Clinch River and Cove Creek Watershed Implementation Plan (Bacteria TMDL) Technical Report

Prepared for:

LENOWISCO Planning District Commission

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ACKNOWLEDGMENTS

Steering Committee Members

Working Group Members

Scott County Soil & Water Conservation District

Clinch Valley Soil & Water Conservation District

Virginia Department of Environmental Quality (DEQ)

Virginia Department of Conservation and Recreation (DCR)

Local citizens and stakeholders in the Clinch River and Cove Creek watershed

Individual summaries of this document for the Clinch River and Cove Creek Watershed are also available from the Virginia Department of Environmental Quality.

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EXECUTIVE SUMMARY

The impaired segments in the Clinch River and Cove Creek Watershed is located primarily in Scott County, Virginia, with a small portion in Russell and Lee Counties. There is also a small portion of the watershed draining from across the Tennessee state line. There are eleven (11) different impaired segments in this study area. The impaired segments are on the following streams: Clinch River, Cove Creek, Stock Creek, Moll Creek, Valley Creek, Blackwater Creek, Copper Creek and North Fork Clinch River.

The listing of these segments were due to exceedance of the State's water quality standards for fecal bacteria. This means that the stream does not support the primary contact recreation use, which includes swimming, wading, and fishing, due to an increased risk of illness or infection when coming in direct contact with the water. The State standard for *E.coli* bacteria should not exceed a geometric mean of 126 cfu per 100 mL of water. Geometric means are calculated using all data collected during any calendar month with a minimum of four weekly samples. If there are insufficient data to calculate monthly geometric means in freshwater, no more than 10.5% of the total samples in the assessment period shall exceed 235 cfu per 100 mL. In addition, a stream will be placed on Virginia's impaired waters list if over 10.5% of samples collected during a 6-year assessment window exceed 235 cfu per 100 mL. As a result of the impairment listings, and court actions taken against the United States Environmental Protection Agency (USEPA), total maximum daily load (TMDL) studies were developed for the Clinch River and Cove Creek Watershed and approved by the USEPA. The studies established the reduction in fecal bacteria loads for the watershed needed to restore them so they would meet water quality standards for fecal bacteria and fully support primary contact recreation.

Virginia law requires expeditious implementation of TMDLs. An Implementation Plan (IP) shows how fully supporting status for impaired waters can be achieved and the pollutant load reductions established in the TMDL studies can thereby be met. In making progress towards the state's requirement to implement TMDLs, a framework was established for reducing fecal bacteria levels to achieve the water quality goals for the impaired streams.

Review of TMDL Development

MapTech, Inc. was contracted to develop *E. coli* bacteria TMDLs for the Clinch River and Cove Creek Watershed. The TMDLs were completed in September 2013, revised and approved by the USEPA in April 2014. Modeling conducted in support of the fecal bacteria TMDLs considered loads in runoff resulting from wildlife (*e.g.,* deer, raccoon, muskrat, beaver, turkey, goose, mallard, and wood duck), livestock (*e.g.,* beef, dairy and horse), and residential (*e.g.,* failing septic systems, straight pipes, dogs and cats) sources. Direct loads to the stream (including direct deposition from cattle and wildlife), uncontrolled discharges (failing septic systems and straight pipes), and permitted sources were also modeled. The *E. coli* standard(s) current at the time of modeling, along with an implicit Margin of Safety (MOS) were used as the water quality endpoints.

The Clinch River and Cove Creek TMDLs show that in order to meet the water quality standard for fecal bacteria, the reductions shown in **Table ES-1.1** must be achieved in the watershed.

Table ES-1.1 *E. coli* TMDL reduction scenarios for the Clinch River and Cove Creek Watershed.

	Percent Reductions to Existing Bacteria Loads					
Watershed	**Straight Pipes**	**Residential[1]**	**Livestock Direct**	**Agricultural (Crop & Pasture)**	**Wildlife Direct**	**Forest**
Clinch River	100	63	99	0	0	0
Blackwater Creek	100	13	99	0	0	0
NF Clinch River	100	100	99	13	0	0
Stock Creek	100	0	17	0	0	0
Moll Creek	100	15	99	0	0	0

Public Participation

The actions and commitments described in this document were drawn together through input from local citizens, local government representatives, Virginia Departments of Environmental Quality (DEQ), Conservation and Recreation (DCR), and Health (VDH), Virginia Cooperative Extension (VCE), Natural Resources Conservation Service

[1] Failing septic system, pet waste and stormwater.

(NRCS), the Scott County and Clinch Valley Soil and Water Conservation Districts, MapTech, Inc. and other organizations. Every citizen and interested party in the watershed was encouraged to become involved in implementing the plan to help restore the health of the Clinch River and Cove Creek Watershed.

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

Opinions were voiced throughout the public participation meetings regarding what should be included in the Implementation Plan. Most members of the working groups agreed that the cornerstone of the Implementation Plan should be cultivating public involvement and education, and encouraging commitment and partnerships between the citizens in the watershed and government agencies in order to reduce fecal bacteria pollution in the Clinch River and Cove Creek watershed. A final 30-day public comment period was conducted for the final draft of the Implementation Plan. One comment was received on the public document and was addressed in the final document (as posted on the DEQ website).

Assessment of Implementation Action Needs

The quantity or extent of pollution control measures, or BMPs, needed during implementation was determined through spatial analyses of land use and stream-networks, along with regionally appropriate data archived in the DCR Agricultural BMP Database. Additionally, input from local agency representatives and community members were used to verify the analyses. Overall, the needs to meet the TMDLs for the 10-year implementation period were identified and are shown in **Table ES-1.2**.

Table ES-1.2 Agricultural, residential and industrial BMPs needed in the Clinch River and Cove Creek Watershed.

Control Measure	Unit	Blackwater Creek	Clinch River	NF Clinch River	Stock Creek	Moll Creek
Pasture & Livestock Exclusion						
Livestock Exclusion with Riparian Buffer (LE-1T)	System	50	66	59	35	493
Livestock Exclusion with Reduced Setback (LE-2T)	System	50	65	59	34	492
Stream Protection (WP-2T)	System	7	8	8	5	64
Stream Exclusion with Grazing Land Management (SL-6/CREP)	System	1	1	1	1	9
Streamside Fence Maintenance	Linear ft	9,013	11,712	10,625	6,238	88,288
Agricultural Nonpoint						
Improved Pasture Management	Acres	0	0	50	0	0
Residential						
Septic Systems Pump-out Program	System	202	305	1,443	1,167	2601
Septic System Repair	System	5	7	34	27	61
Septic System Installation/Replacement	System	40	31	128	151	197
Alternative Waste Treatment System Installation	System	12	10	41	48	61
Sewer System Connect	System	0	0	0	0	3
Rain Garden	Acres-Treated	0	20	200	0	0
Infiltration Trench	Acres-Treated	0	20	200	0	0
Bioretention Basin	Acres-Treated	0	20	200	0	0
Residential Pet Waste Education Program	Program	1	1	1	0	1

Cost/Benefit Analysis

The costs of the above control measures were determined based on the cost of control measures previously installed through the Virginia Agricultural Cost-Share Program in the Clinch River and Cove Creek Watershed and discussions with local agency representatives and working groups. The cost of technical assistance needed to implement the control measures was determined based upon discussions with working group members and technical assistance costs from both ongoing and previous Implementation Plans in similar watersheds. The estimated total cost to install

agricultural and residential control measures in the Clinch River and Cove Creek Watershed is $41,789,116.

The primary benefit of implementation is the reduction of *E. coli* bacteria and sediment in this watershed. With the completion of this Implementation Plan, the risk of illness or infection as a result of direct contact with *E. coli* bacteria will decrease significantly. Streambank protection, provided through exclusion of livestock from streams, will also lead to improved aquatic habitat. The practices recommended in this document will provide economic benefits to landowners in addition to the anticipated environmental benefits. Specifically, alternative (clean) water sources, exclusion of cattle from streams, and intensive pasture management will improve profitability of farms, while private sewage system installation and maintenance will ultimately save homeowners money by preventing expensive fees and repairs. Keeping cattle in clean, dry areas has been shown to reduce the occurrence of mastitis 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 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.

Measurable Goals and Milestones for Attaining Water Quality Standards

The end goal of implementation is restored water quality of the impaired waters and subsequent de-listing of these impairments from the Commonwealth of Virginia's Section 305(b)/303(d) list within 10 years (see **Table 6.1**). Progress toward end goals will be assessed during implementation through tracking of control measure installations and continued water quality monitoring. Agricultural and residential control measures will be tracked through the Virginia Agricultural Cost-Share Program.

The Stage I goals for implementation will focus on correcting straight pipes and failing septic systems, fencing cattle out of the streams, and improving pasture management. Stage II focuses on continuing these efforts and implementing stormwater controls (i.e.,

rain gardens, infiltration trenches, and bioretention basins). The BMP implementation goals associated with the milestones are listed in **Table 6.2** through **Table 6.6**.

The Clinch River and Cove Creek Watershed is divided into 17 subwatersheds. If feasible, streamside fencing efforts should be prioritized in the order of subwatersheds in **Table 6.7** and **Figure 6.7**. Targeting of residential BMPs should be initiated in the Clinch River and Cove Creek Watershed in the order shown in **Table 6.7** and **Figure 6.8**. This order was derived from ranking the sum of loads from failing septic systems and straight pipes in each subwatershed. A third method of targeting practices in agricultural and residential areas involves considering the cost-efficiency of specific practices. **Table 5.8** indicates the cost-efficiencies of the practices proposed in this IP. Practices with high cost-efficiencies, relative to other practices, will provide the greatest benefit per dollar invested.

Stakeholders and Their Role in Implementation

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

The Scott County, Daniel Boone and Clinch Valley SWCDs will be in charge of initiating contact with farmers and homeowners in the impaired watershed to encourage the installation of agricultural and residential BMPs. This one-on-one contact will facilitate communication of the water quality problems and the corrective actions needed. The Scott County, Daniel Boone, and Clinch Valley SWCDs staff will conduct outreach activities in the watershed to garner the participation and community support necessary to reach implementation milestones, and to make the community aware of the water quality impairments present in the Clinch River and Cove Creek Watershed and how they may affect local residents. Such activities will include information exchange through newsletters, mailings, field days, organizational meetings, etc. The Scott County, Daniel Boone and Clinch Valley SWCDs staff will work with appropriate organizations (such as VCE) to educate the public.

In the Commonwealth of Virginia, water quality problems are dealt with through legislation, incentive programs, education, and legal actions. The agencies regulating

activities that impact water quality in Virginia include: DEQ, DCR, Virginia Department of Agriculture and Consumer Services (VDACS), DMME and VDH.

Achieving the goals of this IP (*i.e.*, improving water quality and removing these waters from the Section 303(d) list) is dependent on stakeholder participation – not only the local citizens needing agricultural control measures or residential waste treatment facilities, but also all citizens living in the watershed. It must be acknowledged first that there is a water quality problem, and changes must be made as needed in operations, programs, and legislation to address these pollutants. Local citizens can become involved by picking up after their pets, properly maintaining their septic systems, becoming water quality monitoring volunteers and volunteering to distribute information and educate others at public events.

Potential Funding

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

- Federal Clean Water Act Section 319(h) Funds
- Community Development Block Grant Program (CDBG)
- Conservation Reserve Program (CRP)
- Conservation Reserve Enhancement Program (CREP)
- USDA Environmental Quality Incentives Program (EQIP)
- Regional Conservation Partnership Program (RCPP)
- USDA Wildlife Habitat Incentive Program (WHIP)
- Clean Water State Revolving Fund (CWSRF)
- Virginia Agricultural Best Management Practices Cost-Share Program (VACS)
- Virginia Agricultural Best Management Practices Tax Credit Program
- Virginia Small Business Environmental Assistance Fund Loan Program
- Virginia Water Quality Improvement Fund (WQIF)
- Southeast Rural Community Assistance Project (SE/R-CAP)
- National Fish and Wildlife Foundation (NFWF)

Implementation is scheduled to occur in two main stages. The first stage involves implementation of the most cost-effective control measures. Once the measures included in this stage are implemented, it is hoped that the level of *E. coli* in these streams will be good enough to remove them from the State's impaired waters list. Stage II describes the

remainder of the control measures required to achieve the targeted pollutant load reductions and achieve the reductions called for in the TMDL studies.

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

1. INTRODUCTION

1.1 Background

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

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

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

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

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 Commonwealth of Virginia has found that many stream segments do not meet state water quality standards for protection of the six beneficial uses: recreation/swimming, aquatic life, wildlife, fish consumption, shellfish consumption, and public water supply (drinking).

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

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

1.2 Clinch River and Cove Creek Watershed Recreation Use Impairments

The Clinch River and Cove Creek TMDL study area consists of five (5) TMDL watersheds. Refer to Figure 1.2 for a map showing their boundaries and the impairments they contain. Refer to **Table 1.1** for a listing of the impairments included in each modeling group.

There are eleven (11) different impaired segments in this study area. The impaired segments are on the following streams: Clinch River, Cove Creek, Stock Creek, Moll Creek, Valley Creek, Blackwater Creek, Copper Creek and North Fork Clinch River. In the sections below, each impaired segment is described. The TMDL watershed names are the reference names used in this document, which includes the respective streams associated with each TMDL watershed in Table 1.1.

Table 1.1 Impairments within the Clinch River and Cove Creek Watershed and the TMDL watersheds used for modeling.

TMDL Watershed	Stream Name	Impairment ID
Blackwater Creek	Blackwater Creek	VAS-P16R_BKW01A02
Clinch River	Clinch River	VAS-P13R_CLN01A02
N. Fork Clinch River	N. Fork Clinch River	VAS-P15R_NFC01B00
	N. Fork Clinch River	VAS-P15R_NFC01B08
	N. Fork Clinch River	VAS-P15R_NFC01C02
Stock Creek	Stock Creek	VAS-P13R_STO01A00
	Cove Creek	VAS-P13R_COV01B08
Moll Creek	Moll Creek	VAS-P14R_MOL01A08
	Copper Creek	VAS-P14R_COP02B08
	Copper Creek	VAS-P14R_COP03A02
	Valley Creek	VAS-P14R_VAL01A02

1.2.1 Clinch River (VAS-P13R_CLN01A02)

The Clinch River in Russell and Scott Counties flows southwest before it reaches the Virginia/Tennessee state line.

The Clinch River is listed as impaired from the Copper Creek confluence near Speers Ferry downstream to the Tennessee state line near Shelby (9.69 stream miles) on the 2012 303(d) list for not supporting the recreation/swimming use. DEQ monitoring at station 6BCLN206.70 showed an 11.1% *E. coli* bacteria standard violation rate in the 2012 305(b) assessment.

1.2.2 Blackwater Creek (VAS-P16R_BKW01A02)

Blackwater Creek in Lee County flows in a horseshoe bend pattern before it reaches the Virginia/Tennessee state line.

Blackwater Creek is listed as impaired from East Fork Blackwater Creek confluence downstream to the Tennessee state line (2.11 stream miles) on the 2012 303(d) list as impaired for not supporting the recreation/swimming use. DEQ monitoring at station 6BBKW005.82 showed a 66% *E. coli* bacteria standard violation rate in the 2012 305(b) assessment.

1.2.3 Cove Creek (VAS-P13R_COV01B08)

Cove Creek in Scott County flows southeast before its confluence with the Clinch River. Cove Creek from its confluence with Millstone Branch to confluence with Clinch River north of Starnes Slant (6.94 stream miles) was listed as impaired on the 2012 303(d) list for not supporting the recreation/swimming use. DEQ monitoring station 6BCOV001.68 had an *E. coli* bacteria standard violation rate of 35% in the 2010 assessment.

1.2.4 Stock Creek (VAS-P13R_STO01A00)

Stock Creek, in Scott County, flows south before its confluence with the Clinch River. Stock Creek from stream mile 4.56 downstream to the Clinch River confluence at Clinchport (4.51 stream miles) was listed as impaired on the 2010 303(d) list for not supporting the recreation/swimming use. DEQ monitoring station 6BSTO000.45, had an *E. coli* bacteria standard violation rate of 40% in the 2010 assessment.

1.2.5 Copper Creek (VAS-P14R_COP02B08)

Copper Creek, in Russell and Scott Counties flows southwest before its confluence with the Clinch River. Copper Creek from the Grassy Creek confluence upstream to beginning of WQS Class V waters (9.70 stream miles) was listed as impaired on the 2012 303(d) list for not supporting the recreation/swimming use. DEQ monitoring station 6BCOP047.75 had an *E. coli* bacteria violation rate of 41.2% in the 2012 assessment.

1.2.6 Copper Creek (VAS-P14R_COP03A02)

The Copper Creek impaired segment is from mile 52.5 through Dickensonville upstream to mile 56.8 (4.3 stream miles) was listed as impaired on the 2012 303(d) list for not supporting the recreation/swimming use. DEQ monitoring station 6BCOP052.77 had an *E. coli* bacteria violation rate of 44.4% in the 2012 assessment.

1.2.7 Moll Creek (VAS-P14R_MOL01A08)

Moll Creek in Russell County flows southwest before its confluence with Copper Creek. Moll Creek from Copper Creek to second tributary, includes Porter Hollow (4.20 stream miles) was listed as impaired on the 2012 303(d) list for not supporting the recreation/swimming use. DEQ monitoring station 6BMOL000.03 had a violation rate of 61.1% in the 2012 assessment.

1.2.8 Valley Creek (VAS-P14R_VAL01A02)

Valley Creek in Scott County flows south before its confluence with Copper Creek. Valley Creek from near Farley Chapel to confluence with Copper Creek (1.01 stream miles) was listed as impaired on the 2012 303(d) list of impaired waters for not supporting the recreation/swimming use. DEQ monitoring station 6BVAL000.25 had a bacteria standard violation rate of 38.9% in the 2012 assessment.

1.2.9 North Fork Clinch River (VAS-P15R_NFC01B00)

The North Fork Clinch River in Lee and Scott Counties flows southwest before it's confluence with the Clinch River. North Fork Clinch River from the Pattonsville Branch confluence downstream to the Cox Branch confluence (7.62 stream miles) was listed as impaired on the 2012 303(d) list of impaired waters for not supporting the recreation/swimming use. DEQ monitoring station 6BNFC010.65 had a bacteria standard violation rate of 50% in the 2012 assessment.

1.2.10 North Fork Clinch River (VAS-P15R_NFC01B08)

The North Fork Clinch River from Fraley Branch confluence downstream to the Pattonsville Branch confluence (3.39 stream miles) was listed as impaired on the 2012

303(d) list for not supporting the recreation/swimming use. DEQ monitoring station 6BNFC018.68 had a 35% violation rate in the 2012 assessment.

1.2.11 North Fork Clinch River (VAS-P15R_NFC01C02)

The North Fork Clinch River from the Cox Branch confluence near Fairview downstream to Tennessee state line near Dona (5.59 stream miles) was listed as impaired on the 2012 303(d) list for not supporting the recreation/swimming use. DEQ monitoring station 6BNFC003.80 had a 45% violation rate in the 2012 assessment.

Figure 1.1 shows the location of the impairments and TMDL watersheds in the Clinch River and Cove Creek TMDL Watershed. Each TMDL watershed correlates to a TDML equation and an allocated load. **Table 1.2** details the impairments in the Clinch River and Cove Creek TMDL Watershed included in this study.

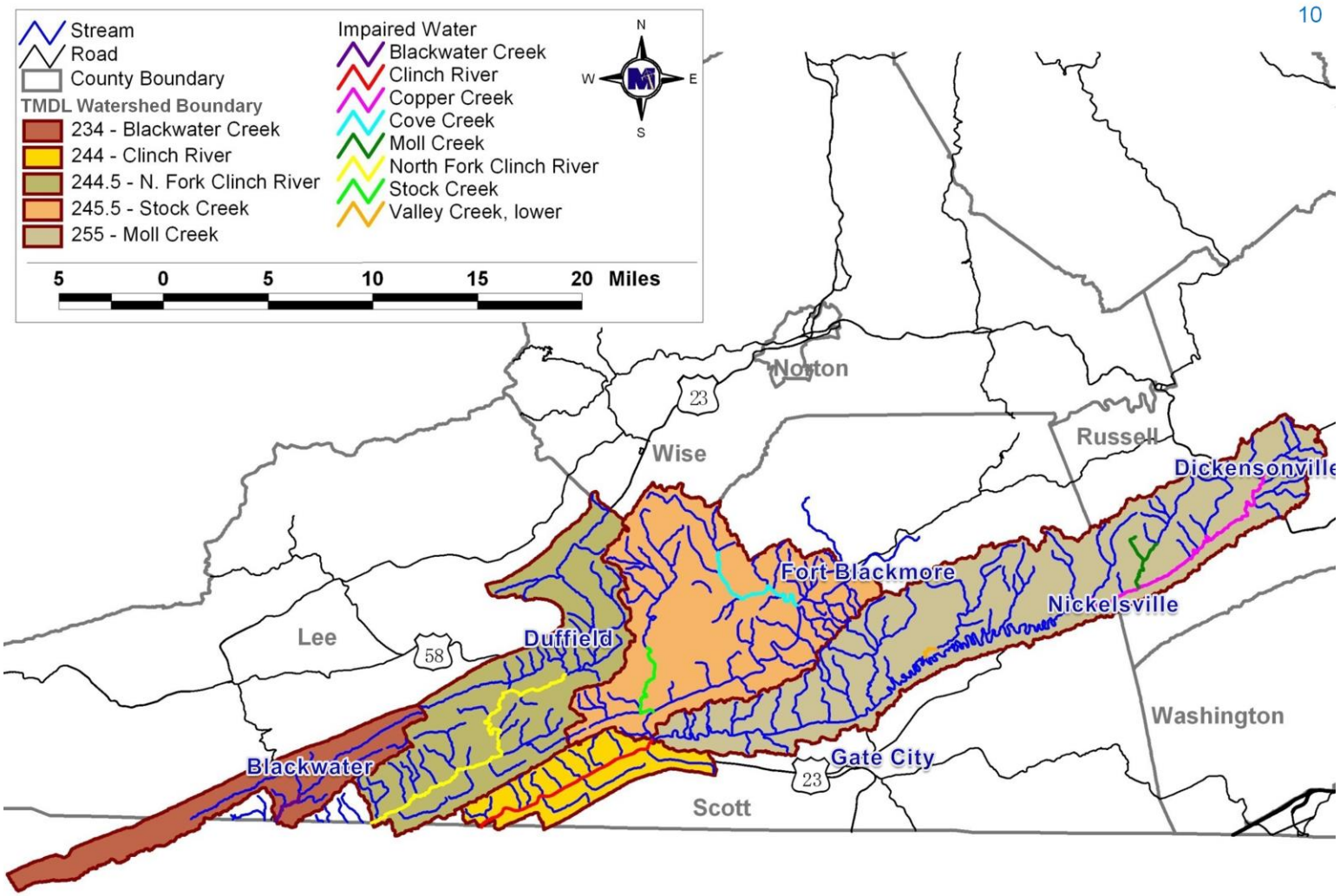

Figure 1.1 The impaired segments and TMDL watershed in the Clinch River and Cove Creek Watershed.

