Implementation Plan for the Fecal Coliform TMDL (Total Maximum Daily Load) for the Upper Nansemond River

April 2012

PEP 12-03

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ABSTRACT

The Upper Nansemond River watershed is located within Isle of Wight County and the City of Suffolk in Southeastern Virginia. In response to Section 303(d) of the Clean Water Act, the Virginia Department of Environmental Quality (VADEQ) listed portions of the Nansemond River watershed beginning in 1996 for being unable to attain the water quality standard for primary contact recreational use and shellfish harvesting use due to elevated levels of fecal coliform bacteria.

The Virginia Department of Environmental Quality completed the "Fecal Bacteria Total Maximum Daily Load Development for the Nansemond River" in March 2006. The Study set allocations to limit bacteria pollutant loads discharged to the watersheds to levels that were modeled to achieve compliance with the state water quality criteria for bacteria for shellfish harvesting and primary contact recreational use. This Implementation Plan bridges the gap between those specified pollutant load allocations and actual reductions in bacteria counts in the Nansemond River watershed by recommending a set of actions to be taken in the watersheds during a fifteen year project timeframe.

ACKNOWLEDGMENTS

This report was prepared by the Hampton Roads Planning District Commission (HRPDC) in cooperation with the Virginia Department of Environmental Quality, Virginia Department of Conservation and Recreation, Virginia Department of Health, the City of Suffolk, and Isle of Wight County, Virginia.

IMPLEMENTATION PLAN FOR THE FECAL COLIFORM TMDL (TOTAL MAXIMUM DAILY LOAD) FOR THE UPPER NANSEMOND RIVER

April 2012

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY 1
1.1 Introduction 1
1.2 Review of Nansemond River Bacteria TMDL 1
1.3 Public Participation 2
1.4 Implementation Actions 3
1.5 Associated Costs and Benefits 3
1.6 Measurable Goals and Milestones 3
1.7 Stakeholders Roles and Responsibilities 4
1.8 Potential Funding Sources 4
2.0 INTRODUCTION 5
2.1 Purpose, Scope, and Timeframe 5
2.2 Regulatory Background 8
2.3 Designated Use and Water Quality Standard 8
2.4 Nansemond River TMDL Development Efforts 9
2.5 Nansemond River Watershed 10
3.0 STATE AND FEDERAL REQUIREMENTS 12
3.1 State Requirements 12
3.2 Federal Requirements 12
4.0 REVIEW OF TMDL DEVELOPMENT 13
4.1 Description of Watershed Characteristics 13
4.2 Description of Impairment 15
4.3 Description of Water Quality Monitoring 17
4.4 Description of Water Quality Modeling 19
4.5 Description of Sources Considered 19
4.5.1 Point Source Contributions 19
4.5.2 Non-Point Source Contributions 19
4.6 TMDL Load Reductions and Allocation Results 20
5.0 ADDITIONAL INFORMATION SINCE TMDL DEVELOPMENT 22
5.1 Land use Changes 22

5.2 Shellfish Condemnation Areas Changes 23
5.3 Water Quality Monitoring Changes 23
5.4 Updated Shoreline Survey 23
6.0 PUBLIC PARTICIPATION 25
7.0 IMPLEMENTATION OPTIONS 26
7.1 Linking the TMDL to Implementation 26
7.2 Identifying Implementation Actions 26
7.2.1 Sanitary Sewer System Improvements 29
7.2.2 Septic System Programs 29
7.2.3 Stormwater Programs 31
7.2.4 Water Quality Monitoring 33
7.2.5 Boating Programs 34
7.2.6 Pet Waste Programs 34
7.2.7 Erosion and Sediment Control 35
7.2.8 Land Use Management 35
7.2.9 Agriculture Programs 36
7.2.10 Wildlife Contribution Controls 36
7.3 Implementation Costs and Benefits 36
8.0 MEASURABLE GOALS AND MILESTONES 40
8.1 Establishing Goals 40
8.1.1 TMDL Goals 40
8.1.2 Related Watershed Management Goals 40
8.2 Establishing a Timeline and Milestones for Implementation 40
8.3 Developing Tracking and Monitoring Plans 42
9.0 STAKEHOLDERS ROLES AND RESPONSIBILITIES 43
9.1 Federal 43
9.1.1 United States Environmental Protection Agency 43
9.2 State 43
9.2.1 Department of Environmental Quality (DEQ) 43
9.2.2 Department of Conservation and Recreation (DCR) 44
9.2.3 Virginia Department of Health (VDH) 44

9.2.4 Soil and Water Conservation District 44
9.2.5 Department of Game of Inland Fisheries 45
9.3 Regional 45
9.3.1 Hampton Roads Planning District Commission 45
9.3.2 Hampton Roads Sanitation District 45
9.4 City of Suffolk 46
9.5 Isle of Wight County 46
9.6 Private Sector, Non-governmental, and Citizen Groups 46
10.0 POTENTIAL FUNDING SOURCES 48
10.1 Requirements for Section 319 Fund Eligibility 49
REFERENCES 50

1.0 EXECUTIVE SUMMARY

1.1 Introduction

This Implementation Plan (IP) is a companion document to the report, "Fecal Bacteria Total Maximum Daily Load Development for the Nansemond River," The Nansemond River TMDL Study set allocations to limit bacteria pollutant loads discharged to the Nansemond River and Shingle Creek to levels that were modeled to achieve compliance with the state water quality criteria for bacteria for shellfishing waters and primary contact recreation. This IP bridges the gap between those specified pollutant load allocations and actual reductions in bacteria counts in the watershed by recommending a set of actions to be taken in the watershed during a fifteen year project timeframe.

State and Federal Requirements

Two sets of regulatory requirements for the development of TMDL IPs are applicable in the state of Virginia.

- §303(d) of the Federal Water Pollution Control Act of 1972 commonly known as the Clean Water Act (CWA)
- Virginia Water Quality Monitoring, Information and Restoration Act of 1997 (WQ MIRA)

CWA strives "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The inception of the federal TMDL program is found in section 303(d) of that legislation. WQMIRA requires the State to develop reports assessing water quality of state waters, to provide data to develop programs addressing water quality impairments, to develop TMDLs and to develop IPs.

1.2 Review of Nansemond River Bacteria TMDL

As a result of monitoring conducted by the Virginia Department of Health's Division of Shellfish Sanitation (DSS) and the Virginia Department of Environmental Quality (DEQ), portions of the Nansemond River and its tributaries were listed as impaired on Virginia's 1996 Section 303(d) list for being unable to attain the criteria for the primary contact recreation. In 2004, a 3.28 square mile area segment, named Nansemond River and tributaries, was listed as impaired for the Virginia Department of Health (VDH) shellfish harvesting use due to violations of the fecal coliform bacteria standards. The criteria are in place to protect the public from health effects associated with the consumption of bacteriologically contaminated shellfish.

A TMDL study for the Nansemond River, completed by DEQ in March 2006, examined the watershed characteristics and the sources of fecal coliform to the bays. Using monthly monitoring data, bacterial source tracking (BST), and a tidal volumetric model, DEQ assigned

maximum allowable loads to each source in the watersheds in order to bring the Nansemond River into compliance with the water quality standard for shellfish propagation and primary contact recreation.

Table 1-1: TMDL Reduction in Bacteria Loadings from Existing Conditions (Primary Contact Recreation Standard)

Waterbody Segment	Percent Reduction from Existing Condition					
	Direct Wildlife	NPS Forest/Wetlands	Direct Livestock	NPS Agriculture	Direct Human Loads	NPS Residential
Shingle Creek	0	0	0	0	100	0
Nansemond River Upper	0	0	90	100	100	50
Lake Meade Dam	0	0	90	50	100	50

Table 1-2: TMDL Reduction in Bacteria Loadings from Existing Conditions (Shellfishing Standard)

Waterbody Segment	Percent Reduction from Existing Condition					
	Direct Wildlife	NPS Forest/Wetlands	Direct Livestock	NPS Agriculture	Direct Human Loads	NPS Residential
Shingle Creek	97	98	100	99	100	99
Nansemond River Upper*	96	97	0	96	100	96
Lake Meade Dam	0	0	0	0	100	0
* Assumes Shingle Creek meets standard						

The core of this IP is a set of actions found in Section 7 aimed to reduce the levels of bacteria in the Nansemond River watershed. The actions chiefly target bacteria from human and pet ("anthropogenic") sources. This reflects the staged implementation recommended by the Virginia Department of Environmental Quality and referenced in the TMDL Study.

1.3 Public Participation

Two public meetings were held in the watershed to engage the public in the development of the TMDL Implementation Plan for the Nansemond River Watershed. A work group composed of representatives from city departments, the Hampton Roads Planning District Commission (HRPDC), and state and federal agencies was formed to guide development of the TMDL IP.

1.4 Implementation Actions

The management actions outlined in this IP capitalize on existing and planned programs and efforts within the Nansemond watershed and will be implemented in four phases. Ongoing actions have already been initiated in response to other regulatory programs, but are expected to reduce bacteria loads to the waterbodies. Phase I actions are those that have been recently initiated or will be initiated in the near future in response to the TMDL and are scheduled for completion within five years. Phase II activities are those that are planned for implementation within the next five to ten years and may not have approved funding sources yet. Phase III actions may require regulatory changes, so they may be implemented as necessary if actions undertaken in the previous phases do not significantly improve water quality within the study area. All management actions were divided into the following ten management categories:

- Sanitary Sewer System Improvements
- Septic System Programs
- Stormwater Programs
- Monitoring
- Boating Programs
- Pet Waste Programs
- Erosion and Sediment Control
- Land Use Management
- Agricultural BMPs
- Wildlife Contribution Controls

1.5 Associated Costs and Benefits

The primary benefit of the implementation of the management actions described in this IP is the reduction of bacteria levels in the Nansemond River and tributaries. The programs and actions contained within this IP will serve to reduce the anthropogenic sources of bacteria within the Nansemond River Watershed. Because many of the programs mentioned in this report also serve purposes other than to just reduce bacteria and because they cover areas larger than the Nansemond Watershed, the costs of reducing bacteria levels in the Nansemond Watershed can be difficult to estimate. City of Suffolk staff estimated costs for management categories using knowledge of current program costs and best professional judgment.

1.6 Measurable Goals and Milestones

The goal of the TMDL developed for the Nansemond River is to bring the impaired water segments within the Nansemond watershed into compliance with the water quality standard

for bacteria in shellfishing waters. Once the water segment achieves compliance with the bacteria criteria, then the segment can be removed from the 303(d) Impaired Waters List. Throughout the fifteen year project timeframe, DSS and DEQ will continue monthly monitoring of stations throughout the Nansemond watershed. Currently, this monitoring program includes four DSS stations at the mouth of the Nansemond and two DEQ stations in the headwaters. The City of Suffolk has requested DEQ and DSS to resume monitoring at inactive stations and is pursuing establishment of its own monitoring program. Project progress will be tracked throughout the timeframe of the implementation plan, and the effectiveness of the management actions proposed in this IP will be evaluated at the end of five, ten, and fifteen years.

1.7 Stakeholders Roles and Responsibilities

Stakeholders are individuals who live or have land management responsibilities in the watershed, including government agencies, businesses, private individuals and special interest groups. Stakeholder participation and support is essential for achieving the goals of this TMDL effort. Stakeholders for this project were identified at the beginning of IP development and invited to sit on the Workgroup for the project.

1.8 Potential Funding Sources

One of the objectives of this TMDL Implementation Plan was to maximize utilization of existing programs and resources to achieve the goal of reducing bacteria levels within the Nansemond Watershed. In general funding for these programs and the management actions described in this IP will come from four sources:

- Locality funds
- Private / nonprofit funds
- Virginia State funds
- Federal funds

2.0 INTRODUCTION

2.1 Purpose, Scope, and Timeframe

This Implementation Plan (IP) is a companion document to the report, "Fecal Bacteria Total Maximum Daily Load Development for the Nansemond River" completed by MapTech Inc. for the Virginia Department of Environmental Quality (DEQ) in March 2006, which will henceforth be referred to as the TMDL Study. The IP creates a framework to achieve the reductions in bacteria counts recommended in the TMDL Study. The core of this IP is the set of actions presented in Section 7 intended to reduce the levels of fecal coliform bacteria in the Nansemond River and its tributaries from controllable sources. The goal of the IP is compliance with the State of Virginia water quality standard for bacteria for shellfishing waters and primary contact recreation. This IP follows the State guidance for TMDL implementation plans published by DEQ.

The TMDL study that was approved by the US Environmental Protection Agency (USEPA) in December 2006 and the Virginia State Water Control Board in July 2008 examined the watersheds, their characteristics, and the sources of fecal coliform throughout the watersheds. Using monthly monitoring data, bacterial source tracking (BST), Hydrological Simulation Program-FORTRAN (HSPF), and a tidal volumetric model, DEQ was able to assign maximum allowable loads to each source in the watersheds in order to bring the Nansemond River and Shingle Creek into compliance with the water quality standards.

This IP outlines a strategy and the proposed actions to reduce anthropogenic loading of bacteria to the level set forth in the TMDL study in order to comply with the water quality standard for fecal coliform for shellfishing waters. The proposed actions included in this IP will be performed by the City of Suffolk and Isle of Wight County in cooperation with state, federal, and non-governmental entities. These actions are expected to be completed within a ten to fifteen year timeframe.

The pollutant reductions in the Nansemond River Watershed will be implemented in a staged fashion. Staged implementation is an iterative process that first addresses those sources with the largest impact on water quality. Stage 1 management actions will target the controllable, anthropogenic bacteria sources identified in the TMDL, setting aside control strategies for wildlife except for cases of over population. During the implementation of the stage 1 scenario, all controllable sources will be reduced to the maximum extent practicable using an iterative approach. DEQ will re-assess water quality data collected by the Virginia Department of Health, Division of Shellfish Sanitation (VDH-DSS) throughout the Nansemond watershed during and subsequent to the implementation of the stage 1 scenario to determine if the water quality standard is attained.

Stage 1 implementation management actions will be divided into the following four phases:

1. Ongoing actions have already been initiated in response to other regulatory programs, but are expected to reduce bacteria loads to the waterbodies.
2. Phase I actions are those that have been recently initiated or will be initiated in the near future in response to the TMDL and are scheduled for completion within five years.
3. Phase II activities are those that are planned for implementation within the next five to ten years and may not have approved funding sources yet.
4. Phase III actions may require regulatory changes, and they may be implemented as necessary if Phase I and Phase II actions do not significantly improve water quality within the study area.

Stage 1 implementation actions are discussed in greater detail in Section 7. The TMDL may be reevaluated by DEQ after implementation of Stage 1 management actions or if new information on water quality in the Nansemond system becomes available. Only DEQ can revise a TMDL; the decision tree for approval and revision of the TMDL and Implementation Plan is illustrated in Figure 2-1.

