A TOTAL MAXIMUM DAILY LOAD REDUCTION IMPLEMENTATION PLAN FOR FECAL COLIFORM REDUCTION FOR THE NORTH RIVER WATERSHED

11/30/2015

Submitted to the Town of Bridgewater

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Executive Summary

The executive summary shall include a section for each of the chapters in the IP, with a brief summary of each following chapter. Because of this, it cannot be written until the IP has been completed.

Introduction

TMDL is an acronym for Total Maximum Daily Load, which is the maximum amount of any sort of pollutant that a water body can assimilate without surpassing the state water quality standard. Most natural water bodies (rivers, lakes, or streams) can accommodate a certain amount of pollutant naturally without degradation. If the water body surpasses the water quality standard 10.5% of the time during an assessment period, the water body is placed on the Commonwealth of Virginia's 303(d) List of Impaired Waters.

The draft 2014 list may be found at http://deq.state.va.us/Programs/Water/WaterQualityInformationTMDLs/WaterQualityAssessments/2014305%28b%29303%28d%29IntegratedReport.aspx.

Several of the subsidiary basins of North River are on the list. Many, including Dry River, Muddy Creek, Pleasant Run, and Mill Creek already have active TMDL implementation plans in place.

The Town of Bridgewater is currently required to address fecal coliform with a TMDL Implementation Plan. This TMDL was originally developed by the Department of Biological Systems Engineering at Virginia Tech in January 2006 and was subsequently modified by the EPA in a letter to DEQ dated December 9, 2008. This modification allows the Town 9.75e+09 CFU/year of fecal coliform. (A "CFU" is a colony-forming unit and is used to estimate the number of viable bacterial cells in a sample.)

After TMDL reports are written, Virginia's 1997 Water Quality Monitoring, Information and Restoration Act states in section 62.1-44.19:7 that the "Board shall develop and implement a plan to achieve fully supporting status for impaired waters". In fulfilling the state's requirement for the development of a TMDL Implementation Plan, a framework has been established for reducing fecal coliform concentrations and achieving the water quality goals for which TMDL allocations were developed. With successful completion of the implementation plan, Bridgewater will be well on the way to restoring the impaired waters of the North River and enhancing the value of this important resource. Additionally, development of an approved implementation plan will improve the locality's chances for obtaining monetary assistance during implementation.

The detrimental effects of bacteria in food and water supplies have been repeatedly documented. For example, in May 2000, in Walkerton, Ontario a town of approximately 5,000 people, there were seven confirmed deaths with four other deaths under investigation, and over 2000 poisonings all attributed to drinking water polluted by E. *coli* Type 0157:H7 (Raine, 2000) (Miller, 2000). Financially, the contamination resulted in a $250 million class action lawsuit filed against the Ontario government. The source of the pollution according to the Cattleman's Association was probably runoff from a feedlot located more than 5 miles from the wells used for the town's water supply.

On August 8, 1994 the Virginia Department of Health was notified of campers and counselors at a Shenandoah Valley summer camp developing bloody diarrhea. E. *coli* 0157:H7 was confirmed as the causative agent. In Franklin County Virginia, 1997, an outbreak of illnesses involving 3 children was attributed

to E. *coli* (0157:H7) in Smith Mountain Lake. The children were exposed to the bacteria while swimming in the lake and a two year old was hospitalized as a result of the exposure (Roanoke Times, 1997). In August of 1998, 7 children and 2 adults at a daycare center in rural Floyd County were infected with E. *coli* (0157:H7). Upon investigation, two of the properties' wells tested positive for total coliform (Roanoke Times, 1998). On June 6, 2000, Crystal Spring, Roanoke's second largest water source, was shut down by Virginia Department of Health for E. *coli* contamination.