Table 1.2 Impairments within the Clinch River and Cove Creek Watershed included in this study.

Stream Name Impairment ID	Impairment(s) Contracted	Initial Listing Year	2012 River Miles	2012 Listing Violation%	Impairment Location Description
Clinch River VAS-P13R_CLN01A02	*E. coli*	2008	9.69	10.53 EC	From the Copper Creek confluence near Speers Ferry downstream to the Tennessee state line near Shelby.
Blackwater Creek VAS-P16R_BKW01A02	*E. coli*	2008	2.11	66 EC	From East Fork Blackwater Creek confluence downstream to the Tennessee state line.
Cove Creek VAS-P13R_COV01B08	E. coli	2008	6.94	44 EC	From its confluence with Millstone Branch to confluence with Clinch River north of Starnes Slant.
Stock Creek VAS-P13R_STO01A00	*E. coli*	2008	4.51	44 EC	From stream mile 4.56 downstream to the Clinch River confluence at Clinchport.
Copper Creek VAS-P14R_COP02B08	*E. coli*	2008	9.70	55 EC	From the Grassy Creek confluence upstream to beginning of WQS Class V waters.
Copper Creek VAS-P14R_COP03A02	*E. coli*	2008	4.3	44 EC	From mile 52.5 through Dickensonville upstream to mile 56.8.
Moll Creek VAS-P14R_MOL01A08	*E. coli*	2008	4.20	55 EC	From Copper Creek upstream, to second tributary, includes Porter Hollow.
Valley Creek VAS-P14R_VAL01A02	*E. coli*	2008	1.01	22 EC	From near Farley Chapel to confluence with Copper Creek.
North Fork Clinch River VAS-P15R_NFC01B00	*E. coli*	2008	7.62	55 EC	From the Pattonsville Branch confluence downstream to the Cox Branch confluence.
North Fork Clinch River VAS-P15R_NFC01B08	*E. coli*	2008	3.39	33 EC	From Fraley Branch confluence downstream to the Pattonsville Branch confluence.
North Fork Clinch River VAS-P15R_NFC01C02	*E. coli*	2010	5.59	44 EC	From the Cox Branch confluence near Fairview downstream to Tennessee state line near Dona.

EC - Based on the instantaneous *E. coli* standard of 235 cfu/100mL

Eight land uses were identified in the watershed. These land uses were obtained by merging different sources including the Multi-Resolution Land Characteristics Consortium (MRLC) land use grid and aerial photography of the region. The eight land use types are given in **Table 1.3**. Within each subwatershed, up to the ten land use types were represented. Each land use in each subwatershed has hydrologic parameters (*e.g.*, average slope length) and pollutant behavior parameters (*e.g., E. coli* accumulation rate) associated with it. These land use types are represented in HSPF as pervious land segments (PERLNDs) and impervious land segments (IMPLNDs). Impervious areas in the watershed are represented in four IMPLND types, while there are ten PERLND types, each with parameters describing a particular land use. Some IMPLND and PERLND parameters (*e.g.*, slope length) vary with the particular subwatershed in which they are located. Others vary with the season (*e.g.*, upper zone storage) to account for plant growth, die-off, and removal.

Figure 1.2 shows the land uses used in modeling the Clinch River and Cove Creek Watershed study area. **Table 1.4** shows the breakdown of land uses within the drainage area of each impairment.

Table 1.3 Consolidated land use categories for the Clinch River and Cove Creek Watershed study area drainage area used in HSPF modeling.

TMDL Land use Categories	Pervious / Impervious (%)
Barren	Pervious (94%) Impervious (6%)
Cropland	Pervious (100%)
Developed	Pervious (90%) Impervious (10%)
Forest	Pervious (100%)
Pasture	Pervious (100%)
Grassland	Pervious (100%)
Wetland	Pervious (100%)
Water	Pervious (100%)

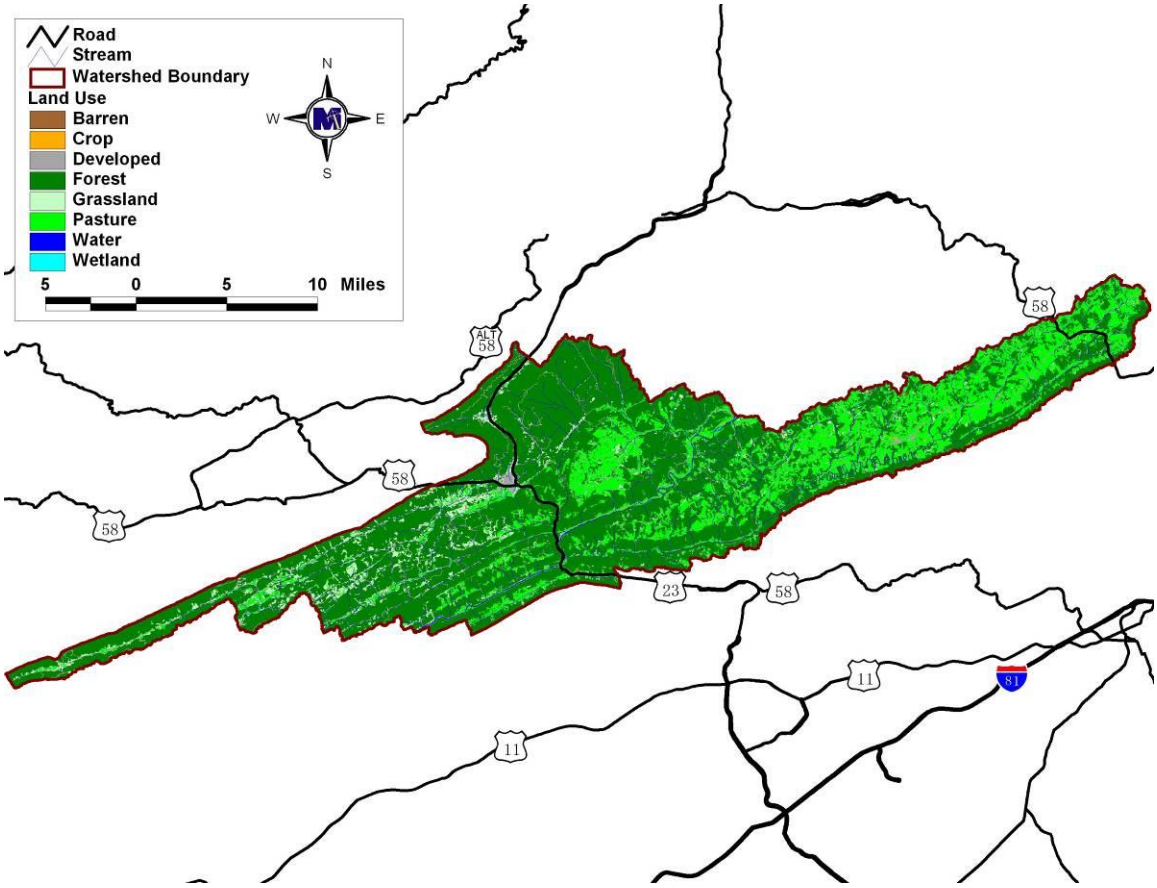

Figure 1.2 Land uses in the Clinch River and Cove Creek Watershed study area.

Table 1.4 Spatial distribution of land use types in acres in the Clinch River and Cove Creek Watershed study area.

Watershed	Water	Developed	Barren	Forest	Grassland	Pasture	Cropland	Wetland
Blackwater Cr	1.11	982.54	28.24	17,288.53	2,395.19	1,325.47	11.56	5.12
Clinch R	106.30	930.94	31.14	11,485.58	713.44	2,539.30	0.00	26.91
NF Clinch R	0.00	3,756.69	140.55	40,247.91	6,012.22	1,963.75	0.00	10.90
Stock Cr	115.65	2,481.70	38.92	44,868.83	1,946.84	10,947.83	64.27	82.06
Moll Cr	0.00	4,455.24	137.00	43,387.45	2,485.04	34,789.23	69.16	7.12
Total	**223.06**	**12,607.12**	**375.85**	**157,278.30**	**13,552.74**	**51,565.58**	**145.00**	**132.10**

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

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

1.3 Applicable Water Quality Standards

According to 9 VAC 25-260-5 of Virginia's State Water Control Board *Water Quality Standards*, the term "water quality standards" means "…provisions of state or federal law which consist of a designated use or uses for the waters of the Commonwealth and water quality criteria for such waters based upon such uses. Water quality standards are to protect the public health or welfare, enhance the quality of water and serve the purposes of the State Water Control Law and the federal Clean Water Act".

As stated in Virginia state law 9 VAC 25-260-10 (Designation of uses),

> *A. All state waters, including wetlands, are designated for the following uses: recreational uses, e.g., swimming and boating; the propagation and growth of a balanced, indigenous population of aquatic life, including game fish, which might reasonably be expected to inhabit them; wildlife; and the production of edible and marketable natural resources, e.g., fish and shellfish.*
>
> *E. At a minimum, uses are deemed attainable if they can be achieved by the imposition of effluent limits required under §§ 301(b)(1)(A) and (B) and*

306 of the Clean Water Act and cost-effective and reasonable best management practices for nonpoint source control.

Virginia's current bacterial standard uses *E. coli* and *enterococci* as bacterial indicators. *E. coli* and *enterococci* are both bacteriological organisms that can be found in the intestinal tract of warm-blooded animals; there is a strong correlation between these and the incidence of gastrointestinal illness. Like fecal coliform bacteria, these organisms indicate the presence of fecal contamination. Prior to January 2003, Virginia's water quality standard in fresh water for swimming/recreational use was based on fecal coliform rather than *E.coli.* The change was based on EPA's recommendation that all states adopt an *E. coli* or *enterococci* standard for fresh water and *enterococci* criteria for marine waters by 2003. The EPA pursued the states' adoption of these standards because there is a stronger correlation between the concentration of these organisms (*E. coli* and *enterococci*) and the incidence of gastrointestinal illness than with fecal coliform.

The criteria which were used in developing the bacteria TMDLs that are the subject of this study are outlined in Section 9 VAC 25-260-170 and read as follows:

A. The following bacteria criteria (colony forming units (CFU)/100 ml) shall apply to protect primary contact recreational uses in surface waters, except waters identified in subsection B of this section:

E.coli bacteria shall not exceed a monthly geometric mean of 126 CFU/100 ml in freshwater.

Enterococci bacteria shall not exceed a monthly geometric mean of 35 CFU/100 ml in transition and saltwater.

1. See 9VAC25-260-140 C for boundary delineations for freshwater, transition and saltwater.

2. Geometric means shall be calculated using all data collected during any calendar month with a minimum of four weekly samples.

3. If there are insufficient data to calculate monthly geometric means in freshwater, no more than 10.5% of the total samples in the assessment period shall exceed 235 E.coli CFU/100 ml .

4. If there are insufficient data to calculate monthly geometric means in transition and saltwater, no more than 10% of the total samples in the assessment period shall exceed enterococci 104 CFU/100 ml.

5. *For beach advisories or closures, a single sample maximum of 235 E.coli CFU/100 ml in freshwater and a single sample maximum of 104 enterococci CFU/100 ml in saltwater and transition zones shall apply.*

1.3.1 Wildlife Contributions

In some streams for which TMDLs have been developed, water quality modeling indicates that even after removal of all sources of *E. coli* (other than wildlife), the stream will not attain standards. TMDL allocation reductions of this magnitude are not realistic and do not meet USEPA's guidance for reasonable assurance. Based on the water quality modeling, many of these streams will not be able to attain standards without some reduction in wildlife. However, Virginia and USEPA are not proposing the reduction of wildlife to allow for the attainment of water quality standards. This is obviously an impractical action. While managing over-populations of wildlife remains as an option to local stakeholders, the reduction of wildlife or changing a natural background condition is not the intended goal of a TMDL. In such a case, after demonstrating that the source of *E. coli* contamination is natural and uncontrollable by effluent limitations and BMPs, the state may decide to re-designate the stream's use for secondary contact recreation or to adopt site specific criteria based on natural background levels of *E. coli*. The state must demonstrate that the source of *E. coli* contamination is natural and uncontrollable by effluent limitations and BMPs through a Use Attainability Analysis (UAA). All site-specific criteria or designated use changes must be adopted as amendments to the water quality standards regulations. Watershed stakeholders and USEPA will be able to provide comment during this process.

1.4 Project Methodology

The overall goal of this project was to begin the process of restoring water quality in the Clinch River and Cove Creek impaired stream segments.

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

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

2. STATE AND FEDERAL REQUIREMENTS FOR IMPLEMENTATION PLANS

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

2.1 State Requirements

Implementation of TMDLs 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 expeditiously implement TMDLs. An Implementation Plan (IP) shows how fully supporting status for impaired waters can be achieved and the pollutant load reductions established in the TMDL studies can thereby be met. In order for IPs to be approved by the Commonwealth, they must meet the requirements as outlined by WQMIRA. WQMIRA requires that IPs include the following:

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

2.2 Federal Recommendations

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

The listed elements include:

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

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

2.3 Section 319 Funding Eligibility Requirements

The USEPA 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 (DCR & DEQ, 2003):

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

3. REVIEW OF TMDL DEVELOPMENT

MapTech, Inc. was contracted to develop *E. coli* bacteria TMDLs for the Clinch River and Cove Creek Watershed. The TMDLs were completed in September 2013, revised and approved by the USEPA in April 2014. The TMDL documents are posted at the Virginia Department of Environmental Quality website, www.deq.virginia.gov. The *E. coli* load reductions called for in the TMDL studies were reviewed to determine the water quality goals and associated pollutant reductions that would need to be addressed through the development of the Implementation Plan.

3.1 Water Quality Modeling

In order to understand the implications of the load allocations determined during TMDL development, it is important to understand the modeling methods used in the analysis.

3.1.1 Fecal Bacteria Modeling

The USGS Hydrologic Simulation Program - Fortran (HSPF) water quality model was used as the modeling framework to simulate hydrology and fecal coliform fate and transport for the bacteria TMDL allocations. The water quality endpoint used for determining the necessary reduction to *E. coli* loads was the monthly geometric mean standard (126 cfu/100 mL), with an implicit margin of safety.

Five (5) individual point sources are permitted to discharge to surface waterbodies in the Clinch River and Cove Creek Watershed study area through the Virginia Pollutant Discharge Elimination System (VPDES). These are listed in **Table 3.1**. The use of "UT" in this table refers to unnamed tributaries. Permitted point discharges that may contain pathogens associated with fecal matter are required to maintain an *E. coli* concentration below 126 cfu/100mL, the current standard. One method for achieving this goal is chlorination. Chlorine is added to the discharge stream at levels intended to kill pathogens. The monitoring method for ensuring the goal is to measure the concentration of total residual chlorine (TRC) in the effluent. Typically, if minimum TRC levels are met, bacteria concentrations are reduced to levels well below the standard.

Table 3.2 shows 35 domestic general permits within the Clinch River and Cove Creek Watershed study area. These permits allow treated residential wastewater to be discharged to surface waters. All of these permitted systems discharge water and bacteria to the streams. **Figure 3.1** shows the VPDES permit locations within the watershed. **Figure 3.2** shows the location of the domestic general permits within the Clinch River and Cove Creek Watershed study area.

There are no VPDES Animal Feeding Operations (AFOs) or Virginia Pollution Abatement (VPA) facilities in the study area.

Table 3.1 Summary of VPDES permitted point sources permitted for fecal bacteria control in the Clinch River and Cove Creek Watershed study area.

Permit	Receiving Stream(s)	Facility Name	Permitted for *E. coli* control
VA0066311	Culbertson Branch	Scott County Schools - Twin Springs High	Y
VA0087955	Copper Creek	Nickelsville WWTP	Y
VA0029564	North Fork Clinch River	Duffield Industrial Park WWTP	Y
VA0065471	North Fork Clinch River X-Trib	Empire Mobile Home Park STP	Y
VA0064009	North Fork Clinch River	Beeline Mobile Home Park STP	Y

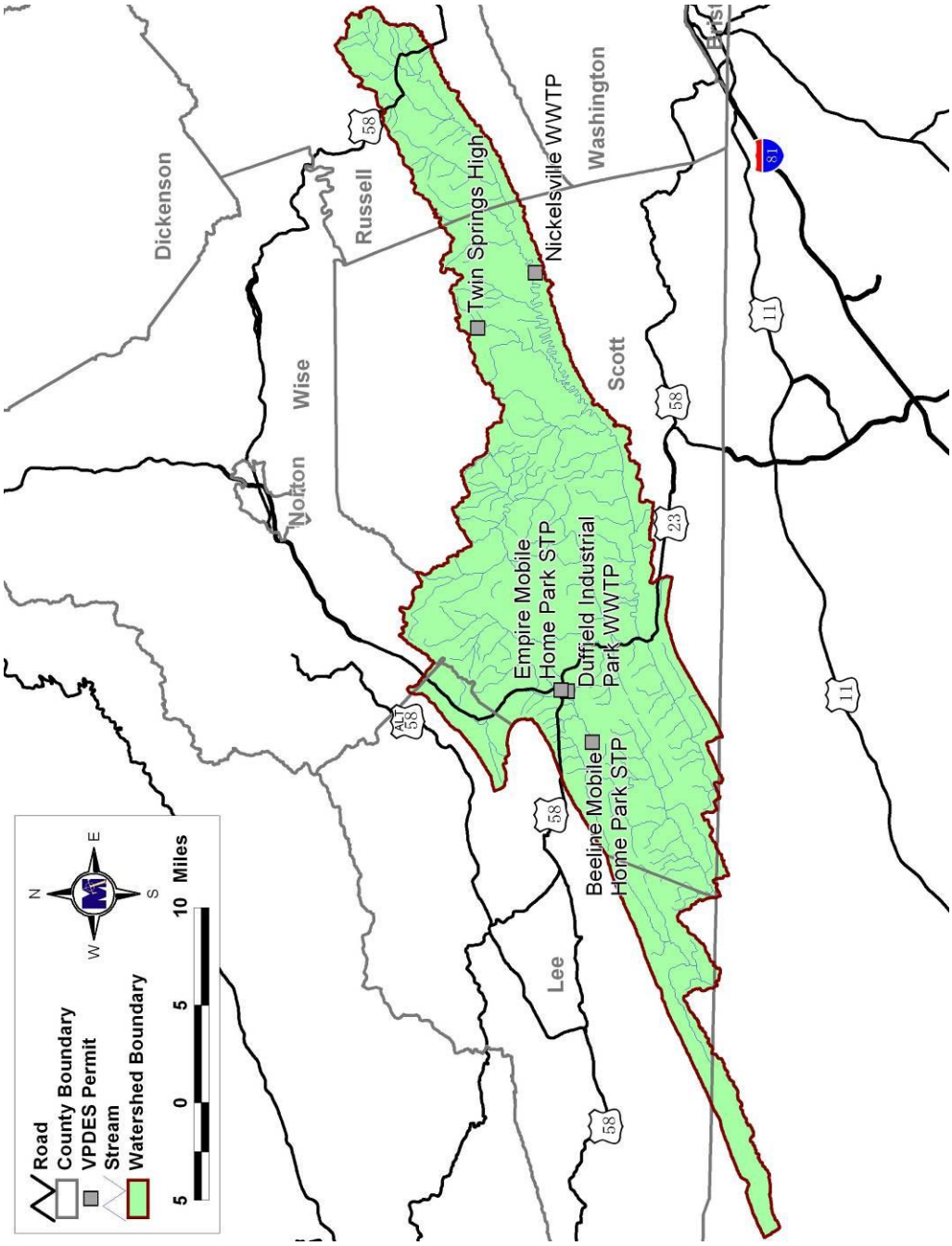

Figure 3.1 Location of the VPDES permits within the Clinch River and Cove Creek Watershed study area.

