

	Reforestation of erodible pasture	FR-1	1%	0%
Cropland	Continuous no-till	SL-15A	3%	3%
	Cover crops	SL-8B	3%	3%
Residential septic	Septic tank pumpouts	RB-1	24%	1%
	Connection to public sewer	RB-2	0%	0%
	Septic system repair	RB-3	40%	10%
	Septic system replacement	RB-4	24%	3%
	Septic system replacement with pump	RB-4P	7%	1%
	Alternative waste treatment	RB-5	11%	4%

Table 7.4a Staged implementation goals for Piney River

BMP Type	Description	BMP code	Units	Stage 1	Stage 2
Direct deposit	Livestock exclusion with riparian buffers	CREP	feet	3,780	4,725
		SL-6T/LE-1T		52,921	66,151
		WP-2T		3,780	4,725
	Livestock exclusion with reduced setback	LE-2T		15,120	18,900
Pasture	Improved pasture management	EQIP (529,512)		2,023	0
	Riparian buffers	CREP, SL-6T, WP-2T		58	72
	Permanent vegetation on critical areas	SL-11		46	0
	Reforestation of erodible pasture	FR-1		0	0
Cropland	Continuous no-till	SL-15A	acres	15	15
	Cover crops	SL-8B		0	0
Residential septic	Septic tank pumpouts	RB-1	pumpout	31	2
	Connection to public sewer	RB-2	connection	3	0
	Septic system repair	RB-3	repair	52	13
	Septic system replacement	RB-4	system	32	3
	Septic system replacement with pump	RB-4P		11	1
	Alternative waste treatment	RB-5		17	6
Average annual <i>E.coli</i> load (cfu/yr) (Existing= 1.94 x 10 ¹⁴				1.40x10 ¹⁴	1.22x10 ¹⁴

% Violation of the Single Sample <i>E. coli</i> standard (235 cfu/100mL) Existing condition = 15.47%	9.58%	4.72%
% Violation rate of the Geometric Mean <i>E. coli</i> standard (126 cfu/100mL)	16.67%	0%

Table 7.4b Percent of land use receiving BMP by stage in Piney River

BMP Type	Description	BMP code	Stage 1	Stage 2
Direct deposit	Livestock exclusion with riparian buffers	CREP	2%	3%
		SL-6T/LE-1T	28%	35%
		WP-2T	2%	3%
	Livestock exclusion with reduced setback	LE-2T	8%	10%
Pasture	Improved pasture management	EQIP (529,512)	44%	0%
	Riparian buffers	CREP, SL-6T, WP-2T	1%	2%
	Permanent vegetation on critical areas	SL-11	1%	0%
	Reforestation of erodible pasture	FR-1	0%	0%
Cropland	Continuous no-till	SL-15A	1%	1%
	Cover crops	SL-8B	0%	0%
Residential septic	Septic tank pumpouts	RB-1	24%	1%
	Connection to public sewer	RB-2	2%	0%
	Septic system repair	RB-3	40%	10%
	Septic system replacement	RB-4	22%	3%
	Septic system replacement with pump	RB-4P	7%	1%
	Alternative waste treatment	RB-5	11%	4%

7.2 Water Quality Monitoring

Improvements in water quality will be evaluated through water quality monitoring conducted at VADEQ monitoring stations located in the watersheds as shown below in Figure 7.1. The map shows stations that are part of VADEQ's Ambient Monitoring Program, wherein bi-monthly watershed monitoring takes place on a rotating basis for two consecutive years of a six-year assessment cycle. Trend stations are also highlighted on the map. These stations are part of a regular monitoring cycle and are not typically rotated on an off of the

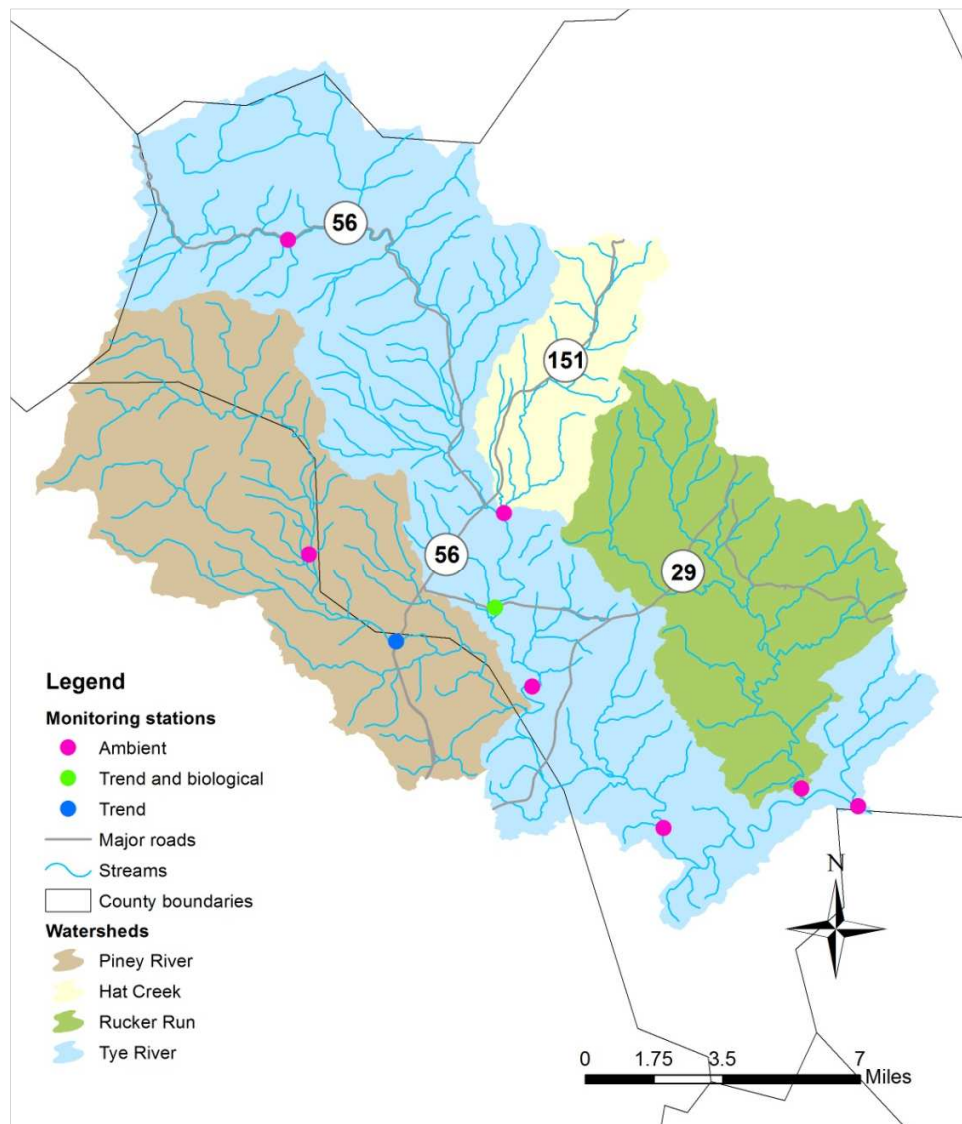


Figure 7.1. VADEQ monitoring stations and station type following TMDL IP completion

monitoring schedule. In cases where the monitoring station used to place a stream on the impaired waters list is a trend station (shown in green and blue in Figure 7.1), monitoring will continue as usual. For the other ambient monitoring stations, monitoring will begin no sooner than the second odd numbered calendar year following the initiation of TMDL implementation. Beginning implementation monitoring after 2 to 3 years of TMDL implementation will help ensure that time has passed for remedial measures to have stabilized and BMPs to have become functional. At a minimum, the frequency of sample collections will be every other month for two years. After two years of bi-monthly monitoring an assessment will be made to determine if the segments are no longer

impaired. If full restoration, as defined in the current or most recent version of the DEQ Final Water Quality Assessment Guidance Manual, has been achieved, monitoring will be suspended. If the two listing stations shown on the map, or any other stations associated with this implementation plan have three or more exceedances of the bacteria standard within this two year period, monitoring will be discontinued for two years. Bi-monthly monitoring will be resumed for another two years on the odd numbered calendar year in the third two-year period of the six year assessment window. After this, the most recent two years of data will be evaluated, and the same criteria as was used for the first two year monitoring cycle will apply.

Intensive, one-year monthly sampling may occur within any single calendar year. It is generally preferred to conduct sampling over a two year period to help minimize the effect of fluctuating climate conditions related to dry and wet events.

There is the potential for additional monitoring at a subset of stations in the watersheds where continual VADEQ monitoring is conducted on a bi-monthly basis beginning on the next odd number calendar year after the initiation of implementation. This will require an additional funding source and can only be accomplished with sufficient resources to support needs of the data users, and only if watershed conditions and stakeholder support are suitable to this strategy. These monitoring stations will be located in the watersheds based on TMDL implementation funds, either state, federal, or other sources, becoming available.

7.3 Targeting

Implicit in the process of a staged implementation is targeting of best management practices. Targeting ensures optimum utilization of limited technical and financial resources. The agricultural working group discussed potential targeting strategies of fencing practices and other agricultural BMPs. The group discussed the best ways to identify and correct problem areas in the watershed that may be contributing a large amount of pollution to the streams. Citizen monitoring was identified as a good way to identify these areas. Citizen monitoring sample sites should be located in areas of the river where watershed residents have access and typically swim. These areas should be targeted for outreach in the event that monitoring shows high levels of *E. coli*. Generally,

the agricultural working group felt that since participating in agricultural BMP cost share programs to date has been low in the watersheds, it would be best to throw a wide net with respect to outreach and promotion of BMP programs.

The residential working group identified areas in the watersheds that are most likely to have straight pipes and failing septic systems and should therefore be targeted for implementation first. These areas included homes along Dickie Road and upstream of it, and about 50 homes between Lowesville and Woodson that were built in the 50's and 60's. The Shipman area was identified as a good location for expansion of public sewer due to the presence of concentrated development. Citizen monitoring was also identified as a good tool for improved targeting of outreach efforts for residential BMPs and locating failing septic systems and straight pipes. The group did not recommend floating the stream to identify straight pipes.

7.3.2 Fencing Prioritization by Subwatershed

The agricultural working group discussed additional methods for targeting of livestock stream exclusion practices in the watershed. Since portions of the watershed are very steep and subject to greater erosion and runoff, it was suggested that slope be considered in development of targeting strategies. An analysis of the water quality benefits of livestock exclusion was performed for each subwatershed based on 1) the extent of pasture next to the stream 2) the number of livestock in the watershed and 3) the slope of the watershed. Each watershed was divided up into a series of smaller subwatersheds, which were then ranked in ascending order based on the ratio of bacteria loading per fence length and slope (Figure 7.2).

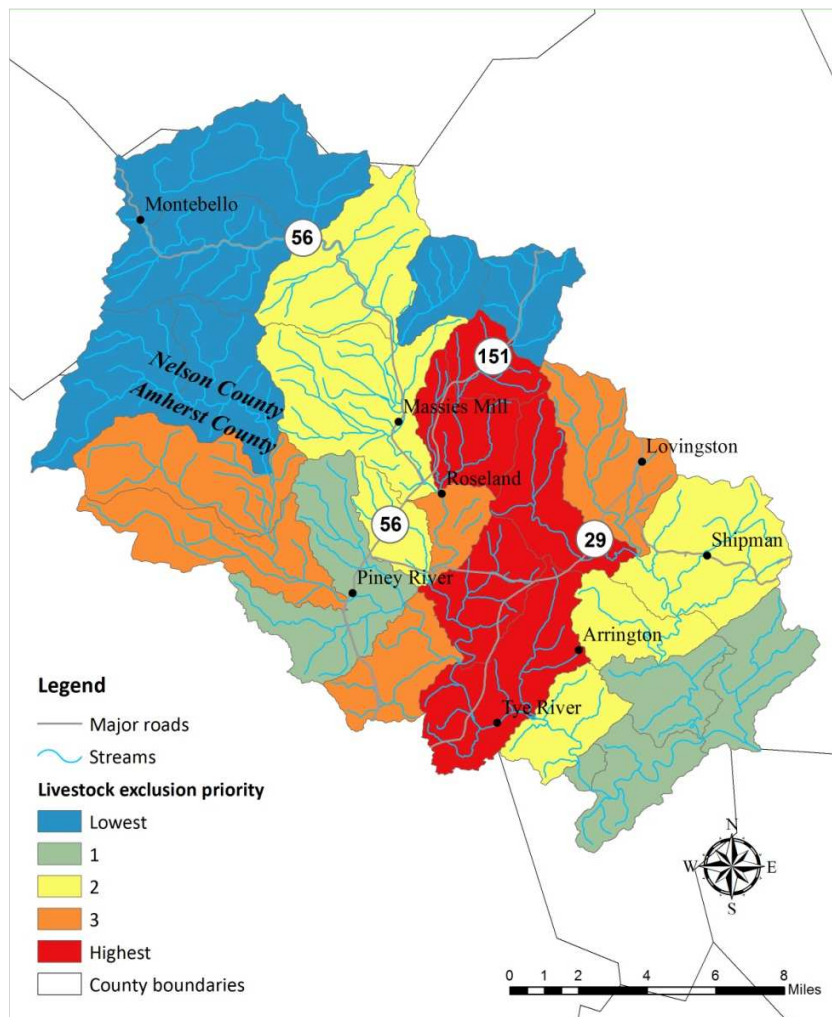


Figure 7.2 Fencing prioritization by subwatershed: Tye River, Rucker Run, Hat Creek and Piney River

8. STAKEHOLDERS AND THEIR ROLE IN IMPLEMENTATION

Achieving the goals of this plan is dependent on stakeholder participation and strong leadership on the part of both community members and conservation organizations. The Thomas Jefferson and Robert E. Lee Soil and Water Conservation Districts both currently cover portions of the watershed with respect to administration of the VA Agricultural BMP Cost Share Program. Implementation of this plan will require coordination between the two SWCD's across county boundaries, particularly if additional staff are brought on board to support implementation efforts. Additional partners will be necessary in order to address residential implementation needs including

the Nelson and Amherst County Health Departments. The following sections in this chapter describe the responsibilities and expectations for the various components of implementation.