Isolated cases? No. Throughout the U.S., the Center for Disease Control estimates at least 73,000 cases of illnesses and 61 deaths per year caused by this one fecal coliform pathogen (i.e. E. *coli* 0157:H7 bacteria) (CDC, 2001). Other fecal coliform pathogens (e.g. E. *coli* 0111) are responsible for similar illnesses. In addition, other bacterial and viral pathogens are indicated by the presence of fecal coliforms. Whether the source of contamination is human or livestock 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. Water quality standards are society's implementation of legislative measures resulting from an assessment of the acceptable risks.

Successful completion of this Implementation Plan will help avoid the concerns illustrated above.

This Plan has the following components:

- Executive Summary
- Introduction
- State and Federal Requirements for Implementation Plans
- Review of TMDL development
- Public Participation
- Implementation Actions
- Measurable Goals and Milestones
- Stakeholders' Roles and Responsibilities
- Integration with Other Watershed Plans
- Potential Funding Sources

State and Federal Requirements for Implementation Plans

Currently, TMDL implementation plans are not required in the Federal Code; however, Virginia State Code does incorporate the development of implementation plans for impaired streams. There are a number of state and federal requirements and recommendations for TMDL IPs that are relevant to their implementation. These requirements and recommendations serve to create a plan that outlines a clear, detailed and achievable solution to water quality impairments. This implementation plan for the Town of Bridgewater is designed to meet the requirements of Virginia's 1997 Water Quality Monitoring Information and Restoration Act (WQMIRA). It is also designed to meet the recommendations of an approvable IP in EPA's "Guidance for Water Quality-Based Decisions: The TMDL Process" (USEPA, 1999) along with EPA's requirements for Section 319 nonpoint source grants to States. These requirements and recommendations are discussed in great detail in the TMDL technical report.

Review of TMDL Development

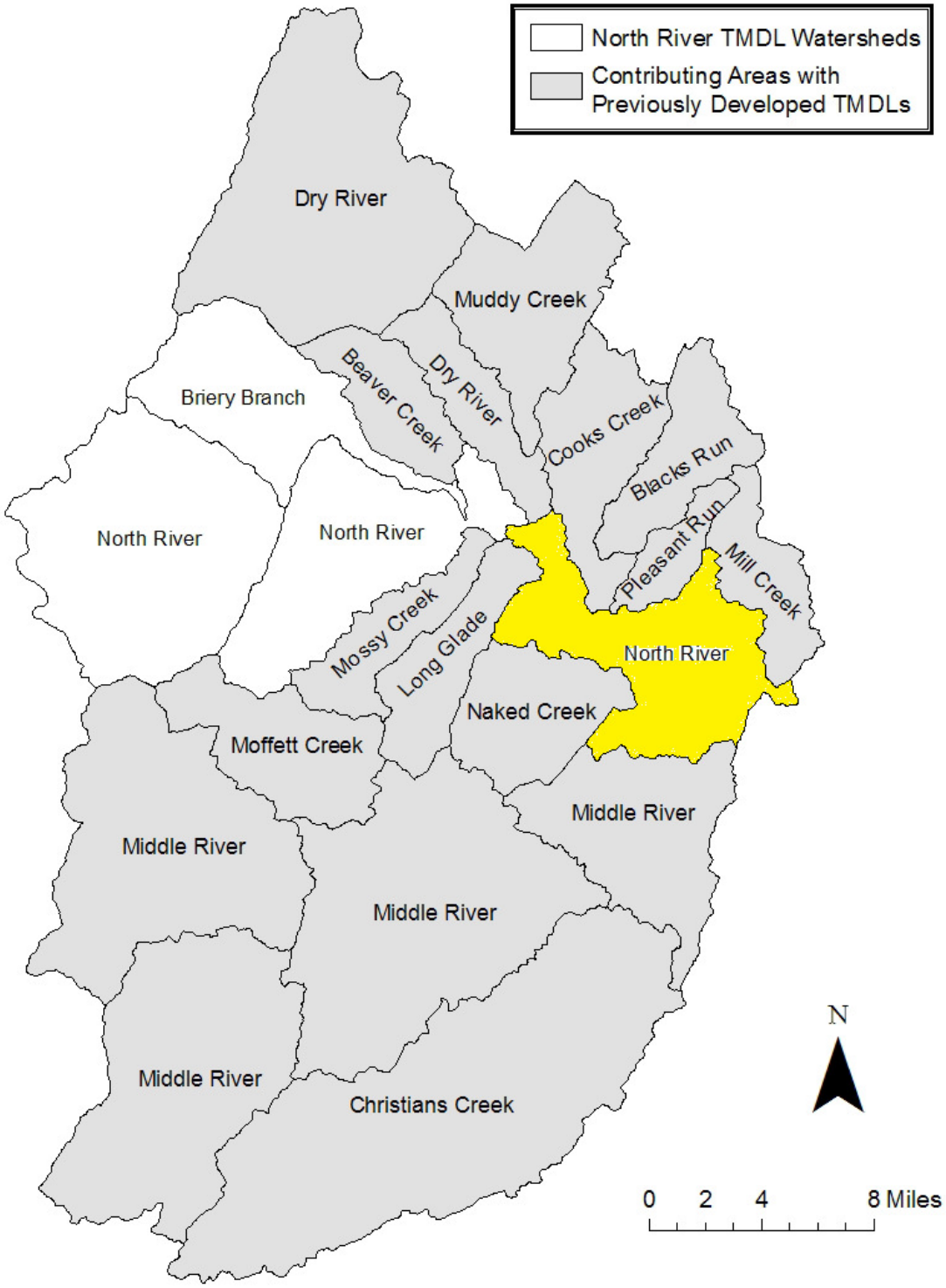
The North River watershed (VAV-B10R through VAV-29R, 523,298 acres) is located in Rockingham and Augusta Counties, Virginia, encompassing the cities of Harrisonburg and Staunton. North River flows east, merges with South River, and discharges into the South Fork of the Shenandoah River (USGS Hydrologic Unit Code 02070005). The South Fork of the Shenandoah River joins with the North Fork of the Shenandoah River to form the Shenandoah River; the Shenandoah River flows into the Potomac River; the Potomac River discharges into the Chesapeake Bay. The Chesapeake Bay has been designated a National Treasure, and is the source of much concern regarding water quality.

