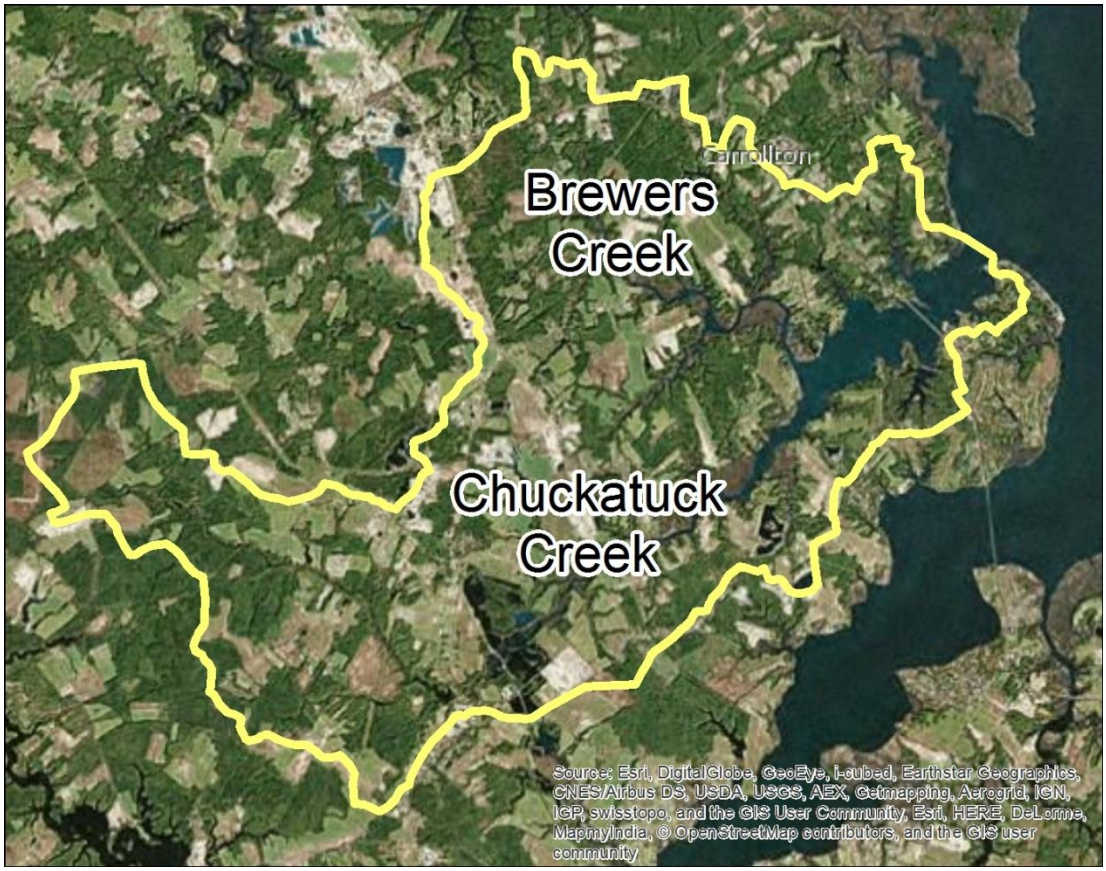
Water Quality Implementation Plan for the Chuckatuck Creek and Brewers Creek Watershed

Technical Report

Shellfish Areas Listed Due to Bacterial Contamination



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The Virginia Department of Environmental Quality in cooperation with the stakeholders of Isle of Wight County and the City of Suffolk

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ACKNOWLEDGEMENTS

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Nansemond River Preservation Alliance
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Suffolk News-Herald
Citizens and stakeholders in Chuckatuck and Brewers Creeks

EXECUTIVE SUMMARY

This document includes restoration activities for Chuckatuck Creek and Brewers Creek in Isle of Wight County and the City of Suffolk, Virginia. Both creeks drain into the Lower James River. A TMDL report that was approved by EPA in 2010 identified the impairments in this watershed.

These creeks do not support Virginia's bacteria standards for the production of edible and marketable seafood. The applicable fecal coliform bacteria standard specifies that the geometric mean shall not exceed an MPN (most probable number) or CFU (colony forming unit) of 14 per 100 milliliters, and the 90th percentile fecal coliform value for a sampling station not exceed an MPN of 49 per 100 milliliters for a 3-tube decimal dilution test or 31 CFU per 100 milliliters for a membrane filtration test. For every waterbody on the Clean Water Act (CWA) section 303(d) list of impaired waters, both the CWA and the U.S. Environmental Protection Agency (EPA) require that states develop a Total Maximum Daily Load (TMDL) for each pollutant (40 CFR Part 130). TMDLs establish the reduction in loads needed to restore these waters. The Virginia Water Quality Monitoring, Information and Restoration Act (WQMIRA) directs the State Water Control Board (SWCB) to "develop and implement a plan to achieve fully supporting status for impaired waters."

Review of TMDL Development

The TMDL was developed using a simplified tidal volumetric model along with bacterial source tracking to aid in identifying sources (i.e. human, livestock, pet, and wildlife) of fecal contamination in the development of the TMDL. The TMDL for Chuckatuck Creek and Brewers Creek was based on the 30-sample 90th percentile concentration, which was determined to represent the critical condition and require greater reductions. The bacteria TMDL is comprised of three required load components – the waste load allocation (WLA) from point sources, the load allocation (LA) from nonpoint sources, and a margin of safety (MOS), as summarized in *Table ES-1*.

Under Waste Load Allocation, there are two MS4 permits within the watershed, one for Isle of Wight County and one for the City of Suffolk, as well as a future growth load calculated using 1% of the total TMDL. MS4 programs are in the process of developing TMDL Action Plans to address WLAs to meet the special conditions in their permit for approved TMDLs. The Action Plan will identify and implement BMPs and other management strategies to meet the TMDL WLA and achieve compliance with the special condition.

Load allocations are typically addressed through the TMDL Implementation Plan to characterize the assortment of corrective actions needed to reduce nonpoint source pollutant loads. The LA of the TMDL is further defined along with the reduction required by the TMDL plan (*Table ES-2)*.

Table ES-1. **Summary of TMDL Allocation Loads**

	WLA Waste Load Allocation (MPN/day)	LA Load Allocation (MPN/day)	MOS Margin of Safety	TMDL	Reduction Needed (%)
	1.10E+10 Isle of Wight County MS4 (VAR040020)				
	1.50E+11 City of Suffolk MS4 (VAR040029)				
	3.17E+11 Future Growth (1% of TMDL)				
Total	**4.79E+11**	**3.12E+13**	***Implicit***	**3.17E+13**	**96%**

Table *ES-2.* Nonpoint source bacteria loads and reductions required by TMDL.

Watershed	Current Load (MPN/day)	Load Allocation (MPN/day)	Reduction Needed (%)
Chuckatuck Creek and Brewers Creek	8.88E+14	3.12E+13	96%†

† Note: In the Tidewater Region of Virginia, 57% of shellfish TMDLs have called for bacteria reductions between 80-100% and 27% of shellfish TMDLs have called for bacteria reductions between 60-80%. The remaining 17% of TMDL studies called for reductions below 60%.

Public Participation

DEQ representatives held public meetings to inform the public about the end goals and status of the IP process, as well as to provide a means for soliciting participation in the smaller, more targeted meetings (i.e., working groups). Two working groups were formed at the beginning of the planning process: an agricultural/residential working group and a government working group. The working groups focused primarily on the source reassessment, as well as assignment of best management practices within the watersheds. Throughout the public participation process, a major emphasis was placed on addressing septic system problems, increasing education/outreach, and methods for obtaining implementation funding.

Assessment of Implementation Action Needs

Field surveys in the watershed and analysis of aerial imagery were used along with the workgroup process and the TMDL studies to reassess bacterial sources to the creeks and evaluate alternative BMPs and strategies to reduce the bacteria loads. The workgroups discussed the costs, effectiveness, and appropriateness of the various practices in the watershed. The best management practice needs for each of two implementation phases (10 years per phase) were identified and are shown in *Tables ES-3, ES-4,* and *ES-5*.

Cost estimates for agricultural, residential, and educational programs in this plan were calculated by multiplying the unit cost by the number of BMP units in each watershed. The unit cost estimates for the agricultural BMPs were derived from the Department of Conservation and Recreation's Agricultural Cost-Share Database. All agricultural practices with a Virginia Agricultural Cost-Share (VACS) practice code should adhere to the guidelines and reimbursement costs outlined in the VACS manual. Cost estimates included in this plan for these practices should be viewed as the maximum allowable reimbursement cost per practice, and thus serve as an estimate of the cost that could be incurred if stakeholders install the most protective measures on their lands. The unit costs for residential practices were developed through discussions with local health departments, the TMDL IP working groups and estimates from previous TMDL implementation plans. Estimates for education programs were based on target audience size and experience in other plans.

The total Phase 1 (years 1-10) cost estimate for the area is $1,945,525. The additional Phase 2 (years 11-20) implementation cost for the area is $202,300.

Table ES-3. **Agricultural BMPs to be included during Phase 1 (Years 1-10) in Chuckatuck Creek and Brewers Creek.**

	Agricultural BMPs	
Phase 1 (Years 1-10)	**Units**	**Practice**
86	Acres	Woodland Buffer Filter Area (FR-3)
6	System	Livestock Exclusion (LE-1T, SL-6T)
17	System	Small Acreage Grazing System (SL-6AT)
3225	Acres	Small Grain Cover Crop (SL-8B) (VACS Funding)
325	Acres	Pasture Management (Livestock/horse) (SL-10T)
70	Acres	Grass Filter Strip (WQ-1)
14	Acres	Sediment Retention, Erosion, or Water Control Structures (WP-1)

Table ES-4. **Residential and pet waste BMPs to be included during Phase 1 (years 1-10) and Phase 2 (years 11-20) in Chuckatuck Creek and Brewers Creek.**

		Residential BMPs	
Phase 1 (Years 1-10)	**Phase 2 (Years 11-20)**	**Units**	**Practice**
1162	581	System	Septic Tank Pumpout (RB-1)
27		System	Septic System Repair (RB-3)
18		System	Septic System Replacement/Installation (RB-4)
34		System	Septic System Replacement/Installation with Pump (RB-4P)
30		System	Alternative Waste Treatment System (RB-5)
1		System	Marina Boat Waste Discharge Facilities
8		Acres	Vegetated Buffer on Residential Land
14		Acres	Rain Garden
7		System	Pet Waste Station
60		System	Pet Waste Composter
1		System	Confined Canine Waste System

Table ES-5. **Education programs needed for Chuckatuck Creek and Brewers Creek.**

		Education programs	
Phase 1 (Years 1-10)	**Phase 2 (Years 11-20)**	**Total cost per program ($)**	**Practice**
1	1	3,000	Recreational Boater Education Program
3	3	2,500	Residential Education Program (pet, septic)
3	3	2,500	Aquaculture (Oyster Gardening) Education Program
	1	10,000	Wildlife Education/Management Program

The primary benefit of this implementation is cleaner water in Chuckatuck and Brewers Creeks. The goal is to implement the IP so that fecal contamination may be reduced and allow for the removal of the condemnation of the shellfish growing areas. The principal benefit to private oyster growers in the creeks would be that once water quality in restored, they would no longer need to transport their floats to clean water to depurate oysters prior to consumption. However, further reducing fecal contamination levels in these creeks, particularly from human sources will improve public health by reducing the risk of infection from fecal sources through contact with surface waters.

The residential programs will play an important role in improving water quality, but there may also be additional return on the investment in terms of economic benefits to homeowners. An improved understanding of private on-site sewage 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 replacement of failing on-site sewage disposal systems with new septic or alternative treatment

systems will have a direct and substantial impact by improving property values and improving the local economy.

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 enhances the resources and funding necessary to pursue restoration and enhancement activities. The agricultural and residential practices recommended in this document are expected to provide economic benefits, as well as environmental benefits to the property owners in the watershed.

INTRODUCTION

Background

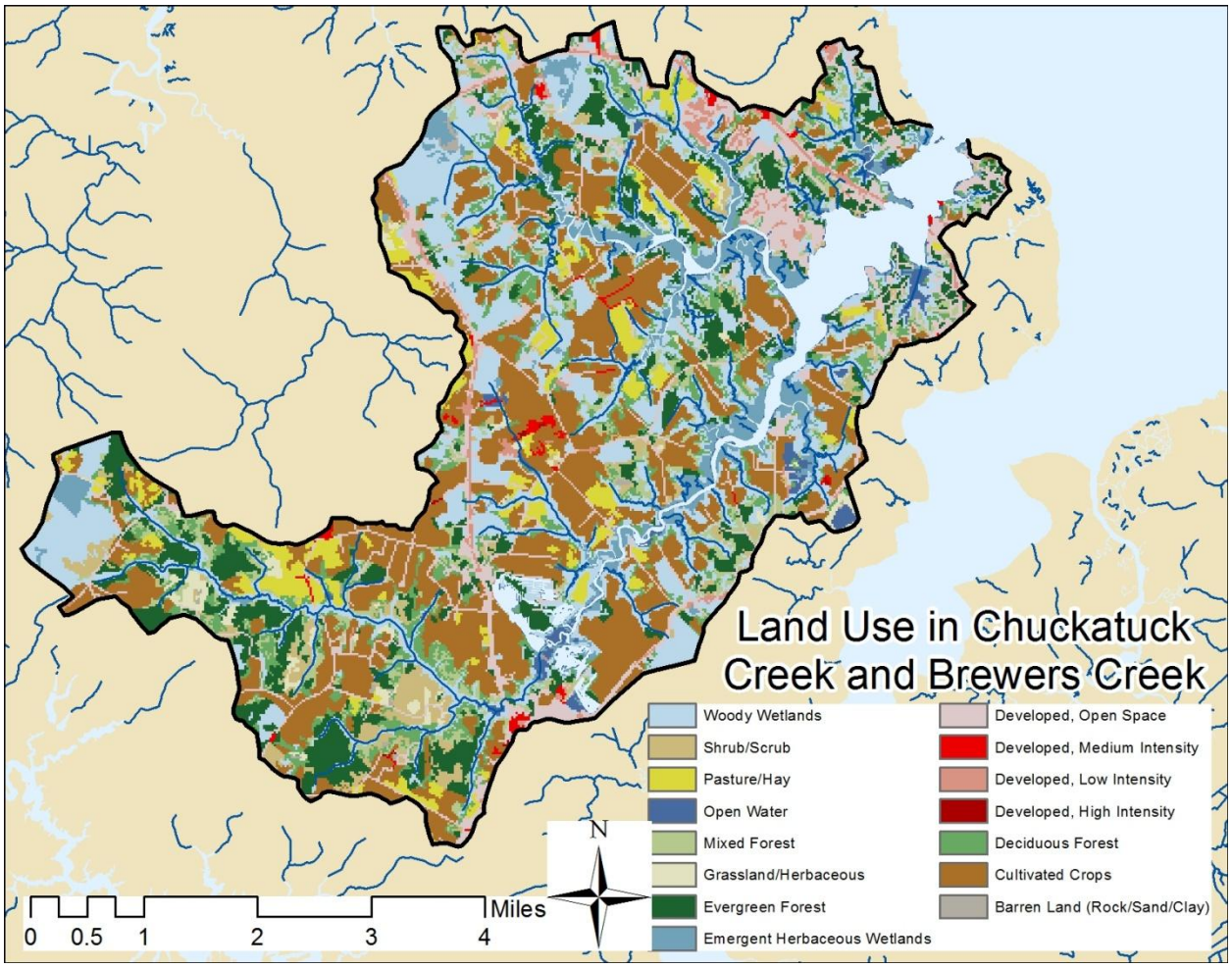
Chuckatuck Creek and Brewers Creek are located within Isle of Wight County and the City of Suffolk in the Hampton Roads region of Virginia. These tidal creeks drain into the Lower James River and the Chesapeake Bay (VAHU6: JL42; HUC 12: 020802060905). The primary land use types within the watersheds are forest, wetland, and agriculture. A listing of acreages for the 15 National Land Cover Dataset (NLCD 2011) land uses and the general land categories are shown in *Table 1*.

A map showing the land use in the watershed based on the 2011 NLCD is displayed in *Figure 1*. The health of these waters is important for both recreation and aquaculture and is closely linked to the enjoyment of those who live nearby and visit the creeks.

Table 1. **Land use within the Chuckatuck Creek and Brewers Creek Watershed (NLCD 2011).**

General Land Category	Specific Land Use Type	Acres	Total Acres	Percentage of Watershed	Total Percent
Developed	Developed, Open Space	1754	2181	9.7	12
	Developed, Low Intensity	292		1.6	
	Developed, Medium Intensity	125		0.7	
	Developed, High Intensity	10		0.1	
Agriculture	Cultivated Crops	4303	5129	23.9	28
	Pasture/Hay	826		4.6	
Forest	Deciduous Forest	1279	3830	7.1	21
	Evergreen Forest	1801		10.0	
	Mixed Forest	750		4.2	
Wetlands	Woody Wetlands	3720	4838	20.6	27
	Emergent Herbaceous Wetlands	1118		6.2	
Water	Open Water	1196	1196	6.6	7
Other	Barren Land (Rock/Sand/Clay)	35	844	0.2	5
	Shrub/Scrub	578		3.2	
	Grassland/herbaceous	231		1.3	
Total		18018		100	100

Figure 1. **Land use in Chuckatuck Creek and Brewers Creek based on the 2011 NLCD.**



The CWA, which became law in 1972, requires that all U.S. streams, rivers, and lakes meet certain water quality standards. The CWA also requires that states conduct monitoring to identify polluted waters or those that do not meet standards. Through this required program, the state of Virginia has found that many stream segments do not meet state water quality standards for protection of the five beneficial uses, which are fishing, swimming, shellfish, aquatic life, and drinking. Virginia submits a list on the health of all its waters to Congress every two years. No waterbody can be removed from the list until:

- Its problems are solved and standards are achieved or
- The designated uses not being achieved are removed after a detailed analysis clearly shows that they cannot be obtained.

When water bodies fail to meet standards, section 303(d) of the CWA and the US Environmental Protection Agency's (EPA) Water Quality Management and Planning Regulation (40 CFR Part 130)

require states to develop TMDLs for each pollutant. A TMDL is a "pollution budget" for a waterbody. 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 nonpoint 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 EPA, measures must be taken to reduce pollution levels in streams. These measures, which can include the use of better treatment technology and the installation of best management practices (BMPs), are implemented in a staged process. CWA regulations prohibit new discharges that "will cause or contribute to the violation of water quality standards."

Applicable Water Quality Standards

Water quality standards are designed to protect public health or welfare, enhance the quality of water and serve the purposes of the State Water Control Law (§62.1-44.2 et seq. of the Code of Virginia) and the federal CWA (33 USC § 1251 et seq.). Virginia Water Quality Standard 9 VAC 25-260-10 (Designation of uses) states:

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

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

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

   1. *Naturally occurring pollutant concentrations prevent the attainment of the use;*
   6. *Controls more stringent than those required by §§301(b) and 306 of the Clean Water Act would result in substantial and widespread economic and social impact.*

(For a complete listing of this legislative reference regarding the Designation of Uses in Virginia waters, please go to: http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC25-260-10)

For a shellfish supporting waterbody to be in compliance with Virginia's bacteria standards for the production of edible and marketable natural resource use, the Virginia Department of Environmental Quality (DEQ) specifies the following criteria (9VAC 25-260-160):

> *"In all open or estuarine waters capable of propagating shellfish or in specific areas where public or leased private shellfish beds are present, and including those waters on which condemnation or restriction classifications are established by the State Department of Health, the following criteria for fecal coliform shall*

apply; the geometric mean fecal coliform value for a sampling station shall not exceed an MPN (most probable number) or MF (membrane filtration using mTEC culture media) of 14 per 100 milliliters (ml). The estimated 90th percentile shall not exceed an MPN of 43 per 100 ml for a 5-tube decimal dilution test or an MPN of 49 per 100 ml for a 3-tube decimal dilution test or MF test of 31 CFU (colony forming units) per 100 ml."

