CHESAPEAKE BAY
PHASE II WATERSHED IMPLEMENTATION PLAN

HAMPTON ROADS
REGIONAL PLANNING FRAMEWORK, SCENARIO, AND STRATEGIES

Prepared by the staff of the
HAMPTON ROADS PLANNING DISTRICT COMMISSION

Report No. PEP12-01

JANUARY 2012

This project received funding from the Environmental Protection Agency's Chesapeake Bay Program through the Virginia Department of Conservation and Recreation (DCR), via grant number CBRAP-2010-11-PT.

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REPORT DOCUMENTATION

TITLE:

Chesapeake Bay Phase II Watershed Implementation Plan, Hampton Roads Regional Planning Framework, Scenario, and Strategies

REPORT DATE:

January 2012

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ABSTRACT:

This report was prepared by the Hampton Roads Planning District Commission (HRPDC) as supplemental material intended as an appendix to the February 2012 local government strategy submittals to the Virginia Department of Conservation and Recreation (DCR) as input to the forthcoming Virginia Phase II Watershed Implementation Plan (WIP) for the Chesapeake Bay TMDL. The goal of the regional engagement effort is to provide the state with proof of local engagement and assure the EPA that localities are seriously considering the TMDL requirements. The purpose of this report is to

- Document the efforts of the Hampton Roads Region to participate in the development of Virginia's Phase II WIP; and
- Describe the preferred water quality management scenario for the Hampton Roads region that provides the level of treatment similar to the Virginia Phase I WIP.

ACKNOWLEDGEMENTS:

Funding for this document was provided by the Hampton Roads localities through the Regional Stormwater Program and by the following grant sources:

- National Fish and Wildlife Foundation (NFWF) Chesapeake Bay Stewardship Fund, Small Watershed Grant
- Virginia Department of Conservation and Recreation 2011 Chesapeake Bay Regulatory Accountability Program Grant

This document was prepared by the Hampton Roads Planning District Commission in cooperation with member localities. Preparation of this report was included in the Hampton Roads Planning District Commission Unified Planning Work Program for Fiscal Year 2012 approved by the HRPDC at its Executive Committee meeting of June 16, 2011.

ACKNOWLEDGEMENTS

The Hampton Roads Planning District Commission (HRPDC) would like to thank the HRPDC Regional Steering Committee for the Chesapeake Bay TMDL Phase II Watershed Implementation Plan and the Regional Stormwater Management Committee for their contributions to the planning effort and for their cooperation in developing this document.

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PREFACE

This report was prepared by the Hampton Roads Planning District Commission (HRPDC) as supplemental material intended as an appendix to the February 2012 local government strategy submittals to the Virginia Department of Conservation and Recreation (DCR) as input to the forthcoming Virginia Phase II Watershed Implementation Plan (WIP). At the request of the Commonwealth of Virginia, HRPDC agreed to facilitate the involvement of member localities in Virginia's Phase II WIP development process. HRPDC endorsed a two-tiered (regional and local) approach to facilitate and support the planning process and to collect information from Hampton Roads stakeholders. The goal of this effort is to provide the state with proof of local engagement and assure the EPA that localities are seriously considering the TMDL requirements. The purpose of this report is to:

- Document the efforts of the Hampton Roads Region to participate in the development of Virginia's Phase II WIP; and
- Describe the preferred water quality management scenario for the Hampton Roads region that provides the level of treatment similar to the Virginia Phase I WIP.

Preparation of this report was included in the Hampton Roads Planning District Commission Unified Planning Work Program for Fiscal Year 2012.

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1 Regional Approach to the Phase II Watershed Implementation Plan

1.1 Purpose

This report was prepared by the Hampton Roads Planning District Commission (HRPDC) as supplemental material intended as an appendix to the February 2012 local government strategy submittals to the Virginia Department of Conservation and Recreation (DCR) as input to the forthcoming Virginia Phase II Watershed Implementation Plan (WIP). The purpose of this report is to:

- Document the efforts of the Hampton Roads Region to participate in the development of Virginia's Phase II WIP; and
- Describe the preferred water quality management scenario for the Hampton Roads region that provides the level of treatment similar to the Virginia Phase I WIP.

This section includes a profile of the Hampton Roads region, an overview of the regional coordination and planning approach for the Phase II WIP, and an overview of the development of the regional water quality management scenario, which is presented in Section 6 of this report.

1.2 Qualifications and Conditions

The regional water quality management scenario represents aggregate information for the Hampton Roads region. Neither the Hampton Roads localities nor the HRPDC are able to make unconditional commitments at this time given a host of factors, including Phase II WIP submittal time constraints, funding limitations and competing demands for finite resources in a poor economy, incomplete land use data, the absence of an approved cost estimating methodology and approved alternate BMPs, and the absence of an authorized expanded nutrient credit exchange. Therefore, while the information in this report is representative of local government planning efforts, it does not reflect unconditional local government commitments and should not be interpreted to constitute unqualified local-level actions or future programs. The planning approach and assumptions applied by HRPDC staff were developed for the purposes of providing the preferred regional management scenario only. Therefore, the utility of the information is limited to the regional scale, and any attempt to interpret or distribute the aggregate information contained herein across individual Hampton Roads localities or at any smaller scale likely will result in false conclusions and misrepresentation of local information. In summary, the regional scenario proposed herein is expected to change as new information and data, management tools, and sources of funding are made available to the localities.

The regional scenario generally reflects the BMPs and programs that have proven to be effective in the region. Although not yet approved, alternate BMPs that will be cost effective and support other locality goals are proposed herein. However, the regional scenario is just one possible solution to meeting the Phase I WIP level of effort. Changes in state policies and funding would influence BMP selection. Most importantly, the scenario cannot be implemented by 2025 without additional research to support alternate BMPs and the creation of new funding sources to assist the localities with their implementation.

It should be noted that throughout the Phase II WIP development process Virginia, via communications through DCR staff, has repeatedly expressed to localities that the Phase II WIP process and the Municipal Separate Storm Sewer Systems (MS4) permit process are being handled separately by the agency, and that it is not DCR's intent to apply Phase II WIP strategies to the negotiation of MS4 permits or relate the Phase II WIP strategies to local government compliance with MS4 permit requirements. At a meeting with localities and HRPDC on January 5, 2012, DCR staff agreed to memorialize this position in a forthcoming written statement to Hampton Roads localities.

1.3 Background

The U.S. Environmental Protection Agency (EPA) completed a Total Maximum Daily Load (TMDL) for the Chesapeake Bay watershed on December 29, 2010. The TMDL identified the nitrogen, phosphorus, and sediment reductions that each Bay State needs to achieve in order for the Chesapeake Bay to meet water quality standards. The TMDL included Phase I WIPs developed by States within the Bay watershed. The Commonwealth of Virginia (Virginia) Phase I WIP outlined the actions expected of the wastewater sector, urban/stormwater sector, agriculture sector, and on-site sewage sector in order to meet statewide nutrient and sediment reduction goals.

The next step in the TMDL process is for states to develop Phase II WIPs that describe strategies to implement the Phase I WIP. EPA expected Phase II WIPs to more closely engage local governments, watershed organizations, conservation districts, citizens and other key stakeholders in reducing water pollution. Virginia requested that Planning District Commissions throughout the Chesapeake Bay watershed assist with the collection of input from localities for Virginia's Phase II WIP. HRPDC agreed to coordinate the involvement of Hampton Roads localities in Virginia's Phase II WIP development process.

The Phase II WIP is part of the accountability framework for the Chesapeake Bay TMDL, wherein EPA will track and assess Bay restoration progress and, as necessary, implement specific federal actions if jurisdictions do not meet their commitments. The deadline for submittal of Virginia's Phase II WIP to EPA is March 2012. Virginia asked localities to develop nutrient management strategies to address the level of treatment described in the Phase I WIP and submit local strategies to Virginia by February 1, 2012 for inclusion in the Phase II WIP.

1.4 Profile of the Hampton Roads Region

The Hampton Roads Region includes 27 localities: the Cities of Chesapeake, Franklin, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg; the Counties of Gloucester, Isle of Wight, James City, Southampton, Surry, and York; and the Towns of Boykins, Branchville, Capron, Claremont, Courtland, Dendron, Ivor, Newsoms, Smithfield, Surry, and Windsor (see Figure 1-1).

Hampton Roads is home to approximately 1.7 million residents and is among the top forty largest Metropolitan Statistical Areas in the country, the sixth largest in the Southeast. Hampton Roads is located in Southeastern Virginia. A defining feature of the Hampton Roads region is its location at the mouth of the Chesapeake Bay, which is known as the "world's greatest natural harbor." A significant portion of the regional economy derives from the competitive advantage provided by this natural harbor, which enhances the region's strategic capabilities to support

military activities, foreign trade operations, and port facilities. The region is also a prime East Coast tourist destination, with coastal beaches, recreational waterways, and historic resources.

1.4.1 Hampton Roads Portion of the Chesapeake Bay Watershed

Portions of Hampton Roads are located within the Chesapeake Bay watershed. All or some of the lands within the localities listed below drain to the Bay (see Figure 1-2):

Chesapeake (portion)	Portsmouth
Gloucester*	Smithfield
Hampton (portion)	Suffolk (portion)
Isle of Wight (portion)	Surry (portion)
James City	Virginia Beach (portion)
Newport News	Williamsburg
Norfolk	Windsor
Poquoson	York

*Gloucester participates in both the Hampton Roads Planning District and the Middle Peninsula Planning District and is submitting County information for the Phase II WIP via the Middle Peninsula Planning District.

For the purposes of the Chesapeake Bay TMDL, the watershed is subdivided into basins by major receiving water body. The portions of Hampton Roads within the Chesapeake Bay watershed are located in either the James River basin or York River basin (see Figure 1-3).

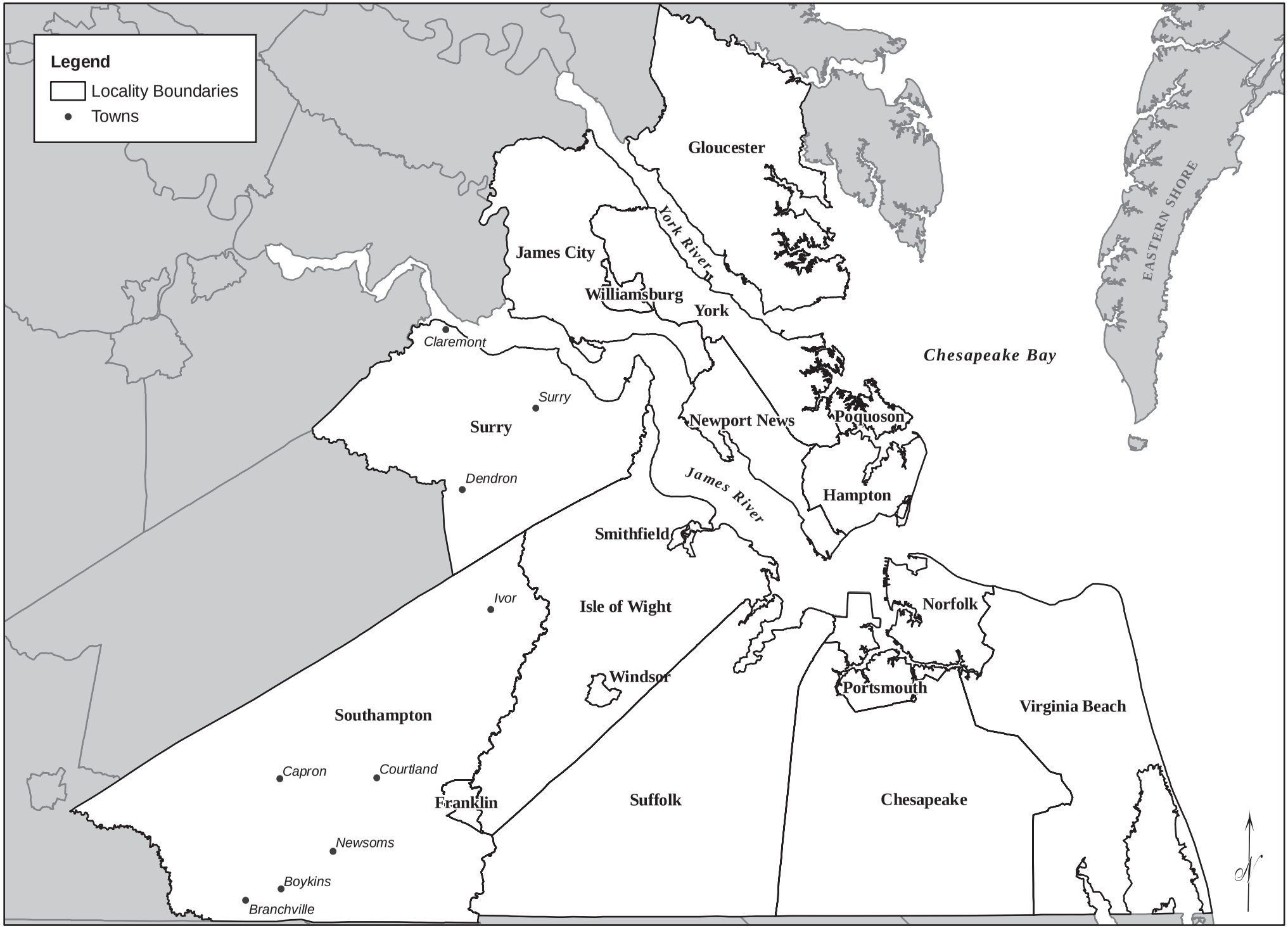

Figure 1-1 Hampton Roads Region

Created by HRPDC GIS Staff (January 2012)