The North River is divided into three watersheds—the Upper, Middle, and Lower. The Town of Bridgewater is in the Lower North River, designated as sub-watershed B23 in the TMDL. The graphic below on page 6 indicates sub-watershed B23 in yellow, with gray used to designate sub-watersheds where other implementation plans have already been developed.

Water quality samples collected on North River during the 2004 Assessment Period indicated that 29%, 33%, and 37% of the samples collected at stations 1BNTH021.00, 1BNTH022.25, and 1BNTH014.08, respectively, violated the instantaneous water quality standard for bacteria. The instantaneous freshwater water quality standard for fecal coliform specifies that fecal coliform concentration in the stream water should not exceed 400 colony forming units (cfu) per 100 mL; the instantaneous standard for Escherichia coli specifies that the E. coli concentration should not exceed 235 cfu/100 mL. Due to the frequency of water quality violations at these three stations, North River remained on Virginia's 2004 303(d) list of impaired water bodies for fecal coliform. North River has been assessed as not supporting the Clean Water Act's Swimming Use Support Goal and has been on the 303(d) list since 1996.

North River remained on the State's Impaired Waterways list. The report reads, in part, "This segment remains impaired due to violations of the fecal coliform bacteria WQS at station: 1BNTH029.30 (3 violations of 6 samples); 1BNTH022.25 (5 violations of 12 samples for e-coli) 1BNTH014.08 (8 violations of 36 samples) and 1BNTH007.69 (3 violations of 12 samples for e-coli) Initial Listing Date: 2002; This segment is included in the EPA approved North River TMDL for bacteria. Federal TMDL ID # 23366. "

In order to remedy the fecal coliform water quality impairment, a Total Maximum Daily Load (TMDL) has been developed, taking into account all sources of bacteria and a margin of safety (MOS).


