COMMONWEALTH of VIRGINIA

Chesapeake Bay TMDL
Phase I Watershed Implementation Plan

Revision of the Chesapeake Bay Nutrient and Sediment Reduction Tributary Strategy

November 29, 2010

PREAMBLE TO VIRGINIA'S PHASE I WATERSHED IMPLEMENTATION PLAN

The Chesapeake Bay is a national treasure and an ecological wonder. As Virginians, we are committed to ensuring a clean and vibrant Chesapeake Bay for future generations to cherish. We strongly believe a clean Bay is good for the economic well being of the State.

Since the submission of our draft plan on September 3, and EPA's response to the draft, we have been involved, along with EPA, in various stakeholder and public comment meetings across the state. During these sessions groups expressed their opinions and feedback on our draft plan. As a result, we have made substantial changes to the draft Plan after consultation with EPA, many stakeholders, and the public.

We have now crafted a good, amended plan that addresses the issues raised by EPA, and allows us to achieve pollution reductions absent "backstops" from EPA. However, the unexpected results of the most recent model run received from EPA on Tuesday, November 23 that showed a surprising allocation gap of more than a million pounds of nitrogen, force us to submit this plan as only an "initial submission." With only 14 work hours before the November 29 deadline we could not fully react to this very late data, although working through much of the holiday weekend we have been able to devise changes increasing the Wastewater Treatment load reduction significantly. Per discussions between Chuck Fox, EPA Senior Advisor to the Administrator for the Chesapeake Bay, and Martin Kent, the Governor's Chief of Staff, Virginia and EPA will continue to work to modify this plan over the next 7 to 10 days. These extra days will allow for additional model runs to identify ways to close this unexpected gap in the plan.

As we did in our draft plan, we must reiterate Virginia's concerns about the process, cost, legality, allocations, and compressed timing in the development of this plan. EPA asserts that it must develop the Bay TMDL by December 31, 2010 pursuant to the requirements of the Consent Decree entered in the case American Canoe Association et al. v. the United States EPA , 54 F. Supp. 2d 621 (E.D. Va. 1999). We note, again, that Virginia was not a party to that case, and the Consent Decree established a deadline of May 1, 2011 for the EPA to establish TMDLs for certain identified Virginia waters and pollutants if Virginia had not done so itself. This rush to completion has caused concerns in local governments and industry as well.

It is important to emphasize again that this plan is being developed during the worst economy in generations. Virginians have already invested billions of dollars in Chesapeake Bay water quality improvement to date. Full implementation of this plan will likely cost more than $7 billion new dollars which would be another federal unfunded mandate on the state, localities, private industries, and homeowners. In addition to the new health care law and other new regulatory burdens, it is placing enormous new fiscal stress on state budgets. However as a show of good faith, the Governor will include $36.4 million new dollars in our Water Quality Improvement Fund in his 2011 budget amendments. In these austere times, we cannot guarantee what additional funding will be provided by our General Assembly. It is our position that the success of the WIP may be subject to the provision of sufficient federal funding to assist in covering these massive new unfunded mandates.

As we indicated before, Virginia will move forward with the implementation of this plan with a clear focus on flexibility and cost effectiveness. For instance, it is our belief that an expanded nutrient credit exchange program will afford the same approach to other sectors, particularly urban stormwater and septic systems, and it will allow for decisions to be made across sectors in an orderly and cost-effective manner. Therefore Virginia will rely on principles of adaptive management taking advantage of new technology and low cost methods that may become available in the next 15 years to achieve our goals.

Again, Virginia must state its significant concerns with the nearly absolute reliance on management by computer model. While the Bay model has seen years of development it continues to experience flaws that call its outcomes into question. We are especially concerned that level of precision expected is far beyond what the model is capable of and fails to consider the economic consequences of its actions.

I would also call your attention to our proposed approach for the James River watershed. Because of its geographic location, the James has less impact on the water quality of the mainstem of the Chesapeake Bay than any other river. The James also is unique because of the chlorophyll standards that were adopted in 2005 with the concurrence of EPA. We believe that because sufficient new information is available for the James River, we should take the time necessary to review the James River numeric chlorophyll standards to ensure that they reflect the best science and regulatory approaches. Therefore, we have included a detailed plan to accomplish this review and amend standards if necessary prior to the scheduled revision of the TMDL in 2017. We will also consider developing a local chlorophyll-based TMDL for the James River. Our plan demonstrates that we will meet the 2017 target loads prescribed by EPA in all basins, including the James.

Based on all these issues, Virginia again reserves the right to adjust this plan based on new information such as conservation efforts currently implemented but not accounted for in the model, adverse economic impacts on business, funding availability from federal and other sources, and improved scientific methodologies.