For those waters that do not meet the criteria, Chapter 310 of the Administrative Code describes the process by which shellfish grown in restricted (condemned) waters can enter the commercial market, a process referred to as depuration or relaying.

Fecal Bacteria Impairments

Fecal coliform bacteria concentration in exceedence of the shellfish use standard constitutes an impairment in Virginia shellfish growing waters. This group of bacteria is used as an indicator of the presence of fecal contamination; a common member of the fecal coliform group is *Escherichia coli*. Fecal coliform bacteria are associated with fecal material derived from humans and warm-blooded animals, and their presence in aquatic environments is an indication that the water may have been contaminated by pathogens or disease-producing bacteria or viruses. Waterborne pathogenic diseases include typhoid fever, viral and bacterial gastroenteritis, and hepatitis A. Pathogens are concentrated in filter-feeding shellfish and can cause disease when eaten uncooked. Therefore, the presence of elevated numbers of fecal coliform bacteria is an indicator that a potential health risk exists for individuals consuming raw or undercooked shellfish. Fecal contamination can occur from point source inputs of treated sewage or from nonpoint sources of human waste (e.g., malfunctioning septic systems), and waste from livestock, pets, and wildlife.

The shellfish impairments in Chuckatuck and Brewers Creeks are based on restrictions placed on commercial shellfish harvest to protect public health. A condemnation in Growing Area 62-080 was issued by the Virginia Department of Health, Division of Shellfish Sanitation (VDH-DSS) based on monthly monitoring data on 6 October 2010 (Appendix B). VDH-DSS collects monthly fecal coliform bacteria samples from each of its sampling stations in Virginia's tidal estuaries. They then calculate geometric means based on the most recent 30 months of sampling data to determine condemnation areas.

This IP outlines a strategy for reducing anthropogenic loadings of bacteria to a level that complies with the TMDL. With completion of the IP, Virginia has identified a plan for meeting the water quality goals within the creeks and a means to enhance local natural resources. Additionally, approval of the IP will enhance opportunities for funding during implementation.

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 these and explicitly state if the elements are a required component of an approvable IP or are merely a recommended topic that should be covered in a thorough IP. This chapter has three sections that discuss the a) requirements outlined by the Water Quality Monitoring, Information, and Restoration Act (WQMIRA) that must be met in order to produce an IP that is acceptable and approvable by the Commonwealth, b) EPA recommended elements of IPs, and c) required components of an IP in accordance to Section 319 guidance.

State Requirements

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

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

Federal Requirements

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

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

Requirements for Section 319 Fund Eligibility

EPA develops guidelines that describe the process and criteria to be used to award CWA Section 319 nonpoint source grants to States. Congress amended the CWA in 1987 to establish the Section 319 Nonpoint Source Management Program. Under Section 319, States, Territories, and Indian Tribes receive grant money, which supports a wide variety of activities, including the restoration of impaired waters. The guidance is subject to revision and the most recent version should be considered for IP development. The "Supplemental Guidelines for the Award of Section 319

Nonpoint Source Grants to States and Territories in FY 2003" identifies the following nine elements that must be included in the IP to meet the 319 requirements:

1. Identify the causes and sources of 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 procedures 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, measureable 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 progress is being made towards attaining water quality standards, and if not, the criteria for determining if the watershed-based plan needs to be revised; and
9. Establish a monitoring component to evaluate the effectiveness of the implementation efforts.

The process of incorporating these state and federal guidelines into an IP consists of three major components:

1. Public participation
2. Implementation actions
3. Measurable goals and milestones.

Once developed, DEQ will present the IP to the SWCB for approval as the plan for implementing pollutant allocations and reductions contained in the TMDL. DEQ will also request that the plan be included in the appropriate Water Quality Management Plan (WQMP), in accordance with the CWA's Section 303(e) and Virginia's Public Participation Guidelines for Water Quality Management Planning. As stated in the Memorandum of Understanding (MOU) between EPA and DEQ, DEQ will also submit a draft Continuous Planning Process to EPA where DEQ commits to regular updates of the WQMPs. Therefore, the WQMPs will be the repository for all TMDLs and the TMDL IPs developed within a river basin. The IP will also be presented to the EPA Nonpoint Source Program for approval.

REVIEW OF TMDL DEVELOPMENT

Water quality monitoring data, bacteria source assessments and the allocated reductions in the TMDL study within Chuckatuck Creek and Brewers Creek were reviewed to determine the implications of the TMDL on IP development.

As part of TMDL development, bacterial source tracking (BST) sampling was conducted by VDH-DSS in Chuckatuck Creek and Brewers Creek. Bacterial source tracking is intended to aid in identifying sources (i.e. human, livestock, pet, and wildlife) of fecal contamination in water bodies. The study used the antibiotic resistance approach (ARA) for the analysis, which is based on the premise that bacteria from different sources have different patterns of resistance to a variety of antibiotics. Samples were collected at two stations and analyzed on a monthly basis from October 2004 to September 2005. The BST results were used to estimate the percentage of the bacteria load coming from each of the source sectors: wildlife, human, livestock, and pet. It should be noted that BST and ARA have advantages and disadvantage and the results from studies using these methodologies should be used in conjunction with other knowledge of the watershed. BST is not a quantitative tool and was only intended to be used to identify and estimate potential source loads to the study area.

A simplified tidal volumetric model was used in the development of the TMDL. This method uses the volumes of the creeks being studied and the monitored fecal coliform concentrations to calculate the current load conditions. The creek volume and the state water quality standard were used to calculate the allowable load. The difference between the current load and the allowable load was then used to calculate the required reduction for each creek. The TMDL was based on the 30-sample 90th percentile concentration, which was determined to represent the critical condition.

Please note that the data used to calculate the loads and reductions in the TMDL study were collected between January 1999 and July 2007 and were thus analyzed using 3-tube dilution tests; the water quality standard for this method was 49 MPN per 100 mL. This implementation plan will use load allocations and reductions calculated in the EPA approved TMDL, however it should be noted that samples collected by VDH after 2008 were analyzed using a membrane filtration technique that has an associated water quality standard of 31 CFU per 100 mL.

The bacteria TMDL is comprised of three required load components – the waste load allocation (WLA) from point sources, the load allocation (LA) from nonpoint sources, and a margin of safety (MOS), as summarized in *Table 2*.

Under Waste Load Allocation, there are two MS4 permits within the watershed, one for Isle of Wight County and one for the City of Suffolk, as well as a future growth load calculated using 1% of the total TMDL. MS4 programs are in the process of developing TMDL Action Plans to address WLAs to meet the special conditions in their permit for approved TMDLs. The Action Plan will identify and implement BMPs and other management strategies to meet the TMDL WLA and achieve compliance with the special condition.

Load allocations are typically addressed through the TMDL Implementation Plan to characterize the suite of corrective actions needed to reduce nonpoint source pollutuant loads. The LA of the TMDL is further defined along with the reductions required by the TMDL plan (*Table 3)*.

***Table 2*. Summary of TMDL Allocation Loads**

	WLA Waste Load Allocation (MPN/day)	LA Load Allocation (MPN/day)	MOS Margin of Safety	TMDL	Reduction Needed (%)
	1.10E+10 Isle of Wight County MS4 (VAR040020)				
	1.50E+11 City of Suffolk MS4 (VAR040029)				
	3.17E+11 Future Growth (1% of TMDL)				
Total	**4.79E+11**	**3.12E+13**	***Implicit***	**3.17E+13**	**96%**

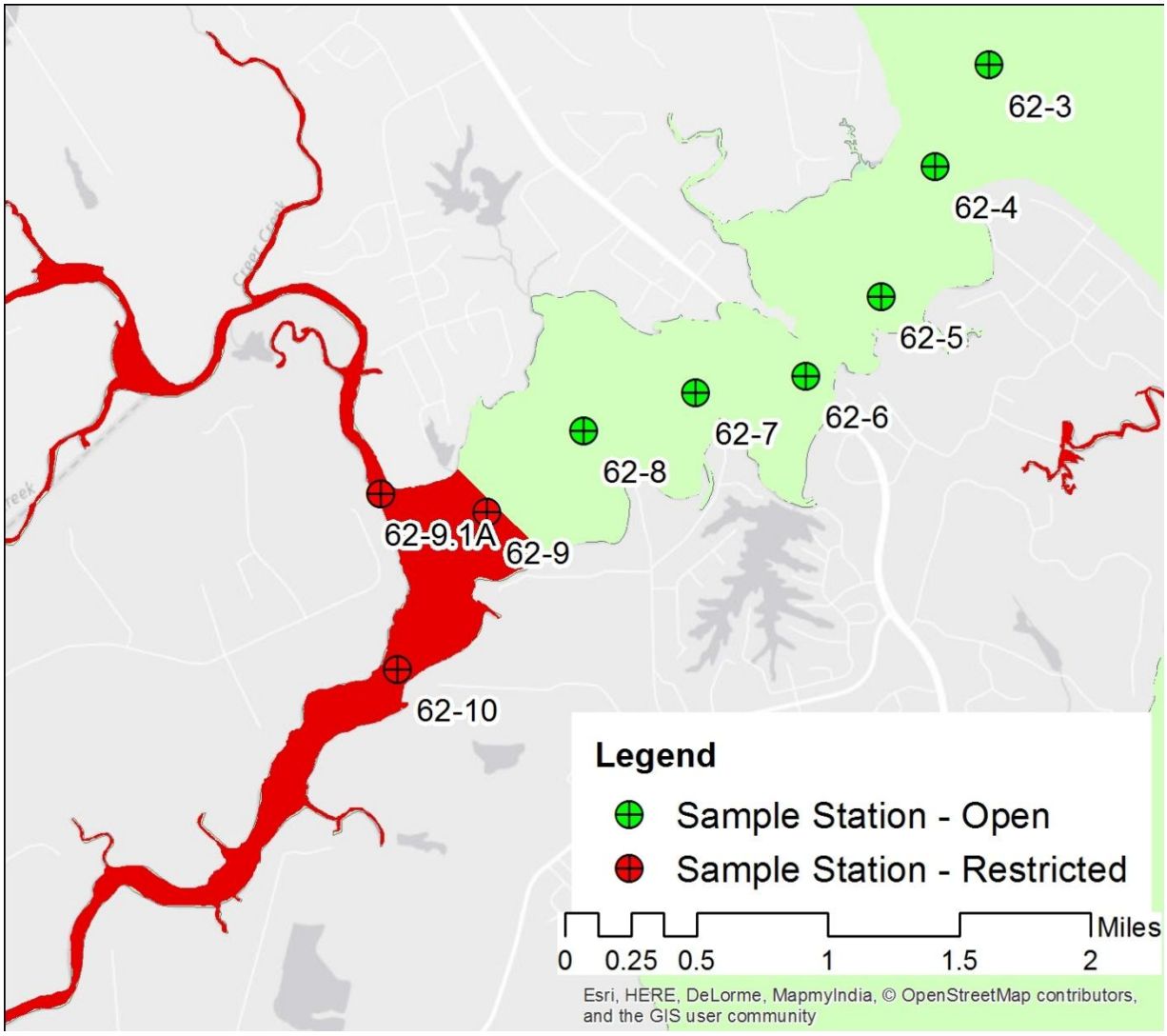
Table 3. Nonpoint source bacteria loads and reductions required by TMDL.

Watershed	Current Load (MPN/day)	Load Allocation (MPN/day)	Reduction Needed (%)
Chuckatuck Creek and Brewers Creek	8.88E+14	3.12E+13	96%†

† Note: In the Tidewater Region of Virginia, 57% of shellfish TMDLs have called for bacteria reductions between 80-100% and 27% of shellfish TMDLs have called for bacteria reductions between 60-80%. The remaining 17% of TMDL studies called for reductions below 60%.

The TMDL study titled *Shellfish Bacteria Total Maximum Daily Load (TMDL) Development Chuckatuck Creek and Brewers Creek Watersheds* was approved in 2010 and is available on the internet via the DEQ website, http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/TMDL/TMDLDevelopment/ApprovedTMDLReports.aspx. This TMDL used the 90th percentile standard of 49 MPN/100 ml because it was the more stringent condition for assessing water quality in each creek. *Figure 2* shows the locations of VDH sampling stations as well as the current impairments in the two creeks. Note that some sampling stations included in the 2010 TMDL are no longer regularly sampled by VDH-DSS.

Figure 2. **Current VDH sampling stations and impairments in Chuckatuck Creek and Brewers Creek.**



SOURCE REASSESSMENT

This section explains the source reassessment that was conducted within the watershed. On 6 October 2010, VDH announced a shellfish condemnation of the growing areas within Chuckatuck and Brewers Creeks (Appendix B).

See Appendix C for specific source assessment worksheets as well as Appendix D for Practice Details, which were the same for each stream. Reassessment of nonpoint fecal sources from residential sewage disposal systems, livestock, wildlife and pets were estimated using census data, local input, and habitat availability.

Livestock sources within the watershed were obtained using numbers reported in the TMDL study, workgroup reported numbers, and VDH Shoreline Sanitary Survey reports. During the government workgroup, stakeholders pointed out that the pigs included in the TMDL study were likely part of the Locust Grove Farm (VPG100074), which is a state permitted 1,920 head swine operation. Field applications follow permit requirements and DEQ inspections have confirmed that all buffers are maintained. Therefore, the 1,350 pigs that were included in the TMDL source assessment are not addressed by additional BMPs in this implementation plan, as they are already regulated by the permit. Attendees of the government workgroup also noted that the number of horses recorded in the TMDL study was likely too low.

Septic system estimates within the watersheds were compiled using information from VDH, the City of Suffolk, Isle of Wight County, and workgroup input. A 12 percent failure rate of septic systems was estimated with the help of VDH representatives.

The number of dogs in the watershed was determined using an updated American Veterinary Medical Association (2005) calculation that was based on the number of houses within each watershed. Dog estimates assumed that 36.5 percent of households had 1.6 dogs (0.365 * 1.6 * Number of houses). One dog day care center was noted at the edge of the watershed.

Wildlife estimates were based on previously reported TMDL data and stakeholder input. Although stakeholders noted other types of wildlife could be included in the report, they agreed that the numbers in the TMDL study could be used for the implementation planning process.

These revised source assessment numbers were used to assign BMPs in the watershed that would address the load reductions reported in the 2010 TMDL. For example, the number of houses using septic systems in the watershed and the 12 percent septic failure estimate were used to assign a variety of septic BMPs to address the 100% human load reduction required by the 2010 TMDL.

PUBLIC PARTICIPATION

Public input on restoration and outreach strategies for this IP was an important part of this planning process. Since the plan will be implemented primarily by watershed stakeholders on a voluntary basis with some financial incentives, local input and support are the primary factors that will determine the success of this plan. The actions and commitments compiled in this document were developed by citizens in the watershed, City of Suffolk and Isle of Wight County government officials, the Peanut Soil & Water Conservation District, DCR, DEQ, VDH, VIMS, the Nansemond River Preservation Alliance, and the Suffolk-Nansemond Chapter of the Izaak Walton League of America. All citizens and interested parties in the watershed are encouraged to put the IP into action and contribute to the restoration of these creeks.

Public Meetings for Chuckatuck and Brewers Creeks

Public meetings were held to inform the public regarding the end goals and status of the IP project, as well as to provide a means for soliciting participation in the smaller, more targeted meetings (i.e., working groups). Two workgroups were formed: an agricultural/residential workgroup and a government workgroup. Representatives of DEQ attended each working group in order to facilitate the process and integrate information collected from the various attendees.

The first public meeting was held on March 6, 2014 at CE&H Ruritan Hall, which is located at 8881 Eclipse Drive, Suffolk, VA. The meeting was publicized in *The Virginia Register* and emails were sent to contacts that had been established in the area during previous work. This initial meeting was attended by a total of 28 people, including local landowners, farmers, academics, and government officials. During the meeting DEQ representatives explained the TMDL and IP development processes, bacterial loading models, and the purpose of each type of workgroup. The group decided that 2 working groups would be formed, one agricultural/residential working group and one government working group. However, the group elected to meet as one large working group during the later portion of this meeting.

The final public meeting was held on September 24, 2015 at CE&H Ruritan Hall. The meeting was publicized in *The Virginia Register* and emails were sent to contacts that had been established in the area during previous work. DEQ representatives presented the final IP which included planned BMPs, the implementation timeline, proposed responsibilities, and costs. Fourteen people attended the final public meeting.

Working Groups

Overall, there were a total of 4 working group meetings and 1 steering committee meeting during the development of the Implementation Plan (Appendix A).

The first working group meeting was held at the end of the first public meeting on March 6, 2014 at CE&H Ruritan Hall, 8881 Eclipse Drive, Suffolk, VA. The group, which consisted of 28 people, elected to remain as one large working group for this meeting rather than splitting into two separate working groups. The discussion during this meeting covered current knowledge gaps, the potential

for agricultural and residential BMP installation, septic system maintenance issues, and education opportunities in the watersheds.

The government working group met on January 29, 2015 at CE&H Ruritan Hall. A total of 29 people attended this meeting, including government representatives, local citizens, non-profit group members, and environmental consultants. DEQ representatives first gave an overview of the TMDL and IP processes and requested updated septic and sewer information from the City of Suffolk and Isle of Wight County. DEQ representatives discussed pet waste best management practices as well as education and outreach that could be included in the plan. The meeting was concluded with a discussion of the livestock, wildlife and pet numbers to be included in a source re-assessment for the watershed. Stakeholders noted that the pigs included in the TMDL source assessment were most likely all part of a state permitted swine operation (Locust Grove Farm). In addition, Peanut SWCD representatives noted that the number of cattle reported in the TMDL seemed high, rather than 113 cattle, a more accurate estimate would be 55-60 cattle.

The agriculture/residential working group met on April 30, 2015 at CE&H Ruritan Hall. A total of 14 people attended this meeting. During the meeting, DEQ representatives reviewed the initial best management practices to be included in the plan as well as the associated costs and timeline for implementation. Several questions were raised regarding funding for the agricultural and residential practices. To conclude the meeting, Elizabeth Taraski, Executive Director of the Nansemond River Preservation Alliance (NRPA), told the group about a recent restoration project that they completed with a local boy-scout troop at the mouth of Chuckatuck Creek.

The final agriculture/residential working group met on June 4, 2015 at CE&H Ruritan Hall. A total of 14 people attended this meeting. DEQ representatives reviewed the best management practices to be included in the plan. The group agreed that since recreational boater education programs would discuss the importance of properly disposing of boat waste, a boat pump-out station should be included in the plan. DEQ representatives also noted that HRSD has a mobile boat pump-out program that could be used in the area. To conclude the meeting, DEQ representatives explained the remaining meetings necessary to complete the implementation planning process and how stakeholders could go about applying for 319 nonpoint source funding once a request for applications is issued.

The steering committee meeting was held on July 22, 2015 at CE&H Ruritan Hall. A total of 11 people attended this meeting. DEQ representatives reviewed planned BMPs, the implementation timeline, proposed responsibilities, and costs with the attendees. After the presentation, attendees provided comments on the draft plan. DEQ requested that any written comments from the meeting attendees or other stakeholders who were unable to attend be submitted within 2 weeks. Within this window, two public comment letters were received. These public comments and the corresponding DEQ responses have been included in the appendix of the technical document.

ASSESSMENT OF IMPLEMENTATION ACTION NEEDS

Since the development of the EPA approved TMDL (Shellfish Bacteria Total Maximum Daily Load (TMDL) Development Chuckatuck Creek and Brewers Creek Watershed), various BMPs have been installed in the watersheds. Agricultural BMPs that were installed between the completion of the TMDL in July 2010 and the most updated record of BMPs on the Virginia Agricultural BMP and CREP Database (current as of 06/09/2015; http://dswcapps.dcr.virginia.gov/htdocs/progs/BMP_query.aspx) were used to credit those BMPs that were installed after the development of the TMDL. The information obtained from the database contained all BMPs installed within the Virginia 6th Order National Watershed Boundary Dataset (NWBD) unit in the region (JL42), which also corresponds to the IP watershed.