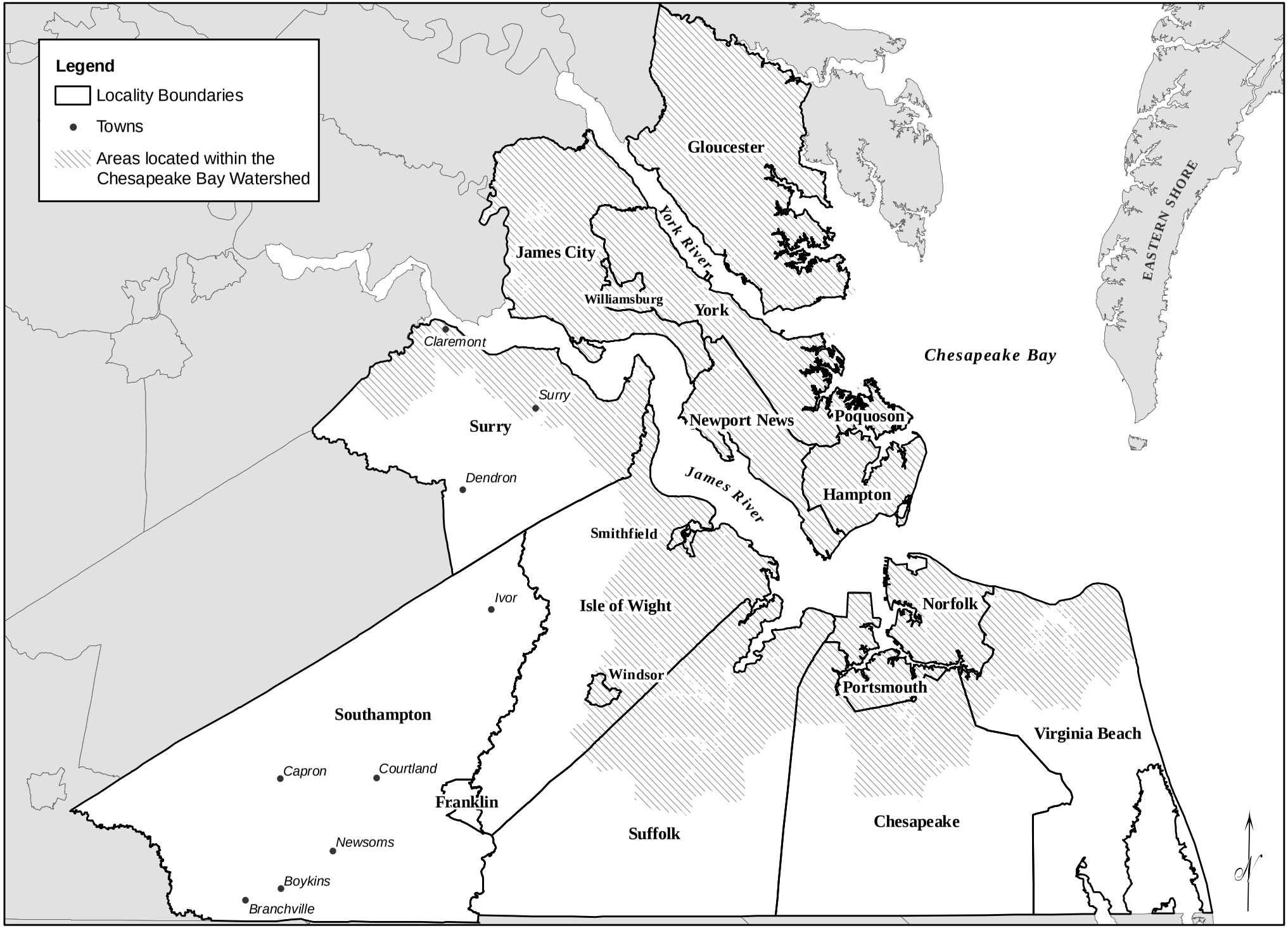

Figure 1-2 Portions of Hampton Roads in the Chesapeake Bay Watershed

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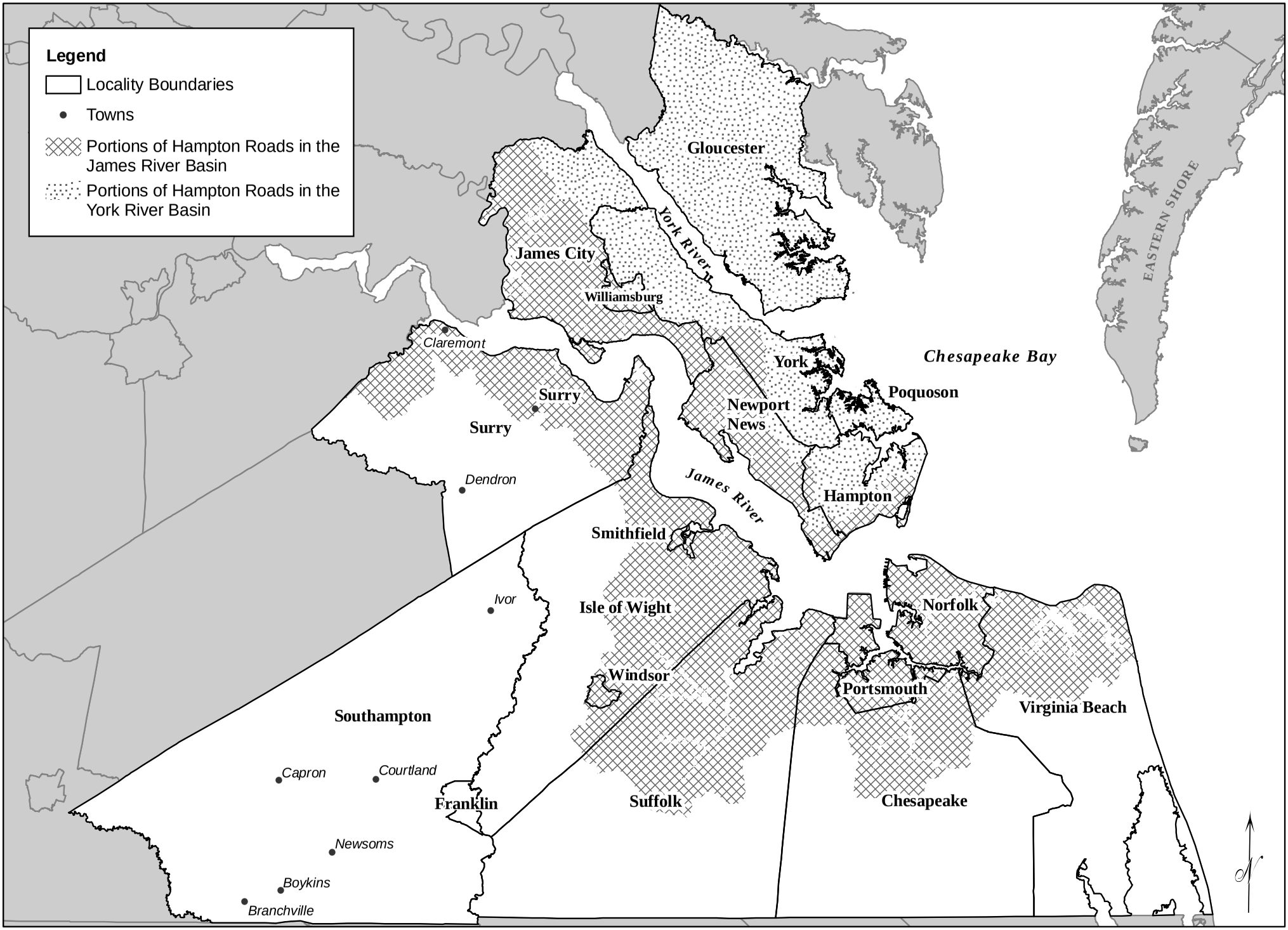

Figure 1-3 Portions of Hampton Roads in the James River and York River Basins

Created by HRPDC GIS Staff (January 2012)

1.4.2 Sources of Water Pollution in the Chesapeake Bay

The multitude of streams, rivers and wetland areas provide unique recreational, aesthetic, and economic advantages to the Hampton Roads region. However, these features also present challenges for protecting water quality. The waters of the Chesapeake Bay and its tributaries have been negatively impacted by surrounding land uses that cause the accumulation of high levels of nitrogen, phosphorus and sediment from a variety of sources. Virginia's Phase I WIP identifies five major source sectors responsible for water pollution in the Chesapeake Bay:

1. Wastewater treatment plant discharges;
2. Agricultural runoff;
3. Urban/suburban stormwater runoff;
4. Onsite wastewater/septic systems; and
5. Atmospheric deposition (air pollution)

1.5 Coordination of the Phase II WIP Process in Hampton Roads

At the request of the Commonwealth of Virginia, HRPDC agreed to facilitate the involvement of member localities in Virginia's Phase II WIP development process. Correspondence dated June 22, 2011 from HRPDC to the Secretary of Natural Resources outlined the Hampton Roads regional approach to coordination of local government input to the Phase II WIP. HRPDC endorsed a two-tiered (regional and local) approach to facilitate and support the planning process and to collect information from Hampton Roads stakeholders. Section 2 of this report provides further details on the regional engagement process.

1.5.1 Regional Steering Committee

The regional tier is a steering committee composed of representatives of the member localities, federal and State agencies, agriculture, development, and selected environmental group representatives (see Table 1-1). The Regional Steering Committee was formed by HRPDC to identify common priorities for research, legislation, and funding to complement efforts at the local tier. HRPDC staff provided administrative and liaison support for the Committee.

From July 2011 through January 2012, the Regional Steering Committee held monthly regional meetings to facilitate the coordination effort and to address three primary objectives:

1. Divide nutrient loads based on land use and ownership (agricultural, transportation, military) to clearly identify the portion of the nutrient reductions that the locality must implement.
2. Coordinate with EPA and DCR to expand the types of best management practices (BMPs) that can be incorporated into the Chesapeake Bay model.
3. Provide regional feedback on resources needed from the State, such as more authority, regulations, and funding.

The Regional Committee, as an advisory committee to HRPDC, also reported progress via HRPDC staff presentations at the monthly meetings of the Planning District Commission.

1.5.2 Local Government Working Groups

The local tier consists of local government working groups composed of locality staff from all departments affected by or affecting nutrient load reductions within the locality. These working groups developed locality nutrient reduction strategies for submittal to Virginia by selecting combinations of BMPs or nutrient reduction methods to provide a similar level of treatment as that described in Virginia's Phase I WIP BMP scenarios.

The activities and meeting schedules of locality working groups varied from jurisdiction to jurisdiction. In general, the working groups began forming in July 2011 and met between Regional Steering Committee meetings. Locality questions or developing concerns were brought to the Regional Steering Committee for discussion and information on Committee progress was conveyed to locality administration via working group representatives.

Table 1-1: Regional Steering Committee Representation

Localities:	City of Chesapeake City of Hampton City of Newport News City of Norfolk City of Poquoson City of Portsmouth City of Suffolk City of Virginia Beach City of Williamsburg Gloucester County Isle of Wight County James City County Surry County Town of Smithfield Town of Windsor York County
Other local entities:	Hampton Roads Sanitation District Colonial Soil and Water Conservation District Peanut Soil and Water Conservation District Tidewater Soil and Water Conservation District Virginia Dare Soil and Water Conservation District
State and federal entities:	Virginia Department of Conservation and Recreation Virginia Department of Environmental Quality Virginia Department of Forestry Virginia Department of Health Virginia Department of Transportation Virginia Institute of Marine Science U.S. Air Force U.S. Geological Survey U.S. Navy
Interested parties:	Chesapeake Bay Foundation Elizabeth River Project James River Association Lynnhaven River Now Virginia Institute of Marine Science Tidewater Builders Association

1.6 Development of the Preferred Regional Water Quality Management Scenario

In a November 9, 2011 letter to local governments, DCR director Mr. David Johnson identified Virginia's data needs from localities for the Phase II WIP and requested that the following information be submitted to DCR by February 1, 2012:

1. Develop a current BMP inventory.
2. Evaluate the land use/land cover information.
3. Review the 2017 and 2025 BMP scenarios as identified in the Phase I WIP and develop preferred local scenarios that provide a similar level of treatment.
4. Develop strategies to implement the preferred BMP scenarios.
5. Identify any resource needs to implement the strategies and BMP scenarios.

To address the State's request, HRPDC endorsed the following process at its meeting on November 17, 2011:

- Localities will each submit an individual plan to DCR that focuses on narrative strategies and includes items 1, 2, 4, and 5 above.
- HRPDC staff will translate strategies into a report with two basin-level BMP scenarios of the cumulative local strategies to address item #3 above. One scenario would address the portion of Hampton Roads in the James River basin and the other would address the York River basin. The regional report will be distributed to localities on January 19, 2012 following presentation of the report to the HRPDC at its Commission meeting.

The goal of this effort is to provide the state with proof of local engagement and assure the EPA that localities are seriously considering the TMDL requirements. The EPA has stated that it will implement backstops if the states cannot demonstrate reasonable assurance that the TMDL nutrient reductions will be implemented. The backstops are the most expensive strategies for Hampton Roads communities.

To meet the February 1, 2012 deadline, localities were asked to provide HRPDC staff with local strategies (item #3 above) by December 28, 2011. This schedule did not allow for formal review and approval of local strategies by local elected officials. In addition, the strategies do not constitute future financial commitments by localities. DCR's Virginia Assessment Scenario Tool (VAST) was found to have limitations that preclude the creation of basin-level BMP scenarios. Therefore, HRPDC staff developed a preferred regional water quality management scenario that includes both the James and York River basins. The regional scenario has not been approved by local governments and is only provided as a technical representation of best BMP estimates given the limited time for development and review (see Section 6).

1.6.1 Aggregation of Local Strategies into the Preferred Regional Water Quality Management Scenario

At its December 1, 2011 meeting, the Regional Steering Committee agreed that local strategies should be based on the financial commitment that each locality is willing to make. If the financial commitment does not match the implementation level in the Phase I WIP, then the region would acknowledge the gap between local strategies and the Phase I WIP targets. In follow-up staff correspondence during December 2011, DCR clarified that Virginia will disregard local strategies if such strategies fall too far short of the Phase I WIP targets, and Virginia will instead

apply the Phase I WIP scenario to the locality. Given this new information, HRPDC at its December 15, 2011 meeting endorsed an amended process to develop the management scenario where HRPDC staff will select BMPs to fill any gap between local scenarios and the Phase I WIP level of treatment, as needed.

With the development of preferred local BMP strategies to provide a similar level of treatment to the Phase I WIP, localities also identified the strategies or portions of strategies that could realistically be funded, along with the qualifications and conditions necessary to achieve the Phase I WIP level of treatment. HRPDC staff collected this information through the Regional Steering Committee.

HRPDC staff aggregated locality strategies to create a preferred regional water quality management scenario. The final scenario and this accompanying report were approved by the HRPDC at its Commission meeting on January 19, 2012 for distribution to localities.

2 Regional Engagement

Regional engagement in the Phase II WIP process included representatives from multiple levels of local government, state government, and stakeholders from the community through HRPDC meetings and HRPDC subcommittee and advisory committee meetings. Throughout 2010 and 2011, HRPDC staff briefed the Hampton Roads Planning District Commissioners on the Phase II WIP development process, and Commissioners approved actions that influenced the Phase II WIP development process. This section provides an overview of the regional engagement process. Meeting materials or correspondence referenced in this section can be reviewed on the HRPDC website (http://www.hrpdcva.gov/).

The Regional Steering Committee was convened in July 2011 as an advisory committee to HRPDC to involve regional stakeholders in the Phase II WIP development process. Building from the stakeholders involved in the Tributary Strategies Project Steering Committee in the mid-1990s, the HRPDC invited agencies and organizations contributing to and benefiting from nutrient reductions and improved water quality in the Chesapeake Bay to join locality representatives in participating on the Regional Steering Committee to guide the development of the Phase II WIP. Suggestions from the Steering Committee were brought to the HRPDC for approval. The Commissioner's actions from the previous month are reviewed at each Regional Steering Committee Meeting.

2.1 Hampton Roads Planning District Commission

Virginia has identified the PDCs as the preferred organization to coordinate local involvement in the Chesapeake Bay TMDL Phase II WIP process. The Hampton Roads Planning District Commission (HRPDC), one of 21 Planning District Commissions in the Commonwealth of Virginia, is a regional organization representing this area's sixteen local governments. Membership on the 45-member Commission is based on population, with each jurisdiction having a minimum of two members. The Commission has an Executive Committee, made up of one member from each jurisdiction. The Executive Committee provides policy oversight to the HRPDC's activities through monthly meetings held between the quarterly meetings of the full Commission.

The following is a list of Commission meetings at which issues of the Chesapeake Bay TMDL Phase II WIP process were discussed and action was taken and/or guidance was given in regard to the process. All Commission meeting agendas, handouts and presentation can be downloaded from http://www.hrpdcva.gov/AgendaArchives.asp.

September 2010

- HRPDC staff briefed the Commission on the Chesapeake Bay TMDL and the Virginia WIP.
- Commission advised staff to work with a Commission Subcommittee to draft comments on Virginia's Chesapeake Bay Draft TMDL and Virginia's Phase I WIP.

October 2010

- Commission Subcommittee met on October 4, 2010 to draft comments. Locality input was incorporated into a Comment Package that was submitted online to EPA on November 8, 2010. The Commonwealth of Virginia was also copied.

- HRPDC staff presented a cost estimate and regional concerns regarding the Chesapeake Bay TMDL and the Virginia WIP.

November 2010

- HRPDC staff briefed the Commission on the regional concerns with the Chesapeake Bay TMDL and on local government policy and program options regarding the TMDL.

- Commission approved the Hampton Roads Statement of Legislative Principles Regarding Implementation of the Chesapeake Bay TMDL.

December 2010

- HRPDC staff briefed the Commission's Executive Committee on the revised Watershed Implementation Plan (WIP) that Virginia submitted to the EPA.

- Executive Committee authorized HRPDC staff to:

    - Schedule a meeting with local government city attorneys and HRPDC Special Legal Counsel Dave Evans.

    - Send materials to the Hampton Roads General Assembly representatives and the Hampton Roads Congressional Delegation members.

    - Develop timeline and strategies.

January 2011

- HRPDC staff presented update on the Chesapeake Bay TMDL and outlined the actions HRPDC staff will take to assist localities in preparing the requirements of the TMDL.

- Commission adopted HRPDC Resolution No. 2011-01 endorsing the "Hampton Roads Statement of Legislative Principles Regarding Implementation of the Chesapeake Bay TMDL" and requesting appropriate state and federal support for needed funding and legislative authority allowing local governments to implement the necessary programs.

- Commission authorized staff to:

    - Develop a Regional framework for the Chesapeake Bay TMDL Phase II Watershed Implementation Plan.

    - Establish a steering committee of source sector representatives.

    - Send a letter to the Secretary of Natural Resources requesting guidance on Phase II WIP development.

    - Develop a FAQ sheet on the Chesapeake Bay TMDL and Water Implementation Plans.

February 2011

- Mr. Dave Evans, McGuire Woods, Legal consultant to the HRPDC, briefed the Commission on the EPA's responses to HRPDC comments submitted on November 8, 2010. Mr. Evans had previously led an extensive discussion on the EPA's responses with local government attorneys and technical staff on January 25, 2011.

- Commission's concerns were incorporated into a letter sent to the Virginia Secretary of Natural Resources on February 7, 2011.

March 2011

- HRPDC Agenda Note provides Commission a summary of recent events related to the Chesapeake Bay TMDL.

- Commission approved holding a Special Executive Committee meeting on March 31, 2011 to hear a presentation from the Virginia Secretary of Natural Resources' office and continue discussion with staff and legal counsel.

Special meeting convened to address Chesapeake Bay TMDL and the Virginia process for developing the Phase II WIP.

- HRPDC staff presented the region's considerations of the TMDL issue over the past several months, and highlighted major decisions and associated documents.

- Jeff Corbin, Senior Advisor to the EPA Administrator on Chesapeake Bay restoration presented a review of EPA's response to HRPDC letter and other comments, and EPA's views on the way forward to implement the TMDL and Virginia Watershed Implementation Plan.

- Anthony Moore, Assistant Secretary for Chesapeake Bay Restoration, David A. Johnson, Director of the Department of Conservation and Recreation, and Russ Baxter, Department of Environmental Quality presented a review of the process for preparing the Virginia Phase II Watershed Implementation Plan.

- David Evans, McGuire Woods, Legal consultant to the HRPDC, briefed the Commission on several legal issues related to the Chesapeake TMDL and Virginia Watershed Implementation Plan.