8.1 Partner Roles and Responsibilities

8.1.1 Watershed Landowners

The majority of practices recommended in this plan are related to agriculture since it is a predominant land use in the watersheds. Participation from local farmers is thus a key factor to the success of this plan. Consequently, it is important to consider characteristics of farms and farmers in the watersheds that will affect the decisions farmers make when it comes to implementing conservation practices on their farms. For example, the average size of farms is an important factor to consider, since it affects how much land a farmer can give up for a riparian buffer. The age of a farmer, which was 58 in Virginia in 2012, may also influence their decision to implement best management practices, particularly if they are close to retirement and will be relying on the sale of their land for income during retirement. In such cases, it may be less likely that a farmer would be willing to invest a portion of their income in best management practices. Table 8.1 provides a summary of relevant characteristics of farmers and producers in Nelson and Amherst Counties from the 2007 Agricultural Census. These characteristics were considered when developing implementation scenarios, and should be utilized to develop suitable education and outreach strategies.

Table 8.1 Characteristics of farms and farmers in Nelson and Amherst Counties

Characteristic	Nelson	Amherst
Number of farms	462	424
Land in farms (acres)	76,149	88,430
Full owners of farms	302	289
Part owners of farms	139	105
Tenants	21	30
Operators identifying farming as their primary occupation	151	179
Operators identifying something other than farming as their primary occupation	311	245
Average age of primary operator	58	59.3

Average size of farm (acres)	158	209
Average value of farmland (\$/acre)	\$4,685	\$3,063
Average net cash farm income of operation (\$)	\$3,579	-\$2,201
Average farm production expenses (\$)	\$28,467	\$22,344
Farms with internet access	269	212
<i>Farm typology (acres)</i>		
Small family farms: retirement and residential/lifestyle	328	322
Small family farms: farming occupation	39	45
Large and very large family farms	6	1
Nonfamily farms	23	10

In addition to local farmers, participation from homeowners is also critical to the success of this plan. Though the amount of bacteria that is coming from failing septic systems and straight pipes is minimal compared to livestock, human waste carries with it pathogens that can cause health problems above and beyond those associated with livestock waste.

8.1.2 Thomas Jefferson and Robert E Lee SWCDs and Natural Resource Conservation Service

During the implementation project, the SWCDs and NRCS will continue to reach out to farmers in the watersheds and provide them with technical and financial assistance with conservation practices. Their responsibilities include promoting available funding and the benefits of BMPs and providing assistance in the survey, design, and layout of agricultural BMPs. The SWCD and NRCS staff will conduct outreach activities in the watershed to encourage participation in conservation programs. Such activities include mailing out newsletters and organizing field days. The SWCD's will work cooperatively in their efforts to increase local awareness of water quality issues in the creeks and make agricultural landowners aware of financial and technical assistance available for BMP implementation in the watersheds. Should funding for additional staff to implement the agricultural component of this plan become available, the SWCDs will work together to ensure adequate coverage of the project area across their coverage boundaries.

Dedicated staff is currently not available to lead efforts to correct failing septic systems and straight pipes. Watershed groups such as the Middle James Roundtable could work with the Nelson and Amherst County Health Departments to implement such a program using grant funds. In addition, the Thomas Jefferson SWCD is currently implementing a residential septic program in the nearby Rockfish River watershed. Since they have trained and experienced staff, they could take the lead in administering a residential cost share program as well should funding become available.

8.1.3 Nelson and Amherst Counties

Decisions made by local governments regarding land use and zoning will play an important role in the implementation of this plan. Currently, both Nelson and Amherst Counties have zoning and land use policies in place that support the preservation of agricultural land and encourage good stewardship of natural resources. The location of the Tye River watershed and its tributaries within Nelson and Amherst Counties is such that it has not been subject to intense development pressures, making it likely that the predominant land uses in the watershed will remain agriculture and forest. Local government support of this type of land conservation will become increasingly important as greater numbers of conservation measures are implemented across the watersheds.

8.1.4 Virginia Department of Environmental Quality

The Virginia Department of Environmental Quality (DEQ) has a lead role in the development of TMDL-IPs to address non-point source pollutants such as bacteria from straight pipes, failing septic systems, pet waste, agricultural operations, and stormwater that contribute to water quality impairments. DEQ provides available grant funding and technical support for the implementation of NPS (non-point source) components of TMDL-IPs. DEQ will work closely with project partners including the Thomas Jefferson and Robert E Lee Soil and Water Conservation Districts to track implementation progress for best management practices. In addition, DEQ will work with interested partners on grant proposals to generate funds for projects included in the implementation plan. When needed, DEQ will facilitate additional meetings of the steering committee to discuss implementation progress and make necessary adjustments to the implementation plan.

DEQ is also responsible for monitoring state waters to determine compliance with water quality standards. DEQ will continue monitoring water quality in the Tye River and its tributaries in order to assess water quality and determine when restoration has been achieved and the streams can be removed from Virginia's impaired waters list.

8.1.5 Virginia Department of Conservation and Recreation

The Virginia Department of Conservation and Recreation (DCR) administers the Virginia Agricultural Cost Share Program, working closely with Soil and Water Conservation Districts to provide cost share and operating grants needed to deliver this program at the local level. DCR works with the SWCDs to track BMP implementation as well. In addition, DCR administers the state's Nutrient Management Program, which provides guidelines and technical assistance to producers in appropriate manure and poultry litter storage and application, as well as application of commercial fertilizer.

8.1.6 Other Potential Local Partners

There are numerous opportunities for future partnerships in the implementation of this plan and associated water quality monitoring. A list of additional organizations and entities with which partnership opportunities should be explored is provided below:

- VA Cooperative Extension
- Blue Ridge Medical Center
- Master Well Owner Network (VCE)
- Blue Ridge Sierra Club
- Blue Ridge Chapter of VA Master Naturalists
- Keep Nelson Beautiful
- VA Department of Forestry
- Central VA Land Conservancy
- Chesapeake Bay Foundation
- Habitat for Humanity

8.2 Integration with Other Watershed Plans

Each watershed in the state is under the jurisdiction of a multitude of individual yet related water quality programs and activities, many of which have specific geographic boundaries and goals. These include but are not limited to TMDLs, Roundtables, Water Quality Management Plans, erosion and sediment control regulations, stormwater management, Source Water Protection Programs, and local comprehensive plans.

Coordination of the implementation project with these existing programs could result in additional resources and increased participation.

8.2.1 Nelson County Comprehensive Plan

The Nelson County Comprehensive Plan includes a section on “Natural, and Scenic, and Historic Resources.” Among the objectives established in this section of the plan are the protection of the county’s water resources, and recognition that the county’s major rivers and waterways are significant environmental resources, offering opportunities for recreation and requiring protection. The plan also recognizes the prevalence of steep slopes in the watershed and encourages limitation of clearing, grading, and overgrazing on these areas due to their potential for increased runoff. A recommendation is included in this plan that watershed management techniques be instituted in order to protect rivers and streams in addition to a wellhead protection program. A series of watershed protection design standards developed by the Center for Watershed Protection are featured in the plan, and incorporation of these standards into local ordinances is recommended. Examples include using natural vegetation to mitigate stormwater runoff such as riparian buffers and minimizing paving requirements. These standards along with the other recommendations for the protection of the county’s natural resources included in the comprehensive plan will directly support implementation efforts in the Tye River watershed. In addition, the comprehensive plan features a greenway plan that extends along the Tye and Piney Rivers. The proposed greenway is designed to highlight and capitalize upon the county’s natural resources and tourism potential, making restoration of these streams to support primary contact recreation increasingly important.

8.2.2 Amherst County Comprehensive Plan

The Amherst County Comprehensive Plan includes a section on “Environment,” which outlines techniques available for protecting the county’s natural resources. Low Impact Development is one of these techniques. This form of development helps to reduce stormwater runoff from developed areas, thereby protecting water quality. While the Tye River watershed does not include a large amount of developed land for Low Impact Development “retrofits”, employing this method of development in the future will help to avoid exacerbating the existing water quality impairments in the streams. The plan also

mentions the Conservation Reserve and Conservation Reserve Enhancement Programs as tools available to protect natural resources. These programs are also featured as key tools in this water quality improvement plan. Perhaps most importantly, it is noted in the plan that land preservation and environmental protection were emphasized more than any other topics by citizens who participated in the development of the plan. It is stated in the plan that these issues should serve as cornerstones of the comprehensive plan, and that watersheds and streams should receive more attention for protection. Based on these comments and the additional recommendations for natural resource protection in Amherst County's comprehensive plan, it is clear that there are areas of shared interest and overlap between this water quality improvement plan and goals and objectives with respect to water resources in the county.

8.2.3 Tye River: Wild and Scenic River Designation

The Scenic River Act was enacted in 1970 as a means of recognizing Virginia's scenic rivers and their immediate surrounding environments. In order to be eligible for this designation, a river must have notable natural, scenic, historical and recreational attributes. A 12.7 mile section of the Tye River received this designation in 2014 (Figure 8.1). This section extends from Route 738 to the confluence with the James River. This designation gives local governments and citizens a greater voice in planning and implementation of federal and state projects that might affect the river. In addition, it requires that the Federal Energy Commission consider the impact of hydropower projects on the river. The General Assembly must also authorize the construction, operation and maintenance of any structure that will impede the flow of the river (such as a dam). This designation is indicative of the value of the Tye River to the local community. The implementation of this plan will enhance the value of this natural resource with respect to recreational use of the river as well as its ecological value.

8.2.4 Virginia's Phase II Chesapeake Bay Watershed Implementation Plan

Virginia's Watershed Implementation Plan (WIP) outlines a series of BMPs, programs and regulations that will be implemented across the state in order to meet nitrogen, phosphorous and sediment loading reductions called for in the Chesapeake Bay TMDL, completed in December 2010. The TMDL is designed to ensure that all pollution control

measures needed to fully restore the Bay are in place by 2025, with at least 60% of the actions completed by 2017. A number of the BMPs included in this implementation plan are also found in Virginia's WIP. Consequently, Nelson and Amherst Counties will be able to track and receive credit for program in meeting Phase II WIP goals while also working towards implementation goals established in this plan to improve local water quality. For more information about Virginia's Phase II WIP, please visit DEQ's webpage.

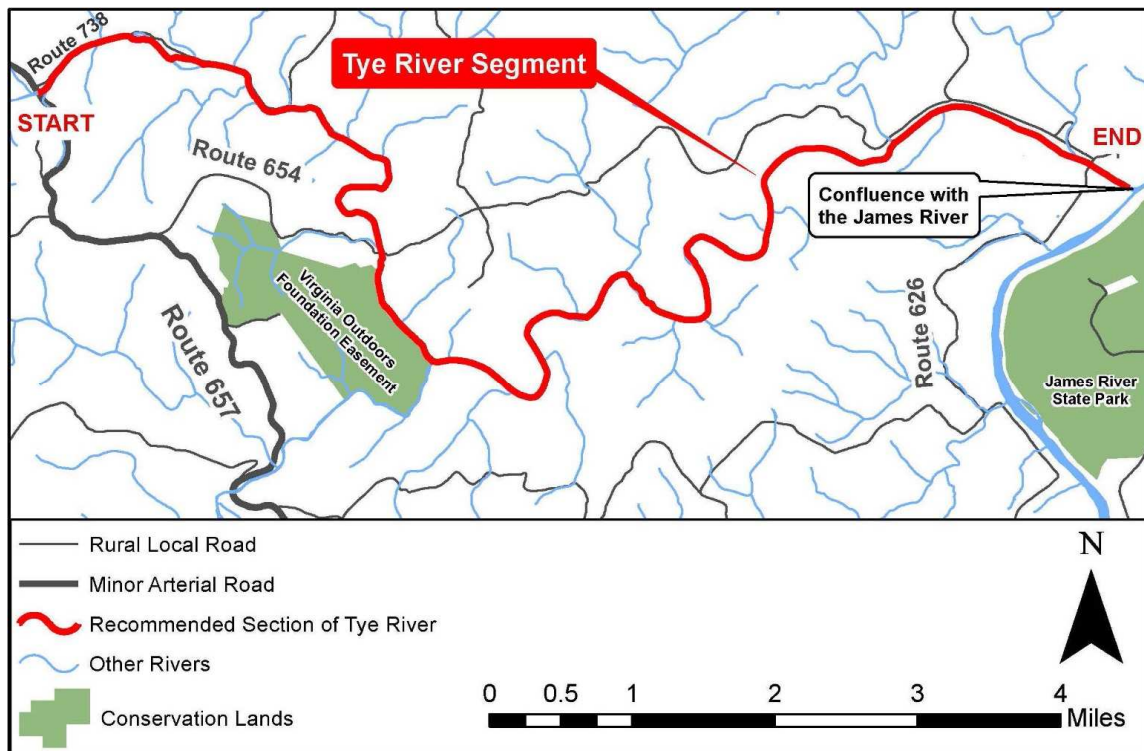


Figure 8.1 Tye River Scenic River designation. Map from Tye Scenic River Report (VADCR, 2014)

8.2.5 Additional Natural Resource Management and Conservation Planning

There are a number of organizations working to implement natural resource management and land conservation plans in the watersheds. The Virginia Department of Game and Inland Fisheries is currently working to implement the “Northern Bobwhite Quail Action Plan for Virginia,” which includes a series of recommended management practices that will also help to improve water quality by reducing runoff and filtering out pollutants before they reach the stream. Trout Unlimited has a “Trout in the Classroom” program to

engage local schools and students in learning about the importance of clean water and high quality aquatic habitat to support trout and other aquatic species. This type of outreach and education will also support the water quality improvement goals included in this plan. In addition, a number of organizations including the Virginia Outdoors Foundation and the Nature Conservancy are working to preserve agricultural land in Virginia through conservation easements. These easements can include some form of riparian buffer protection, and also help to ensure the longevity of efforts made to implement conservation practices on agricultural land. Whenever possible, efforts should be made to integrate the implementation of these and other conservation-related plans that will impact water quality with this plan for the Tye River and its tributaries.