Although several types of BMPs have been installed since the TMDL was written, credit was only assigned for those BMPs that reduce bacterial loads and have been proposed in this implementation plan. The only BMP that fit these criteria was Small Grain Cover Crop for Nutrient Management and Residue Management (SL-8B). A total of 3,108 acres of SL-8B were installed after the approval of the TMDL study. In addition, Peanut SWCD representatives estimate that 75 percent of the row crop fields in the area use the small grain cover crop BMP. This number was used to estimate the appropriate number of SL-8B acres to include in this implementation plan.

The TMDL study, along with information provided by local governments, VDH-DSS Sanitary Shoreline Surveys, and input from stakeholder workgroups were used to evaluate the various BMPs and strategies that would be effective in reducing bacteria loading to the creeks. The workgroup considered BMPs by reflecting on cost estimates, effectiveness, and appropriateness based on the characteristics and needs of the watershed.

The BMP and corrective action needs in the watershed can be divided into four major categories: agricultural, residential, education programs, and pet waste management BMPs.

Agricultural BMPs

Stakeholders in the watershed and Peanut SWCD officials reported that the number of cows estimated in the TMDL study should be reduced from 113 to 60 and the number of horses included in the source assessment should be increased. In addition, the 1,350 pigs that were included in the TMDL source assessment are not addressed by additional BMPs in this implementation plan, as they are already regulated by a general permit for hog farms. BMPs to address cattle, horse, and cropland coverage include buffers, livestock exclusion, pasture management, and cover crops. Livestock exclusion BMPs (LE-1T, SL-6T), the small acreage grazing system BMP (SL-6AT), the woodland buffer filter area BMP (FR-3), the small grain cover crop BMP (SL-8B), the Sediment Retention, Erosion, or Water Control Structures BMP (WP-1), the grass filter strip BMP (WQ-1), and the pasture management BMP (SL-10T) are cost-shared practices for TMDL implementation areas. *Table 4* summarizes the agricultural BMPs considered in the Chuckatuck Creek and Brewers Creek watershed.

All agricultural practices with a Virginia Agricultural Cost-Share (VACS) practice code should adhere to the guidelines and reimbursement costs outlined in the VACS manual. Cost estimates included in this plan for these practices should be viewed as the maximum allowable reimbursement cost per practice, and thus serve as an estimate of the cost that could be incurred if stakeholders install the most protective measures on their lands.

Table 4. **Agricultural BMPs needed for Chuckatuck and Brewers Creeks.**

	Agricultural BMPs	
Phase 1 (Years 1-10)	**Units**	**Practice**
86	Acres	Woodland Buffer Filter Area (FR-3)
6	System	Livestock Exclusion (LE-1T, SL-6T)
17	System	Small Acreage Grazing System (SL-6AT)
3225	Acres	Small Grain Cover Crop (SL-8B) (VACS Funding)
325	Acres	Pasture Management (Livestock/horse) (SL-10T)
70	Acres	Grass Filter Strip (WQ-1)
14	Acres Treated	Sediment Retention, Erosion, or Water Control Structures (WP-1)

Residential BMPs

Residential BMPs will focus on maintenance and repair of septic systems, identification and elimination of illegal "straight pipe" sewage discharges, replacement of failed septic systems, and installation of alternative waste treatment systems. In addition, minimization of pet waste runoff from homeowner's yards through education, pet waste composters, and installing vegetated buffers, rain gardens and pet waste collection facilities in public areas with high usage are included in the plan. For additional information on rain garden design and construction, see http://www.fairfaxcounty.gov/nvswcd/raingardenbk.pdf. During workgroup meetings, City of Suffolk and Isle of Wight government officials confirmed that they have not recorded any sanitary sewer overflows (SSOs) since the completion of the TMDL in 2010.

Stakeholders noted that since recreational boater education will cover the impact that overboard discharge of human waste can have on water quality, a boat pump out should be included in the plan. In addition, it should be noted that HRSD currently offers a mobile pump out program (http://www.hrsd.com/boatereducationproject.shtml). Appointments for pump outs can be made via phone or email.

Septic Failure Rate and Alternative Waste Treatment Systems

A 12 percent septic system failure rate was estimated in this report. In addition, it was estimated that 3 percent of the houses in the watersheds lacked septic systems.

The City of Suffolk provided GIS data showing the number of structures with septic systems and the number of structures that were connected to the sewer. In addition, they outlined areas in Eclipse, VA, which is at the mouth of Chuckatuck Creek, where houses are currently being connected to the sewer. Once these houses have been connected to the sewer, there will be a total of 726 properties on septic and 217 properties connected to the sewer. Although there are no current plans for connecting more neighborhoods to the sewer system at this time, City of Suffolk staff have identified an additional 3 neighborhoods where sewer infrastructure may be feasible in the future if requested/petitioned from the citizens of the neighborhoods (Sleepy Lake, Oakland, and Hobson, 368 properties in total).

Isle of Wight also provided septic and sewer GIS data. They reported that there were a total of 1126 septic and 198 sewered houses in the Chuckatuck and Brewers Creek watershed.

This plan recognizes the need for alternative waste treatment systems where site conditions do not permit a conventional septic system. VDH representatives helped to determine the soil types that would be conducive for conventional septic systems, soils that would need an alternative system, and soils where either conventional or alternative systems could be used, but an alternative system would likely be needed (*Figure 3*). A GIS analysis was performed that compared the current position of septic systems and the locations of these soil categories (*Table 5*). The numbers of residential structures on these unfavorable soil types were then multiplied by the 12 percent septic failure rate. This provided an initial estimate of the total number of alternative waste treatment systems that would be needed within each watershed. The number of alternative systems that were estimated using soil properties were then compared to VDH data for alternative system installations in order to determine a realistic number of alternative systems that could be installed in each 10-year phase.

Figure 3. **Map of soils where conventional septic systems, alternative on site systems, or either type (though likely alternative) of system would be acceptable. Soil determinations were made with the assistance of VDH representatives.**

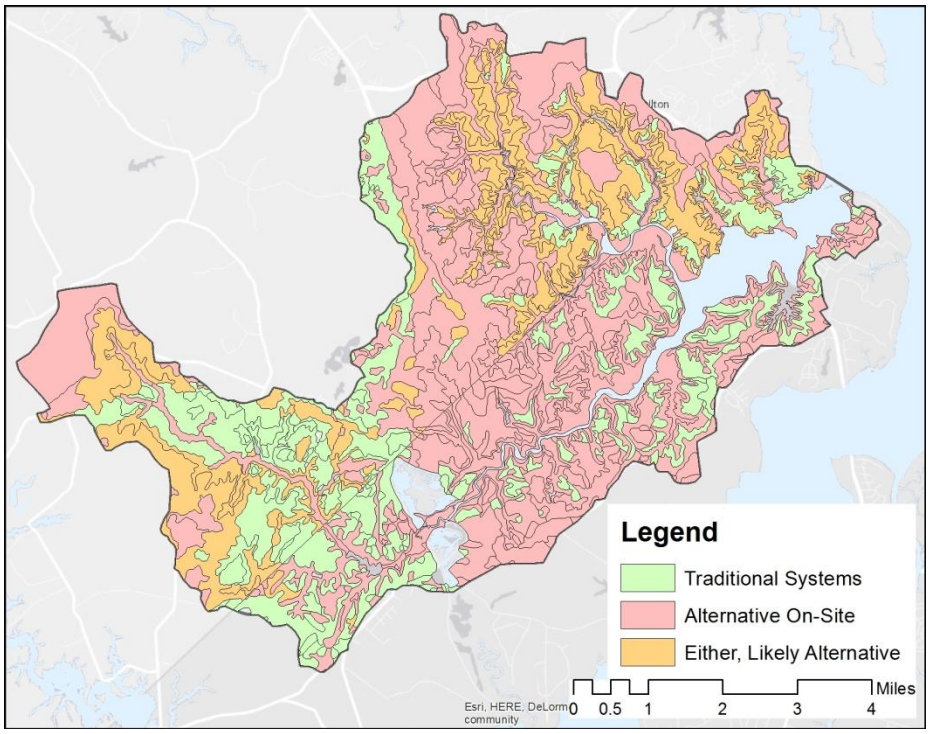


Table 5. **Total number of properties connected to the public sewer and total number of septic systems within each municipality in the watershed. The total number of septic systems are further divided into the number of systems that exist in soils conducive for conventional septic system installation (Conventional), the number of systems that exist in soils where it is likely that an alternative system would be needed, but a conventional system may be acceptable (Either), and the number of systems that would require an alternative waste treatment system (Alternative).**

Municipality	Total Sewer	Total Septic	Conventional	Either	Alternative
Isle of Wight County	198	1126	352	489	285
City of Suffolk	217	726	308	0	418
Total	328	1852	660	489	703

City of Suffolk representatives reported that their planning department mailed septic pump out reminder letters in the Zone 1 region beginning in July 2009. Zone 1 includes the Chuckatuck watershed as well as other watersheds nearby. Details about the City of Suffolk's septic pumpout

program, as well as maps of each of the delineated zones can be found at: http://www.suffolkva.us/pcd/chesapeake-bay-preservation-area/septic-tank-pump-out-program/septic-tank-pump-out-program/. During the first round of Zone 1 mailings in 2009, 1096 letters were sent out and 83 percent complied with the septic pump out requirement. In July 2014, the City of Suffolk sent out 1254 letters to homeowners in Zone 1 reminding them of the five year septic pumpout requirement.

The Isle of Wight septic pumpout program began in the eastern portion of the county, which drains to the Chesapeake Bay, in the fall of 2008. Property owners with on-site septic systems in the Smithfield Election District were the first to be notified of the 5 year pumpout requirement via mailings. In each subsequent year, the county mailed pumpout notices to one additional election district until all five districts had been notified. Mailings to the Newport Election District, which includes the Chuckatuck area, were first sent to homeowners in the fall of 2012. Mailed notices and homeowner compliance with the pumpout requirement are tracked in a database that currently contains 3,473 files; 50 percent of homeowners are in compliance.

A summary of the residential BMPs included in this plan are found in *Table 6*.

Table 6. **Residential BMPs needed for Chuckatuck and Brewers Creeks.**

		Residential BMPs	
Phase 1 (Years 1-10)	**Phase 2 (Years 11-20)**	**Units**	**Practice**
1162	581	System	Septic Tank Pumpout (RB-1)
27		System	Septic System Repair (RB-3)
18		System	Septic System Replacement/Installation (RB-4)
34		System	Septic System Replacement/Installation with Pump (RB-4P)
30		System	Alternative Waste Treatment System (RB-5)
1		System	Marina Boat Waste Discharge Facilities
8		Acres	Vegetated Buffer on Residential Land
14		Acres	Rain Garden

Education Programs

Among the standard BMPs, several target audiences were identified for educational outreach efforts, including recreational boaters and residential property owners. Currently, the Nansemond River Preservation Alliance (NRPA; http://nansemondriverpreservationalliance.org/) and the Suffolk-Nansemond Chapter of the Izaak Walton League of America (https://sites.google.com/site/suffolknansemondchapter/) organize many outreach and education activities for local people. The River Talk Series, which is organized by NRPA, covers a variety of water quality issues in the Nansemond River, Chuckatuck Creek, and surrounding creeks. A

'Connecting the Classroom with the Environment' seventh grade level learning module was launched in the City of Suffolk Public Schools in 2013 as part of NRPA's Nansemond Watershed Initiative and has reached nearly 2,000 students.

In addition to outreach and education, NRPA programs include water quality monitoring and BMP installation. NRPA members regularly monitor water quality in the region (salinity, oxygen, clarity, temperature, pH, and *E. coli*) and issue a State of the Nansemond Report Card based on this data. NRPA members have also organized several buffer restoration, oyster restoration, and living shoreline projects in the Nansemond River/Chuckatuck Creek area. Of note is a Living Shoreline Project on the northern boundary of the VolvoPenta property in Chuckatuck Creek. This project, which was a collaboration between NRPA, a local Boy Scout troop, and the VolvoPenta Test Facility in Suffolk, restored 200 ft of shoreline with replanted marsh grass and an oyster sanctuary to the north.

Outreach to recreational boaters that use the public boat ramps and marinas in the watersheds along with other boaters that may enter the creek for recreational purposes is an important element of this plan. The focus of this educational effort will be to inform boaters about the availability of sanitary pump out facilities in the area and the detrimental impact that overboard discharge of human waste can have on water quality. This education program should also inform boaters about HRSD's Boat Pump Out Program (http://www.hrsd.com/boatereducationproject.shtml). Appointments for pump outs using this program can be made via phone or email. Funding for recreational boater education should include money for signs at marinas, boat ramps, boat refueling areas, and other boat related facilities. These signs should include information about HRSD's Boat Pump Out Program and any local sanitary pump out facilities in the watershed.

Additionally, this educational effort may be in cooperation with DEQ's efforts to have Virginia's tidal creeks designated as No-Discharge Zones.

> No Discharge Zones in Virginia
> Recognizing the need to minimize the potential for contamination from any and all sources in these sensitive areas, the Virginia General Assembly unanimously passed House Bill 1774 in February, 2009. The Bill resolves that Virginia pursue NDZ designation for all its tidal creeks. (http://www.deq.virginia.gov/tmdl/ndz.html)

This designation would further restrict vessels from discharging wastes even after the wastes have been treated by approved marine sanitation devices.

According to the VADGIF Equipment Regulations, "vessels with installed toilets and marine sanitation devices shall be in compliance with federal regulations which set standards for sewage discharges from marine sanitation devices. Vessels without installed toilets or without installed marine sanitation devices shall not directly or indirectly discharge sewage into state waters. Sewage and other wastes from self-contained, portable toilets or other containment devices shall be pumped out at pump-out facilities or carried ashore for treatment in facilities approved by the Virginia Department of Health."

Another set of educational programs will focus on aquaculture education, or "oyster gardening." Funds may be used to support educational efforts aimed at helping homeowners set up their own dockside oyster floats and offering a lecture series on the latest research in oyster culture. Oyster gardening provides great filtration and builds stronger connections to local water quality.

Finally, there will be several education outreach efforts to residential property owners in the watersheds. Educational materials will address managing nuisance wildlife, pet waste management, horse BMP education, rain garden and residential buffer installation and maintenance, and proper care and maintenance of septic systems. Proper septic system maintenance includes: knowing the location of the system components and protecting them (*e.g.,* not driving or parking on top of septic tanks or drain fields, not planting trees where roots could damage the system), keeping hazardous chemicals out of the system, minimizing or eliminating the use of garbage disposals, pumping out the septic tank every five years, and knowing how to identify system problems. Resources from the "Septic Smart" program, which was created by EPA, can be used to educate homeowners in the watersheds (www.epa.gov/septicsmart). A summary of the education programs included in this plan can be found below in *Table 7*.

Table 7. **Education programs needed for Chuckatuck and Brewers Creeks.**

		Education programs	
Phase 1 (Years 1-10)	**Phase 2 (Years 11-20)**	**Units**	**Practice**
1	1	Program	Recreational Boater Education Program
3	3	Program	Residential Education Program (pet, septic)
3	3	Program	Aquaculture (Oyster Gardening) Education Program
	1	Program	Wildlife Education/Management Program

Pet Waste Management BMPs

Isle of Wight County and the City of Suffolk both participate in a Regional Stormwater Education program that encourages pet owners to "scoop the poop." Additional information about this regional campaign can be found at askHRgreen.org. In addition, City of Suffolk and Isle of Wight representatives reported that they provide pet waste information at outreach events.

Pet waste stations could be installed in the watershed in cooperation with local homeowners' associations that would be able to determine ideal locations for the stations within communities and help to secure operation and maintenance plans. In addition, homeowners' associations in the watershed could be ideal partners for residential education activities, which could include septic system maintenance, pet waste education/composters, and rain garden/vegetated buffer installation, among others. Increased availability of public pet waste stations coupled with residential education programs should result in expanded use of this BMP by the public. Two neighborhoods in the watershed with homeowners' associations are Sleepy Lake and Founders Pointe. Pet waste stations

could also be placed in Lone Star Lakes Park, where pet owners are required to walk dogs on a leash. Confined canine waste control systems could be installed at kennels and dog daycare centers in the watershed. See *Figure 4* for mapped locations of potential pet waste stations and confined canine waste control systems. A summary of the pet waste disposal stations (facility/signage/supplies) needs as well as pet waste composters and confined canine waste systems are summarized in *Table 8*.

***Figure 4*. Map of potential locations for pet waste best management practices.**

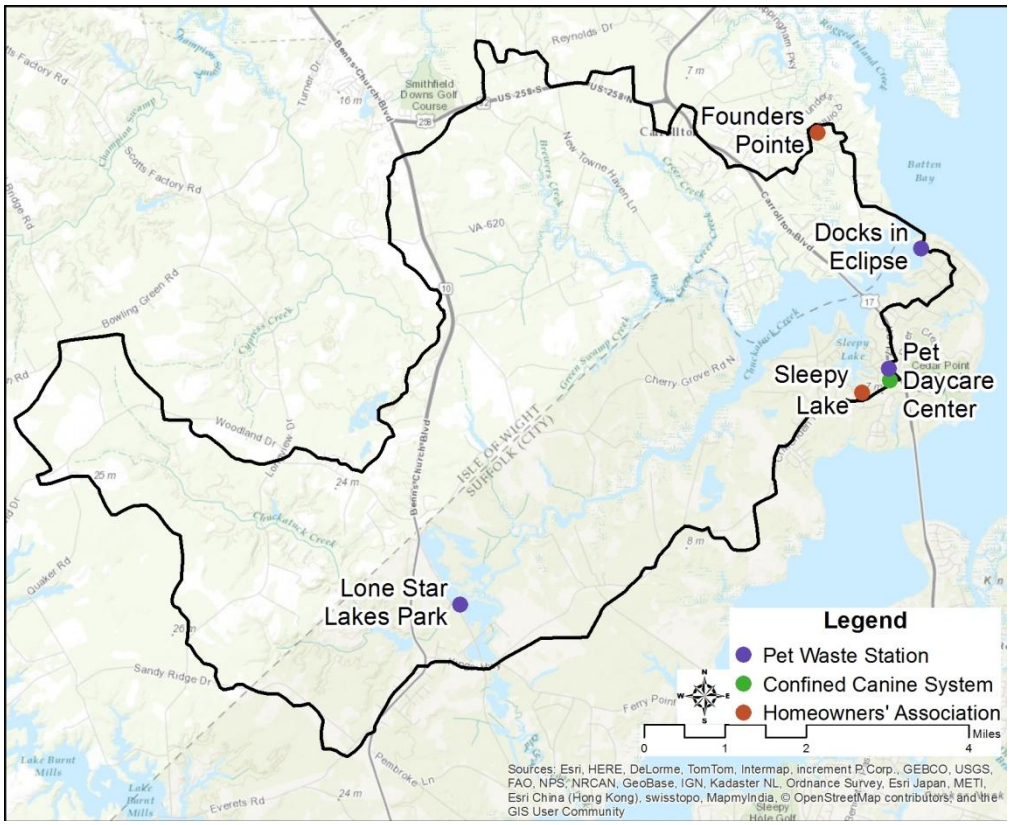


***Table 8*. Pet waste disposal stations (facility/signage/supplies), pet waste composters, and confined canine waste systems proposed for Phase 1 (years 1-10) in Chuckatuck and Brewers Creeks.**

	Pet Waste BMPs	
Phase 1 (Years 1-10)	**Units**	**Practice**
7	System	Pet Waste Station
60	System	Pet Waste Composter
1	System	Confined Canine Waste System

Phased Implementation

Initial implementation efforts (Phase 1) will focus on the most cost effective BMPs that reduce human, pet, and livestock sources of contamination. Upon completion of Phase 1, water quality will be re-assessed to determine if water quality standards are attained. If water quality standards are not being met, additional actions may be implemented in Phase 2. In addition, local citizens may elect to move forward with wildlife management plans to address fecal coliform contributions. These plans typically evaluate wildlife populations and explore control options in order to maintain sustainable wildlife levels based on local citizen objectives. Phase 2 will also include continued educational programming. *Table 9* shows the percent bacteria reduction after each phase of the plan.