Commission authorized HRPDC staff to send a letter to the EPA stating the Commission's concerns regarding the Chesapeake Bay TMDL Phase II WIP. Letter was sent March 31, 2011.**May 2011**

- HRPDC staff presented a summary of the EPA's response to HRPDC asking EPA to clarify its intentions regarding implementation of the Bay TMDL, and overview of Phase II Watershed Implementation Plan.

July 2011

- Commission adopted HRPDC Resolution No. 2011-05 "Support of Continued Funding to Support Restoration of the Chesapeake Bay."

September 2011

- HRPDC staff presented summary of the Regional Steering Committee's progress toward developing the Regional input for Virginia's Phase II WIP.

October 2011

- HRPDC staff presented summary of the Chesapeake Bay TMDL Phase II WIP process and discussed letter from EPA sent on October 5, 2011 to the Secretary of Natural Resources.

- Commission authorized HRPDC staff to send a letter to EPA asking for the removal of individual Waste Load Allocations for the Phase I MS4 permits from the Chesapeake Bay TMDL; and send a letter to the Virginia Secretary of Natural Resources requesting additional guidance. Letters were sent on October 20, 2011.

November 2011

- HRPDC staff presented summary of EPA's comments at the Chesapeake Bay Stakeholder Advisory Group. EPA did not send a written response to the HRPDC's October 20, 2011 letter.

- Commission approved Regional Steering Committee recommendation to only include narrative program level strategies in local government Phase II WIP submissions to Virginia. HPRDC staff is directed to translate locality strategies into a report.

December 2011

- HRPDC staff presented a Chesapeake Bay TMDL Phase II WIP update and advised Commissioners to authorize HRPDC staff to compile a Phase II WIP scenario from all localities and submit to the Virginia Department of Conservation an aggregate input deck as an appendix to local government submittals.

- Commission approved schedule for locality data submission to HRPDC staff.

2.2 HRPDC Regional Steering Committee for the Chesapeake Bay Phase II Watershed Implementation

The Regional Steering Committee for the Chesapeake Bay Phase II Watershed Implementation Plan, formed in response to the request of the Commonwealth of Virginia to assist with the collection of input from localities for Virginia's Phase II WIP development process, first convened in July, 2011. Since that time, the Steering Committee has met monthly through January 2012.

The Regional Steering Committee is comprised of local leaders and technical experts from all HRPDC localities in the Chesapeake Bay watershed; the General Manager of the Hampton Roads

Sanitation District; Virginia State representatives from the Department of Health, Department of Environmental Quality, Department of Conservation and Recreation, and Department of Transportation; Federal representatives from the U.S. Geological Survey and U.S. Department of Defense – Air Force and Navy ; nonprofit representatives from the Virginia Institute of Marine Sciences, Virginia Association of Soil and Water Conservation Districts, Lynnhaven River NOW, James River Association, Elizabeth River Project, and the Chesapeake Bay Foundation; and a representative from the Tidewater Builders Association.

Membership on the Regional Steering Committee was designed to give local stakeholders the opportunity to be involved in Virginia's Phase II WIP development process by sharing information and resolving confusion about technical issues, data availability and regulatory authority. The role of HRPDC is to facilitate the Regional Steering Committee meetings; serve as a conduit for information exchange between State, Federal and local governments; and provide technical assistance to localities.

HRPDC staff identified three primary objectives for the Regional Steering Committee to address:

1. Divide nutrient loads among localities based on land use and ownership (agricultural, transportation, military) to clearly identify the portion of the nutrient reductions that each locality must implement.
2. Coordinate with EPA and DCR to expand the types of best management practices (BMPs) that can be incorporated into the Chesapeake Bay model.
3. Provide regional feedback on resources needed from the State, such as more authority, regulations, and funding

The first meeting in July 2011 set the course for the Regional Steering Committee. The meeting began with a summary by the Virginia Department of Conservation and Recreation of the goals included in Virginia's Phase I WIP and an overview of the Phase II WIP process. HRPDC staff then presented the proposed process for coordinating the Phase II WIP development in Hampton Roads, and the steps that local governments should be taking to participate in the development of the Phase II WIP.

The final component of the meeting was a facilitated discussion by HRPDC staff to gain feedback from the stakeholders as to how the HRPDC will assist in locality WIP development. The discussion was divided into five areas:

1. Key concerns by sector;
2. Technical assistance needs;
3. Additional management actions;
4. Funding needs and potential sources; and
5. Legislative priorities.

Based on stakeholder responses during the facilitated discussion and further prioritization exercises at later meetings, HRPDC staff proceeded with coordinating the efforts necessary to achieve the three primary objectives stated above.

2.2.1 Septic System Legislative Subcommittee

At the September Regional Steering Committee meeting, Mr. David Tiller from the Virginia Department of Health provided a briefing on the treatment of septic tanks in the Chesapeake Bay TMDL. After the presentation the Committee expressed concern over the lack of tools available to localities to achieve the large number of retrofits that are needed to meet nitrogen reductions in the septic system sector. The Committee agreed to form a Septic System Legislative Subcommittee that would develop legislative and policy recommendations for the Regional Steering Committee to vote on.

The Subcommittee began its discussion by reviewing the options for the onsite/septic sector that were listed in the Chesapeake Bay TMDL Phase 1 Watershed Implementation Plan. Each attendee was given the opportunity to share their locality's concerns and give suggestions for legislative and policy changes. The suggestions were all listed and then categorized three recommendations for the Regional Steering Committee to vote on:

1. Seek legislative changes necessary to establish tax credits for upgrade/replacement of existing conventional systems with nitrogen reducing systems, *or connection to existing sewer (added during discussion)*.
2. Look into steps for gaining General Assembly approval to grant all counties the authority to require hook-ups to existing sewer lines when appropriate.
3. Work with state agencies to establish a cost share program, similar to what is done with the Agricultural BMP Cost Share Program, to assist with the cost of required upgrades or replacements and incentivize non-failing septic system owners to upgrade to a denitrifying system.

The Regional Steering Committee agreed at the November 2011 meeting to include all three recommendations into the regional legislative package. In December 2011, the HRPDC approved its 2012 Legislative Agenda, including these recommendations.

2.3 Information Sharing

HRPDC staff created a webpage, http://www.hrpdcva.gov/pep/ChesBayTMDLInfo.asp, dedicated to the Chesapeake Bay TMDL and Phase II Implementation Process. The webpage includes documentation regarding the actions of other states involved in the Chesapeake Bay TMDL; FAQ sheet on the Chesapeake Bay TMDL and Watershed Implementation Plans, Regional Steering Committee meeting agendas, summaries and presentations; and additional relevant materials.

The HRPDC Review, http://www.hrpdcva.gov/HamptonRoadsReview/, and the HRPDC E-newsletter have also been used to provide updates on the Chesapeake Bay TMDL process to the community.

HRPDC also hosted webinars and training with post discussion sessions regarding the Chesapeake Bay Phase II WIP process. The Chesapeake Stormwater Network and Center for Watershed Protection held Chesapeake Bay stormwater training. HRPDC hosted webinars for the Chesapeake Assessment and Scenario Tool (CAST), the Maryland Assessment and Scenario Tool (MAST), and the Virginia Assessment and Scenario Tool (VAST).

3 Regional Framework

There are numerous entities throughout the Hampton Roads region that own or manage land holdings and/or influence land use and development practices. Many stakeholders have Virginia Pollutant Discharge Elimination System (VPDES) permits and other development-related permits that require management of water quality impacts from permitted activities and nutrient reductions to implement the Chesapeake Bay TMDL.

The Regional Steering Committee considered stakeholder and jurisdictional relationships in Hampton Roads and agreed that the ability to fund and implement water quality management actions is based on land ownership, jurisdictional oversight, and programming and enforcement authority. This section describes the regional planning framework developed to identify and delineate the lands to be addressed in local government Phase II WIP strategies.

3.1 Planning Assumptions and Expectations

The regional planning framework is based on the following planning assumptions and expectations:

<u>Virginia and EPA programs</u>:

- Virginia and EPA will manage and fund nutrient reductions on State and federally owned property.
- Virginia will implement nutrient reductions for wastewater and industrial point-source discharges through the VPDES permitting process and permit conditions; future facility permits, revisions, and renewals will be consistent with the Phase I WIP.
- To reduce nutrients contributed by air deposition, EPA will implement nutrient reductions through the Clean Air Act regulatory programs and permitting processes; future permits, revisions, and renewals will be consistent with the Phase I WIP.
- As agricultural nutrient reductions cannot be enforced through any existing permitting program, Virginia, through the Soil and Water Conservation Districts (SWCDs), will encourage reductions through outreach activities and cost share programs.
- Agricultural nutrient reductions may also be implemented through the purchase of credits via Virginia's expansion of the nutrient credit exchange program.
- Virginia, through VDH, will enforce existing requirements for upgrades and repairs to failing septic systems.

<u>Locality programs</u>:

- Local governments will implement urban sector nutrient reductions on publicly-owned land and encourage voluntary nutrient reductions on private property.
- Additional nutrient reductions will be required for redevelopment projects, consistent with Virginia's revised stormwater regulations.
- Localities will require septic system conversions and connections to the municipal sewer system in limited areas, to the extent of local authority.

The regional framework assumes that federal, state, and local governments, as well as those private entities subject to VPDES permit requirements are responsible for nutrient reduction strategies to address lands and facilities under their respective ownership, management, or administration. The purpose of the framework is to help localities identify and focus planning efforts on lands where local government actions can be implemented. Hampton Roads localities do not have authority to implement strategies on lands and facilities owned or managed by other entities. Therefore, such lands are excluded from local strategies.

The regional water quality management scenario described in Section 6 includes federal and state lands. The Phase I WIP strategies were applied to these lands. In contrast, regional Phase II WIP strategies were developed for locality lands and applied in the regional scenario.

3.2 Summary of Federal, State, and Locality Lands

The federal government and the Commonwealth of Virginia own or are responsible for a significant amount of land located within the boundaries of Hampton Roads localities. Quantifying this land area within the Chesapeake Bay watershed is an important and necessary step in determining locality responsibilities for nutrient reductions. For the purposes of this report, HRPDC staff developed estimates of land areas categorized as federal, state, or locality lands using geographic information system (GIS) analysis (see Table 3-1). Federal and State lands consist of lands owned by the federal government or the Commonwealth of Virginia. Locality lands were identified as the remaining lands within a locality's jurisdiction that are not federal or state lands, and therefore include of both locality-owned and private properties. Sections 3.3 to 3.5 provide descriptions and further discussion of the land categories.

Table 3-1: Federal, State, and Locality Lands in the James and York River Basins

Basin	Federal Lands		State Lands		Locality Lands	
	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin
James River	38,765.25	6.81%	30,585.88	5.37%	499,741.36	87.81%
York River	28,629.02	11.05%	12,726.47	4.91%	217,767.60	84.04%

To derive the estimates in Table 3-1, HRPDC staff compared GIS datasets obtained from multiple sources including, but not limited to EPA, the U.S. Navy, the National Oceanic and Atmospheric Administration, Virginia DCR, Virginia Department of Transportation (VDOT), and localities, as well as information on file at HRPDC. In general, land ownership datasets were mostly consistent, with some minor discrepancies in parcel boundary lines and coastlines. Larger discrepancies, such as misidentified parcels or missing sites, were reconciled. The information in the table represents the best estimate of land ownership given the available resources and timeframe for completion of the analysis. Maps displaying the results of the analyses are included as Figures 3-1 to 3-3.

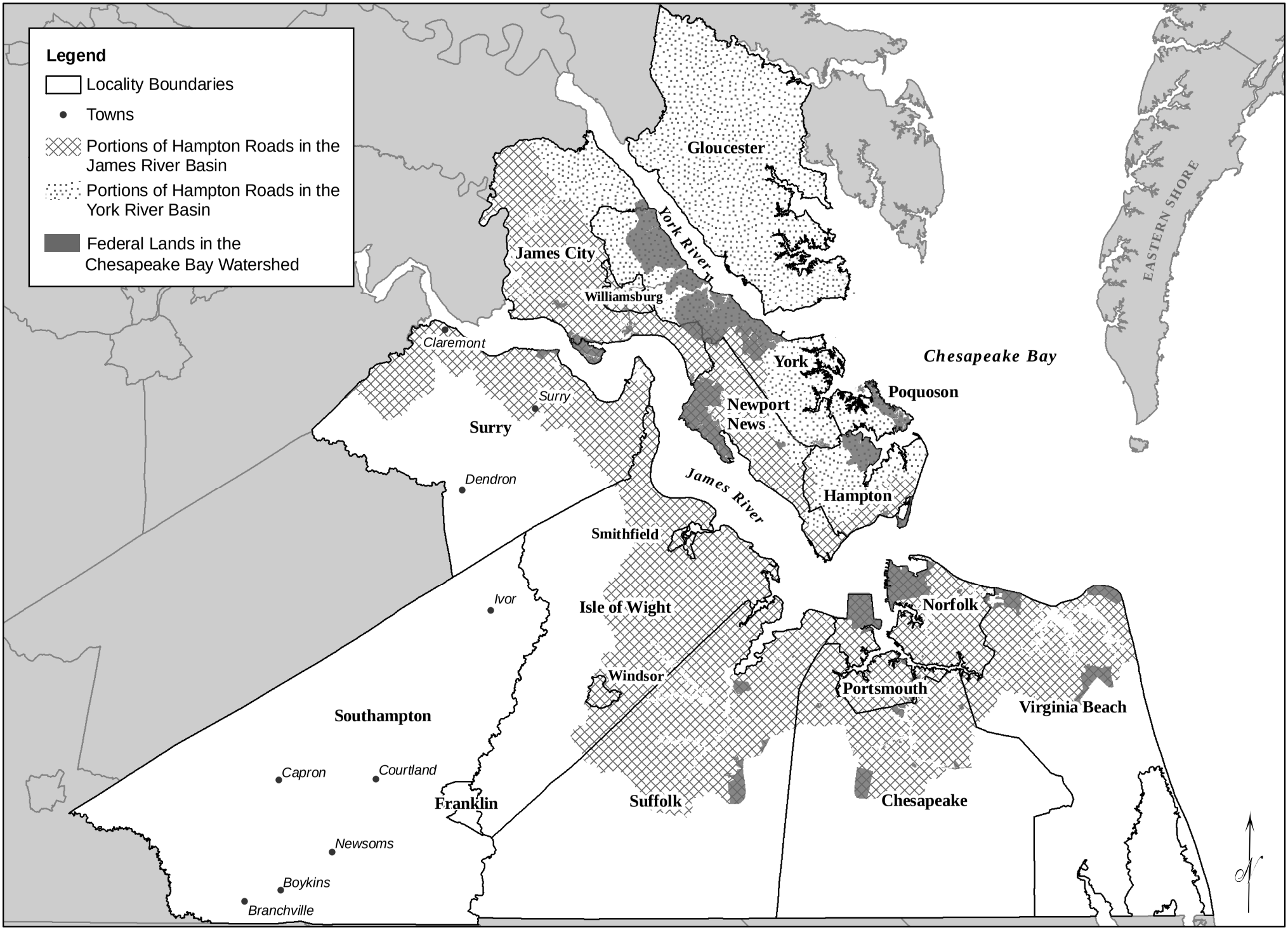

Figure 3-1 Federal Lands in the Chesapeake Bay Watershed Located in Hampton Roads

0 5 10 20 Miles

Created by HRPDC GIS Staff (January 2012)