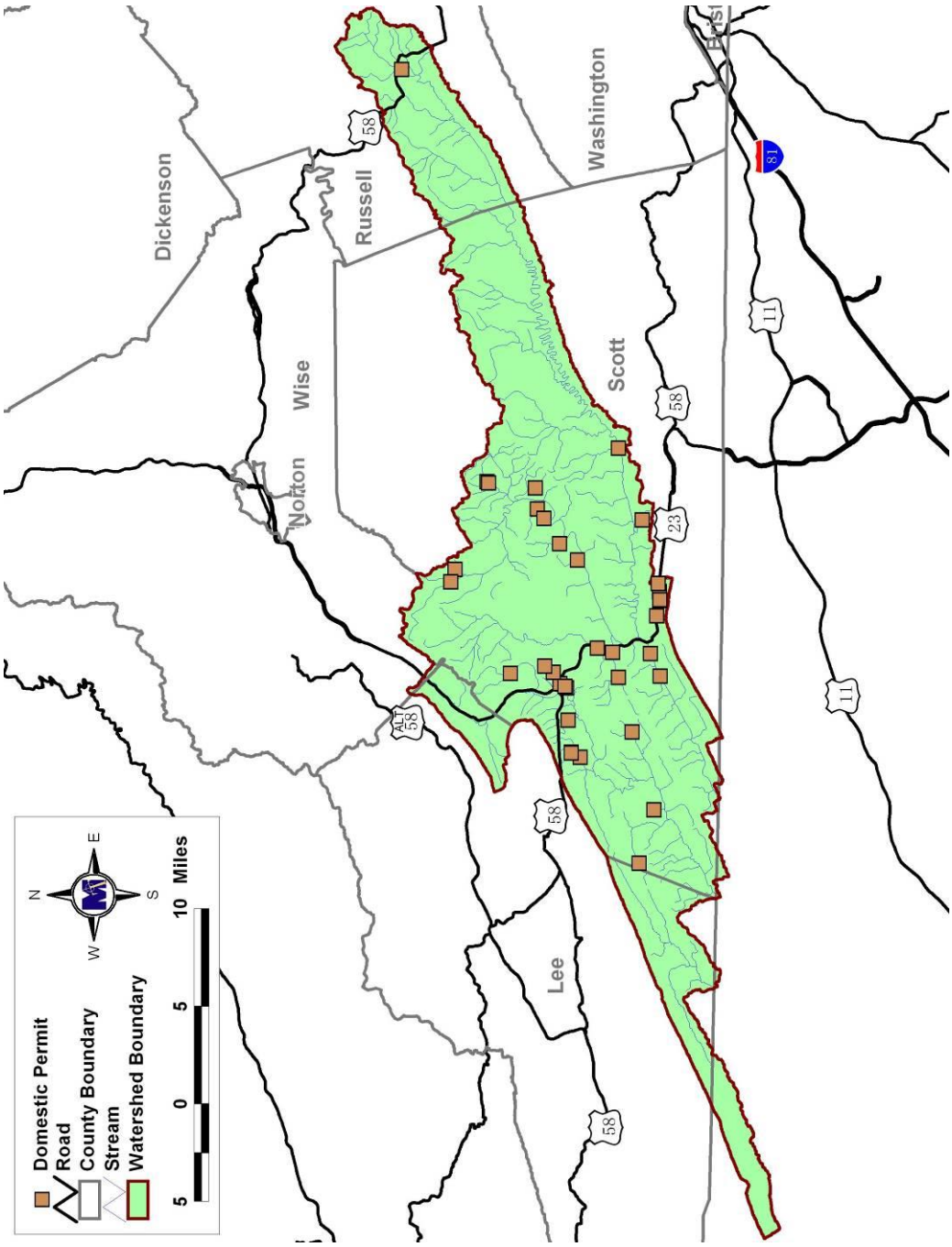

Figure 3.2 Location of the domestic general permits within the Clinch River and Cove Creek Watershed study area.

Table 3.2 Single family home permits in the Clinch River and Cove Creek Watershed study area.

Permit	Receiving Stream	Facility Type
VAG400739	Hobbs George and Phyllis Residence STP	Domestic
VAG400083	Bledsoe George Residences STP	Domestic
VAG400632	Reed Deloris A Residence STP	Domestic
VAG400010	Austin Bobby Residence STP	Domestic
VAG400097	Hickam Margaret Residence STP	Domestic
VAG400162	Rogers Douglas Q Residences STP	Domestic
VAG400237	Stewart Allie Residence STP	Domestic
VAG400241	Fincham Joyce Residence STP	Domestic
VAG400282	Holland Richard Residence STP	Domestic
VAG400448	Bowen Billy T and Michelle Residence STP	Domestic
VAG400514	Holden Edward V Residence STP	Domestic
VAG400651	McKinney Teresa Rhea Residence STP	Domestic
VAG400689	Sturgill Kenneth Residence STP	Domestic
VAG400008	Arnold Julia F Residence SFH STP	Domestic
VAG400037	Calhoun Jimmy Residence STP	Domestic
VAG400084	Gibson Monnie Residence STP	Domestic
VAG400332	Lane Rentals STP	Domestic
VAG400650	Quillen Keith Residence STP	Domestic
VAG400683	Bryan WIlliam J and Hazel B Residences STP	Domestic
VAG400723	Mullins Daniel Residence STP	Domestic
VAG400153	Ramey Stella Residence STP	Domestic
VAG400158	Carter Jimmy and Melinda Residence STP	Domestic
VAG400203	Warren Frederick C Residence STP	Domestic
VAG400310	Wolfe Lynn Residence STP	Domestic
VAG400742	Sherron Hugh Residence STP	Domestic
VAG400459	Lane Reggie Residence STP	Domestic
VAG400860	Murdock Vickie Residence STP	Domestic
VAG400528	Hunter Randall Residence STP	Domestic
VAG400562	Hilton Residences STP	Domestic
VAG400676	Dorton Bonnie Residence STP	Domestic
VAG400602	Johnson Richard Residence STP	Domestic
VAG400799	McNew Fred Residence STP	Domestic
VAG400147	Owens Dennis Residence STP	Domestic
VAG400354	Copper Creek Community Church STP	Domestic
VAG400661	Salyer Roger K and Mary Residence STP	Domestic

Both urban and rural nonpoint sources of *E. coli* bacteria were considered in water quality modeling. Sources included residential sewage treatment systems, land application of waste,

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

3.1.2 *E. coli* Model Allocations

Several model runs were made investigating scenarios that would meet the monthly geometric mean TMDL goal of 126 cfu/100mL (includes an implicit margin of safety). The final load reductions are shown in **Table 3.3**.

Table 3.3 *E. coli* load reductions allocated during TMDL development for the Clinch River and Cove Creek Watershed.

	Percent Reductions to Existing Bacteria Loads					
Watershed	**Straight Pipes**	**Residential[2]**	**Livestock Direct**	**Agricultural (Crop & Pasutre)**	**Wildlife Direct**	**Forest**
Clinch River	100	63	99	0	0	0
Blackwater Creek	100	13	99	0	0	0
NF Clinch River	100	100	99	13	0	0
Stock Creek	100	0	17	0	0	0
Moll Creek	100	15	99	0	0	0

[2] Failing septic system. Pet

Since state law requires that failing septic systems and straight pipes be corrected, a 100% reduction in bacteria from these sources is needed. In addition, the final allocation scenario calls for a 17 - 99% reduction of direct in-stream loading from livestock, a 0 - 13% reduction of the *E. coli* loading from agricultural land, a 0 - 100% reduction of the *E. coli* loading from residential land uses, and no reductions from wildlife sources.

3.2 Implications of TMDL and Modeling Procedure on Implementation Plan Development

The major implication in the development of these TMDLs is that large reductions are required to achieve the water quality standard. All uncontrolled discharges, failing septic systems, leaking sewer lines, and overflows must be identified and corrected; livestock must be excluded from streams and much of the residential and rural nonpoint sources of fecal bacteria must be reduced.

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.

These TMDLs included straight pipes and failing septic systems in the total bacteria load to the streams. The number of straight pipes (665) and failing septic systems (191) in the study area were estimated. In instances where currently available data was different than data in the TMDL report, the best available data was used to quantify corrective actions and develop cost estimates.

4. PUBLIC PARTICIPATION

Public participation was an integral part of the TMDL Implementation Plan development, and is critical to promote reasonable assurances that the implementation activities will occur. Attendance was encouraged through email, phone calls and notices sent to the Virginia Register.

4.1 Public Meetings for the Clinch River and Cove Creek Watershed

Two sets of public meetings were held for the project. The first set of public meetings were held simultaneously at the Crooked Road Tech Center in Duffield, VA and at the Senior and Community Building at Keith Memorial Park in Nickelsville, VA on March 10, 2016. The meetings were publicized in the Virginia Register, and were attended by twenty (20) people, including, citizens, government agents and two consultants. Information delivered to the public at the meetings included a general description of the TMDL process, a more detailed description of TMDL development and IP development, and a solicitation for participation in working groups.

The final set of public meetings was held on November 17, 2016, simultaneously, at the Crooked Road Tech Center in Duffield, VA and at the Senior and Community Building at Keith Memorial Park in Nickelsville, VA. The primary purpose of these meeting was to present the final TMDL Implementation Plan. A presentation was given describing the Implementation Plan using major components as an outline: Review of TMDL development, public participation, assessment of needs, cost/benefit analysis, and implementation.

In addition to the public meetings, a steering committee, and combined specialized working groups (agricultural/residential and government) were assembled from communities of people with common concerns regarding the TMDL process. The working groups served as the primary arena for seeking public input on implementation actions to be included in the plan, associated costs and outreach methods. The steering committee reviewed reports from each of the working groups and helped to guide the overall development of the Implementation Plan. A representative of the Virginia Department of Environmental Quality (DEQ) directed each working group and steering committee meeting in order to facilitate the

process and integrate information collected from the various communities. The minutes from each of the working groups and the steering committee are included in Appendix A.

The specialized working groups (agricultural/residential and government) also played an important role in the development of the plan. The role of the Agricultural and Residential Working Group (AGRWG) was to review implementation from an agricultural perspective, identify any obstacles (and solutions) related to BMP implementation, and to provide estimates on the type, number, and costs of BMPs. The residential section discussed methods needed to reduce human and pet sources of bacteria entering the Clinch River and Cove Creek Watershed, recommended methods to identify and correct or replace failing septic systems and straight pipes, and provide input on the BMPs to include in the plan. The goals of the Government Working Group (GWG) was to identify regulatory controls currently in place in the watershed that may help to improve water quality (*e.g.*, livestock stream access and sewer line connections), to identify existing programs and technical resources that may enhance implementation efforts, and to propose additional programs that would support implementation.

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

Table 4.1 Meetings held pertaining to the Clinch River and Cove Creek Watershed TMDL Implementation Plan development.

Date	Meeting Type	Location	Attendance
March 10, 2016	Public Meetings	Crooked Road Tech Center Duffield, VA Senior and Community Building Nickelsville, VA	20
March 24, 2016	Agricultural and Residential Working Group	Senior and Community Building Nickelsville, VA	5
April 13, 2016	Government Working Group	Scott County SWCD Office Gate City, VA	12
October 27, 2016	Steering Committee	Crooked Road Tech Center Duffield, VA	6
November 17, 2016	Final Public Meetings	Crooked Road Tech Center Duffield, VA Senior and Community Building Nickelsville, VA	11

4.1.1 Agricultural and Residential Working Group

The Agricultural and Residential Working Group (ARWG) meetings were held jointly. The meeting occurred on March 24, 2016 at the Senior and Community Building at Keith Memorial Park in Nickelsville, VA. The members consisted of citizens from the watershed, representatives from the Town of Nickelsville, County Public Service Authorities, The Nature Conservancy, Virginia Department of Forestry, and DEQ. The agricultural discussion focused on the current status of agriculture in the watershed, obstacles to participation in conservation practices, and better ways to promote these practices. The residential discussion covered the current state of sewage treatment in the area, better ways to approach residents with potential improvements, and potential sources of funding.

4.1.2 Government Working Group

The Government Working Group (GWG) meeting took place on April 13, 2016. The group considered local programs contributing to the control of bacterial pollution from residential, industrial/commercial, and agricultural sources. There was some discussion regarding livestock numbers. It was stated that the dairy numbers were too high, and that there was only one known dairy with 25 milk cows in Scott County. Additionally, it was suggested that the cattle and sheep numbers may be disproportionally high, relative to the numbers in

Scott County. However, the existing estimates were based on the county numbers and calculated based on the proportion of pasture in the watershed. No alternative approach for calculating the numbers was suggested. Regarding agricultural BMPs, it was suggested that there is more willingness to implement BMPs than the current funding would support, and that there is some strictly voluntary (no cost assistance) work that has been done in the watershed, including some fencing livestock out of streams.

Regarding failing septic systems and straight pipes, no significant clusters of known problems were identified. It was suggested that the Nickelsville WWTP has had multiple overflows, however, no data were provided. Stakeholders indicated that there was only one known dog breeder in the area, and that pet waste was probably not a problem.

Approaches to gaining participation and funding sources were also discussed.

4.1.3 Steering Committee

The purpose of the Steering Committee was to provide guidance on the content and presentation of the final IP document and ensure that the working group recommendations were appropriately incorporated into the plan. The Steering Committee met on October 27, 2016 at the Crooked Road Tech Center in Duffield, Virginia. The minutes from the working groups and steering committee meetings can be found in Appendix A. The final public meeting presentation was also reviewed for input and comment from the committee.

4.2 Summary

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

5. ASSESSMENT OF IMPLEMENTATION ACTION NEEDS

An important part of the Implementation Plan is the identification of specific best management practices (BMPs) and associated technical assistance needed to improve water quality in the watershed. 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, the BMPs needed to meet the water quality goals established during the TMDL study are quantified.

5.1 Identification of Control Measures

Potential control measures or best management practices (BMPs), their associated costs and efficiencies, and potential funding sources were identified through review of the TMDL, input from Working Groups, and literature review. Control measures were assessed based on cost, availability of existing funds, reasonable assurance of implementation, and water quality impacts. Some control measures were indicated or implied by the TMDL allocations, while others were selected through a process of stakeholder review and analysis of effectiveness in the watershed. 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 fecal bacteria identified by the TMDL studies dictated some of the control measures that must be employed during implementation. In order to meet the reductions in direct bacteria deposition from livestock, some form of stream exclusion is necessary. Fencing is the most obvious choice. However, the type of fencing, its distance from the stream bank, and the most appropriate management strategy for the fenced pasture are less obvious. The 100% reduction in loads from straight pipes, failing septic systems, sewer leaks, and sewer overflows is a pre-existing legal requirement as well as a result of the TMDL. This reduction indicates that all illicit discharges (*i.e.*, straight pipes and cross-connections) in the watershed should be corrected, and that all onsite sewage treatment systems (OSTS) (*e.g.*, septic systems and alternative waste treatment systems) and sewer infrastructure must be maintained in proper working condition.

While it is recognized that farmers will want to minimize the cost of fencing and the amount of pasture lost, any fencing installed through the use of cost-share programs should follow established NRCS specifications and be located 35-ft from the stream bank, at a minimum, as specified in existing Virginia cost-share programs. This is particularly relevant in the North Fork Clinch River Watershed, where pollutant reductions in runoff from pasture are recommended.

An alternative water source will typically be required where pasture is fenced off from streams. The main criterion is that the system be dependable. Water systems alone (*i.e.*, with no streamside fencing) have been shown to reduce the amount of time cattle spend in the stream by as much as 50 to 80%. This is not a large enough reduction to meet all of the TMDLs. It should be restated here that it is recommended that all fencing, even that which is installed solely at the landowner's expense, be placed at least 35-ft from the stream. The wide buffer helps to reduce bacteria, as well as sediment loads in runoff. The incorporation of effective buffers 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 illness and exposure to swampy areas near streams. Additionally, intensive pasture management, which becomes possible with an alternative water source, has been shown to improve overall farm profitability and environmental impact. From a part-time farmer's perspective, the best management scenario is one that requires minimal input of time. This would seem to preclude intensive pasture management. However, those farmers who have adopted an intensive pasture-management system typically report that the additional management of the established system amounts to "opening a gate and getting out of the way" every couple of days. Additionally, the efficient use of the pasture often means that fewer supplemental feedings are necessary. Among

both part-time and full-time farmers there are individuals who are hesitant to allow streamside vegetation to grow unrestricted because of aesthetic preferences or because they have spent a lifetime preventing this growth. However, given the reductions needed in pollutant fecal bacteria delivery to the stream, a vegetated buffer would be beneficial. For planning purposes, it was assumed that a vegetated buffer would be established in conjunction with stream fencing.

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

5.1.2 Control Measures Selected through Stakeholder Review

In addition to the control measures that were directly indicated by the TMDL, a number of measures were needed to control fecal bacteria from land-based bacteria sources. Various scenarios were developed that began with implementation of the measures indicated by the TMDL. Next, specific sources of fecal bacteria were addressed where highly economic practices were identified. For instance, a residential pet waste program was specified to educate citizens on proper disposal of pet wastes, for all but the Stock Creek Watershed.

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

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

Currently, pasture management is implemented through the USDA EQIP program as prescribed grazing (528) and as BMP SL-10T in TMDL implementation project areas funded by DEQ. Funding is available as an incentive payment per acre when used in conjunction with the livestock exclusion systems and is considered an enhancement to grazing management. Employing pasture management can produce significant economic gains to producers at a very low investment cost.

The final set of control measures identified and the efficiencies used in this study to estimate needs are listed in **Table 5.1**. "Direct Reductions" are those that reduce the load of pollutant from a specific source to the stream itself or to the land. "Buffer" practices control pollutants through both a land conversion and treatment of runoff from an upstream area. "Runoff Treatment" measures are those that either treat runoff from a given land area (e.g., retention ponds) or treat runoff based on changing the runoff-producing characteristics of the land (e.g., improved pasture management).

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

Type Description	Bacteria Reduction Efficiency	Reference	Unit	Unit Cost
Agricultural BMPs				
Livestock Exclusion with Riparian Buffer (LE-1T)	100%	1	system	$20,600
Livestock Exclusion with Reduced Setback (LE-2T)	100%	1	system	$11,500
Stream Exclusion with Grazing Land Mgnt (CREP/SL-6)	100%	1	system	$20,000
Stream Protection (WP-2T)	100%	1	system	$3,400
Improved pasture management (SL-10T; EQIP 528)	50%	4,6	acre	$75
Residential BMPS				
Septic Tank Pump-Out (RB-1)	5%	2	system	$400
Septic System Installation/Replacement (RB-4)	100%	1,2	system	$6,500
Sewer System Connection (RB-2)	98%	1,4	system	$700
Alternative Waste Treatment System (RB-5)	98%	1,2	system	$20,000
Septic System Repair (RB-3)	100%	1,4	system	$3,500
Residential Rain Gardens	85%	9	acre-treated	$3,000
Infiltration Trench	90%	8,5	acre-treated	$6,000
Bioretention Basins	85%	7,6	acre-treated	$19,000
Pet Waste Education Program	75%	3	program	$3,750

Notes:

1. Removal efficiency is defined by the practice.
2. DCR and DEQ TMDL Implementation Plan Development Guidance Manual
3. Modified from Swann, C. 1999. A survey of residential nutrient behaviors in the Chesapeake Bay. Widener Burrows, Inc. Chesapeake Bay Research Consortium. Center for Watershed Protection. Ellicott City, MD. 112pp.
4. Commonwealth of Virginia. 2005. Chesapeake Bay Nutrient and Sediment Reduction Tributary Strategy. www.naturalresources.virginia.gov/Initiatives/TributaryStrategies/
5. Schwab, G.O., D.D. Fangmeier, W.J. Elliot, R.K. Frevert. 1992. Soil and Water Conservation Engineering, 4th Edition. Wiley.
6. Bacteria efficiency estimated based on sediment and nutrient efficiency
7. US EPA. "Storm Water Technology Fact Sheet Bioretention." (1999): 8.
8. US EPA. "Storm Water Technology Fact Sheet Infiltration Trench." (1999): 7
9. Hunt, William F, Jonathan T Smith, and Jon Hathaway. City of Charlotte Pilot BMP Monitoring Program , Mal Marshall Bioretention Final Monitoring Report. City of Charlotte, 2007.

5.2 Quantification of Control Measures

The quantity of control measures recommended during implementation was determined through spatial analyses, and modeling alternative implementation scenarios, as well as requests from Working Group members. Spatial analyses included the processing of data that included land use, census data, stream networks, and elevation, along with data archived in the DCR Agricultural BMP Database and TMDL development documents. The map layers and archived data were combined to establish the number of control measures recommended overall, in each watershed, and in each subwatershed, where appropriate. Estimates of the amount of on-site

treatment systems, sewer connections, streamside fencing and number of full livestock exclusion systems were made through these analyses. The quantities of additional control measures were determined through modeling alternative scenarios and applying the related reduction efficiencies to their associated loads.

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

5.2.1 Agricultural Control Measures

5.2.1.1 Livestock Exclusion BMPs

DEQ provided estimates of fencing needs, as well as existing fencing efforts. These estimates were based on spatial analysis and local input. A map of potential streamside fencing required for the Clinch River and Cove Creek Watershed is shown in **Figure 5.1**. The total estimate of 318 miles (1,678,333 feet) of streamside fence would be required to exclude all livestock that are quantified in the TMDL from streams in the watersheds (**Table 5.2**).