We understand that our work will not end with the submission of our Watershed Implementation Plan. We will continue to work with EPA, stakeholders, and the public to ensure that our implementation improves water quality in a manner that is sensible, fair and cost effective as this process unfolds over the next 15 years. The Governor is fully supportive of all reasonable efforts to improve this great natural resource in conjunction with the leaders of the other Bay states.

Douglas W. Domenech
Secretary of Natural Resources
November 29, 2010
Richmond, Virginia

Virginia Watershed Implementaton Plan: TABLE OF CONTENTS

SECTION 1: VIRGINIA'S PLAN: OVERVIEW

The Phase I Watershed Implementation Plan (WIP) has been developed by the Commonwealth of Virginia as required by the U.S. Environmental Protection Agency (EPA) as an implementation plan for the Chesapeake Bay Total Maximum Daily Load (TMDL).

1.1 Background and Approach to WIP Development

The Chesapeake Bay TMDL WIP can become a continuation of work begun with Virginia's Tributary Strategies in 2005. Adoption of the tributary strategies resulted in significant progress in a number of areas of point and nonpoint pollution control including:

- Establishment of first in the Chesapeake Bay watershed cap on nutrient loads from significant point source dischargers.
- Establishment of a nutrient credit exchange program that has been successful in ensuring orderly and cost-effective upgrades of sewage treatment plants.
- Expansion of nutrient management on a wide variety of land uses.
- Accelerated and focused agricultural cost-share program, including special emphasis given to "priority practices."
- Consolidated and strengthened stormwater management program
- Improved oversight and implementation of local erosion and sediment control and Chesapeake Bay Preservation Act programs
- Improved reporting of agricultural best-management programs to ensure full credit is given
- Improved reporting of stormwater management practices.

This plan charts out actions necessary to achieve the Chesapeake Bay TMDL allocations between now and 2025 with the greatest emphasis on actions planned between now and 2017. It incorporates the principles of adaptive management so that the success or failures of actions can be evaluated and adjustments to programs and strategies are made. This plan incorporates the experience of tributary strategy development along with new knowledge and new tools.

The WIP acknowledges shortcomings in available data or in our ability to analyze data where this is an issue. The actions proposed will be based on the best available science and data, but we expect the base of knowledge and information to expand and to make adjustments accordingly in consultation with affected stakeholders and the Environmental Protection Agency (EPA). Virginia is also bound by the provisions of state law that require cost evaluations along with a benefit analysis for implementation plans. Adjustments to this plan will be considered based on cost effectiveness and other key factors.

Although the Chesapeake Bay TMDL is often discussed and thought of conceptually as a single TMDL, it is comprised of 92 segments. Virginia contributes drainage to 39 segments within the watershed. All 39 segments are listed as impaired for excessive nutrients and sediments.

The WIP contains pollution loads allocated or assigned to different source sectors of nitrogen, phosphorus and suspended solids. These sectors include wastewater treatment plants, agriculture, forest, urban stormwater, onsite/septic and air sources that contribute to the nutrient and sediment (also referred to as total suspended solids or "TSS") problems of the Chesapeake Bay. The plan also provides broad strategies proposed to meet those allocations. In accordance with federal expectations, those strategies and contingencies included in the plan are intended to meet reasonable assurance requirements for the Chesapeake Bay TMDL. However, we acknowledge that this is a plan and does not confer any additional budgetary, regulatory or legal authority to governmental agencies. Any programs or strategies that are not currently authorized by state law or regulation may be pursued through the legislative process or through the Virginia Administrative Process Act.

1.2 Guiding Principles for Virginia's Watershed Implementation Plan

- Equity: This plan seeks to approach each sector with significant but achievable actions in a way that all sectors share in meeting TMDL allocations.

- Cost-effectiveness: This plan charts out actions and timeframes in a manner that emphasizes cost effective practices. It plans actions in a step-wise fashion over time to allow for less costly actions to be taken first, before more expensive actions are conducted. This plan also proposes an expanded use of the Nutrient Credit Exchange or other offset mechanisms to allow for flexibility in meeting reduction targets and TMDL allocations.

- Credit Past Progress: Nutrient and sediment reduction in the Chesapeake Bay watershed does not begin with this plan. Nutrient reduction has been taking place in a significant fashion for more than a decade. This plan recognizes the significant progress made and the relative progress among sectors.

- Reasonableness and Feasibility to Implement: This plan attempts to set high expectations for practices that are likely to be implemented across all sectors, not simply those that are theoretically possible but are not reasonable to expect given significant technical, legal or financial barriers.