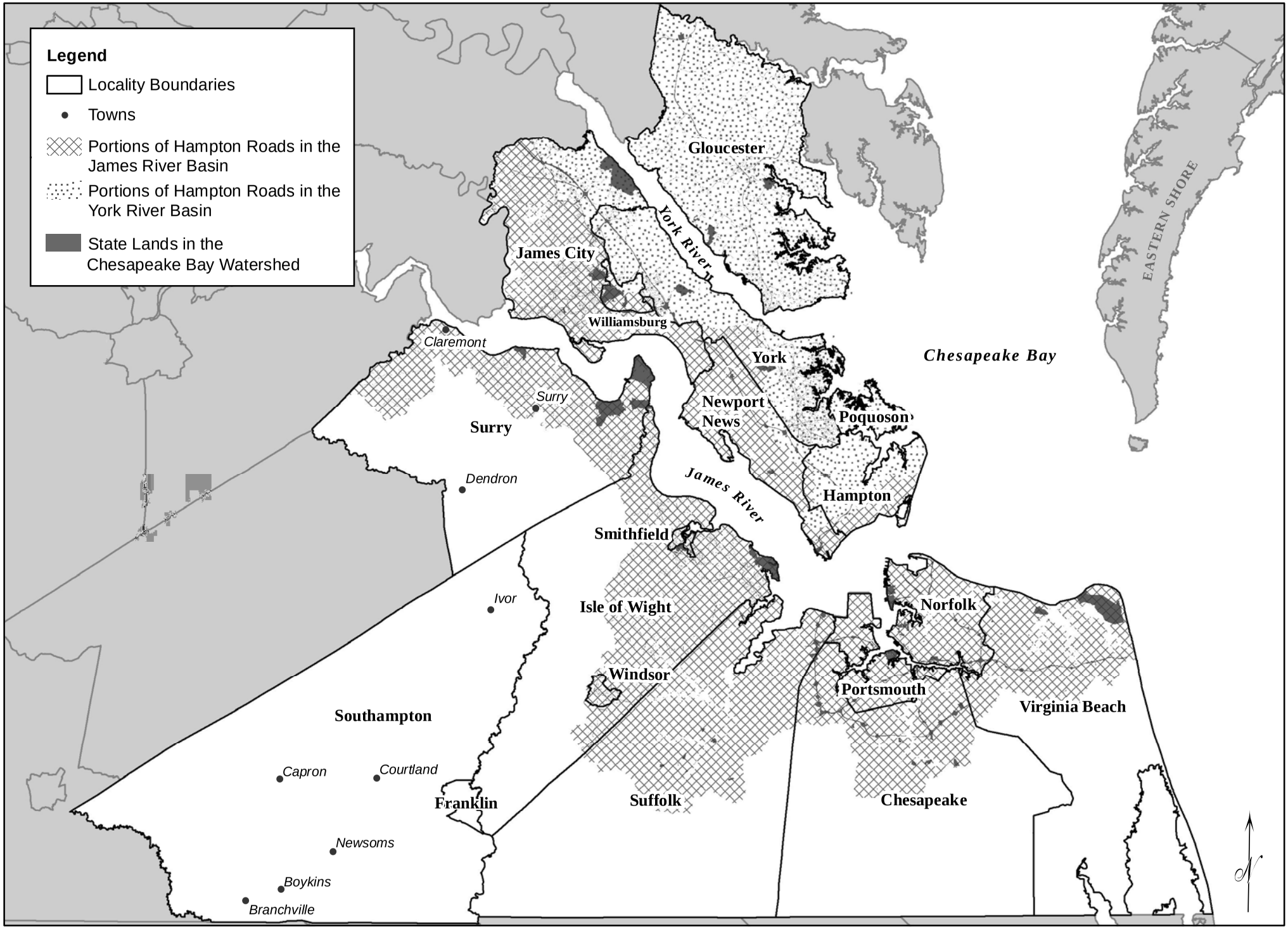

Figure 3-2 State Lands in the Chesapeake Bay Watershed Located in Hampton Roads

Created by HRPDC GIS Staff (January 2012)

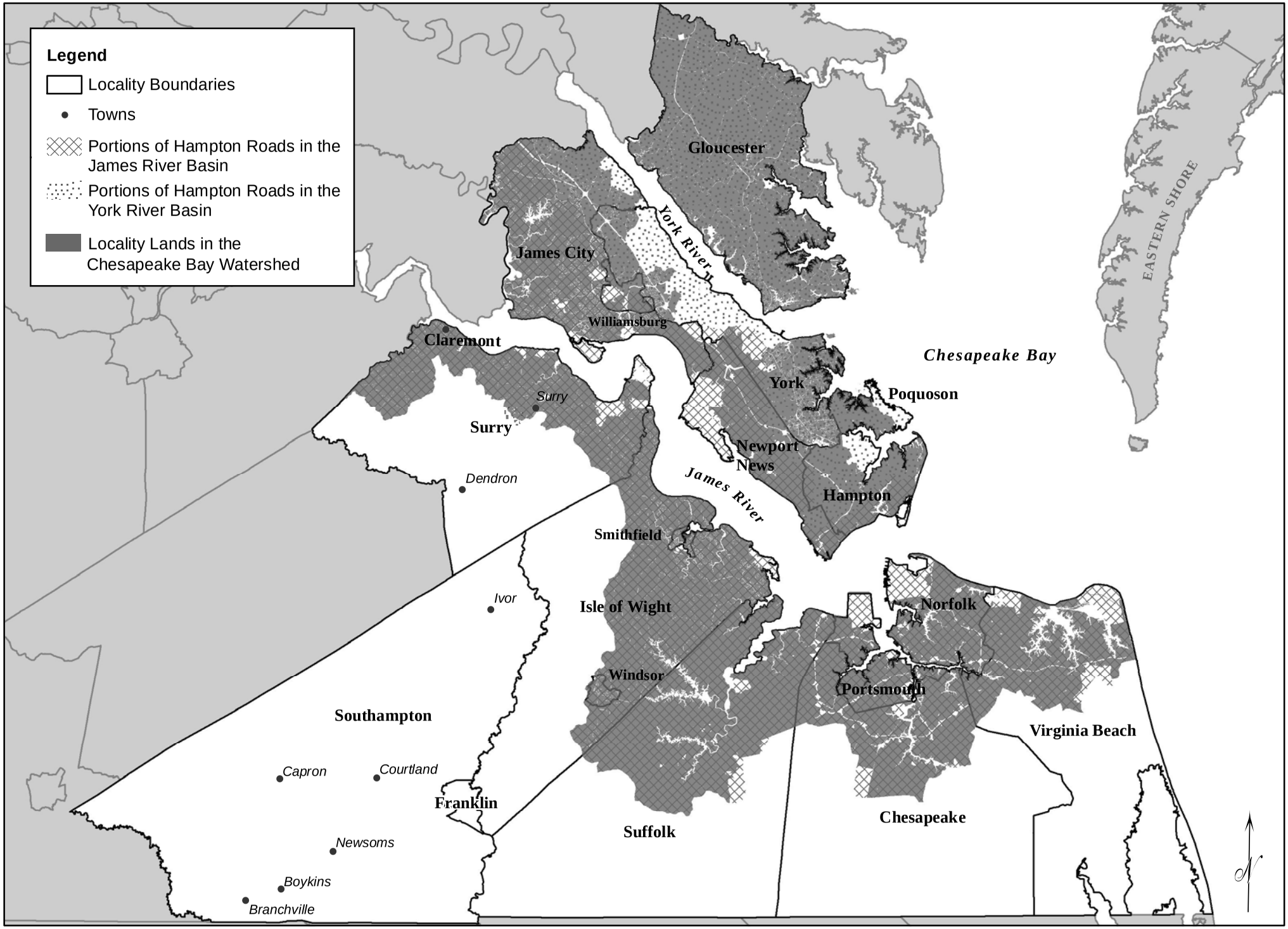

Figure 3-3 Locality Lands in the Chesapeake Bay Watershed Located in Hampton Roads

Created by HRPDC GIS Staff (January 2012)

0 5 10 20 Miles

3.2.1 Methodology for Land Analyses

Three separate analyses were conducted. The first was a comparison of geographic databases of federal properties within Hampton Roads, which compared a database put together in-house by HRPDC staff with data provided by the EPA and the U.S. Navy. The second analysis used data from VDOT, the Virginia Geographic Information Network (VGIN), DCR, and local governments to estimate the amount of Virginia-owned lands within Hampton Roads. The third analysis used land cover data to estimate the amount of state-owned land that was impervious developed, pervious developed, and undeveloped in the region.

Federal Land Analysis: HRPDC staff compared GIS datasets from an in-house analysis, the U.S. Navy, and EPA with the goal of identifying potential inconsistencies between the datasets (with a primary focus on the accuracy of the EPA datasets). Locality property data was incorporated later to provide a more comprehensive assessment of local and regional data on federal land ownership. The method used was simple overlay analysis. Overall, the datasets were mostly consistent with each other; however, several significant inconsistencies or inaccuracies were identified in the EPA dataset. Specifically, the EPA dataset did not contain the NASA Langley Research Center (~722 acres), the Jefferson Lab facility (~221 acres), the Veterans Affairs Hospital in Hampton (~100 acres), or a section of the Yorktown Naval Weapon Station (~120 acres). In addition, the EPA dataset assigned nearly 2,500 extra acres to the Norfolk Naval Station in Norfolk, nearly 120 additional acres to Ft. Eustis in Newport News, approximately 200 additional acres to the Craney Island Facility in Portsmouth, and approximately 262 additional acres to Joint Base Little Creek in Virginia Beach, among others. In addition, the EPA dataset assigned federal properties in York County and Suffolk to the Navy, when in fact they are owned and maintained by the Department of the Interior.

State Land Analysis: HRPDC staff estimated state-owned lands using data from VDOT, DCR, the Virginia Geographic Information Network, and Hampton Roads local governments. State lands in Hampton Roads fall into three broad categories: VDOT-owned road rights-of-way, conservation easements, and other state properties. VDOT owns and maintains nearly all roads and rights-of-way in Virginia's counties; it also owns and maintains interstate highways, as well as the State Route 164 corridor in Portsmouth and Suffolk. Rights of way were calculated using local property data (in most cases, rights-of-way were simply left as voids in these datasets) along with VDOT's road centerline dataset and VGIN's aerial photography. State-owned conservation easements were compiled as part of a previous HRPDC green infrastructure planning project. Other state lands were then identified using locality property databases, which contained ownership information for each individual parcel. For this analysis, any parcel owned by public colleges and universities, state departments, or the Commonwealth of Virginia (or any variant thereof) was included. While these categories overlapped in some cases, no areas were "double counted" in the final state lands database.

Land Cover Analysis: Once the final state lands database was compiled, land cover data from the National Oceanic and Atmospheric Administration's Coastal Change Analysis Program was used to estimate the amount of state land that is developed impervious and developed pervious. To simplify the analysis, the original land cover data was reclassified to consolidate the agricultural classifications into a single agriculture category, with similar steps being taken for forests, wetlands, submerged lands/water, and other land types. The developed land categories were maintained. The spatial analysis feature in ArcMap was used to calculate the amount of each land cover type within each state land parcel. However, due to the coarseness of the land cover data (30-meter pixels), this analysis resulted in some state parcels without land cover

data, since they were too small for the analysis. To overcome this, the share of each land cover type was calculated for each locality. This share was then multiplied by the total amount of state land within that locality to estimate the overall amount of each land cover on state lands. These land cover amounts were then multiplied by the impervious/pervious surface coefficients found in the land use section of the Chesapeake Bay Watershed Model documentation to calculate total values for impervious and pervious surface for each locality. The results were summed by locality, watershed basin (James and York), and region (see Table 3-2).

Table 3-2: Summary of Land Cover Analysis of Impervious/Pervious Surface

Geography	Area within Chesapeake Bay Watershed (acres)	State Land within Chesapeake Bay Watershed (acres)	State Developed, Impervious Cover within Chesapeake Bay Watershed (acres)	State Developed, Pervious Cover within Chesapeake Bay Watershed (acres)
Chesapeake	56,524	2,150.01	371.82	1,118.12
Gloucester	140,212	4,074.39	240.12	794.38
Hampton	33,100	552.48	181.45	305.37
Isle of Wight	102,395	4,277.40	185.05	622.11
James City	93,175	7,713.54	536.27	1,878.97
Newport News	44,254	1,246.25	423.12	557.43
Norfolk	34,708	2,372.67	1,011.09	1,253.10
Poquoson	9,833	0	0	0
Portsmouth	21,684	928.98	353.96	528.37
Suffolk	104,208	905.14	62.06	173.97
Surry	70,221	9,054.46	24.38	126.77
Virginia Beach	56,388	4,448.82	227.42	825.62
Williamsburg	5,576	1,103.74	68.43	174.03
York	68,594	4,484.48	526.01	1,708.10
Hampton Roads	828,216	43,312.35	4,211.18	10,066.35
Hampton Roads - James River Basin	569,092	30,585.88	3,143.10	6,928.60
Hampton Roads - York River Basin	259,123	12,726.47	1,067.74	3,136.64

3.3 Federal Lands

The regional planning framework assumes that lands owned or controlled by federal agencies and programs will meet the nutrient reductions described in the Phase I WIP. Therefore, federal lands and facilities are excluded from locality Phase II WIP nutrient reduction strategies. Federal exclusions in Hampton Roads are primarily comprised of lands managed by the following entities:

- Department of Commerce
    - National Oceanic and Atmospheric Administration
- Department of Defense
    - Navy
    - Air Force
    - Army
- Department of Energy
- Department of Homeland Security
    - Coast Guard
- Department of the Interior
    - Fish and Wildlife Service
    - National Park Service
- Department of Veterans Affairs
- National Aeronautics and Space Administration

It is estimated that federal lands comprise 6.81% of the James River Basin and 11.05% of the York River Basin (see Table 3-1).

3.4 State Lands

The regional planning framework assumes that lands owned or controlled by Virginia will meet the nutrient reductions described in the Phase I WIP. Therefore, state lands and facilities are excluded from locality Phase II WIP nutrient reduction strategies. State exclusions in Hampton Roads are primarily comprised of lands managed by the following entities:

- Department of Conservation and Recreation
- Department of Game and Inland Fisheries
- Department of Transportation
- State colleges and universities
- Virginia Housing Development Authority
- Virginia Port Authority

It is estimated that state lands comprise 5.37% of the James River Basin and 4.91% of the York River Basin (see Table 3-1).

3.5 Locality Lands

It is estimated that "locality lands" comprise 87.81% of the James River Basin and 84.04% of the York River Basin (see Table 3-1). For the purposes of this report, "locality lands" are identified as the remaining lands within a locality's jurisdiction that are not federal or state lands, and therefore include both locality-owned property, private property, and public and private properties subject to VPDES permit requirements negotiated with Virginia. Private property includes residential, commercial, and industrial areas where the locality's authority to implement stormwater BMPs or retrofits is limited to the land use approval process for development and redevelopment. Properties subject to VPDES permit requirements include HRSD facilities and other sites that host permitted dischargers; permit conditions are negotiated with Virginia and compliance is demonstrated through state-administered programs, and locality authority is limited to the land use approval process.

3.5.1 Local Governments

In Hampton Roads, localities have existing authority, programs, and mechanisms to implement water quality management strategies on lands as follows:

- Locality-owned lands and facilities (examples include municipal centers, parks, recreation centers, locality maintenance base yards, fire and police facilities, and other general public facilities);
- Areas that drain to the local Municipal Separate Storm Sewer Systems (MS4s); and
- Areas that may be developed or redeveloped subject to land use approvals (erosion and sediment control programs, statewide stormwater management regulations, and Bay Act regulations).

The regional planning framework assumes that local governments will develop strategies to address nutrient reductions on locality-owned lands, areas draining to the local MS4, and areas subject to land use approvals.

3.5.2 Hampton Roads Sanitation District

The Hampton Roads Sanitation District (HRSD) operates the regional wastewater system that serves most of southeast Virginia, including 17 cities and counties that host a total population of approximately 1.6 million. HRSD is a political subdivision of the Commonwealth of Virginia, created by public referendum in 1940 to eliminate sewage pollution in the tidal waters of the Hampton Roads. HRSD operates nine major wastewater treatment plants in Hampton Roads and 4 smaller plants on the Middle Peninsula (see Figure 3-4). Wastewater from locality wastewater collection systems is conveyed to HRSD's interceptor system, which transmits flows to treatment plants.

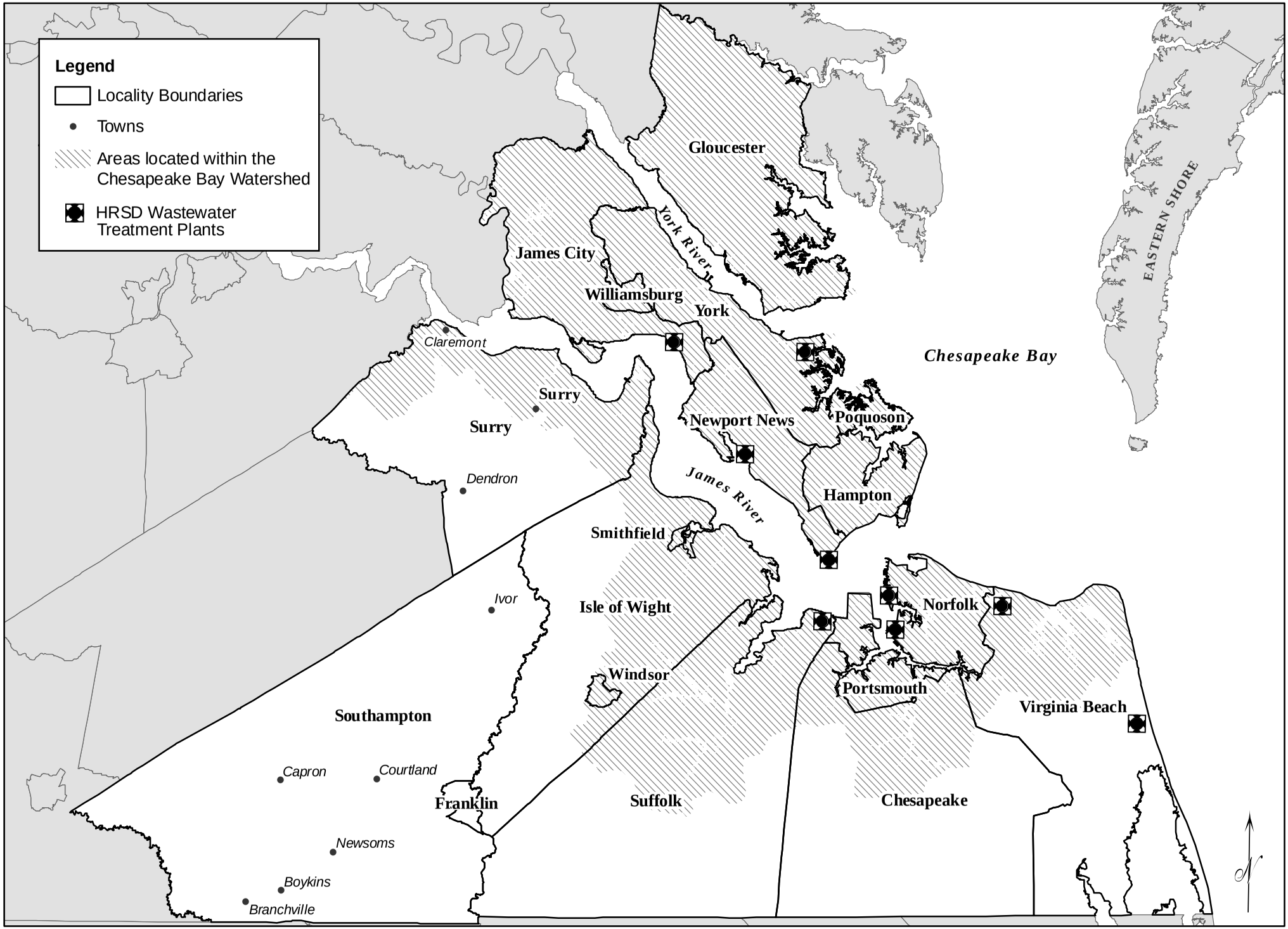

Figure 3-4 HRSD Wastewater Treatment Plants in Hampton Roads

Created by HRPDC GIS Staff (January 2012)

HRSD facilities are located within locality boundaries, but are regulated by VPDES permits administered by Virginia. Discharges of treated effluent from HRSD plants must comply with permit limitations. The Virginia Department of Environmental Quality (DEQ) administers the permit, which is reviewed, revised if necessary, and reissued every five years. HRSD maintains a nutrient management plan to address required reductions. Capital improvements are underway to allow HRSD to comply with current nitrogen and phosphorus permit limits. The Phase I WIP, however, includes new nitrogen and phosphorus limits for HRSD. It is anticipated that future renewals of HRSD's VPDES permit will be consistent with the Phase I WIP.