North River TMDL Watersheds
Contributing Areas with Previously Developed TMDLs
Dry River
Muddy Creek
Briery Branch
Beaver Creek
Dry River
Cooks Creek
Blacks Run
Pleasant Run
Mill Creek
North River
North River
North River
Mossy Creek
Long Glade
Naked Creek
Moffett Creek
Middle River
Middle River
Middle River
Middle River
Christians Creek
N
0 2 4 8 Miles

The TMDL was developed for the new water quality standard for bacteria, which states that the calendar-month geometric mean concentration of E. coli shall not exceed 126 cfu/100 mL, and that no single sample can exceed a concentration of 235 cfu/100mL. TMDLs have been previously developed for many of the tributaries to North River (the gray shaded areas in the above illustration). Standard nomenclature has been used to define three areas: the 'entire North River watershed' includes all hydrologic units making up the North River watershed; the 'North River TMDL watershed' includes only those areas without a previously developed TMDL (North River and Briery Branch); and the 'contributing areas' with previously developed TMDLs include the hydrologic units with previously developed TMDLs (Middle River, Moffett Creek, Christians Creek, Mossy Creek, Dry River, Muddy Creek, Long Glade, Cooks Creek, Blacks Run, Pleasant Run, Naked Creek, Mill Creek, and Beaver Creek). Using this nomenclature, allocation scenarios for the TMDL were developed for the North River TMDL watershed. During modeling, detailed hydrology was simulated for the entire North River watershed; detailed bacteria concentrations were simulated only for the North River TMDL watershed. Modeling files from previously developed TMDLs for the contributing areas were used to simulate bacteria for those areas, and the results of those simulations were input to the model for the North River TMDL watershed. Thus, listing of bacteria sources (including permitted facilities) was restricted to the North River TMDL watershed; other types of information specified whether they are for the entire North River watershed or just the North River TMDL watershed. Approved TMDLs are in place to implement corrective actions to achieve water quality standards in the contributing areas; the TMDL technical report details the further reductions in the North River TMDL watershed that are necessary to meet water quality standards in the entire North River. For this reason, fecal coliform bacteria concentrations from the contributing areas were modeled at the geometric mean standard (200 cfu/100 mL) during allocation scenario generation.

The TMDL allocated a non-point loading 566e10 cfu per year to sub-basin 23 from residential sources (TMDL, page 161). To quote the TMDL (pp. 106-107) "In addition to the permitted point sources, a Municipal Separate Storm Sewer System (MS4) permit is in place for the town of Bridgewater (permit number VAR040054). It is assumed that the E. coli load originating on the portion of the impervious land segments covered by the MS4 permit (ILS MS4 Load) will be controlled by those permits. The difference between the ILS MS4 allocation load and the future conditions load is 6.10e11 cfu/year, which is to be mitigated by MS4 regulation requiring implementation of best management practices to reduce pollutants to the "maximum extent practicable."

Public Participation

Public participation, "buy-in", and ownership of the water improvement process is critical to sustaining a long-term process. Immediate actions may (or may not) have an immediate effect, but it is certain that a relapse to previous behaviors will cause any short-term improvements to be lost. Citizen engagement is critical.

Engagement shall be most effective when multiple interested parties are engaged. Existing stakeholder groups include:

- Bridgewater Town government
- Virginia Department of Conservation and Recreation (VADCR)
- Virginia Department of Environmental Quality (VADEQ)
- Virginia Department of Health (VDH)
- Virginia Department of Transportation (VDOT)
- Natural Resources Conservation Service (NRCS)
- Shenandoah Valley Soil and Water Conservation District (SVSWCD)
- Friends of the North River

Engagement and outreach efforts should begin immediately, even while this IP draft is under review. These outreach efforts should have several goals:

1. They should inform the public about the regulatory environment and the end goals of the TMDL effort.
2. They should identify areas of common interest among the stakeholder groups.
3. They should educate regarding the selected BMP's and the plan of action to implement those BMP's.
4. They should educate regarding the eventual positive outcomes of the effort, including better recreational uses, increased revenue from tourism, and better public health.