In some water bodies for which TMDLs have been developed, water quality modeling indicates that even after removal of all bacteria sources (other than wildlife), the water body may not attain standards under all flow regimes at all times. As is the case for the Nansemond River and Shingle Creek, these water bodies may not be able to attain shellfishing standards without some reduction in wildlife load. Virginia and EPA are not proposing the elimination of wildlife to allow for the attainment of water quality standards. While managing over populations of wildlife remains as a limited option to local stakeholders, the reduction of wildlife or changing of a natural background condition is not the intended goal of a TMDL. If water quality standards are not being met after implementation of stage 1 management actions, then it may be determined through a Use Attainability Analysis (UAA) that shellfish propagation is not a viable use for the Nansemond System. The UAA process is discussed in greater detail in Section 7.2.

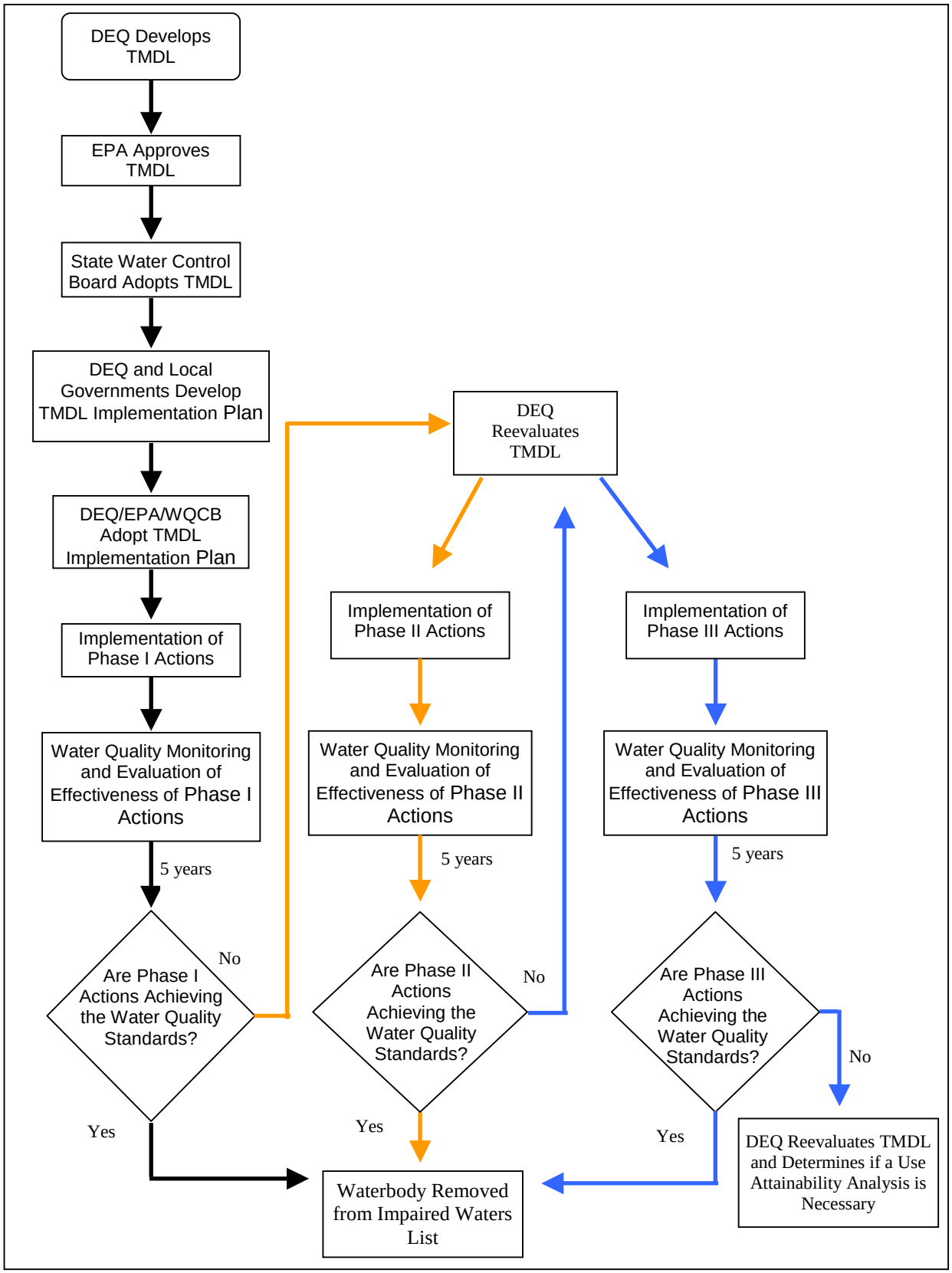

Figure 2-1: Decision Tree for Approval and Revision of TMDL

2.2 Regulatory Background

Section 303(d) of the Clean Water Act and EPA's Water Quality Planning and Management Regulations (40 CFR Part 130) require states to develop Total Maximum Daily Loads (TMDLs) for water bodies which are exceeding water quality standards. TMDLs represent the total pollutant loading that a water body can receive without violating water quality standards. Water quality standards are numeric or narrative limits on pollutants that are developed to ensure the protection of human health and aquatic life. The TMDL process establishes the allowable loading of pollutants for a water body based on the relationship between pollution sources and in-stream water quality conditions. By following the TMDL process, states can establish water quality based controls to reduce pollution from both point and non-point sources to restore and maintain the quality of their water resources (EPA 1991).

In accordance with Federal regulations at 40 CFR § 130.7, a TMDL must comply with the following requirements: (1) designed to attain and maintain the applicable water quality standards, (2) include a total allowable loading and as appropriate, wasteload allocations (WLAs) for point sources and load allocations for nonpoint sources, (3) consider the impacts of background pollutant contributions, (4) take critical stream conditions into account (the conditions when water quality is most likely to be violated), (5) consider seasonal variations, (6) include a margin of safety (which accounts for uncertainties in the relationship between pollutant loads and instream water quality), (7) consider reasonable assurance that the TMDL can be met, (8) be subject to public participation.

Once a TMDL is developed and approved by EPA, measures must be taken to reduce pollution levels in the stream. 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 that is described along with specific BMPs in the IP. In general, the Commonwealth intends for the pollutant reductions to be implemented in a staged fashion. Staged implementation is an iterative process that first addresses those sources with the largest impact on water quality.

2.3 Designated Use and Water Quality Standard

According to Virginia Water Quality Standards (9 VAC 25-260-5), the term "water quality standards means provisions of state or federal law which consist of a designated use or uses for the waters of the Commonwealth and water quality criteria for such waters based upon such uses. Water quality standards are to protect the public health or welfare, enhance the quality of water and serve the purposes of the State Water Control Law (§62.1-44.2 et seq. of the Code of Virginia) and the federal Clean Water Act (33 USC §1251 et seq.)."

According to Virginia Water Quality Standards (9 VAC 25-260-10A), "all state waters 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 be reasonably expected to inhabit them; wildlife; and the production of edible and marketable natural resources (e.g., fish and shellfish)."

The impairments for the Nansemond River and Shingle Creek are based on restrictions placed upon the harvesting of shellfish from these waters and the state water quality standard for primary contact recreation. The shellfish restrictions which are issued by the Virginia Department of Health's Division of Shellfish Sanitation (DSS) are based on monthly monitoring data. DSS collects monthly fecal coliform bacteria samples from each of its sampling stations in the waterbodies. DSS calculates geometric mean and 90th percentile concentration values based on the most recent 30-months of sampling data. Most of the stations were listed for failing to attain the 90th percentile criteria. Attainment of the primary contact recreation standard is determined by DEQ based on assessment of water samples collected by DEQ.

For a shellfish supporting water body to be in compliance with Virginia's bacteria standards for the production of edible and marketable natural resources use, DEQ specifies the following criteria (9VAC 25-260-160): "In all open ocean 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 bacteria shall apply; The geometric mean fecal coliform value for a sampling station shall not exceed an MPN (most probable number) of 14 per 100 milliliters. The 90th percentile shall not exceed an MPN of 43 for a 5 tube, 3 dilution test or 49 for a 3 tube, 3 dilution test"

The EPA has recommended that all states adopt an enterococci standard for marine waters. The adoption of the enterococci standard went into effect January 15, 2003 in Virginia. The new criteria, used in developing the bacteria TMDL in this study, are outlined in 9 VAC 25-260-170. The applicable standard for Nansemond River and Shingle Creek is a single sample maximum of 104 cfu/100ml.

2.4 Nansemond River TMDL Development Efforts

In the 1998 *303(d) Total Maximum Daily Load Priority List and Report* the same segments of the Nansemond River and Shingle Creek were listed as impaired for not supporting the primary contact recreational use due to violations of the fecal coliform bacteria standards.

In the 2002 *303(d) Report on Impaired Waters* the same Nansemond River segment, called Nansemond River (Upper), was listed again for not supporting the primary contact recreational use due to violations of the fecal coliform bacteria standards. Shingle Creek was again listed as impaired for not supporting the primary contact recreational use.

In the *2004 Virginia Water Quality Assessment 305(b)/303(d) Integrated Report* the Nansemond River (Upper) impairment was extended to the Route 58 bridge and was renamed Nansemond River (Lake Meade Dam). The entire segment was listed for not supporting the primary contact recreational use due to violations of the fecal coliform bacteria and enterococci bacteria standards. A new segment was added to the 2004 List, which includes the Lake Meade Dam

segment and the Shingle Creek segment as well as the Nansemond River downstream to Sleepy Hole and other tributaries. The 3.28 square mile area of this segment, named Nansemond River and tributaries, was listed as impaired for the VDH shellfish harvesting use (condemnation zone #8) due to violations of the fecal coliform bacteria standards. Shingle Creek was listed as impaired for the VADEQ primary contact recreational use and for the VDH shellfish harvesting use (a portion of condemnation zone #8) due to violations of the fecal coliform bacteria standards. Figure 1.2 shows the 2004 impaired segments.

A TMDL study for the Nansemond River, completed by DEQ in March 2006, examined the watershed characteristics and the sources of fecal coliform to Nansemond River. Using monthly monitoring data, bacterial source tracking (BST), and a tidal volumetric model, DEQ assigned maximum allowable loads to each source in the watersheds in order to bring the Nansemond River into compliance with the water quality standard for shellfish propagation and primary contact recreation.

2.5 Nansemond River Watershed

The Nansemond River watershed, which is contained in USGS Hydrologic Unit Code 02080208, contains Suffolk and a portion of Isle of Wight County, Virginia. Both the West Branch Reservoir and the Lake Meade Reservoir are located within the Nansemond River watershed. The Nansemond River drains to the lower James River basin (Figure 2-1).

The estimated human population within the Nansemond River drainage area currently is 47,605 (DEQ, 2006). Among Virginia counties and cities, Suffolk City ranks 3rd for the production of peanuts, 2nd for cotton and 10th for soybeans (Virginia Agricultural Statistics, 2002). Isle of Wight County ranks 4th for the production of peanuts, 3rd for cotton and 5th for soybeans (Virginia Agricultural Statistics, 2002). Suffolk City is home to 531 species of wildlife including 54 types of mammals (*e.g.,* beaver, raccoon, and white - tailed deer) and 218 types of birds (*e.g.,* wood duck, wild turkey) (VDGIF, 2006). Isle of Wight County has 420 species of wildlife including 48 types of mammals and 203 types of birds (VDGIF, 2006).

For the period from 1948 to 2004, the Nansemond River watershed received an average annual precipitation of approximately 47.89 inches, with 56% of the precipitation occurring during the May through October growing season (SERCC, 2006).

Average annual snowfall is 7.2 inches, with the highest snowfall occurring during January (SERCC, 2006). Average annual daily temperature is 59.1°F. The highest average daily temperature of 88.1°F occurs in July, while the lowest average daily temperature of 29.9°F occurs in January (SERCC, 2006).

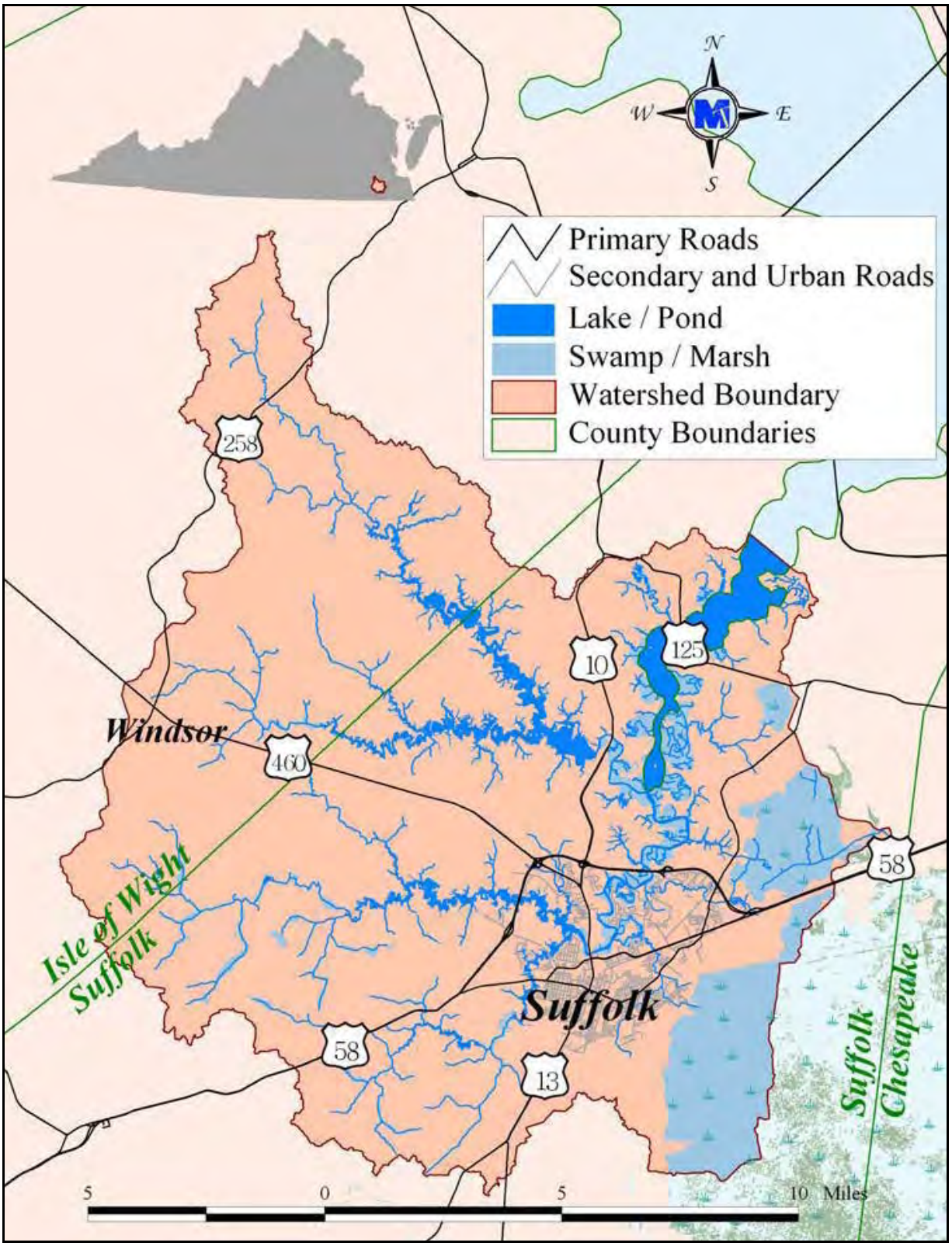

Figure 2-1: Location of Nansemond River Watershed

3.0 STATE AND FEDERAL REQUIREMENTS

3.1 State Requirements

The TMDL Implementation Plan 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 Implementation Plans to be approved by the Commonwealth, they must include the following:

- Date of expected achievement of water quality objectives;
- Measurable goals;
- Necessary corrective actions;
- Associated costs, benefits, and environmental impact of addressing the impairment.