The point source waste load allocations (WLA), contained in Appendix Q of the Chesapeake Bay TMDL, appear in the reissued General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia [9 VAC 25 - 820], effective January 1, 2012. As the WLAs for wastewater dischargers are contained in the permit, DCR did not develop local targets for this source sector in the agency's December 2011 draft Phase II WIP document.

3.5.3 Other VPDES Permitted Facilities

Other operations and facilities, besides HRSD, are subject to VPDES permits administered by Virginia. Permit conditions are negotiated with DEQ and compliance is demonstrated through state-administered programs. Examples include industrial facilities and school sites. These sites may discharge directly to waters of the United States or to MS4s. Permittees must comply with current discharge permit limits, and like HRSD, it is anticipated that future VPDES permit renewals will be consistent with the Phase I WIP.

3.6 Evolving Planning Issues

Controlling nutrient and sediment loads from the urban sector, agriculture sector, and onsite septic systems will require extensive land-based controls on private property to achieve the nutrient reductions required by the Chesapeake Bay TMDL. EPA, Virginia, and local governments cannot force private land owners to install controls in the absence of direct regulatory authority over land owners (in the case of EPA and the Virginia) or redevelopment requiring local approvals (in the case of the localities). EPA recognizes the limits of the agency's authority over non-point source agriculture and onsite septic systems. It is critical that EPA and Virginia also recognize the limits of local governments' authority over existing development.

Several areas related to the development of local-level strategies continue to evolve. It is anticipated that local strategies will be adapted as new information and guidance emerges to address the areas described below.

3.6.1 Private Property

Localities have very limited ability to require retrofits on private property. Local governments own a small percentage of the urban lands within their respective jurisdictional boundaries. The majority of urban lands are privately owned. Treatment of significant portions of these private lands may be necessary to achieve nutrient reductions from the urban runoff sector at levels identified in the Chesapeake Bay TMDL.

There are significant obstacles associated with controlling nutrient and sediment loads in runoff from private property, as well as concerns regarding how private property retrofits would be

implemented and maintained. To pursue implementation by local governments, localities may have to acquire extensive easements through negotiation and condemnation for the installation and maintenance of treatment measures. Easement acquisition would unreasonably increase costs and extend the implementation schedule. To pursue implementation by property owners, incentive programs, maintenance agreements, and long-term program administration mechanisms would need to be developed; concerns regarding property rights would need to be addressed, and critical levels of land owner participation/implementation would need to be attained. Given the multitude of unresolved issues related to private property, it is anticipated that local strategies will focus on treatment of locality-owned lands until the TMDL process affords more practicable options for treatment of private property.

HRPDC is currently pursuing a grant-funded project to examine the opportunities and constraints for nutrient reductions on private property. The project will examine feasibility, and associated nutrient removal from private property BMPs, with the objective of developing strategies to encourage voluntary installation of BMPs by land owners.

3.6.2 Unregulated Urban Lands

Some localities have urban areas that are not regulated under the VPDES permit for the locality MS4. Examples include the City of Suffolk, Isle of Wight County, James City County, Surry County, and York County. Many of the issues associated with controlling nutrient and sediment loads from private lands also apply to unregulated urban lands. Localities do not have authority to require retrofits on unregulated urban lands, but Virginia has attributed a significant portion of the urban load to these areas.

Most unregulated urban lands are located within localities with significant rural areas. Local nutrient reduction strategies for these lands will likely be limited to retrofits of schools, community centers, and municipal center sites that are located outside the MS4 permit boundaries.

3.6.3 Agricultural and Forested Lands

Agricultural and forested lands exist in some portions of Hampton Roads. Localities with such lands conducted outreach to multiple sectors to collaborate on strategies. Coordination efforts varied by locality, but primarily included SWCDs and the Virginia Department of Forestry. For localities with agriculture and forest lands, local strategies may prioritize the implementation of nutrient reductions from rural sources. Such opportunities may be more cost-effective than seeking nutrient reductions from urban sources. However, local governments have no authority over activities on agriculture lands and do not regulate or control the implementation of agricultural or forestry best management practices. It is expected that State support will continue for existing SWCD educational programs and cost share assistance to agricultural producers who install conservation practices on their farms.

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4 Programmatic Strategies

Hampton Roads localities have many existing nutrient reduction programs. The Chesapeake Bay Preservation Act has implemented land use practices to protect water quality for over 20 years and stormwater regulations have restricted nutrient loads from new development. The revised stormwater regulations will require no net increase in nutrient loads from new development and reduce loads by 20% for redevelopment. Six localities have Phase I MS4 permits and six localities are under the Phase II MS4 general permit. The MS4 localities have developed stormwater programs that include many strategies that support the Chesapeake Bay TMDL implementation.

The most common nutrient management strategies in Hampton Roads are street sweeping, catch basin cleaning, storm drain vacuuming, reduction of illicit discharges, public education programs addressing pet waste and construction of structural BMPs. Many existing BMPs are wet ponds which reduce flooding by providing storage capacity but do not provide as much nutrient removal as the urban BMPs in Virginia's Phase I WIP. The filtration and infiltration BMPs in the Phase I WIP have high efficiency removal rates but due to the high water table and poorly draining soils in Coastal Virginia, these BMPs are not widely used.

Each locality has selected specific strategies that fit the locality's needs and opportunities which will be identified in the locality Phase II WIP submittals. The following subsection describes the initiatives and alternatives that the Regional Steering Committee identified and recommends the State support and submit to the Chesapeake Bay Program (Bay Program) for approval.

4.1 Alternate BMPs

The localities in Hampton Roads have identified numerous strategies and practices that will reduce nutrient loads that are not included in the Bay Program's models. In some instances, the Chesapeake Bay Program and Maryland have initiated studies to define and approve these alternate BMPs. However, there are a few alternate BMPs that have not been adequately studied and additional research must be conducted to quantify their effectiveness. Also, nutrient source reductions, such as eliminating air pollutants and boat discharges, should be accounted for in the Bay models and guidance on how to track and report those efforts should be established by the state and Bay Program. Virginia and the EPA should lead efforts to research and approve the following alternate BMPs.

4.1.1 Air Deposition

The Chesapeake Bay Program Water Quality Implementation Team approved revisions to the atmospheric deposition credit decision rules at the May 23, 2011 meeting. The revisions aimed to allow "additional nitrogen credits realized through more stringent controls at the jurisdictional level, beyond minimal federal requirements". Localities should be allowed to apply for credits that are implemented at a local scale instead of state-wide. EPA should improve monitoring programs to measure nitrogen from vehicles and quantify the nitrogen reductions associated with reducing miles traveled or switching to electric or natural gas vehicles. Localities should be allowed to take credit for programs that reduce air emissions that are the source of nitrogen loads on urban lands.

4.1.2 Illicit Discharges

The Hampton Roads localities report and track the volume of sanitary sewer overflows. Significant resources have been and are being spent to reduce overflows and plans are underway to rehabilitate and expand the capacity of the wastewater system to further reduce overflows. The Bay model should account for these reductions by developing an Illicit Discharge BMP as discussed by the CBP Wastewater Treatment Workgroup.

4.1.3 No Discharge Zones

Hampton Roads has miles of waterways and hosts thousands of boaters each year. There is potential to reduce the nutrients released into the Bay and its tributaries by instituting No Discharge zones in our tidal waters. The amount of nitrogen and phosphorus pumped out of holding tanks and treated at wastewater treatment plants instead of released directly to the Bay could be estimated. The City of Virginia Beach has found that the implementation of No Discharge zones has contributed to water quality improvements in the Lynnhaven River. If MS4 localities could include No Discharge zones as a part of their compliance strategy, it would encourage the establishment of more pump-out facilities which would reduce the potential health threats associated with high bacteria levels in sewage discharged as well as reducing nitrogen and phosphorus loads to the Bay.

4.1.4 Terminal Reservoirs

Several localities in the region host drinking water reservoirs which drain large portions of the Chesapeake Bay watershed. Most of the reservoirs are terminal reservoirs from which water is withdrawn and pumped to a water treatment plant. Very little water is ever discharged from the terminal reservoir dams so the runoff collected by the reservoir drainage areas does not reach the Bay or its tributaries. The Bay models include the impact of large dams on nutrient transport; however, the documentation is not extensive. The Bay Program should provide additional analysis to help localities evaluate whether the models sufficiently simulate the nutrient and sediment captured by existing reservoirs. Localities may also consider how dam releases could be managed to minimize the nutrients and sediment released in extreme storm events.

4.1.5 Oyster Reef Restoration and Construction

The Hampton Roads localities support the use of oyster reef restoration and construction as alternate BMPs for compliance planning purposes, as well as the eventual approval of these BMPs. The City of Virginia Beach has proposed restored sanctuary oyster reefs as a result of a study by the City, Army Corps of Engineers, and Virginia Institute of Marine Science. The same study quantified the annual reduction in nitrogen, phosphorus, and sediment loadings per acre of oyster reef in the Lynnhaven River. This research, along with a previous study of oyster reef nutrient removal in Maryland's Choptank River and the extensive existing literature on the ability of oyster reefs to reduce sediment loads, should inform decisions regarding the efficiencies of oyster reef restoration and construction.

4.1.6 Submerged Aquatic Vegetation Restoration

The Chesapeake Bay Program surveys the amount of submerged aquatic vegetation and includes the information in the Water Quality model. The nutrient reductions associated with submerged aquatic vegetation are included in the bay modeling simulations but are not quantified and published so localities can evaluate submerged aquatic vegetation restoration as an alternate BMP. Localities need adequate information to evaluate the cost effectiveness of submerged aquatic vegetation restoration and the Bay Program should develop a method of crediting restoration by locality.

4.1.7 Floating Wetlands

The Hampton Roads localities support the use of floating wetlands as an alternate BMP for compliance planning purposes, as well as the eventual approval of this BMP. This BMP would primarily be used to enhance treatment in existing wet ponds and retention basins. When compared to BMPs like construction of detention or retention basins, floating wetlands can be rapidly implemented and provide more cost-effective stormwater treatment with additional environmental benefits. There is significant existing research describing the efficiencies of treatment wetlands and an ongoing pilot project at the Norfolk Zoo; localities are interested in more studies for specific application in Virginia. Future studies, along with existing research, should inform decisions regarding the BMP efficiencies of floating wetlands.

4.1.8 Wetland Restoration

There are many opportunities in the region to restore different types of wetlands. Localities recommend that the Chesapeake Bay Program evaluate the nutrient and sediment removal efficiencies of forested wetlands, freshwater emergent wetlands, and tidal marshes and establish credits for their restoration. In order to acknowledge and protect the water quality contributions of existing wetlands, the Watershed model should track wetlands as a separate land use, instead of categorizing them as forest (further discussion of wetland restoration is provided in Section 5).

4.1.9 Urban Tree Canopy

Many localities have established programs to increase the urban tree canopy. The Bay Program should approve their Forestry workgroup's proposal to allow urban tree planting to be modeled as planting 100 trees is equivalent to converting one acre of urban pervious land to forest.

4.1.10 Street Sweeping

Credit for Street Sweeping has been approved by the Bay Program. However, there are two methods of reporting street sweeping: mass loading approach and qualifying street lanes method. The mass loading approach includes a calculation to estimate the nitrogen and phosphorus contained in the solids removed. Virginia recommended that localities use the qualifying street lanes method. Most Hampton Roads localities do not sweep streets bi-weekly so the miles swept do not qualify for nutrient reduction credits under the qualifying street lanes method. Localities do track street the weight of sweeping solids collected during sweeping, and the Bay Program Street Sweeping memo lists the mass loading approach as the preferred option. However, the VAST tool does not allow localities to take credit for the nutrient removal associated with the sweeping solids. Hampton Roads localities recommend that Virginia

promote reporting using the mass loading approach and encourage the Bay Program to apply nutrient removal credits in accordance with their guidance.

4.1.11 Catch Basin Cleaning and Storm Drain Vacuuming

Maryland has proposed "Catch Basin Cleaning" and "Storm Drain Vacuuming" as alternate BMPs. The proposed removal rates for both BMPs are 1.5 lbs TN, 0.6 lbs TP, and 600 lbs TSS per ton of collected dry material. The Hampton Roads localities recommend that Virginia request the same alternate BMPs.

4.1.12 Trash Removal, Yard Waste Collection, Leaf Recycling

Many localities implement programs to remove trash, collect yard waste or recycle leaves. These programs reduce the organic material available to contribute nitrogen and phosphorus in stormwater runoff. The Bay Program should evaluate these programs, similar to the catch basin cleaning and storm drain vacuuming, to estimate the nutrient removal associated with tons of material collected.

4.1.13 Pesticide Management

The application of pesticides contributes to the amount of nutrients reaching the Bay and its tributaries. Localities should be credited with nutrient reductions by quantifying reductions in pesticide application on public lands or by documenting the effectiveness of public outreach campaigns to minimize pesticide usage. The state should consider the need to track pesticide sales and their impact on water quality.

4.1.14 Education Programs (especially pet waste)

The Hampton Roads localities support the use of education programs as an alternate BMP for compliance planning purposes, as well as the eventual approval of this BMP. The Hampton Roads region has been conducting a public education and outreach program (HR STORM) since 1997 to reduce stormwater runoff and improve local water quality. Reducing the amount of pet waste reaching the stormwater system has been a long-term objective of the program. Reducing pet waste as a source of nutrients should be an approved nutrient management strategy. Localities could document the effectiveness of HR STORM by surveying public participation and understanding of its messages or reporting the number of pet waste disposal bags distributed.

4.1.15 Shoreline Erosion Control, Offshore Stabilization, and Outfall Stabilization

Shoreline Erosion Control, Offshore Stabilization, and Outfall Stabilization are viable opportunities for localities to reduce nutrients and sediment reaching the Bay and its tributaries. The state has suggested that localities track and report these activities as Stream Restoration in the Stream Restoration BMP. The guidance for the Stream Restoration BMP should be more detailed and provide additional examples of equivalent practices especially in tidal waters. The Bay Program should evaluate the efficiencies of different types of shore stabilization, particularly living shorelines, which the state is advocating through the wetlands regulatory program. Also, the state should request that the Stream Restoration efficiencies be updated as soon as the BMP panel issues its findings.

4.1.16 BMP Retrofits

Since many localities in Hampton Roads are highly developed urban areas, some structural BMPs will need to be built on properties that are already developed. These BMP Retrofits may be constrained by site conditions and buildings so the BMPs cannot be built to the same specifications as BMPs designed in conjunction with new development. The Bay Program has acknowledged the need for guidance and established a panel workgroup to develop a methodology for determining credit for BMP Retrofits. The region supports this initiative and urges the state to advocate for flexibility for this type of BMP.

4.1.17 BMP Enhancements and Restoration

The Bay Program has established a panel workgroup to define types and removal efficiencies for BMP enhancements. Hampton Roads localities intend to repair and improve many existing BMPs, particularly wet ponds. These improvements will increase the function of the BMPs and should be credited with additional nutrient and sediment removal.

BMP facilities that were constructed prior to 2006 were included in the Watershed model calibration. It is generally believed that older facilities do not function as well as new ones due to deterioration and lack of maintenance. Their deteriorated condition would be accounted for in the calibration. Any restoration to BMPs to improve their ability to remove sediment or nutrients should be eligible for credit as a reduction strategy. The following scheme for this treatment is proposed.