- Meeting EPA's Reasonable Assurance: EPA has advised that any plans submitted must meet the so-called "reasonable assurance" test. While there is some uncertainty to the meaning of that term, this plan includes necessary references to existing authority and means of implementation. For example, in cases where action requires additional legal authority, Virginia will chart a path for seeking such authority.

- Incorporating Future Actions: Allocations will be set at a level that presumes expected reductions from new and enhanced programs with the recognition that if such programs fail, the plan will be revisited and alternatives pursued.

- Course Correction in 2017: The plan is written knowing that new information and technologies will be available in the future, especially post-2017. EPA has established 2017

as an important date on the path to full implementation by 2025. It will be an opportunity to evaluate the significant actions that have taken place and re-evaluate the TMDL allocations based on changing conditions, new science and new technology. Therefore, this plan is less specific for actions in the post 2017 timeframe.

- Determine Best Use of Trading, Credits and Nutrient Exchanges: EPA has encouraged the states to consider exchanges of allocations between basins, and Nitrogen and Phosphorus exchanges within a basin to provide a more reasonable, cost-effective WIP for the Commonwealth. We have therefore included the use of the existing Nutrient Credit Exchange program to ensure that targets are met over the 15 year implementation period of the TMDL. A full description of the process to develop a more expansive program is contained later in this section.

- High Expectation for Federal Lands: Federal facilities in Virginia have made great strides in Chesapeake Bay protection. This plan presumes, as articulated in Executive Order 13508, that federal lands will receive treatment at extremely high levels.

1.3 Use and Limitations of the Chesapeake Bay Model

The TMDL is developed using the Chesapeake Bay model which allows for evaluation of implemented and proposed actions. While meeting the requirements of the model are important in order to meet the technical elements of the TMDL, our focus is on implementing practices and programs that result in real environmental improvement. We will use the model as a management tool, but we will tailor our actions within real scientific, economic, social and political frameworks.

The Chesapeake Bay watershed model is not a perfect representation of actual conditions on the landscape. Rather, it is a rough approximation. As such, we will continue to work with EPA to improve the model and use an adaptive management approach to adjust strategies as necessary based on those improvements. EPA has already committed to fix two known flaws that could result in changes to the strategies articulated in this document. We will also continue to provide EPA with our best information to ensure that the proper uses and limitations of the model are understood by citizens and stakeholders.

1.4 Stakeholder Engagement and the Stakeholder Advisory Group

The Secretary of Natural Resources formed an advisory group to assist in developing Virginia's plan to implement the Chesapeake Bay TMDL. The Stakeholder Advisory Group (SAG) provides a forum for discussion during the development of the Chesapeake Bay TMDL and the WIP. Virginia's approach to engaging a wide variety of interested parties through the SAG resulted in critical feedback on the model inputs, outputs, and the abilities to implement a host of practices across Virginia's bay watershed. The SAG met on December 17, 2009 and February 26, June 15, August 24, and November 16, 2010. Members reviewed and advised on sector pollutant load reductions and the sector allocations that will be used to meet the interim and final goals.

Significant numbers of public comments were received by the end of the comment period on November 8. This plan has been revised based on comments received and the comments will continue to be evaluated as implementation actions take place.

1.5 Summary of Source Sector Strategies

Wastewater

Allocation: TMDL waste load allocations (WLAs) for Significant Municipal and Industrial Facilities are set in two existing regulations: Water Quality Management Planning Regulation (9 VAC 25-720) and Chesapeake Bay Watershed General Permit Regulation (9 VAC 25-820). These are enforceable provisions that "cap" the dischargers' total nitrogen (TN) and total

phosphorus (TP), and allow for nutrient credit exchange to achieve compliance with regulatory requirements. These existing requirements are supplemented by an additional 1.6 million pound reduction of nitrogen and 200,000 lb reduction of phosphorus in the James River prior to 2017 and an additional reduction of 1.0 million pounds of nitrogen and 250,000 pound reduction in phosphorus in the James river post-2017

As described in the James River strategy, the additional nitrogen and phosphorus reductions established for the James River necessary to achieve current standards for chlorophyll "a" have been allocated in the aggregate to the basin beyond 2017 pending planning and technical assessment by significant discharges and a concurrent analysis of the chlorophyll standard. This is fully described in the James River strategy section of this plan.

Allocations for sediment loads will be set at technology levels since wastewater is an insignificant portion of the sediment load. Nutrient WLAs for Non-significant Municipal and Industrial Facilities will be set at levels consistent with the procedure outlined in the Code of Virginia, which establishes the 2005 loads as the levels that cannot be exceeded in the future. Combined Sewer System allocations should be set for communities with combined sewer systems (CSS) at Long Term Control Plan (LTCP) levels with adjustments for future urban stormwater management actions that may reduce the amount of loadings from CSS.