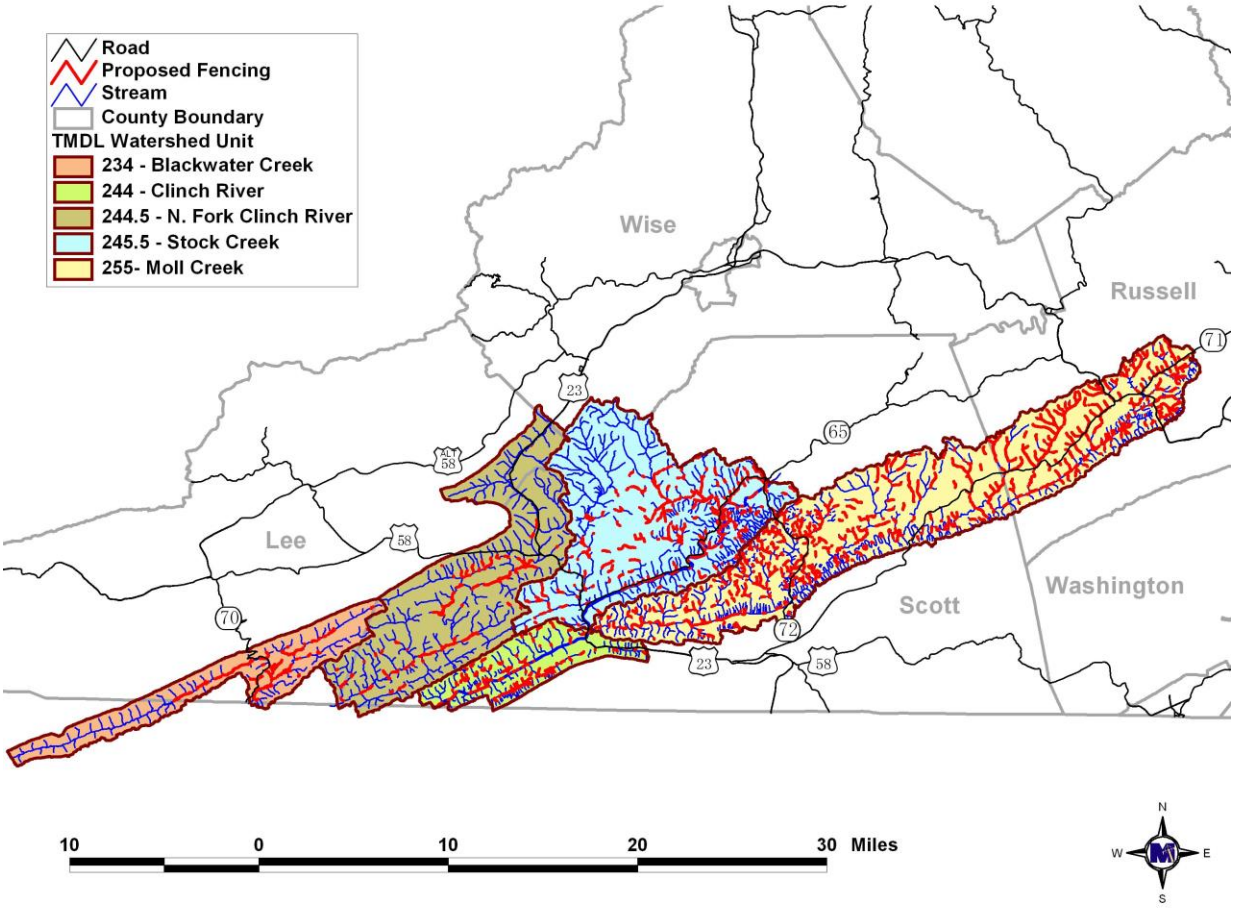

Figure 5.1 Potential streamside fencing for streams in the Clinch River and Cove Creek Watershed.

Table 5.2 Fencing analysis by Virginia watershed unit (VAHU6).

VAHU6	Potential Fencing (ft)	Outside of TMDL Watershed (ft)	Existing Fence (ft)	Not Fenced (ft)	Average length of fencing (ft)
TC25	125,229	0	5,179	120,050	518
TC26	67,368	0	1,357	66,011	452
TC27	316,873	0	13,710	303,163	1,055
TC28	676,335	0	106,348	569,987	1,281
TC29	250,767	0	60,505	190,262	931
TC30	473,857	0	45,041	428,816	1,126
TC31	85,128	0	11,640	73,488	2,328
TC32	91,067	6,913	14,551	69,603	1,119
TC33	170,138	12,404	0	157,734	0
TC34	131,569	10,182	0	121,387	0

Table 5.3 Estimation of total streamside fence needs in the Clinch River and Cove Creek Watershed.

TMDL Watershed	VAHU6 Watershed	Potential Fencing (ft)	Outside of TMDL Watershed (ft)	Existing Fence (ft)	Not Fenced (ft)	Reduction Identified in TMDL	Fence Needed (ft)
Blackwater Creek	TC34 (Partial)	131,569	10,182	0	121,387	99%	120,173
Clinch River	TC33 (Partial)	170,138	12,404	0	157,734	99%	156,157
NF Clinch River	TC31, TC32 (Partial)	176,195	6,913	26,191	143,091	99%	141,660
Stock Creek	TC25, TC26, TC27	509,470	0	20,246	489,224	17%	83,169
Moll Creek	TC28, TC29, TC30	1,400,959	0	211,894	1,189,065	99%	1,177,174
	Total (ft)	*2,388,331*	*29,499*	*258,331*	*2,100,501*		*1,678,333*

The DCR Agricultural BMP Database was utilized to determine typical characteristics of full livestock exclusion systems (e.g., streamside fencing length per practice) so that the number of different systems needed could be accurately estimated. The database was queried for information on grazing land protection systems (LE-1T and LE-2T) and stream protection systems (WP-2T) alreadyinstalled in these watersheds. The LE-1T system includes streamside fencing, cross fencing, an alternative watering system, and a 35-ft buffer from the stream (the LE-2T system includes the same items as the LE-1T but only requires a 10-ft buffer). It was estimated that 47% of livestock exclusion systems would be accomplished through the installation of LE-1T systems. The (LE-1T) offers 85% cost share and is only available in targeted TMDL watersheds with Implementation Plans. The LE-2T offers 50% cost share in TMDL watersheds with Implementation Plans. The WP-2T systems include streamside fencing, hardened crossings, and a 35-ft buffer from the stream. The WP-2T practice is only available in TMDL-targeted implementation areas. 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 sometimes viewed as less desirable, because it does not provide cost share for the installation of a well. This was reflected in the number of WP-2 systems noted in the Ag BMP Database. Consequently, it was estimated that only 1% of fencing would be accomplished using the WP-2T practice. Fencing through the Conservation Reserve Enhancement Program (CREP) is an option in the watershed

provided a 35-ft setback is used. The Conservation Reserve Program (CRP) is an alternative for landowners who do not want to install a 35-ft buffer; this program requires only a 20-ft buffer.

To establish the total number of livestock exclusion systems necessary to achieve full implementation, systems were calculated by dividing the potential pasture streamside fencing required by the average streamside fencing length per system. The breakdown of number of exclusions systems that are expected to be LE-1T, LE-2T, SL-6T or WP-2T is based on historical use of these practices in the Clinch River and Cove Creek Watershed and input from the Agricultural Working Group. **Table 5.4** shows the livestock exclusion requirements for the watersheds.

It was estimated that 7.5% of all fencing length would need to be replaced during the length of the implementation (see **Table 5.3** previously). That amounts to 125,876 feet in the Clinch River and Cove Creek Watershed. These maintenance costs were split between the two stages.

Table 5.4 Estimation of number of full exclusion systems required in the Clinch River and Cove Creek Watershed.

TMDL Watershed	LE-1T Systems	LE-2T Systems	SL-6/CREP Systems	WP-2T Systems
Blackwater Creek	50	50	7	1
Clinch River	66	65	8	1
NF Clinch River	59	59	8	1
Stock Creek	35	34	5	1
Moll Creek	493	492	64	9
Total	703 (47%)	700 (46%)	92 (6%)	13 (1%)

Note: Values rounded to nearest whole number

5.2.1.2 Land-Based BMPs

The only TMDL watershed in the Clinch River and Cove Creek TMDL area that requires reductions to land-based bacteria loads from agricultural lands is the North Fork Clinch River Watershed. Specifically, a reduction of 13% of the load from pasture is needed. Part of this reduction is achieved through the stream buffer created when livestock are fenced out of the stream. These buffers will act as filters, trapping bacteria and sediment before it runs into the stream. When considering the effectiveness of a vegetated buffer in trapping pollutants, it is important to consider the area that will be draining to the buffer. For modeling purposes, it was assumed that a typical buffer would be capable of receiving and treating runoff from an area four

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 140 feet wide and 1,000 feet long. Beyond four 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 filter. The remaining reduction can be achieved through implementation of improved pasture management on 50 acres of pasture land. It is anticipated that improvement will take the form of an intensively managed grazing system.

5.2.2 Residential Control Measures

5.2.2.1 BMPs to Correct Failing Septic Systems and Straight Pipes

All straight pipes must be identified and corrected during implementation since a 100% load reduction from these sources was deemed necessary to meet the TMDL goal. In addition, correction of failing septic systems is necessary in all of the TMDL watersheds. **Table 5.5** shows the number of failing septic systems and straight pipes for each TMDL watershed.

Table 5.5 Estimated residential waste treatment systems in the Clinch River and Cove Creek Watershed.

TMDL Watershed	Houses with Septic Systems	Potential Failing Septic Systems	Straight Pipes
Clinch River	305	10	38
NF Clinch River	1,443	48	155
Stock Creeks	1,167	39	187
Moll Creek	2,601	87	235
Blackwater Creek	202	7	50
Total	**5,718**	**191**	**665**

The following BMPs have been identified to correct failing septic systems and straight pipes: septic system repairs, septic system replacement, connect to public sewer system, and alternative waste treatment systems. It was estimated that 70% of the failing septic systems would need to be repaired. Of the remaining failing septic systems, 19% would have to be replaced with conventional septic systems and 10% would be corrected with alternative wastewater treatment systems. It was also estimated that as few as 1% would be able to connect to a public sewer system. The same percentages were applied to straight pipe corrections with the exception that there can be no repairs (**Table 5.6**).

Table 5.6 Percentages of corrective actions needed to address failing septic systems and straight pipes.

Item	Failing Septic Systems	Straight Pipes
Repair	70%	NA
Replacement	19%	77%
Alternative system	10%	22%
Sewer system hook up	1%	1%
Total	100%	100%

Note: NA .. not applicable

5.2.2.2 Land-Based BMPs

The Clinch River and Cove Creek Watershed TMDLs require reductions to residential, land-based bacteria sources, also known as nonpoint sources (NPS). It was determined there are approximately 3,080 dogs in the watershed which contribute to residential bacteria runoff (watershed summary in

Table 5.). The residential education program will address the benefits of cleaning up after pets and maintaining septic systems. This program may also include a combination of educational materials distributed to pet owners, signage describing water quality concerns related to pet waste, and disposal bags and receptacles in areas of high pet traffic. Educational efforts are vital to the successful implementation of these TMDLs.

In order to return the streams to fully supporting status, all the BMPs in

Table 5. need to be implemented. Specifically, in the Clinch River and North Fork Clinch River TMDL Watersheds, there is a need to control bacteria in runoff from residential lands using structural practices since this is where the majority of residential homes exist in the watershed. These practices include rain gardens, bioretention basins, and infiltration trenches. Stock Creek, Moll Creek and Blackwater Creek are much less populated; therefore, residential runoff is not an issue and these types of control measures are not relevant. In regard to controlling fecal bacteria, all of these practices operate in the same way and with similar efficiency. Essentially, the runoff water is retained and allowed to seep into the ground, slowing the delivery to the stream. The longer travel time for the runoff water allows for die-off of the pollutant, and reduces the sudden "spike" of bacteria that is received by the stream during a rainfall event. Rain gardens are

generally designed for smaller scales, and are more appropriate for residential settings, where runoff from rooftops, driveways, and yards can be controlled. Bioretention basins and infiltration trenches are generally used for larger scale projects that are needed in commercial areas. A staged approach to implementation of these control measures is described in Chapter 6 of this document.

Table 5.7 Estimated number of dogs in the Clinch River and Cove Creek Watershed.

	Clinch River	NF Clinch River	Stock Creek	Moll Creek	Blackwater Creek	Total
Dogs	160	816	631	1,362	111	3,080

Table 5.8 All residential BMPs recommended to return the streams to fully supporting status in the Clinch River and Cove Creek Watershed.

Control Measure	VA Cost-Share Practice No.	Clinch River	NF Clinch River	Stock Creek	Moll Creek	Blackwater Creek
Septic Systems Pump-Out	RB-1	305	1,443	1,167	2,601	202
Septic System Installation	RB-4, RB-4P	31	128	151	197	40
Sewer System Connection	RB-2				3	
Alternative Treatment System Installation	RB-5	10	41	48	61	12
Septic System Repair	RB-3	7	34	27	61	5
Residential Rain Gardens (ac-treated)	N/A	20	200			
Infiltration Trench (ac-treated)	N/A	20	200			
Bioretention Basins (ac-treated)	N/A	20	200			
Residential Pet Waste Education Program	N/A	1	1		1	1

5.3 Technical Assistance and Education

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

installers on the maintenance requirements expected of the homeowner because many installers are not aware of the maintenance required. In addition, a Pet Waste Education program should be developed.

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

Agricultural Programs

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

Residential Programs

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

Technical assistance needed to implement the agricultural and residential components of the plan was based on discussions with stakeholders and similar projects. Technical assistance was quantified using full time equivalents (FTE), with one FTE being equal to one forty-hour work week position. It was determined that one residential and urban FTE and one agricultural FTE would be needed to provide technical assistance in the Clinch River and Cove Creek Watershed

during each year of the first 10 years of implementation. The SWCDs agreed to manage the agricultural and residential programs. In this capacity, they will be in charge of funds for the associated FTEs. Existing staff will work on the BMPs identified in this plan.

5.4 Cost Analysis

5.4.1 Agricultural Control Measures

Streamside fencing through or adjacent to pasture with potential livestock access was translated and quantified into full livestock exclusion systems as described in Section 5.2.1.1. The costs for the LE-1T, LE-2T and WP-2T systems were estimated based on the cost of systems already in place in the Clinch River and Cove Creek Watershed.

Table 5.9 Agricultural control measure costs and needs in the Clinch River and Cove Creek Watershed (for units by subwatershed see Table 5.4).

Agricultural Control Measure	Unit	Cost ($) per Unit	Total Units	Total Cost
Pasture & Livestock Exclusion				
Livestock Exclusion with Riparian Buffer (LE-1T)	System	$20,600	703	$14,481,800
Livestock Exclusion with Reduced Setback (LE-2T)	System	$11,500	700	$8,050,000
Stream Exclusion with Grazing Land Mgnt (CREP/SL-6)	System	$20,000	92	$1,840,000
Stream Protection (WP-2T)	System	$3,400	13	$44,200
Fence Maintenance	Linear ft	$3.50[3]	125,875	$440,566
Subtotal:				**$24,856,566**
Agricultural Nonpoint Controls				
Improved Pasture Management (EQIP 528; SL-10T))	Acre	$75	50	$3,750
Subtotal:				**$3,750**
Total:				**$24,860,316**

The total cost of livestock exclusion systems includes not only the costs associated with fence installation, repair, and maintenance; but also the cost of taking land (*e.g.*, 35-ft buffer area) out of production. The cost of fence maintenance was identified as a deterrent to participation. Financial assistance possibilities for maintaining fences include an annual 25% tax credit for

[3] One-time fence payment over the 10-year lifespan.

fence maintenance and conservation easements where the landowner is paid a percentage of the land value to leave it undisturbed. Additionally, the streambank protection (WP-2T) cost-share practice will be available as part of the implementation project and provides an upfront incentive payment to maintain stream fencing. The cost per foot for streamside fence maintenance is estimated at $3.50/ft.

The remaining costs outlined in **Table 5.** were determined through literature review, analysis of the Virginia Agricultural BMP Database, and discussion with stakeholders. The number and type of practices that have been installed in each watershed were determined through discussions with local personnel, DEQ personnel, and data from the Virginia Agricultural BMP Database.

5.4.2 Residential Control Measures

Following recommendations from local stakeholders, it was estimated that 70% of the failing septic systems would need to be repaired (**Table 5.6**, $3,500). Of the remaining failing septic systems, 19% would be corrected with conventional septic systems ($5,000) and 10% would be corrected with alternative wastewater treatment systems ($15,000). Because of unavailability of connections, only 1% would tie into a public sewer system in the future ($700). An equal percentage of sewer system hookups apply to straight pipe corrections. Also, 77% of the straight pipes would be replaced with septic systems and 22% with alternative systems. The remaining costs outlined in **Table 5.10** were determined through literature review, and discussion with stakeholders.

Table 5.10 Residential control measure costs in the Clinch River and Cove Creek Watershed (for units by subwatershed see Table 5.).

Control Measure	Unit	Cost per Unit	Total Units	Total Cost
Septic Systems Pump-Out (RB-1)	System	$400	5,718	$2,287,200
Septic System Installation (RB-4, RB-4P)	System	$6,500	547	$3,555,500
Sewer System Connection (RB-2)	Connection	$700	3	$2,100
Alternative Treatment System Installation (RB-5)	System	$20,000	172	$3,440,000
Septic System Repair (RB-3)	System	$3,500	134	$469,000
Residential Rain Gardens	Acre-Treated	$3,000	220	$660,000
Infiltration Trench	Acre-Treated	$6,000	220	$1,320,000
Bioretention Basins	Acre-Treated	$19,000	220	$4,180,000
Residential Pet Waste Education Program	Program	$3,750	4	$15,000

Total	**$15,928,800**

5.4.3 Technical Assistance

It was determined by stakeholders that it would require $50,000 to support the salary, benefits, travel, training, and incidentals for education of one technical FTE. It was determined there was a need for one full-time agricultural and one full-time residential and urban technical FTE per year. This allocates 2 FTEs for each of the first ten years of implementation for a total of 20 FTE years. At the end of the first ten years, implementation should be complete. The total potential cost to provide technical assistance during implementation is expected to be approximately $1,000,000.

5.4.4 Total Estimated Costs

The total estimated cost for the 10 years of implementation in the Clinch River and Cove Creek Watershed are shown in **Table 5.**.

Table 5.11 Total estimated implementation costs for the Clinch River and Cove Creek Watershed.

TMDL Watershed	Agricultural BMPs	Residential BMPs	Technical Assistance	Total Cost
Blackwater Creek	$1,779,946	$602,050	$58,860	$2,440,394
Clinch River	$2,311,492	$1,111,750	$84,538	$3,507,167
NF Clinch River	$2,098,238	$7,951,950	$246,274	$10,296,582
Stock Creek	$1,237,233	$2,502,800	$89,442	$3,831,725
Moll Creek	$17,433,408	$3,760,250	$520,886	$21,713,249
Grand Total	**$24,860,316**	**$15,928,800**	**$1,000,000**	**$41,789,116**

5.4.5 Estimated Costs by Stage

Following a staged approach, implementation has been divided into two stages, with an effort to concentrate resources in the first stage. The Stage I goals for implementation will focus on correcting straight pipes and failing septic systems, fencing cattle out of the streams, improving pasture management and implementing a pet waste education program. Stage II focuses on continuing these efforts and implementing stormwater controls (i.e., rain gardens, infiltration trenches, and bioretention basins).

For the Clinch River and Cove Creek Watershed impairments, **Table 5.7** shows the estimated cost of installing the recommended agricultural and residential BMPs in Stage I. **Table 5.** shows the estimated costs in Stage II. The Stage I and II costs by watershed are presented in Chapter 6.

Factoring in technical assistance costs, the total cost for full implementation in the Clinch River and Cove Creek Watershed comes to approximately $42 million.

Table 5.7 Costs to implement Stage I for the Clinch River and Cove Creek Watershed by TMDL watershed.

TMDL Watershed	Agricultural BMPs	Residential BMPs	Technical Assistance	Total Cost
Blackwater Creek	$1,764,173	$302,900	$29,199	$2,096,272
Clinch River	$1,155,746	$277,750	$41,963	$1,475,459
NF Clinch River	$1,049,119	$1,177,850	$123,197	$2,350,166
Stock Creek	$618,617	$1,251,400	$45,846	$1,915,863
Moll Creek	$8,716,704	$1,882,000	$259,796	$10,858,500
Grand Total	**$13,304,358**	**$4,891,900**	**$500,000**	**$18,696,258**

Table 5.13 Costs to implement Stage II for the Clinch River and Cove Creek Watershed by TMDL watershed.

TMDL Watershed	Agricultural BMPs	Residential BMPs	Technical Assistance	Total Cost
Blackwater Creek	$15,773	$299,150	$29,199	$344,122
Clinch River	$1,155,746	$834,000	$41,963	$2,031,709
NF Clinch River	$1,049,119	$6,774,100	$123,197	$7,946,416
Stock Creek	$618,617	$1,251,400	$45,846	$1,915,863
Moll Creek	$8,716,704	$1,878,250	$259,796	$10,854,750
Grand Total	**$11,555,958**	**$11,036,900**	**$500,000**	**$23,092,858**

5.5 Benefit Analysis

The primary benefit of implementation is cleaner waters in Virginia. Specifically, *E. coli* contamination in the Clinch River and Cove Creek Watershed will be reduced to meet water quality standards. **Table 5.8** indicates the cost efficiencies of the practices being proposed in this IP. 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.

Table 5.8 Cost efficiencies of control measures in units removed per $1,000 in the Clinch River and Cove Creek Watershed.

Agricultural	Bacteria
Grazing Land Protection System (LE-1T and LE-2T) and Stream Protection System (WP-2T)	5.3E+10
Improved Pasture Management	2.0E+12
Residential	
Septic System Repair	5.6E+10
Septic System Installation/Replacement	2.8E+11
Alternative Waste Treatment System Installation	9.1E+10
Sewer System Connection	1.8E+12
Pet Waste Education Program	1.3E+13
Rain Garden	1.5E+10
Bioretention Basin	2.3E+09
Infiltration Trench	7.7E+09

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

5.5.1 Agricultural Practices

A clean water source has been shown to improve weight gain and milk production in cattle. Fresh clean water is the primary nutrient for livestock with healthy cattle consuming, on a daily basis, close to 10% 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 cleaner water source can prevent illnesses and avoid additional veterinary expenses.

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 initiate 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.