8.3 Legal Authority

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

DEQ has responsibility for monitoring waters to determine compliance with state standards, and for requiring permitted point dischargers to maintain loads within permit limits. It has the regulatory authority to levy fines and take legal action against those in violation of permits. Beginning in 1994, animal waste from confined animal facilities that hold in excess of 300 animal units (cattle and hogs) has been managed through a Virginia general pollution abatement permit. These operations are required to implement a number of practices to prevent surface and groundwater contamination. In response to increasing demand from the public to develop new regulations dealing with animal waste, the Virginia General Assembly passed legislation in 1999 requiring DEQ to develop regulations for the management of poultry waste in operations having more than 200 animal units of poultry (about 20,000 chickens) (ELI, 1999). On January 1, 2008 DEQ assumed regulatory oversight of all land application of treated sewage sludge, commonly referred to as biosolids as directed by the Virginia General Assembly in 2007. DEQ's

Office of Land Application Programs within the Water Quality Division to manages the biosolids program. The biosolids program includes having and following nutrient management plans for all fields receiving biosolids, unannounced inspections of the land application sites, certification of persons land applying biosolids, and payment of a \$7.50 fee per dry ton of biosolids land applied. DEQ holds the responsibility for addressing nonpoint sources (NPS) of pollution as of July 1, 2013.

DCR is responsible for administering the Virginia Agricultural Cost Share and Nutrient Management Programs. Historically, most DCR programs have dealt with agricultural NPS pollution through education and voluntary incentives. These cost-share programs were originally developed to meet the needs of voluntary partial participation and not the level of participation required by TMDLs (near 100%). To meet the needs of the TMDL program and achieve the goals set forth in the CWA, the incentive programs are continually reevaluated to account for this level of participation.

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

VDH is responsible for maintaining safe drinking water measured by standards set by the EPA. Their duties also include septic system regulation and, historically, regulation of biosolids land application on permitted farmland sites. Like VDACS, VDH's actions are complaint-driven. Complaints can range from a vent pipe odor that is not an actual sewage violation and takes very little time to investigate, to a large discharge violation

that may take many weeks or longer to effect compliance. In relation to these TMDLs, VDH has the responsibility of enforcing actions to correct or eliminate failed septic systems and straight pipes.

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

8.4 Legal Action

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

Successful implementation depends on stakeholders taking responsibility for their role in the process. The primary role, of course, falls on the landowner. However, local, state and federal agencies also have a stake in ensuring that Virginia's waters are clean and provide a healthy environment for its citizens. An important first step in correcting the existing water quality problem is recognizing that there is a problem and that the health

of citizens is at stake. Virginia's approach to correcting NPS pollution problems has been, and continues to be, encouragement of participation through education and financial incentives.

9. FUNDING

A list of potential funding sources available for implementation has been developed. A brief description of the programs and their requirements is provided in this chapter. Detailed descriptions can be obtained from the SWCD, DEQ, DCR, NRCS, and VCE.

9.1 Virginia Agricultural Best Management Practices Cost-Share Program

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

9.2 Virginia Agricultural Best Management Practices Tax Credit Program

For all taxable years, any individual or corporation engaged in agricultural production for market, 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. Any practice approved by the local SWCD Board must be completed within the taxable year in which the credit is claimed. The credit is only allowed for expenditures made by the taxpayer from funds of his/her own sources. 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. If the amount of the credit exceeds the taxpayer's liability for such taxable year, the excess may be carried over for credit against income taxes in the next five taxable years until the total amount of the tax credit has been taken. This program can be used independently or in conjunction with other cost-share programs on the stakeholder's portion of BMP costs. It is also approved for use in supplementing the cost of repairs to streamside fencing.

9.3 Virginia Agricultural Best Management Practices Loan Program

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

9.4 Virginia Small Business Environmental Assistance Fund Loan Program

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

9.5 Virginia Water Quality Improvement Fund

This is a permanent, non-reverting fund established by the Commonwealth of Virginia in order to assist local stakeholders in reducing point and nonpoint nutrient loads to surface waters. Eligible recipients include local governments, SWCDs, and individuals. Grants for both point and non point source pollution remediation are administered through VADEQ. Most WQIF grants provide matching funds on a 50/50 cost-share basis.

9.6 Conservation Reserve Program (CRP)

Through this program, cost-share assistance is available to establish cover of trees or herbaceous vegetation on cropland. Offers for the program are ranked, accepted and processed during fixed signup periods that are announced by FSA. If accepted, contracts are developed for a minimum of 10 and not more than 15 years. Payments are based on a per-acre soil rental rate. To be eligible for consideration, the following criteria must be met: 1) cropland was planted or considered planted in an agricultural commodity for two of the five most recent crop years, and 2) cropland is classified as "highly-erodible" by NRCS. Application evaluation points can be increased if certain tree species, spacing, and seeding mixtures that maximize wildlife habitats are selected. Land must have been owned or operated by the applicant for at least 12 months prior to the close of the signup period. The payment to the participant is up to 50% of the cost for establishing ground cover. Incentive payments for wetlands hydrology restoration equal 25% of the cost of restoration.

9.7 Conservation Reserve Enhancement Program (CREP)

This program is an "enhancement" of the existing USDA CRP Continuous Sign-up. It has been "enhanced" by increasing the cost-share rates from 50% to 75% and 100%, increasing the rental rates, and offering a flat rate incentive payment to place a permanent "riparian easement" on the enrolled area. Pasture and cropland (as defined by USDA) adjacent to streams, intermittent streams, seeps, springs, ponds and sinkholes are eligible to be enrolled. Buffers consisting of native, warm-season grasses on cropland, to mixed hardwood trees on pasture, must be established in widths ranging from the minimum of 30% of the floodplain or 35 feet, whichever is greater, to a maximum average of 300 feet. Cost-sharing (75% - 100%) is available to help pay for fencing to exclude livestock from the riparian buffer, watering facilities, hardwood tree planting, filter strip establishment, and wetland restoration. In addition, a 40% incentive payment upon completion is offered and an average rental rate of \$70/acre on stream buffer area for 10-15 years. The State of Virginia will make an additional incentive payment to place a perpetual conservation easement on the enrolled area.

The landowner can obtain and complete CREP application forms at the FSA center. The forms are forwarded to local NRCS and SWCD offices while FSA determines land

eligibility. If the land is deemed eligible, NRCS and the local SWCD determine and design appropriate conservation practices. A conservation plan is written, and fieldwork is begun, which completes the conservation practice design phase.

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

9.8 Environmental Quality Incentives Program (EQIP)

This program was established in the 1996 Farm Bill to provide a single voluntary conservation program for farmers and landowners to address significant natural resource needs and objectives. Approximately 65% of the EQIP funding for the state of Virginia is directed toward "Priority Areas." These areas are selected from proposals submitted by a locally led conservation work group. Proposals describe serious and critical environmental needs and concerns of an area or watershed, and the corrective actions they desire to take to address these needs and concerns. The remaining 35% of the funds are directed toward statewide priority concerns of environmental needs. EQIP offers 5 to 10-year contracts to landowners and farmers to provide 75% cost-share assistance, 25% tax credit, and/or incentive payments to implement conservation practices and address the priority concerns statewide or in the priority area. Eligibility is limited to persons who are engaged in livestock or agricultural production. Eligible land includes cropland, pasture, and other agricultural land in priority areas, or land that has an environmental need that matches one of the statewide concerns.

9.9 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. In Virginia,

these plans are prepared to address one or more of the following high priority habitat needs: early grassland habitats that are home to game species such as quail and rabbit as well as other non-game species like meadowlark and sparrows; riparian zones along streams and rivers that provide benefits to aquatic life and terrestrial species; migration corridors which provide nesting and cover habitats for migrating songbirds, waterfowl and shorebird species; and decreasing natural habitat systems which are environmentally sensitive and have been impacted and reduced through human activities. Cost-share assistance of up to 75% 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. For cost-share assistance, USDA pays up to 75% of the cost of installing wildlife practices.

9.10 Wetland Reserve Program (WRP)

This program is a voluntary program to restore and protect wetlands on private property. The program benefits include providing fish and wildlife habitat, improving water quality, reducing flooding, recharging groundwater, protecting and improving biological diversity, and furnishing recreational and esthetic benefits. Sign-up is on a continuous basis. Landowners who choose to participate in WRP may receive payments for a conservation easement or cost-share assistance for a wetland restoration agreement. The landowner will retain ownership but voluntarily limits future use of the land. The program offers landowners three options: permanent easements, 30-year easements, and restoration cost-share agreements of a minimum 10-year duration. Under the permanent easement option, landowners may receive the agricultural value of the land up to a maximum cap and 100% of the cost of restoring the land. For the 30-year option, a landowner will receive 75% of the easement value and 75% cost-share on the restoration. A ten-year agreement is also available that pays 75% of the restoration cost. To be eligible for WRP, land must be suitable for restoration (formerly wetland and drained) or connect to adjacent wetlands. A landowner continues to control access to the land and may lease the land for hunting, fishing, or other undeveloped recreational activities. At

any time, a landowner may request that additional activities be added as compatible uses. Easement participants must have owned the land for at least one year.

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

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

9.12 National Fish and Wildlife Foundation

The National Fish and Wildlife Foundation administers the Chesapeake Bay Stewardship Fund, which is dedicated to the protection and restoration of the Chesapeake Bay. The Stewardship Fund is supported through partnerships with government agencies and private corporations, and typically awards \$8 million to \$12 million per year through two competitive grant programs and a technical assistance program. Larger “Innovative Nutrient and Sediment Reduction Grants” are available to non profits, local governments and state agencies, while smaller “Small Watershed Grants” are available to non profits and local governments. A request for grant proposals is typically issued in the spring of each year, and awards are made in the late summer/early fall.

9.13 Regional Conservation Partnership Program

The Regional Conservation Partnership Program (RCPP) was authorized through the 2014 Farm Bill. This 5-year program promotes coordination between NRCS and its partners to deliver conservation assistance to producers and landowners. NRCS provides assistance to producers through partnership agreements and through program contracts or easement agreements. The RCPP competitively awards funds to conservation projects

designed by local partners specifically for their region. Eligible partners include agricultural or silvicultural producer associations, farmer cooperatives, state or local governments, municipal water treatment entities, conservation-driven nongovernmental organizations and institutions of higher education. Under RCPP, eligible landowners of agricultural land and non-industrial private forestland may enter into conservation program contracts or easement agreements under the framework of a partnership agreement. The Chesapeake Bay watershed is one of the eight “Critical Conservation Areas” identified for this program. These areas receive 35% of program funding.

9.14 Virginia Natural Resources Commitment Fund

The fund was established in the Virginia Code as a subfund of the Water Quality Improvement Fund in 2008. Monies placed in the fund are to be used solely for the Virginia Agricultural BMP Cost Share Program as well as agricultural needs for targeted TMDL implementation areas.

9.15 Clean Water State Revolving Fund

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

9.16 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 that provides compensation for aquatic resources in financially and environmentally

preferable ways. Not every site or property is suitable for mitigation banking. Mitigation banks are required to be protected in perpetuity, to provide financial assurances and long term stewardship. The mitigation banking process is overseen by an Inter-Agency Review Team made up of state and federal agencies and chaired by DEQ and Army Corps of Engineers.