- 2010 – 2011 - Continue Existing Water Quality Management Planning Regulation (9 VAC 25-720) and Chesapeake Bay Watershed General Permit Regulation (9 VAC 25-820) with current loading allocations with additional pre-2017 reduction in the James River.
- Seek legislative changes necessary to require offsets for nutrient loads of less than 1000 gpd either as separate legislation or as a component of amendments to the Nutrient Credit Exchange.
- Seek legislative changes to establish requirement for offsetting loads for discharger that expand to less than 40,000 gpd.

Onsite/Septic

Allocation: This plan attempts to reduce the rate of growth in this sector through regulatory actions and proposes to offset some loads through an expansion of the Nutrient Credit Exchange Program.

- Implement amendments to Virginia Department of Health regulations for alternative systems. The proposed amendments require a minimum 50% reduction in delivered N for all new small alternative onsite systems in the Chesapeake Bay watershed resulting in an effective delivered load to the edge of the project boundary of 4.5 lbs TN/person/year. All large alternative onsite systems will demonstrate compliance with <3 mg/l TN at the project boundary.

- As a component of the revisions to the Nutrient Credit Exchange law proposed in 2012, allow for increased loads from onsite/septic to be aggregated at a jurisdictional level and available for offsets
- Seek revisions to the Code of Virginia will be considered to require all new and replacement systems in the Chesapeake Bay watershed to utilize either (1) "shallow-placed" systems capable of reducing nitrogen loss or (2) denitrification technology to reduce nitrogen loss and consider requirements for additional nitrogen reducing technologies in certain defined sensitive areas.
- Seek revisions to the Code of Virginia that will promote the use of community onsite systems which provide a greater reduction of TN.
- Seek legislative changes necessary to establish 5 year pumpout requirements for septic tanks in jurisdictions within Virginia's Chesapeake Bay watershed (this mirrors the existing requirement for septic tanks within Chesapeake Bay Preservation Act areas).
- Seek legislative changes necessary to establish tax credits for upgrade/replacement of existing conventional systems with nitrogen reducing systems.
- Encourage the use of currently authorized "Betterment Loans" for repairs to existing systems and explore other financial incentives or relief to encourage the upgrade of existing systems especially for low and moderate income households.

Agriculture

Allocations: Allocations are set for unregulated agricultural operations at levels resulting from significantly expanded implementation of conservation and nutrient management plans addressing the application of nutrients, tillage methods, cover crops, retention or establishment of buffers and exclusion of livestock from streams. It is the expectation of this plan that these practices will be widely implemented on agricultural lands. WLA allocations for Concentrated Animal Feeding Operations (CAFOs) are set according to EPA guidance and adjusted to reflect Virginia data with the WLA based on full implementation of practices such as adequate waste storage and barnyard runoff controls.

- Implement resource management plans on most agricultural acres which may include:

  35 foot grass or forest buffers between cropland and perennial surface waters; stream exclusion of livestock over time; implemented nutrient management plans.
- Improve tracking of voluntary agricultural and forestry BMPs.
- Account for all current mandated practices in Concentrated Animal Feeding Operations (CAFO) and permits required for certain poultry operations.
- Provide cost-share funding to achieve implementation of incentive based practices.

Urban Stormwater

Loads from stormwater will be expressed as both waste load allocations (for regulated activities) and load allocations (for unregulated stormwater). Allocations for newly developed land will be set at a level that results in no increase above allowable 2025 average nutrient loads per acre from previous land uses; unless offsets are obtained in the event on-site controls will not fully achieve allowable loads. Allocation for existing urban areas is based on high levels of implementation of management practices described below.

- Revise Virginia's Stormwater Management Regulations to prevent loads increases from new development (currently under revision).
- Additional BMPs on existing pervious and impervious lands through future permits and wider adoption of stormwater utility fees or other funding mechanisms.
- Restrictions for application of non-agricultural fertilizers and voluntary reporting from "for-hire" applicators.
- Municipal/county owned nonagricultural lands receiving nutrients to develop, implement and maintain nutrient management plans.
- Golf courses implement nutrient management plans.
- Controls on certain do-it-yourself non-agricultural lawn and turf fertilizers.
- Incorporate requirements within Virginia's Stormwater Management Regulations (under revision) that redevelopment meets reductions in nutrient and sediment loads.

1.6 James River Strategy

This plan proposes a different approach for the James River given its unique qualities and the chlorophyll standards that apply only to the James.