Information regarding nuisance wildlife laws and conflict resolution can be found on the Virginia Department of Game and Inland Fisheries (VDGIF) website (http://www.dgif.virginia.gov/wildlife/problems/).

The US Fish and Wildlife Service (FWS) has revised federal regulations to include depredation orders relating to resident Canada geese that can cause injury to people, property, agricultural crops, or other interests. The Nest and Egg Depredation Order allows for the destruction of resident Canada geese nests and eggs by landowners, homeowners associations, public land managers, and local governments once they have registered the land they own on the Resident Canada Goose Nest and Egg Registration Site (https://epermits.fws.gov/eRCGR/geSI.aspx?ReturnUrl=%2feRCGR). The Agricultural Depredation Order allows agricultural producers to control resident Canada geese using certain lethal methods when the geese are damaging crops. For details and permitting information for this practice, see the VDGIF website (http://www.dgif.virginia.gov/wildlife/problems/canada-geese/).

There are several non-lethal deer management options recommended by VDGIF: fencing, keeping dogs in areas where deer are unwanted, loud noises, and chemicals that will taste or smell bad to deer. If these management techniques are unsuccessful, there are five programs available to landowners: the Deer Management Assistance Program (DMAP), Damage Control Assistance Program (DCAP), kill permits, Deer Population Reduction Program (DPOP), and the urban archery season. For details on these five programs, see the VDGIF website (http://www.dgif.virginia.gov/wildlife/problems/deer/).

If water quality standards are still not met, a Use Attainability Analysis (UAA) may be initiated to reflect the presence of naturally high bacteria levels due to uncontrollable sources. The outcome of the UAA may lead to the determination that the designated uses of the waters may need to be changed to reflect the attainable uses.

***Table 9*. Projected bacterial load reductions during Phase 1 and Phase 2 implementation within the Chuckatuck and Brewers Creek watershed.**

Watershed	Phase 1 Bacterial Load Reduction (%)	Phase 2 Bacterial Load Reduction (%)
Chuckatuck and Brewers Creeks (JL42)	61.2	100

COST / BENEFIT ANALYSIS

Cost estimates of agricultural, residential, and other BMPs in this plan were calculated by multiplying the unit cost by the number of BMP units in each watershed. The unit cost estimates for the agricultural BMPs were derived from DCR's Agricultural Cost Share Database. All agricultural practices with a Virginia Agricultural Cost-Share (VACS) practice code should adhere to the guidelines and reimbursement costs outlined in the VACS manual. Cost estimates included in this plan for these practices should be viewed as the maximum allowable reimbursement cost per practice, and thus serve as an estimate of the cost that could be incurred if stakeholders install the most protective measures on their lands. For example, $48 has been allotted for each acre of SL-8B because that would be the cost per acre for early planting with Abruzzi rye ($15 per acre + $25 per acre early bonus + $8 per acre Abruzzi rye bonus = $48 per acre). The unit costs for residential practices were developed through estimates from previous TMDL IPs and discussions with the workgroups. Cost share septic system funding was also useful for determining practice costs. Estimates for education programs were based on target audience size and experiences in other TMDL IPs.

Estimated implementation costs for BMPs in the Chuckatuck Creek and Brewers Creek watershed are listed in *Table 10*. The total Phase 1 (years 1-10) cost estimate for the entire area is $1,945,525. The additional Phase 2 (years 11-20) implementation cost for the entire area is $202,300.

Table 10. **Implementation costs for Chuckatuck and Brewers Creeks.**

Chuckatuck and Brewers Creeks Implementation Costs				
Units	Practice	Practice Number	Per Unit Cost	Estimated Cost
86	Woodland Buffer Filter Area	FR-3	$700	$60,200
6	Livestock Exclusion	LE-1T, SL-6T	$15,000	$90,000
17	Small Acreage Grazing System	SL-6AT	$1,500	$25,500
3225	Small Grain Cover Crop for NM (VACS Funding)	SL-8B	$48	$154,800
325	Pasture Management (Livestock/horse)	SL-10T	$75	$24,375
70	Grass Filter Strip	WQ-1	$175	$12,250
14	Sediment Retention, Erosion, or Water Control Structures	WP-1	$4,300	$60,200
1162	Septic Tank Pump Out - MANDATORY	RB-1	$300	$348,600
27	Septic System Repair	RB-3	$3,000	$81,000
18	Septic System Installation/Replacement	RB-4	$6,000	$108,000
34	Septic System Installation/Replacement with Pump	RB-4P	$8,000	$272,000
30	Alternative on Site Systems	RB-5	$20,000	$600,000
1	Marina Boat Waste Discharge Facilities		$6,000	$6,000
1	Recreational Boater Education Programs		$3,000	$3,000
3	Residential Education Programs (pet, septic, horse/sheep)		$2,500	$7,500
3	Aquaculture Education Workshops (public/restaurant)		$2,500	$7,500
8	Vegetated Buffer on Residential Land		$175	$1,400
14	Rain Garden		$5,000	$70,000
60	Residential Pet Waste Composters		$50	$3,000
1	Confined Canine Waste System		$6,000	$6,000
7	Public Pet Waste Collection Facility/Trash Can/Signage/Supplies		$600	$4,200
Phase 1 Total				$1,945,525
Optional - Phase 2 Implementation Costs				
581	Septic Tank Pump Out - MANDATORY	RB-1	$300	$174,300
1	Recreational Boater Education Programs		$3,000	$3,000
3	Residential Education Programs (pet, septic, horse/sheep)		$2,500	$7,500
3	Aquaculture Education Workshops (public/restaurant)		$2,500	$7,500
1	Wildlife Education/Mgmt. Program (~95% of required wildlife load)		$10,000	$10,000
Optional - Phase 2 Total				$202,300
Total Chuckatuck and Brewers Creek				$2,147,825

The primary benefit of this implementation is cleaner water in Chuckatuck and Brewers Creeks. The goal is to implement the IP so that fecal contamination may be reduced and allow for the removal of the condemnation of the shellfish growing areas. The principal benefit to private oyster growers in the creeks would be that once water quality in restored, they would no longer need to transport their floats to clean water to depurate oysters prior to consumption. However, further reducing fecal contamination levels in these creeks, particularly from human sources will improve public health by reducing the risk of infection from fecal sources through contact with surface waters.

The residential programs will play an important role in improving water quality, but there may also be additional return on the investment in terms of economic benefits to homeowners. An improved understanding of private on-site sewage 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 replacement of failing on-site sewage disposal systems with new septic or alternative treatment systems will have a direct and substantial impact by improving property values and improving the local economy.

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 enhances the resources and funding necessary to pursue restoration and enhancement activities. The agricultural and residential practices recommended in this document are expected to provide economic benefits, as well as environmental benefits, to the property owners in these watersheds.

STAKEHOLDER ROLES AND RESPONSIBILITIES

Stakeholders are individuals who live or have land management responsibilities in the watershed, including government agencies, businesses, private citizens, and special interest groups. Achieving the goals of the Chuckatuck Creek and Brewers Creek TMDL IP efforts (i.e. improving water quality and removing these waters from the impaired waters list) is dependent on stakeholder participation. Both the local stakeholders who are charged with the implementation of control measures and the government stakeholders who are responsible for overseeing human health and environmental programs must first acknowledge there is a water quality problem, and then make the needed changes in operations, programs, and legislation to address the pollutants.

EPA has the responsibility for 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 five state agencies responsible for regulating and providing educational outreach for activities that impact water quality with regard to this implementation plan. These agencies include: the Department of Environmental Quality, the Department of Conservation and Recreation, the Department of Health, the Department of Agriculture and Consumer Services (VDACS), and VA Cooperative Extension (VCE).

DEQ is responsible for monitoring the waters to determine compliance with state standards, and for requiring permitted point source dischargers to maintain pollutant loads and concentrations within permit limits. They have the regulatory authority to levy fines and take legal action against those in violation of permits. Additionally, DEQ is responsible for presenting this IP to the SWCB for approval as the plan for implementing pollutant allocations and reductions contained in the TMDL. DEQ is responsible for addressing nonpoint sources (NPS) of pollution as of July 1, 2013.

Historically, most **DCR** programs 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 TMDL-required 100 percent participation of stakeholders. To meet the needs of the TMDL program and achieve the goals set forth in the CWA, the incentives under the 319 program have been adjusted to account for 100 percent participation. It should be noted that DEQ does not have regulatory authority over the majority of NPS issues addressed in this document. Their Division of Chesapeake Bay Local Assistance enforces compliance with the Chesapeake Bay Preservation Act, including septic pump out requirements and the protection of Resource Protection Areas (RPAs) and Resource Management Areas (RMAs).

Through Virginia's Agricultural Stewardship Act, the **VDACS Commissioner of Agriculture** has the authority to investigate claims that an agricultural producer is causing a water quality problem on a case-by-case basis. If deemed a problem, the Commissioner can order the producer to submit an agricultural stewardship plan to the local soil and water conservation district. If a producer fails to implement the plan, corrective action can be taken, which 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. The enforcement of the Agriculture Stewardship Act is entirely complaint driven.

VDH is responsible for maintaining safe drinking water measured by standards set by EPA. Their duties also include On-Site Sewage System regulations. Like VDACS, VDH's program 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 from a failed septic system that may take many weeks or longer to achieve compliance. VDH has the responsibility of enforcing actions to correct or eliminate failed systems and straight pipes (Swage Handling and Disposal Regulations, 12 VAC 5-610-10 *et seq.*). Their Division of Shellfish Sanitation (DSS) is responsible for protecting the health of shellfish consumers by ensuring that growing waters are properly classified for harvesting. DSS monitors water quality in shellfish growing areas and provides shellfish closings and sanitary surveys to identify deficiencies along the shoreline. They also administer the Clean Marina Program to address the proper operation of pump out facilities and boater education.

VCE is an educational outreach program of Virginia's land grant universities (Virginia Tech and Virginia State University), and is a part of the national Cooperative State Research, Education and Extension Service, an agency of the U.S. Department of Agriculture. VCE is a product of cooperation among local, state and federal governments in partnership with local citizens. VCE offers educational outreach and technical resources on topics such as crops, grains, livestock, dairy, horse pasture management, natural resources and environmental management. VCE has several publications related to TMDLs and promotes water quality education and outreach methods to citizens, businesses, and developers regarding necessary pet waste reductions. For more information on publications and county extension offices, visit www.ext.vt.edu.

VCE also oversees the Master Gardener Program. The **Suffolk Master Gardeners Association (SMGA)** assists local homeowners, recreational gardeners, and local public schools. They have worked with first grade teachers in Suffolk to create a lesson plan about plant anatomy that meets SOL requirements. In addition, SMGA provides rainbarrel construction education, advice and assistance for rain garden installation, and other various clean water practices. Water quality stewardship will be the primary theme of the SMGA tent at the 2015 Suffolk Peanut Festival, an event that attracts more than 100,000 attendees.

VDOF (Virginia Department of Forestry) has prepared a manual to inform and educate forest landowners and the professional forest community on proper BMPs and technical specifications for installation of these practices in forested areas. Forestry BMPs are intended to primarily control erosion. For example, streamside buffers provide nutrient uptake and soil stabilization, which can benefit water quality by reducing the amount of nutrients and sediment that enter local streams.

The **NRCS** (Natural Resources Conservation Service) is the federal agency that works hand-in-hand with the American people to conserve natural resources on private lands. NRCS assists private

landowners with conserving their soil, water, and other natural resources. Local, state, and federal agencies along with policymakers rely on the expertise of the NRCS staff.

The **Peanut Soil and Water Conservation District (PSWCD)** works with many agricultural producers in the region to improve agricultural practices and minimize impacts to the area waterways. In addition to the farming community, they work with citizens on erosion and sediment related compliance concerns and encourage innovative techniques for dealing with stormwater.

The **Hampton Roads Planning District Commission (HRPDC)** is a regional organization that has participation from sixteen local municipalities. The HRPDC facilitates many regional committees that focus on topics varying from economics, transportation, and environmental issues. They facilitate the askHRgreen.org website, which focuses on different environmental campaigns in the region, including the "scoop the poop" pet waste initiative and the FOG (fats, oils, and grease) educational campaign.

The **Nansemond River Preservation Alliance** (NRPA; http://nansemondriverpreservationalliance.org/) is an important organization that is engaged in outreach and education for local people in the region. The River Talk Series, which is organized by NRPA, covers a variety of water quality issues in the Nansemond River, Chuckatuck Creek, and surrounding creeks. A 'Connecting the Classroom with the Environment' seventh grade level learning module was launched in the City of Suffolk Public Schools in 2013 as part of NRPA's Nansemond Watershed Initiative and has reached nearly 2,000 students. In addition to outreach and education, NRPA programs include water quality monitoring and BMP installation. NRPA members regularly monitor water quality in the region (salinity, oxygen, clarity, temperature, pH, and *E. coli*) and issue a State of the Nansemond Report Card based on this data. NRPA members have also organized several buffer restoration, oyster restoration, and living shoreline projects in the Nansemond River/Chuckatuck Creek area.

The **Suffolk-Nansemond Chapter of the Izaak Walton League of America** (IWLA; https://sites.google.com/site/suffolknansemondchapter/) was chartered in 1954 and is dedicated to natural resource conservation and education. The chapter holds monthly meetings, at which they host local environmental speakers and discuss chapter activities. One of the main goals of these chapter activities is to encourage environmental stewardship in the community, especially in young people.

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, they can take a leading role in water quality and pet owner education through mailings to landowners, but may need assistance from the Steering Committee and other area groups for the content of these mailed materials. The City of Suffolk and Isle of Wight County will be key partners in seeking grant funds to repair/replace failing on-site sewage disposal systems and to fund the various education programs proposed in the IP.

Successful implementation depends on stakeholders taking responsibility for their role in the process. *Table 11* summarizes the responsibilities for implementation of the plan. While the primary role falls on the landowner, local, state, and federal agencies also have a stake in seeing that Virginia's waters are clean and provide a healthy environment for citizens. While it is unreasonable to expect that the natural environment (*e.g.,* streams and rivers) can be made 100 percent free of risk to human health, it is possible and desirable to minimize pollution related to humans. Virginia's approach to correcting NPS pollution problems has been, and continues to be, primarily encouragement of participation through education and financial incentives. It is noted that while this IP has been prepared for bacteria impairments in the watersheds, many of the BMPs will also result in reductions in nutrients and sediment reaching the Chesapeake Bay and therefore contribute also to improvements called for in the Chesapeake Bay Watershed Implementation Plan.

Table 11. **Implementation responsibilities for Chuckatuck and Brewers Creeks.**

Practice	Implementation Responsibility	Oversight Responsibility	Potential Funding
Livestock Exclusion/Buffers	Landowners, SWCD, NRCS	SWCD	Cost-Share
Small Acreage Grazing	Landowners, SWCD, NRCS	SWCD	Cost-Share
Vegetated Buffer on Cropland	Landowners, SWCD, NRCS	SWCD	Cost-Share
Cover Crops on Agricultural Lands	Landowners, SWCD, NRCS	SWCD	Cost-Share
Pasture Management	Landowners, SWCD, NRCS	SWCD	Cost-Share
Septic Tank Pump Out	Landowners	City of Suffolk & Isle of Wight County, VDH	Private, Grant
Septic System Repair	Landowners	City of Suffolk & Isle of Wight County, VDH	Private, Grant
Septic System Installation/Replacement	Landowners	City of Suffolk & Isle of Wight County, VDH	Private, Grant
Septic System Installation/Replacement with Pump	Landowners	City of Suffolk & Isle of Wight County, VDH	Private, Grant
Alternative Waste Treatment Systems	Landowners	City of Suffolk & Isle of Wight County, VDH	Private, Grant
Marina Boat Waste Discharge Facilities	Local Citizens, VDH	VDH	Private, Grant
Educational Programs	Local Citizen Groups, NRPA, Izaak Walton League-Suffolk Nansemond Chapter, nearby University organizations, SWCD, NRCS, Suffolk Master Gardeners	None	Grant
Vegetated Buffers on Residential Land	Landowners, VDOF, Suffolk Master Gardeners	City of Suffolk & Isle of Wight County	Grant
Residential Pet Waste Composters	Landowners, Local Citizen Groups	None	Grant
Public Pet Waste Collection Facility/Signage/Supplies	Local Citizen Groups, City of Suffolk & Isle of Wight County, SWCD, Parks, Private Property Owners, Campgrounds	None	Grant

MEASURABLE GOALS AND MILESTONES FOR ATAINING WATER QUALITY STANDARDS

Timeline and Milestones

The goals of implementation are restored water quality in Chuckatuck and Brewers Creeks, the removal of the shellfish growing areas from Virginia's Section 303(d) list of impaired waters, and the lifting of the shellfish condemnations on the creeks. Progress toward the end goals will be assessed during implementation through tracking of BMP installations and continued water quality monitoring. Phase 1 implementation is estimated to take ten years. The septic pumpouts identified in the implementation plan, will be continuous over the 20-year plan, with a goal to complete 2/3 of the practices in the first 10 years (Phase 1) and the remaining 1/3 in the final 10 years of the plan (Phase 2).

Years 1 and 2 will include implementation of septic system BMPs, including pump outs, repairs, replacement, and installation of alternative septic systems where they are needed. Septic tank pump outs will be prioritized for residents identified as reaching the five year point since their last documented service. In addition, residential education programs focused on septic system maintenance, pet waste management, and nuisance wildlife management will occur during this time.

Years 3 and 4 of implementation will continue septic repairs, replacements, and pump outs (especially for households that have not been serviced in five years or more). Residential education programs focused on pet waste management, vegetated buffers, and rain gardens will occur during this time. Pet waste composters will be distributed as part of this education effort. Livestock exclusion and grazing system BMP opportunities will be included in year 3 and 4 activities.

Years 5 and 6 will include recreational boater education and aquaculture education programs. In addition, septic repairs, replacements, and pump outs (especially for households that have not been serviced in five years or more) will continue. Pet waste stations will be installed in high traffic locations and areas frequented by dog walkers. Agricultural BMP practices will be implemented in years 5 and 6 as well.

Years 7 and 8 of implementation will include increased establishment of residential and woodland buffers and rain gardens. Continued septic repairs, replacements, pump outs (especially for households that have not been serviced in five years or more), and installation of a boat pump out facility will occur in years 7 and 8.

Years 9 and 10 of implementation will provide an opportunity to complete any BMPs or education programs that were not completed in previous years as scheduled. In addition, septic repairs, replacements, and pump outs (especially for households that have not been serviced in five years or more) will continue. Residential and woodland buffer establishment and rain garden construction will be continued in years 9 and 10.

Upon completion of the ten-year Phase 1 implementation period, all of the BMPs (except for 1/3 of the septic pumpouts, which are included in Phase 2) and education programs identified in this plan should have been implemented. Assuming that these reduced loads are maintained and no new bacteria sources are added, the creeks should be on track for delisting. However, it is possible that wildlife loads may still need to be addressed to meet TMDL reductions.

Water quality will be reassessed to determine if the water quality standard is attained. If water quality standards are not being met, the local citizens may elect to move forward with Phase 2 (years 11-20) implementation to address the fecal coliform contribution from wildlife through a wildlife management plan, additional septic pumpouts, and additional education. A UAA may be initiated to reflect the presence of naturally high bacteria levels due to uncontrolled sources. The outcomes of the UAA may lead to the determination that the designated use(s) of the waters may need to be changed to reflect the attainable use(s).

Tracking Implementation

Tracking of BMP implementation will serve as an interim measure of progress toward improving water quality in these creeks. Agricultural BMPs installed through the Virginia Agricultural Cost-Share Program will be tracked in the Agricultural Cost-Share Database. Repairs or replacements of onsite septic systems and straight pipes identified in the shoreline sanitary survey can be tracked through VDH and can be monitored on their website at http://www.vdh.state.va.us/EnvironmentalHealth/Shellfish/documents/shoreline_survey.pdf. In addition, the City of Suffolk and Isle of Wight County maintain records of septic pumpouts in the area. BMPs implemented through grants such as 319 and the Water Quality Improvement Fund would be tracked by project sponsors administering the grants and reported to DEQ.