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APPENDICES

APPENDIX A: Working Group Meeting Minutes

Tye River Agricultural Working Group Meeting #1

Massies Mill Ruritan Hall

November 7, 2013

Nesha McRae from the Virginia Department of Environmental Quality (DEQ) welcomed participants and explained that the role of the agricultural working group will be to provide feedback on agricultural best management practices to include in the water quality improvement plan along with education and outreach strategies. One participant asked about the length of the impaired segment shown on the map of the Tye River. He noted that a much shorter segment was shown on the maps developed earlier this year when the water quality study was developed. Nesha said she would look in to this difference. Following the meeting, Nesha discussed the impairment with the water quality assessor in DEQ's Valley Regional Office. The impaired segment of the Tye River from its confluence with Hat Creek to its confluence with Piney River was added on in the 2012 assessment once the water quality study was already underway. The impaired segment of the Tye River extending approximately 8 miles upstream of the confluence with Hat Creek is a biological impairment that was listed in the 2012 assessment as well.

The meeting began with a discussion about the general state of agriculture in the watershed today. Participants explained that agriculture is declining across the nation, including in the Tye River watershed. However, there has not been much conversion of agricultural land for residential and commercial development, with the peak of population growth in the area occurring in the 1920's. There are not many absentee landowners in the watershed, and an estimated 50% of the farms in the watershed are leased versus owned by the operator. More of the larger farms in the watershed are leased. Several participants expressed concerns about conservation programs like the Conservation Reserve Enhancement Program (CREP) that offers rental payments to farmers for land taken out of production. They explained that some landowners who rent land to farmers may increase their asking price since the rental payments made through these programs are so high. Farmers will not be able to afford these prices. It was suggested that staff working to promote these programs make landowners aware that these rental rates should not be applied to working pasture and cropland.

The group discussed livestock exclusion practices and potential obstacles to participation. It was noted that maintenance would be a significant problem for many farmers. The 10-year period associated with most agricultural best management practice (BMP) contracts issued through the state cost share program is a concern for many farmers. Weather events can often damage large portions of fence, which the farmer would be responsible for fixing over that 10 year period. Nesha mentioned that a Flexible Fencing Program had been offered in the Shenandoah Valley that gave farmers more flexibility in fencing material and placement, and only required a 5 year maintenance commitment. The group agreed that it would be nice to see something like that offered in Nelson County. Nesha offered to look in to funding options for a program like this. It was also noted that farmers need to be able to access the stream to water livestock if their well goes out. Representatives from the Thomas Jefferson Soil and Water Conservation District (TJSWCD) explained that the SWCD is willing to work with farmers in situations where

livestock do not have access to a well and the stream is fenced. It was also noted that there are BMPs that offer limited stream access points available through the state cost share program. In addition, there was recently a new policy statement added to the state cost share program fencing practices as well as the TMDL fencing practices that states that the conservation planning process for developing an alternative watering system for livestock should include consideration of some means to provide water to the livestock during emergency conditions. One participant commented that a stream is a more reliable watering source than a well in many cases, particularly in situations where a farmer is leasing land and is not there every day to check on his/her livestock.

The group moved on to discuss the costs and benefits of livestock exclusion. Several participants explained that while cattle prefer to drink from a well, they like to cool themselves in the stream in the summer. Providing shade for cattle helps to keep them cool, but that they will still go to the stream to cool off if given the opportunity. This is particularly the case in tall fescue pastures where infections from endophytic fungus are common. In addition, it was noted that there are some cases where livestock actually lose weight when a stream is excluded because they are traveling longer distances to reach waterers. The group discussed proper placement of waterers and grazing systems in order to avoid this problem. The benefits of exclusion were noted including reduced veterinary bills and increased weight gain and milk production (though it was noted that there are no dairies in the watershed so this benefit does not apply). Nesha asked the group whether CREP is a popular program in the watershed. Several participants stated that there were very few CREP projects in the area and that most of them were completed by absentee landowners. The group also discussed the extent of rotational grazing utilized in the watershed. Not all landowners have implemented a rotational grazing system, but the acceptance of this practice is quickly growing in the area. Mob grazing is another management strategy that is gaining popularity; however, it is not currently utilized by any farmers in the Tye River watershed.

The group discussed the fact that the responsibility of implementing BMPs falls on private property owners. It was noted that the Virginia Farm Bureau has formally stated that farmers should not be expected to install additional BMPs to meet TMDL goals. One participant asked what would happen if landowners chose not to participate in the implementation effort and the TMDL goal was not reached. Nesha explained that this is a voluntary plan and that there are currently no regulatory consequences for private landowners who do not install BMPs to reduce non point source pollution coming from their property. Another participant noted that this TMDL process should be considered a prime opportunity to prevent government regulation of Virginia's agricultural community, and that 100% cost share is currently available for livestock exclusion project in Virginia. The participant suggested that now is the perfect time for farmers to participate in these programs. It was also noted that the Tye River was recently designated as a "scenic river," which should be considered another opportunity for the community to benefit from their water resources through increased tourism as a result of the designation.

The group discussed the human health impacts of exposure to bacteria from manure. One participant noted that he had not gotten sick from exposure to livestock manure, which he had been coming in contact with for much of his life. One participant suggested that we should consider regulating recreation in Virginia's rivers rather than trying to address the bacteria

impairments present in waterbodies like the Tye River. Another participant responded that they had always valued being able to swim and fish in the river and that they would not support regulating the use of our waterways.

The group discussed targeting strategies for implementation efforts. One participant expressed the concern that we are treating all landowners the same with this planning effort, when the reality is that some landowners are contributing disproportionately to the problem. Nesha explained that the plan is not intended to single out individual landowners, but that targeting strategies could be used to focus implementation efforts where they will make the greatest difference. The group could also consider focusing in areas where we know recreation is occurring. Citizen monitoring was discussed as a way to target implementation efforts in areas where there are the greatest water quality problems. A citizen monitoring network has already been established in the Tye River watershed and can assist in identifying hot spots in the watershed. One participant noted that it would be worthwhile to try to get a better count of livestock in the watershed. Some refinements were made to original estimates when the water quality study was completed earlier this year, but additional survey work could be conducted. Another participant suggested that pasture with significant slopes be identified and targeted during implementation since runoff from these areas is most likely higher than others. He explained that this could be done using mapping software. Nesha responded that she could look in to getting elevation data for the watershed to identify these areas.

One participant commented that he has a farm in the watershed and that he does not want the legacy of his land and his family to be one of a polluter. He stated that he intended to work with the local Soil and Water Conservation to do something on his property so that he can do his part to improve water quality in the river.

Nesha explained that there would most likely be two more meetings of the agricultural working group during the development of the water quality improvement plan. She will be preparing a summary of the meeting and distributing it to participants prior to the next working group meeting. She asked the group if evening meetings worked best for participants and the group agreed evenings were best. The meeting adjourned at 9:00.

Tye River TMDL Agricultural Working Group Meeting #2

Massies Mill Ruritan Hall

December 12, 2013

The meeting began with a review of the meeting summary distributed to participants from the last working group meeting. As was noted during the previous meeting, the length of the impaired segment of the Tye River has grown since the TMDL study was completed. This was a result of new data collected during development of the 2012 assessment. The extension of this impaired segment will not impact development of the TMDL implementation plan since it is based on the entire watershed area rather than just the impaired reaches. The group did not have any additional revisions to be made to the meeting summary.

Pasture Management Scenarios

The group discussed three potential scenarios to address bacteria coming from pasture land in the watershed. Rotational grazing/improved pasture management was discussed as a key component in each scenario. In addition, loafing lot management systems were included in one potential scenario. An assumption was made in the development of this scenario that a management system would typically be designed for 125 beef cattle. Cost share is available to develop paddocks, sacrifice areas, concrete walkways, and in some cases, loose housing facilities. The group thought that there were not many operations this large in the watershed. Most farms are not going to have over 35-40 head per herd. Those herds will be broken up over several fields. In the winter those herds may be combined if the other field is far away (concentration of livestock occurs more during the winter). The group expressed concerns about the cost of these types of systems and noted that they require spreading of manure, meaning that the farmer needs to have somewhere to put it. There are some situations in the watershed where feeding is done in the bottom land very near the river. During the winter these areas can get very denuded and muddy. Farmers aren't feeding on top of the hill where this would be less of a problem due to ease of management. Permanent vegetation on critical areas or tree plantings on denuded areas was discussed as another option for pasture. There is cost share available for these practices through the state cost share program. The steep slopes in the watershed were noted as a potential factor that might contribute to areas of concentrated erosion where this type of practice would be applicable. It was noted that while this could be included, the extent proposed in the scenario on the handout was too high. This should be reduced to more like 1-2% of pasture land. The group agreed that pasture management is the most cost effective practice to pursue and will provide the greatest bang for the buck, particularly when compared to loafing lot management systems and waste storage facilities. It was agreed that there is not a need for additional waste storage in the watershed.

Targeting of Best Management Practices

The group reviewed a potential targeting strategy that accounted for slope, riparian pasture, and the number of livestock in each subwatershed. Based on these factors, subwatersheds were ranked for targeting of outreach and implementation efforts. One participant asked if there is a correlation between slope and bacteria concentrations in streams. It was noted that there is a strong correlation between slope and runoff, which will be carrying with it manure from

pastures. One participant asked how successful the Thomas Jefferson SWCD has been in their outreach efforts in the watershed to date (is targeting really necessary?). SWCD and NRCS staff explained that they have limited resources in terms of staff time to contact farmers. In addition, this is a very large watershed. One participant asked about involvement of the Robert E. Lee SWCD in this project. There have been cases where SWCD's have worked jointly to implement a water quality improvement plan like what is being developed for the Tye River. It was noted that Robert E Lee SWCD should be involved in development of this plan. It was also suggested that outreach be conducted to different stakeholder groups including beef producers in the watershed.

Flexible Fencing Program

At the last meeting, the group discussed interest in implementing a Flexible Fencing Program in the watershed similar to what has been done in the Shenandoah Valley through the Chesapeake Bay Funders Network. Nesha McRae followed up with representatives from this organization after the meeting to determine if there was potential for support of such a program. They are going to consider possibilities and determine if any of the funders would be interested in providing support. If funding was made available, the Funders Network would like to see a program implemented that is similar to what Headwaters SWCD is doing in Augusta County. This program is just getting started and includes pilot projects for different watering systems (RAM pump, pasture pump) and notification systems for when wells loose power. In addition, some funding is available for fencing materials, though less than in previous programs due to the fact that state and federal programs now offer financial assistance with reduced setback fencing. In addition, this program is targeting outreach at property owners who are leasing their land to local farmers. It was noted that the contract length for the Flex Fence projects has typically been 3 years, as opposed to 10 years through the state cost share program. This has been appealing to farmers in the Valley due to concerns about maintenance. One participant noted that RAM pumps are not very dependable and that cattle farmers need dependability. These pumps fail often and require a lot of maintenance. Silt can be a real problem, which is why you don't see many of them around today. Another participant shared a nose pump that he had brought to the meeting. This type of pump doesn't require any power but may not work in freezing temperatures. The group expressed an interest in including this type of pump in any proposal submitted to the Bay Funders Network. Several participants agreed that it is hard to beat the reliability of a stream. It was noted that several of the livestock exclusion practices offered through state and federal cost share programs allow stream crossings and limited access points. This does not prevent direct deposition of manure into the stream, but it limits it. The intent of these access points is to provide enough room for cattle to get to the stream to drink, but not wallow in the water.

Fencing Systems

A series of different fencing systems available through state and federal cost share programs was reviewed along with an implementation scenario showing the amount of fencing that would be accomplished through each type of system. One participant asked about the \$0.50/ft incentive payment offered through the Stream Protection Practice. This payment is made up front and is intended to assist with maintenance costs. Another participant asked which of these practices allow limited access to the stream. All of the exclusion practices allow for limited access when

practical. The group discussed the lack of exclusion systems in the watershed and local resistance to fencing and it was stated that we would have a hard time selling these practices to local farmers. NRCS and SWCD staff have limited resources and it was noted that implementation of these practices might increase if additional outreach was conducted. While farmers might not be willing to exclude all of the streams on their farms, they may be willing to consider fencing on a field by field basis. It was noted that there are many options available to farmers today that weren't around several years ago. People need to be made aware of these options.

The inability to flash graze buffers was noted as an obstacle to livestock exclusion. Allowing flash grazing for even 6 hours twice a year would be a great way to manage buffers and keep invasives out. This would allow grasses to grow up and filter out more pollutants. It was noted that state and federal programs used to allow this practice, but it was abused and is no longer permitted. Nesha offered to check with the Bay Funders Network and see if this would be allowable through their programs. It was also noted that when buffers get overgrown, coyotes often sneak in and snatch up calves. The group discussed the length of time that it takes to establish a buffer of hardwood trees, which would eventually eliminate the need for more intensive management. It was stated that this can take 20 or 30 years. In the meantime, many farmers do not like the wild look of an overgrown buffer; they like to keep these areas mowed. Another participant responded that sometimes the 'wild look' is better for the stream channel. The clean look sometimes is a point of pride for the farmer.