5.5.2 Residential Practices

The residential programs will play an important role in improving water quality, since human waste can carry with it human viruses in addition to the bacterial and protozoan pathogens that all fecal matter can potentially carry. In terms of economic benefits to homeowners, an improved understanding of on-site sewage treatment systems, including knowledge of what steps can be taken to keep them functioning properly and the need for regular maintenance, will give homeowners the tools needed for extending the life of their systems and reducing the overall cost of ownership. The average septic system will last 20 to 25 years if properly maintained. Proper maintenance includes: knowing the location of the system components and protecting them (e.g., not driving or parking on top of them), not planting trees where roots could damage the system, keeping hazardous chemicals out of the system, and pumping out the septic tank every 3 to 5 years. The cost of proper maintenance, as outlined here, is relatively inexpensive ($260) in comparison to repairing or replacing an entire system ($6,500 to $20,000).

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 maintaining these systems should continue long after implementation is complete. As will be discussed in greater detail in Chapter 8, a portion of the funding for implementation can be expected to come from state and federal sources. This portion of funding represents money that is new to the area and will stimulate the local economy. In general, implementation will provide not only environmental benefits to the community, but economic benefits as well which, in turn, will allow for individual landowners to participate in implementation.

6. MEASURABLE GOALS AND MILESTONES FOR ATTAINING WATER QUALITY STANDARDS

Given the scope of work involved with implementing these TMDLs, returning the streams to fully supporting status and de-listing from the Virginia Section 305(b)/303(d) list is expected within 10 years. Described in this section are milestone identification, timeline for implementation, and the targeting of control measures.

6.1 Milestones Identification

The end goals of implementation are restored water quality of the impaired waters and subsequent de-listing of these impairments from the Commonwealth of Virginia's Section 305(b)/303(d) list within 10 years (see **Table 6.1**). Progress toward end goals will be assessed during implementation through tracking of control measure installations and continued water quality monitoring. Agricultural and residential control measures will be tracked through the Virginia Agricultural Cost-Share Program.

Expected progress in implementation is established with two types of milestones: *implementation milestones* and *water quality milestones*. Implementation milestones establish the amount of control measures installed within certain timeframes, while water quality milestones establish the corresponding improvements in water quality that can be expected as the implementation milestones are met. The milestones described here are intended to achieve full implementation within 10 years.

Following the idea of a staged implementation approach, resources and finances will be concentrated on the most cost-efficient control measures first. For instance, concentrating on eliminating straight pipes and correcting failing septic systems within the first years may provide the highest return on water quality improvement with less cost to landowners. The Stage I goals for implementation will focus on correcting straight pipes and failing septic systems, fencing cattle out of the streams, improving pasture management and implementing a pet waste education program. Stage II focuses on continuing these efforts and implementing stormwater controls (i.e., rain gardens, infiltration trenches, and bioretention basins).

It is anticipated that implementation will begin for the Clinch River and Cove Creek Watershed in the coming year, after which two milestones will be sought over the next 10 years informed by pollution source reductions related to the TMDLs (Table 6.1). The BMP implementation goals associated with the milestones are listed in **Table 6.2** through **Table 6.6**. The first milestone will be five years after implementation begins, whereby some of the more cost-efficient control measures will be installed, with significant reductions in bacteria anticipated. The hope is that this stage will provide a water quality result that may lead to delisting an impairment.

Table 1.3 presents a breakdown of the costs for Stage I. Following Stage I implementation, the steering committee should evaluate water quality improvements and determine how to proceed to complete implementation (Stage II). Costs for Stage II are presented in **Table 1.3**. Based on completing both implementation stages, the final milestone would be achieving the bacteria reductions required by the TMDLs and this is anticipated by 2027.

Table 6.1 Stage I and Stage II percent reduction scenarios for the Clinch River and Cove Creek Watershed.

TMDL Watershed	Stage	Straight Pipes	Residential[4]	Livestock DD	Pasture	Progress toward TMDL Goal
Blackwater Creek	I	50	1	50	0	78%
	II	100	13	99	0	100%
Clinch River	I	50	1	50	0	98%
	II	100	23	99	0	100%
NF Clinch River	I	75	5	50	13	60%
	II	100	37	99	13	100%
Stock Creek	I	50	0	17	0	64%
	II	100	0	17	0	100%
Moll Creek	I	50	15	50	0	76%
	II	100	15	99	0	100%

[4] Residential reductions are limited to anthropogenic sources (no wildlife reductions).

Table 6.2 Stage I and Stage II implementation goals for Blackwater Creek.

Control Measure	Unit	Stage I	Stage II
Agricultural			
Livestock Exclusion with Riparian Buffer (LE-1T)	System	25	25
Livestock Exclusion with Reduced Setback (LE-2T)	System	25	25
Stream Exclusion with Grazing Land Mgnt (CREP/SL-6)	System	7	
Stream Protection (WP-2T)	System	1	
Residential			
Septic Systems Pump-Out (RB-1)	System	101	101
Septic System Installation (RB-4)	System	20	20
Sewer System Connection (RB-2)	System	0	0
Alternative Treatment System Installation (RB-5)	System	6	6
Septic System Repair (RB-3)	System	3	2
Residential Rain Gardens	Acre-Treated	0	0
Infiltration Trench	Acre-Treated	0	0
Bioretention Basins	Acre-Treated	0	0
Residential Pet Waste Education Program	Program	1	0

Table 6.3 Stage I and Stage II implementation goals for the Clinch River.

Control Measure	Unit	Stage I	Stage II
Agricultural			
Livestock Exclusion with Riparian Buffer (LE-1T)	System	33	33
Livestock Exclusion with Reduced Setback (LE-2T)	System	33	32
Stream Exclusion with Grazing Land Mgnt (CREP/SL-6)	System	4	4
Stream Protection (WP-2T)	System	1	0
Residential			
Septic Systems Pump-Out (RB-1)	System	153	152
Septic System Installation (RB-4)	System	15	16
Sewer System Connection (RB-2)	System	0	0
Alternative Treatment System Installation (RB-5)	System	5	5
Septic System Repair (RB-3)	System	4	3
Residential Rain Gardens	Acre-Treated	0	20
Infiltration Trench	Acre-Treated	0	20
Bioretention Basins	Acre-Treated	0	20
Residential Pet Waste Education Program	Program	1	0

Table 6.4 Stage I and Stage II implementation goals for the North Fork Clinch River.

Control Measure	Unit	Stage I	Stage II
Agricultural			
Livestock Exclusion with Riparian Buffer (LE-1T)	System	30	29
Livestock Exclusion with Reduced Setback (LE-2T)	System	30	29
Stream Exclusion with Grazing Land Mgnt (CREP/SL-6)	System	4	4
Stream Protection (WP-2T)	System	1	0
Improved Pasture Management (EQIP; SL-10T)	Acre	25	25
Residential			
Septic Systems Pump-Out (RB-1)	System	722	721
Septic System Installation (RB-4)	System	64	64
Sewer System Connection (RB-2)	System	0	0
Alternative Treatment System Installation (RB-5)	System	21	20
Septic System Repair (RB-3)	System	17	17
Residential Rain Gardens	Acre-Treated	0	200
Infiltration Trench	Acre-Treated	0	200
Bioretention Basins	Acre-Treated	0	200
Residential Pet Waste Education Program	Program	1	0

Table 6.5 Stage I and Stage II implementation goals for the Stock Creek.

Control Measure	Unit	Stage I	Stage II
Agricultural			
Livestock Exclusion with Riparian Buffer (LE-1T)	System	35	0
Livestock Exclusion with Reduced Setback (LE-2T)	System	34	0
Stream Exclusion with Grazing Land Mgnt (CREP/SL-6)	System	5	0
Stream Protection (WP-2T)	System	1	0
Residential			
Septic Systems Pump-Out (RB-1)	System	584	583
Septic System Installation (RB-4)	System	76	75
Sewer System Connection (RB-2)	System	0	0
Alternative Treatment System Installation (RB-5)	System	24	24
Septic System Repair (RB-3)	System	14	13
Residential Rain Gardens	Acre-Treated	0	0
Infiltration Trench	Acre-Treated	0	0
Bioretention Basins	Acre-Treated	0	0
Residential Pet Waste Education Program	Program	0	0

Table 6.6 Stage I and Stage II implementation goals for Moll Creek

Control Measure	Unit	Stage I	Stage II
Agricultural			
Livestock Exclusion with Riparian Buffer (LE-1T)	System	247	246
Livestock Exclusion with Reduced Setback (LE-2T)	System	246	246
Stream Exclusion with Grazing Land Mgnt (CREP/SL-6)	System	32	32
Stream Protection (WP-2T)	System	5	4
Residential			
Septic Systems Pump-Out (RB-1)	System	1,301	1,300
Septic System Installation (RB-4)	System	99	98
Sewer System Connection (RB-2)	System	2	1
Alternative Treatment System Installation (RB-5)	System	31	30
Septic System Repair (RB-3)	System	31	30
Residential Rain Gardens	Acre-Treated	0	0
Infiltration Trench	Acre-Treated	0	0
Bioretention Basins	Acre-Treated	0	0
Residential Pet Waste Education Program	Program	1	0

6.2 Timeline

Based on meeting the above milestones, a 10-year Implementation Plan timeline was formulated for the Clinch River and Cove Creek Watershed (**Figure 6.1** through **Figure 6.5**). The timeline describes the needs for implementation in terms of completion of the agricultural and residential control measures.

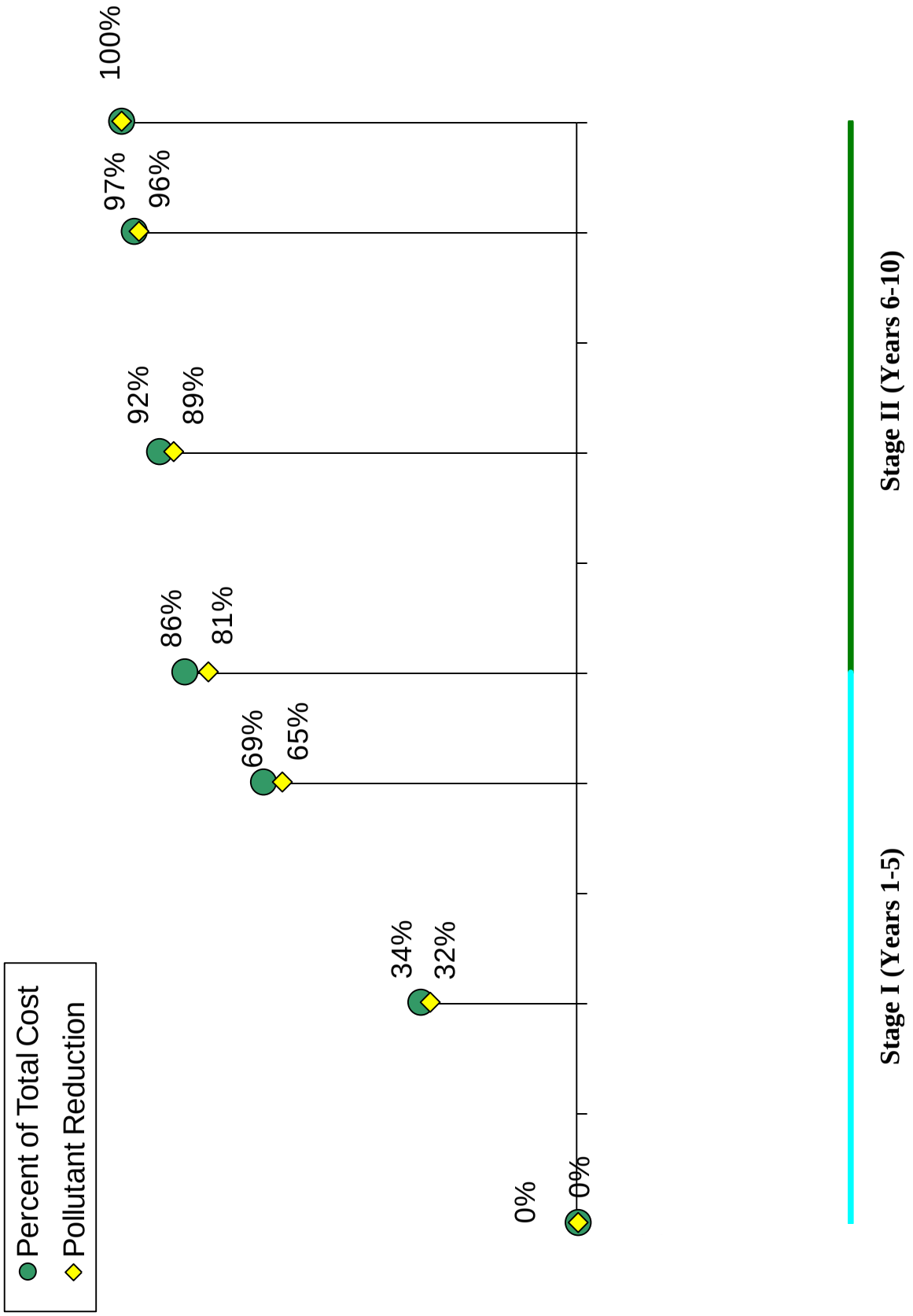

Figure 6.1 Timeline for implementation in the Blackwater Creek Watershed.

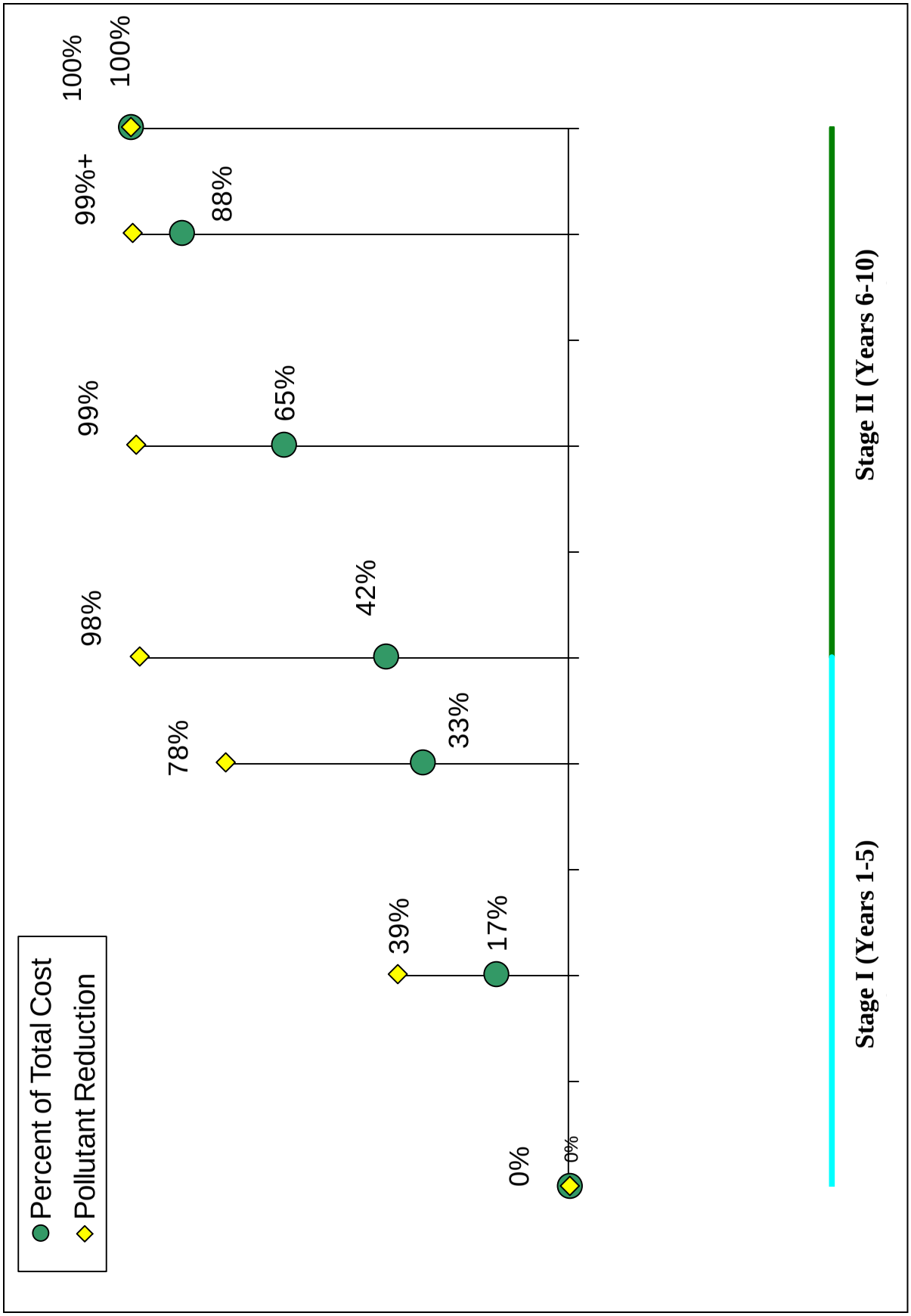

Figure 6.2 Timeline for implementation in the Clinch River Watershed.

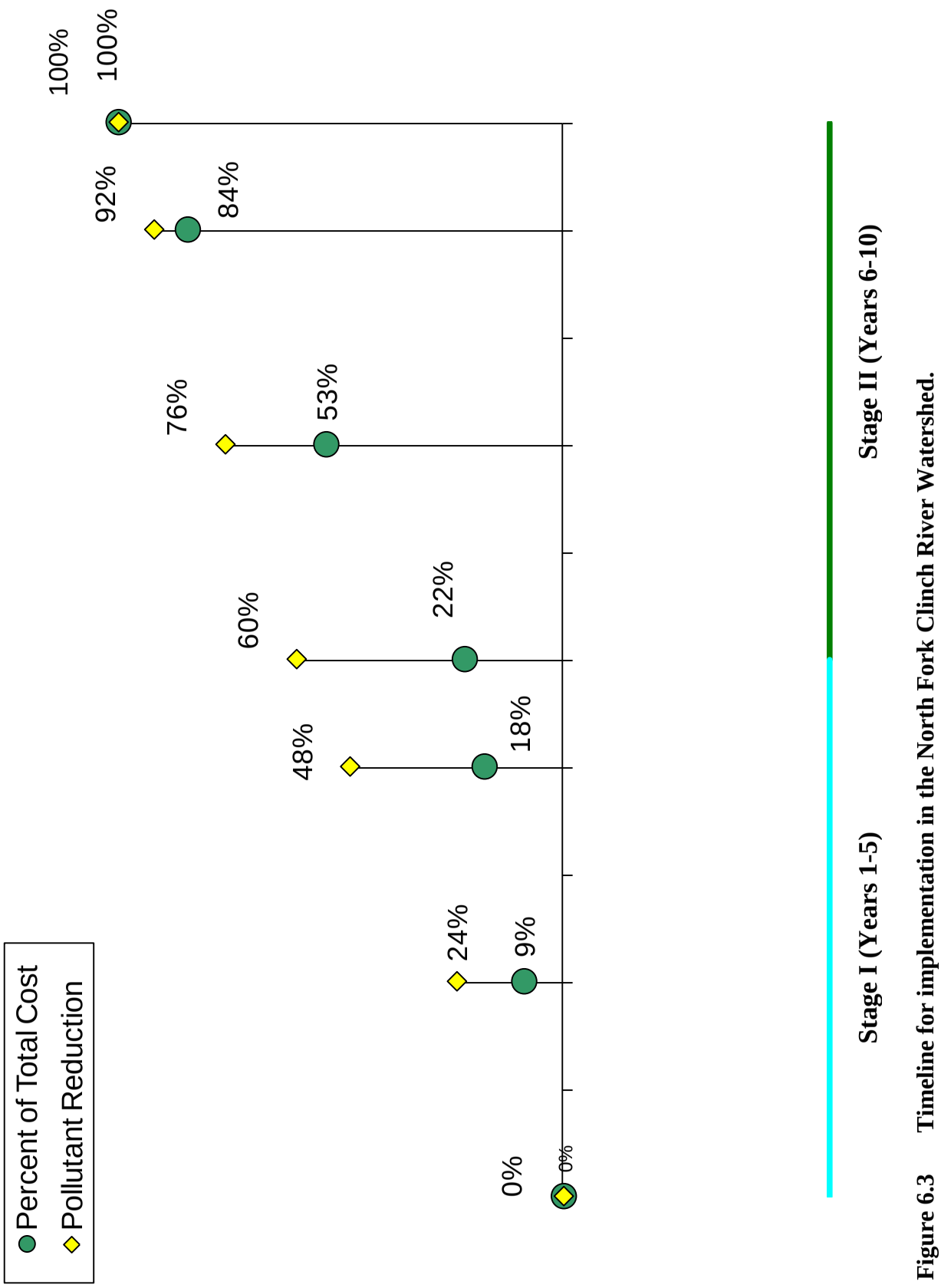

Figure 6.3 Timeline for implementation in the North Fork Clinch River Watershed.