In 2005 the State Water Control Board adopted several regulations to address the nutrient and sediment impairments in Virginia's portion of the Chesapeake Bay and its tidal rivers, including the James River. In March 2005, the State Water Control Board adopted water quality standards to protect the Chesapeake Bay and tidal rivers; these standards included five new designated uses, numeric criteria for dissolved oxygen, submerged aquatic vegetation and water clarity, and a narrative chlorophyll criterion. Action on numeric chlorophyll criteria for the tidal James River was delayed to give further consideration to public comments and to develop nutrient loading and cost alternative analyses. The Board considered the James River chlorophyll criteria at their June 2005 meeting, and adopted criteria at their November 2005 meeting.

Concurrent with these actions, the Board also amended the Virginia Water Quality Management regulation to include nitrogen and phosphorus allocations for 125 significant wastewater dischargers throughout the Bay watershed that would, along with needed actions by non-point sources, achieve all of the new water quality standards.

Determining the appropriate numeric chlorophyll criteria for the tidal James River was particularly challenging and the rulemaking process included an additional step of using consideration of attainability to help determine the proper criteria since the other lines of evidence did not clearly point to specific and defensible criteria levels. EPA worked with Virginia on these regulations and approved them as meeting the requirements of the Clean Water Act. Virginia immediately began an aggressive program to implement nutrient reductions from point and nonpoint sources, including expenditures and commitments to add nutrient removal facilities at wastewater treatment plants, alone exceeding $1.5 billion. Of this amount, over $400 million has been directed to the James River basin. Localities and industries in the James River basin have developed their regulatory compliance plans and made long-term funding commitments based on the approved regulations.

Recent determinations by EPA during the Chesapeake Bay TMDL development process call into question the conclusions and agreements reached during Virginia's 2005 rulemaking process for the chlorophyll criteria. The draft nutrient allocations for the James River basin issued by EPA on July 1, 2010 are significantly more stringent than the levels that formed the basis for the state regulatory actions taken in 2005 for the chlorophyll criteria and the wastewater treatment plant allocations. Achieving these more stringent allocations would require estimated additional expenditures of between $0.5 to 1.0 billion to the restoration costs in the James basin. In addition, technological advancements since 2005 in field monitoring for the chlorophyll parameter provide a much greater understanding of the concentrations and variability of chlorophyll in the tidal James River. These advancements include "data-flow" monitoring which provides thousands of data points during a single monitoring cruise. Additional scientific research has since taken place, providing a greater understanding of the impact of algae blooms on aquatic life. Also, EPA has recently issued criteria to protect against Harmful Algal Blooms that should be evaluated for application in the tidal James River.

The Commonwealth views the draft nutrient allocations included in EPA's July 1, 2010 letter for the James River basin to be at the lower end of a range of nutrient loads allocations needed to protect the aquatic life uses in the tidal James River. The Commonwealth concludes that additional scientific study is needed to provide a more precise and scientifically defensible basis for setting the final nutrient allocations.

- New information must be evaluated to ensure the Commonwealth's chlorophyll criteria for the tidal James River are appropriately protective of the river's designated uses and are based on the best scientific information and data currently available. This new information includes: application of Harmful Algae Bloom criteria; analysis of data-flow monitoring information to better understand the size and duration of algal bloom events; scientific research; and other information supplied by citizens and stakeholders.
- In order to conduct a thorough review of available information, and to allow sufficient time for the collection of additional data-flow information in the tidal James River during various hydrologic seasons, a three-year time period is needed to complete this study.
- In response to creditable findings from the three-year study, DEQ will ask the State Water Control Board by 2015 to begin the rulemaking process under the Virginia Administrative Process Act to consider amending the chlorophyll criteria in the Water Quality Standards [9

VAC 25-260-310.bb.]. The time estimate for completing the Virginia rulemaking process is 18 to 24 months. Virginia may also consider developing a local James River chlorophyll-based TMDL.

- The schedule described above, not to exceed five years, allows for production of revised chlorophyll criteria well within the time period for Phase 1 implementation of the Bay TMDL.
- As part of the review of the chlorophyll criteria, we will review the modeling framework used in predicting chlorophyll response to changes in nutrient and sediment inputs to the James River. The usefulness of the model can be improved by providing information on algae bloom events, both temporally and spatially, instead of long-term average chlorophyll concentrations.
- Appendix 2 to this Strategy is a draft Study Plan for this review and update of the James River site-specific numeric chlorophyll water quality criteria. DEQ welcomes comments on this draft plan.