Flyers, directed mailings, the use of the Town's existing newsletter and website, and public meetings may all be used to engage, educate, and enthuse the public. Website and newsletter efforts should begin immediately. Facebook and Twitter accounts should be utilized to increase Town/public communication about stormwater topics.

Upgrades to the website may include the following:

- Inclusion of third-party publications such as the EPA's "After the Storm" video series.
- Inclusion of third-party publications such as the DCR's Bay Act brochure.
- Inclusion of third-party videos such as "Fish Facing Warmer Waters" from www.chesapeakbay.net.
- Other items may be modified from the websites of other local municipalities. The City of Winchester has particularly good materials.

Hardcopy versions of this information shall also be prepared, and shall be distributed at functions such as Dayton Days or the Bridgewater Town Christmas Parade. It is recommended that these materials be prepared in both English and Spanish.

Additional employee training is expected to be minimal. Town maintenance staff already work routinely on landscaping and other tasks, and have formal training on turf maintenance and proper application of fertilizers and other soil amendments. The construction of new sanitary services places no additional skill demands on the Town. The pet waste stations need to be dumped and cleaned on a routine basis—this is not a task that requires training. It will require orientation to the new policy.

Implementation Actions

Implementation, per the requirement of the TMDL technical report, are to be to the "maximum extent practical". It is understood that "maximum extent practical" will be a topic of discussion and negotiation.

Selection of Appropriate BMP's

Potential control measures were selected following careful review of the TMDP technical report, conversations with DEQ staff, and an evaluation of the "on ground" situation in the Town. The selected control measures were chosen with an eye toward cost, ease of implementation, and water quality impacts. The difficulty of long-term operation and maintenance was also considered.

Pet waste control has been selected for early emphasis. This BMP has the advantage of being relatively straightforward, relatively low cost, and easy to explain to the public.

Currently, the Town has 49 buildings on private septic systems. (Please see the attached map.) These 49 private septics are grouped in a handful of areas. Eight of them are clustered along West Bank Street, immediately adjacent to North River. Placing these lots on public sanitary sewer is Phase II. This effort is understood to be costly.

Additional control measures exist but are not under consideration due to high cost, low improvement, or limited impact on fecal coliform. Limited impact on fecal coliform is primarily due to the fact that Bridgewater is already enacting many of these measures, and they are therefore already included in the baseline FC count. These measures include street sweeping, erosion and sediment (E&S) controls on construction sites, streambank restoration, and nutrient management for residential and urban settings.

Beyond this level of control for the pollutants of interest, practices that require the control or treatment of runoff are the primary tools available. These measures control bacteria, sediment, and phosphorus. The resulting set of additional BMPs include bioretention filters, rain gardens, and retention ponds. However, please see the discussion of integration with other plans in the appropriate section.

Quantification of BMP's

The two primary selected BMP's are listed in the table below.

BMP	Bacterial Removal Efficiency	Reference
Repaired septic system	100%	Commonwealth of Virginia. 2005. Chesapeake Bay Nutrient and Sediment Reduction Tributary Strategy. www.naturalresources.virginia.gov/Initiatives/TributaryStrategies/
Pet litter control program **with** composting	75%	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.
Pet litter control program **without** composting	40%	Research by Shenandoah Soil and Water Conservation District

Implicit in the TMDL technical report 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 urban and residential development. The principles of low-impact development (LID) should be considered, whenever feasible, as increased pollutant loads from newly developed sources could undermine the work being proposed in this IP. Bridgewater already enjoys a relatively high population of rain gardens. These, and other infiltration measures, should continue to be used.