3.2 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.

4.0 REVIEW OF TMDL DEVELOPMENT

4.1 Description of Watershed Characteristics

The Nansemond River watershed, which is contained in USGS Hydrologic Unit Code 02080208, contains Suffolk and a portion of Isle of Wight County, VA. Both the Western Branch Reservoir and the Lake Meade Reservoir are located within the Nansemond River watershed. The Nansemond River drains to the lower James River basin (DEQ 2006).

Wildlife populations; ranges, rates of failure, locations, and number of septic systems; domestic pet populations; numbers of cattle and other livestock; and information on livestock and manure management practices for the Nansemond River watershed for 2004 conditions were all used to calculate fecal coliform loads from land-based nonpoint sources in the watershed. The estimated fecal coliform production and accumulation rates due to these sources were calculated for the watershed and incorporated into the model. Also, represented in the model were direct nonpoint sources of uncontrolled discharges, and direct deposition by wildlife (DEQ 2006).

The TMDL study utilized the National Land Cover Data (NLCD) produced cooperatively between the U.S.Geological Survey (USGS) and the U.S. Environmental Protection Agency (USEPA). The collaborative effort to produce this dataset is part of a Multi-Resolution Land Characteristics (MRLC) Consortium project. Using 30-meter resolution Landsat 5 Thematic Mapper (TM) satellite images taken between 1990 and 1994, digital land use coverage was developed identifying up to 21 possible land use types. Classification, interpretation, and verification of the land cover dataset involved several data sources (DEQ 2006). Approximate acreages and land use proportions for each impaired segment are given in Table 4-1 and shown in Figure 4-1.

Table 4-1: 2000 Land Use for Nansemond River Watershed (DEQ 2006)

Land Use		Shingle Creek	Nansemond River (Upper)	Nansemond River (Lake Meade Dam)	Nansemond River and Tributaries
Barren/Transitional	acres	86	578	578	1,416
	percentage	0.8%	1.0%	0.9%	1.2%
Commercial	acres	383	2,315	2,624	3,300
	percentage	3.6%	4.0%	4.1%	2.7%
Forest	acres	808	16,070	16,439	34,547
	percentage	7.5%	27.5%	25.6%	28.5%
High Intensity Residential	acres	782	1,200	1,200	1,229
	percentage	7.3%	2.1%	1.9%	1.0%
Livestock Access (LAX)	acres	600	75	86	230
	percentage	5.6%	0.1%	0.1%	0.2%
Low Intensity	acres	488	2,951	3,041	4,663

Land Use		Shingle Creek	Nansemond River (Upper)	Nansemond River (Lake Meade Dam)	Nansemond River and Tributaries
Urban/Grass	percentage	4.6%	5.1%	4.7%	3.8%
Pasture Hay	acres	1,125	6,479	7,050	16,138
	percentage	10.5%	11.1%	11.0%	13.3%
RowCrop	acres	6	11,264	11,976	23,552
	percentage	0.1%	19.3%	18.6%	19.4%
Water	acres	6,426	1,425	1,620	6,592
	percentage	60.0%	2.4%	2.5%	5.4%
Wetland	acres	3	16,040	19,679	29,601
	percentage	0.0%	27.5%	30.6%	24.4%
Total	acres	10,706	58,396	64,293	121,268

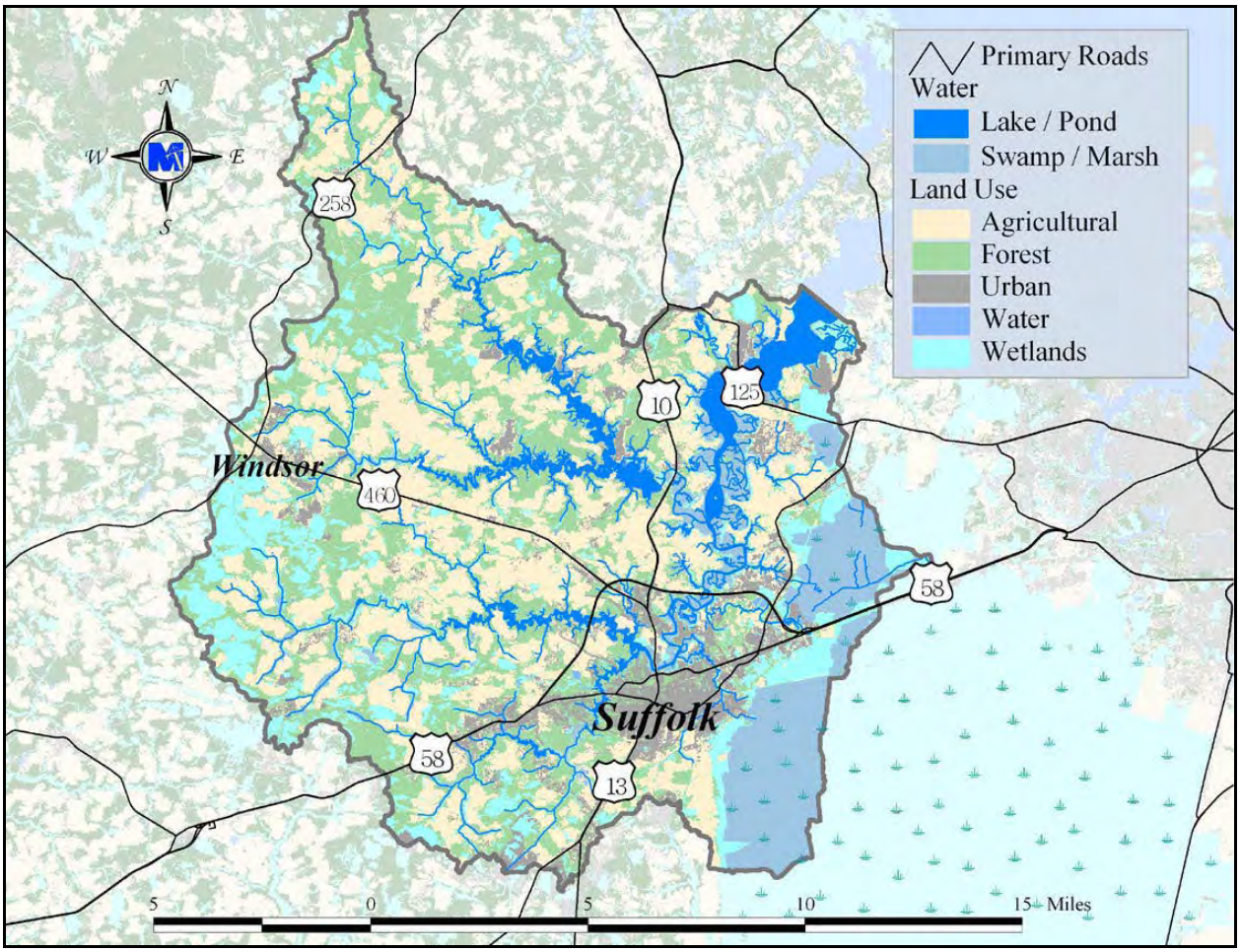

Figure 4-1 Nansemond River Land Use (DEQ 2006)

4.2 Description of Impairment

Pollution from both point and nonpoint sources can lead to fecal coliform bacteria contamination of water bodies. Fecal coliform bacteria are found in the intestinal tract of warm-blooded animals. Although most fecal coliform are not pathogenic, their presence in water indicates contamination by fecal material. For contact recreational activities such as swimming, health risks increase with increasing fecal coliform counts. If the fecal coliform concentration in a water body exceeds state water quality standards, the water body is listed for violation of the primary contact recreational use. Virginia has recently adopted an Escherichia coli (E. coli) water quality standard for freshwater and an enterococci standard for saltwater and transition zones for surface waters. The concentrations of these organisms are considered to be better indicators of health risk than the concentration of the broader fecal coliform group (DEQ 2006).

In the 1998 303(d) Total Maximum Daily Load Priority List and Report the same segments of the Nansemond River and Shingle Creek were listed as impaired for not supporting the primary contact recreational use due to violations of the fecal coliform bacteria standards.

In the 2002 303(d) Report on Impaired Waters the same Nansemond River segment, called Nansemond River (Upper), was listed again for not supporting the primary contact recreational use due to violations of the fecal coliform bacteria standards. Shingle Creek was again listed as impaired for not supporting the primary contact recreational use.

In the 2004 Virginia Water Quality Assessment 305(b)/303(d) Integrated Report the Nansemond River (Upper) impairment was extended to the Route 58 bridge and was renamed Nansemond River (Lake Meade Dam). The entire segment was listed for not supporting the primary contact recreational use due to violations of the fecal coliform bacteria and enterococci bacteria standards. A new segment was added to the 2004 List, which includes the Lake Meade Dam segment and the Shingle Creek segment as well as the Nansemond River downstream to Sleepy Hole and other tributaries. The 3.28 square mile area of this segment, named Nansemond River and tributaries, was listed as impaired for the VDH shellfish harvesting use (condemnation zone #8) due to violations of the fecal coliform bacteria standards. Shingle Creek was listed as impaired for the VADEQ primary contact recreational use and for the VDH shellfish harvesting use (a portion of condemnation zone #8) due to violations of the fecal coliform bacteria standards. Figure 1.2 shows the 2004 impaired segments.

A TMDL study for the Nansemond River, completed by DEQ in March 2006, examined the watershed characteristics and the sources of fecal coliform to the bays. Using monthly monitoring data, bacterial source tracking (BST), and a tidal volumetric model, DEQ assigned maximum allowable loads to each source in the watersheds in order to bring the Nansemond River into compliance with the water quality standard for shellfish propagation and primary contact recreation. Figure 4-2 illustrates the impaired segments for which a TMDL was developed.

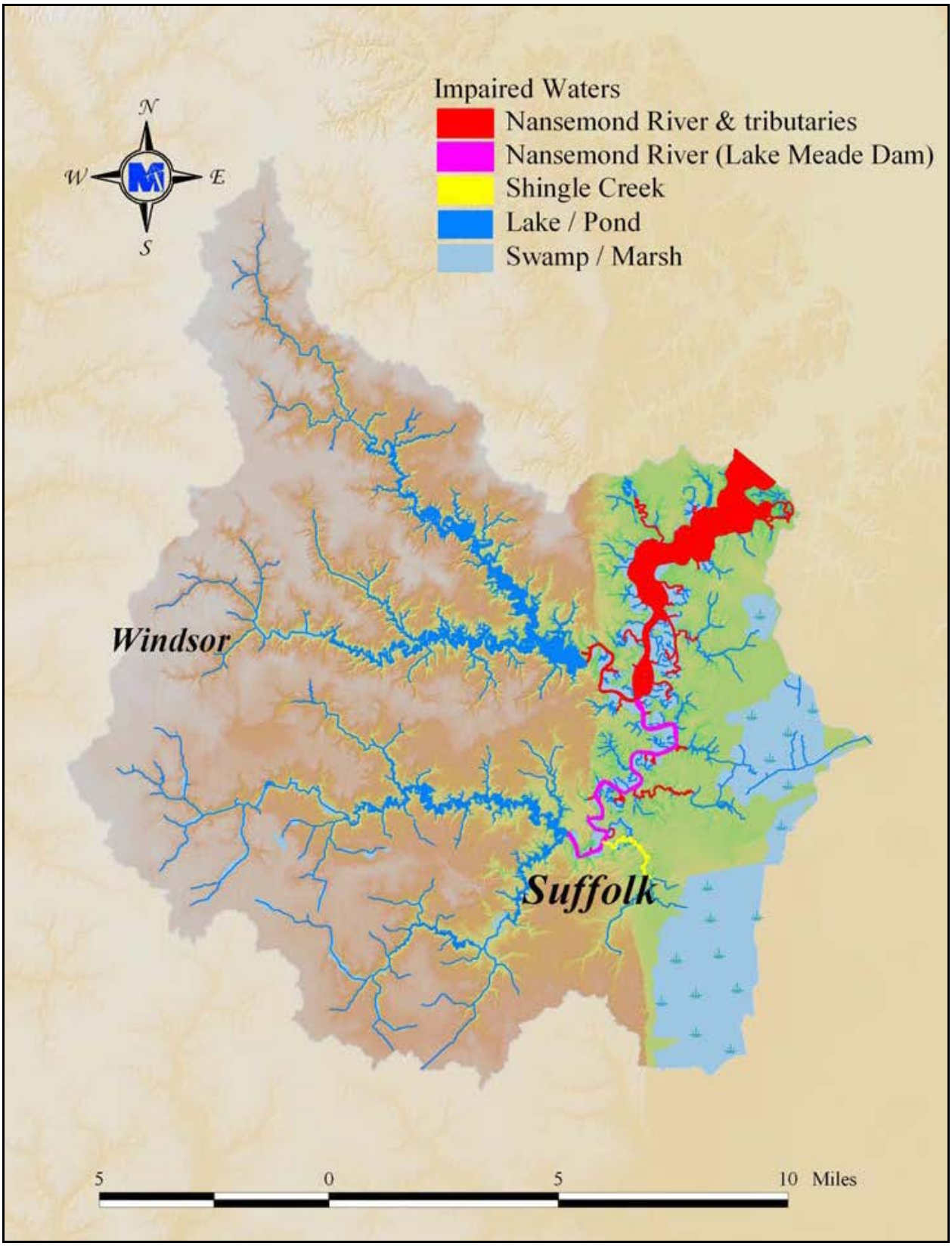

Figure 4-2: Impaired Stream Segments in the Nansemond River Watershed (DEQ 2006)

4.3 Description of Water Quality Monitoring

VADEQ monitors water quality at 14 stations within the Nansemond River watershed. During the TMDL development fecal coliform concentrations were analyzed for these stations from January 1980 through October 2005. Table 4-2 summarizes the water quality at these stations. Enterococci concentrations were analyzed for the most upstream station on the Nansemond River and one station on Shingle Creek. Table 4-3 summarizes the water quality at these stations. Figure 4-3 illustrates the location of the DEQ monitoring sites available at the time of the TMDL study.