James River Implementation Stages:

Stage 1 - Virginia continues implementation of current nutrient regulations in the James River basin with an additional 2.60 mp/y Total Nitrogen ("TN") and 0.45 mp/y Total Phosphorus ("TP") reduction from significant wastewater discharges identified in the final computer model input deck submitted to EPA. The 2012 Watershed General Permit will include those point source allocations in the current permit (no compliance schedule/limits effective January 1, 2011), plus allocations for identified discharges to accomplish the following: i.) an additional reduction of 1.6 mp/y of TN and 0.2 mp/y of TP in the lower tidal James River with a compliance schedule to end December 31, 2016; and, ii.) a provision requiring an additional 1.0 mp/y TN reduction in the lower tidal James River and an additional 0.25 mp/y TP reduction throughout the James River basin with a compliance schedule ending December 31, 2021. These reductions, combined with actions proposed in the other source sectors, will be sufficient to achieve the nutrient allocations for the James River basin needed to meet the dissolved oxygen water quality criteria. Virginia will also achieve by 2017 60% of the total N and P allocations established by EPA on July 1, 2010 with the expected reductions from point sources combined with actions proposed in the other source sectors.

Stage 2 - The remaining 3.3 mp/y N and 0.35 mp/y P reductions called for in the July 1, 2010 allocations in the James River basin to achieve the chlorophyll water quality criteria are assigned as an aggregate waste load allocation (WLA) to all of the significant wastewater treatment facilities in the James River. The Commonwealth expects the TMDL will likewise assign this aggregate WLA in the same manner.

Achieving the chlorophyll-based nutrient reductions, as well as the additional 1.0 mp/y TN and 0.25 mp/y TP reductions described in Stage 1, will be accomplished through a schedule extending into the 2017 Watershed General Permit for the following reasons:

- The July 1 allocations issued by EPA were significantly more stringent than the current point source nutrient control program being implemented by the Commonwealth of Virginia and the dischargers.

- The new chlorophyll-based allocations call for POTWs, with few exceptions, to achieve state-of-the-art treatment [TN = 3mg/l and TP = 0.1 mg/l] throughout the entire James River basin, as well as reductions from industrial dischargers that may not be attainable.
- Achieving these additional significant nutrient reductions in the near term would be disruptive to the on-going nutrient reduction program being implemented through State regulations and permits, financing mechanisms including WQIF Grant Agreements, local debt and sewer rate increases, and related construction of treatment facilities.
- Neither Virginia nor any of the individual wastewater treatment facilities that would be affected has evaluated what engineering and technology changes would need to be made to the various point sources and their recent compliance plans and construction projects in order to adapt to these unanticipated allocation revisions or how long it would take to make those changes.
- In addition to the engineering and technology evaluations, issues of equity, cost-effectiveness, attainability, phasing in multiple projects and financial capabilities at the state and local levels will need to be explored to ensure the best interests of the citizens of the Commonwealth are served.

For the Watershed General Permit effective January 1, 2012, the Fact Sheet accompanying the permit will acknowledge and describe the staged implementation approach. The permit will also contain a schedule for completing the appropriate evaluations described above to ensure that needed additional upgrades to wastewater treatment facilities will proceed expeditiously once the Watershed General Permit is reissued effective January 1, 2017.

The Commonwealth expects to develop a local James River basin TMDL by 2016 following the planning and technical assessments by significant dischargers and a concurrent analysis of, and possible revision to, the chlorophyll standard as described above. This local James River basin TMDL will consider revisions to allocations among all source sectors as needed to achieve equitable and cost-effective nutrient reductions. Specific WLAs will be assigned to each significant wastewater treatment facility and revised allocations to other source sectors as appropriate to meet the TMDL basin allocations.

When the Watershed General Permit is reissued in 2017 it will contain allocations for individual facilities to fully comply with the WLAs of the updated TMDL. The permit will also contain interim milestones leading to compliance with these allocations.

1.7 An Expanded Role for the Nutrient Credit Exchange

In 2005 the Commonwealth took a major step in protecting the Chesapeake Bay by establishing the Chesapeake Bay Watershed Nutrient Credit Exchange Program (Code of Virginia at §62.1-44.19:12). The General Assembly determined that adoption and utilization of a watershed general permit and market-based point source nutrient credit trading program would assist in: (a) meeting pollution reductions and cap load allocations cost-effectively and as soon as possible in

keeping with the 2010 timeline and objectives of the Chesapeake 2000 Agreement, (b) accommodating continued growth and economic development in the Chesapeake Bay watershed, and (c) providing a foundation for establishing market-based incentives to help achieve the nonpoint source reduction goals.