Measurable Goals and Milestones

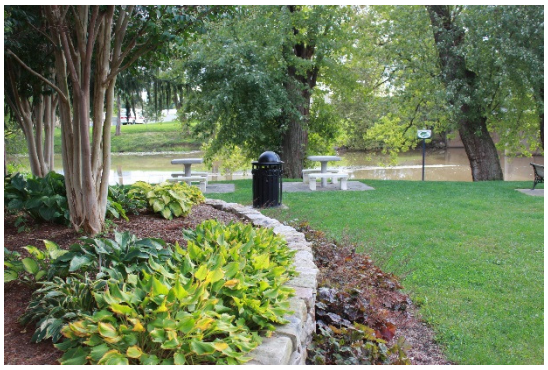
State and EPA guidance requires IPs to identify the BMPs necessary to meet the TMDL allocations. EPA guidance also requires that there is a "reasonable assurance" that implementation will be completed. The requirement of "reasonable assurance" implies that a staged scenario be developed in the case that full implementation requirements are not practical or reasonable in current conditions; consequently, implementation has been divided into two stages.

Phase 0 of implementation is to develop costs and funding sources. Initial cost estimates are provided in each phase discussion below.

The primary funding source is expected to be internal, provided by Town resources. This will certainly be true for Phase I, due to the narrow time constraints.

It is recommended that Phase II funding investigate exterior sources such as grants and cost-share items. The author team has investigated cost-share from NRCS—none are currently available that apply to urban areas. However, Virginia Department of Health has potential grants that apply to septic development. Other agencies may also provide support.

Phase I



Phase I focuses on reducing the pet-based load to North River. The North River TMDL notes that there is an average of one "dog equivalent unit" (DEU) per household in the watershed, and that each DEU produces, on average, 0.45e9 cfu/day. There are approximately 2,556 households in Bridgewater, holding approximately 2,556 DEU. This ownership generates 4.57e14 cfu/year as potential loading to North River.

Phase I shall seek to eliminate 40% of this waste load, or 1.83 cfu/year, from North River. To meet this requirement, public education is necessary. To engage the public, 2,556 flyers shall be enclosed with water bills during Q4 2015. Additionally, a minimum of 3 public meetings shall be held within a six month time frame.

There is one veterinarian in Bridgewater, and this company shall be encouraged to adopt a waste control program.

Finally, each of the ten public parks in Bridgewater shall receive a public pet waste receptacle, either composting or non-composting, by May 1, 2016.

Shenandoah Soil and Water Conservation District has an extensive library available to support these educational efforts. They also coordinate the purchase of infrastructure items to obtain discounts.

Phase I is expected to cost $6,000 to $8,000.

Phase II

Phase II begins the process of removing existing private septic systems and placing those buildings on public sewer. This process shall begin with the eight residences on West Bank Street. The septic fields of some of these residences are within 30' of the river. Attaching them to public sewer is expected to reduce groundflow contamination by 40 cfu/ 100 ml, as noted on page 51 of the TMDL.

An appropriate milestone for this phase is design completion by the end of 2016, with construction complete by the end of 2017.

Until detailed design is complete, precise costs will be impossible to determine. Previous similar projects indicate a cost of $250,000 to $500,000, depending primarily on the degree of use of Town resources for construction.

Phase I effectiveness shall be measured by weighing the combined waste removed from the pet waste stations and transported to the Rockingham County landfill. The stations have already been ordered but not yet placed. It is expected that initially the stations will be dumped monthly, and that the frequency will be increased as public awareness, and hence participation, increases. The weight of the removed waste can be converted into a removed amount of nitrogen, phosphorous, and e. coli.

Phase II effectiveness shall be measured by monitoring the water meters associated with the new services and converting to typical residential e. coli loading.