Table 4-2: Summary of DEQ Fecal Coliform Monitoring 1980 - 2005 (DEQ 2006)

Stream	VADEQ Station	Count (#)	Median (cfu/100mL)	Percent Violation
Nansemond River	2-NAN000.20	137	4	1
Nansemond River	2-NAN002.77	262	14	9
Nansemond River	2-NAN002.88	20	4	0
Nansemond River	2-NAN005.82	130	10	3
Nansemond River	2-NAN007.89	136	23	1
Nansemond River	2-NAN010.69	137	75	17
Nansemond River	2-NAN012.53	95	93	28
Nansemond River	2-NAN013.50	33	170	15
Nansemond River	2-NAN014.96	99	230	33
Nansemond River	2-NAN016.07	96	240	44
Nansemond River	2-NAN019.14	343	1,500	70
Nansemond River	2-NAN019.73	51	460	57
Shingle Creek	2-SGL001.00	314	1,600	73
Shingle Creek	2-SGL001.50	31	1,600	68

Table 4-3: Summary of DEQ *enterococci* Monitoring 2000 - 2005 (DEQ 2006)

Stream	VADEQ Station	Count (#)	Median (cfu/100mL)	Percent Violation
Nansemond River	2-NAN019.14	40	95	45
Shingle Creek	2-SGL001.00	19	220	68

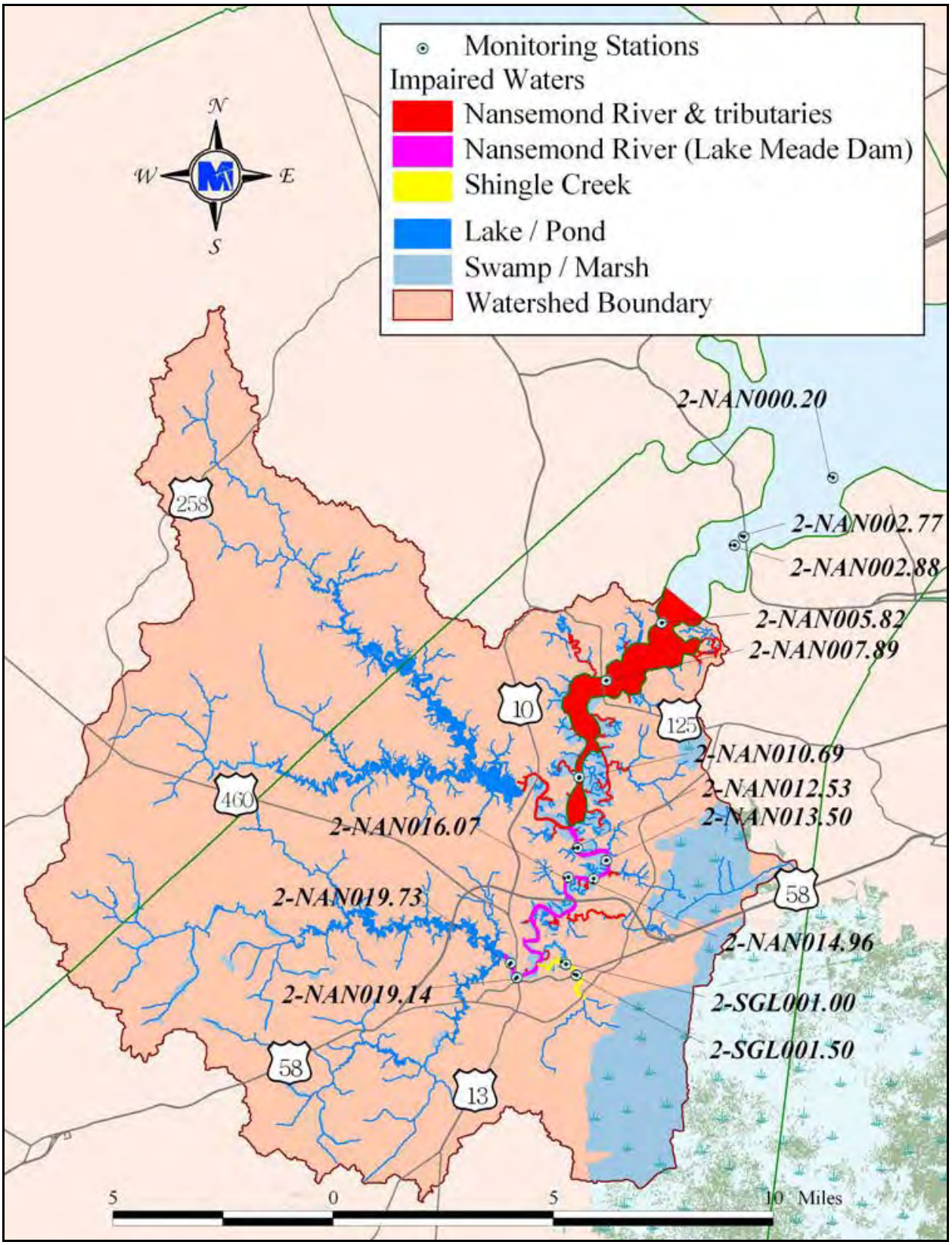

Figure 4-3: DEQ Water Quality Monitoring Stations (DEQ 2006)

4.4 Description of Water Quality Modeling

TMDL development requires the use of a watershed-based model that integrates both point and nonpoint sources and simulates in-stream water quality processes. The Hydrologic Simulation Program – FORTRAN (HSPF) version 12 (Bicknell et al., 2001; Duda et al., 2001) was used to model fecal coliform transport and fate in the Nansemond River watershed. The presence of a tidal zone within the impaired reaches required the addition of a tidal model to accurately model tidal fluxes in the tidal zones. A Tidal PRISM water quality model for small coastal basins and tidal creeks (Kuo and Park, 1994) was used to model fecal coliform transport and fate in the tidal zones.

Additional details on the input data used for the modeling and the calibration process can be found in the 2006 TMDL Study.

4.5 Description of Sources Considered

Bacteria sources in the Nansemond River watershed were characterized using data and anecdotal information from the following: Virginia DEQ, Virginia Department of Conservation and Recreation (DCR), Virginia Department of Game and Inland Fisheries (DGIF), Virginia Department of Agricultural and Consumer Services (VDACS), Virginia Department of Health (VDH), public participation, watershed reconnaissance and monitoring, published information, and professional judgment. Point sources and nonpoint sources of bacteria are discussed below and described in detail in the TMDL report.

4.5.1 Point Source Contributions

Twenty-two point sources are permitted to discharge to waterbodies in the Nansemond River watershed. Seven of these facilities are permitted for fecal control, with known fecal coliform concentrations and design discharges. For calibration and validation condition runs, recorded flow and fecal coliform concentration or Total Residual Chlorine (TRC) levels documented by the VADEQ were used as the input for each permit. The TRC data was related to fecal colifrom concentrations using a regression analysis. The design flow capacity was used for allocation runs. This flow rate was combined with a fecal coliform concentration of 200 cfu/100 ml (when applicable) to ensure that compliance with state water quality standards could be met even if permitted loads were at maximum levels (DEQ 2006).

4.5.2 Non-Point Source Contributions

Land based nonpoint sources are represented as an accumulation of pollutants on land, where some portion is available for transport in runoff. The amount of accumulation and availability for transport vary with land use type and season. The model allows for a maximum accumulation to be specified. The maximum accumulation was adjusted seasonally to account

for changes in die-off rates. Some nonpoint sources are represented as being deposited directly to the stream (e.g., animal defecation in stream). These sources are modeled similarly to point sources, as they do not require a runoff event for delivery to the stream.

Sources of nonpoint source bacteria pollution within the watersheds include livestock, wildlife, pets, and humans. The TMDL estimated bacteria loads from failing septic systems, sewer system overflows, livestock, land application of manure, wildlife, and pets.

4.6 TMDL Load Reductions and Allocation Results

The Total Maximum Daily Load or total allowable load for a waterbody is composed of a waste load allocation (WLA), load allocation (LA), and margin of safety (MOS).

Total Allowable Load = Waste Load Allocation (WLA) + MOS + Load Allocation (LA)

Allocation scenarios were modeled using HSPF. Existing conditions were adjusted until the water quality standard was attained. Because United States Environmental Protection Agency (USEPA) requires a zero percent violation load allocation in TMDLs, modeling was conducted for a target value of 0% exceedance of the VADEQ *enterococci* standards and of the VDH fecal coliform standards. Scenarios were evaluated to predict the effects of different combinations of source reductions on final in-stream water quality. Modeling of these scenarios provided predictions of whether the reductions would achieve the target of 0% exceedance. Shingle Creek requires a 97% reduction from direct wildlife loads; a 98% reduction from land-based wildlife loads; 99% reductions from direct livestock, land-based agriculture and land-based residential; and 100% reduction from direct human sources. Nansemond River (Upper) requires a 96% reduction from direct wildlife loads; a 97% reduction from land-based wildlife loads; 96% reductions from land-based agriculture and land-based residential; 0% reduction from direct livestock; and 100% reduction from direct human sources. Nansemond River (Lake Meade Dam) and Nansemond River and Tributaries both require 100% reductions from direct human sources, with no further reductions needed. The final TMDL values are shown in Tables 4-4 and 4-5.

The City of Suffolk has a Municipal Separate Storm Sewer System (MS4) permit with multiple outfalls (The TMDL identified the permit number for Suffolk as VAR040044, but it has since been changed to VAR040029). For the TMDL, it was assumed that all impervious area in the downtown Suffolk area drains to an MS4 outfall to the Nansemond River. This area was limited to the impervious area in subwatersheds 1, 2, and 5, which was estimated at 1,577 acres. All fecal coliform and *enterococci* from this area were allocated to the City of Suffolk MS4 in the TMDL tables. The portion of Isle of Wight County within the Nansemond Watershed is outside the MS4 boundary, so IOW County did not receive a WLA.

Table 4-4: Annual enterococci loads for Nansemond River Watershed

Impairment	WLA	LA	MOS	TMDL
	(cfu/year)	(cfu/year)		(cfu/year)
Shingle Creek (subwatershed 5)	2.19E+10	1.05E+13		1.05E+13
VAR040044*	2.19E+10			
Nansemond River (Upper) (subwatersheds 1,2,5)	9.99E+10	5.80E+13		5.81E+13
VA0021709	2.18E+09			
VA0086134	3.14E+10			
VAR040044*	6.63E+10			
Nansemond River (Lake Meade Dam) (subwatersheds 1,2,3,5)	9.99E+10	4.26E+13		4.27E+13
VA0021709	2.18E+09			
VA0086134	3.14E+10			
VAR040044*	6.63E+10			

***** This permit number represents the City of Suffolk and has been changed to VAR040029.
** This permit number represents IOW County Public Schools within the watershed and has been changed to VAR040020.

Table 4-5: Annual fecal coliform loads for Nansemond River Watershed

Impairment	WLA	LA	MOS	TMDL
	(cfu/year)	(cfu/year)		(cfu/year)
Shingle Creek (subwatershed 5)	2.78E+09	1.05E+13		1.05E+13
VAR040044*	2.78E+09			
Nansemond R. and Tributaries (all subwatersheds)	3.89E+10	9.47E+12		9.51E+12
VA0021709	1.06E+09			
VA0027138**	2.54E+09			
VA0027146**	2.26E+09			
VA0069302	1.88E+09			
VA0086134	1.53E+10			
VAG403000	1.06E+08			
VAR040044*	1.58E+10			

* This permit number represents the City of Suffolk and has been changed to VAR040029.
** This permit number represents IOW County Public Schools within the watershed and has been changed to VAR040020.

5.0 ADDITIONAL INFORMATION SINCE TMDL DEVELOPMENT

Since the development of the Nansemond River TMDL Study in 2006, additional data has been collected that can aid the understanding of water quality dynamics within the watershed.

5.1 Land use Changes

The land use data used in the TMDL report was derived from satellite images from 1990 and 1994. The City of Suffolk maintains parcel level land use data for the Nansemond River watershed (Table 5-1 and Figure 5-1).

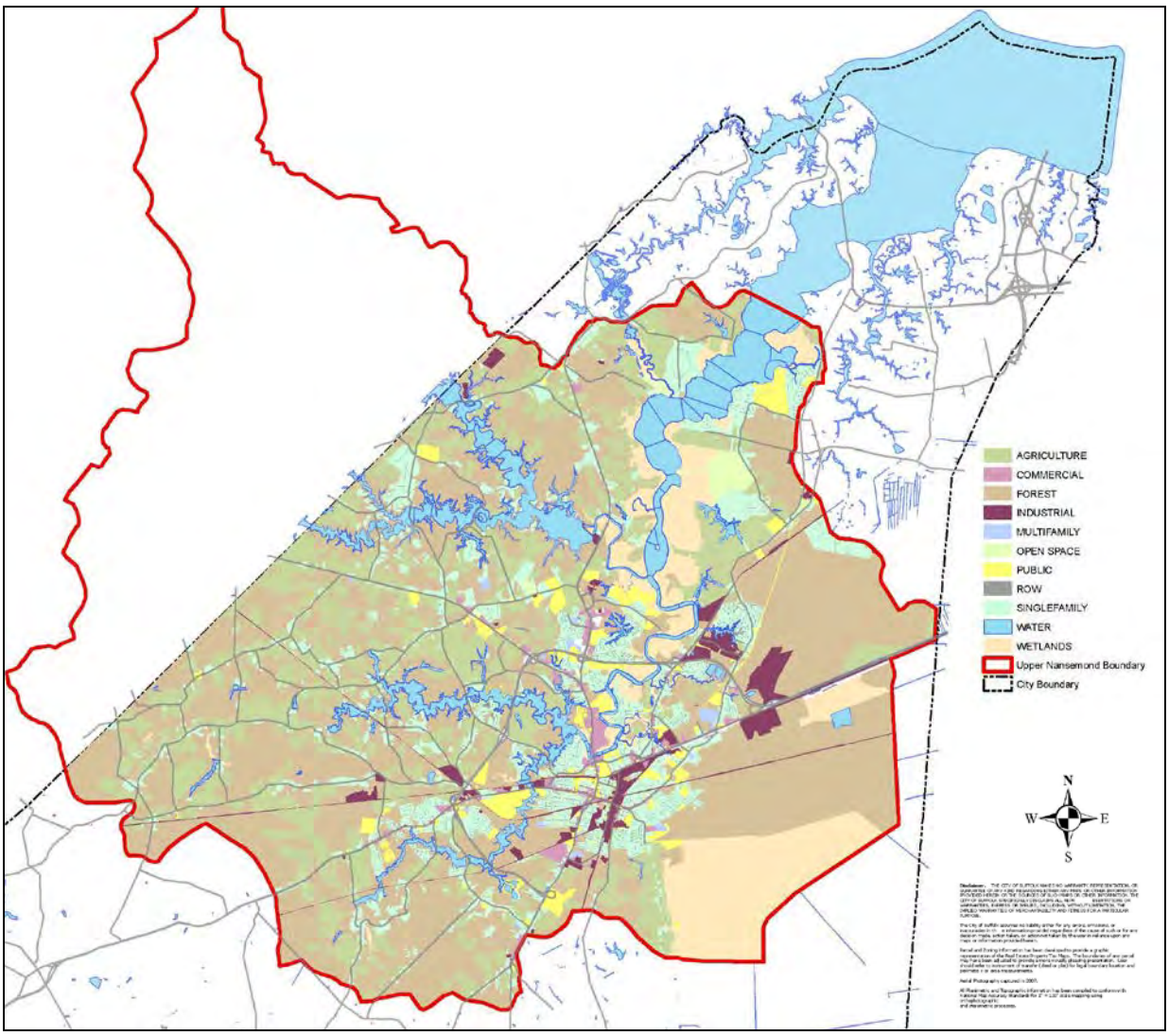

Figure 5-1: 2010 Land Use for City of Suffolk within Nansemond River Watershed

Table 5-1: 2010 Land Use for City of Suffolk within Nansemond River Watershed

Land Use	Percent	Acres
AGRICULTURE	19.6	17,615
COMMERCIAL	1.0	914
FOREST	42.8	38,511
INDUSTRIAL	2.3	2,050
MULTIFAMILY	0.2	215
OPEN SPACE	0.6	559
PUBLIC	3.8	3,382
RESIDENTIAL	0.0	1
ROW	1.5	1,306
SINGLEFAMILY	10.8	9,703
VACANT	0.0	37
WATER	7.6	6,839
WETLANDS	9.9	8,867
TOTAL	100	89,998