The group discussed how a Flex Fencing Program would be administered in the Tye River watershed. There are several partners that are part of the current project in Augusta County. The Bay Funders are helping fund outreach as part of this effort with a goal of talking to each landowner in the watershed three times. Concerns were expressed about working with SWCDs on cost share projects. A participant asked if there are cases where a landowner signed up to receive cost share, completed a practice, and then is told by the SWCD that funding is no longer available. SWCD staff explained that this does not happen. Once a contract is signed, the funding is set aside for the project. However, funding for practices does fluctuate from year to year, so a farmer may follow back up with the SWCD about completing a practice and find out that the cost share available several months ago has been allocated to other projects. The group discussed the problem of having to pay for fencing costs upfront before the SWCD reimburses you. It was noted that there is a low interest loan program available to farmers to help with this expense. One participant stated that repayment may come one year after the practice is completed. One farmer stated that they always got paid but sometimes there were times where there was a month lag. The group discussed trust of conservation organizations in the community. The SWCD and NRCS staff was noted as being highly respected, efficient and easy to work with by a farmer who had participated in cost share programs. Cooperative Extension was mentioned as another important organization that is trusted by farmers. Participants wanted to make sure that they were involved in the planning process (they had representation at the meeting).

Cropland Management Strategies

The group discussed potential cropland management strategies to include in the plan. There is not a lot of cropland in the watershed; however, there are some management practices that could

be considered to reduce the bacteria load from this land use including continuous no till and cover crops. The group estimated that 90% of cropland in the area is no till and that nobody is doing tillage any more due to the fact that diesel is too expensive. The group discussed issues with the cover crop program administered by the SWCD including planting and kill dates required in order to receive cost share. Even if farmers do not qualify for cost share, they are still likely to plant a cover crop. It was suggested that it would not be worthwhile to include continuous no till in the plan since everyone is already doing it. However, cover crops could be included. There is one major landowner in the watershed who has cropland and he is already doing no till. DEQ will follow up with SWCD staff on the extent of additional cover crops that could be included in the plan.

Targeting Citizen Monitoring

The group reviewed a map of existing citizen monitoring stations in the watershed along with associated water quality data. The use of citizen monitoring to target outreach to hot spots in the watershed was discussed as a potential strategy. There will be funding from DEQ to continue the existing citizen monitoring program in 2014. Input on station locations was requested. One participant noted that they would like to see where people have access to the river and where they swim. A citizen monitor commented that they are monitoring bacteria at a location on the Tye River where people commonly swim. Another participant asked about the potential to use Bacteria Source Tracking to better target outreach efforts in the watershed. It was noted that this type of sampling can be misleading since it only shows a snapshot of what is going on in the river at one point in time. Taking a census of what is in the watershed is a more reliable way of determining where the bacteria is coming from. In addition, this type of monitoring is very expensive. One participant commented that there aren't any livestock on Dickey Road on the Piney River and that bacteria in this reach of the river is probably coming from straight pipes and failing septic systems. It was also noted that there is a lot of wildlife in the Piney watershed—deer and beaver. Several participants noted that there are just a few spikes in the water quality data, which are probably outliers or peaks when it rains and there is a lot of runoff. The group reviewed existing violation rates of the bacteria standard and discussed the likelihood of getting the streams off of the impaired waters list. It was agreed that this was very feasible. It was also noted that we must also consider the magnitude of the violation in addition to the violation rate. We commonly see numbers much higher than this in some rivers in the region.

One participant asked what we decided in the last residential working group meeting. This group discussed outreach strategies to encourage septic system maintenance and ways to locate straight pipes. The group did not recommend conducting stream floats to identify straight pipes. It was noted that the area upstream from Dickey Road is very hilly and likely have a lot of straight pipes. One participant commented that this section of the Piney River runs fast and hard so you might not see the impact until further downstream. DEQ will share information with residential working group and this group is able to participate in that group. Several suggestions were made regarding monitoring station locations including placing another station at Painted Rock and locating one on the opposite side of 29 on Ruckers Run. One of the participants noted that much of this portion of the stream is on his property. It was suggested that he volunteer to sample this reach next year. One participant asked if any sampling had been done up at Montebello. He commented that there is a population of horses in this area that may be contributing to the problem. The group discussed how this area is commonly visited by tourists.

Another participant asked about the fish hatchery in Montebello and how it might be contributing to the problem. The hatchery has a discharge permit and is regulated. Biosolids applications in the watershed were discussed as another potential source of bacteria. If treated as required by law, biosolids should not be contributing bacteria to the stream since they are sterilized at the treatment plant. One participant asked about the status of a biosolids permit request in Piney River. DEQ was not familiar with this permit request and offered to follow up on it. The group requested that failing septic systems and straight pipes be dealt with very seriously in the implementation plan. Practices to address these sources are typically considered high priority and are placed in the first 5 years of the project timeline in many watershed plans. A participant suggested that landowners should walk up and down the watershed looking for straight pipes.

Next Steps

The next agricultural working group meeting will be held in late January or early February, probably on a Thursday based on availability of the building. In the meantime, the meeting summary will be prepared and distributed to the group for comments.

Tye River Agricultural Working Group Meeting #3

Massie's Mill Ruritan Hall

February 20, 2014

Attendees

John Benner (VCE)	Mike Campbell (landowner)
Kory Kirkland (NRCS)	Brian Walton (TJ SWCD)
Emily Nelson (TJSWCD)	Ann Weber (landowner)
Luke Longanecker (TJSWCD)	Charles Weber (landowner)
David Hight (landowner)	Sandra Hight (landowner)
Cecil Thacker (landowner)	Mark Campbell (landowner)
Tina Sullivan (DEQ)	Don Kain (DEQ)
James Fulcher (landowner)	Nesha McRae (DEQ)

Meeting Summary

The meeting began at 7:00 pm with a recap by Nesha McRae of DEQ of key points from the last agricultural working group meeting. This included the use of rotational grazing as a best management practice (BMP) in the plan rather than relying too heavily on highly engineered, expensive practices like waste storage facilities. The extent of cropland in the watershed was confirmed as being rather limited and the extent of cropland BMPs included in the plan will be based on existing levels of implementation in the watershed. In addition, livestock exclusion and preferred buffer widths were discussed in detail at the last working group meeting.

One participant expressed his concern that the Department of Environmental Quality (DEQ) was not going to use stakeholder input effectively in the development of this plan. He felt that the state already had an idea of what they wanted to see happen in the watersheds, and that this was what was going to go into the plan. DEQ explained that this is a voluntary plan, the success of which will rely very heavily on local support and buy in to the actions included in the plan. Consequently, stakeholder input is absolutely critical to the success of the project. DEQ agreed that it would be nice to have more local farmers present at the agricultural working group meetings, particularly those who have been resistant to implementing agricultural BMPs to date; however, only so much can be done to encourage their participation.

The group moved on to review a handout showing two proposed stages of BMP implementation. DEQ asked the group if there are any practices that are missing from either stage of implementation. No additional BMPs were identified for inclusion in the plan. One participant asked about the level of staffing that will be needed in order to implement all of the BMPs. The group discussed the role of the Soil and Water Conservation District (SWCD) in working with participants to encourage them to install BMPs. Since these are voluntary programs, this can take a considerable amount of time. SWCD staff will play a critical role in helping to "sell" these practices. Interest may increase as farmers see their neighbors implementing practices and they can observe how they work. Distrust of the government may slow things down though.

Some of this may change as younger farmers take over management of local farms and are willing to try new things.

The group evaluated staffing options including having one person handling all of the outreach with a longer timeline versus two or more people with a shorter timeline. It was agreed that it would be better to have one person be the point person for the project in order to build trust in the community. There could be several people providing support behind the scenes though. Trust is a critical factor in the likelihood that farmers will implement BMPs. If a project goes terribly wrong, this will definitely hinder progress since others will be observing closely. Depending on the amount of time that a septic program would take to administer, it may be necessary to have a septic technician and an agricultural technician to handle the programs. Staff from the Thomas Jefferson SWCD asked how the Tye watershed compares to the Upper Rockfish where they currently have one staff person implementing both programs. DEQ offered to follow up with them and provide a comparison of the two project areas and the extent of work needed in both. It was explained that most of the technical work for the septic program is actually done by the Health Department. SWCD staff work on program outreach and promotion (e.g. postcard mailings) and handle the paperwork for program signups. In Amherst County, there is a requirement for septic tank pump outs every five or seven years when a system is installed, but there is nobody on staff to follow up with homeowners and ensure that this is happening. It was noted that some of the problems with septic system failures in the Nellysford area are due to the soil type.

The group discussed an appropriate timeline for both stages of implementation. One participant asked what the meaning of the two stages was. DEQ staff explained that Stage 1 is what it would take to de-list the impaired stream segments while Stage 2 is what is needed to meet the TMDL. DEQ staff explained that the Stage 1 goal of delisting the streams is the more relevant of the two, but that the state is required to show just what it would take to meet the TMDL goal of never violating the water quality standard which is why Stage 2 is included as well. The group discussed the current status of the streams and what it would take to get them delisted. It was noted that Piney River isn't in terrible shape, but that Hat Creek and Rucker Run are smaller streams and may be tougher to delist. The group agreed that the time frame for meeting these goals really depends on who is hired to do the work.

DEQ noted that the residential working group had selected an overall timeline of ten years, with Stage 1 completed in five years. The group discussed whether or not to have the two timelines line up, but had some reservations about a total timeline of ten years based on the extent of work that is needed, particularly livestock exclusion fencing. NRCS and SWCD staff noted that even the extent of fencing needed in Stage 1 will be very difficult to accomplish. One participant asked about the extent of fencing typically installed on a farm. Staff responded that a project with 1 mile of fencing is considered large. DEQ staff explained that the fencing estimates are somewhat conservative since they are based on the assumption that all streams that can be fenced will, including those running through very narrow pastures where it may make more sense to redirect grazing elsewhere.

It was noted that since this project area includes two SWCD regions and two localities, coordination will be important for implementation. DEQ has previous experience working with two SWCD's on TMDL implementation projects, and generally speaking it has gone smoothly.

One participant noted that Amherst County has a program that will provide additional BMP cost share to bring totals up to 100%

It was agreed that it made sense to address the failing septic systems early on, but that a ten year timeline might be more appropriate for Stage 1 of agricultural BMP implementation. DEQ staff did not think it would be an issue to have the residential BMPs complete within the first ten years and the agricultural practices to continue on for several more years. One participant asked what happens if all of the failing septic systems are corrected before the agricultural BMPs are completed and the streams meet water quality standards. DEQ staff explained that the success of the project will be determined based on water quality data, not BMP implementation levels. Once the stream meets standards and can be delisted, the project will be considered a success. The group reached a consensus that ten years is an appropriate timeline for Stage 1 BMP implementation goals. For Stage 2, DEQ staff encouraged the group to be realistic in setting the timeline, but not to look so far out that the community will feel that it will take far too long to improve the streams. Keeping the timeline at less than 15 years was recommended. The group agreed that a total of 15 years for both stages was acceptable.

One participant asked if the TMDL program would be impacted by changes in administrations, and specifically, if this implementation plan would be revisited as a result. DEQ staff noted that generally speaking, changes in the administration would not impact the content of the implementation plan. However, it was also noted that the Chesapeake Bay TMDL has become very political and is currently facing several lawsuits. The impacts of these lawsuits on local TMDL implementation plans are unknown at this point. However, the American Farm Bureau Federation has expressed their preference to continue with TMDL implementation at the local level (as we are doing in the Tye watershed) rather than at the Bay watershed scale.

The group discussed phasing outreach strategies. DEQ staff asked whether there were particular outreach strategies that should be tried early on, and then others that should be employed later in the project if we are not making progress. Farm tours and field days working with Cooperative Extension were noted as being some of the best ways to get farmers to come out to meetings. Extension agents are typically trusted and respected in the farming community. It might be best to leave DEQ out of the mix when it comes to promoting things like this. It will be important to focus on benefits to production rather than the TMDL and water quality. The practices where there are both water quality and production benefits will be the best received. DEQ is fine with this approach since the streams will benefit regardless of the angle that is taken with respect to outreach. Larger companies like McDonalds and Wal-Mart are now looking to purchase beef that is raised sustainably. This might help to encourage adoption of BMPs. Food is also a big draw for meetings. Extension rarely has funding for food, so if additional resources can be secured to help with this, that might help to increase attendance.

The group discussed BMP cost estimates provided in the handout. The total estimated agricultural BMP implementation cost is just under \$12 million while Stage 1 costs are estimated at \$4 million. One participant asked whether the cost of water systems and limited access points was included in the fencing system cost estimates on the handout. DEQ explained that those components were factored in. SWCD staff asked about funding available for pasture management. Since there is already funding available for fencing, participants wanted to know if funds could be shifted to support pasture management. DEQ staff explained that there is a

pasture management practice in the TMDL Cost Share Manual Supplement, but that it is still a pilot practice that is only available in a few areas. SWCD staff was curious as to how it had been received, and explained that they had heard the extent of requirements in order to receive cost share for this practice may make it less popular. NRCS has a similar practice, which could also be applied to help meet the pasture management goal. Several participants wanted to know how having a TMDL implementation plan would help in terms of funding for BMPs since the SWCD and NRCS already have funds for these programs. It was explained that additional funds could be brought into the watershed which would make it less competitive for farmers to get cost share. In addition, funds for staff to help with outreach can be made available. This is really critical considering how limited staff at NRCS and the SWCD is. Staffing will be a large part of the expense of implementation.