Monitoring

Improvements in water quality and implementation progress will ultimately be determined through monitoring conducted by VDH-DSS at established bacteriological monitoring stations in accordance with its shellfish monitoring program. DEQ will continue to use data from these monitoring stations and related ambient monitoring stations to evaluate improvements in the bacterial community and the effectiveness of TMDL implementation in attainment of the general water quality standard. VDH-DSS water quality monitoring can be accessed using the agency's GIS Data Viewing tool which uses Google Earth at: http://www.vdh.state.va.us/EnvironmentalHealth/Shellfish/documents/ShellfishSanitation.kml. In addition, see Figure 2 for the locations of VDH-DSS monitoring stations within the watersheds.

Additional monitoring may be conducted by citizen monitors to better identify bacterial sources and the effectiveness of implementation actions. NRPA members regularly monitor water quality in the region (salinity, oxygen, clarity, temperature, pH, and *E. coli*) and issue a State of the Nansemond Report Card based on this data.

INTEGRATION WITH OTHER WATERSHED PLANS AND PROJECTS

Virginia's watersheds are managed under a variety of individual, though related, water quality programs and activities, many of which have specific geographical boundaries and goals. These include, but are not limited to the Chesapeake Bay TMDL and Watershed Implementation Plan, TMDLs, Watershed Roundtables, Water Quality Management Plans, Watershed Management Plans, Erosion and Sediment Control regulations, Stormwater Management Program, Source Water Assessment Program, Green Infrastructure Plans, and local comprehensive plans.

Current on-going watershed projects or programs to be integrated with this IP include:

- City of Suffolk Septic Tank Pump-Out and Inspection
- Isle of Wight County Septic Tank Pump-Out and Inspection
- Peanut Soil and Water Conservation District Agricultural Cost Share Program

POTENTIAL FUNDING SOURCES

Potential funding sources available during implementation were identified during IP development. A brief description of the programs and their requirements are provided in this chapter. Detailed descriptions can be obtained from the Peanut Soil and Water Conservation District (PSWCD), Virginia Department of Conservation and Recreation (DCR), Virginia Department of Environmental Quality (DEQ), Natural Resources Conservation Service (NRCS), Virginia Cooperative Extension (VCE) and others listed below. It is recommended that participants discuss funding options with experienced personnel at these agencies in order to choose the best option.

Virginia Water Quality Improvement Fund

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

Virginia Agricultural Best Management Practices Cost-Share Program

The cost-share program is funded with state funding administered through local SWCDs. Locally, the PSWCD administers the program to encourage farmers to use BMPs on their land to better control bacteria, sediment, nutrient loss, and transportation of pollutants into surface water and groundwater due to excessive surface flow, erosion, leaching, and inadequate animal waste management. Cost-share is typically 75 percent of the actual cost, not to exceed the various cost share caps, but there are also some that offer 50 percent or offer an incentive payment per acre.

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 percent of the first $70,000 expended for agricultural best management practices by the individual. Any practice approved by the local SWCD Board shall be completed within the taxable year in which the credit is claimed. If the amount of the credit exceeds the taxpayer's liability for such a taxable year, the excess may be carried over for credit against income taxes in the next five taxable years. The credit shall be allowed only for expenditures made by the taxpayer from funds of his/her own sources. This program can be used independently or in conjunction with other cost-share programs in the stakeholder's portion of BMP costs.

Virginia Small Business Environmental Assistance Fund Loan Program

The Fund, administered through VADEQ, is used to make loans or to guarantee loans to small businesses for the purchase and installation of environmental pollution control equipment, equipment to implement voluntary pollution prevention measures, or equipment and structures to implement agricultural BMPs. The equipment must be needed by the small business to comply with

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

Federal Clean Water Act Section 319 Incremental Funds

USEPA develops guidelines that describe the process and criteria to be used to award CWA Section 319 NPS grants to states. States may use up to 20 percent of the Section 319 incremental funds to develop NPS TMDLs as well as develop watershed based plans for Section 303(d) listed waters. The balance of funding can be used to implement watershed based plans that have TMDLs. Funds can be used for residential and agricultural BMPs, and for technical and program staff to administer the BMP programs.

Community Development Block Grant Program

The Department of Housing and Urban Development sponsors this program, which is intended to develop viable communities by providing decent housing, a suitable living environment, and expanded 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 the Farm Services Agency (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. Application evaluation points can be increased if certain tree species, spacing, and seeding mixtures that maximize wildlife habitats are selected. Land must have been owned or operated by the applicant for at least 12 months prior to the close of the signup period. The payment to the participant is up to 50 percent of the cost for establishing ground cover. Incentive payments for wetlands hydrology restoration equal 25 percent of the cost of restoration.

Environmental Quality Incentives Program (EQIP)

This program is administered by the NRCS and includes cropland erosion control, nutrient management, forest management, animal waste management, grazing land practices, and wildlife habitat on eligible lands. Contracts up to 10 years are written with eligible producers in order to achieve an EQIP plan of operation that includes structural and land management practices. Cost-share is made available to implement one or more eligible conservation practices and incentive payments can be made to implement one or more management practices.

Wildlife Habitat Incentives 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 nesting and cover habitats for migrating songbirds, waterfowl, and shorebird species; and decreasing natural habitat systems that are environmentally sensitive and have been impacted and reduced through human activities. Cost-share assistance of up to 75 percent of the total cost of installation (not to exceed $10,000 per applicant) is available for establishing habitat. Applicants will be competitively ranked within the state and certain areas and practices will receive higher ranking based on their value to wildlife. Types of practices include: disking, prescribed burning, mowing, planting habitat, converting fescue to warm season grasses, establishing riparian buffers, creating habitat for waterfowl, and installing filter strips, field borders, and hedgerows. For cost-share assistance, USDA pays up to 75 percent of the cost of installing wildlife practices.

Wetland Reserve Program (WRP)

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

landowner continues to control access to the land and may lease the land for hunting, fishing, or other undeveloped recreational activities. At any time, a landowner may request that additional activities be added as compatible uses. Land eligibility is dependent on length of ownership, whether the site has been degraded as a result of agriculture, and the land's ability to be restored. Restoration agreement participants must show proof of ownership. Easement participants must have owned the land for at least one year and be able to provide clear title.

National Fish and Wildlife Foundation

Offers are accepted throughout the year and processed during fixed signup periods. The signup periods are in 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. Projects are funded in the US 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 (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.

Virginia Department of Forestry

Through the US Forest Service Watershed Forestry Program, VDOF has developed a **Virginia Trees for Clean Water** program designed to improve water quality by planting buffers and trees in neighborhoods and communities.

Southeast Rural Community Assistance Project, SERCAP

Southeast RCAP is a non-profit organization that offers grants and loans to low income households in rural regions to help upgrade their water and wastewater facilities. Funding is also used to assist with projects run by small, rural governments, to develop small businesses, and to assist with hook-up costs.

LIST OF ACRONYMS

ARA	Antibiotic Resistance Analysis
BMP	Best Management Practice
BST	Bacterial Source Tracking
CFU	Colony Forming Unit
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
CWA	Clean Water Act
DCAP	Damage Control Assistance Program
DCR	Department of Conservation and Recreation
DEQ	Department of Environmental Quality
DMAP	Deer Management Assistance Program
DPOP	Deer Population Reduction Program
DSS	Division of Shellfish Sanitation
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
FOG	Fats, Oils, and Grease
FR-3	Woodland Buffer Filter Area
FSA	Farm Service Agency
FWS	Fish and Wildlife Service
GIS	Geographic Information System
HRPDC	Hampton Roads Planning District Commission
HRSD	Hampton Roads Sanitation District
HUC12	Hydrologic Unit 12 digit Code
IP	TMDL Implementation Plan
IWLA	Izaak Walton League of America
LE-1T	Livestock Exclusion with Riparian Buffers
MF	Membrane filtration
mL	Milliliter
MOU	Memorandum of Understanding
MPN	Most Probable Number
NRPA	Nansemond River Preservation Alliance
NLCD	National Land Cover Dataset
NOAA	National Oceanic and Atmospheric Administration
NPS	Nonpoint Source
NRCS	Natural Resource Conservation Service
NWBD	National Watershed Boundary Dataset
PSWCD	Peanut Soil and Water Conservation District
RB-1	Septic Tank Pump Out
RB-3	Septic System Repair
RB-4	Septic System Installation/Replacement

RB-4P	Septic System Installation/Replacement with Pump
RB-5	Alternative Waste Treatment System
RPA	Resource Protection Area
RMA	Resource Management Area
SERCAP	Southeast Rural Community Assistance Project
SL-6AT	Small Acreage Grazing System
SL-6T	Stream Exclusion with Grazing Land Management for TMDL Implementation
SL-8B	Small Grain Cover Crop for Nutrient Management
SL-10T	Pasture Management
SMGA	Suffolk Master Gardeners Association
SSO	Sanitary Sewer Overflow
SWCB	State Water Control Board
TMDL	Total Maximum Daily Load
UAA	Use Attainability Analysis
USDA	US Department of Agriculture
VACS	Virginia Agricultural Cost-Share
VAHU6	Virginia Hydrologic Unit 6
VCE	Virginia Cooperative Extension
VDACS	Virginia Department of Agriculture and Consumer Services
VDGIF	Virginia Department of Game and Inland Fisheries
VDH	Virginia Department of Health
VDOF	Virginia Department of Forestry
VIMS	Virginia Institute of Marine Science
WHIP	USDA Wildlife Habitat Incentives Program
WP-1	Sediment Retention, Erosion, or Water Control Structures
WQ-1	Grass Filter Strip
WQIF	Water Quality Improvement Fund
WQMIRA	Virginia's 1997 Water Quality Monitoring, Information and Restoration Act
WQMP	Water Quality Management Plan
WRP	USDA Wetland Reserve Program

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VA Department of Environmental Quality
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VA Department of Forestry
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http://www.vdh.state.va.us/LHD/WestTide/

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APPENDIX A

Initial and Final Public Meeting Summaries

Work Group Meeting Summaries:

Government Working Group Meeting Summary

Residential/Agricultural Working Group Meeting Summary

Steering Committee Meeting Summary

Chuckatuck and Brewers Creeks TMDL Implementation Plan Development

Public Meeting March 6, 2014

Location: The CE & H Ruritan Hall, 8881 Eclipse Drive Suffolk, Virginia

Start: [6:30 PM]

End: [8:30 PM]

Meeting Attendees:

Name	Affiliation	Address	Work Group (Ag., Res., Gov.)
Brian Alperin	City of Suffolk	441 Market Street, Suffolk, VA., 23434	Gov.
Mike Lane	Lane Environmental Consultants	1200 Babbtown Road, Suffolk, VA., 23434.	Ag
Byron Carmeon	NRPA	3616 Labrador Ln, Suffolk, VA., 23434	Non-profit
Ed Milley	NRPA	1416 Bridge Road, Suffolk, VA., 23434	Res.
Kim Hummel	Isle of Wright	P.O. Box 80, Isle of Wight, VA., 23397	Gov.
George Winslow	Carrollton/ Isle of Wight	23481 Owen Farm Road, Carrollton, VA 23314	Res.
Ram Gupta	DEQ-CO	629 E. Main St., Richmond VA.,	Gov.
Sherry Earley	City of Suffolk	440 Market Street, Suffolk, VA., 23434	Gov.
Erin Roundtree	City of Suffolk	440 Market Street, Suffolk, VA., 23434	Gov.
Art Kirkby	**DCR**	1549 A Holland Rd. Suffolk, VA., 23434	Gov.
Chuck Griffin	Peanut SWCD	203 Wimbledon Smithfield, VA., 23430	Gov.
Joseph Barlow	Landowner	P.O. Box 2116 Suffolk VA., 23434	Res.
Shelley Barlow	Landowner	P.O. Box 2116 Suffolk VA, ., 23434	Res.
Keith Pope	Landowner	7105 Crittendan Rd, Suffolk, VA, 23185	Res.

Albert Moor	City of Suffolk	1258 Holland Rd., Suffolk, VA., 23434	Gov.
Roger Fawcett	City of Suffolk	411 Market Street, Suffolk, VA., 23434	Gov-Council
Michaell Reiss	NRPA	6444 Bridleway, Norfolk, 23578	Non-profit
Jim Winter	SWGA	8921 River Crescent, Suffolk VA 23435	
Roy Pope	Homeowner	7105 Crittendan Rd, Suffolk VA, 23185	Res.
Lynn Pope	Homeowner	7105 Crittendan Rd, Suffolk VA, 23185	Res.
Jamie Brunkow	James River Association	1201 Jamestown Rd. Williamsburg, VA 23185	Non-profit
Wayne Sawyer	Bennett's Creek Nursery	17497 Benns Church Blvd., Smithfield VA., 23430	Bus.
Matthew Sawyer	Bennett's Creek Nursery	17497 Benns Church Blvd., Smithfield VA., 23430	Bus.
Robert Black	Bennett's Creek Nursery	17497 Benns Church Blvd., Smithfield VA., 23430	Bus.
Jay Duell	VDH	135 Hall Ave., Suffolk, VA 23434	Gov.
Robert Johnson	Homeowner	5988 Bennetts Creek Ln., Suffolk, VA., 23423	Res.
Elizabeth Taraski	NRPA	P.O Box. 6090 Suffolk VA., 23433	Non-profit
Tausha Fanslan	Environmental Science	3604 Old Spice Ct. Chesapeake VA., 23321	Bus.

I. Agenda Item: Purpose of Meeting –What is an Implementation Plan? - DEQ

1. **Discussion:** A power point presentation was utilized to explain the purpose of the meeting and demonstrate how and why the original TMDL documents were developed for the watersheds studied. The power point also provided a detail review of the TMDL Implementation Plan development process and the various roles that the stakeholders can play in the development process.

2. **Discussion:** DEQ discussed how changes in the Virginia Health Department sampling techniques will affect the required reduction from the various potential sources of bacteria.

3. **Discussion:** Introduce the purpose of the various work groups and explain how these groups will help direct the TMDL implementation plan.

Question received during this presentation are provided below.

Q: Is there shellfish to harvest in the creeks?

Response: Historically the fishery supported several watermen and today many watermen from around the state harvest oysters near the mouth of Chuckatuck Creek.

Q: Where are the locations of the VDH monitoring stations?

Response: A map showing the locations of the monitoring stations was projected for the audience to view.

II. Agenda Item: Form Residential and Agriculture work groups and begin discussing possible BMPs, suitable restoration sites, and constraints to BMP implementation in the watershed.

Note: The group did not want to split up during the breakout session and remained as a single mixed agriculture/residential work group.

*****Comments from the combined residential/agriculture work group are provided below.**

Septic Tank Identification and Management

1. Can we use soil maps for the region to determine the locations of poorly drained soils where septic systems are most likely to fail?
   Response: This seems like a reasonable idea to begin identifying potential areas to implement BMPs.

2. Can we use recently produced flood maps to identify area where septic systems are likely to fail from high water tables or during flood events.
   Response: Again this idea seems like a reasonable way to identify potential areas to implement BMPs.

3. Can we use historical imagery or county records to compare the age of residents/communities to determine where older septic systems in need of maintenance/pump out/replacement may exist?
   Response: Local governments indicated that some of this information is available and historical aerial imagery can be viewed on goggle earth. This information can also be used to identify the density of the

neighborhoods to determine if a scoop the poop campaign is necessary or will be successful.

4. Where is the city sewer system available in the watershed?
   Response: Suffolk government officials provided a general description of the location of the city sewage line, and discussed the limitation and barriers to add more sewage lines to rural communities (Expensive).
5. Geese and waterfowl population seem to be growing. What can we do about this problem?
   Response: DEQ recognizes that wildlife population are an issue, but we choose to manage bacteria from human and domestic animal population first because these sources are easier to manage and more cost efficient. If we successfully reduce bacteria from human and domestic animal sources and the waters are still impaired we will then look at activities to manage wildlife populations. Handouts to manage wildlife populations were provided.

6. Several sewage lines cross the river. Are these sources of bacteria and what kind or maintenance/inspection do the sewage line receive?
   Response: Suffolk government officials report that since these lines are relatively young and functioning properly they will not be a source of bacteria. The lines have a regular inspection/ maintenance schedule.
7. How can we best educate the public about septic system maintenance/repairs?
   Response: Currently occurring. HRGreen educational materials are being distributed in the watershed.

8. When septic systems are pump out, are the systems inspected? Are the residences required to repair malfunctioning systems?
   Response: VDH is not informed if the system is malfunction by the pump out company and the systems are not thoroughly inspected. The local VDH does have a record of all permitted septic system installed since the 1960's.

9. When is it appropriate to use conventional vs alternative septic systems?
   Response: This depends on the soil type and the soil wetness. Very site specific.

10. Does the Isle of Wight County or City of Suffolk have a current septic pump out program?
    Response: Yes residence are required to pump out there septic systems once every five years. Both Suffolk and Isle of Wight indicated that there is a data base of septic pump outs in the region.

11. How is the locations where sewage line are located determined?
    Response: HRSD determines this based on population density and need.

<u>Pet Waste Management</u>

12. Urban vs Rural Pet waste
    Response: The group opinion leaned towards focusing on the pet waste management in the urban portions of the watershed. This is where we are most likely to find higher density of pets. HRGreen

has a variety of education material available and there are grant available for installing new pet waste stations.

13. Can we use realtors to distribute pet waste educational materials?
    Response: This seemed like a reasonable idea to the work group.

14. Comments: *Veterinary clinic, a mailer for city pet licenses, and homeowner associations would be a good way to reach the general public with scoop the poop information.*

Livestock/Horses

15. Most large animals in the watershed are "pet" horses. Are there currently any horse owners practicing BMP.
    Response: Yes a couple horse owners have consulted with the Peanut SWCD to develop waste management plans. Generally stable horses and boarding houses that generate large piles of manure are more concerning than horses left to pasture.
16. Should a local ordinance be established to manage horse manure (at boarding houses, ect.)
    Response: No, this does not seem necessary. An education program is preferable.
17. Are there any other farm animals in the watershed?
    Response: Yes, two farms have cattle in the headwaters of Chuckatuck Creek. The description of the conditions of these two farms seems like they would benefit from BMP practices.

Boating/Marinas

18. Should we establish a boat No Discharge Zone in the creeks?
    Response: The topic is worth a discussion, but there is very limited boat pump out station in the watershed. These stations should be updated and/or new stations should be created prior to establishing a NDZ. There is grant funding available to assist with this endeavor.

Communication/Advertising

19. What is the best way to advertise these meetings to the public?
    Response: Suffolk and Isle of Wight Cable Stations, HRGreen Ads., Extension Agents, Local Churches, Civic Leagues, Local Festivals – Bennett's Creek Park
20. The next meeting will be set up via a doodle poll to be sent out by email to the work group.

Chuckatuck and Brewers Creeks TMDL Implementation Plan Development Public Meeting September 24, 2015

Final Public Meeting

Location: CE&H Ruritan Hall, 8881 Eclipse Drive, Suffolk, VA 23434

Start: 6:00 pm
End: 7:00 pm

Kristie Britt-DEQ/TRO, Ram Gupta-DEQ/TRO, Dinah Oliver-DEQ/TRO, Jim Winters-NRPA, Elizabeth Taraski-NRPA, David Basnett- NRPA, Karla Smith – NRPA, Mike Reiss- NRPA, Erin Rountree-Suffolk Public Works, David A. Kuzma-Isle of Wight, Albert Moon- Suffolk Public Works, Patricia and Don Boyd - Citizens, Bill Rogers – Citizen

- Welcome and Introductions
- Purpose of Meeting
- Review of TMDL and IP Development

  A presentation was delivered to review information related to the Implementation Plan. Topics covered included VDH water sampling for fecal coliform, potential bacterial sources, TMDLs and the incorporation of an Implementation Plan, Best Management Practices (BMPs), timeline of events and funding.