5.2 Shellfish Condemnation Areas Changes

VDH-DSS analyzes fecal coliform bacteria samples in order to determine if stations are meeting shellfishing standards. As of July 17, 2009 the lower section of the Upper Nansemond condemnation area was opened for shellfishing. This area reaches from north of Sleepy Hole Point to south of Newmans Point (Figure 5-2).

5.3 Water Quality Monitoring Changes

Since the development of the TMDL, VDH and DEQ have not been collecting bacteria data at many of the stations within the Nansemond River watershed (Figure 5-2). VDH is currently monitoring at eight stations at the mouth of the Nansemond and is in communications with the City of Suffolk to resume monitoring at two more stations upstream. DEQ is currently only monitoring enterococci concentrations in the headwaters of the Nansemond River (2-NAN019.14) and the mouth of Shingle Creek (2-SGL001.00). The City of Suffolk has requested that DEQ resume monitoring at stations further upstream.

5.4 Updated Shoreline Survey

VDH-DSS conducts shoreline surveys adjacent to shellfishing areas. The shoreline survey for the Upper Nansemond River also includes areas adjacent to the Lower Nansemond River shellfishing area. The survey conducted in 2001 identified sixty-six on-site sewage deficiencies, twenty-eight sites of potential pollution, four industrial waste sites, six boating activity sites, and nine sites that contribute animal pollution. After the TMDL was developed, VDH conducted a shoreline survey in February 2010. The more recent survey showed that sixty of the on-site sewage deficiencies had been corrected, and only identified five sites of potential pollution, six animal pollution sites, two industrial waste sites, and five boating activity sites.

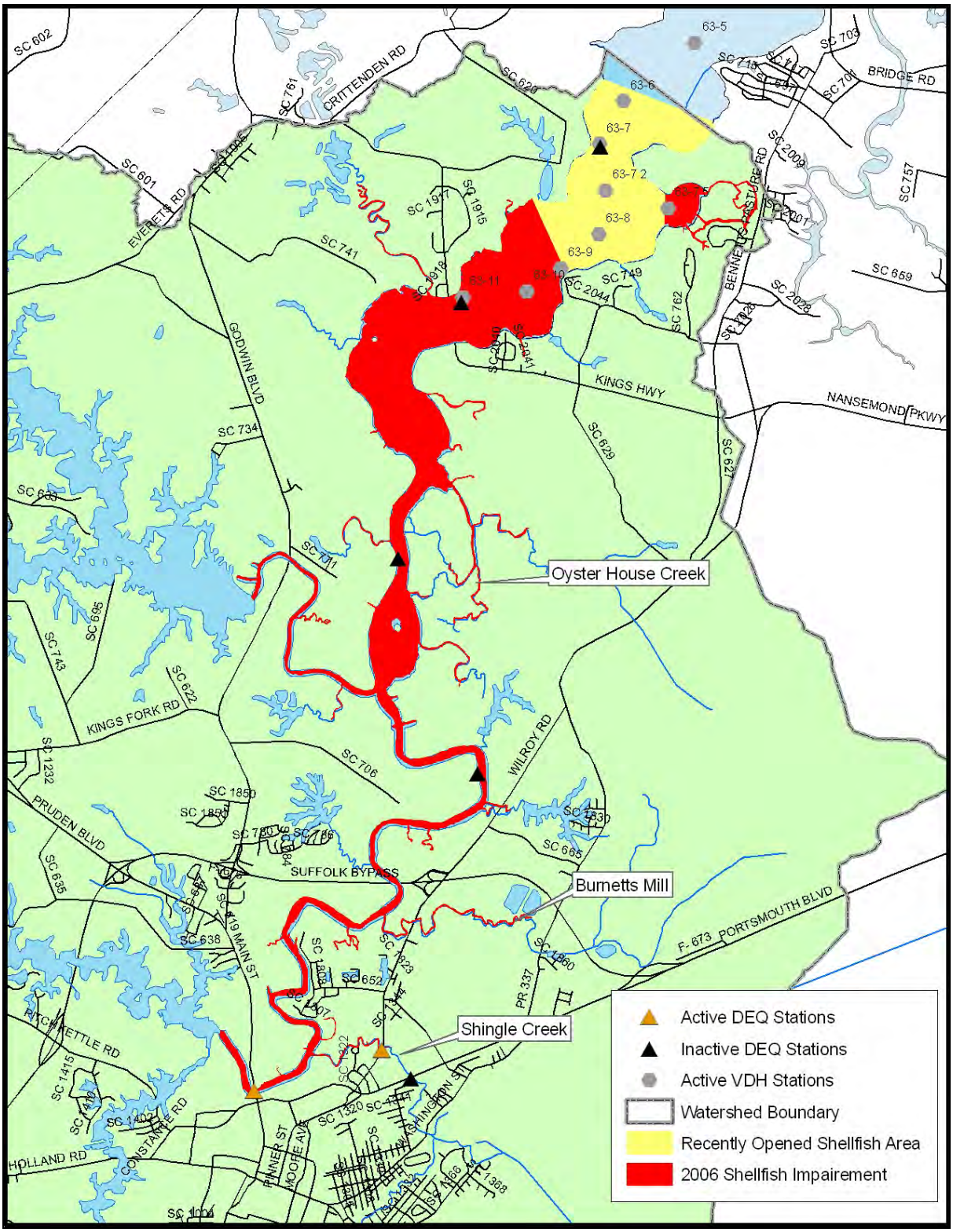

Figure 5-2: Recently Opened Shellfishing Area in Nansemond River and Active Monitoring Stations.

6.0 PUBLIC PARTICIPATION

An essential step in implementing a TMDL is the input from a broad range of individuals, agencies, organizations and businesses because of their interest and familiarity with local water quality needs and conditions. Public participation facilitates dialogue between local stakeholders and government agencies to commit resources to TMDL implementation, such as funding and technical support. Community members are best suited to identify and resolve sources of water quality problems. In order to engage the public in the development of the TMDL Implementation Plan for the Upper Nansemond River Watershed, two public meetings were held in July 2009 and the May 2010. The City of Suffolk and other agencies are pursuing a number of activities independently of the TMDL Implementation Plan Process. Where appropriate, these initiatives were incorporated into the TMDL Implementation Plan process.

A work group was established to guide development of the TMDL Implementation Plan. The work group met approximately on a monthly basis from April 2009 to April 2010 to review background materials and draft elements of the implementation plan. The work group was composed of representatives of city departments and state and federal agencies.

- City of Suffolk – Departments of Planning, Public Works, Public Utilities, Parks and Recreation, Agriculture
- Isle of Wight County
- Hampton Roads Sanitation District
- Hampton Roads Planning District Commission
- Virginia Department of Environmental Quality – Water Division and Virginia Coastal Program
- Virginia Department of Conservation and Recreation – Divisions of State Parks, Chesapeake Bay Local Assistance and Soil and Water Conservation
- Virginia Department of Health
- Virginia Department of Game and Inland Fisheries
- Peanut Soil and Water Conservation District

7.0 IMPLEMENTATION OPTIONS

Implementation of this TMDL will contribute to the ongoing water quality improvement efforts aimed at restoring water quality in the Chesapeake Bay. In general, reduction strategies will be implemented in a staged process that first addresses sources with the largest impact on water quality. In urban areas, the focus will be on reducing pollution due to sanitary sewer overflows, septic system failures, stormwater runoff and recreational boating.

7.1 Linking the TMDL to Implementation

The Upper Nansemond River TMDL was approved by EPA in 2006, but relied largely on data collected prior to 2004. It is important to consider both the TMDL as well as the additional information obtained since its completion when developing the implementation actions that may improve water quality within the Upper Nansemond River watershed. It should be noted that due to uncertainty, the allocations contained in the TMDL study should, but may not, result in attainment of the bacteria standard for primary contact recreation and shellfishing within the Nansemond River and Shingle Creek. The success of the management actions proposed in this document will be determined by ambient water quality data rather than attainment of load allocations.

The City of Suffolk, Isle of Wight, and other partners will utilize an adaptive management approach in the implementation of the management actions described within this report. These management actions discussed in detail in subsequent sections were chosen because it is believed they will have the greatest effect on improving water quality within the Upper Nansemond watershed. As actions are implemented, water quality data are collected, and new information and technology become available, Suffolk and Isle of Wight, in consultation with the Commonwealth, will discontinue actions that are deemed ineffective and add actions that may not be included in this report.

7.2 Identifying Implementation Actions

The implementation actions discussed below were developed to reduce human, livestock, and pet sources of bacteria loading to the Nansemond River. These actions will be implemented in four phases as identified in Table 7-1. Ongoing actions have already been initiated in response to other regulatory programs, but are expected to reduce bacteria loads to the waterbodies. Phase I actions are those that have been recently initiated or will be initiated in the near future in response to the TMDL and are scheduled for completion within five years. Phase II activities are those that are planned for implementation within the next five years but may not have approved funding sources yet. Phase III actions may require regulatory changes, but they may be implemented as necessary if Phase I and Phase II actions do not significantly improve water quality within the study area. If all these actions prove to be insufficient to meet the water quality criterion for primary contact recreation or shellfishing in all or parts of the Nansemond River or Shingle Creek, then the designation of these waters may need to be further evaluated.

In order to remove a designated use or establish subcategories of a use, the state must demonstrate 1) that the use is not an existing use, 2) that downstream uses are protected, and 3) that the source of bacterial contamination is natural and uncontrollable by effluent limitations and by implementing cost-effective and reasonable best management practices for non-point source control (9 VAC 25-260-10). This and other information is collected through a special study called a Use Attainability Analysis (UAA). All site-specific criteria or designated use changes must be adopted as amendments to the water quality standards regulations. Watershed stakeholders and EPA will be able to provide comment during this process. Extensive follow-up monitoring, described in Section 8.4, will evaluate if the modeling assumptions were correct. If water quality standards are not being met, a UAA may be initiated to reflect the presence of naturally high bacteria levels due to uncontrollable sources.

Table 7-1 Management Options for Implementation of Nansemond River TMDL

Management Category	Management Option	Development Phase
Sanitary Sewer Improvements	Implement schedule defined by Regional SSO Consent Order (9/26/2007 – 11/26/2013)	Ongoing
	Sewer System Evaluation Survey Plan	Complete
	SSES Field Activities – System Assessments	Ongoing
	RSOBC – Maintenance, Operation and Management Plan	Complete
	Flow Monitoring Plan and Flow Evaluation Reports	Complete
	Flow Monitoring Program – SSES Basins	Complete
	Find and Fix Field Activities (Severe Defects)	Ongoing
	Long Term Rehabilitation Plan Development	Ongoing
	HRSD Federal Consent Decree	Ongoing
	Turlington Park Sewer Extension	Ongoing
	Lake Speight Sewer Extension	Ongoing
	Nansemond Shores and Holiday Point Sewer Extension	Complete
	Cedar Point Sewer Extension	Complete
	Bennett's Harbor Sewer Extension	Complete
	Participation in HRFOG education program	Ongoing
Septic System Programs	CBPA Septic Tank Pump Out and Inspection Information	Ongoing
	Continue to update septic system locations through pump out program	Ongoing
Stormwater Programs	Enforcement of Illicit Discharge provisions within the Stormwater Management Ordinance	Ongoing
	Participation in Regional Stormwater Education program	Ongoing
	Stormwater Medallion Program	Phase I
	Outfall inventory and reconnaissance	Phase I
	Estimate Stormwater contribution from urbanized area to bacteria loading	Phase II
	Water quality monitoring at outfalls	Phase III
Monitoring	Regional Bacteria Source Tracking Study – Shingle Creek	Phase I
	Establish additional monitoring stations on River	Phase II
Boating Programs	Expanded Boater Education Program	Phase I
	Explore No Discharge Zone Designation	Phase III
Pet Waste Programs	"Scoop the Poop" Campaign	Ongoing
	Pet waste containers in regional parks	Ongoing
	Explore "Scoop the Poop" ordinance	Phase III
Erosion and Sediment Control	Enforcement of Suffolk/IOW Erosion and Sediment Control Ordinance	Ongoing
	No wake zones at Constance Wharf and Bennett's Creek	Ongoing
Land Use Management	Chesapeake Bay Preservation Area Ordinance	Ongoing
	Living Shoreline Program	Phase III
Agriculture Programs	Virginia Agricultural BMP Cost Share Program	Ongoing
	Investigate grant funding for horse owner programs	Phase III
Wildlife Contribution Controls	DGIF deer control programs	Ongoing

7.2.1 Sanitary Sewer System Improvements

The TMDL calls for a 100 percent reduction in bacteria loading from human sources throughout the Upper Nansemond watershed. Sources of human bacteria loading to these waterways include sanitary sewer overflows (SSOs) and failing septic systems. SSOs occur when sewer pipes become blocked due to roots, grease or sediment, or when the system loses electric power at pump stations.