An investment of over $1.5 billion in implementing this program over the past five years has enabled the Commonwealth to achieve significant reductions in nutrient loads discharged to the Chesapeake Bay from Virginia's municipal and industrial wastewater treatment facilities. The Commonwealth is recognized nationally for having one of the most robust, comprehensive, and successful credit exchange programs. Additional information about this program can be found at the following websites:

http://www.deq.virginia.gov/vpdes/nutrienttrade.html
http://www.theexchangeassociation.org/Default.htm

In 2009, the General Assembly expanded the Commonwealth's nutrient offset program by amending the Code of Virginia to allow for a stormwater nonpoint nutrient offsets program to meet nutrient control requirements for new development.

Overview of the Existing Nutrient Credit Exchange Program

- **Wastewater** – full participation in program; have options of either installing additional nutrient removal facilities or buying credits; facilities performing better than their allocations may sell credits in the market.

- **Storm Water [New Development]** – participation in program is limited to new development and to securing non-point source offsets when on-site practices cannot practicably achieve sufficient pollution reductions.

- **Agriculture and Forest Land** – may sell credits only to new or expanding wastewater treatment facilities or new development if the agriculture lands or newly created forest area meet established "baselines" of management practices. A complete description of current baselines for agricultural operations can be found at:

- **Storm Water [Existing Development or MS4 permittees] and On-Site/Septic Systems** – not currently allowed to participate in program.

Need for an Expanded Nutrient Credit Exchange Program

When the Chesapeake Bay TMDL is issued, about half the land area of the Commonwealth will be under nutrient and sediment load allocations that cap the discharge of these pollutants from point and non-point sources. Unless changed, these pollutant allocations will become permanent pollutant caps on each of the major Virginia Bay river basins that all the source sectors, added together, cannot exceed. In order to help meet the challenging pollution reduction requirements imposed by the Bay TMDL, this Phase 1 WIP recommends the Commonwealth expand the nutrient credit exchange program to better ensure that future nutrient and sediment reduction

actions are as equitable and as cost-effective as possible among all of the source sectors. An expanded program also allows local decision-makers to consider nutrient and sediment generating potential as they face development, land use, and capital planning challenges.

The Nutrient Credit Exchange is a tool to allow for greater flexibility in the implementation of necessary nutrient reduction practices. The exchange will also allow for decisions regarding the timing of and location of implementation activities. It is not presumed that the expansion of the Nutrient Credit Exchange will achieve all necessary reductions. As the WIP describes, significant management actions are proposed in each sector with all basins meeting the 60% reduction goal by 2017 and the TMDL allocations by 2025. As with all aspects of TMDL implementation, Virginia will use the two-year milestones to assess the status of the nutrient credit exchange with respect to the WIP.

Expanding the Nutrient Credit Exchange Program

The following is the proposed schedule and preliminary list of issues to be addressed as work begins on a modification to the existing law and program.

TIMELINE:

January 2011: Resolution will be introduced in the General Assembly that directs a study of the nutrient credit exchange program by the Secretary of Natural Resources assisted by a stakeholder group and staffed by state agency personnel. Virginia will notify EPA of all meetings.

March 2011 – October 2011: Meetings of stakeholder group

November 2011 – Report Presented to Governor and General Assembly and sent to EPA.

January 2012 - Introduce bill in House and Senate

July 1, 2012 – Should bill pass, revisions to Credit Exchange Law become effective.

Annual Reporting: Virginia expects that current annual reporting requirements contained in the Code of Virginia will continue and full accounting will be done on an annual basis.

September 1. 2015 – Evaluation of credit availability and expectations for capacity for the Exchange to meet TMDL reductions and development of WIP contingencies for meeting TMDL allocations.

By December 31, 2017 – TMDL allocations modified to reflect credit availability and WIP revisions to assign reduction responsibilities.

ISSUES TO BE ADDRESSED BY STUDY

Available credits based on TMDL allocations and WIP.

The availability of credits from existing facilities and the ability of new sources to generate credits that are sufficient to meet and maintain TMDL allocations is a critical factor in the success of an expanded program. The study will use current information regarding the

availability of credits as reported by the existing Nutrient Credit Exchange, potential credit generation based on existing nonpoint source guidance, and testimony and other information brought to the committee from agencies, academic institutions, private interests, landowners and others. The study will also examine the likely rate of use of credits by various sectors based on growth rates, permit requirements and other factors.

Regulatory "drivers" for participation by additional sectors

The current nutrient credit exchange is "driven" by requirements in the following sectors:

Wastewater: Requirements in § 62.1-44.19:14 of the Code of Virginia that allows use of credits to achieve compliance with nutrient allocations for wastewater treatment facilities authorized to discharge nutrients by the Chesapeake Bay Watershed General Permit.