- Best Management Practices Overview

  - Agricultural

    Phase 1 Livestock Exclusion: Concern over who will cover the cost of $15,000. DEQ representatives explained this cost is covered by the Virginia Agricultural Cost-Share Program.

    Grass Strips: Requested explanation of why grass strips are beneficial. Grass filter strips are vegetative buffers that are located along the banks of water courses to filter runoff, anchor soil particles, and protect banks against scour and erosion. Even the best conservation measures on a farm allow some soil movement during heavy rains. Filter strips are the stream's last line of defense against pollution. Since filter strips trap eroded soil, they help keep sediment out of streams. The strips also improve water quality by

filtering out fertilizers, pesticides, and microorganisms that otherwise might reach waterways.

-Septic and Marina Boat Discharge

Marine Vessel Regulation: Community representative suggested that DEQ add in language regarding DGIF and their vessel regulations. DEQ representatives acknowledged this information and will review.

RESPONSE: Additional wording can be added to the text of the reports under Educational Programs (new text in red)

Outreach to recreational boaters that use the public boat ramps and marinas in the watersheds along with other boaters that may enter the creek for recreational purposes is an important element of this plan. The focus of this educational effort will be to inform boaters about the availability of sanitary pump out facilities in the area and the detrimental impact that overboard discharge of human waste can have on water quality. This education program should also inform boaters about HRSD's Boat Pump Out Program (http://www.hrsd.com/boatereducationproject.shtml). Appointments for pump outs using this program can be made via phone or email. Funding for recreational boater education should include money for signs at marinas, boat ramps, boat refueling areas, and other boat related facilities. These signs should include information about HRSD's Boat Pump Out Program and any local sanitary pump out facilities in the watershed.

Additionally, this educational effort may be in cooperation with DEQ's efforts to have Virginia's tidal creeks designated as No-Discharge Zones.

No Discharge Zones in Virginia

Recognizing the need to minimize the potential for contamination from any and all sources in these sensitive areas, the Virginia General Assembly unanimously passed House Bill 1774 in February, 2009. The Bill resolves that Virginia pursue NDZ designation for all its tidal creeks. (http://www.deq.virginia.gov/tmdl/ndz.html)

This designation would further restrict vessels from discharging wastes even after the wastes have been treated by approved marine sanitation devices.

According to the VADGIF Equipment Regulations, "vessels with installed toilets and marine sanitation devices shall be in compliance with federal regulations which set standards for sewage discharges from marine sanitation devices. Vessels without installed toilets or without installed marine sanitation devices shall not directly or indirectly discharge sewage into state waters. Sewage and other wastes from self-contained, portable toilets or other containment devices shall be pumped out at pump-out facilities or carried ashore for treatment in facilities approved by the Virginia Department of Health."

-Residential

-Pet Waste

Station Locations: Community representative asked where the exact locations of the pet waste stations within each suggested area were located. The map provided in the plan shows locations which include Lone Star Lakes, Docks in Eclipse and at the Pet Daycare Center. DEQ representatives explained there are 7 stations proposed in the plan which can be placed at varying locations within the proposed areas of interest.

-Education

- Timeline

Years 1-2

- Residential education – focus on septic maintenance, pet waste management, and nuisance wildlife control

Years 3-4

- Residential education – focus on pet waste (composters distributed), vegetated buffers, and rain gardens
- Livestock exclusion and grazing system BMPs

Years 5-6

- Recreational boater and aquaculture education program
- Pet waste stations and additional agricultural BMPs

Years 7-8

- Residential and woodland buffer installation/rain garden installation
- Boat pump-out facility

Years 9-10

- Complete any remaining BMPs or education programs still needed

- Roles and Responsibilities

A community representative requested to include "City" under Implementation Responsibility for the Practice of Public Pet Waste Collection Facility/Signage/Supplies

RESPONSE: : The word "Counties" is already listed in the Implementation Responsibility column and implies both the City of Suffolk and Isle of Wight County.

- Funding
- Questions/Comments

At the end of the meeting, a question was asked about the execution of the plan. DEQ representatives explained the progression of additional meetings required before a 30 day public comment period and submission to EPA for approval. Once EPA has approved the plan it is eligible for 319 nonpoint source funding, which means that local stakeholders would be able to apply for the funding the next time a request for applications is issued. The nonpoint source funding cannot be used to satisfy any permit conditions (i.e. MS4 permits), as it is only allotted for addressing unpermitted nonpoint sources in the watershed.

30-Day Public Comment Period: September 25 – October 26

- Additional Information

Virginia Agricultural Cost-Share (VACS) BMP Manual
http://dswcapps.dcr.virginia.gov/htdocs/agbmpman/csmanual.pdf

DGIF Marine Sanitation Guidelines
http://www.dgif.virginia.gov/boating/wog/equipment-regulations.asp#Marine_Sanitation_Devices

DEQ TMDLs
http://www.deq.state.va.us/programs/water/waterqualityinformationtmdls/tmdl.aspx

DEQ VEGIS Map Viewer
http://www.deq.state.va.us/mapper_ext/default.aspx?service=public/wimby

Government Working Group Meeting

January 29, 2015

Meeting Notes

Location: CE&H Ruritan Hall, 8881 Eclipse Drive, Suffolk, VA 23434

Start: 1:00 pm
End: 3:00 pm

Meeting Attendees:

Dana Gonzalez- DEQ/TRO, Dinah Oliver-DEQ/TRO, Jennifer Howell-DEQ/TRO, Jim Winters-Nansemond River Preservation Alliance (NRPA), Stuart Lassiter-Suffolk DPU, Erin Rountree-Suffolk PW Engineering, Kim Hummel-Isle of Wight County, Bruce Schwenneker- Witman Requrdt & Assoc, Melissa Lindgren-Isle of Wight County, Geoff Paine-NRPA, Chuck Griffin-Peanut SWCD, Art Kirby-DCR, Taucha Fanslau-NRPA, Jamie Armentrout-Stokes Environmental, Mac Sisson-VIMS, Jack Eure-NRPA, Dave Basnett-resident, Jay Duell-Suffolk & Isle of Wight Health Dept., Matthew Ward-Suffolk News Herald, Danny Stephenson-Izaak Walton League of America (IWLA) Suffolk, David Allmon-IWLA Suffolk, Michael Reiss-NRPA, Elizabeth Taraski-NRPA, John Yon-resident, Bob Kerr-Kerr Environmental Services, Karl Mertig-Kimly-Horn & Associates, Joe Barlow Jr.-Cotton Plains Farm, Steven Barnum-NRPA, Ed Heide-City of Suffolk

I. Agenda Item: Overview of TMDL and IP Process

Discussion: DEQ representatives reviewed the TMDL for Chuckatuck and Brewers Creeks and explained the purpose of the implementation plan. The plan will address the unpermitted, nonpoint sources of fecal coliform pollution in the watershed. In addition, DEQ representatives explained that these types of plans are typically implemented in a phased approach, with Phase 1 (1-5 years) addressing all anthropogenic sources in the watershed and Phase 2 (years 6-10) addressing education, septic maintenance, and wildlife management, if needed.

II. Agenda Item: Houses and Septic Systems in the Watershed

Discussion: DEQ representatives requested that Isle of Wight and City of Suffolk representatives provide either GIS files or addresses of residences within the watershed and whether or not those homes use septic systems or are connected to the sewer. In addition, DEQ representatives requested that Isle of Wight and City of Suffolk representatives help identify neighborhoods that could still be connected to the sewer and which communities would be too difficult to connect to the sewer. This information will help DEQ representatives determine how many septic best management practices will be needed in the implementation plan. City of Suffolk representatives explained several projects that have been completed or will be completed in the near future for connecting communities to the sewer system. They also noted that the City of Suffolk treatment plant is no longer on septic, it is on sewer. City of Suffolk representatives and Isle of Wight representatives confirmed that they would work with DEQ to gather the requested information.

DEQ representatives requested that Isle of Wight and City of Suffolk representatives explain their septic pump-out notification procedures. City of Suffolk representatives reported that they send letters out to residents in the watershed notifying them of the need for septic pump-outs every 5 years; they have over 80 percent compliance. Isle of Wight representatives reported that they

have sent letters to residents needing septic pump-outs on a yearly basis since 2008; they have approximately 50 percent compliance in the county.

DEQ representatives asked the group if there were any neighborhoods within the watershed that are known for having greater septic failures. There were no neighborhoods that the group could point to and VDH representatives said that failures in the watershed are more sporadic.

DEQ asked meeting attendees if they were aware of any funding currently available in the watershed for addressing straight pipes and failing septics. VDH representatives noted that the Southeast Rural Community Assistance Project was a good source of information and funding in the watershed and that they would provide contact information for a local representative.

III. **Agenda Item: Pet Waste**

Discussion: DEQ representatives gave a brief overview of the types of pet waste best management practices that are typically included in implementation plans. They explained that pet waste stations and education signs could be placed in areas where dog walkers frequent and requested that if workgroup members could determine locations where pet waste stations would be useful, it would be helpful to include a map in the plan that would identify these locations.

DEQ representatives asked what pet waste education or best management practices are currently in the watershed. City of Suffolk and Isle of Wight representatives noted that they provide pet waste information at outreach events. It was also noted that the AskHRGreen.org website that is maintained by the Hampton Roads PDC has additional pet waste information.

DEQ representatives asked work group members if they were aware of any hunt clubs or dog kennels in the watershed. No workgroup members could point to any specific kennels within the Chuckatuck and Brewers Creeks watersheds, but they noted that the City Clerk in Suffolk should have a record of all kennel licenses sold; these licenses are for 10 dogs or more.

IV. **Agenda Item: Education and Outreach**

Discussion: DEQ representatives explained the types of education and outreach that are typically included in implementation plans and asked workgroup members if there were certain programs that have worked well in the past, or if there were programs that the workgroup believed would not work as well in the watershed. Workgroup members noted that the Nansemond River Preservation Alliance and the Izaak Walton League currently conduct many education programs and would be willing to help with education planning for the implementation plan.

V. **Agenda Item: Source Assessment**

Discussion: DEQ representatives explained that one of the ways bacteria loads are estimated within the watershed is through a source assessment. They requested that workgroup members evaluate the source assessment numbers for livestock and wildlife in the watershed that were reported in the TMDL. Peanut SWCD representatives noted that the number of cattle reported in the TMDL seemed high, rather than 113 cattle, a more accurate estimate would be 55-60 cattle. In addition, local farmers in the watershed noted that they did not believe there were any hogs in the watershed. There is one hog farm that is on the edge of the watershed boundary, but it might drain to a different watershed. DEQ representatives stated that they would investigate the number of hogs further. Workgroup members noted that they believed the number of ducks reported in the TMDL might be low, but acknowledged that the number is difficult to estimate because of the seasonal fluctuations in the duck

population. Workgroup members noted that it might be worthwhile to estimate the number of feral cats in the watershed and investigate management options for this potential source.

Workgroup members noted that it would be helpful to identify areas where boater pump-outs could be added as well as assessing the number of vessels that have on-board sewage systems. It was noted that the coast guard auxiliary may be able to provide this information.

Agriculture/Residential Working Group Meeting

April 30, 2015

Meeting Notes

Location: CE&H Ruritan Hall, 8881 Eclipse Drive, Suffolk, VA 23434

Start: 1:00 pm
End: 3:00 pm

Meeting Attendees:

Dana Gonzalez- DEQ/TRO, Jennifer Howell-DEQ/TRO, Jim Winters-NRPA, Stewart Lassiter-Suffolk DPU, David Keeling Suffolk Public Works, Erin Rountree-Suffolk Public Works, Melissa Lindgren-Isle of Wight, Art Kirby-DCR, Robert Johnson-NRPA and resident, Jay Duell-Western Tidewater Health District VDH, Elizabeth Taraski-NRPA, Gordon Hatchell-resident, Alice Seaman-resident, Marvin Seaman-resident

I. Agenda Item: Best Management Practices (BMPs), Timeline, and Costs

Discussion: DEQ representatives reviewed the initial best management practices to be included in the plan as well as the associated costs and timeline for implementation. Agricultural BMPs were discussed first. DCR representatives explained that there are only two livestock producers in the watershed, one of whom may be interested in some best management practices. In addition, there are many horse owners in the watershed, but generally these horse owners already have good management practices in place. There was discussion about whether the VACS codes should be included in the plan if the plan allows for more funding than the typical VACS BMPs. The proposed reimbursement rate for cover crops in the plan is $100 per acre, but the VACS cost share funding for this practice (SL-8B) is either $40 for early planting or $15 for late planting. It was suggested that the use of this $100 per acre be confirmed and potentially tailored to maximize water quality benefits (because the cost share amount would be attractive to many farmers). Some suggestions included stipulating that the time frame for planting is early in the season and placing an emphasis on planting of cover crops in "buffer areas" around streams. For example, the plan could say that the practice should be within 200 ft of a stream edge, rather than all over the field. In addition, we should consider increasing the number of SL-8B acres, the currently allotted 215 acres could be used by one farm quite easily and we want to ensure that there is enough funding to increase this practice on a variety of farms. One statistic that was cited is that in the Peanut SWCD, $1.3 million in cost share for SL-8B has been distributed. In addition, DCR questioned whether the LE-2T practice (Livestock Exclusion with 10 ft set-back) should warrant the same reimbursement as LE-1T, which requires a 35 foot buffer. It was suggested that either LE-2T be removed, or if it is left in the plan, less funding be allocated to that practice.

It was recommended that because each phase of implementation would cover 10 years, the number of education programs and the cost per program, especially residential programs, should be increased. NRPA representatives agreed to help hone the education numbers using information from previous programs. In addition, rain garden, residential buffer, and horse BMP education should be added to the residential education curriculum. It was noted that the funding allotment for septic system installation with a pump was probably low for the area; the cost should be increased from $6,500 to $8,000. In addition, stakeholders asked why $600 was allotted for each pet waste station when the actual cost for the station would be lower. DEQ representatives explained that the total cost included in the IP would allow for pet waste station, bag, and liner costs. After this explanation, the group agreed that $600 per station would be okay.

II. Agenda Item: Review of Current Watershed Activities

Discussion: Elizabeth Taraski, Executive Director of the Nansemond River Preservation Alliance (NRPA), told the group about a recent restoration project that they completed with a local boy-scout troop at the mouth of Chuckatuck Creek. They placed 200 bags (40 lbs each) of oyster shells about 10 feet offshore to create oyster habitat and also planted marsh grass to restore some of the shoreline with natural habitat. In addition, NRPA is encouraging local land owners to install living shorelines and grow oysters off of their docks to help improve local water quality.

Agriculture/Residential Working Group Meeting

June 4, 2015

Meeting Notes

Location: CE&H Ruritan Hall, 8881 Eclipse Drive, Suffolk, VA 23434

Start: 5:30 pm
End: 7:00 pm

Meeting Attendees:

Dana Gonzalez- DEQ/TRO, Jennifer Howell-DEQ/TRO, Dinah Oliver-DEQ/TRO, Jim Winters-NRPA, Erin Rountree-Suffolk Public Works, Melissa Lindgren-Isle of Wight, Elizabeth Taraski-NRPA, Brian Martin-NRPA, Karla Smith- NRPA, David Gill-NRPA, Jacob Dorman-City of Suffolk, Shelley Barlow-Cotton Plains Farm, Mike Reiss-NRPA, David A. Kuzma-Isle of Wight

I. Agenda Item: Best Management Practices (BMPs), Timeline, and Costs

Discussion: DEQ representatives reviewed the best management practices to be included in the plan as well as the associated costs and timeline for implementation. Agricultural BMPs were discussed first. DEQ representatives explained that when VACS practice codes are used in the plan, the VACS program manual should be the ultimate guide for cost share reimbursement. Dollar amounts are included in the plan as place holders for maximum reimbursement costs. In addition, DEQ representatives explained that the acreage of small grain cover crop (SL-8B) was increased in the plan in order to reflect the high usage of the BMP by farmers in the watershed. Cover crop acres were based on the Soil and Water Conservation District Representative's estimate that 75 percent of the cropland in the area has small grain cover crops.

DEQ representatives explained the education programs proposed in the plan. One stakeholder pointed out that if recreational boater education will educate boaters about the hazards of disposing waste directly overboard, there should be funding allotted for a boater pump-out in the area. The group agreed that including a pump out in the plan as well as explaining HRSD's boater pump-out service in the education portion of the plan would be helpful. In addition, one stakeholder suggested that a buffer project could also incorporate a walking trail along the water. The City of Suffolk noted that in light of these suggestions, it would be advantageous to look at the Parks and Recreation Master Plan. Some of the activities included in the master plan may mesh well with the activities in the implementation plan.

At the end of the meeting, several questions were asked about the timeline for the rest of the plan as well as execution of the plan. DEQ representatives explained the progression of additional meetings required before a 30 day public comment period and submission to EPA for approval. Once EPA has approved the plan it is eligible for 319 nonpoint source funding, which means that local stakeholders would be able to apply for the funding the next time a request for applications is issued. The nonpoint source funding cannot be used to satisfy any permit conditions (i.e. MS4 permits), as it is only allotted for addressing unpermitted nonpoint sources in the watershed.

Steering Committee Meeting

July 22, 2015

Meeting Notes

Location: CE&H Ruritan Hall, 8881 Eclipse Drive, Suffolk, VA 23434

Start: 10:00 am
End: 11:15 am

Meeting Attendees:

Dana Gonzalez- DEQ/TRO, Jennifer Howell-DEQ/TRO, Dinah Oliver-DEQ/TRO, Jim Winters-NRPA, Mike Reiss-NRPA , Melissa Lindgren-Isle of Wight, David A. Kuzma-Isle of Wight , Kim Hummel-Isle of Wight, Ed Heide-City of Suffolk, Stewart Lassiter-Suffolk DPU, Mike Kelly- Suffolk Parks & Recreation

I. Agenda Item: Best Management Practices (BMPs), Timeline, Proposed Responsibilities, and Costs

DEQ representatives presented actions proposed in the implementation plan as well as the implementation timeline, responsibilities, and expected costs. Questions that were brought up regarding the presentation included:

- Concern over the number of pumpouts listed and how many would be provided for when writing a grant application. DEQ representatives clarified that the pumpout number was watershed specific, not city/county-wide. In addition, they explained that the number of septic pumpouts was determined based on the total number of septic systems in the watershed.
- There was a question about how practice RB-4 and RB-4P differ. DEQ representatives explained that the RB-4P practice incorporated a pump and stated that they would follow up after the meeting to send the specifications from the TMDL Cost-share Manual.
- There was an inquiry about funds to help homeowners hook up plumbing within their houses when connecting to the sewer system when they are unable to afford it. DEQ representatives noted that it might be worth contacting the Southeast Rural Community Assistance Project to see if funding is available to help with plumbing.
- A suggestion was made to include two pet waste stations in Lone Star Lakes Park. There are two paths of different lengths (2 mile and 3 mile), and each path could use a pet waste station.

II. Agenda Item: Comments on Draft Plan

DEQ representatives requested that all feedback and additional written comments about the draft plan be provided by August 5th. In addition, they asked for any comments that meeting attendees had during the meeting. Those comments were as follows:

- Pg 14: Change phrasing from “City officials identified…” to “additional neighborhoods.” This is because the residents have to petition the city to add sewer infrastructure into a neighborhood.
- Pg 15: Make city pumpout program wording more general
- Table ES-2: The percent reduction required by the TMDL (96%) seems very high; it might be good to break that large reduction up into more manageable parts. There was a discussion about recreational vs. shellfish water quality standards and if the phases could be broken up to meet these different standards throughout implementation. It was also noted that in the public meeting it would be good to specifically explain the difference between consumption and recreational standards

- Concern was expressed about clarification of TMDL Action Plans and the path moving forward. Specifically, how will progress be measured and why are all of the VDH sample stations not evenly impaired. DEQ representatives explained that stations downstream may not be impaired because they are more frequently flushed during tidal cycles.
- It was noted that in Isle of Wight septic pumpouts now cost $350, not $300. DEQ representatives stated that they would look into increasing the price included in the plan if they are able to.
- It was noted that Lone Star Lakes park should be referred to as a City or local park
- Attendees noted that the City of Suffolk offices are now located at 442 W. Washington Street, Suffolk, VA 23434; this address should be edited at the end of the IP document

Steering Committee Written Comments

DRAFT Comments
Water Quality Implementation Plan for Chuckatuck Creek and Brewers Creek Watershed
Aug 2015

1. Pg vi, Table ES-2:

Comment: Do we understand this table correctly? Non-point source bacteria loads need to be reduced by 96%? That seems to be a very large number. Would we expect a 10% reduction per year over the 10 years of the Implementation Plan? How does this compare to other like waterways the DEQ has assessed?