The City of Suffolk and Isle of Wight County are currently involved in a regional effort to work with HRSD, Virginia DEQ, and EPA Region 3 to develop and implement a plan to address SSOs. The City and County entered into a Regional Consent Order with DEQ in September, 2007 that outlined actions necessary to reduce SSOs. The actions include the development and implementation of a Sanitary Sewer System Evaluation Survey (SSES) and the development and implementation of a Condition Assessment and Rehabilitation Plan.

The SSES has three phases, two of which have been completed. The first phase involved the physical inspection of 100% of the sewer manholes in each SSES basin. The second phase involved the smoke testing of the system to identify leaks and interconnections with the stormwater system. The final phase will involve the closed circuit tv inspection of the sewer lines. All aspects of the SSES were completed as of December 2011. The Condition Assessment and Rehabilitation Plan are being developed, which will contain improvements to the system necessary to correct identified deficiencies. They will be incorporated in to the Regional Wet Weather Management Plan which is scheduled for completion on 2013. This Plan will be implemented over the next 10 to 15 years.

7.2.2 Septic System Programs

Virginia State law requires that anyone living within a Chesapeake Bay Preservation Area (CBPA) have their septic tank pumped or inspected once every five (5) years. Research has shown that failing septic systems contribute considerable amounts of pollution to groundwater and the Chesapeake Bay and its tributaries such as the Nansemond River. By having the tank pumped, the number of solids leaving the septic tank and migrating into the drainfield is greatly reduced which allows the drainfield to function as designed for a much greater length of time thereby reducing groundwater pollution.

7.2.2.1 City of Suffolk

Approximately two-thirds of the City is located within the Chesapeake Bay watershed as shown on the Septic Tank Pump-Out Program map. Within this watershed, the City has assigned five (5) zones for compliance which will be implemented from July 2009 through June 2014. The properties affected are estimated to be 6,453. Of that number, the first phase of pump out notification for Zone 1 was started in July 1, 2009 and subsequent Zones 2-5 will be notified on consecutive years ending the 5-year cycle in FY 2014. Areas further to the south are within the watershed that drains toward the Albemarle Sound and are not required to pump out but are encouraged to on a regular basis.

On July 1st of each year, the City sends out letters advising those property owners who live in the Chesapeake Bay Preservation Overlay District and who are served by a septic system, to get their septic tanks pumped out. The property owners have one year to perform this task. A copy of the receipt from the hauler as well as the Property Owner's Certification form is returned to the Department of Planning and Community Development in order to ensure compliance with this requirement. This cycle continues over a 5-year period with letters being mailed out in July of each year for each of the zones. For property owners who have had their tank pumped out within the past 5 years, a copy of the haulers receipt would need to be provided to the City to ensure compliance. Informational meetings have been held by the City along with a representative from the Chesapeake Bay Local Assistance Board each year to explain the program to those impacted by this requirement and to answer questions. With the assumption of the CBPA Program by DCR and the Soil and Water Conservation Board, it is expected that these annual meetings will continue.

The septic tank pump out program is mandated by the Department of Conservation and Recreation, Chesapeake Bay Local Assistance Board with no funding provided by the State in order to implement this program. The Health Department can provide a list of sewage haulers who have been certified by the State for providing this service.

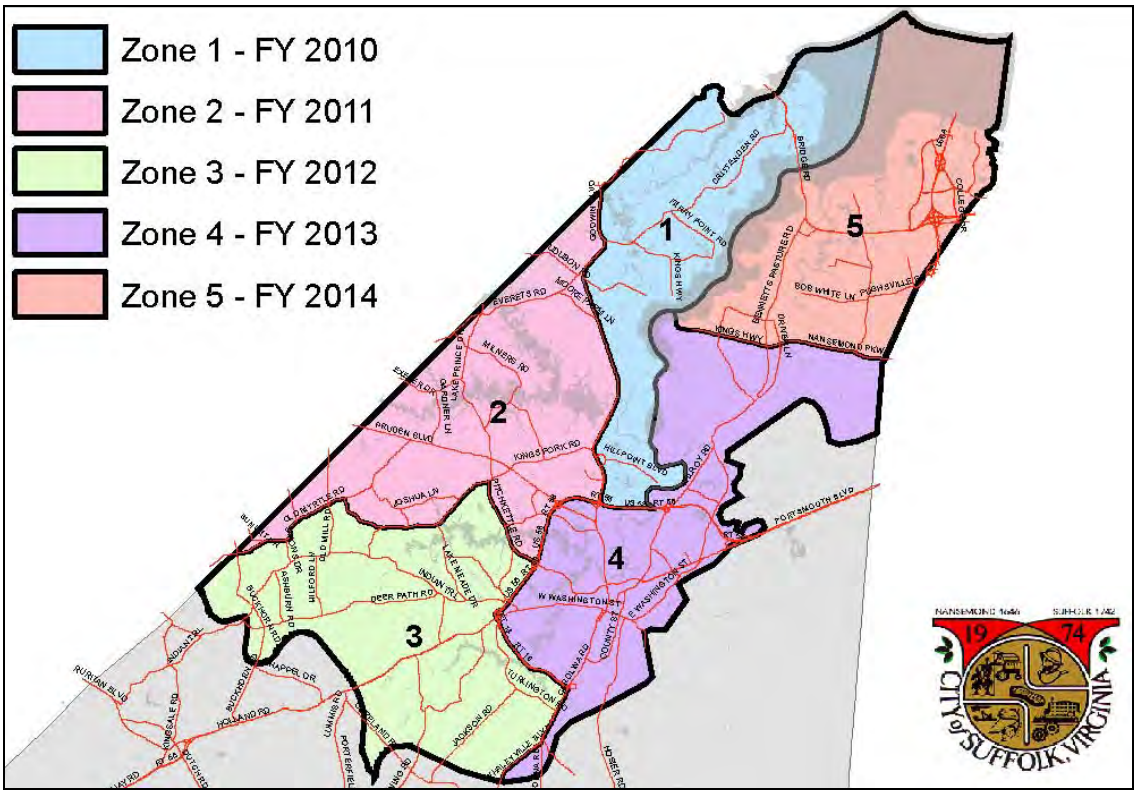

Figure 7-1: Septic Tank Pump Out Program Zone Boundaries.

7.2.2.2 Isle of Wight County

The Chesapeake Bay septic tank pump-out initiative is a state-mandated program under the Chesapeake Bay Preservation Act. Article 6 of Isle of Wight County's Chesapeake Bay Preservation Area Ordinance requires regular septic tank pump-outs at least once every five years in most cases.

The IOW County septic pump-out program implementation began in the fall of 2008 in the Smithfield Election District, followed by the Windsor in 2009, the Carrsville election district in 2010, and the Hardy Election District in 2011. The Newport Election District will receive notification in the fall of 2012.

The implementation consists of direct mailings from the Department of Planning and Zoning to homeowners with on-site septic tanks. The mailed package includes an introductory letter, the Septic Pump-Out Registration and Compliance form, and supporting information designed to help homeowners understand the need for routine septic tank pump-outs.

Once notified by the county, homeowners generally have two years to have a septic tank pump-out done. If there has been a pump-out within the past five years then the date of the next septic tank pump-out tracks from the date of that most recent pump-out.

7.2.3 Stormwater Programs

The TMDL calls for reductions in bacteria delivered to waterbodies through urban stormwater runoff. Traditional definitions of stormwater have usually characterized it as nonpoint source runoff. However, most urban and industrial stormwater is discharged through conveyances, such as separate storm sewers, ditches, channels or other conveyances, which are considered point sources under the Clean Water Act (CWA), and subject to regulation through the National Pollutant Discharge Elimination System (NPDES) permit program.

Virginia is an authorized state under the federal permitting program. DCR administers the federal program pertaining to the municipal separate storm sewer systems (MS4s) and construction activities as part of the Virginia Stormwater Management Program (VSMP) permit program, which is authorized under the Virginia Stormwater Management Act. As mandated by the Clean Water Act and EPA's Phase 1 (11/16/90) and Phase 2 (12/8/99) stormwater regulations, the federal permitting requirements have been incorporated into the Permit Regulation in sections 4 VAC50-60-380 and 390.

Only a small portion of the Upper Nansemond River Watershed is covered by the City of Suffolk's Phase II VSMP permit (Figure 7-2). The City has implemented or plans to implement the following programs to reduce the bacteria concentrations delivered to the River via stormwater runoff. Isle of Wight County's MS4 permit does not overlap with the Nansemond River watershed.

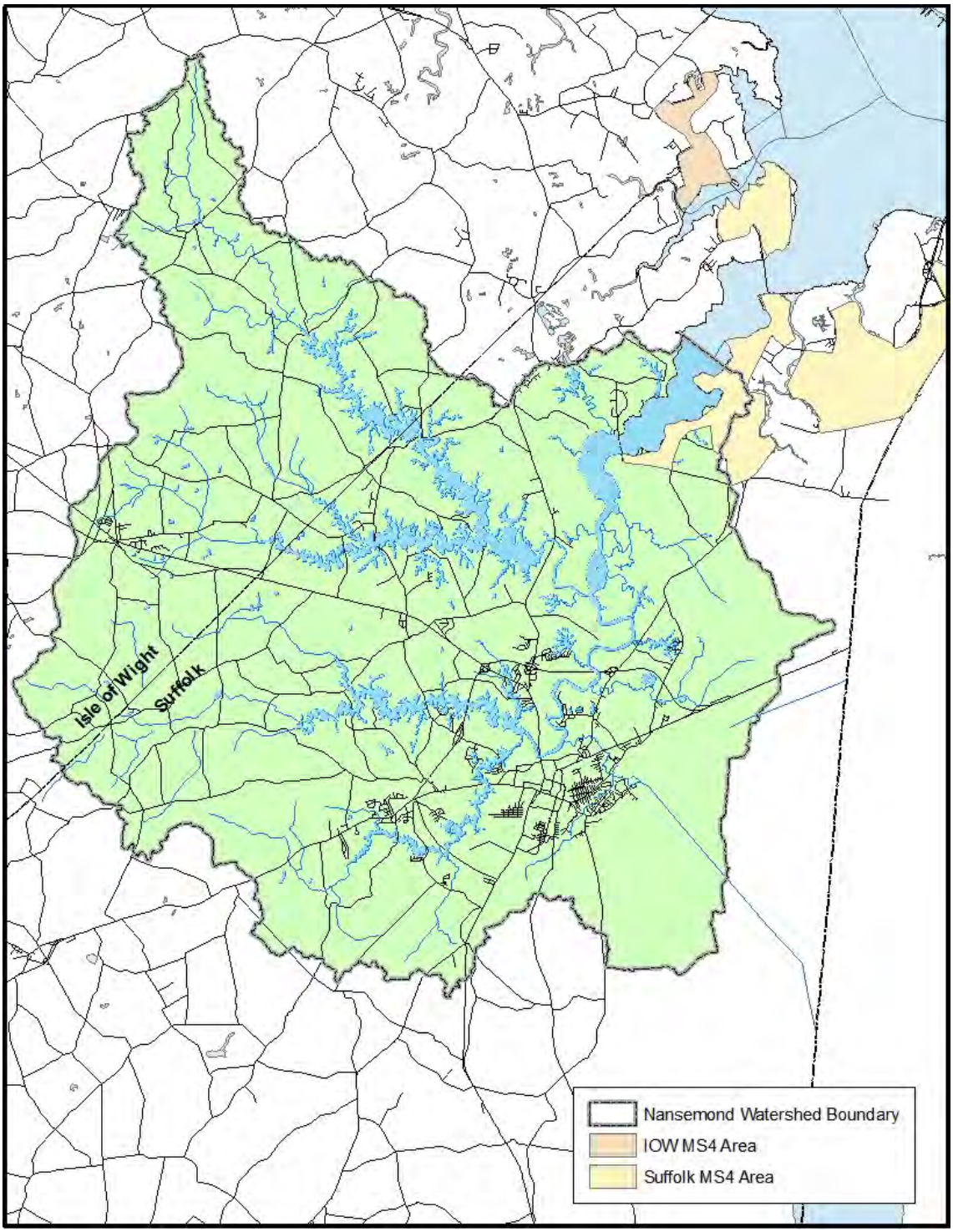

Figure 7-2: Map of MS4s within the Nansemond River Watershed

7.2.4 Water Quality Monitoring

The City of Suffolk has petitioned DEQ to resume monitoring at stations within the Nansemond River and Shingle Creek. The City is currently developing a monitoring plan, in coordination with the Hampton Roads Sanitation District and the Virginia Department of Health – Division of Shellfish Sanitation, to establish monitoring stations outside of the areas that are currently being monitored. This monitoring will be used to identify problem areas in the watershed, evaluate measures that have been implemented and track progress toward the TMDL.

The size and scope of this monitoring program are still being developed and should be considered a Phase II activity. There are a potential of ten sites located within this watershed that may be monitored. It is expected that the actual number will be closer to six or eight sample locations. All sites will be monitored for fecal bacteria and a limited number will also be monitored for enterococcus. In addition, samples will most likely be collected to monitor for nutrient and sediment loading in conjunction with the Chesapeake Bay TMDL and Virginia's Watershed Implementation Plan.

Many localities within Hampton Roads are faced with the lack of useful bacteria source tracking information provided by Total Maximum Daily Load (TMDL) Studies being developed by DEQ. Stormwater departments throughout the Region experience difficulty in reducing bacteria to impaired waterbodies without sufficient information on the contributing sources, and Utilities departments are being burdened with requests to investigate system deficiencies without reliable evidence. Both departments expressed interest in using reliable methods to determine if bacteria are from a human source. With bacteria TMDLs approved or scheduled for development within all the Hampton Roads localities, locality staff requested additional information on potential bacteria source tracking methodologies.

The Hampton Roads Planning District Commission staff has been leading a regional effort to develop a bacterial source identification methodology for the Hampton Roads region. Proven genetic techniques will be used to differentiate bacteria sources at the species level so that TMDL plans can be designed and targeted to address the cause of the bacterial impairment. University researchers are conducting the study, which the Hampton Roads Sanitation District and the following localities are funding: Isle of Wight, James City County, Norfolk, Portsmouth, Suffolk, Virginia Beach, Williamsburg and York County.

In April 2008 locality staff attended a meeting to hear presentations from leading scientists in the bacteria source tracking field. Dr. Rachel Noble (UNC), Dr. Jody Harwood (USF), and Dr. Charles Hagedorn (VT), provided the attendees with information on the state of the science and the most promising methodologies. Following this meeting, a subcommittee consisting of representatives from the Region's localities and PDC staff was formed to work with the scientists to develop a regional study plan.

The subcommittee considered small watersheds that had completed TMDLs, and selected watersheds that had very high bacteria concentrations and/or significant public interest. Three case study sites were selected: Shingle Creek in Suffolk, Moores Creek in York County, and Mill

Dam Creek in Virginia Beach. After the Regional Study is completed in 2012, a toolbox of source tracking methodologies will be available to local governments to use in determining if impaired waterbodies are impacted by human sources of bacteria.