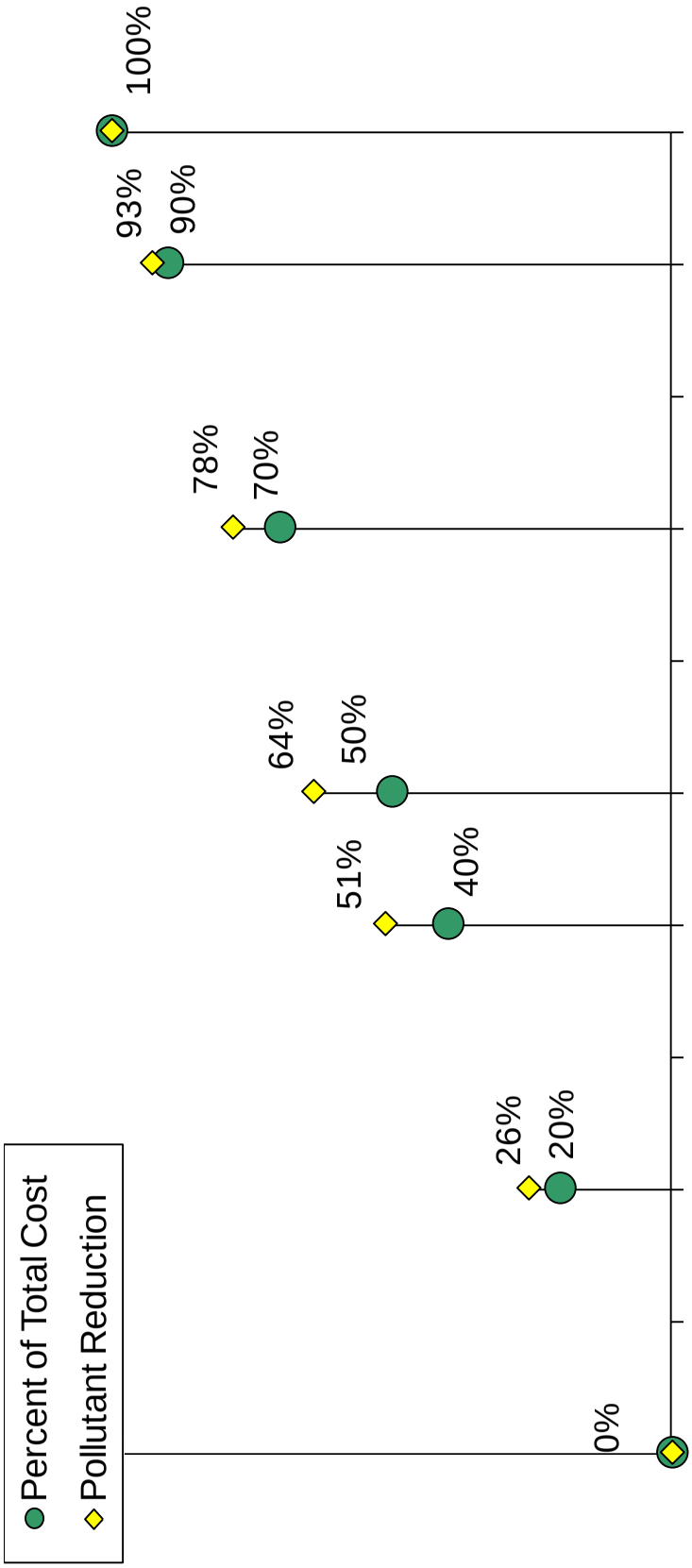

Figure 6.4 Timeline for implementation in the Stock Creek Watershed.

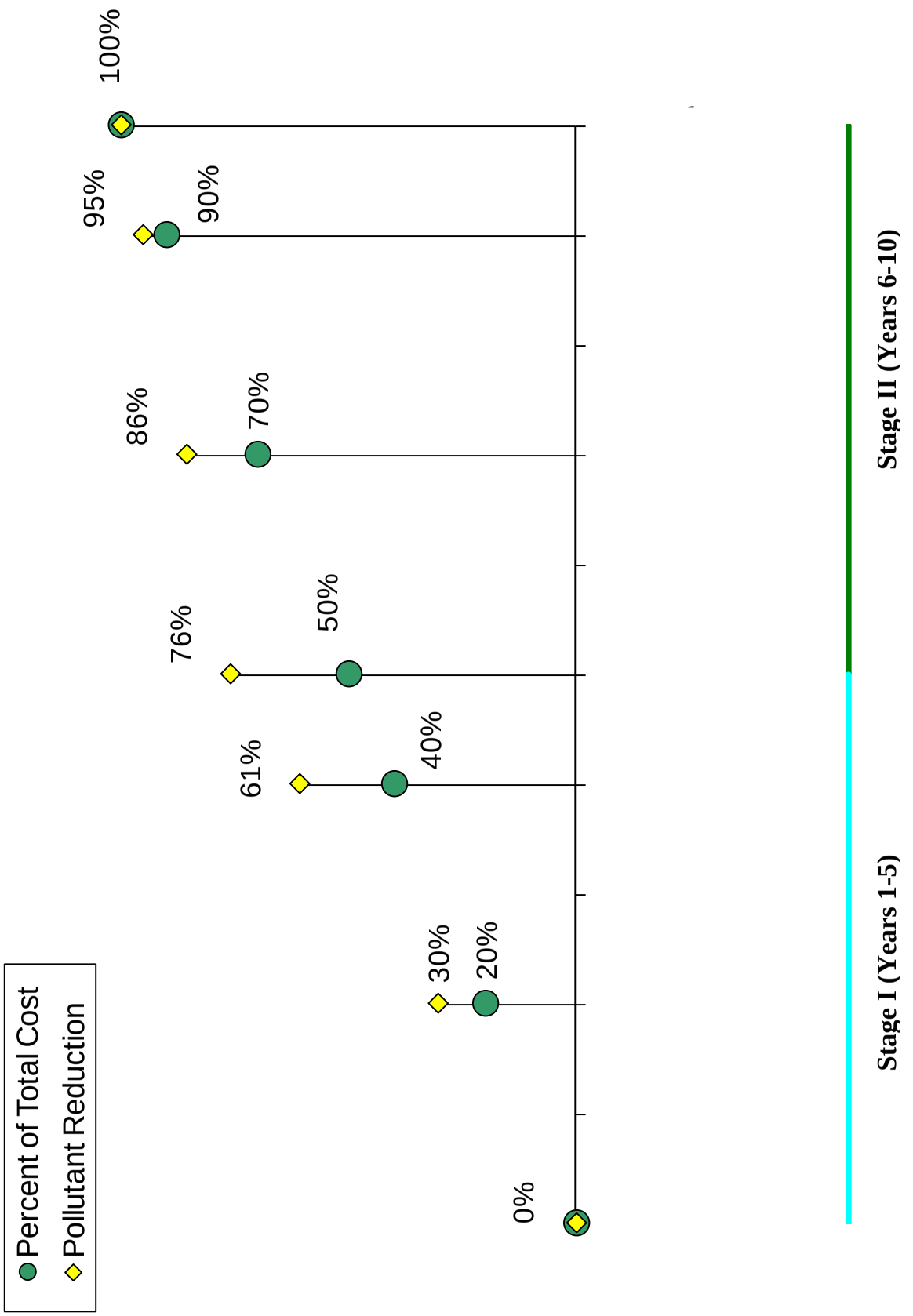

Figure 6.5 Timeline for implementation in the Moll Creek Watershed.

6.3 Targeting

Implicit in the process of a staged implementation is targeting of control measures. Targeting ensures optimum utilization of resources. The Clinch River and Cove Creek Watershed was divided into 17 subwatersheds **(Figure 6.6**). Targeting of critical areas for livestock fencing was accomplished through analysis of livestock population and the fencing requirements for each subwatershed. The subwatersheds were ranked in descending order based on the animal numbers per fence length required. If feasible, effort should be made to prioritize resources in the order of subwatersheds in **Table 6.7** and **Figure 6.7**. For example, the SWCD should initiate participation from farmers in subwatershed 43. This targeting priority list should be used to focus outreach promoting the cost-share programs available.

Alternatively, it can be argued that pollution problems are cumulative from the top to the bottom of a watershed and that unless upstream problems are resolved first, downstream BMPs may be overwhelmed. From this perspective, prioritization of the subwatersheds for livestock fencing should proceed in an upstream to downstream fashion. In this case, the highest priority is assigned to the highest numbered subwatersheds. However, regardless of the prioritization, any interested parties should not be turned away simply because their farm is in a low ranking subwatershed.

Targeting of residential BMPs should be initiated in the Clinch River and Cove Creek watershed in the order shown in **Table 6.7** and **Figure 6.8**. This order was derived from ranking the sum of loads from failing septic systems and straight pipes in each subwatershed. In the Clinch River and Cove Creek area the highest priority subwatershed for septic repairs is 44 and for straight pipes is 34.

A third method of targeting practices in agricultural and residential areas involves considering the cost-efficiency of specific practices. **Table 5.8** indicates the cost-efficiencies of the practices proposed in this IP. Practices with high cost-efficiencies, relative to other practices, will provide the greatest benefit per dollar invested.

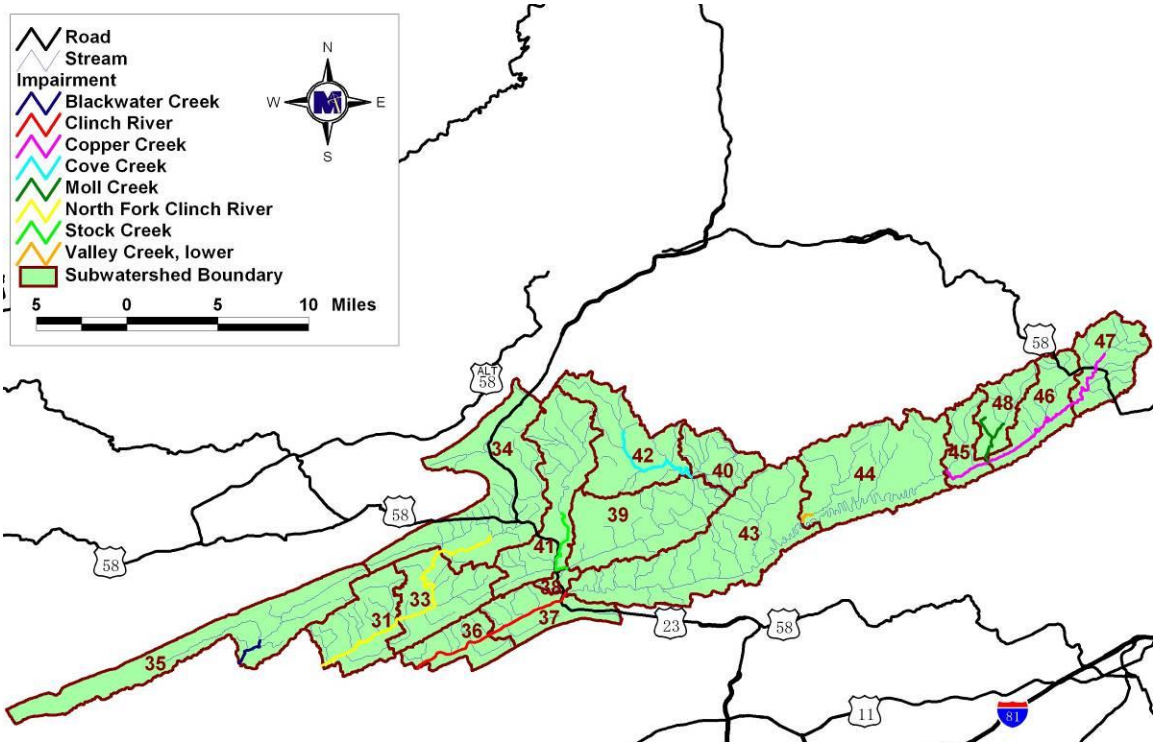

Figure 6.6 Subwatersheds within the Clinch River and Cove Creek Watershed.

Table 6.7 Targeting subwatershed order for streamside fencing in the Clinch River and Cove Creek Watershed.

Priority	Subwatershed Number
	Clinch River and Cove Creek Watershed
1	43
2	47
3	46
4	48
5	35
6	45
7	44
8	36
9	40
10	37
11	34
12	33
13	39
14	31
15	41
16	42
17	38

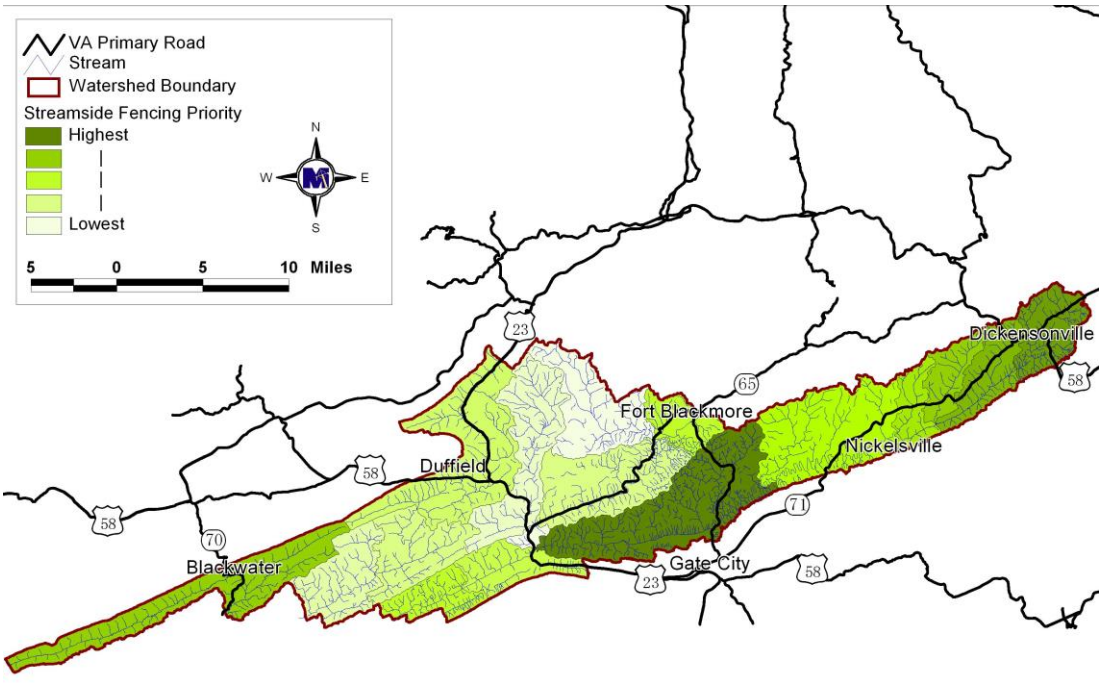

Figure 6.7 Streamside fencing prioritization within the Clinch River and Cove Creek Watershed.

Table 6.7 Targeting TMDL subwatershed order for human fecal bacteria sources in the Clinch River and Cove Creek Watershed.

Priority	Subwatershed Number
	Clinch River and Cove Creek Watershed
1	44
2	43
3	37
4	36
5	47
6	46
7	34
8	48
9	45
10	35
11	31
12	39
13	41
14	42
15	33
16	40
17	38

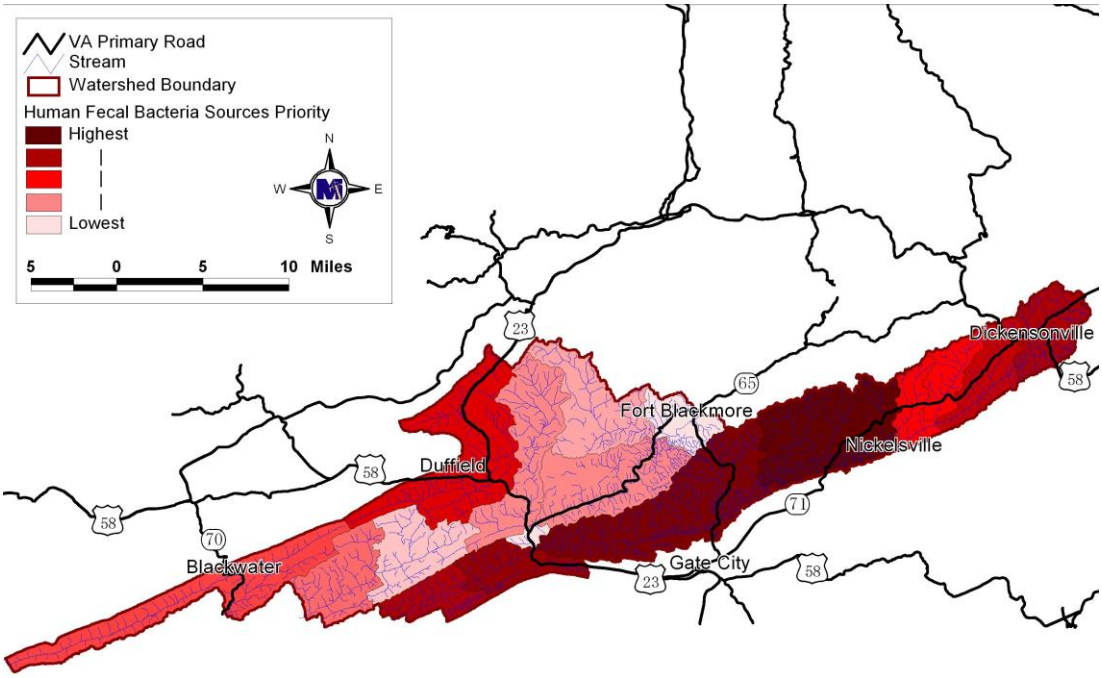

Figure 6.8 Septic repair/replacement/installation prioritization within the Clinch River and Cove Creek Watershed.

7. STAKEHOLDERS AND THEIR ROLE IN IMPLEMENTATION

Achieving the goals of this effort (*i.e.,* improving water quality and removing these waters from the impaired waters list) is dependent upon stakeholder participation. Both the local stakeholders charged with implementation of control measures and the stakeholders charged with overseeing our nation's human health are key elements of a successful IP. The first step is to acknowledge that a water quality problem exists and realize that needed changes must be made in operations, programs, and legislation to address these pollutants. The Scott County, Daniel Boone and Clinch Valley SWCDs have agreed to take responsibility for initiating contact to encourage landowners to install the agricultural BMPs and to correct residential onsite wastewater treatment systems in need. DEQ staff will take the responsibility of working with the Scott County and Clinch Valley SWCDs and other partners in tracking implementation efforts as well as organizing the steering committee for evaluations of implementation progress. The following sections in this chapter describe the responsibilities and expectations for the various components of implementation.

7.1 Partners and their Role in Implementation

7.1.1 Scott County, Clinch Valley and Daniel Boone Soil & Water Conservation Districts and USDA Natural Resource Conservation Service

Both the SWCDs and NRCS are continually reaching out to farmers in the watershed and providing them technical assistance with conservation practices. The Scott County, Clinch Valley and Daniel Boone SWCDs are local government entities providing soil and water conservation assistance to farmers and residents in the Clinch River and Cove Creek watershed. During the implementation project, the SWCDs, along with NRCS, will provide outreach, technical and financial assistance to farmers and homeowners in the Clinch River and Cove Creek. Their responsibilities will include promoting implementation goals, available funding and the benefits of BMPs and providing assistance in the survey, design, layout, and approval of agricultural and residential BMPs. Education and outreach activities are a significant portion of their responsibilities. The Scott County, Clinch Valley and Daniel Boone SWCDs will be eligible for technical assistance funding to support their duties.

7.1.2 Lee, Scott and Russell Counties

Decisions made by local government staff and elected officials regarding land use and zoning will play an important role in the implementation of this plan. This makes the Lee, Scott and Russell County Boards of Supervisors and the Planning Commissions key partners in long term implementation efforts. Local government support of land conservation will become increasingly important as greater numbers of conservation measures are implemented across the watershed. Ensuring that land remains in agriculture and forest will allow the practices installed to continue to benefit water quality.

7.1.3 Virginia Department of Environmental Quality

The Virginia Department of Environmental Quality has a lead role in the development of TMDL implementation plans. DEQ also provides available grant funding and technical support for TMDL implementation. DEQ will work closely with project partners including the Scott County, Clinch Valley, and Daniel Boone 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 staff can also provide support with education and outreach related to water quality.

DEQ is also responsible for monitoring state waters to determine compliance with water quality standards. DEQ will continue monitoring water quality in Clinch River and Cove Creek watershed 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.

7.1.4 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 and track implementation. In addition, DCR administers the state's Nutrient

Management Program, which provides technical assistance to producers in appropriate manure storage and manure and commercial fertilizer.

7.1.5 Virginia Department of Health

The Virginia Department of Health (VDH) is responsible for adopting and implementing regulations for onsite wastewater treatment and disposal. The Sewage Handling and Disposal Regulations require homeowners to secure permits for handling and disposal of sewage (e.g. repairing a failing septic system or installing a new treatment system). VDH staff provide technical assistance to homeowners with septic system maintenance and installation, and respond to complaints regarding failing septic systems and straight pipes.

7.1.6 Other Potential Local Partners

There are numerous additional opportunities for future partnerships in the implementation of this plan. Additional potential partners in implementation include:

- VA Cooperative Extension
- County and city schools
- Trout Unlimited
- Virginia Department of Forestry
- Virginia Department of Game and Inland Fisheries
- The Nature Conservancy
- Clinch-Powell Clean Rivers Initiative
- Clinch River Valley Initiative
- Upper Tennessee River Roundtable

7.2 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 Program, and local comprehensive plans. Coordination of the implementation project with these existing programs could result in additional resources and increased participation.

7.3 Monitoring

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

The DEQ monitoring stations in the Clinch River and Cove Creek Watershed are described in **Table 7.1.** Up-to-date monitoring results are available to residents by requesting the information from DEQ. All of these stations are ambient water quality stations, however one trend station exists in the watershed at Speers Ferry. Implementation monitoring will generally be done in the same manner as that done during TMDL development. However, modifications may be made to reflect the needs of the implementation plan. The selection of sites and the frequency and duration of implementation monitoring will be determined by the TMDL staff, in cooperation with regional monitoring staff and representatives from other agencies.

Table 7.1 Monitoring station ID and station location for active DEQ stations in Clinch River and Cove Creek Watershed.