Response: There are numerous bacteria TMDLs across the state with nonpoint source reductions in the 80-100% range. A footnote has been added to Table ES-2 to reflect this assertion:

Table ES-2. Nonpoint source bacteria loads and reductions required by TMDL.

Watershed	Current Load (MPN/day)	Load Allocation (MPN/day)	Reduction Needed (%)
Chuckatuck Creek and Brewers Creek	8.88E+14	3.12E+13	96%†

† Note: In the Tidewater Region of Virginia, 57% of shellfish TMDLs have called for bacteria reductions between 80-100% and 27% of shellfish TMDLs have called for bacteria reductions between 60-80%. The remaining 17% of TMDL studies called for reductions below 60%.

We do not expect that best management practice implementation will result in a linear reduction of bacteria in the watershed. Often there may be a time lag between BMP implementation and measureable water quality results so proposing a 10% reduction per year may not accurately reflect what will occur in the system.

2. Pg vi, Assessment of Implementation Action Needs:

Comment: Recommend that the Executive Summary include a section that establishes the causes of contamination in order of severity. Understanding the hierarchy of the causes of contamination facilitates prioritization of resources.

Response: Human sources are a priority because there are regulatory requirements to address failing septic systems and straight pipes. However, in the TMDL study it was documented that livestock produce the largest bacteria load, followed by pets and humans. Therefore, based on the reasonable number of BMPs and corrective actions needed across the nonpoint source sectors, DEQ recommends that efforts to address human, agricultural and pet waste sources occur concurrently.

3. Pg 16-17, Educational Programs "Outreach" para:

Comment: The Implementation Plan should include a recommendation that a sign be posted at all marinas, boat sales, boat repair, and boat refueling facilities providing information on the HRSD mobile pump out program. This program should be a recurring theme in the clean water educational program.

Response: That is an excellent idea. The wording in the education section has been changed to reflect your comment:

"Outreach to recreational boaters that use the public boat ramps and marinas in the watersheds along with other boaters that may enter the creek for recreational purposes is an important element of this plan. The focus of this educational effort will be to inform boaters about the availability of sanitary pump out facilities in the area and the detrimental impact that overboard discharge of human waste can have on water quality. This education program should also inform boaters about HRSD's Boat Pump Out Program (http://www.hrsd.com/boatereducationproject.shtml). Appointments for pump outs using this program can be made via phone or email. Funding for recreational boater education should include money for signs at marinas, boat ramps, boat refueling areas, and other boat related facilities. These signs should include information about HRSD's Boat Pump Out Program and any local sanitary pump out facilities in the watershed."

4. Pgs 13-16, Septic Failure Rate and Alternative Waste Treatment Systems:

Comment: A number of entries throughout the Implementation Plan indicate that septic tanks are a very significant source of the bacterial pollution in these creeks. Currently the transition of septic system to sewer is handled very passively as neighborhoods must petition to obtain City sewer. This situation is understandable due to the costs involved. However, the amount of reduction of waste load needed in the watershed (96%) indicates a more aggressive plan for extending sewers in the watershed considering environment factors is indicated. The Implementation Plan should draw this conclusion.

Response: In implementation plan development, land use planning by the local government in regards to sewer expansions and local comprehensive plans are considered and acknowledged. In addition, in IPs, DEQ does not prescribe changes to local land use planning, ordinances, etc. The IPs do acknowledge when these types of issues are brought up by local stakeholders in the public participation process. Your comment will be part of the public record.

5. Pg 19, Phased Implementation; and pg 22, Table 9, Phase 2:

Comment: If we have to go to a Phase II, what are the implications? How often does this happen? Is it normal, or unusual? It appears a decision has already been made to go to Phase 2 for some septic tank BMPs (Pg 27, Timelines and Milestones para).

Response: In this IP, Phase 2 is a continuation of a couple of management measures from Phase 1 – septic tank pump outs and educational programs. Once Phase 1 measures have been completed and additional monitoring has occurred to determine if water quality standards are met, the local community will decide if more needs to be done to control wildlife sources in Phase 2. All IPs in Virginia have multiple implementation phases like Chuckatuck and Brewers Creek. The first IPs in Virginia were developed in 2003. None of the IPs have totally met the Phase 1 goals, but a number of watersheds have been delisted from the Impaired Waters List by meeting the bacteria standard prior to completing all of the Phase 1 goals.

6. Pg 24, VCE and Pg 25:

Comment: While Suffolk's Agriculture Agent (the fancier words for what many people know as a County Agent) spends his time and attention on farm level agriculture. The VCE also oversees the Master Gardener Program that provides advice and assistance to home owners and recreational gardeners. The Suffolk Master Gardeners Association (SMGA) has an active program of education in the Suffolk Public School System reinforcing their SOLs about the parts of a plant, and their importance, for all first grade students. SMGA provides an educational program about and how to build your own rain barrel. Advice and assistance is available on rain gardens, and other clean water practices available to the home gardener. Information is available in several venues: visit the web page (suffolkmastergarden.org), call the Grow Line (757-514-4335), email (webmaster@suffolkmastergardener.org) or find on Facebook or Twitter. Water quality will be a primary theme of the SMGA tent at Peanut Fest in 2015, and will provide an educational opportunity on how each individual can support water quality for the more than 100,000 people that attend. Reference to the SMGA should be included in the Implementation Plan.

Response: Thank you for noting this need. We have added the following text to the stakeholder section:

"VCE also oversees the Master Gardener Program. The **Suffolk Master Gardeners Association (SMGA)** assists local homeowners, recreational gardeners, and local public schools. They have worked with first grade teachers in Suffolk to create a lesson plan about plant anatomy that meets SOL requirements. In addition, SMGA provides rain barrel construction education, advice and assistance for rain garden installation, and other various clean water practices. Water quality stewardship will be the primary theme of the SMGA tent at the 2015 Suffolk Peanut Festival, an event that attracts more than 100,000 attendees."

The following contact information has been added to the Contact Information section:

Suffolk Master Gardeners Association
www.Suffolkmastergardener.org
Grow Line: 757-514-4335
webmaster@suffolkmastergardener.org

Nansemond River Preservation Alliance P.O. Box 6090, Suffolk, Virginia 23433

WATER QUALITY IMPLEMENTATION PLAN FOR THE CHUCKATUCK CREEK AND BREWERS CREEK WATERSHED

To be published in August 2015
NANSEMOND RIVER PRESERVATION ALLIANCE (NRPA)
Comments/Feedback on July 22, 2015 Steering Committee Meeting
Submitted by NRPA to Dr. Gonzalez by email August 2, 2015

Congratulations to Dr. Gonzalez and the DEQ Team! You have provided an outstanding Implementation Plan and captured the essence of all the work you, the cities, environmental groups, and citizens have accomplished. Well done!

As requested during the Steering Committee Meeting on 22 July 2015, and your email of the same date, below is the Nansemond River Preservation Alliance (NRPA) feedback:

1. Pg, vi, Table ES-2: NRPA suggests that an additional table or graph be added that shows the mean and extremes of bacterial loads for the Implementation Plans done over the last 5 years (at least one year) throughout the State. The purpose of this addition would be to provide a frame of reference so readers of the Plan can understand the magnitude of the 96%non point source bacteria load figure for Chuckatuck and Brewers Creek.

Response: In order to address this concern, a footnote has been added to Table ES-2 as follows:

Table ES-2. Nonpoint source bacteria loads and reductions required by TMDL.

Watershed	Current Load (MPN/day)	Load Allocation (MPN/day)	Reduction Needed (%)
Chuckatuck Creek and Brewers Creek	8.88E+14	3.12E+13	96%†

† Note: In the Tidewater Region of Virginia, 57% of shellfish TMDLs have called for bacteria reductions between 80-100% and 27% of shellfish TMDLs have called for bacteria reductions between 60-80%. The remaining 17% of TMDL studies called for reductions below 60%.

2. Pg vi-viii, Paragraph entitled: "Assessment of Implementation Action Needs": NRPA suggests that the causes of the bacterial load in these creeks be specifically stated in order of severity – the top three or five causes. It septic tanks are the primary problem then say that directly. Only by understanding the severity of the causes can we all properly prioritize effort and resources.

Response: Human sources are a priority because there are regulatory requirements to address failing septic systems and straight pipes. However, in the TMDL study it was documented that livestock produce the largest bacteria load, followed by pets and humans. Therefore, based on the reasonable number of BMPs and corrective actions needed across the nonpoint source sectors, DEQ recommends that efforts to address human, agricultural and pet waste sources occur concurrently.

3. Pgs 13-16, Paragraph entitled: "Septic Failure Rate and Alternative Waste Treatment Systems": Septic systems are the issue most discussed in the Implementation Plan for Chuckatuck and Brewers Creeks (pg vi, second paragraph; pg vii, Table ES-4 (septic and septic related BMPs make up more than 50% of Residential BMP); pg viii, second paragraph; pg 4, Fecal Bacteria Impairments paragraph; pg 9, Source Reassessment, paragraphs 3 and 6; pg 13, Residential BMPs, 1st paragraph; pgs 1-16, Septic Failure Rate and Alternative Waste Treatment Systems; pg 17, paragraph 4 (last paragraph); pg 21, Table 9, (septic costs are by far the highest of identified BMPs); pg 23, 1st full sentence at top of page; pgs 27-28, Timeline and Milestones, each timeline contains septic tank actions; and, pg 28, Tracking Implementation.

The apparent importance of septic tank solutions prompts the following NRPA suggestions:

➢ The City of Suffolk should consider adding a new approach to the extension of sewers within the City. This new approach would be based on environmental concerns and target sewer extensions where they would do the most good to improve water quality within Suffolk's waterways.

➢ The City of Suffolk should establish a viable plan for environmentally based sewer extension in order of environmental priority to allow it to compete for State, Federal, or private grants and

publicize it to residents. Environmentally based funding is increasing in size and those with plans that support clean water may be able to save their city and its citizen's considerable resources.

➢ The City of Suffolk should inform its citizens of the potential for positive environmental impacts of extending sewers into areas where waterways are closed or threatened. For example, on page 14, the potential for sewers into the Sleepy Lake, Oakland, and Hobson communities,as originally disclosed in the draft, should be publicized and not removed by DEQ from the Implementation Plan as was suggested by city staff during the July 22, 2015 meeting. Presumably it was included because both density of homes and nearness of the sewer treatment plant mean it is viable. Transparency to citizens is important. If it is left in by DEQ it will show residents sewer is practical in those neighborhoods. It will also be a reference point for those, such as environmental groups,interested in discussing sewers;to those potentially making federal, state, and private grants available to defer the cost; and, even, if there is no interest due to cost, the importance to comply with city directives on maintaining septic tanks and septic fields. The vast majority of people may well do the right thing (as those on the Lynnhaven River in Virginia Beach did) if they are educated about the environmental need to do so. NRPA, with sound DEQ and city statistics, is willing to address civic leagues and homeowner associations as was done by a number of environmental groups involved in cleaning up the Lynnhaven River. These efforts were very successful in improving water quality in the Lynnhaven River and opening the area to shellfish harvesting (from less than 10% to more than 40% in 5 years).

➢ The City of Suffolk should provide quantitative measures in the Implementation Plan of its progress in dealing with septic tank issues as contained in the last paragraph on page 15 and DEQ should put them in the Implementation Plan.The city staff asked DEQ to remove the City's figures on the basis figures since change occurs as the City continues its mailings. The exact figures provided in the last paragraph on page 15 may not be accurate at a later time as mailings continue. However, providing a set of figures in the Implementation Plan, specifying the date they are determined, is valid and helpful. The only way to demonstrate status is through these figures. The only way to determine progress is via periodic reporting of this information. It also provides a transparent and effective way to demonstrate the effort.

Response: In light of these comments the section about Suffolk's septic pumpout program has been edited to read:

"City of Suffolk representatives reported that their planning department mailed septic pump out reminder letters in the Zone 1 region beginning in July 2009. Zone 1 includes the Chuckatuck watershed as well as other watersheds nearby. Details about the City of Suffolk's septic pumpout program, as well as maps of each of the delineated zones can be found at: http://www.suffolkva.us/pcd/chesapeake-bay-preservation-area/septic-tank-pump-out-program/septic-tank-pump-out-program/. During the first round of Zone 1 mailings in 2009, 1096 letters were sent out and 83 percent complied with the septic pump out requirement. In July 2014, the City of Suffolk sent out 1254 letters to homeowners in Zone 1 reminding them of the five year septic pumpout requirement."

The section about future neighborhood connections now reads:

"The City of Suffolk provided GIS data showing the number of structures with septic systems and the number of structures that were connected to the sewer. In addition they outlined areas in Eclipse, VA, which is at the mouth of Chuckatuck Creek, where houses are currently being connected to the sewer. Once these houses have been connected to the sewer, there will be a total of 726 properties on septic and 217 properties connected to the sewer. Although there are no current plans for connecting more neighborhoods to the sanitary sewer system at this time, City of Suffolk staff have identified an additional 3 neighborhoods where sewer infrastructure may be feasible in the future if requested/petitioned from the citizens of the neighborhoods (Sleepy Hole, Oakland, and Hobson; 368 properties in total).

4. Pg viii or Pg 33: NRPA suggests that DEQ list the schedule for future Water Quality Implementation Plans in Suffolk (or Isle of Wight) either at the end of the Executive Summary or at the end of the Plan. It is useful to know what other Plans (such as for the Nansemond River and Bennett's Creek) are going to be done and when.

Response: Several implementation plans have already been written for many of the watersheds in Suffolk and Isle of Wight. Please see DEQ's Implementation Plan page, which has links to each of the IPs written throughout the state (http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/TMDL/TMDLImplementation/TMDLImplementationPlans.aspx).

Here is a link to the Nansemond River Plan: http://www.deq.virginia.gov/Portals/0/DEQ/Water/TMDL/ImplementationPlans/nansemondip.pdf.

Since the nonpoint source program moved from DCR to DEQ in 2013, an official prioritization order for implementation plans has not been established. However, identifying watersheds for future implementation planning relies heavily on local stakeholder interest. NRPA's interest in planning for Bennett's Creek has been noted and will be part of the public record.

Sincerely,

Elizabeth Taraski James M. Winters John Newhard Executive Director Board of Directors Chair, Shoreline Committee

taraski.nrpa@gmail.com jamesmwinters@yahoo.com newhard@charter.net

APPENDIX B

VDH Shellfish Condemnation Notice (6 October 2010)

REGISTRAR OF REGULATIONS

10 SEP 23 PM 12: 26

COMMONWEALTH of VIRGINIA

Department of Health
DIVISION OF SHELLFISH SANITATION
109 Governor Street, Room 614-B
Richmond, VA 23219

Ph: 804-864-7487
Fax: 804-864-7481

NOTICE AND DESCRIPTION OF SHELLFISH AREA CONDEMNATION NUMBER 062-080, CHUCKATUCK CREEK

EFFECTIVE 6 OCTOBER 2010

Pursuant to Title 28.2, Chapter 8, §28.2-803 through 28.2-808, §32.1-20, and §2.2-4002, B.16 of the *Code of Virginia.*

1. The "Notice and Description of Shellfish Area Condemnation Number 062-080, Chuckatuck Creek," effective 23 January 2008, is cancelled effective 6 October 2010.

2. Condemned Shellfish Area Number 062-080, shown as Section A, is established, effective 6 October 2010. It shall be unlawful for any person, firm, or corporation to take shellfish from this area for any purpose, except by permit granted by the Marine Resources Commission, as provided in Section 28.2-810 of the *Code of Virginia.* The boundaries of this area are shown on the map titled "Chuckatuck Creek, Condemned Shellfish Area Number 062-080, 6 October 2010" which is part of this notice.

3. The Department of Health will receive, consider and respond to petitions by any interested person at any time with respect to reconsideration or revision of this order.

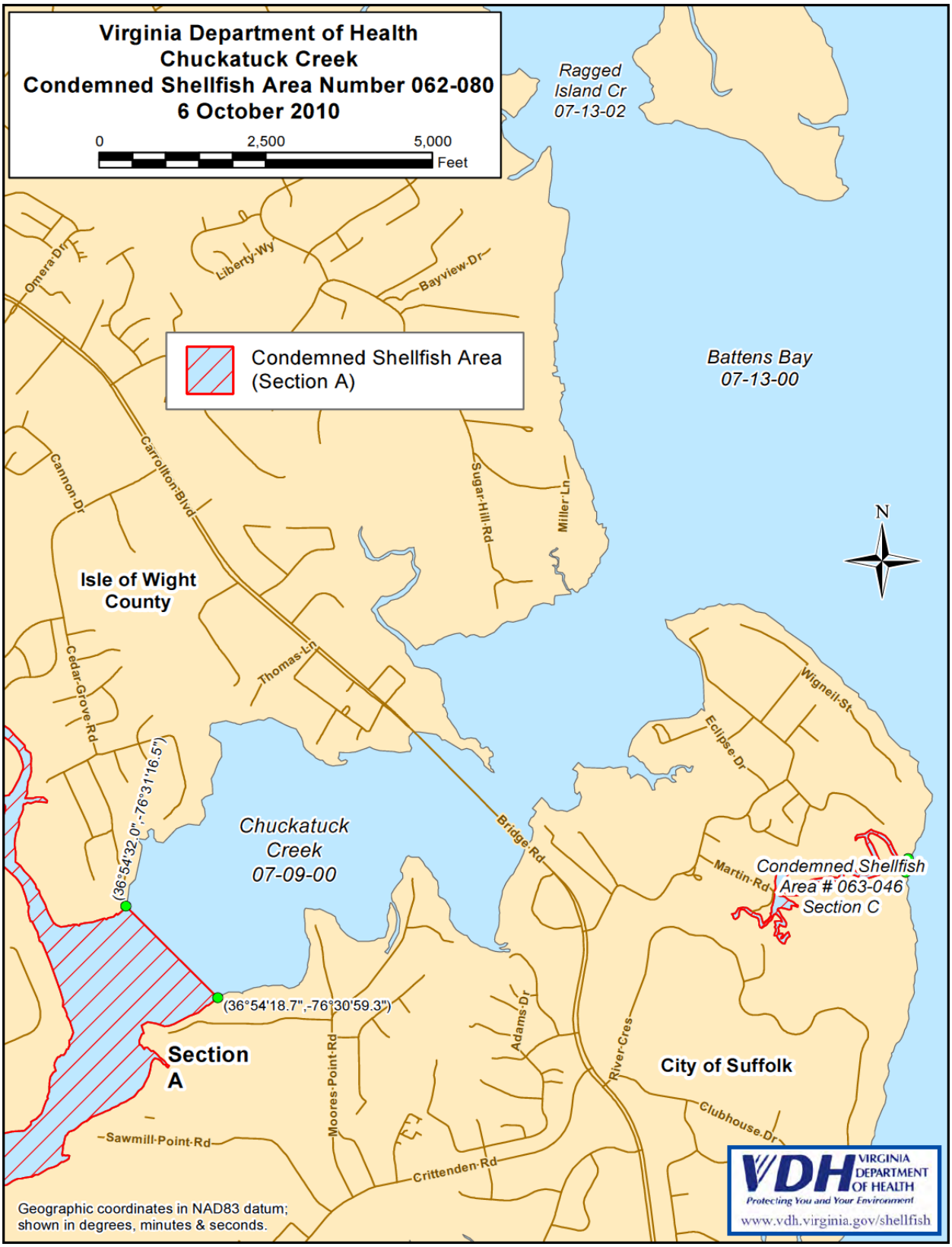
BOUNDARIES OF CONDEMNED AREA NUMBER 062-080

A. The condemned area shall include that portion of Chuckatuck Creek and its tributaries upstream of a line drawn between latitude / longitude map coordinate (36°54'32.0", -76°31'16.5") and map coordinate (36°54'18.7",-76°30'59.3").