For facilities that were constructed prior to 2006, there should be three classifications of restoration:

1. Sediment Removal – Removal of sediment, slimes or non-vegetative debris that is equal to or greater than 1/10 the volume of the facility. For wet pond, the volume of the facility would be where the water was at the normal water elevation or invert of the outfall pipe. For dry ponds or enhanced extended detention facilities, the volume would include the volume of any forebays, to their overflows, and ½ the height of the dewatering structure.
2. Vegetative Harvesting – Removal of excessive, non-planned vegetative growth with off-site sequestration or composting. In cases where the growth of material or its harvesting causes a denuded condition, appropriate plant species shall be restored.
3. Filter Media Enhancements – Removal and sequestration of contaminated material and replacement with a media that is superior to those originally proposed in the design specification (i.e. replacing sand with a sand/organic or sand/zeolite mixture).

For BMP restorations meeting these requirements, the difference, in pounds as a result of pollutant removal efficiency, between the older style BMP and the newer style BMP should be an approved reduction credit.

4.1.18 BMP Conversion

The Bay Program has established a panel workgroup to define types of BMP conversions and their removal efficiencies. The region encourages the panel to consider a wide variety of conversions to provide flexibility and cost effective options for converting existing BMPs into more effective BMPs. Innovations in the treatment of urban stormwater continue to provide new solutions and the Bay program should provide a framework to encourage new technology. If new BMPs and conversions cannot be credited in the model, localities will be reluctant to invest in them.

5 Implementation Challenges and Recommended Initiatives

In general, Chesapeake Bay TMDL implementation challenges can be characterized in terms of:

- Research and model revisions
- Policy support; and
- Funding support.

This section describes the challenges anticipated in implementing nutrient reduction strategies and provides recommended initiatives to address gaps in information and resources. The Hampton Roads region strongly recommends that the state and EPA consider the number and magnitude of these gaps and dedicate more staff and funding resources to the Chesapeake Bay TMDL implementation.

The region recognizes that it is unlikely that all of these initiatives can be supported by the limited resources available. Hampton Roads localities have identified the following initiatives as of the highest priority:

- Increase the budgets for the Agricultural BMP Cost-share Program and the Conservation Reserve Enhancement Program and double the Soil and Water Conservation District staffing to promote and manage these programs (see Section 5.3.1).

- Issue a $300 million state bond measure to finance wastewater upgrades, taking advantage of low interest rates (see Section 5.3.4).

- Expand the Virginia Agricultural BMP Cost-Share Program or establish a new Septic System Cost Share Program to provide 50% of the projected total average annual cost of $114 million to assist required septic system upgrades or replacements, to incentivize denitrifying upgrades to non-failing septic systems, and to allow cost-share funds to be used for connecting septic systems to sanitary sewer systems in sewered areas (see Section 5.3.2).

- Expand the Chesapeake Bay Preservation Act to include all localities within the Chesapeake Bay Watershed.

5.1 Initiatives for Research and Model Revisions

Further research and revisions to the Chesapeake Bay model are recommended to improve water quality management programs and guide WIP implementation strategy decisions. HRPDC supports the use of EPA and Virginia funding and staff support to pursue the initiatives listed below:

5.1.1 Incorporate Local Data into Models

The Bay Program should develop a process for incorporating local land use data into the Bay models as soon as possible and, at a minimum, ensure that the information is incorporated into the 2017 model calibration. As part of the Phase II WIP process, many localities have mapped their land use/land cover. This information is more appropriate for implementation planning and tracking progress than using the current methodology for estimating land use throughout

the Bay watershed. The Bay modelers should provide criteria for the type and format of land use data that they can use in the models.

Virginia should develop a framework for collecting local data and issuing BMP guidance and updates on the Bay program's modeling efforts. The lack of a framework and clear expectations has frustrated local planning efforts and development of implementation strategies. Specifically, the state should provide:

- Template for tracking BMP data and schedule for submitting the data.
- Frequently asked questions for Urban BMPs.
- Updates describing recently proposed BMPs, approved BMPs or revised modeling assumptions.
- Process for localities to request addition of alternate BMPs to the Chesapeake Bay Watershed Model.
- Assumptions regarding the redistribution of locality target reductions based on the implementation of the fertilizer ban, additional L3 level of reductions on federal lands instead of L2, and changes to air deposition due to the construction or closure of stationary sources.
- Schedule and process for incorporating locality corrections for pre-2006 BMPs.

5.1.2 Implement Water Quality Monitoring in Coastal Virginia to Estimate Urban Loads

The Bay Program does not collect and calculate nutrient and sediment loads for the tidal areas of Virginia. The technology and equipment exists to measure the water quality and flowrates but it is expensive and more difficult than gathering data in non-tidal areas. The Bay Program should gather data from tidal zones to validate loading rates and measure the ratio of nitrogen, phosphorus, and sediment in urban runoff from Virginia's Coastal Plain. Virginia should consider partnering with localities to provide financial assistant to expand water quality monitoring in tidal areas.

5.1.3 Evaluate Impact of Extreme Weather Events

This year the impact of major storm events on water quality in the Bay attracted media attention and scientific interest. However, the research remains incomplete and fails to provide assessments on whether extreme weather events have a more significant impact on the long-term water quality in the Bay than the day-to-day nutrient reductions. Given the significant investment of funds required to meet the TMDL by 2025, the Bay Program should focus research on evaluating the potential need for BMPs designed to minimize the impact of extreme storm events.

5.1.4 Revise Segmentsheds in Each Basin to Reflect Hydrodynamics

Several segmentsheds in the Hampton Roads region may have been incorrectly assigned to drainage basins. The localities request that the state or Bay modelers provide the justification to support basin assignments for segmentsheds, specifically, the assignment of the Lynnhaven River to the James River basin and the assignment of portions of the City of Poquoson to the Mobjack Bay basin, and consider model revisions to accommodate all segmentsheds that discharge directly to the Chesapeake Bay.

5.1.5 Designate Wetlands as Land Use Category

The current land use framework tracks wetlands under the forest category. This causes confusion and suspicion that the wetland loading rates do not reflect the capacity of wetlands to reduce the quantity of runoff and reduce nutrient and sediment loads. The Watershed model should be revised to track wetlands as a separate land use category with an appropriate loading rate.

5.1.6 Evaluate BMP Effectiveness to Reduce Bacteria Impairments

In Hampton Roads, many waterways are impaired for bacteria. Localities would like to select BMPs that would address bacteria impairments as well as reduce nutrients. The region requests that Virginia's Department of Environmental Quality dedicate approximately $50,000 of the funds for development of TMDL implementation plans to provide an assessment of BMPs that provide nutrient <u>and</u> bacteria reductions.

5.1.7 Evaluate BMP Effectiveness to Reduce Flooding

Many localities experience extensive flooding and would like to select BMPs that alleviate flooding as well as reduce nutrients. The region requests that Virginia dedicate approximately $50,000 of the funds for flood control and emergency planning to provide an assessment of BMPs that provide nutrient removal <u>and</u> flood control.

5.2 Initiatives for Policy Support

The region supports policy efforts to realize cost effective nutrient reductions. The following nine initiatives are discussed in this section:

1. Expand the Nutrient Credit Exchange program;
2. Expand the Chesapeake Bay Preservation Act (CBPA) to the entire Chesapeake Bay watershed;
3. Expand septic system pump-out requirements statewide, require retrofits for failing systems, and grant counties the authority to require sanitary sewer system connections where appropriate.
4. Amend the Virginia Code to allow all Virginia localities to adopt an ordinance containing a set of tree canopy preservation requirements based on development density.
5. Provide permit controls for stormwater runoff from currently unregulated urban lands;
6. Define and encourage redevelopment;
7. Streamline the Resource Protection Area (RPA) process to facilitate BMPs that provide nutrient reductions from urban waterfront or coastal areas;
8. Encourage voluntary stormwater reuse in appropriate areas;
9. Partner with non-governmental organizations (NGOs) to promote private property BMP retrofits; and

10. Extend implementation schedule for TMDL and/or Special Order of Consent for Sanitary Sewer System Overflows to reduce fiscal stress on rate payers, or provide federal funding for implementation of both EPA requirements.

5.2.1 Expand Nutrient Credit Exchange Program

The Nutrient Credit Exchange program should be expanded to provide for local government involvement. Program expansion will offer localities greater flexibility in selecting cost effective nutrient management strategies to meet the required TMDL nutrient reductions. Virginia is advocating that local governments manage nutrient reductions within locality boundaries. Therefore, Virginia should provide localities with greater control in nutrient trading such that locality staff expertise on nutrient management opportunities may be applied toward water quality improvements at the local scale.

The following recommendations are offered regarding program expansion:

- The Nutrient Credit Exchange program framework should allow, but not require, MS4 permit holders to trade with all sectors and also allow credits to be part of MS4 compliance strategies. Allowing localities to trade broadly will help develop and underpin the market, which will benefit all sectors. Allowing credits to be part of MS4 compliance strategies gives even greater purpose to an expanded trading program and thus deepens the market.
- Localities should be provided with the authority to establish local nutrient credit programs and banks, allowing localities to set priorities to improve and protect local water quality.
- Localities should be notified of credits generated and certified on private property within its respective boundaries and, ideally, allowed to purchase the credits before they are offered to other entities in the exchange.

Additionally, some details related to an expanded Nutrient Credit Exchange program should be considered as part of legislation or later in the regulatory process:

- The watershed scale where credit trading may occur should be defined, and localities should be allowed to restrict trades to a smaller scale to meet local water quality goals.
- The program should, at a minimum, track phosphorus and sediment reductions associated with nitrogen credits and eventually allow phosphorus and sediment credit trading.
- Localities should be allowed to create and sell credits even if the total TMDL target reductions for the MS4 have not been met. For example, localities might increase street sweeping, sell the credits, and use the payments for credits to build regional BMPs. As MS4 permits are to be dynamic and iterative from one five-year permit cycle to the next, it would be prudent to include creative ways to capitalize upon progress as such progress is being realized so that additional work and benefits can be sparked.
- The program should allow trades from different sectors at a 1:1 ratio. When the original nutrient credit exchange program was put in place, a 2:1 ratio was instituted to address scientific unknowns at the time. Today, better information exists to support BMP efficiencies and such a ratio is not needed. The use of this error factor likely has been

detrimental to market development. The current 2:1 ratio is so high that agriculture-to-treatment plant trades are not occurring.

- Virginia should be required to review credit certification applications within 60 days of submittal. Efficiency in the credit trading system is important to its market development. Enabling regulations for the program should require the state agency designated to review credit certification applications do so in a reasonably short period of time.

5.2.2 Expand Chesapeake Bay Preservation Act to the Entire Chesapeake Bay Watershed

The CBPA was implemented in 1990 by all of the localities in the region. The restrictions on land development and evaluation of water quality impacts have reduced the nutrients reaching the Bay. The region urges the state to expand the CBPA to the entire Chesapeake Bay watershed to provide for locality authority to implement development and stormwater controls to support nutrient reductions. Within the CBPA, development must meet general performance criteria that are designed to reduce nonpoint source pollution and/or protect sensitive lands from disturbance. These criteria include:

- Preserve natural vegetation
- Minimize the area of land disturbance
- Minimize the installation of impervious cover such as pavement
- Strictly control soil erosion during land clearing and construction
- Control the quantity and quality of stormwater runoff
- Pump out septic tanks once every five years
- Provide a reserve drainfield for septic tanks, which equals the waste treatment capacity of the primary drainfield
- Complete site plan review for all development
- Control stormwater quality in agricultural and forested areas.

5.2.3 Expand Septic System Pump-out Requirements and Provide County Authority to Require Sanitary Sewer System Connections

Hampton Roads localities support the expansion of existing regulatory authority and the creation of new regulations to address the nutrient reductions from the onsite wastewater/septic system sector. The following recommendations are offered to inform policy making:

- Expand the 5-year septic system pump-out requirement statewide and require retrofits for failing systems: As most septic system nutrient reductions cannot be enforced through any existing permit programs, Virginia should expand the 5-year septic system pump-out requirement to include all systems in Virginia. Virginia should also enforce requirements for retrofits of failing septic systems.

- Grant counties the authority to require sanitary sewer system connections: Cities in Virginia already have the authority to require homes and facilities on septic systems to connect to the municipal sanitary sewer system in service areas. Virginia should grant

counties the same authority and address this need with a single policy action that applies to all counties at once.

5.2.4 Allow all Localities to require Tree Canopy Preservation

The region supports the amendment of Virginia Code Section 15.2-961.1 that would enable all Virginia localities to adopt an ordinance containing a set of tree canopy preservation requirements based on development density. Section 15.2-961.1 was adopted during the 2008 General Assembly session and is currently applicable only to the localities within Planning District Eight. Increasing the urban tree canopy is an inexpensive method to reduce nutrient loading through runoff reduction and will allow localities to reduce the cost of achieving nutrient reductions for urban stormwater.

5.2.5 Provide Permit Controls for Stormwater Runoff from Unregulated Urban Lands

Virginia's December 2011 draft Phase II WIP indicates that MS4 permits will be utilized to ensure BMP implementation on existing developed lands achieves nutrient and sediment reductions equivalent to specified levels. Virginia plans to require MS4s to develop, implement, and maintain Chesapeake Bay Watershed Action Plans consistent with the WIP.

Many localities have developed areas that are essentially urbanized, but are not included in the locality MS4 permit-regulated area. Localities do not have authority to enforce MS4 permit compliance or require retrofits on unregulated urban lands. If Virginia intends, as indicated in the state's draft Phase II WIP, to utilize MS4 permits to ensure nutrient and sediment reductions on developed lands, then Virginia should expand the area regulated under MS4 permits to include all developed lands. The upcoming EPA rulemaking may likely result in the redesignation of urban areas. Upon redesignation of urban areas, Virginia is encouraged to minimize any lag between EPA rulemaking and incorporation of revisions into Virginia's regulations and MS4 permits.

5.2.6 Define and Encourage Redevelopment

The revised statewide stormwater management regulations require redevelopment projects to reduce phosphorus loads by twenty percent. HRPDC applied for and received Coastal Zone Management Program grant funds to pursue a project to address this initiative. The Coastal Zone study will coordinate with local planners to define redevelopment, promote better tracking of redevelopment activities, and identify the potential for nutrient reductions associated with redevelopment goals in Comprehensive Plans and other local initiatives. The study will evaluate the cost effectiveness of nutrient reductions as part of redevelopment projects and evaluate potential strategies to encourage more redevelopment or expand new BMPs to treat adjacent lands during redevelopment projects. The state should provide additional economic incentives for redevelopment, such as development grants, and elevate the priority of redevelopment projects that support Chesapeake Bay TMDL implementation goals to the highest level, facilitating the project approval process.

5.2.7 Streamline the RPA Process to Facilitate BMPs that Provide Nutrient Reductions from Urban Waterfront or Coastal Areas

Coastal and waterfront development tends to be dense, with high land values and construction costs. Installing new stormwater BMPs or retrofits in urban waterfront and coastal areas is

difficult and primarily constrained by the lack of available land area and high cost of development, part of which is the result of the arduous permitting process. Nutrient reductions from these developed areas can be addressed by installing BMPs located in adjacent riparian areas, instream sites, or downstream wetland areas, which are typically located in the Resource Protection Areas (RPAs) of the CBPA.

Virginia should revise the permitting process to streamline and prioritize approvals for projects proposed in RPAs when the primary purpose of the project is to provide stormwater sector nutrient reductions from existing development. Stream channels altered for treatment and constructed wetlands are efficient in removing nutrients, sediment, and bacteria, but such BMPs are difficult to implement given the regulations, permitting, and approval process related to development in RPAs. Consideration should be given to projects where the primary scope is to install BMPs to treat stormwater runoff from adjacent developed areas, especially if the project provides for long-term maintenance and is planned in consultation with the locality.

5.2.8 Encourage Voluntary Stormwater Reuse in Appropriate Areas

Virginia's regulations do not aggressively encourage rainwater harvesting and stormwater reuse. If commercial and residential property owners were encouraged to capture rainwater and use it for irrigation or for toilet flushing, the quantity of water reaching the Bay would be reduced and the quality would be improved. The state should revise the building code to support the use of cisterns and the Health Department should evaluate the advantages of allowing stormwater reuse within residential buildings. State support is needed to advocate for Bay model incorporation and credit for nutrient management from rain barrels other stormwater reuse activities. Lastly, the state should promote and fund the use of harvested rainwater or stormwater reuse instead of potable water consumption for industrial and manufacturing processes.

5.2.9 Partner with Non-Government Organizations to Promote Private Property Retrofits

The goal of this initiative is to evaluate the feasibility of implementing BMPs on private property and estimate the potential nutrient removal of these BMPs. HRPDC applied for and received Coastal Zone Management Program grant funds to pursue a project to address this initiative. CH2M Hill and Wetlands Watch have started the Coastal Zone study which includes conducting outreach to non-profit organizations to catalog existing BMPs that were implemented through grant-funded efforts and other voluntary projects and compiling information on voluntary and mandated private property stormwater management programs and practices, including financial incentive programs and utility credits. A roundtable is scheduled in January 2012 to discuss the initial findings and gather feedback from NGOs, developers, and local government staff on the most promising ideas.