DEQ staff discussed next steps for the project. A steering committee meeting will be held in about a month. The committee will meet once to review the draft plan and provide assistance with plans for the final public meeting. DEQ asked for volunteers to serve on the steering committee. James Fulcher, Mike Campbell and Luke Longanecker volunteered to serve on the committee.

DEQ shared a fact sheet in citizen monitoring in the Tye River and its tributaries. Funding has been obtained to continue this program in 2014. Participants were asked to let DEQ know if there are interested in participating. If there is sufficient interest, a training will be held, most likely at the library in Lovington. DEQ is currently waiting to receive monitoring supplies from Central Office and will follow up with interested stakeholders once materials are received.

The meeting was adjourned at 8:30.

Tye River Residential Working Group Meeting #1

Massie's Mill Ruritan Hall

November 7, 2013

Tara Sieber from the Virginia Department of Environmental Quality (DEQ) welcomed participants and explained that the role of the residential working group will be to provide feedback on residential septic best management practices to include in the water quality improvement plan along with education and outreach strategies.

Tara asked the group whether or not local landowners are aware of septic system maintenance needs and how to reach landowners with educational materials. Participants recommended developing informational brochures and leaving them at home improvement and hardware stores such as Southern States, Ace Hardware, and Colleen Feed and Seed. The group also recommended using an Enviroscope at the Nelson Center to illustrate how a failing septic system can impact water quality. The Master Well Owner Network was discussed as another way to communicate the negative impacts of failing septic systems on water quality including private drinking water. This organization is run by Virginia Cooperative Extension and could serve as a great partner in education and outreach. In addition, participants suggested sharing information on septic maintenance at the annual Health Fair held in Nelson County each summer. Additional methods of outreach were discussed including:

- Targeted mailings to landowners
- Distributing informational brochures to septic system contractors and plumbers to hand out to customers
- Publishing articles in Blue Ridge Life and the Nelson County Times
- Working with the Department of Health to distribute the short articles they publish on septic system maintenance
- Setting up a display at the Farmers Markets in Nellysford and Amherst.

The group discussed maintenance needs for alternative waste treatment systems including an annual inspection. Participants agreed that proper maintenance needs are largely unknown by property owners. A representative from the Department of Health estimated that there are only a dozen or two of these systems in Nelson County with an average cost of \$25,000.

Detection of straight pipes was discussed by participants. Highlighting the impact of a straight pipe on the value of a home was noted as a way to encourage landowners to correct these systems. Community Development and Habitat for Humanity were identified as good potential partners in working to identify and eliminate straight pipes in the watershed. Absentee property owners with renters should also be contacted in case they are not aware of the presence of straight pipes on their rental properties. The group also recommended working through existing social networks like churches and identifying key players who could help reach out to landowners. Participants did not recommend floating the river in order to identify straight pipes in the watersheds.

A pumpout program was discussed as a way to assist landowners with septic system maintenance and to identify failing septic systems. A program like this would be appealing to tenants and landowners. The group agreed that the average cost of a pumpout is around \$300. A similar program in Gold Mine Creek in Louisa County was mentioned as a potential model. In addition, the Thomas Jefferson SWCD (TJSWCD) has a grant for a septic system cost share program in both the Moores Creek and Rockfish River watersheds. They are using grant funds to advertise septic system repair and replacement assistance and to help landowners correct failing systems.

Participants reviewed estimates of failing septic systems and straight pipes in the watershed along with the number of repairs and replacements needed. The Department of Health permits septic system repairs in the watershed, which must be completed by licensed contractors. They have some records of repairs and replacements, but they are spotty. Participants thought that the estimates for the number of repairs versus replacements looked good, but that the estimate that 73% of straight pipes would be replaced with alternative systems was too high considering that there are very few of these in the watershed. Piney River and Lovingston were identified as two potential areas where property owners with failing septic systems may be able to connect to public sewer. It was suggested that the Nelson County Service Authority be contacted in order to get their input on what can be done to address failing septic systems in the watershed. The sewage treatment plant and the water treatment plant could also be brought into the planning discussion.

The group discussed next steps in developing the implementation plan. A second residential working group meeting will be held prior to the final public meeting. Tara asked participants what days of the week and times would work best. Tuesdays, Wednesdays, and Thursdays were identified as good meeting days and late afternoon was identified as a good time to meet. The meeting adjourned at 9:00.

Tye River Residential Working Group Meeting #2

Massie's Mill Ruritan Hall

January 23, 2014

The meeting began with a discussion of remaining opportunities to connect to public sewer in the watersheds and associated costs. A representative from the Nelson County Service Authority explained that approximately 5 years ago, all of the sewer in Piney River was activated with over 100 connections to the sewer line. The line extends up 151 and towards Lowesville. Some of the estimated failing septic systems in the TMDL study may have been addressed through these connections. This number could possibly be reduced for Piney River. New households can connect now, but there is no funding to expand the lines any further. If new homes are constructed within 300 feet of an existing water and sewer line they are required to connect. When the sewer line was extended, grants were provided to homeowners so that they could connect to the sewer at no cost. In addition, monthly fees are subsidized in Nelson County so that some homeowners are only paying \$29/month.

Expanding sewer service up Piney River to Lowesville would help to correct many failing systems, which are prevalent between Lowesville and Woodson. There are about 50 homes between the two towns that were built in the 1930's and 1940's that are likely to have failing septic systems (this is probably where we will find the heaviest concentration of failing systems in the Amherst County portion of the watershed). The Shipman area is home to some concentrated development and also remains unsewered, this would be another good location for expansion of public sewer (there is already public water). There is a white clay that is present in portions of the watershed spanning from the Roseland Rescue Squad to Amherst and about a mile from Colleen to Piney River. This clay makes it challenging to install a conventional septic system. In addition, some interest has been expressed in extending a water line through Roseland due to the taste of the well water caused by the presence of minerals. The area upstream of Dickie Road was identified as another potential hot spot for failing septic systems and straight pipes. There are a number of homes upstream of this area and quite a bit of rock, making septic system failures more common.

The group could not think of any opportunities to connect to public sewer in Hat Creek and suggested that this figure be changed to 0. There are a few limited opportunities in Rucker Run (the median of Interstate 29 down to Co-Op Road behind the Electric Cooperative). It was recommended that additional monitoring be conducted in the Rucker Run watershed to determine whether failing septic systems are significant contributors to the bacteria problem.

The cost to connect to public sewer varies based on site conditions. If a grinder pump is necessary (which is the case with many properties in the area), this will increase the cost by as much as \$3,000. The overall range of connecting to public sewer was identified as \$8,000 - \$12,000. The cost of a conventional system without a pump is typically \$6,000-\$7,000. When a pump is needed the price goes up to about \$8,000. A representative from the Health Department agreed with the estimate that around 25% of systems require a pump. The group discussed how

a pump out assistance program could be used to encourage septic system maintenance and to identify failing systems. It was agreed that this would be an excellent outreach strategy for the watersheds.

A potential timeline for implementation was shared with the working group. The timeline spanned a period of 10 years with the majority of pumpouts, repairs and replacements with conventional septic systems occurring in the first 5 years. The more costly practices including alternative waste treatment systems could be targeted for the last several years of implementation in order to maximize funding for projects. One participant commented that 10 years seemed long and asked if this is a typical timeline for this amount of work. DEQ staff provided examples from other project areas and discussed the pros and cons of longer and shorter timelines. The group agreed that they did not want to overshoot and then fall short, but that they also did not want to pick a timeline that did not motivate people to act. Several participants commented on how long it can take to get the word out about programs, then get finances put together to do a project like this. After considerable discussion the group decided that they were comfortable with the 10 year timeline.

The group discussed education and outreach strategies. It was noted that it will be important not to take a heavy handed approach and to be flexible in working with partners. It will be important to emphasize the local health issue associated with the bacteria impairment. There is a health fair held at the high school in July that could serve as a good outreach opportunity. The Blue Ridge Medical Center could be a good partner in this effort. The Health Department was identified as another key partner. They have an epidemiologist on staff that could be of some help in communicating health risks of primary contact with bacteria in our streams. Periodic news articles and updates in the paper could be helpful. It will be important to make sure that outreach efforts do not appear to be driven by pressure from the government. Local citizens will not respond well to this sort of outreach. Other potential partners were discussed including the Blue Ridge Sierra Club (contact: Tom Eick), the Blue Ridge Chapter of the VA Master Naturalists (contact: Susan McSwain) and Keep Nelson Beautiful, which is currently working to reorganize. DEQ staff offered to check on opportunities to work with VA Cooperative Extension and their Master Well Owner Network Program. They have been able to offer well water clinics in other counties and have excellent educational materials that demonstrate the connection between well water and contaminants such as malfunctioning septic systems.

DEQ staff discussed next steps in the process of developing the water quality improvement plan for the Tye River and its tributaries. DEQ will prepare a draft of the plan and then hold a steering committee meeting where stakeholders can review and provide comments on the draft. The steering committee should include representatives from both the agricultural and residential working groups. Tom Eick, Gail Roussos and David Collins offered to represent the residential working group on this committee.

DEQ staff shared the good news that they have been able to secure funding for another year of citizen monitoring in the watershed. If additional monitors can be recruited, DEQ will perform another training. Monitoring materials will be delivered at a pick up in the next month or so. The meeting was adjourned at 9:00 pm.

Tye River Steering Committee Meeting

Massies Mill Ruritan Hall

April 3, 2014

Attendees

Tom Eick (VDH)

James Fulcher (Landowner)

Mike Campbell (Landowner)

Don Kain (DEQ)

Brian Walton (TJSWCD)

Nesha McRae (DEQ)

Luke Longanecker (TJSWCD)

John Benner (VCE)

Conny Roussos (Landowner)

Spencer Pelfrey (DEQ)

Meeting Summary

The meeting began with a review of the draft public document of the TMDL Implementation Plan for the Tye River and tributaries. A participant asked how the document would be distributed and how DEQ will ensure that the public is aware that it is out there. Nesha McRae (DEQ) responded that a few hard copies would be made available at the final public meeting, and that the document will be posted on DEQ's website. She will follow up with local groups and Nelson and Amherst Counties to see if a link to the document could be posted on their websites as well. It was suggested that a link to the document be provided in any announcements for the public meeting.

The group discussed the format of the Executive Summary in the document, which is intended to also serve as a one page fact sheet (front and back). The committee agreed that the shorter length was a good idea. The scenic river designation is noted in this summary. DEQ asked the group if this was a contentious issue in the county, and whether it should be noted in the document. The committee agreed that it was generally accepted by the public since it would not bring additional regulations to the community. The group discussed the demographics figures included in the document and noted that farmers in the region are not netting much income from their operations. This should be made clear since it is an indicator of some of the obstacles that may be encountered with BMP implementation efforts. DEQ noted that the document focuses on implementation goals associated with removing the streams from the impaired waters list, rather than meeting the full TMDL (0% violation rate). These goals are more reasonable and affordable, though still very expensive. The cost of implementation was discussed and one participant suggested including some information about the portion of that cost that would be returned to the local economy (work done by local contractors, materials purchased locally etc). DEQ agreed to look at other project areas to try to find some of this information. The TJSWCD may be able to help with this as well.

The committee reviewed the public participation section. A participant from the agricultural working group noted that comments made during these meetings regarding limited access to the stream for livestock should be included in the summary of participation. This is a key point to make since many farmers do not know that this is allowable through the Ag BMP Cost Share Program. During the review of the Implementation Actions section of the document, it was requested that additional information be added about the potential for a Flexible Fencing

Program. It should be made very clear that this is not something that is available in the area at the moment, but that it is a program stakeholders would like to see implemented in the region. Key points to mention included flexibility in materials farmers could use, the shorter contract period, the fact that it is private money (less paperwork), and that the fencing can go at the top of the bank. One participant asked whether there are other organizations besides the Chesapeake Bay Funders Network that would fund this sort of a program. DEQ noted that there is currently a Request for Proposals open from the National Fish and Wildlife Foundation. That could be a potential source of funding, DEQ staff offered to follow up with NFWF on a potential proposal.

The committee moved on to discuss the Education and Outreach section of the document. The group discussed strategies to identify straight pipes including stream walks. This should not be included in the document since the residential working group expressed concerns about private property rights. DEQ shared some of the strategies that have worked well in other watersheds to get landowners with straight pipes to come forward for assistance. One tool that has worked well is postcard mailings with coupons for financial assistance to correct systems. VCE will be hosting a drinking water clinic in partnership with the Master Well Owner Network out of VA Tech for Amherst County residents. The workshop will be held in the middle of August and could serve as an excellent outreach opportunity for the implementation project. Several additional outreach events were identified for inclusion in the plan: Kite Festival in April (Peter Agelesto is the contact), Nelson County Community Day in April (Contact Planning and Zoning Dept to see about setting up a display, Tom Eick will be attending and could distribute materials).