7.2.5 Boating Programs

The TMDL did not evaluate sources of bacteria due to recreational boating activity, but there are at least four marinas on the River within the watershed, and boating activity is common in the lower reaches of the Nansemond.

Congress passed the Clean Vessel Act in 1992 (CVA) to help reduce pollution from vessel sewage discharges. The Act established a five-year federal grant program administered by the U.S. Fish and Wildlife Service and authorized $40 million from the Sport Fish Restoration Account of the Aquatic Resources Trust Fund for use by the States. Federal funds can constitute up to 75% of all approved projects with the remaining funds provided by the States or marinas. Reauthorized in 1998, Congress extended the pumpout grant program through 2003, providing $50 million to continue to provide alternatives to overboard disposal of recreational boater sewage.

Since 1996, VDH and HRSD have partnered in an annual boater education program funded through the Clean Vessel Act. This program provides boater education concentrating on the proper disposal of on-board sanitary wastes. It also provides free sanitary holding tank pump-outs as a demonstration of ease and effectiveness. Operating with student interns, the activity takes place on weekends during the primary boating season from Memorial Day to Labor Day.

Section 312 of the Clean Water Act requires boats with installed toilets to also have Marine Sanitation Devices (MSDs). Type I and II MSDs are treat and discharge units, while Type III MSDs are holding tanks that must be pumped out at pump out facilities. State law and regulations (9 VAC 25-71) prohibit the discharge of raw sewage from boats, holding tanks, or portable toilets. Federal law prohibits a state from adopting regulations regarding MSDs that are more stringent than federal regulations, but it allows a state to petition EPA for designation of No Discharge Zones (NDZs), where all sewage discharges, treated or untreated, are banned. The state must demonstrate that the particular water body requires special protection and that there are adequate pump out facilities in the area, since boat sewage wastes in NDZs would have to be held until pumped out.

7.2.6 Pet Waste Programs

The City of Suffolk and Isle of Wight County participate in the Regional Stormwater Education program that encourages pet owners to pick up after their dogs. Localities distribute pet waste bag dispensers and participate in online, print, and radio media campaigns. The full suite of activities undertaken by the Regional Stormwater Education program is detailed each year in an annual report that is available at askHRgreen.org. The City of Suffolk has placed pet waste containers in the regional parks that are within the Nansemond River watershed.

7.2.7 Erosion and Sediment Control

Erosion and sedimentation control measures may indirectly reduce the bacteria loading to waterbodies. Bacteria can cling to small sediments, so erosion prevention measures should also serve to reduce bacteria loading. The Virginia Department of Conservation and Recreation (DCR) implements the state Erosion and Sediment Control (ESC) Program according to the Virginia Erosion and Sediment Control Law, Regulations, and Certification Regulations (VESCL&R). The law is codified at Title 10.1, Chapter 5, Article 4 of the Code of Virginia, regulations are found at Section 4VAC30-50, and certification regulations are found at Section 4VAC50-50 of the Virginia Administrative Code. The ESC Program's goal is to control soil erosion, sedimentation, and nonagricultural runoff from regulated "land-disturbing activities" to prevent degradation of property and natural resources. The regulations specify "Minimum Standards," which include criteria, techniques and policies that must be followed on all regulated activities. These statutes delineate the rights and responsibilities of governments that administer an ESC program and those of property owners who must comply.

DCR has created the Virginia Erosion and Sediment Control Handbook in order to establish minimum design and implementation standards to control erosion and sedimentation from land-disturbing activities in Virginia. In accordance with the Erosion and Sediment Control Ordinances in Suffolk and Isle of Wight County, all construction within the Nansemond River watershed must conform to the minimum standards of The Virginia Erosion and Sediment Control Regulations and the Virginia Erosion and Sediment Control Handbook third edition. All construction related activities are to limit land disturbance to the amount necessary to accommodate the desired improvements. Work will be avoided in the tree drip line area and comply with the Virginia Erosion and Sediment Control Handbook with respect to tree preservation and protection. All contractors must have the current edition of the Virginia Erosion and Sediment Control Handbook available on-site.

7.2.8 Land Use Management

The Virginia General Assembly adopted the Chesapeake Bay Preservation Act in 1988 and required all localities in Tidewater Virginia to implement local water quality measures by utilizing and developing land in ways that minimize impacts on water quality.

The City of Suffolk responded to this requirement by adopting the Chesapeake Bay Preservation Area Ordinance (CBPAO) in September of 1990. The CBPAO affects all properties that drain to the Chesapeake Bay in the City. The purpose of the CBPAO is to protect existing high quality waters, prevent an increase in pollution and to restore state waters to a condition that permits all reasonable public uses and supports the growth of healthy aquatic life. This is accomplished by regulating development practices in the watershed. The most highly regulated areas are buffers called Resource Protection Areas (RPAs). RPAs include tidal wetlands, non-tidal wetlands, tidal shores, highly erodible soils, and a variable width buffer area not less than one hundred feet in width that is adjacent to and landward of these areas. Buffer areas are also

located along both sides of any water body with recurrent flow. All of the other land in the watershed is labeled as Resource Management Areas, and protects the boundaries of the RPA.

Isle of Wight County adopted a Chesapeake Bay Preservation Area Ordinance in November 1990. Resource Protection Areas are located adjacent to the James and Pagan Rivers. In the Nansemond River watershed, part of the Chesapeake Bay Watershed, RPAs are located along perennial streams.

7.2.9 Agriculture Programs

Existing conservation activities on agricultural lands are coordinated by the Peanut Soil and Water Conservation District (PSWCD). According to PSWCD staff, ninety percent of the crop lands in the watershed are currently enrolled in cost share for cover crop, no till, or conservation strips. All row crop producers and hog operations are required to have a nutrient management program. PSWCD staff estimates that there are a significant number of small horse operations within the watershed that do not qualify to receive cost share dollars because they do not meet the definition of a farm. The PSWCD currently provides these horse owners with technical assistance upon request. Suffolk and Isle of Wight will work with the PSWCD to identify a funding source for outreach and implementation of conservation practices to horse owners within the watershed.

7.2.10 Wildlife Contribution Controls

The water quality modeling conducted during the development of the Nansemond River Bacteria TMDL indicated that a reduction in loads from wildlife will be necessary to achieve water quality standards in some portions of the watershed. However, Virginia and EPA do not advocate the elimination of wildlife to allow for the attainment of water quality standards.

Isle of Wight County and the City of Suffolk will coordinate with the Department of Game and Inland Fisheries to monitor the populations of geese and deer and manage any over populations as necessary.

The Department of Game and Inland Fisheries (DGIF) completed a resident geese tagging effort in late 2009, and will coordinate with Suffolk and Isle of Wight as necessary. DGIF also manages deer control programs along Chuckatuck Creek and Lone Star Lake.

7.3 Implementation Costs and Benefits

The primary benefit of the implementation of the management actions described in this IP is the reduction of bacteria levels in the Upper Nansemond River and Shingle Creek. The programs and actions contained within this IP will serve to reduce the anthropogenic sources of bacteria within the Upper Nansemond Watershed. Because many of the programs mentioned in this report also serve purposes other than to reduce bacteria, and they cover areas larger than the

Nansemond Watershed, the costs of reducing bacteria levels can be difficult to estimate. Estimated costs for proposed management actions and programs are outlined in Table 7-3. The estimated costs for programs such as stormwater management and sanitary sewer system improvements are estimated for the Nansemond watershed from the citywide annual budgets for these programs.

Table 7-3: Estimated Costs of Management Options (City of Suffolk)

Management Category	Management Option	Estimated Initial Costs[1]	Estimated Maintenance Costs[1]
Sanitary Sewer Improvements	Implement schedule defined by Regional SSO Consent Order (9/26/2007 – 11/26/2013)	$50,000,000	$2,500,000
	HRSD Federal Consent Decree	$140,000,000	$3,000,000
	Turlington Park Sewer Extension	$2,200,000	$50,000
	Lake Speight Sewer Extension	$2,200,000	$50,000
	Nansemond Shores and Holiday Point Sewer Extension	$3,000,000	$50,000
	Cedar Point Sewer Extension	$3,000,000	$50,000
	Bennett's Harbor Sewer Extension	$2,500,000	$50,000
Septic System Programs	CBPA Septic Tank Pump Out and Inspection Information Program	$40,775	$22,700
	Continue to update septic system locations through pump out program	$8,155	$4,540
Stormwater Programs	Enforcement of Illicit Discharge provisions within the Stormwater Management Ordinance	$40,000	$12,000
	Participation in Regional Stormwater Education Program		$6,500
	Stormwater Medallion Program	$12,000	$800
	Outfall inventory and reconnaissance	$200,000	$100,000
	Estimate Stormwater contribution from urbanized area to bacteria loading	$750,000	$150,000
	Water quality monitoring at outfalls	$350,000	$100,000
Monitoring	Regional Bacteria Source Tracking Study – Shingle Creek	$350,000[2]	
	Establish additional monitoring stations on River	$125,000	$75,000
Boating Programs	Expanded Boater Education Program		
	Explore No Discharge Zone Designation		
Pet Waste Programs	"Scoop the Poop" Campaign		
	Pet waste containers in regional parks	$30,000	$40,000
	Explore "Scoop the Poop" ordinance	$10,000	
Erosion and Sediment Control	Enforcement of Suffolk/IOW Erosion and Sediment Control Ordinance	N/A	$900,000
	No wake zones at Constance Wharf and Bennett's Creek	N/A	$1,500
Land Use Management	Chesapeake Bay Preservation Area Ordinance - Update	$80,000	
	Living Shoreline Program		
Agriculture Programs	Virginia Agricultural BMP Cost Share Program		$685,000[3]
	Investigate grant funding for horse owner programs		
Wildlife Contribution Controls	DGIF deer control programs		

[1] Overall estimates available for broad categories only, based on estimated funding availability, subject to City Council approvals, budget appropriations, grants received, State funding appropriations, and Federal funding appropriations, coupled with known costs for current specific programs and maintenance requirements.

[2] Total Regional Study Cost for work in three watersheds.

[3] Annual budget for conservation programs within the Nansemond River Watershed.

Table 7-3: Estimated Costs of Management Options (Isle of Wight County)

Management Category	Management Option- Isle of Wight County	Estimated Initial Costs[1]	Estimated Annual Maintenance Costs[1]
Sanitary Sewer Improvements	Implement schedule defined by Regional SSO Consent Order	350,000	100,000
	Implementation of SSES Plan	100,000	60,000
	Participation in HRFOG education program	1000	500
Septic System Programs	CBPA Septic Tank Pump Out and Inspection Information Program	1,300	300
	Continue to update septic system locations through pump out program	300	300
Stormwater Programs	Enforcement of Illicit Discharge provisions within the Stormwater Management Ordinance	N/A in Nansemond watershed	N/A
	Participation in Regional Stormwater Education Program		Annual Dues to HRPDC
	Stormwater Medallion Program	No cost to County	N/A
	Outfall inventory and reconnaissance	N/A in Nansemond watershed	N/A
	Estimate Stormwater contribution from urbanized area to bacteria loading	N/A in Nansemond Watershed	N/A
	Water quality monitoring at outfalls	N/A in Nansemond Watershed	N/A
Monitoring	Regional Bacteria Source Tracking Study – Shingle Creek	$6,534	N/A
	Establish additional monitoring stations on River	N/A	N/A
Boating Programs	Expanded Boater Education Program	N/A	N/A
	Explore No Discharge Zone Designation	N/A	N/A
Pet Waste Programs	"Scoop the Poop" Campaign		
	Pet waste containers in regional parks		
	Explore "Scoop the Poop" ordinance		
Erosion and Sediment Control	Enforcement of Suffolk/IOW Erosion and Sediment Control Ordinance	N/A	$10,000 in this watershed
	No wake zones at Constance Wharf and Bennett's Creek	N/A	N/A
Aquatic Resource Restoration	Living Shoreline Program	N/A	N/A
Land Use Management	Chesapeake Bay Preservation Area Ordinance	1,300	1,300
Agriculture Programs	Virginia Agricultural BMP Cost Share Program		
	Investigate grant funding for horse owner programs		
Wildlife Contribution Controls	DGIF deer control programs		

[1] Overall estimates available for broad categories only, based on estimated funding availability, subject to County approvals, budget appropriations, grants received, State funding appropriations, and Federal funding appropriations, coupled with known costs for current specific programs and maintenance requirements.

8.0 MEASURABLE GOALS AND MILESTONES

8.1 Establishing Goals

8.1.1 TMDL Goals

- Reduce fecal bacteria load in order to meet the Total Maximum Daily Load and established water quality standards to the maximum extent economically achievable.
- Interim Goal: Reduce fecal bacteria load in order to meet water quality standards for primary contact recreation to the maximum extent economically achievable.

8.1.2 Related Watershed Management Goals

- Restore water quality to the level necessary to support shellfish propagation for water quality benefits.
- Increase the area open for direct marketing of shellfish within the Upper Nansemond River

8.2 Establishing a Timeline and Milestones for Implementation

As described in previous sections, the actions proposed in this implementation plan will be implemented in phases. A schedule of Phase I activities is contained in Table 8-1, and phase II and III actions will be implemented as actions prove necessary and funding becomes available. The completion of management actions will be tracked in program annual reports. Management actions related to stormwater management will be reported in the City of Suffolk's and Isle of Wight County's MS4 annual reports.