The region needs the state to support this approach by considering what data tracking would be required for MS4s to include BMPs, especially LID features, on private property as part of their permit compliance strategies and TMDL implementation. Localities also encourage the EPA to require federal grant recipients to track and report BMP implementation at a level of detail that would satisfy permit requirements and could be incorporated into the Bay models. Eventually, more effort will be required to maintain federally funded BMPs and programs after the grant period. Federal and state grant managers should partner with localities to ensure that projects are capable of long-term sustainability, consider constraints related to private property issues, and continue to contribute to the Chesapeake Bay TMDL implementation.

5.2.10 Extend Implementation Schedule for TMDL and/or Special Order of Consent for Sanitary Sewer System Overflows

The EPA has acknowledged that compliance with Clean Water Act (CWA) requirements for stormwater and wastewater is typically accomplished through independent planning and that this approach may not allow local governments to cost-effectively address and prioritize the most serious water quality issues (see EPA web page titled Integrated Municipal Stormwater and Wastewater Plans: http://cfpub.epa.gov/npdes/integratedplans.cfm). Current economic challenges are stressing implementation of all CWA programs, and EPA has indicated that applying an integrated planning process will allow local governments to determine the critical path to achieving water quality objectives by identifying efficiencies in implementing wastewater and stormwater requirements. EPA has noted that the CWA and implementing regulations, policy, and guidance provide the necessary flexibility to implement an integrated planning process.

The Chesapeake Bay TMDL constitutes the region's stormwater CWA obligations. As noted in Section 3 of this report, HRSD must comply with the new point-source discharge permit requirements. According to the November 18, 2011 Senate Finance Committee Report, the estimated costs of wastewater sector upgrades necessary to achieve compliance with the Chesapeake Bay TMDL are more than $586 million.

As for the region's wastewater CWA obligations, EPA placed HRSD under a federal Consent Decree to address sanitary sewer overflows (SSOs); the federal agreement is complemented by the Virginia DEQ's Special Order by Consent between HRSD, 13 Hampton Roads localities and the Virginia State Water Control Board. HRSD and localities are actively working on required milestones to address the federal and state wastewater agreements. Given the planning and anticipated implementation schedule, the wastewater compliance activities and the Chesapeake Bay TMDL activities are in competition for fiscal resources. The funds for wastewater compliance activities will be collected from individual rate payers through both the wastewater collection system maintenance fee charged by localities and the sewage conveyance and treatment fee charged by HRSD. HRSD rates are predicted to increase over the next several years to fund necessary improvements. Likewise, localities are also likely to increase rates to fund improvements. More definitive cost information will be developed, but compliance with the federal and state agreements will likely require hundreds of millions of dollars.

Considering the concurrent stormwater and wastewater CWA obligations for the Hampton Roads region, the EPA is urged to implement an integrated planning process for regional wastewater and stormwater CWA obligations and to extend the implementation schedule for the Chesapeake Bay TMDL and/or the HRSD Consent Decree to reduce fiscal stress on rate payers. Likewise, Virginia is urged to extend the schedule for the Special Order of Consent between HRSD and localities. EPA should also consider providing federal funding for implementation of both EPA requirements.

5.3 Initiatives for Funding Support

The November 18, 2011 Senate Finance Committee Report, "Chesapeake Bay TMDL Watershed Implementation Plan: What will it cost to meet Virginia's goals?" estimates the total cost to implement the Chesapeake Bay TMDL in Virginia at $13.6 to $15.7 billion, but identifies only $3.2 billion of that cost as the portion to be funded by the state. The report asserts that the remaining implementation costs will be borne by local governments, utility rate payers, farmers,

and private property owners. The following initiatives for state funding are supported by the Region:

1. Provide state funding for agriculture sector nutrient reductions.
2. Provide state funding for onsite wastewater/septic sector nutrient reductions.
3. Provide state funding for urban/suburban stormwater sector nutrient reductions.
4. Provide state funding for wastewater sector nutrient reductions.
5. Provide state funding for Transportation-related Urban Sector Nutrient Reductions.
6. Provide state funding and staff to address initiatives for research and model revisions (see Section 5.1) and initiatives for policy support (see Section 5.2).

5.3.1 Provide State Funding for Agriculture Sector Nutrient Reductions

The agriculture sector is a significant source of nonpoint source pollution in Virginia. Therefore, expanded use of agricultural BMPs could realize significant water quality benefits. Agricultural producers and farmers are interested in land practices that protect water quality and have the additional benefits of soil conservation and efficient use of farm resources. It is critical that Virginia continues to fund and provide adequate staff to develop the following programs to robust levels with the capacity to meet the demand for program participation:

- The Virginia Agricultural BMP Cost-share Program and Conservation Reserve Enhancement Program; and
- The Virginia BMP Tax Credit Program.

These programs, administered by the local SWCDs, facilitate the implementation of agricultural BMPs by offering financial and technical assistance as incentives to carry out construction or implementation of selected BMPs. The cost-share program's BMPs can often be funded by a combination of state and federal funds.

Adequate funding and staff resources should be provided to the Agricultural BMP Cost-share Program and Conservation Reserve Enhancement Program, considering SWCD administration of the program. Currently, the demand for cost-share assistance is greater than the program's capacity to meet assistance requests. With no dedicated funding source, the potential for nutrient reductions from Virginia's agricultural areas is limited by the program's resource constraints. According to the November 18, 2011 Senate Finance Committee Report, there is currently no base funding for the required technical assistance provided by the local SWCDs, and the funding need is estimated to increase significantly from FY 2013 to 2018. Also, as the program is currently structured, the out-of-pocket cost to a farmer to implement a BMP project may make the project infeasible. Program changes that apply means testing and allow for hardship exemptions will likely enable a larger group of farmers to implement voluntary BMPs.

The BMP Tax Credit Program supports voluntary installation of agricultural BMPs by allowing producers with an approved conservation plan to take a credit against state income tax. This program and other state tax credit programs that encourage the use of conservation equipment must be maintained and strengthened to encourage more voluntary nutrient management on agricultural lands.

Agricultural BMPs provide inexpensive means of reducing pollutant loads. The cost-per-pound of nutrients removed is generally one to two orders of magnitude less than the cost of nutrients

removed from wastewater and stormwater. Virginia should support existing agriculture BMP incentive programs and seek additional opportunities to optimize BMP implementation in this sector. Virginia should double the SWCD staffing to promote and manage these programs.

5.3.2 Provide State Funding for Onsite Wastewater/Septic Sector Nutrient Reductions

The Chesapeake Bay TMDL requires nitrogen reductions in the onsite wastewater/septic system sector. Tools are needed to incentivize septic system upgrades that provide for denitrification of treated effluent. Many septic systems are non-failing, but are not operating efficiently. Because upgrading these systems would provide nutrient reductions for the sector, Virginia should support and fund the following:

- Expand the Virginia Agricultural BMP Cost-Share Program or establish a new septic system cost share program, to assist with the cost of required upgrades or replacements and to incentivize upgrades to non-failing septic systems to denitrifying systems and allow cost-share funds to be used for connecting septic systems to sanitary sewer systems in sewered areas. The November 18, 2011 Senate Finance Committee Report estimates the total average annual cost of $114 million for septic system retrofits and annual system maintenance; cost share funds should be provided equal to 50% of the projected costs.
- Establish tax credits for the upgrade or replacement of existing conventional systems with nitrogen reducing systems, or for the connection of septic systems to existing sanitary sewer systems.

5.3.3 Provide State Funding for Urban/Suburban Stormwater Sector Nutrient Reductions

Achieving nutrient reductions from urban/suburban stormwater sector sources is significantly more expensive than achieving the same reductions in other sectors. The cost-per-pound of nutrients removed is generally one to two orders of magnitude greater than the cost of nutrient removal at wastewater treatment plants and agricultural BMPs. Furthermore, the cost to implement stormwater retrofits in existing developed areas is much higher than the cost to install stormwater management practices for new development. For most urban localities, Phase II WIP strategies include stormwater retrofits on public property. However, the costs to implement stormwater retrofits are principally borne by local governments, and effectively, individual rate payers.

Currently, there are no dedicated funds for stormwater retrofit cost-share or grant programs; the surplus-funded Virginia Water Quality Improvement Fund (WQIF) is the only existing mechanism to provide state cost-share and grant funds for stormwater sector projects.

Virginia should dedicate funds to support urban/suburban stormwater sector nutrient reductions. The purpose of WQIF is to provide water quality improvement grants to local governments, SWCDs, and individuals for point and nonpoint source pollution prevention, reduction and control programs. If this program is to be employed in any state strategy to address urban/suburban stormwater sector nutrient reductions, the following key issues need to be addressed:

- The WQIF does not have adequate funding. The surplus money used to fund the program limits the projects implemented through the program.

- The WQIF guidelines favor prioritization of projects that provide point source pollution reductions from the wastewater sector and nonpoint source pollution reductions mainly from the agriculture sector. Only a small amount of funds benefit the urban/suburban stormwater sector.

Virginia should consider the appropriate regulatory and administrative actions to address urban/suburban stormwater sector nutrient reductions using the WQIF. Options to strengthen program capabilities include:

- Increasing the total amount of funding to the WQIF program;
- Provide a dedicated funding source that does not rely on surplus funding; and
- Revise the program guidelines to give some priority to projects that support coastal community networking to engage multiple local governments in projects such as shoreline restoration and stream restoration.
- Revise the program guidelines to give some priority to projects for urban/suburban sector nutrient reductions.

If Virginia intends the WQIF to remain focused on point source pollution reductions from the wastewater sector and nonpoint source pollution reduction from the agriculture sector, the state is urged to develop new options to fund urban/suburban sector nutrient reductions.

5.3.4 Provide State Funding for Wastewater Sector Nutrient Reductions

According to the November 18, 2011 Senate Finance Committee Report, the estimated costs of wastewater sector upgrades necessary to achieve compliance with the Chesapeake Bay TMDL are more than $586 million. Additionally, the current shortfall in the state's existing obligations to localities for cooperatively-funded projects is over $104.4 million. The Virginia Water Quality Improvement Fund will not be sufficient to address the cost of required improvements. To address this need, Virginia should consider the following options:

- Increase funding to the WQIF for wastewater sector projects; and
- Issue a $300 million state bond measure to finance wastewater upgrades, taking advantage of low interest rates.

If Virginia does not pursue the above options or other means of providing increased state financing for wastewater upgrades, local wastewater utility rates will increase, and the financial burden to implement wastewater sector upgrades will be borne by local rate payers.

5.3.5 Provide State Funding for Transportation related Urban Sector Nutrient Reductions

The Bay Program's Science and Technical Advisory Committee (STAC) published a summary of its "Workshop on Atmospheric Deposition of Nitrogen" (STAC Publication 09-001). The major findings suggest that vehicle exhaust is the largest source of fossil-fuel derived nitrogen pollution. Data was presented that indicated that "the rate of deposition of nitrogen in the immediate vicinity of roads and highways can be very high, with much of this occurring as the direct deposition of nitrogen gases to surfaces such as roads, tree, and buildings rather than falling in precipitation". The key recommendation from the workshop is that "there be much greater emphasis on treating urban and highway stormwater runoff to help reduce the nitrogen pollution that is deposited onto these surfaces". The Hampton Roads localities recommend that

Virginia provide the funding and staff required for VDOT to treat stormwater runoff from state-owned roads to the L2 implementation level or higher.

5.3.6 Provide State Funding and Staff to Address Initiatives for Research and Model Revisions and Initiatives for Policy Support

Sections 5.1 and 5.2 of this report provide recommended initiatives for:

- Further research and revisions to the Chesapeake Bay model; and
- Policy efforts to realize cost effective nutrient reductions.

Virginia requested that localities identify gaps in information and resources. The research and model revision initiatives and the policy initiatives described earlier in this section were formulated to address these gaps and must be adequately funded to support Virginia's compliance with the Chesapeake Bay TMDL.

6 Regional Scenario

This section presents the preferred water quality management scenario for the Hampton Roads region that provides the level of treatment similar to the Virginia Phase I WIP. As noted in the overview of the regional planning approach in Section 1, the regional scenario was prepared by HRPDC as supplemental material intended as an appendix to the February 2012 local government Phase II WIP submittals to DCR.

HRPDC staff developed the regional scenario and supporting planning approach and assumptions to addressing DCR's request for localities to "review the 2017 and 2025 BMP scenarios as identified in the Phase I WIP and develop preferred local scenarios that provide a similar level of treatment." The scenario represents aggregate information for the region and generally reflects the BMPs and programs that have proven to be effective in Hampton Roads. However, the regional scenario is just one possible solution to meeting the Phase I WIP level of effort.

The planning approach and assumptions applied by HRPDC staff were developed for the purposes of providing the preferred regional management scenario only. Therefore, the utility of the information is limited to the regional scale, and any attempt to interpret or distribute the aggregate information contained herein across individual Hampton Roads localities or at any smaller scale likely will result in false conclusions and misrepresentation of local information. In summary, the regional scenario proposed is expected to change as new information and data, management tools, and sources of funding are made available to the localities. Therefore, while the information in this report is representative of local government planning efforts, it does not reflect unconditional local government commitments and should not be interpreted to constitute unqualified local-level actions or future programs.

This section describes the methodology used to develop the scenario, the assumptions applied, and the results of the exercise. Corrected land use information for Hampton Roads is provided as input to future revisions of the Bay model. Localities support the use of the regional scenario as the preferred BMP scenario for Hampton Roads and request that DCR utilize the information herein instead of the default Phase I WIP scenario for non federal lands in Chesapeake, Hampton, Isle of Wight County, James City County, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Surry County, Williamsburg, Virginia Beach, and York County.

6.1 Scenario Development Methodology

HRPDC staff collected and aggregated information from localities to accomplish the following objectives:

- Create 2011 Progress scenario in the Virginia Assessment Scenario Tool (VAST) based on locality records of BMPs implemented since January 1, 2006.
- Calculate the gap between Hampton Roads 2011 Progress and the Phase I WIP level of effort.
- Develop Hampton Roads preferred regional scenario that meets the Phase I WIP level of effort.

6.1.1 Creation of 2011 Progress Scenario

The method used to consolidate Hampton Roads locality data and create the 2011 Progress scenario is described below. This analysis evaluates nutrient loads and reductions from non-federal lands. The percent treatment is calculated based on 2010 VAST land use data excluding federal lands.

- Agriculture sector: Apply the 2010 Progress scenario as a baseline and edit data to account for agriculture BMP updates and agricultural land use corrections provided by Isle of Wight and James City County.

- Septic sector: Apply corrections to existing septic system data to reflect locality reported data. If a locality could not provide this data, the number of septic tanks in the 2010 Progress scenario created by DCR was applied.

- Urban Stormwater sector: Apply the BMPs in the 2005 Progress scenario provided by DCR plus the locality reported post-2005 BMP data. Erosion and sediment control treatment was applied to 33% of acres of the regulated construction land use based on locality provided data. No additional BMPs were specifically entered for treatment of developed State lands unless the locality reported them. Existing BMPs on State land may be partially captured in DCR's 2005 Progress Scenario.

6.1.2 Creation of Draft Preferred Regional Scenario to Meet Phase I WIP Level of Effort

The preferred Regional Scenario was created by adding locality-submitted preferred scenarios to the 2011 Progress scenario. Future BMPs on developed State lands were accounted for by applying the Phase I WIP for urban stormwater to the estimated acres of developed state owned lands.

- Agriculture sector: Apply Phase I WIP BMPs, then edit it if any localities included agricultural BMPs in their preferred scenario.

- Septic sector: Apply 2011 Progress plus locality information indicating planned septic to sewer conversions planned between 2011 and 2025. Apply an annual pumpout rate of 20% to reflect the 5 year pumpout Chesapeake Bay Act requirement.
- Urban stormwater sector: The number or acres of proposed BMPs in each locality scenario were applied. If a locality's preferred scenario was submitted in terms of implementation levels, BMPs were normalized to a percentage of the Phase I WIP treatment scenario (see discussion of Urban BMP implementation levels below). All locality scenarios were applied to regulated urban lands, except in Isle of Wight, James City and Surry Counties where urban BMPs were also applied to non regulated urban lands. The BMPs applied to non regulated urban lands in the 2005 Progress scenario were also included in the draft regional scenario. Erosion and sediment control was assumed to be 90% on regulated construction and 95% on extracted lands.

6.1.2.1 Urban BMP implementation levels

If the locality's strategies for urban stormwater BMPs were provided as non-numerical estimates of "high," "medium," and "low" implementation, HRPDC staff identified "high" as equal to 100% of the Phase I WIP level of implementation, and estimated lower percentage values for

"medium" and "low" implementation. Implementation levels applied in this analysis are as follows:

High: Average regional Phase I WIP treatment level

Medium: 50% of the average regional Phase I WIP treatment level.

Low = 25% of the average regional Phase I WIP treatment level.