The committee discussed the Costs and Benefits section of the plan. Concerns were expressed about the costs of residential BMPs including alternative treatment systems. Funding would need to be obtained to support a cost share program for these practices, and even then, landowners might not be able to afford their share of the cost. The upfront costs of BMPs should be noted in this section when cost share programs are discussed. It is important that landowners know that they will have to cover the full cost of the practice and then be reimbursed. It was noted that the turn around time for SWCDs issuing payments is very short though, usually only two to three weeks. There is a low interest loan program (3% interest rate) available through DEQ for ag BMPs, but not for residential septic practices. The septic BMP cost share program allows for payments to be made directly to septic contractors, meaning that the landowner does not have to handle the full upfront cost of the work; however, contractors are often reluctant to do this since they do not get paid immediately after completing the work. DEQ asked the group about the photo of a kayaker at the end of the benefits section. Participants felt that this may bother some landowners in the upper portion of the Piney since kayaking has been an issue with respect to private property rights for some landowners. A photo of a wider section of the river with canoes would be well received. A participant asked how the two Soil and Water Conservation Districts would coordinate implementation efforts. DEQ shared several examples from other project areas where a staff person has worked primarily out of one office but has covered both areas, and where one district has provided another with BMP cost share to spend in their portion of the watershed using their own staff for outreach.

The Goals and Milestones section of the plan was reviewed next. The group felt that the focus should be on Stage 1 goals for de-listing. The livestock exclusion figures shown in the document

appear far too large for the Stage 2 goal. These figures should be shown for the Stage 1 goal instead since they are still quite high, but appear more reasonable. Targeting strategies for implementation were reviewed. It was noted that the target area for septic outreach should be adjusted to include the area upstream of Woodson (the Sam Massies Bridge up to the George Washington National Forest).

The group reviewed the Partner Roles and Responsibilities section. Entities at each local government (e.g. BOS, Planning Commission, Service Authority) should be noted in the description of the county government roles. Additional local partners were identified including the Central VA Land Conservancy, DOF, the Farm Bureau (need to check with them to see if including their name as a partner would be okay), and Nelson/Amherst Beef Producers. Rural Nelson and Keep Nelson Beautiful should be removed since they are now defunct organizations.

The committee reviewed the Integration with Other Watershed Plans Section. DEQ will need to contact Nelson County to see if the version of the comprehensive plan up on the website is the most recent version (2002). Amherst County recently revised their comp plan, but it appears that the version obtained by DEQ was revised in 2013 and should be up to date.

The Funding Section was reviewed and DEQ staff noted that the Chesapeake Bay Funders Network could be described in this section as well.

After completing their review of the public document, the committee moved on to discuss plans for the final public meeting. It was agreed that the earlier in May the better since farmers will be very busy later in the month. Before the 20th would be best. The meeting should be held later in the evening (no earlier than 7:00) since we are in daylight savings time and farmers will be working late. Several potential locations were identified including Nelson County High School, the Massies Mill Ruritan Hall, the Nelson Center and Ivy Hill Church (James Fulcher would be the contact). The agenda was discussed and it was recommended that an elected official be invited to offer a welcome and kick off the evening. Additional speakers suggested included a local landowner who has implemented BMPs (Mark Campbell was recommended), Tom Eick (VDH) and Luke Longanecker (TJSWCD). Partners will also be invited to set up displays. The group discussed hosting an ice cream social at the event since it should be warm out by then. DEQ will work on identifying potential funding sources.

DEQ announced that they will be hosting a citizen monitoring training on April 18th from 3-5pm at the library in Lovington. The meeting adjourned at 9:00 pm.

Tye River Water Quality Improvement Plan: Final Community Meeting

Massies Mill Ruritan Hall

May 15, 2014

The meeting began with a welcome from Emily Harper, Nelson County Parks and Recreation Director. Ms. Harper discussed the scenic rivers designation for the Tye River and how the river is used by the local community. The scenic river designation will become effective July 1, 2014 and includes a 12.7 mile stretch of the river from Depot down to its confluence with the James River. There is also a rail trail along the river, which is frequently used by walkers and bikers. Ms. Harper noted that the Tye River is a real asset to the Nelson County community and welcomed attendees to the meeting.

Nesha McRae, Non Point Source TMDL Coordinator for the VA Department of Environmental Quality provided an overview of the planning process and the contents of the plan. Agricultural and residential BMPs included in the plan were reviewed in addition to education and outreach strategies and the project timeline. It was noted that VA Cooperative Extension will be holding a Master Well Owner Network training in Amherst County on August 25th. This was identified as a good outreach tool for septic system maintenance in the plan. It was also noted that DEQ will be holding a citizen monitoring training on May 27th. DEQ is currently looking for addition volunteer monitors for the Tye River. This will be the second year of the monitoring program.

One participant asked about support available for low income residents with failing septic systems or renters. Concerns were expressed about the financial burdens that installing a new septic system would place on these property owners. Nesha explained that in other watersheds, funding has been secured to provide between 50% and 75% of the cost of septic system repairs and replacements. In addition, there are other programs out that that provide assistance including the South Eastern Rural Community Assistance Program.

Brian Walton, Conservation Technician with the Thomas Jefferson Soil and Water Conservation District (SWCD) presented information on the programs that the SWCD has available to assist agricultural landowners with BMP installation. On participant asked for some background information on the different buffer widths and their capacity to filter out bacteria. Nesha offered to follow up on this and provide some information to the participant.

Mike Campbell, local Nelson County farmer spoke next about the BMPs that he has implemented on his farm and how they have worked for him. He became interested in installing BMPs back in 2003, but it took some time until the SWCD and Natural Resource Conservation Service offered the reduced setback fencing programs that he was interested in. Placing the fencing 35 feet back from the stream on his property would have taken too much of his grazing land. He went with a livestock exclusion system with 10 foot buffers and pressure fed waterers. He does not have livestock totally excluded from the stream on his property, where he has left a 3 acre field open to the stream in case of a power outage or some other reason his livestock need access to the stream to water. He has found it easiest to phase construction. Repayments from the SWCD occurred in a timely manner, and his livestock are finding other shade to cool off in now that the streams are excluded. Mr. Campbell responded to one participant's question about rotational grazing and how it has impacted his stocking density. He explained the installing a

rotational grazing system has allowed him to stock more cattle on his land while also preventing overgrazing.

Tom Eike spoke next on behalf of the Nelson County Health Department. He explained that septic systems are often contentious issues when they are failing and that it has been very useful to have financial assistance programs available to work with homeowners on making repairs and replacements. Mr. Eike noted that installing treatment systems on land that doesn't perk and septic repairs can often be very expensive. Matters can be more complicated in instances where someone is renting a home with a failing septic system since the owner is the individual responsible for correcting the problem. The Nelson County Community Development Foundation was once a big help for funding; however, their funds have dwindled since 2008. Mr. Eike noted that the grant that is in place now to provide landowners assistance with septic systems for the Rockfish River implementation plan has been a big help. People are contacting him for help now and looking for cost share funding.

The meeting adjourned at 8:30 following closing remarks from Nesha McRae. The public comment period for the water quality improvement plan will go from May 16, 2014 through June 16, 2014. Written comments are to be sent directly to Nesha at the Department of Environmental Quality.

APPENDIX B: Public Outreach

First Public Meeting Invitation: Mailing to riparian landowners

October 16, 2013

Dear _____,

I am writing to invite you to a community meeting to kick off the development of a water quality improvement plan for the Tye River and its tributaries (Piney River, Hat Creek and Rucker Run). The Virginia Department of Environmental Quality and partners including the Thomas Jefferson Soil and Water Conservation District will be holding the meeting on ***November 7, 2013 at 7:00 p.m. at the Massie's Mill Ruritan Hall*** (5439 Patrick Henry Highway, Roseland VA). The water quality plan will be designed to reduce bacteria in the Tye River and its tributaries. Currently the creeks are not meeting water quality standards for bacteria. This poses a human health risk for individuals having primary contact with the water (swimming, splashing water in eyes). State law requires that these problems be addressed through a water quality improvement plan (known as a TMDL Implementation Plan).

Using local community input, we will develop a plan that can be implemented voluntarily by stakeholders in the watershed. We hope to draw from experiences that local landowners have had implementing conservation practices on their property, and collect ideas on community outreach strategies.

As a landowner along one of these creeks, your participation in the development of this plan is particularly important if we are to ensure that it includes strategies that the local community can support. During the meeting on the 7th, there will be a brief presentation explaining the planning process that we will use. Following the presentation, we will break out into smaller agricultural and residential working groups. This will be an excellent opportunity to share your thoughts on the types of actions that should be included in the plan, and the best ways to reach out to landowners in the community. We hope to see you there, please feel free to call me in the meantime if you have any questions.

Sincerely,

Nesha McRae
TMDL/Watershed Field Coordinator, VADEQ
Phone: (540)574-7850 Email: nesha.mcrae@deq.virginia.gov

Final Public Meeting Invitation: Mailing to riparian landowners

April 22, 2014

Dear _____,

Over the past six months, The Virginia Department of Environmental Quality and partners have been working with local landowners in your community to develop a plan to restore water quality in the Tye River and its tributaries (Piney River, Hat Creek and Rucker Run). This draft plan will be presented at a community meeting on **May 15, 2014 at 7:00 p.m. at the Massie's Mill Ruritan Hall** (5439 Patrick Henry Highway, Roseland VA). The Thomas Jefferson SWCD and the Chesapeake Bay Foundation will be sponsoring an **ICE CREAM SOCIAL** at the meeting, while other partners will be setting up displays. This will be a great chance for residents to learn about resources available to support restoration efforts.

Tye River and its tributaries are on Virginia's list of impaired or "dirty waters" because they violate the state's water quality standard for bacteria. Levels of bacteria in these streams could lead to an increased risk of illness or infection for people who come into direct contact with the streams (*e.g.* water in the eyes, ears, mouth). Bacteria sources identified in the streams include failing septic systems, straight pipes, wildlife, and agricultural practices in the area. The plan that has been developed over the past six months is meant to serve as a road map to correct these problems.

Strong community participation in this effort helped to ensure that the plan was driven by local input. Considerable efforts were made to involve local stakeholders in planning efforts including agricultural and residential focus group meetings and the formation of a steering committee. The draft plan includes management strategies that can be implemented by landowners such as replacing failing septic systems, excluding livestock from streams, and implementing rotational grazing systems. The plan also includes a timeline, education and outreach strategies, costs and benefits, and potential funding sources.

The meeting on May 15th will kick off a 30-day public comment period during which community members can offer feedback on the plan. As a landowner in the watershed, your participation in the implementation of this plan is absolutely critical. We hope that you will be able to join us for ice cream and a great information exchange!

Sincerely,

Nesha McRae, Non Point Source TMDL Coordinator, VADEQ
Phone: (540)574-7850 Email: nesha.mcrae@deq.virginia.gov

Press Release: Final Public Meeting**May 15, 2014 Meeting to Discuss a Total Maximum Daily Load Implementation Plan for Tye River, Rucker Run, Hat Creek and Piney River; Nelson County, VA**

A public meeting to present a draft water quality improvement plan for Tye River, Hat Creek, Rucker Run and Piney River will be held on Thursday, May 15th at the Massie's Mill Ruritan Hall located at 5439 Patrick Henry Highway, Roseland, Virginia from 7:00 to 9:00 pm. The Thomas Jefferson Soil and Water Conservation District and the Chesapeake Bay Foundation will be sponsoring an ice cream social at the meeting.

Tye River, Hat Creek, Rucker Run and Piney River were identified in Virginia's Water Quality Assessment Integrated Report as impaired for violations of *E.coli* bacteria water quality standard. This poses a human health risk for people having primary contact with the water (swimming, splashing water into your eyes, ears or mouth). Bacteria sources identified that may contribute to this impairment include failing septic systems, discharges of untreated human waste (straight pipes), wildlife, and agricultural practices in the area. Representatives from the VA Department of Environmental Quality (DEQ), and other state and local agencies will be on hand to present a bacteria reduction plan for the impaired waterways. Several partners in this effort will be setting up displays at the meeting, which will be a great opportunity for local residents to learn about the resources available to them should they chose to participate in restoration efforts on their own property.

For the past 6 months, staff from the DEQ and partners including the Thomas Jefferson Soil and Water Conservation District have been working with local landowners to develop a plan to reduce the amount of bacteria coming in to the creeks. The water quality or implementation plan follows a Total Maximum Daily Load (TMDL) study completed by DEQ in 2013. The TMDL study identified the sources of bacteria in the watersheds and the reductions needed from these sources in order to meet water quality standards. The implementation plan that will be presented outlines what is needed to reduce the amount of bacteria in the creeks, the associated costs and benefits of these actions, along with measurable goals and an implementation timeline. Corrective actions (also known as best management practices) may include replacing failing septic systems, removing straight pipes, and reducing polluted runoff from agricultural and residential areas. Best management practices for agricultural sources can include streamside livestock exclusion fencing, rotational grazing, streamside plantings of trees or grasses on cropland and pasture, and reforestation of erodible pasture and cropland.

Participating in implementation efforts will provide local residents and stakeholders with the opportunity to improve and preserve water resources, increase farm production and increase property values in the community. During the meeting on May 15th, the draft plan will be presented to the community, kicking off a 30-day public comment period extending from May 15, 2014 to June 16, 2014 during which community members can offer suggested changes to the plan. For additional information or to submit comments, contact Nesha McRae, at the Virginia Department of Environmental Quality, Valley Regional Office, P.O. Box 3000, Harrisonburg, VA, 22801, by phone (540) 574-7850 or by email nesha.mcrae@deq.virginia.gov.