Station ID	Stream Name	Location
6BCLN206.70	Clinch River	Off Rt. 627, 4.3 miles downstream of USGS gage
6BBKW005.82	Blackwater Creek	Bridge on Rt. 70
6BCOV001.68	Cove Creek	Bridge #6479 on Rt. 827 Off Rt. 649 off Rt. 65
6BSTO000.45	Stock Creek	Bridge #6404 on Rt. 794
6BCOP047.75	Copper Creek	Low water private bridge off Rt. 678 off Rt. 58
6BCOP052.77	Copper Creek	Private bridge off Rt. 678 off Rt. 671 off Rt. 58
6BMOL000.03	Moll Creek	Bridge #6248 on Rt. 678 off Rt. 58
6BVAL000.25	Valley Creek	Bridge #6092 on Rt. 670 off Rt. 71
6BNFC010.65	North Fork Clinch River	Bridge #6005 on Rt. 600 off Rt. 58
6BNFC018.68	North Fork Clinch River	Bridge #6039 on Rt. 624 off Rt. 604 off Rt. 58
6BNFC003.80	North Fork Clinch River	Ford on Rt. 621 off Rt. 600

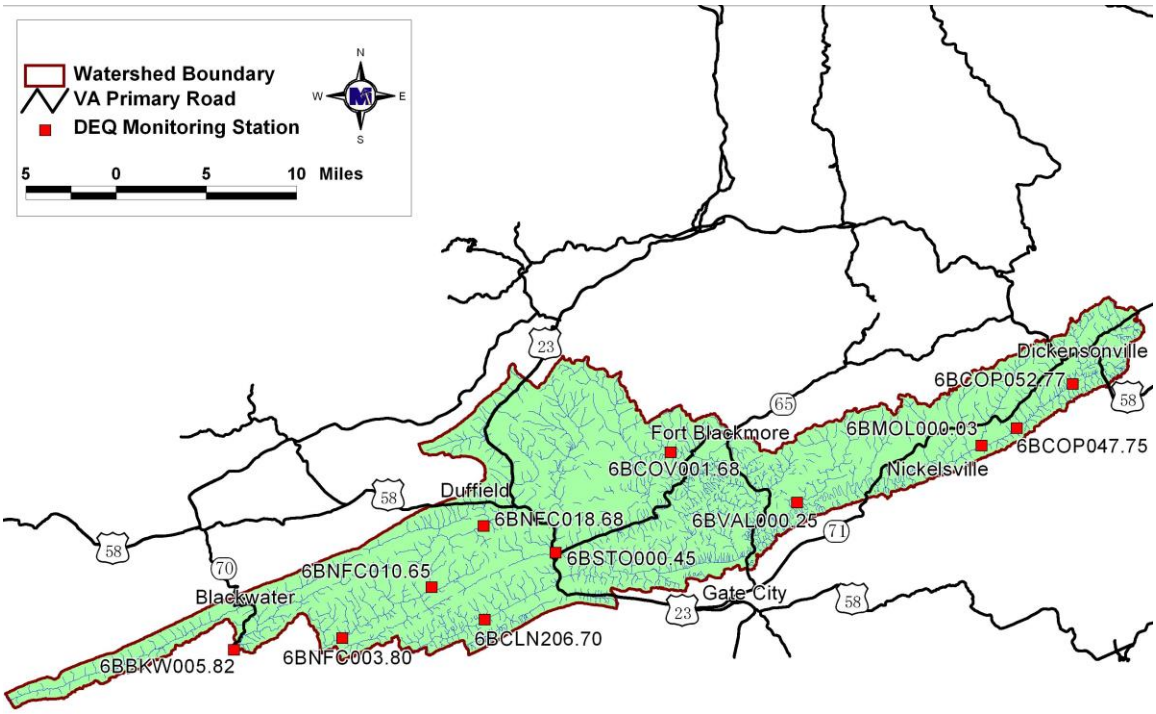

Figure 7.1 Location of DEQ water quality monitoring stations in the Clinch River and Cove Creek Watershed.

7.4 Agricultural, Residential and Industrial Education Programs

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

venues to distribute agricultural education materials. Specific agricultural and residential outreach ideas are outlined in section 5.3.

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

7.5 Legal Authority

The USEPA has the responsibility of overseeing the various programs necessary for the success of the CWA. However, administration and enforcement of such programs falls largely to the states. 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 a directed by the Virginia General Assembly in 2007. DEQ's Office of Land Application Programs within the Water Quality Division to manages the biosolids program. The biosolids program includes

having and following nutrient management plans for all fields receiving biosolids, unannounced inspections of the land application sites, certification of persons land applying biosolids, and payment of a $7.50 fee per dry ton of biosolids land applied.

DEQ holds the responsibility for addressing nonpoint sources (NPS) of pollution. Historically, most DCR programs have dealt with agricultural NPS pollution through education and voluntary incentive programs. These cost-share programs were originally developed to meet the needs of voluntary partial participation and not the level of participation required by TMDLs (near 100%). 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 only two staff members dedicated to enforcing the Agricultural Stewardship Act, and very little funding is available to support water quality sampling. The Agricultural Stewardship Act is entirely complaint-driven.

The *Emergency Regulations for Alternative Onsite Sewage Systems*, adopted in April, 2010, require that all alternative onsite sewage treatment systems in Virginia be visited at least annually by a licensed operator. However, the Virginia Department of Health (VDH) does not currently have the authority, the mandate or the resources to require or conduct similar surveillance of all conventional onsite sewage treatment (septic) systems in the Commonwealth. (Note that, as resources allow, VDH may conduct or assist with such surveys that target localized areas of specific concern.)

Given the above limitations, VDH generally learns of failed septic systems directly or indirectly from the owners of those systems or through complaints from neighbors or other government agencies. Reports of straight pipes are less-frequently received from either source, since they are generally located in less-populated areas and are typically sited/intended to avoid detection.

When VDH receives a report of a non-compliant system, it performs a site inspection, if necessary, to verify the report. VDH then works with the homeowner to address the issue in an effective, timely and regulatory-compliant manner, generally through installation of a septic or alternative onsite system, repair or replacement of an existing system and/or failed components of that system, connection to a central collection/treatment system, or other appropriate measure(s). In the case of non-cooperative homeowners, VDH initially attempts to achieve compliance through internal enforcement actions and, ultimately, through the court system.

An impasse may be reached when a homeowner is willing, but financially unable to correct the non-compliance. In such situations, VDH assists in attempting to locate funding for the needed corrections.

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

The local governments can play a very active role in the implementation process. For example they could promote a septic system maintenance program. This could be done by handing out literature when individuals apply for a building permit. It is recommended that the counties within the Clinch River and Cove Creek Watershed adopt a reserve area for land parcels using on-site wastewater treatment of equal size to the approved on-site disposal system for use in the event the on-site disposal system fails. Further, the reserve area shown

must be of equal capacity to the primary drainfield using the same technology as the primary system. Nothing shall be constructed within the reserve area. The counties could also play an active role in the proper disposal of pet waste. When licenses for dog kennels are issued the owners should be required to produce a plan for the proper disposal of waste from the facility. Future subdivisions should be developed with sustainable growth practices that minimize of eliminate storm water runoff. Future subdivisions should be developed with sustainable growth practices that minimize of eliminate storm water runoff.

8. FUNDING

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

Federal Clean Water Act 319 Incremental Funds

Through Section 319 of the Federal Clean Water Act, Virginia is awarded grant funds to implement the nonpoint source programs. DEQ administers the money in coordination with the Nonpoint Source Advisory Committee (NPSAC) to fund watershed projects, demonstration and educational programs, nonpoint source pollution control program development, and technical and program staff. DEQ reports annually to the USEPA on the progress made in nonpoint source pollution prevention and control. A 319 application will be written upon completion of the IP to request funding for the technical assistance required (FTEs).

Virginia Agricultural Best Management Practices Cost-Share Program (VACS)

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

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

Virginia Agricultural Best Management Practices Tax Credit Program

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

Virginia Small Business Environmental Assistance Fund Loan Program

The Fund, administered through DEQ, 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.

Virginia Water Quality Improvement Fund (WQIF)

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

Community Development Block Grant Program (CDBG)

The Department of Housing and Urban Development sponsors this program, intended to develop viable communities by providing decent housing and a suitable living environment and by expanding economic opportunities primarily for persons of low and moderate income. Recipients may initiate activities directed toward neighborhood revitalization, economic development, and provision of improved community facilities and services. Specific activities may include public services, acquisition of real property, relocation and demolition, rehabilitation of structures, and provision of public facilities and improvements, such as new or improved water and sewer facilities.

Conservation Reserve Program (CRP)

Offers are accepted and processed during fixed signup periods that are announced by FSA. All eligible (cropland) offers are ranked using a national ranking process. If accepted, contracts are developed for a minimum of 10 and not more than 15 years. Payments are based on a per-acre soil rental rate. Cost-share assistance is available to establish the conservation cover of tree or herbaceous vegetation. The per-acre rental rate may not exceed

the Commodity Credit Corporation's maximum payment amount, but producers may elect to receive an amount less than the maximum payment rate, which can increase the ranking score. To be eligible for consideration, the following criteria must be met: 1) cropland was planted or considered planted in an agricultural commodity for two of the five most recent crop years, and 2) cropland is classified as "highly-erodible" by NRCS. Eligible practices include planting these areas to trees and/or herbaceous vegetation. Application evaluation points can be increased if certain tree species, spacing, and seeding mixtures that maximize wildlife habitats are selected. Land must have been owned or operated by the applicant for at least 12 months prior to the close of the signup period. The payment to the participant is up to 50% of the cost for establishing ground cover. Incentive payments for wetlands hydrology restoration equal 25% of the cost of restoration.

Conservation Reserve Enhancement Program (CREP)

This program is an "enhancement" of the existing USDA CRP Continuous Sign-up. It has been "enhanced" by increasing the cost-share rates from 50% 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 statewide goal is 8,000 acres.

The landowner can obtain and complete CREP application forms at the FSA center. The forms are forwarded to local NRCS and SWCD offices while FSA determines land eligibility. If the land is deemed eligible, NRCS and the local SWCDs 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 SWCDs also pay out the state's one-time, lump sum rental payment. FSA conducts random spot checks throughout the life of the contract, and the agency continues to pay annual rent throughout the contract period.

Environmental Quality Incentives Program (EQIP)

This program was established in the 1996 Farm Bill to provide a single voluntary conservation program for farmers and landowners to address significant natural resource needs and objectives. This program replaces the Agricultural Conservation Program (ACP) and the Water Quality Incentive Program. 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.

Regional Conservation Partnership Program (RCPP)

USDA's Natural Resources Conservation Service (NRCS) encourages partners to join in efforts with producers to increase the restoration and sustainable use of soil, water, wildlife and related natural resources on regional or watershed scales. Through the program, NRCS and its partners help producers install and maintain conservation activities in selected project

areas. An example project in Southwest Virginia is on the Clinch and Powell Watershed in Lee, Scott and Russell County. In cooperation with The Nature Conservancy (TNC), this Regional Conservation Partnership Program (RCPP) project seeks to improve aquatic habitat and protect the extraordinary biodiversity of the Clinch and Powell rivers through strategic implementation of Best Management Practices or BMPs. Focal practices will include fencing, watering systems, and establishing/maintaining vegetative areas along waterways in targeted portions of the above counties. These resources may be expired by the implementation stage of this IP so it's best to contact the local Soil and Water Conservation District office for more information.

Wildlife Habitat Incentive Program (WHIP)

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

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

The mission of this project is to promote, cultivate, and encourage the development of water and wastewater facilities to serve low-income residents at affordable costs and to support other development activities that will improve the quality of life in rural areas. Staff members of other community organizations complement the SE/R-CAP central office staff across the region. They can provide (at no cost to a community): on-site technical assistance and consultation, operation and maintenance/management assistance, training, education, facilitation, volunteers, and financial assistance. Financial assistance includes $1,500 toward repair/replacement/installation of a septic system and $2,000 toward repair/replacement/installation of an alternative waste treatment system. Funding is only available for families making less than 125% of the federal poverty level. The federal poverty threshold for a family of four is $23,550 (USDHHS, 2013).

National Fish and Wildlife Foundation (NFWF)

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

Clean Water State Revolving Fund (CWSRF)

USEPA awards grants to states to capitalize their Clean Water State Revolving Funds (CWSRFs). The states, through the CWSRF, make loans for high-priority water quality

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

USEPA Environmental Education Grant Funding Opportunity

USEPA has recently announced an exciting environmental education grant funding opportunity. The purpose of the grants is to promote environmental stewardship and help develop knowledgeable and responsible students, teachers and citizens. For the full USEPA news release, please visit http://go.usa.gov/4DQ. More information on eligibility and application materials, please visit http://www.epa.gov/enviroed/grants.html.

The project start date in proposals should be no earlier than September 1, 2011. There is a requirement to specify an environmental issue, based on USEPA's current priorities that the proposed project will focus on. There is more emphasis on expanding the conversation on environmentalism by including a variety of audiences in proposed projects. There is a strong emphasis on partner letters this year. Letters will be scored for their clarity and completeness. Incomplete applications will not be reviewed. If applying through grants.gov, make sure to register at least one week ahead of time. Check out the FAQ link for more information: http://www.epa.gov/enviroed/grants_faq.html.

GLOSSARY

303(d). A section of the Clean Water Act of 1972 requiring states to identify and list water bodies that do not meet the states' water quality standards.

ACP. Agricultural Conservation Program.

AGRUWG. Agricultural and Residential/Urban Working Group.

Allocations. *That portion of a receiving water's loading capacity attributed to one of its existing or future pollution sources (nonpoint or point) or to natural background sources. (A wasteload allocation [WLA] is that portion of the loading capacity allocated to an existing or future point source, and a load allocation [LA] is that portion allocated to an existing or future nonpoint source or to natural background levels. Load allocations are best estimates of the loading, which can range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting loading.)*

ASA. Agricultural Stewardship Act.

Best management practices (BMPs). *Methods, measures, or practices determined to be reasonable and cost-effective means for a landowner to meet certain, generally nonpoint source, pollution control needs. BMPs include structural and nonstructural controls and operation and maintenance procedures.*

Bioassessment. Evaluation of the condition of an ecosystem that uses biological surveys and other direct measurements of the resident biota.

cfu. colony-forming units.

Clean Water Act (CWA). *The Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972), Public Law 92-500, as amended by Public Law 96-483 and Public Law 97-117, 33 U.S.C. 1251 et seq. The Clean Water Act (CWA) contains a number of provisions to restore and maintain the quality of the nation's water resources. One of these provisions is Section 303(d), which establishes the TMDL program.*

Conventional pollutants. *As specified under the Clean Water Act, conventional contaminants include suspended solids, coliform bacteria, high biochemical oxygen demand, pH, and oil and grease.*

CREP. Conservation Reserve Enhancement Program.

CRP. Conservation Reserve Program.

CWA. Clean Water Act, 1972.

CWSRF. Clean Water State Revolving Fund.

DMME. Virginia Department of Mines, Minerals, and Energy.

E. coli (Escherichia coli). One of the groups of fecal coliform bacteria associated with the digestive tract of warm-blooded animals used as indicator organisms (organisms indicating presence of pathogens) to detect the presence of pathogenic bacteria in the water.

Ecoregion. A region defined in part by its shared characteristics. These include meteorological factors, elevation, plant and animal speciation, landscape position, and soils.

Ecosystem. *An interactive system that includes the organisms of a natural community association together with their abiotic physical, chemical, and geochemical environment.*

Effluent limitation. *Restrictions established by a state or USEPA on quantities, rates, and concentrations in pollutant discharges.*

Endpoint. *An endpoint (or indicator/target) is a characteristic of an ecosystem that may be affected by exposure to a stressor. Assessment endpoints and measurement endpoints are two distinct types of endpoints commonly used by resource managers. An assessment endpoint is the formal expression of a valued environmental characteristic and should have societal relevance (an indicator). A measurement endpoint is the expression of an observed or measured response to a stress or disturbance. It is a measurable environmental characteristic that is related to the valued environmental characteristic chosen as the assessment endpoint. The numeric criteria that are part of traditional water quality standards are good examples of measurement endpoints (targets).*

EQIP. Environmental Quality Incentives Program.

fecal coliform (FC). Indicator organisms (organisms indicating presence of pathogens) associated with the digestive tract.

FSA. Farm Service Agency.

FTE. Full-Time Equivalents.

Geometric mean. A measure of the central tendency of a data set that minimizes the effects of extreme values.

GIS. Geographic Information System. A system of hardware, software, data, people, organizations and institutional arrangements for collecting, storing, analyzing and disseminating information about areas of the earth. (Dueker and Kjerne, 1989).

GIWG. Government/Industrial Working Group.

GWLF. *Generalized Watershed Loading Function. A watershed loading model developed to assess non-point source flow and sediment and nutrient loading from urban and rural watersheds.*

HSPF. Hydrological Simulation Program – Fortran. A computer simulation tool used to mathematically model nonpoint source pollution sources and movement of pollutants in a watershed.

Impairment. A detrimental effect on the biological integrity of a water body that prevents attainment of the designated use.

Indicator organism. *An organism used to indicate the potential presence of other (usually pathogenic) organisms. Indicator organisms are usually associated with the other organisms, but are usually more easily sampled and measured.*

Margin of safety (MOS). *A required component of the TMDL that accounts for the uncertainty about the relationship between the pollutant loads and the quality of the receiving waterbody (CWA Section 303(d)(1)(C)). The MOS is normally incorporated into the conservative assumptions used to develop TMDLs (generally within the calculations or models) and approved by the USEPA either individually or in state/USEPA agreements. If the MOS needs to be larger than that which is allowed through the conservative assumptions, additional MOS can be added as a separate component of the TMDL (in this case, quantitatively, a TMDL = LC = WLA + LA + MOS).*

Memorandum of Understanding (MOU). A memorandum of understanding (MOU) may be used as a confirmation of agreed upon terms when an oral agreement has not been reduced to a formal contract. It may also be a contract used to set forth the basic principles and guidelines under which the parties will work together to accomplish their goals.

MS4. Municipal Separate Stormwater Sewer System.

National Pollutant Discharge Elimination System (NPDES). *The national program for issuing, modifying, revoking and re-issuing, terminating, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of the Clean Water Act.*

Nonpoint sources (NPS). *Pollution that originates from multiple sources over a relatively large area. Nonpoint sources can be divided into source activities related to either land or water use including failing septic tanks, improper animal-keeping practices, forest practices, and urban and rural runoff.*

NPSAC. Nonpoint Source Advisory Committee.

NRCS. Natural Resources Conservation Service.

OSTS. Onsite sewage treatment systems (*e.g.,* septic systems and alternative waste treatment systems).

Phased/staged approach. *Under the phased approach to TMDL development, load allocations and waste load allocations are calculated using the best available data and information recognizing the need for additional monitoring data to accurately characterize sources and loadings. The phased approach is typically employed when nonpoint sources dominate. It provides for the implementation of load reduction strategies while collecting additional data.*

Point source. *Pollutant loads discharged at a specific location from pipes, outfalls, and conveyance channels from either municipal wastewater treatment plants or industrial waste treatment facilities. Point sources can also include pollutant loads contributed by tributaries to the main receiving water stream or river.*

Pollutant. *Dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water. (CWA section 502(6)).*

Pollution. *Generally, the presence of matter or energy whose nature, location, or quantity produces undesired environmental effects. Under the Clean Water Act, for example, the term is defined as the man-made or man-induced alteration of the physical, biological, chemical, and radiological integrity of water.*

Public comment period*. The time allowed for the public to express its views and concerns regarding action by the USEPA or states (e.g., a* Federal Register *notice of a proposed rule-making, a public notice of a draft permit, or a Notice of Intent to Deny).*

Publicly owned treatment works (POTW). *Any device or system used in the treatment (including recycling and reclamation) of municipal sewage or industrial wastes of a liquid nature that is owned by a state or municipality. This definition includes sewers, pipes, or other conveyances only if they convey wastewater to a POTW providing treatment.*

Rapid Bioassessment Protocol II (RBP II). A suite of measurements based on a quantitative assessment of benthic macroinvertebrates and a qualitative assessment of their habitat. RBP II scores are compared to a reference condition or conditions to determine to what degree a water body may be biologically impaired.

Riparian areas. *Areas bordering streams, lakes, rivers, and other watercourses. These areas have high water tables and support plants that require saturated soils during all or part of the year. Riparian areas include both wetland and upland zones.*

Riparian zone. *The border or banks of a stream. Although this term is sometimes used interchangeably with floodplain, the riparian zone is generally regarded as relatively narrow compared to a floodplain. The duration of flooding is generally much shorter, and the timing less predictable, in a riparian zone than in a river floodplain.*

Runoff. *That part of precipitation, snowmelt, or irrigation water that runs off the land into streams or other surface water. It can carry pollutants from the air and land into receiving waters.*

SE/R-CAP. Southeast Rural Community Assistance Project.

Sediment. In the context of water quality, soil particles, sand, and minerals dislodged from the land and deposited into aquate systems as a result of erosion.

Septic system*. An on-site system designed to treat and dispose of domestic sewage. A typical septic system consists of a tank that receives waste from a residence or business and a drain*

field or subsurface absorption system consisting of a series of percolation lines for the disposal of the liquid effluent. Solids (sludge) that remain after decomposition by bacteria in the tank must be pumped out periodically.

Sewer. *A channel or conduit that carries wastewater and storm water runoff from the source to a treatment plant or receiving stream. Sanitary sewers carry household, industrial, and commercial waste. Storm sewers carry runoff from rain or snow. Combined sewers handle both.*

Source. An origination point, area, or entity that releases or emits a stressor. A source can alter the normal intensity, frequency, or duration of a natural attribute, whereby the attribute then becomes a stressor.

SPCA. Society for the Prevention of Cruelty to Animals.

Staged Implementation. A process that allows for the evaluation of the adequacy of the TMDL in achieving the water quality standard. As stream monitoring continues to occur, staged or phased implementation allows for water quality improvements to be recorded as they are being achieved. It also provides a measure of quality control, and it helps to ensure that the most cost-effective practices are implemented first.

Stakeholder. Any person with a vested interest in the TMDL development.

TDN. total digestible nutrients.

TMDL Implementation Plan. A document required by Virginia statute detailing the suite of pollution control measures needed to remediate an impaired stream segment. The plans are also required to include a schedule of actions, costs, and monitoring. Once implemented, the plan should result in the previously impaired water meeting water quality standards and achieving a "fully supporting" use support status.

Total Dissolved Solids (TDS). A measure of the concentration of dissolved inorganic chemicals in water.