Recommended by: _____
Director, Division of Shellfish Sanitation

Ordered by: _____ 9/22/10
State Health Commissioner Date

VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment
www.vdh.virginia.gov/shellfish

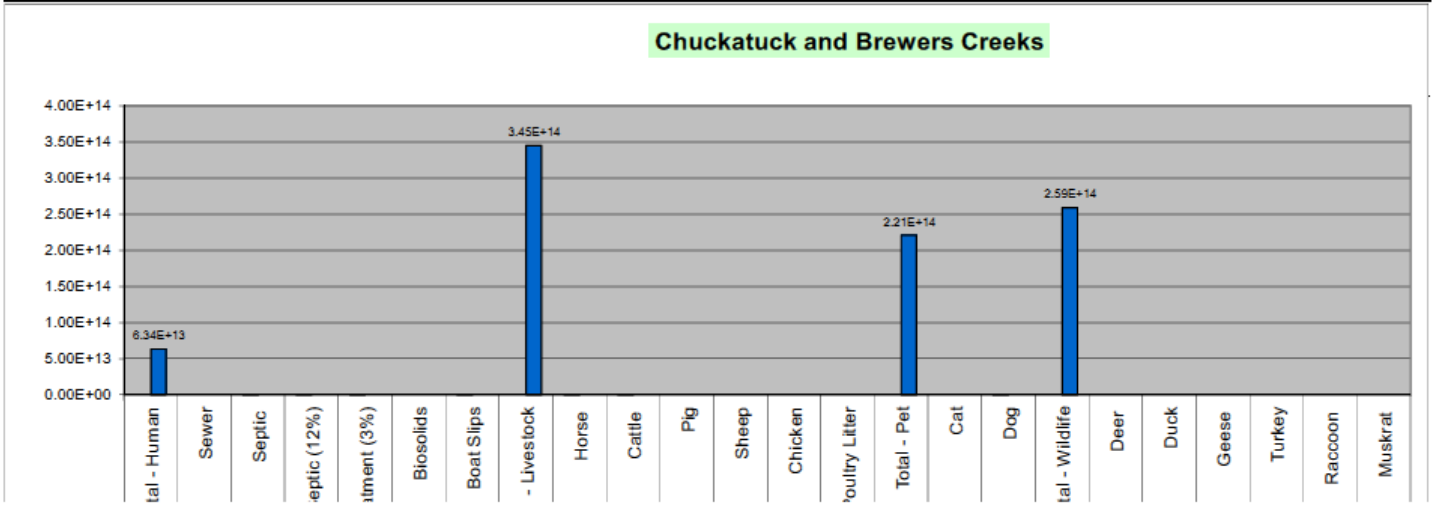

Virginia Department of Health
Chuckatuck Creek
Condemned Shellfish Area Number 062-080
6 October 2010
0
2,500
5,000
Feet
Ragged Island Cr 07-13-02
Battens Bay 07-13-00
Condemned Shellfish Area (Section A)
Omera Dr
Liberty Wy
Bayview Dr
Cannon Dr
Carrollton Blvd
Sugar Hill Rd
Miller Ln
N
Isle of Wight County
Cedar Grove Rd
Thomas Ln
Wigneil St
Eclipse Dr
Chuckatuck Creek 07-09-00
(36°54'32.0",-76°31'16.5")
Bridge Rd
Martin Rd
Condemned Shellfish Area # 063-046 Section C
(36°54'18.7",-76°30'59.3")
Section A
Moores Point Rd
Adams Dr
River Cres
City of Suffolk
Clubhouse Dr
Sawmill Point Rd
Crittenden Rd
Geographic coordinates in NAD83 datum; shown in degrees, minutes & seconds.
VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment
www.vdh.virginia.gov/shellfish

APPENDIX C

Source Assessment, TMDL Table and Implementation Actions for Chuckatuck and Brewers Creeks

Source Assessment, TMDL Table and Implementation Actions for Chuckatuck Creek and Brewers Creek

FC Class	FC Sources	Chuckatuck and Brewers Creeks	FC Production Rate (See FC Production Ref)	Calculated Daily FC Production (FC/day)	Daily FC Production by Class (FC/day)	Contribution Factor (Direct + Indirect)	Calculated Daily FC Contribution to Creek (FC/day)	Calculated Daily FC Contribution by Class (FC/day)	NEW Current Load (MPN/day)	TMDL Load Allocation (MPN/day)	TMDL Load Reductions Required (MPN/day)
Human	Total - Human								6.34E+13	0.00E+00	6.34E+13
	Sewer	415	5.00E+09								
	Septic	1852	5.00E+09	9.26E+12		0.01	9.26E+10				
	Failing Septic (12%)	222	5.00E+09	1.11E+12		0.11	1.22E+11				
	No Treatment (3%)	56	5.00E+09	2.80E+11		1.00	2.80E+11				
	Biosolids	0	2.00E+06								
	Boat Slips	56	5.00E+09	1.52E+09		1.00	1.52E+09				
Livestock	Total - Livestock								3.45E+14	0.00E+00	3.45E+14
	Horse	70	4.20E+08	2.94E+10		0.0100	2.94E+08				
	Cattle	60	1.10E+11	6.60E+12		0.0250	1.65E+11				
	Pig	0	5.50E+09								
	Sheep	0	1.50E+10	0.00E+00		0.0100	0.00E+00				
	Chicken	20	1.90E+08			0.0100					
	Poultry Litter	0	4.50E+04								
Pet	Total - Pet								2.21E+14	0.00E+00	2.21E+14
	Cat	1447	5.00E+09								
	Dog	1324	5.00E+09	6.62E+12		0.0300	1.99E+11				
Wildlife	Total - Wildlife								2.59E+14	3.12E+13	2.28E+14
	Deer	446	2.50E+08								
	Duck	34	7.75E+09								
	Geese	375	1.63E+10								
	Turkey	0	1.20E+08								
	Raccoon	1044	1.00E+11								
	Muskrat	414	3.40E+07								
					0.00E+00			0.00E+00	8.88E+14	3.12E+13	8.57E+14



TMDL Load Reductions Required (MPN/day)	8.57E+14

Phase 1 - Reduce Human, Pet & Livestock Contribution Sources

#	Width	# Animals	Animal Type	Units	DCR Practice Number		Estimated Cost (Implementation + Tech. Assistance)	Estimated FC Reduction Benefit (FC/day)
86	35			Acres	FR-3	Woodland Buffer Filter Area	$ 60,200	6.36E+12
6	35	60	Cow	System	LE-1T/SL-6T	Livestock Exclusion	$ 90,000	9.56E+11
				Acres	SL-1	Vegetative Cover on Cropland	$ -	0.00E+00
	35		Cow	Acres	SL-6	Grazing Land Protection	$ -	0.00E+00
17	35	70	Horse	System	SL-6AT	Small Acreage Grazing System	$ 25,500	3.45E+12
3225				Acres	SL-8B	Small Grain Cover Crop for NM (VACS funding)	$ 154,800	3.18E+13
325		130	Horse & Co	Acres	SL-10T	Pasture Management (Livestock/horse)	$ 24,375	5.96E+08
			Sheep	Acres	SL-10T	Pasture Management (sheep)	$ -	0.00E+00
70				Acres	WQ-1	Grass Filter Strip	$ 12,250	5.18E+12
0	35		Cow	Acres	WP-2T	Stream Protection	$ -	0.00E+00
14				Drainage Acres	WP-1	Sediment Retention, Erosion, or Water Control Structures	$ 60,200	5.52E+11
0			Chicken	System	WP-4	Animal Waste Control Facility	$ -	0.00E+00
0	35		Cow	Acres	WP-4B	Loafing Lot Management System	$ -	0.00E+00
1162				System	RB-1	Septic Tank Pump Out - MANDATORY	$ 348,600	5.81E+09
0				System	RB-2	Septic Connection to Public Sewer System	$ -	0.00E+00
27				System	RB-3	Septic System Repair	$ 81,000	1.41E+10
18				System	RB-4	Septic System Installation/Replacement	$ 108,000	8.91E+10
34				System	RB-4P	Septic System Installation/Replacement with Pump	$ 272,000	1.68E+11
30				System	RB-5	Alternative on Site Systems	$ 600,000	1.49E+11
1				System		Marina Boat Waste Discharge Facilities	$ 6,000	7.62E+08
1				Program		Recreational Boater Education Programs	$ 3,000	3.05E+08
3				Program		Residential Education Programs (pet, septic, horse)	$ 7,500	1.89E+14
3				Program		Aquaculture Education Workshops (public/restaurant)	$ 7,500	2.83E+14
				Program		Oyster Reef Restoration (EQIP)		
				Program		Watermen Education Programs	$ -	0.00E+00
8				Acres		Vegetated Buffer on Residential Land	$ 1,400	5.92E+11
14				Acres		Rain Garden	$ 67,500	2.80E+12
1		15	Dog	System		Confined Canine Waste Control System	$ 6,000	1.69E+09
60		60	Dog/cat	System		Residential Pet Waste Composters	$ 3,000	9.00E+09
7		30	Dog	System		Public Pet Waste Collection Facility/Trash Can/Signage/Supplies	$ 4,200	3.38E+09
0		0		Program		Wildlife Education/Mgmt.Program (~5% of required wildlife load)	$ -	0.00E+00
Chuckatuck and Brewers Creeks Phase 1 Total							**$ 1,943,025**	**5.24E+14**

Additional Load Reductions Required in Phase 2 (MPN/day)	3.33E+14

Phase 2 - Consider Additional Actions to Meet TMDL

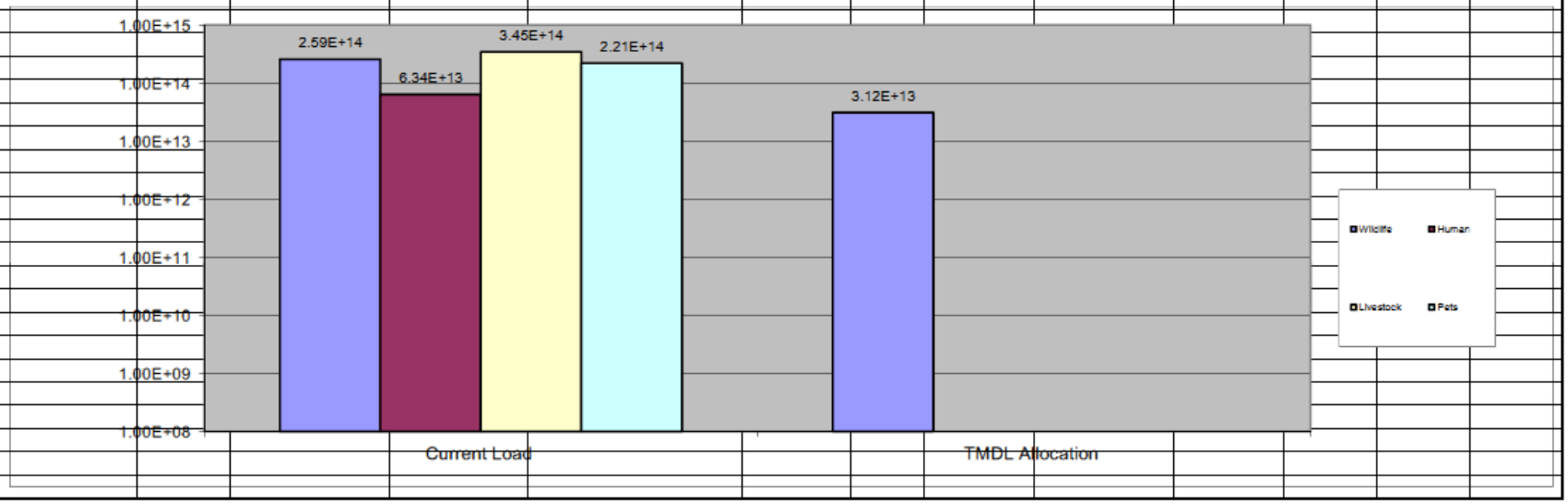
#	Width	# Animals	Animal Type	Units	DSWC Practice Number	Practice	Estimated Cost (Implementation + Tech. Assistance)	Estimated FC Reduction Benefit (FC/day)
0	35			Acres	FR-3	Woodland Buffer Filter Area	0	0.00E+00
0	35			System	LE-1T	Livestock Exclusion with Riparian Buffers	0	0.00E+00
0				System	LE-2T	Livestock Exclusion with Reduced Setback	0	0.00E+00
0	35			Acres	SL-6	Grazing Land Protection	0	0.00E+00
0	35			System	SL-6AT	Small Acreage Grazing System	0	0.00E+00
0				Acres	SL-11	Permanent Vegetative Cover on Critical Areas	0	0.00E+00
0	35			Acres	WP-2T	Stream Protection	0	0.00E+00
0				System	WP-4	Animal Waste Control Facility	0	0.00E+00
0	35			Acres	WP-4B	Loafing Lot Management System	0	0.00E+00
0				Drainage Acres	WP-1	Sediment Retention, Erosion, or Water Control Structures	0	0.00E+00
0				Drainage Acres	WP-5	Stormwater Retention Pond	0	0.00E+00
0				Drainage Acres	WP-7	Surface Water Runoff Impoundment	0	0.00E+00
0				**Acres**	**WQ-1**	**Vegetative Cover on Cropland or Grass Filter Strip**	**0**	**0.00E+00**
581				System	RB-1	Septic Tank Pump Out - MANDATORY	174,300	2.91E+09
0				System	RB-2	Septic Connection to Public Sewer System	0	0.00E+00
0				System	RB-3	Septic System Repair	0	0.00E+00
0				System	RB-4	Septic System Installation/Replacement	0	0.00E+00
0				System	RB-4P	Septic System Installation/Replacement with Pump	0	0.00E+00
0				System	RB-5	Alternative on Site Systems	0	0.00E+00
0				Draiange Acres		Retention Ponds	0	0.00E+00
1						Recreational Boater Education Programs	$ 3,000	3.05E+08
3						Residential Education Programs (pet, septic, horse)	$ 7,500	1.89E+14
3						Aquaculture Education Workshops (public/restaurant)	$ 7,500	2.83E+14
0						Oyster Reef Restoration (EQIP)		
0				Acres		Rain Garden	$ -	0.00E+00
0			Dog	System		Residential Pet Waste Composters	0	0.00E+00
0			Dog	System		Public Pet Waste Collection Facility/Trash Can/Signage/Supplies	0	0.00E+00
1				Program		Wildlife Education/Mgmt. Program (~95% of required wildlife load	$ 10,000	-1.39E+14
Chuckatuck and Brewers Creeks Phase 2 Total							**$ 202,300**	**3.33E+14**

Chuckatuck and Brewers Creek TMDL Implementation Plan Total	$ 2,145,325	0.00E+00

Condemnation Area	Source	BST Allocation % of Total Load	Current Load MPN/ day	TMDL Allocation MPN/ day	Reduction Needed
Chuckatuck and Brewers Creeks	Wildlife		2.59E+14	3.12E+13	88%
	Human		6.34E+13	0.00E+00	100%
	Livestock		3.45E+14	0.00E+00	100%
	Pets		2.21E+14	0.00E+00	100%
	Total		8.88E+14	3.12E+13	96%
		Required Reduction		**8.57E+14**	
		Pet, Human, LS	6.29E+14		
		% of Current Load	70.85%		

Data from TMDL -- used in this analysis

BST-Based	Current	TMDL Alloc.	Redn Needed		
29%	2.59E+14	3.12E+13	88%	88%	Wildlife
7%	6.34E+13	0.00E+00	100%	100%	Human
39%	3.45E+14	0.00E+00	100%	100%	LS
25%	2.21E+14	0.00E+00	100%	100%	Pets
100%	8.88E+14	3.12E+13	96%	96%	Total
		4.79E+11			PS



APPENDIX D

Practice Detail Rate Charts (supplement to Appendix C)

Code	Practice Name	Units for Tracking	Efficiencies B	Total Cost	Capital Cost	Tech Assist Cost	O & M Costs
FR-1	Reforestation of Erodible Crop or Pasture Land	Acres		1,500	1,284	128	16
FR-3	Woodland Buffer Filter Area	Acres	50%	700	545	55	16
LE-1T	Livestock Exclusion with Riparian Buffers	Acres	100%	15,000	284	28	28
LE-2T	Livestock Exclusion with Reduced Setback	Acres	100%	10,000	284	28	28
NM-1	Nutrient Management Plan Writing	Acres		100	7	1	0
SL-1	Permanent Vegetative Cover on Cropland	Acres	75%	300	212		
SL-6	Grazing Land Protection	Acres	100%	400	284	28	28
SL-6AT	Small Acreage Grazing System	System	100%	1,500	284	28	28
SL-8B	Small Grain Cover Crop for Nutrient Management	Acres	20%	48	35		
SL-10T	Pasture Management (Livestock / Horse)	Acres	50%	75			
SL-11	Permanent Vegetative Cover on Critical Areas	Acres		700	640		
SL-15	Conservation Tillage	Acres	61%	100	100		
WP-2A	Streambank Stabilization	Feet		100	12	1	0
WP-2T	Stream Protection	Acres	100%	400	284	28	28
WP-3	Sod Waterway	Acres		0			
WP-4	Animal Waste Control Facility	System	75%	38,900	32,278	3,228	3,300
WP-4B	Loafing Lot Management System	Acres	50%	300	186	19	37
WP-1	Sediment Retention, Erosion, or Water Control Structures	Drainage Acres Treated	80%	4,300	3,363	672	168
WP-5	Stormwater Retention Pond	Drainage Acres Treated	80%	4,300	3,363	672	168
WP-7	Surface Water Runoff Impoundment	Drainage Acres Treated	85%	4,300	3,363	672	168
WQ-1	Grass Filter Strips	Acres	50%	400	350	50	0
WQ-4	Legume Cover Crops	Acres		200	150		
WQ-6B	Wetland Restoration	Acres	50%	2,700	2,550	100	50
RB-1	Septic Tank Pump Out	System	10%	300	280	20	0
RB-2	Septic Connection to Public Sewer System	System	100%	5,600	5,500	100	
RB-3	Septic System Repair	System	95%	3,000	3,000		
RB-4	Septic System Installation/Replacement	System	99%	6,000	6,000		
RB-4P	Septic System Installation/Replacement with Pump	System	99%	8,000	6,500		
RB-5	Alternative on Site System	System	99%	25,000	19,000	4,000	2,000
	Marina Boat Waste Discharge Facilities	System	100%	6,000	6,000		
	Recreational Boater Education Programs	Program		3,000	2,000	1,000	
	Residential Education Programs	Program	50%	2,500	1,500	1,000	
	General Education Program - pet, horse, etc.	Program	75%	5,000	3,000	2,000	
	Pet Litter Control Program	Program	75%	5,000	5,000		

	Confined Canine Waste Control System	System	75%	6,000	5,000	500	500
	Residential Pet Waste Collection and Composter	System	100%	50	50	0	0
	Public Pet Waste Collection Facility/Trash can/Signage/Supplies	System	75%	600	500	0	100
	No Discharge Zone Establishment	**Regulation**					
	Rain Garden	Drainage Acres Treated	70%	5,000			
	Infiltration Trenches	Drainage Acres Treated	90%	6,000			
				200	50	0	100
SL-10T	Pasture Management (Livestock / Horse)	Acres	50%	75			

Note: **1. Education programs - If IP includes more than one watershed within a County, then include only one program per entire county.**
2. Include all septic BMPs in Phase-1; not in Phase-2, except septic pump-out.
3. Include wildlife management program in Phase-1 also.