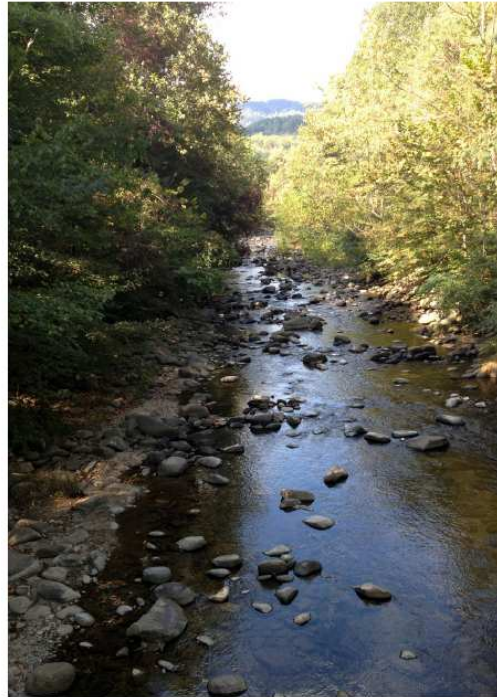
Final Public Meeting Flyer

*Community Meeting to present a
clean up plan for*

**TYE RIVER
HAT CREEK
RUCKER RUN &
PINEY RIVER**

May 15, 2014
7:00-9:00 p.m.

Massies Mill Ruritan Hall
5439 Patrick Henry Highway,
Roseland, VA



*Calling all Tye River
Watershed Residents:*

Over the past six months, The Virginia Department of Environmental Quality and partners have been working closely with interested watershed residents to develop a clean up plan for the Tye River and its tributaries. Currently, the creeks are considered unhealthy due to high amounts of fecal bacteria in the water. This means that people face a greater chance of illness or infection when they go swimming in the creek or get water in their eyes, ears or mouth. Using input from local residents, a plan has been developed outlining the best ways to address these problems in the creek. This meeting is your chance to provide additional input on the plan and learn more about the Tye River.

*Join us for an **ice cream social**, sponsored by the Thomas Jefferson Soil and Water Conservation District and the Chesapeake Bay Foundation while you learn what you can do to help the Tye River!*

For more information, contact:
Nesha McRae, VADEQ
(540) 332-9238
nesha.mcrae@deq.virginia.gov



APPENDIX C: Public Comments**Response to Comments Document for Tye River TMDL
Implementation Plan Development****Introduction:**

A final public meeting was held for the Tye River TMDL Implementation Plan on May 15, 2014. This project included the development of a series of implementation scenarios to meet the *E.coli* bacteria TMDLs for Tye River, Hat Creek, Rucker Run and Piney River in addition to incremental water quality milestones. The draft implementation plan was presented at the meeting and made available on the Virginia Department of Environmental Quality (DEQ) website at that time. A 30-day public comment period on the draft plan was held from May 16 until June 16, 2014. During the public comment period, comments were received from Mr. David Hight, Mr. Robert Fenner, Ms. Valentina Brashers, and Mr. Walter J. Kelly IV. The full text of the original comments and DEQ's responses to those comments are provided below.

Comments from Mr. David Hight (Received May 19, 2014):

My comments are as follows:

There are two types of farming operations in the Tye River watershed. The apple orchard operators all run cattle as a supplement for their labor forces. These farms are well managed and practice conservation. Most of the other cattlemen are part time farmers or retired from other professions. Much, if not all of their land is rented. They operate on a shoestring and basically try to capture as much profit as possible and do not care for the land or conservation. Typical rental rates are \$20.00 per acre per year, with the land owner furnishing fencing materials and paying taxes. Most of the landowners are elderly or absentee and cannot do any work themselves, so this amount does not allow funds to employ "best practices". The renters do not want to spend lots of money or time on land that does not belong to them.. I know many persons involved in these operations, and that is where most of your pollution originates. If the property owner wants the renter to make improvements, most refuse and move their operations. They employ the practices that they were taught by their fathers, etc. None of these operators attended any meeting to my knowledge. I do not have a solution, just information that I don't think that you were aware.

A quick fix that I thought about would be to reduce or eliminate property taxes on any house that was vacated that has been identified as having a straight pipe or failing drain field. This would stop pollution input and reward the owner for doing so. It would not require work be performed. Most structures of this type are marginal, so it removes low quality housing from the market. I would not be surprised if other government agencies are subsidizing the rent for these polluting homes. The moral is that government should be responsible if it contributes to the problem, even if indirectly.

DEQ Response to Mr. Hight:

Dear Mr. Hight,

Thank you for your comments on the Tye River Water Quality Improvement Plan, and for your participation in the planning process. Your comments will be incorporated into the final technical document for this project, which is available upon request.

The information that you have shared with us on the two type of farming operations in the watershed is quite valuable in furthering our understanding of obstacles to participation in agricultural BMP cost share programs. The issue of rented land and BMP implementation is quite challenging. The Headwaters Soil and Water Conservation District, located in Augusta County, currently has a pilot project wherein they are investigating outreach and implementation strategies to encourage BMP adoption in these types of situations. Perhaps the lessons learned through this ongoing effort can be applied in Nelson County in order to address some of the management issues that have been noted on rented land.

Your suggestion to eliminate or reduce property taxes on vacant homes with straight pipes or failing septic systems is an interesting one. In previous implementation projects, our strategy has been to target financial resources at correcting the septic system rather than stopping the actual input of bacteria into the system. You could certainly address this problem using either of these strategies. I would expect that the adjustment of property taxes would be a decision made at the county level in consultation with the local Health Department. I will share your suggestion with the Nelson County Health Department and see if they feel that this is something that they could pursue with the county.

Your active participation in the development of this plan has been quite valuable to us in identifying suitable implementation strategies and tools for local engagement. You have also been very helpful in identifying the challenges associated with BMP implementation and how those challenges may or may not be addressed. Thank you for sharing your extensive knowledge of the Tye River watershed and the local community with us over the past six months.

Comments from Mr. Robert Fener (Received May 29, 2014):

Nesha:

I would once again like to publically thank you, Tara and various agencies and citizens that participated in the formulation of the Nelson County TMDL mitigation plan. I wish we had the forethought to record the meetings because we might have been this year's version of Duck Dynasty.

If there is one thing we never appreciate until it's gone, is clean water. Just ask the residents of West Virginia this past year. How would Richmond respond to an equivalent disaster?

The Nelson County plan for water quality seems very thorough in pointing out the problems with TMDLs, E Coli and more importantly, solutions. Beef cattle farmer Mr. Campbell was very convincing in his presentation when he stated that the measures he had implemented made for a healthier stream, pasture and return on investment. What more could a farmer want? The answer to not wanting gates IS the use of cattle guards. The cattle guards are so effective that in the west, they just paint lines on the roads and the herd stays to the proper side. To answer the argument that cattle would have no water supplies during power outages, I note that solar, wind and rams, all function. During various ice storms, the Derecho, etc. I have never lost power while living entirely off the power grid. Solar watering devices are used throughout the arid west where they have more than proven their reliability. Additionally during an earlier drought, our volunteer fire department provided water to local farmers. There are no rational answers to oppose mitigation measures when in some cases you get 115 % of your investment.

Various agencies seem very generous in helping to solve the cost end of the problem. Society downstream will benefit and farmers get a better return on their investment. I wonder what that number costs per head. When Nelson farmers implement these practices, then maybe they can have value added, like a "Grown in Nelson" label. Think of organic beef: "Chesapeake Bay Friendly."

The sewage problem from humans also seems to be a no brainer. One must ask what are we waiting for.

Lastly, we may want to consider wording for agricultural BMP's. In Amherst County, one land owner participated in various cost share programs and has worked on solving equivalent TMDL problems. Unfortunately, the adjoining neighbor has destroyed his riparian buffer. How much do taxpayers want to spend? If we cannot get voluntary compliance then we at least need to consider mandatory regulations. My fear is that eight to ten years from now we may still be having these meetings.

Thank you for allowing me to comment upon this matter.

Robert Fener

DEQ Response to Mr. Fener:

Dear Mr. Fener,

Thank you for your comments on the Tye River Water Quality Improvement Plan and for your participation in the planning process. Your comments will be incorporated into the final technical document for this project, which is available upon request.

As you noted in your comments, cattle guards would indeed be quite effective in preventing livestock access to streams. In addition, producers would not have to contend with fencing washing out due to flooding. To date, this strategy has not been explored in state or federal agricultural BMP cost share programs due to associated costs. The cost of concrete and/or metal needed for installation would make this practice cost prohibitive

for any significant reach of stream. However, the use of solar watering devices (as mentioned in your comments) has proven to be a cost effective strategy for operating pumps to provide off stream water to livestock.

The development of market based incentives for environmentally conscious agricultural production is being explored across the Chesapeake Bay watershed right now. Consumer demand for products such as “Chesapeake Bay Friendly” beef, chicken and milk would certainly assist state and local partners in incentivizing BMP implementation. As you have stated in your comments, the development of these markets would greatly aid in accomplishing water quality improvement goals while also making it economically viable for producers to change the way in which they farm.

Voluntary, incentive based BMP implementation remains Virginia’s approach to accomplishing reductions on non point source pollution from agricultural operations. We have continued to make progress in the agricultural sector using this approach. Agricultural BMPs installed through state and federal cost share programs typically have a 10-15 year contract period during which the cost share recipient must maintain the practice. These BMPs are subject to spot checks to ensure compliance with the contract. This helps to ensure that tax payer funds are used wisely.

Your active participation in the development of this plan has been quite valuable to us in identifying suitable implementation strategies and tools for local engagement. Thank you for sharing your creative and innovative ideas to help improve water quality in the Tye River!

Comments from Ms. Valentina Brashers (Received May 30, 2014):

Hello,

My name is Tina Brashers. I lived in Nelson County for many years and have floated and fished the Tye regularly for over 35 years. Although I have moved to Fluvanna, it is still my favorite place to go on the weekends, it feels like home. I have been saddened by how much the water quality has visibly deteriorated over the past 10 years - of course I cannot see the bacteria, but the amount of siltation has been increasing, and the river just does not smell as fresh and clean as it once did.

While I can completely understand the concerns of those who raise cattle and crops near the river, the Tye is a true treasure that deserves to be preserved and improved. So many of the other rivers in our area have a chemical smell from waste treatment plants (I now live near the Rivanna below Charlottesville and do not enjoy the odor at all) or have banks that are so eroded that it is impossible to sit by the water and enjoy the beauty of our area. In contrast, the Tye still feels wild and is home to so much wildlife - I see beaver, heron, kingfisher, hawks, deer, and of course smallmouth bass every time I go there.

Please lend my voice to the efforts to clean up the Tye and its tributaries. Thank you

Valentina Brashers MD

DEQ Response to Ms. Brashers:

Dear Ms. Brashers,

Thank you for sharing your appreciation of the Tye River along with the changes that you have noticed in the river over the past ten years. It is clear that the Tye is a highly valued resource in Nelson County and the surrounding area. The recent Scenic River designation supports your observations of the wild nature of much of the watershed and abundant wildlife that are present throughout the riparian corridor.

We hope that the implementation of this plan will lead to significant improvements in water quality in the river. While the plan is designed to address bacteria in the water, many of the actions that will help to accomplish this will also reduce the amount of sediment that you see in the river. Filtering practices like streamside buffers will help to trap sediment before it enters the stream while livestock exclusion will prevent further downcutting of streambanks.

Thank you for your support of our efforts to improve water quality in the Tye River!

Comments from Walter J. Kelly IV (Received June 3, 2014):

Greetings, Ms. McRae

I was excited to read of this: http://www.newsadvance.com/news/local/public-comment-period-now-open-for-tye-river-cleanup-plans/article_b15017bc-ea05-11e3-bb68-001a4bcf6878.html

Living in Keene, Va. I now begin to wonder if Albemarle county has a plan. I drive up Route 20 routinely, seeing cow access directly into the Hardware River. So much can be achieved with fence setbacks. It's obvious. It is encouraging to learn that there are programs to help offset the cost, that being one major, major hurdle. Your agency is doing the right thing.

I reserve special praise for your identification of failing and improper septic systems at specific home sites. I expect that y'all will get a boatload of complaints. That is what motivated me to positively commend your work. Thankfully there are extant some laws carefully crafted many, many decades ago governing septic systems. Nothing new on that front. Even the tea partiers might recognize the benefit of a non-malodorous brew with their fresh caught fish.

Regards,

Walter J.Kelly IV

DEQ Response to Mr. Kelly:

Dear Mr. Kelly,

Thank you for your comments on the Tye River Water Quality Improvement Plan and your support for efforts to identify and correct failing septic systems and straight pipes. A water quality study or Total Maximum Daily Load was completed for the Hardware River in Albemarle County in 2007.

This is the first step in the “TMDL Process” in Virginia, which is followed by the completion of an implementation plan like what was just done for the Tye River.

Financial and technical assistance remain critical in efforts to encourage the installation of best management practices like livestock stream exclusion fencing. As you noted in your comments, this practice leads to marked improvements in water quality.

Locating failing septic systems and straight pipes remains challenging. Once again, financial incentives are an excellent mechanism to encourage landowners to come forward and work with state and local organizations to correct these problems. While funding is not currently available to implement an assistance program for septic systems in the Tye River watershed, the completion of this plan will allow stakeholders to pursue funding opportunities to support a program like this.

Thank you again for your support of this effort!