Total Maximum Daily Load (TMDL). *The sum of the individual wasteload allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources and natural background, plus a margin of safety (MOS). TMDLs can be expressed in terms of mass per time, toxicity, or other appropriate measures that relate to a state's water quality standard.*

Total Suspended Solids (TSS). Usually fine sediments and organic matter. Suspended solids limit sunlight penetration into the water, inhibit oxygen uptake by fish, and alter aquatic habitat.

TRC. Total Residual Chlorine. A measure of the effectiveness of chlorinating treated wastewater effluent.

USDA. United States Department of Agriculture.

USDHHS. .. United States Department of Health and Human Services

USEPA. United States Environmental Protection Agency.

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.

VDACS. Virginia Department of Agriculture and Consumer Services.

DCR. Virginia Department of Conservation and Recreation.

DEQ. Virginia Department of Environmental Quality.

VASCI. Virginia Stream Condition Index.

VCE. Virginia Cooperative Extension.

VDH. Virginia Department of Health.

VDOF. Virginia Department of Forestry.

Watershed. *A drainage area or basin in which all land and water areas drain or flow toward a central collector such as a stream, river, or lake at a lower elevation.*

WHIP. USDA Wildlife Habitat Incentive Program. WHIP is a voluntary program for landowners and land users who want to develop or improve wildlife habitat on private agriculture-related lands.

WQIA. Water Quality Improvement Act.

WQIP. Water Quality Improvement Plan.

WQMIRA. Virginia's 1997 Water Quality Monitoring, Information, and Restoration Act (§62.1-44.19:4 through 19:8 of the Code of Virginia), or NPS management measures.

WQMP. Water Quality Management Plan.

WRP. Wetland Reserve Program.

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APPENDIX A

Working Group and Steering Committee Minutes and Reports

Clinch River and Cove Creek Water Quality Improvement Plan:
Minutes for the 1st Agricultural and Residential Work Group Meeting
Senior and Community Building, Nickelsville, VA
March 24, 2016, 6:00 p.m. – 8:00 p.m.

Attendees:

Eddie Skeen, Watershed Resident, Farmer, County PSA Board member
Lucas Kerns, Virginia Department of Forestry
Ronald Lambert, The Nature Conservancy
Braven Beaty, The Nature Conservancy
Becky Bryant, Mayor, Town of Nickelsville
Betty Salyer, Watershed Resident
Kelly Miller, Virginia Department of Environmental Quality
Martha Chapman, Virginia Department of Environmental Quality

Introductions were made among the attendees and Kelly reviewed the need and purpose for developing a water quality improvement plan in the watershed. The group then discussed information in the agricultural and residential handouts provided by the Virginia Department of Environmental Quality (DEQ).

Agricultural Discussion:

- Trends for agricultural production in the watershed:
  - More cattle
  - More hobby farmers
  - Sheep on the decline
  - Different kind of agriculture now – less row crops and more cattle
  - Seems to be more corn grown for silage
  - Several horses

- Discussion on dairy cows:
  - The livestock estimate from the TMDL indicated 550 milk cows in the Moll/Copper Creek TMDL watershed. The group felt these cows are probably located in the Russell County portion of the watershed. Martha is going to follow-up with SWCD and Extension Agents for both counties.

- Land Cover:
  - Less cropland than in the past
  - More logging now but not as a conversion, forest is left to regenerate
  - Forest cover is probably more now than 20 years ago
  - More pasture now than a few years ago
  - Trend toward some transition of unmanaged farmland – goes in cycles; second generation lets the farm grow up, then sold, and becomes farm again

- Sources of bacteria:
    - Everyone felt the number of wildlife has risen over the past few years
    - Agreed upon sources (based on level of contribution):
        - Cattle
        - Wildlife
        - Pockets of inadequate septic systems – lots of karst areas in the watershed
        - The group decided bacteria from pets is not as large a contributor as other sources and has little impact since no location in the watershed for concentrated pet populations or opportunities for concentrated runoff from pets (dog parks or kennels)
        - Bacteria source tracking is no longer a relied upon method for determining impairment sources.

- Participation in conservation programs:
    - Mr. Skeen indicated he has participated in cost-share programs with the Scott County Soil and Water Conservation District and was happy with the result.
    - The biggest barrier to participation in conservation programs is people don't like government interference on management of their land.
    - Most landowners in watershed are land rich and cash poor.
    - Some people don't want to deal with the maintenance requirements of agricultural BMPs.
    - Suggest researching Scott County land use taxation and possible benefits
    - Because of topography, farmers feed near streams.
    - Farm access road should be promoted more as an effective BMP.
    - Switch promotion of BMPs to farm operation and herd health improvements instead of environmental benefit.
    - Farmers get discouraged when they sign up for a conservation program but are not funded.
    - Suggest working with Scott County SWCD to review unfunded applications when a new program comes around.
    - Promote programs through the FSA newsletter, Cattlemen's Association, and Horse Owners Association.
    - Neighbor to neighbor promotion is important.
    - Research the horticulture facility at the vocational school.
    - Research usefulness of horse waste storage at the Dungannon Horse Park.

Residential Discussion:

- Septic/Sewage:
    - Research how much of the study watersheds have access to public sewer
    - Research historic sewage issues in Copper Creek & Rye Cove areas
    - Consider how to reach out to residents who need help dealing with their septic issues without causing fear
    - Promote any septic assistance programs as helping rather than enforcement

- Logistically, septic pump-outs are difficult and have become unaffordable; recent County estimates have ranged from $450-$900.
- Research any ordinances or VDH repercussions for failing septic systems.
- Investigate availability of SERCAP funding for Scott County.
- Investigate Fiscal Stress Index for the subject watersheds.
- Straight pipes exist because of topography and poor soils; no room for septic system or ground is too rocky; no public sewer available.
- Funding is not available for new systems; funding can only be used to correct existing problems.
- Research if funding could be used to install pump-stations.
- Most towns have public water but outside town limits have no public water.
- Small sewer plant upgrades are needed in the Town of Nickelsville but no funding is available; the Town has tried many sources including Rural Development but the Town is unable to qualify for loans due to their debt-income ratio. Research debt forgiveness options.
- False assumption that all building/structures hooked to public sewer are functioning
- Research how to determine the impact from minor municipal wastewater treatment plants.

Conclusion:

The meeting concluded with a recap of action items:

1. Martha will resend monitoring data to Mr. Skeens
2. Becky will provide the number of public sewer customers in Nickelsville
3. The Government Workgroup will be meeting soon after tonight

The group discussed the next steps including: government workgroup meeting, formation of a steering committee, and adjusting data based on public comment for inclusion in the modeling and reduction scenarios. Martha mentioned another Agricultural & Residential Workgroup meeting may be needed.

MINUTES

Clinch/Cove Creek IP

Government Workgroup Meeting

WHEN: **April 13, 2016; 1:00-3:00**

WHERE: **Scott County Soil & Water Conservation District Office**
369 Gateway Plazas, Suite 101
Gate City, VA 24251

ATTENDEES:

Matthew Wood, Scott County SWCD
Shelia Richards, Scott County SWCD
Brad Stallard, Virginia Department of Health
Andrew Gilmer, Clinch Valley SWCD
Brandon Blevins, Clinch Valley SWCD
Chris Burcher, Upper Tennessee River Roundtable/U.S. Fish & Wildlife Service
Mark Jessee, Natural Resources Conservation Service, Scott County
Scott Jerrel, Virginia Cooperative Extension, Scott County
Martha Chapman, Virginia Department of Environmental Quality
Stephanie Otis, Virginia Department of Environmental Quality
Kelly Miller, Virginia Department of Environmental Quality

Martha Chapman facilitated the meeting beginning with introductions, background information, and defining the meeting goals as:

1) Review the data presented in the 2014 TMDL Study for likelihood and accuracy
2) Gather local information on data presented in the TMDL Study
3) Gather corrective solutions from regulatory and conservation agencies to address the pollutant loads

DISCUSSION QUESTIONS

Regulatory Controls

Question: We are required to identify in the IP regulatory controls in place that could be used to promote implementation. This includes the state's Agricultural Stewardship Act and VDH's Sewage Handling and Disposal Regulations. What about other possible regulations and ordinances?

Responses:

Duffield and Nickelsville have public sewer. Unsure of mandatory hook-up requirements.

No other regulatory controls.

Question: Any "Scoop the Poop" ordinances?

Responses:

No concentrated urbanized areas in the watershed for pet waste to be concentrated enough to impact. Likely no pet waste ordinances.

Pet waste should not be considered a problem in public areas.

One significant Dachshund breeder is located along the river. An estimated 300 dogs are on site. This could be a potential impact.

Question: Do any local governments have a septic tank pump-out ordinance?

Responses: Likely no.

Question: Are there any requirements for failing septic systems to be repaired? VDH orders? Building Department?

Responses: Different definitions of failing septic system and straight pipe. The TMDL formula assigns every illicit discharge as a straight pipe. The VDH differentiates gray water straight pipes and sewage straight pipes.

Question: Do any localities have mandatory connection ordinances to public sewer when available?

Responses: Duffield and Nickelsville have public sewer. Unknown if they have mandatory hook-up requirements.

Agricultural Programs and Implementation Locally

Question: Examining the livestock numbers from the TMDL, do these numbers look accurate?

Responses:

Dairy: dairy cow numbers are inaccurate. 500 dairy cows are not present in the county much less the watershed. Both SWCDs and NRCS know of one, 25 cow dairy in the watershed. This farm is a CREP participant and all water is fenced with a riparian buffer.

Beef: Doubt 10,000 beef cattle throughout the watershed. According to VCE, only 26,000 beef cattle in all of Scott County.

Sheep: VCE states 3200-3300 sheep in whole of Scott County. 2300 sheep in the watershed may be disproportionate.

Horses: Yes, very likely the horse number is correct.

Swine: Yes, hogs are present in fair numbers at the headwaters of the study area.

Question: What is the level of participation in agricultural conservation programs?

Responses:

Good participation. Never enough funding every year to install BMPs on all the interested farmers.

Fencing is not a new conservation practice. The 100% incentive has really increased participation. There is presently a significant backlog of 100% SL-6 applications.

The 100% cost-share is detrimental to the program. It is a concern when the farmer has no investment in the BMP and maintenance and usefulness may suffer. 80/20 cost-share rate would be better.

SWCD tracking program conservation practices considered but NRCS practices, unless state tax credited, are not in the SWCD system.

Question: Is there adequate funding for these programs?

Responses:

No, funding is a big barrier.

Always more requested than money available.

Being able to combine programs and funding sources to best serve the participant is key.

The Resource Conservation Partnership Program (RCPP) just awarded, through partnership with The Nature Conservancy, $680,000 to support agricultural conservation practices in the Clinch & Powell Rivers. This will help with unmet need.

Environmental Quality Incentive Program (EQIP) is still well funded.

Questions (combined from agenda): What is the estimate of farmers not participating in federal and or state cost-share programs locally? Is adequate funding for conservation programs the barrier to participation? Or is participation hindered by other factors? If so, what?

Responses:

Farmers resist because of funding availability or having their portion in cash.

Conservation practices require more management effort and maintenance.

Small farms do not have enough available pasture to convert a portion to riparian buffer.

Copper Creek is destructive at flood stage. Farmers are reluctant to install streamside practices for fear they will be torn out during the next flood.

Allow flash grazing within buffer practices. 75%-90% exclusion is better than 0 exclusion which is what we get when farmers do not want to completely give up available streamside pasture. Allow flash grazing outside nesting session. Could possibly get bigger buffers if grazing is allowed.

Trouble with controlling flash grazing is enforcement.

Education policy makers—farmers are managers and will do what saves money. No farmer will intentionally degrade their property.

Question: Are any farms actively receiving manure or chicken litter from off the farm?

Responses:

Yes, some farms receive poultry litter from Green Valley and farms in North Carolina. These require current nutrient management plans.

Could check with Carl Kling, NM Planner for DCR to see how many farmers in the watershed have nutrient management plans.

Waste storage structures and winter feeding areas require nutrient management plans as well.

Question: Do you believe any voluntary agricultural cost-share practices are being implemented?

Responses:

Yes, farmers routinely do cover crops without any assistance.

Other farmers voluntarily fence off water, maybe not to specifications, but do restrict access.

Interior fencing is a management tool for better pasture, especially on small farms. This is done without any agency involvement.

Farmers fence out woods to protect animal health; keep cattle away from poisonous plants.

Farmers routinely soil test and will not waste money on fertilizer unless they have to.

No-till seeding is now the preferred method of pasture and crop planting.

Farmers are managers and are likely to do what saves them money.

Question: How can we increase participation in agricultural conservation programs?

Responses:

More funding.

Combining funding sources.

Sewage Handling and Disposal

Question: Examining the residential septic information from the TMDL, do these numbers look accurate?

Responses:

Again, not every discharge is a sewer discharge in the eyes of the VDH. Some assumed straight pipe numbers in the TMDL may be only gray water discharges.

Suggest using the concrete numbers from Butcher Fork in Wise County to model the Copper Creek septic numbers. The watersheds, topography, and populations are similar and would accurately mimic the septic needs in the Clinch-Cove IP. VDH has this data and have offered to share with MapTech.

Homes are very close to creek, can't do traditional systems and alternatives are very, very costly.

Question: Are there any specific areas of the watershed known to have historical or chronic sewage issues?

Responses:

Homes are not concentrated in this watershed and so no awareness of any areas where concentrated septic problems are issues.

Question: Are there certain communities/areas that could be referenced in the IP that generally have a higher number of septic system failures?

Responses:

Possibly some areas of straight pipes around Mabe & Stanleytown.

Nickelsville Wastewater Treatment Plant has frequent overflows.

Question: Do the counties have any plans for extending sewer lines in the near future?

Responses:

No plans for extensions.

Question: What is the distance from a sewer line to a house for requiring hookup?

Not discussed.

Question: Do the counties have addresses for houses on sewer?

Responses:

Yes, for Nickelsville, the mayor has agreed to share this information.

Question: If grant funds are made available to address straight pipes and failing septic systems which local agency/organization would possibly be interested and best suited for this role?

Responses:

SWCDs have to be involved in order to input septic practices into the tracking program.

In other places, the SWCD, VDH and the PDC have partner edon successful residential projects. LENOWISCO has successfully partnered on other grants to fund residential septic issues.

Question: How could we promote solutions to septic issues?

Responses:

Must be voluntary. People are scared to admit they have a problem.

Question: How could we promote any available assistance funding?

Responses:

VDH when responding to complaints

Check to see if SERCAP is an option

Septic tank pump & repair companies

Targeted outreach

Pet Waste

Question: Are there hunt clubs, kennels, other boarding facilities where dogs are confined locally long-term or either seasonally? Should these be considered as a potential source issue to address in the IP?

Responses:

One Dachshund breeder in the watershed with an estimated 300 dogs on site.

Forget about pet waste as a whole being a significant contributor. Not enough urban areas.

Other Bacteria Sources

Question: Are there any permitted land applied bio-solids?

Responses:

As far as the group knew, there were no land applied biosolids.

DEQ will check permit numbers to verify.

Question: Are there other potential sources of bacteria that have not been mentioned that should be discussed?

Responses:

Wildlife are a more significant source than presently accounted for.

Integration with Other Activities and Planning in the Area

Question: Are there existing or planned activities, studies, planning efforts that should be referenced in the IP since these could possibly help with meeting IP goals?

Not discussed.

Monitoring

Question: How many trend stations are in the watersheds? Where are they located?

Responses:

DEQ data were presented as a hand-out.

Clinch River and Cove Creek Monitoring Stations

Station ID	Stream Name	Location	Last Sampled
6BCLN206.70	Clinch River	Off Rt. 627, 4.3 miles downstream of USGS gage	02/08/2016
6BBKW005.82	Blackwater Creek	Bridge on Rt. 70	11/14/2012
6BCOV001.68	Cove Creek	Bridge #6479 on Rt. 827 Off Rt. 649 off Rt. 65	11/13/2012
6BSTO000.45	Stock Creek	Bridge #6404 on Rt. 794	11/13/2012
6BCOP047.75	Copper Creek	Low water private bridge off Rt. 678 off Rt. 58	12/10/2012
6BCOP052.77	Copper Creek	Private bridge off Rt. 678 off Rt. 671 off Rt. 58	12/10/2012
6BMOL000.03	Moll Creek	Bridge #6248 on Rt. 678 off Rt. 58	12/10/2012
6BVAL000.25	Valley Creek	Bridge #6092 on Rt. 670 off Rt. 71	12/10/2012
6BNFC010.65	North Fork Clinch River	Bridge #6005 on Rt. 600 off Rt. 58	11/14/2012
6BNFC018.68	North Fork Clinch River	Bridge #6039 on Rt. 624 off Rt. 604 off Rt. 58	11/14/2012
6BNFC003.80	North Fork Clinch River	Ford on Rt. 621 off Rt. 600	11/14/2012

USFWS has ongoing monitoring, not bacteria

Zach Martin at Virginia Tech is monitoring, not bacteria

One trend station exists at Speers Ferry that is monitored every other month.

Last sampling was done in 2012 (above).

Violation rates are very high.

DEQ will check on Stock Creek (Foote Minerals) permit.

Question: What is the projected DEQ monitoring schedule for all stations?

Response: Every 6 years

Question: Are there any on-going or planned citizen monitoring sites in the area? Should citizen monitoring (if not in place) be included in the IP?

Responses:

None that anyone knew about.

Grant funding is available to support monitoring activities which can help identify local areas of problems

Other

Consider the impact of four-wheeler trails in streams; mud is adding sedimentation.

MINUTES

Clinch River and Cove Creek IP
Steering Committee Meeting

WHEN: **October 27, 2016; 6:00-8:00pm**

WHERE: **LENOWISCO Conference Room**
Crooked Road Tech Center
372 Technology Trail Lane, Duffield, VA 24244

ATTENDEES:

Frank Kibler, LENOWSICO PDC
Jim Kern, MapTech, Inc.
Brad Stallard, Virginia Department of Health
Braven Beaty, The Nature Conservancy
Martha Chapman, Virginia Department of Environmental Quality
Stephanie Kreps, Virginia Department of Environmental Quality

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Meeting goal: To prepare for the final public meeting: 1) Provide feedback on the presentation and public document and 2) Finalize process for posting public document and receiving comments.

Jim Kern (MapTech, Inc.) completed the draft Implementation Plan (technical document) and will present this report at the final public meeting. Jim presented the draft PowerPoint presentation to the Steering Committee and they provided feedback to clarify or add information in order to enhance the presentation.

Martha Chapman and Stephanie Kreps (DEQ) provided a draft public document for the Steering Committee to review and provide feedback. This document is based on the technical document developed by MapTech, Inc. and provides a simplified, condensed version of the report for the public.

Next steps:

- Jim will make the revisions to the presentation for the final public meeting, planned on November 17, 6pm to 8pm at the Crooked Road Tech Center located at 372 Technology Trail Lane, Duffield, VA 24244. An additional meeting will take place on the same day and time at the Senior and Community Building at Keith Memorial Park in Nickelsville, VA.
- Steering Committee feedback on the draft public document will be sent to DEQ by November 7 so that the document can be pulled together by

November 10, in time to post it online (DEQ website) for the public to access it before the meeting. Notices will be posted in the local newspapers and copies will be provided at the local libraries.

- A 30-day public comment period for the meetings will begin on November 17 and end on December 19. Written comments should be sent to Martha and she will work with Stephanie to address them.

MINUTES

Clinch River and Cove Creek IP

Final Public Meeting

WHEN: **November 17, 2016; 6:00-8:00pm**

WHERE: **1) Crooked Road Tech Center, Left wing**
372 Technology Trail Lane, Duffield, VA
2) Senior and Community Building at Keith Memorial Park
163 Spartan Band Avenue Nickelsville, VA

ATTENDEES:

Duffield:

- Frank Kibler, LENOWSICO PDC
- Brad Stallard, Virginia Department of Health
- Megan Krager, Natural Tunnel State Park
- Phillip McClellan, MapTech, Inc.
- Mark Trent, Virginia Department of Environmental Quality
- Stephanie Kreps, Virginia Department of Environmental Quality

Nickelsville:

- Danny Dixon, Vice-Mayor of Nickelsville
- Ed Skeen, Nickelsville citizen
- Betty Salyer, Nickelsville citizen
- Jim Kerr, MapTech, Inc.
- Martha Chapman, Virginia Department of Environmental Quality

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Meeting goal: Conduct final public meeting to: 1) Present the final draft of the Clinch River and Cove Creek Watershed Implementation Plan and receive initial feedback, 1) Formerly initiate the 30 day public comment period on the draft plan.

Stephanie Kreps and Martha Chapman (DEQ) gave a brief overview of the TMDL process and where we are in completing the Implementation Plan (see PowerPoint presentation). Phillip McClellan and Jim Kerr (MapTech, Inc.) presented the draft Implementation Plan based on feedback from the last Steering Committee (see PowerPoint presentation).

Next steps:

- Public comment period is November 17-December 19, 2016. Feedback should be sent to Martha Chapman (Martha.chapman@deq.virginia.gov). Comments will be reviewed and considered for the final Implementation Plan

and then submitted to EPA for approval. A hard copy of the draft public document (condensed version of the Implementation Plan) is located at the Lonesome Pine Public Library in Gate City and Russell County Library in Lebanon. Electronic copies of the public document and technical document can be found at
http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/TMDL/TMDLImplementation/TMDLImplementationPlans.aspx
(Select 'Draft TMDL Implementation Plans' and 'Clinch River and Cove Creek')

Meeting notes and presentations for the entire Implementation Plan process can be found at the following website:
http://www.deq.virginia.gov/programs/water/waterqualityinformationtmdls/tmdl/tmdlimplementation/tmdlimplementationprogress.aspx (scroll down to 'Clinch River and Cove Creek- Bacteria IP Development in Lee, Russell and Scott Counties').