6.1.2.2 Accounting for Phase I WIP Level of Effort on State Owned Lands

The analysis of State lands discussed in Section 3 was used to apply the Phase I WIP for urban lands to the estimated acres of state owned developed land. The Phase I WIP scenario (L2) in Table 6-1 below was applied to the estimated developed state acres for each locality. The number of BMPs calculated represents the total acres treated by each BMP in 2025. In order to account for existing BMPs on State owned lands, a percentage of the 2005 Progress BMPs (provided by DCR) equal to the percentage of state owned developed land within the locality was calculated as the 2005 baseline. Additional BMPs were included so the total number of BMPs applied to State owned lands equaled the Phase I WIP L2 scenario. All state owned developed lands were assumed to be regulated and resulting BMPs were applied to regulated lands, except for rural localities where the acres treated by urban BMPs exceeded the total regulated developed acres within the locality. For those rural localities (Surry and Isle of Wight Counties), BMPs to treat state owned land were applied to non-regulated developed lands.

Table 6-1: Phase I WIP Level of Treatment Applied to Developed State Lands

BMP Type	Phase I WIP Level of Treatment
Dry Detention Ponds and Hydodynamic Structures	4.2%
Dry Extended Detention Ponds (new)	9%
Impervious Urban Surface Reduction	7.5%
Street Sweeping Mechanical Monthly	7%
Urban Filtering Practices	4%
Urban Infiltration Practices - no sand/veg no underdrain	4.4%
Urban Nutrient Management (annual)	26.8%
Wet Ponds and Wetlands	10.7%

6.1.3 Calculation of Gaps between Initial Preferred Regional Scenario and Phase I WIP Level of Effort

After incorporating locally submitted data on existing and future BMPs for all thirteen localities within Hampton Roads, the Regional Preferred Scenario achieved a level of effort greater than the Phase I WIP for nitrogen and sediment. However, the preferred scenario only met 87% of the Phase I level of effort for phosphorus.

6.1.4 Identify and Apply Additional BMPs to Fill the Gaps and Meet the Phase I WIP Level of Effort

In order to meet the Phase I WIP level of effort for phosphorus, the initial Preferred Regional Scenario was revised based on the following:

1. Erosion and sediment control on regulated construction was increased from 90% to 95% to reflect better enforcement of erosion and sediment control regulations on construction lands.
2. Urban nutrient management was increased by 10% on non regulated and regulated urban lands. This increase conservatively estimates the impact of the recently passed fertilizer restrictions which will reduce the amount of phosphorus applied to urban pervious lands.

The above changes resulted in a final Regional Preferred Scenario that met 93% of the Phase I WIP level of effort for phosphorus. The BMP implementation levels for the final Regional Preferred Scenario are presented in Table 6-7. In order to close the gap further between the Regional Preferred Scenario and the Phase I WIP the following calculations were performed outside of VAST:

1. Reduction of an additional 2200 pounds of phosphorus due to compliance with the Special Order of Consent for Sanitary Sewer Overflows. The Hampton Roads Sanitation District, HRSD, estimated that the elimination of sewer overflows would result in preventing 15,500 pounds of nitrogen and 2,200 pounds of phosphorus from reaching the waters that drain to the Chesapeake Bay.
2. Reduction of an additional 24,000 pounds of phosphorus due to street sweeping. As mentioned in Section 4 of this report, the Chesapeake Bay Program approved two methods for calculating pollutant reductions due to street sweeping. The recommended method is the mass loading approach. This method directs a locality to record the mass of street solids collected from qualifying streets. It further states that nutrient reduction credit can be estimated by multiplying the dry weight of the solids by .0025 for nitrogen and .001 for phosphorus. Currently, the Virginia Assessment and Scenario Tool (VAST) used to estimate the pollutant reductions of the Regional Preferred Scenario only calculates the sediment removal for street sweeping.

6.2 Corrections to Land Use Data

The locality land use corrections were compiled for the Hampton Roads region and compared to the land use in the 2010 No BMP scenario in VAST (Table 6-2). The data illustrates significant differences in the local land use data and the VAST data. Without maps of these two sets of land use data, it is difficult to evaluate the specific mischaracterizations of lands or identify the boundary discrepancies.

Table 6-2 also estimates the pounds of nutrients associated with local land use corrections. The acres of local land use corrections were multiplied by the average, regional loading rate for each land use type based on the 2010 No BMP scenario. This analysis points out the importance of resolving discrepancies in land use. However, the data has a few flaws that reduce its usefulness.

Many localities provided evaluations of land use that do not equal the same total land area as VAST. This makes it very difficult to estimate how many acres of one land use were mischaracterized as a different land use and adjust the 2011 Progress nutrient loads. Additional time and analysis will be required to incorporate local land use corrections to the 2011 Progress and Preferred Regional scenario.

Table 6-2: Locality Land Use Corrections

	Total Local Corrections *	Average load per Acre of Land Use Type in HRPDC based on VAST (Edge of Stream)			Calculated difference in regional loads based on Local Land Use versus VAST Land Use		
Landuse	**acres**	**lbs N per acre**	**lbs P per acre**	**lbs TSS per acre**	**Total N Load change**	**Total P Load change**	**Total TSS Load change**
Agriculture	**(3,016)**				**91,932**	**30,293**	**1,407,574**
alfalfa	(404)	4.13	0.49	106.48	(1,669)	(198)	(43,029)
animal feeding operations	3	1106.92	205.12	250.85	3,874	718	878
concentrated animal feeding operations	(1)	1824.09	357.93	54.22	(1,148)	(225)	(34)
degraded riparian pasture	(162)	89.27	17.52	286.07	(14,421)	(2,830)	(46,212)
hay with nutrients	(455)	5.23	0.63	107.40	(2,378)	(286)	(48,832)
hay without nutrients	1,079	1.76	0.34	140.68	1,898	367	151,736
hightill with manure	(7,901)	15.22	1.75	457.51	(120,252)	(13,827)	(3,614,764)
hightill without manure	(52)	8.77	0.78	633.39	(454)	(40)	(32,771)
lowtill with manure	1,658				-	-	-
nursery	411	142.69	66.36	197.34	58,712	27,305	81,199
nutrient management alfalfa	-				-	-	-
nutrient management hay with nutrients	-				-	-	-
nutrient management hightill with manure	2,146	15.22	1.75	457.51	32,662	3,756	981,816
nutrient management hightill without manure	586	8.77	0.78	633.39	5,139	457	371,167
nutrient management lowtill with manure	1,079				-	-	-
nutrient management pasture	-				-	-	-
pasture	(987)	4.64	1.24	26.95	(4,581)	(1,224)	(26,608)

*Positive values mean locality estimates more acres than VAST.
Grey cells - Need either loading rates for land uses with nutrient management or local land use without BMPs.

Table 6-2: Locality Land Use Corrections (continued)

	Total Local Corrections*	Average load per Acre of Land Use Type in PDC based on VAST (Edge of Stream)			Calculated difference in regional loads based on Local Land Use versus VAST Land Use		
Land use	**acres**	**lbs N per acre**	**lbs P per acre**	**lbs TSS per acre**	**Total N Load change**	**Total P Load change**	**Total TSS Load change**
Combined Sewer	-				-	-	-
CSS construction	-				-	-	-
CSS extractive	-				-	-	-
CSS impervious developed	-				-	-	-
CSS pervious developed	-				-	-	-
Forest	**5,254**				**(4,986)**	**(195)**	**(202,555)**
forest	6,295	1.69	0.07	12.92	10,639	441	81,334
harvested forest	(1,042)	15.00	0.61	272.54	(15,625)	(635)	(283,888)
mining	(319)				**(2,928)**	**(899)**	**(300,852)**
nonregulated extractive	(257)	9.51	2.93	1034.52	(2,442)	(752)	(265,683)
regulated extractive	(51)	9.46	2.85	684.51	(486)	(146)	(35,169)
Urban	**(16,386)**				**(329,602)**	**(6,000)**	**3,037,456**
nonregulated impervious developed	3,976	8.09	1.58	441.06	32,164	6,282	1,753,561
nonregulated pervious developed	(10,379)	7.27	0.48	69.79	(75,459)	(4,982)	(724,383)
regulated construction	(1,469)	18.63	5.34	2152.93	(27,369)	(7,845)	(3,162,829)
regulated impervious developed	17,578	8.63	1.63	491.37	151,697	28,652	8,637,209
regulated pervious developed	(47,637)	8.62	0.59	72.76	(410,635)	(28,106)	(3,466,102)
Water	**2,235**						
water	2,235	7.79	0.66	0.00	17,412	1,475	-
Grand Total	(11,913)				**(228,172)**	**24,675**	**3,941,623**
Grand Total without water	**(14,148)**				**(245,584)**	**23,200**	**3,941,623**

*Positive values mean locality estimates more acres than VAST.

6.3 Regional Scenario

The regional scenario includes management strategies for agricultural land, septic systems, and urban land. The nutrient reductions for the wastewater sector were not included in the local targets so they are not addressed in this scenario. The state requested a water quality management scenario that provides a level of treatment similar to the Phase I WIP. The Phase I WIP level of effort for the thirteen localities included in the Hampton Roads regional scenario was defined as the difference in nutrient loads from the 2010 No BMP scenario compared to the Phase I WIP scenario that the state created in VAST.

Table 6-3: Hampton Roads Phase I WIP Level of Effort

VAST Scenario	Nitrogen – Edge of Stream (lbs)	Phosphorus – Edge of Stream (lbs)	Sediment – Edge of Stream (lbs)
2010 No BMPs	4,160,790	381,682	82,509,855
Phase I WIP	3,619,775	303,502	67,717,132
Level of Effort (required reductions by 2025)	541,016	78,181	14,792,723

The preferred regional scenario results in nutrient and sediment reductions that are similar to the Phase I WIP level of effort. In order to meet the phosphorus load goals, nitrogen and sediment have been reduced beyond the goal. This knowledge that phosphorus is the most difficult pollutant to reduce by the required amount may drive localities to revise future implementation scenarios to maximize phosphorus removal. The nutrient reductions resulting from the final Preferred Regional Scenario and the additional estimated load reductions are summarized in Table 6.4.

Table 6-4: Hampton Roads Preferred Regional Scenario

VAST Scenario	Nitrogen – Edge of Stream (lbs)	Phosphorus – Edge of Stream (lbs)	Sediment – Edge of Stream (lbs)
2010 No BMPs	4,160,790	381,682	82,509,855
Regional Scenario	3,419,712	309,250	43,495,493
Nutrient Reductions resulting from Regional Scenario	741,079	72,432	39,014,362
Nutrient reductions from Regional Scenario plus SSO and Street Sweeping Reductions	818,531	99,413	39,014,362

The methodology followed to develop the regional scenario was discussed in Section 6.1. The land use data in VAST shows 69,206 acres of agricultural lands for the Hampton Roads region (approximately 10% of the total land). Two localities provided local agricultural management strategies that were able to be included in the regional scenario. The Phase I WIP agricultural strategies were included for the rest of the localities. All localities provided input on the urban management strategies. The inputs for the regional scenario are summarized in Table 6-5 through Table 6-7.

Table 6-5: Edits made to Phase I WIP Scenario for Agriculture for Hampton Roads Preferred Regional Scenario*

BMP	Phase I WIP Level	Locality Specified Level
Cover Crop Standard Drilled Wheat on hightill without manure	8%	25%
Continuous no till	0	100%
Nutrient Management on lowtill with manure	11%	100%
Wetland restoration on hightill manure	.1%	7%

*In order to incorporate these changes into the Regional Scenario and Virginia's Phase II WIP, the affected localities need to be identified. However, these changes only result in a difference of 500 pounds of phosphorus which does not change the percent attainment of the Phase II WIP goal for phosphorus reduction.

Table 6-6: Summary of Septic Inputs to VAST for Regional Preferred Scenario

2010 Progress VAST Septic Systems	50,267
Number of Septic Systems Currently present according to locality data	27,935
Number of Septic Systems Estimated by localities to be present in 2025	22,515
Number of disconnects needed to represent locality systems in 2025	27,752
Percentage of connections entered in Vast	55%
Assumed Annual Pumpout	20%

Table 6-7: Summary of Urban BMP Inputs to VAST for Regional Preferred Scenario

Land Use	BMP Type	2005 Progress BMPs	2006 - 2011 Locality Reported Implementation	Additional Locality BMPs from 2011-2025	WIP I on State lands	Total 2025 Treatment	2025 Percent Treatment
Construction							
	EandS (Acres) (Annual)		1,094				95%
Regulated Extractive							
	EandS (Acres) (Annual)		398				95%
Unregulated Extractive							
	EandS (Acres) (Annual)		0				95%
Unregulated Urban							
	StreetSweep (Acres) (Annual)	-	0	0	14.66	15	0.13%
	UrbanNutMan (Acres) (Annual)	-	376	0	200.70	577	21.55%*
	Impervious Urban Surface Reduction (Acres)	-	0	0	15.71	16	0.14%
	ExtDryPonds (Acres Treated)	7,478	57	0		7,535	15.68%
	DryPonds (Acres Treated)	2,587	94.64	0		2,682	5.58%
	WetPondWetland (Acres Treated)	4,792	611.15	0		5,403	11.25%
	Infiltration (Acres Treated)	45	26.2	0	13.76	85	0.18%
	Filter (Acres Treated)	184	13.564	0	8.97	206	0.43%
Regulated Urban				0		-	
	Bioretention		190.97	1298.22		1,489	0.70%
	Bioswale		78.8	1078.82		1,158	0.54%
	StreetSweep (Acres) (Annual)	-	0	1271.16	237.02	1,508	2.11%
	StreetSweep (lbs) (Annual)		22,783,200	27,790,000		35,401,240***	
	Urban grass buffers (acres)		27.2	72.37		100	0.07%
	Tree Planting (Acres)		4.55	1183.82		1,188	0.84%
	UrbanNutMan (Acres) (Annual)	-	541.7	27221.85	1826.38	29,590	40.97%*
	Impervious disconnect****		5.11	440.29		445	0.62%

Land Use	BMP Type	2005 Progress BMPs	2006 - 2011 Locality Reported Implementation	Additional Locality BMPs from 2011-2025	WIP I on State lands	Total 2025 Treatment	2025 Percent Treatment
Regulated Urban	Impervious Urban Surface Reduction (Acres)	-	77.09	566.68	252.15	896	1.26%
	UrbStrmRest (linft)	-	4970	5500	329.2	10,799	
	ExtDryPonds (Acres Treated)	14,503	914.7	1024.02	467.47	16,909	7.96%
	DryPonds (Acres Treated)	14,061	860.07	3086.272	6.81	18,014	8.48%
	WetPondWetland (Acres Treated)	15,811	6096.79	11508.14	347.11	33,763	15.89%
	Infiltration (Acres Treated)	258	628.1	138.67	558.48	1,583	0.75%
	urban forest buffers		676	376.43		1,052	0.75%
	Shoreline Erosion (In feet)**		5040	11687		16,727	7.87%
	Filter (Acres Treated)	557	448.1	982.94	380.83	2,368	1.12%
	Vegetated Open Channel			2468.04		2,468	1.16%
	Permeable pavement			50		50	0.02%

BMP applied only to impervious developed lands

BMP applied only to pervious developed lands

* Reflects additional 20% implementation to simulate fertilizer restrictions.

** Modeled as Stream restoration in VAST as suggested by DCR.

***Reflects locality reported pounds converted to dry weight (=.7 * 50,573,200)

****Modeled as impervious urban surface reduction in VAST.

The nutrient and sediment reductions achieved by the regional scenario exceed the Phase I level of effort. However, there are several data and modeling issues that must be resolved to accurately assess the region's ability to ultimately meet the requirements of the Chesapeake Bay TMDL.

- Land use must be corrected to evaluate the baseline loads in Hampton Roads. The land use corrections will likely require recalibration of the Bay Program's Watershed model. The recalibration may adjust loading rates for each land use. Then the state will need to allocate the nutrient and sediment reductions based on the new model results.

- Pre-2006 BMPs were included in the current model calibration. DCR provided a list of pre-2006 BMPs in December 2011. Several Hampton Roads localities compared their records of pre-2006 BMPs to DCR's model input of pre-2006 BMPs. The state's estimates were significantly different than the local data. It is unclear if this model input will be revised and how it will change the distribution of nutrient loads.

- The regional scenario applied urban nutrient management on 22% of non regulated developed pervious land and 41% of regulated pervious land. This estimate may be too conservative. Virginia's future fertilizer restrictions may further reduce nutrient loads on developed pervious land.

- Localities submitted existing and future levels of implementation for BMPs that cannot currently be simulated in VAST. Many of these alternate BMPs are discussed in Section 4 of this report. If and when any of these BMPs are added to the Chesapeake Bay Model, localities will adjust their plans accordingly.

The land use discrepancies and inaccuracies in existing BMP implementation levels can only be resolved through recalibration of the Chesapeake Bay Watershed Model. This should be completed prior to referencing any aggregate waste load allocations from the TMDL in any MS4 permit. As stated in Section 1 of this report, the preferred regional scenario is just one possible solution to meeting the Phase I WIP level of effort. Changes in state policies and funding would influence BMP selection. Most importantly, the scenario cannot be implemented by 2025 without additional research to support alternate BMPs and the creation of new funding sources to assist the localities with their implementation.

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