Table 8-1: Timeline for Phase I and Ongoing Management Actions

Management Category	Management Option	Project Start Date	Project Completion Date
Sanitary Sewer Improvements	Implement schedule defined by Regional SSO Consent Order	9/2007	11/2013
	Sewer System Evaluation Survey Plan	Spring 2008	12/2008
	SSES Field Activities – System Assessments	Spring 2009	11/2011
	RSOBC – Maintenance, Operation and Management Plan	9/2007	12/2008
	Flow Monitoring Plan and Flow Evaluation Reports	9/2007	5/2009
	Flow Monitoring Program – SSES Basins	Spring 2008	11/2013
	Find and Fix Field Activities (Severe Defects)	Spring 2009	11/2013
	Long Term Rehabilitation Plan Development	Spring 2009	11/2012
	HRSD Federal Consent Decree	2009	2015
	Turlington Park Sewer Extension	2012	2013
	Lake Speight Sewer Extension	2012	2013
	Nansemond Shores and Holiday Point Sewer Extension	2002	2004
	Cedar Point Sewer Extension	2003	2009
	Bennett's Harbor Sewer Extension	2006	2007
Septic System Programs	CBPA Septic Tank Pump Out and Inspection Information Program	7/2009	Ongoing
	Continue to update septic system locations through pump out program	7/2009	Ongoing
Stormwater Programs	Enforcement of Illicit Discharge provisions within the Stormwater Management Ordinance		
	Participation in Regional Stormwater Education Program	Ongoing	Ongoing
	Stormwater Medallion Program		
	Outfall inventory and reconnaissance		
	Estimate Stormwater contribution from urbanized area to bacteria loading		
	Water quality monitoring at outfalls		
Monitoring	Regional Bacteria Source Tracking Study – Shingle Creek	1/2010	12/2012
	Establish additional monitoring stations on River		
Boating Programs	Expanded Boater Education Program		
	Explore No Discharge Zone Designation		
Pet Waste Programs	"Scoop the Poop" Campaign	Ongoing	Ongoing
	Pet waste containers in regional parks		
	Explore "Scoop the Poop" ordinance		
Erosion and Sediment Control	Enforcement of Suffolk/IOW Erosion and Sediment Control Ordinance	Ongoing	Ongoing
	No wake zones at Constance Wharf and Bennett's Creek		
Land Use Management	Chesapeake Bay Preservation Area Ordinance	Ongoing	Ongoing
	Living Shoreline Program		
Agriculture Programs	Virginia Agricultural BMP Cost Share Program	Ongoing	Ongoing
	Investigate grant funding for horse owner programs	Ongoing	Ongoing
Wildlife Contribution Controls	DGIF deer control programs	Ongoing	Ongoing

8.3 Developing Tracking and Monitoring Plans

As mentioned previously, the City of Suffolk has petitioned DEQ to resume monitoring at stations within the Nansemond River and Shingle Creek. The City is currently developing a monitoring plan, in coordination with the Hampton Roads Sanitary District and the Virginia Department of Health – Division of Shellfish Sanitation, to establish monitoring stations outside of the areas that are currently being monitored. This monitoring will be used to identify problem areas in the watershed, evaluate measures that have been implemented and track progress toward the TMDL.

9.0 STAKEHOLDERS ROLES AND RESPONSIBILITIES

The management actions described in this report will be implemented by federal, state, regional and local agencies and non-governmental organizations in a collaborative effort to achieve the primary goal of reducing fecal coliform concentrations within the Upper Nansemond River Watershed. The following section describes the agencies involved in the development of this Implementation Plan. Table 9-1 summarizes the roles and responsibilities of each agency by indicating which management actions each agency is responsible for.

9.1 Federal

9.1.1 United States Environmental Protection Agency

Section 303(d) of the Clean Water Act and EPA's Water Quality Planning and Management Regulations (40 CFR Part 130) require states to develop Total Maximum Daily Loads (TMDLs) for water bodies which are exceeding water quality standards. The EPA has the regulatory authority to approve TMDLs. Section 303(d) of the CWA and current EPA regulations do not require the development of implementation strategies. The EPA will review the Upper Nansemond TMDL Implementation Plan for completeness.

9.2 State

9.2.1 Department of Environmental Quality (DEQ)

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

The DEQ is the lead agency in the TMDL process. The Code of Virginia directs DEQ to develop a list of impaired waters (303 (d) list), develop TMDLs for these waters, and develop Implementation Plans for the TMDLs. DEQ administers the TMDL process including the public participation component and formally submits the TMDLs to EPA and the State Water Control Board for review and approval.

Additionally, §303(e) of the Clean Water Act and EPA's water quality management regulation 40 CFR 130.5 require the States to develop Water Quality Management Plans (WQMP) for the major watersheds. The purpose of the WQMPs is to present the processes to be used in the

watershed for attaining and maintaining water quality standards. Also, the WQMPs serve as the repository for all TMDLs and TMDL Implementation Plans developed within the watershed. DEQ, with the assistance of DCR, the Department of Mines, Minerals and Energy (DMME), and VDH plans to update the State's 303(e) WQMPs concurrently with the TMDL development effort.

9.2.2 Department of Conservation and Recreation (DCR)

DCR is authorized to administer Virginia's nonpoint source pollution reduction programs in accordance with §10.1-104.1 of the Code of Virginia and §319 of the Clean Water Act. EPA is requiring that much of the §319 grant monies be used for the development of TMDLs.

Because of the magnitude of the nonpoint source component in the TMDL process, DCR is a major participant in the TMDL process. DEQ and DCR have signed a Memorandum of Understanding agreeing to a cooperative effort in the TMDL process including Implementation Plan development. Specifically, DCR agreed to assume responsibility for the nonpoint source component of all TMDLs including the final allocations, with the exception of mineral extraction. This includes those TMDLs contracted by DEQ. Also, DCR agreed to present the nonpoint source component of the TMDLs in the public forums. Another major role DCR has in the TMDL process is the awarding and managing of the contractual services for the development of TMDLs related to nonpoint sources.

9.2.3 Virginia Department of Health (VDH)

The VDH is responsible for classifying shellfish growing waters and monitoring the waters for fecal coliform bacteria. Also, the VDH conducts shoreline surveys to determine potential sources of contamination. This information is evaluated by the VDH to determine areas that are open or restricted for shellfish harvesting for direct marketing. DEQ places the restricted areas on the 303(d) List for TMDL development. VDH –Shellfish Sanitation staff attended Technical Advisory Committee meetings and provided updated monitoring information to the Committee.

9.2.4 Soil and Water Conservation District

The Peanut Soil and Water Conservation (SWCD) is one of 47 districts in Virginia. Districts are subdivisions of state government which coordinate local natural resource protection programs (section 10.1-50 of the code of VA, 1950, as amended). A Board of Directors consists of four elected and two appointed members to govern the district. The Peanut SWCD provides local leadership in conservation of soil, water, and related natural resources in Isle of Wight County and the City of Suffolk. Some programs available through the district include: cost-share assistance to agricultural producers who install conservation practices on their farms as well as a wide variety of educational programs that cater to school children and local organizations. The Peanut SWCD provided updated information on livestock populations in the watershed and conservation practices funded by cost share.

9.2.5 Department of Game of Inland Fisheries

The Virginia Department of Game and Inland Fisheries' mission is to manage Virginia's wildlife and inland fish to maintain optimum populations of all species to serve the needs of the Commonwealth; to provide opportunity for all to enjoy wildlife, inland fish, boating and related outdoor recreation; to promote safety for persons and property in connection with boating, hunting and fishing. DGIF staff attended Technical Advisory Committee meetings and updated the Committee on ongoing and planned activities.

9.3 Regional

9.3.1 Hampton Roads Planning District Commission

Planning District Commissions are voluntary associations that were created in 1969 pursuant to the Virginia Area Development Act and a regionally executed Charter Agreement. The purpose of planning district commissions, as set out in the Code of Virginia, Section 15.2-4207 is "…to encourage and facilitate local government cooperation and state-local cooperation in addressing on a regional basis problems of greater than local significance."

The Hampton Roads Planning District Commission (HRPDC), one of 21 Planning District Commissions in the Commonwealth of Virginia, is a regional organization comprised of this area's sixteen local governments. The HRPDC was formed in 1990 by the merger of the Southeastern Virginia Planning District Commission and the Peninsula Planning District Commission. The HRPDC serves as a resource of technical expertise to its member local governments. It provides assistance on local and regional issues pertaining to Economics, Housing, Planning, Water Resources, Emergency Managements, and Transportation. As a Virginia Planning District, the HRPDC is also the Affiliate Data Center for the region, providing economic, environmental, transportation, census, and other relevant information to businesses, organizations and citizens.

The HRPDC was contracted by the Virginia DEQ, the City of Suffolk, and Isle of Wight County to develop this implementation plan for the bacteria TMDL for the Upper Nansemond River watershed. In addition to facilitating the implementation process and developing this report, the HRPDC will continue to 1) facilitate regional cooperation in stormwater and wastewater management, 2) continue to administer regional education programs, 3) maintain the Sanitary Sewer Overflow Reporting System (SSORS), and 4) develop a protocol for future TMDL Implementation Plan development within Hampton Roads.

9.3.2 Hampton Roads Sanitation District

The Hampton Roads Sanitation District (HRSD), a political subdivision of the Commonwealth of Virginia, was created by public referendum in 1940 to eliminate sewage pollution in the tidal waters of the Chesapeake Bay. The mission of HRSD is to prevent pollution, protect public health, and support community development by providing wastewater collection, treatment,

and related services. In addition to returning treated effluent water to nature, HRSD is also involved in many educational programs. HRSD also provides Environmental Improvement Fund Grants to organizations whose projects benefit the receiving waterways or residents of HRSD and relate to environmental education or water quality improvements. HRSD is a constant partner in making sure the Virginia waters, including the Nansemond Watershed, are becoming a safer resource for years to come. HRSD staff attended Technical Advisory Committee meetings and provided the Committee with information on boater education programs.

9.4 City of Suffolk

As discussed throughout this document, the City of Suffolk has the largest role in improving water quality within the Upper Nansemond River. The City will continue public programs to treat stormwater runoff, prevent SSOs, and manage land use development to the maximum extent practicable and as required by law. Specific actions that the City of Suffolk will implement in order to reduce fecal coliform concentrations within the Upper Nansemond watershed are outlined in Tables 7-1 and 9-1. City of Suffolk staff from public works, public utilities, and parks and recreation attended Technical Advisory Committee meetings and provided beneficial input for this report.

9.5 Isle of Wight County

Isle of Wight County encompasses the western portion of the Nansemond River watershed. Control of pollutants within this area is important to maintaining water quality in the reservoirs of the Nansemond River system. County staff attended Technical Advisory Committee meetings and provided information on existing and planned programs within the County that relate to water quality improvement.

9.6 Private Sector, Non-governmental, and Citizen Groups

A new environmental group has recently formed within the Nansemond River watershed. The Nansemond River Preservation Alliance seeks to check poorly planned development, open more river bottom to shellfish harvesting and improve water quality.

Table 9-1: Management Actions and Responsible Stakeholders

Management Category	Management Option	Stakeholders Responsible
Sanitary Sewer Improvements	Implement schedule defined by Regional SSO Consent Order	Suffolk, IOW, HRSD
	Sewer System Evaluation Survey Plan	Suffolk, IOW
	SSES Field Activities – System Assessments	Suffolk, IOW
	RSOBC – Maintenance, Operation and Management Plan	Suffolk, IOW
	Flow Monitoring Plan and Flow Evaluation Reports	Suffolk, IOW
	Flow Monitoring Program – SSES Basins	Suffolk, IOW
	Find and Fix Field Activities (Severe Defects)	Suffolk, IOW
	Long Term Rehabilitation Plan Development	Suffolk, IOW
	HRSD Federal Consent Decree	HRSD
	Turlington Park Sewer Extension	Suffolk
	Lake Speight Sewer Extension	Suffolk
	Nansemond Shores and Holiday Point Sewer Extension	Suffolk
	Cedar Point Sewer Extension	Suffolk
	Bennett's Harbor Sewer Extension	Suffolk
	Participation in HRFOG education program	Suffolk, IOW, HRPDC
Septic System Programs	CBPA Septic Tank Pump Out and Inspection Information Program	Suffolk, IOW
	Continue to update septic system locations through pump out program	Suffolk, IOW
Stormwater Programs	Enforcement of Illicit Discharge provisions within the Stormwater Management Ordinance	Suffolk, IOW
	Participation in Regional Stormwater Education Program	Suffolk, IOW, HRPDC
	Stormwater Medallion Program	IOW, Suffolk
	Outfall inventory and reconnaissance	Suffolk, IOW
	Estimate Stormwater contribution from urbanized area to bacteria loading	Suffolk, IOW
	Water quality monitoring at outfalls	Suffolk
Monitoring	Regional Bacteria Source Tracking Study – Shingle Creek	Suffolk, IOW, HRPDC
	Establish additional monitoring stations on River	Suffolk, DEQ
Boating Programs	Expanded Boater Education Program	Suffolk, IOW, HRSD
	Explore No Discharge Zone Designation	Suffolk, IOW
Pet Waste Programs	"Scoop the Poop" Campaign	Suffolk, IOW, HRPDC
	Pet waste containers in regional parks	Suffolk
	Explore "Scoop the Poop" ordinance	Suffolk
Erosion and Sediment Control	Enforcement of Suffolk/IOW Erosion and Sediment Control Ordinance	Suffolk, IOW
	No wake zones at Constance Wharf and Bennett's Creek	Suffolk
Land Use Management	Chesapeake Bay Preservation Area Ordinance	Suffolk, IOW
	Living Shoreline Program	Suffolk
Agriculture Programs	Virginia Agricultural BMP Cost Share Program	Peanut SWCD
	Investigate grant funding for horse owner programs	Suffolk, IOW
Wildlife Contribution Controls	DGIF deer control programs	DGIF

10.0 POTENTIAL FUNDING SOURCES

State

Virginia Agricultural Best Management Practices
Cost-Share Program
Virginia Agricultural Best Management Practices
Tax Credit Program
Virginia Agricultural Best Management Practices
Loan Program
Virginia Forest Stewardship Program
Virginia Small Business Environmental Assistance Fund Loan Program
Virginia Resource Authority
Water Quality Improvement Fund
Clean Water Act Revolving Loan Program

Federal

EPA 319 Funds
USDA Conservation Reserve Program (CRP)
USDA Conservation Reserve Enhancement Program (CREP)
USDA Environmental Quality Incentives Program (EQIP)
USDA Forest Incentive Program (FIP)
USDA Watershed and River Basin Planning and Installation Public Law 83-566 (PL566)
USDA Wildlife Habitat Incentive Program (WHIP)
USDA Wetland Reserve Program (WRP)
US Fish and Wildlife Service Private Stewardship Program
US Fish and Wildlife Service Conservation Grants

Local or Regional

City of Suffolk
Isle of Wight County
Chesapeake Bay Small Watershed Grants Program
Wetlands and Chesapeake Bay Civil Penalties Fund
Hampton Roads Environmental Education Program Mini-Grants

Landowner Contributions and Matching Funds

The Virginia and federal cost-share assistance programs require a cost-share match, which is generally 25%.

Private Foundations, Non-Profit Organizations, Businesses

National Fish and Wildlife Foundation
Chesapeake Bay Foundation

10.1 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. The most recent guidance, "Nonpoint Source Program and Grants Guidelines for States and Territories," was effective as of October 23, 2003, and identifies the following nine elements that must be included in the IP to meet the 319 requirements:

1. Identify the causes and sources or groups of similar sources that will need to be controlled to achieve the load reductions estimated in the watershed-based plan;
2. Estimate the load reductions expected to achieve water quality standards;
3. Describe the NPS management measures that will need to be implemented to achieve the identified load reductions;
4. Estimate the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon to implement the watershed-based plan.
5. Provide an information/education component that will be used to enhance public understanding of the project and encourage the public's participation in selecting, designing, and implementing NPS management measures;
6. Provide a schedule for implementing the NPS management measures identified in the watershed based plan that is reasonably expeditious;
7. Describe interim, measurable milestones for determining whether NPS management measures or other control actions are being implemented;
8. Identify a set of criteria for determining if loading reductions are being achieved and 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

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