Stakeholders' Roles and Responsibilities

Achieving the goals of this effort (i.e. improving water quality and removing these waters from the impaired waters list) is without a doubt dependent on stakeholder participation. Not only the local stakeholders charged with implementation of control measures, but also the stakeholders charged with overseeing our nation's human health and environmental programs must first acknowledge there is a water quality problem and then make changes in our operations, programs, and legislation to address these pollutants. The US EPA has the responsibility of overseeing the various programs necessary for the success of the Clean Water Act. 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 include: Virginia Department of Environmental Quality (VADEQ), Virginia Department of Conservation and Recreation (VADCR), Virginia Department of Agriculture and Consumer Services (VDACS), and Virginia Department of Health (VDH).

VADEQ has responsibility for monitoring the waters to determine compliance with state standards, and for requiring permitted, point dischargers to maintain loads within permit limits. They have 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 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 groundwater contamination. In response to increasing demand from the public to develop new regulations dealing with animal waste, in 1999, the Virginia General Assembly passed legislation requiring VADEQ to develop regulations for the management of poultry waste in operations having more than 200 animal units of poultry (about 20,000 chickens), (ELI, 1999).

VADCR holds the responsibility for addressing nonpoint sources (NPS) of pollution. One such program is Virginia's Erosion and Sediment Control Law. Under this provision, an individual or entity must have an approved erosion and sediment control plan and a certification that the plan will be implemented before they can obtain a building permit. However, most VADCR programs dealing with agricultural NPS pollution historically have been through education and voluntary incentive programs. These cost-share programs were originally developed to meet the needs of voluntary partial participation and not the TMDL-required 100% participation of stakeholders. To meet the needs of the TMDL program and achieve the goals set forth in the CWA, the incentive programs must be reevaluated to account for 100% participation. It should be noted that VADCR does not have regulatory authority over the majority of issues addressed here except for the Erosion and Sediment Control program.

Through Virginia's Agricultural Stewardship Act, VDACS Commissioner of Agriculture has the authority to investigate claims that an agricultural producer is causing a water quality problem on a case-by-case basis (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 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 2 staff members dedicated to enforcing the Farm Stewardship Act, and very little funding is available to support water quality sampling. The Agricultural Stewardship Act is entirely complaint driven. As of May 2006, 152 complaints, of which 38% were founded, had been received statewide since the initiation of the legislation. No fines have resulted from these complaints.

VDH is responsible for maintaining safe drinking water measured by standards set by the US EPA. Their duties also include septic system regulation and regulation of biosolids land application. Like VDACS, VDH is complaint driven. Complaints can range from a vent pipe odor that is not an actual sewage violation and takes very little time to investigate, to a large discharge violation that may take many weeks or longer to effect compliance. In the scheme of these TMDLs, VDH has the responsibility of enforcing actions to correct or eliminate failed septic systems and straight pipes, respectively. 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 who can be shown to be causing some harm to the claimant. Through hearing the claims of citizens in civil court, and the claims of government representatives in criminal court, the judicial branch of government also plays a significant role in the regulation of activities that impact water quality.

The Clean Water Act Section 303(d) calls for the identification of impaired waters. It also requires that the streams be ranked by the severity of the impairment and a Total Maximum Daily Load be calculated for that stream that would bring its water back into compliance with the set water quality standard.

Currently, TMDL implementation plans are not required in the Federal Code (pending administrative proceedings) however; Virginia State Code does incorporate the development of implementation plans for impaired streams. The nonpoint source part of the Clean Water Act was largely ignored by EPA until citizens began to realize that regulating only point sources was no longer maintaining water quality standards. Beyond the initiation of the CWA, the entire TMDL program has been complaint driven. Lawsuits from citizens and environmental groups citing USEPA was not carrying out the statutes of the CWA began as far back as the 1970's and have continued until the present. In the state of Virginia in 1998, the American Canoe Association and the American Littoral Society filed a complaint against EPA for failure to comply with provisions of §303d. The suit was settled by Consent Decree, which contained a TMDL development schedule through 2010. It is becoming more common for concerned citizens and environmental groups to turn to the courts for the enforcement of water quality issues.

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

of citizens, particularly those who are least able to protect themselves (i.e. children), is at stake. While it is unreasonable to expect that the natural environment (e.g. streams and rivers) can be made 100% free of risk to human health, it is possible and desirable to make what improvements we can. Virginia's approach to correcting NPS pollution problems has been and continues to be encouragement of participation through education and financial incentives. However, if voluntary approaches prove to be ineffective and the public "will" is to force compliance with existing laws through court actions, then landowners may be required to implement corrective actions without economic assistance from the state and may face punitive fines for non-compliance.

However, at the end of all discussions about interest and participation lies legal responsibility for pollutant reduction. In this case, the Town of Bridgewater is corporately responsible, with execution falling to the Director of Stormwater and Construction Management. The Town Manager holds the responsibility of legally representing the Town. Practical construction and maintenance fall to the Town's Maintenance Department. Please note that although the Town has existing stormwater regulations, no section of code deals specifically with MS4 requirements. Efforts are underway to alter the Town code to address these needs.

Integration with Other Watershed Plans

Bridgewater and its MS4 permit are but one component in the overall health of the North River watershed. Implementation plans have been developed for 19 of the 23 sub-watersheds, and a periodic review of those plans should be performed in order to obtain insight to the most effective BMP's in this particular watershed.

The Virginia Tributary Strategy, released in March 2005, outlines an approach for meeting ambitious reductions in nitrogen, phosphorus and sediment. The document for the Shenandoah/Potomac Basin identifies types and estimated quantities of specific BMPs that are needed to meet water quality goals in the Bay. The strategy calls for implementation of conservation BMPs on 92% of agricultural lands, enhancement of Virginia's stormwater management and erosion and sediment control programs and nutrient management on approximately 90%, 78% and 99% of agricultural, mixed open and urban lands, respectively. The quantity estimates listed in the strategy are based on a large watershed scale and are not specific enough to translate directly to addressing the impairments in watersheds the size of North River.

That said, the development of Bridgewater's Chesapeake Bay TMDL Implementation Plan will influence the final BMPs selected for this fecal coliform TMDL. Some of the infiltration BMPs have a positive influence on fecal coliform, and in the aggregate, may affect the final decisions made in this arena.

Potential Funding Sources

Potential funding sources include:

Virginia Water Quality Improvement Fund: This is a permanent fund established by the Commonwealth of Virginia in order to assist local stakeholders in reducing point and nonpoint source pollutant loads to Virginia's waters. A primary objective of this fund is to reduce the flow of excess sediment, nitrogen and phosphorus into the Chesapeake Bay. Eligible organizations include local governments, SWCDs, universities and individuals. Grants for point sources are administered through VADEQ and grants for nonpoint sources are administered through VADCR. Most WQIF grants provide matching funds on a 50/50 cost-share basis. A request for proposals is distributed annually. Information is available at www.dcr.virginia.gov/sw/wqia.htm.

Southeast Rural Community Assistance Project (Southeast RCAP): The mission of this project is to promote, cultivate, and encourage the development of water and wastewater facilities to serve low-income residents at affordable costs and to support other development activities that will improve the quality of life in rural areas. The project provides grants to low-income families (below 125% of the federal poverty level) for new wastewater facilities and sewer hook-up costs. Information is available at www.southeastrcap.org.

Chesapeake Bay Small Watershed Grants Program: The Chesapeake Bay Small Watershed Grants Program provides grants to organizations working on a local level to protect and improve watersheds in the Chesapeake Bay basin, while building citizen-based resource stewardship. The program is a partnership between the EPA and NFWF. Information is available at www.nfwf.org/programs/chesapeake.

Community Development Block Grant Program: The Virginia 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. Specific activities may include provision of public facilities and improvement, such as new or improved water and sewer facilities. Rockingham County and the City of Harrisonburg are eligible communities. Information is available at www.dhcd.virginia.gov/CD/CDBG/.