Stormwater: Requirements in § 10.1-603.4 of the Code of Virginia that allows use of credits in cases when a series of criteria have been met and where "full compliance with post development nonpoint nutrient runoff compliance cannot practicably be met on site" (§ 10.1-603.8:1. D (iv))

Additional Drivers for other source sector to be addressed during the study:

- Analysis of regulatory requirements applied to the onsite/septic including proposed regulatory or statutory changes that require nutrient reducing systems and methods or requirements for local governments to "aggregate" loads from the septic/onsite sector and require offsets those loads from other sectors within a jurisdiction or through the credit exchange within a river basin.

- Requirements of the General Permit for Construction Activity: Regulations are under development that will likely change water quality requirement for construction activities. Virginia law allows for nutrient credits to be used to achieve nutrient reductions required under Section 10.1-603.8:1. With more stringent nutrient criteria under development as well as requirements in the WIP for loadings not to exceed loads from previous land uses, there is likely to be additional demand from new development.

- Requirements to implement the Chesapeake Bay TMDL contained in any MS4 permits. The study will also examine the allocations assigned to MS4 permittees. It will assess the utility of establishing an association of permittees similar to the existing Nutrient Credit Exchange Association who would have collective responsibilities under a watershed general permit or other regulatory vehicle.

"Baselines"

In the existing program, Virginia law establishes "baselines" above which credits can be generated. For point sources, point source credits are the difference between waste load allocation for the permitted facility and the monitored nutrient loads that are discharged by that facility with an adjustment by the applicable delivery factor. For nonpoint sources the Code of Virginia only allows credits for practices that "achieve reductions beyond those already required

by or funded under federal or state laws or the Virginia tributaries strategies plans…" Agency guidance has been developed that has established the parameters from agricultural practices and land conversion. Given the Code of Virginia establishes the baseline for agricultural credits as "Virginia tributaries strategies plans", some modification to the existing program would be necessary to tie the baseline to the TMDL allocations and the underlying agricultural practices contained in the WIP.

Baselines for urban practices have not yet been established and will be addressed in the study. One option is a "performance baseline" that establishes a reduction percentage based on existing urban loads to those established in Virginia's WIP. Under such an approach, credits could be generated from urban lands that go beyond the percentage reduction established in the TMDL on a site by site basis. Another option would be to allow credits to be generated on a practice by practice basis so long as proposed practices exceed the efficiencies presumed in the Chesapeake Bay model.

Land conversions are currently credited in the existing program and modifications may be recommended based on updated modeling information provided by EPA.

Other Key Issues

The existing program has strict certification, enforcement and accounting requirements prescribed in law and regulation and these current standards will be reviewed during the study as well as their applicability to the proposed expansion. The Code of Virginia, Section 62.1-44.19:18 establishes compliance and reporting requirements for the program. Section 62.1 – 44.19:18 empowers the Department to audit and take other actions necessary to ensure that reports are correct.

Options for including trading or offsets in permits for currently regulated entities will be addressed by the study. Based on final statutory language adopted by the General Assembly, Virginia will develop in consultation with regulated entities, a permitting approach that accounts for trades or offsets.

The study will also evaluate the feasibility of incorporating unregulated lands into the nutrient credit exchange and determine the drivers that would help achieve reductions where regulatory requirements do not exist.

The study will also examine the utility of establishing public or private nutrient banks or a nutrient trading fund that could serve to purchase credits with funds collected from program participants that would meet permit obligations or achieve additional reductions.

TMDL Allocations and the WIP

The source sector allocations included in this Phase 1 WIP are based in part upon a functioning and viable expanded nutrient credit exchange program. The 2025 TMDL nutrient allocations are shown in the tables in Section 2. For the wastewater, stormwater, and on-site sectors, an expanded credit exchange would provide attainment options outside of sole reliance on sector specific best management practices (BMPs).

1.8 TMDL Overview and Introduction

This preliminary or Phase I WIP has been developed by the Commonwealth of Virginia as required by the U.S. Environmental Protection Agency. It contains all components outlined by the EPA in their guidance letter of Nov. 4, 2009. This document also serves as a revision to the Commonwealth's Chesapeake Bay nutrient and sediment reduction strategy.

This watershed-wide plan is submitted to EPA as part of the multi-state and federal effort to develop a nutrient and sediment Total Maximum Daily Load for the Chesapeake Bay and its tidal tributaries. More locality-specific plans will be developed in Phase II.

While Virginia is responsible for developing this WIP, EPA is responsible for developing the TMDL for the Chesapeake Bay. The WIP is a state plan to meet the federal maximum loads established by EPA. Complete information from EPA is available at: http://www.epa.gov/chesapeakebaytmdl/

A TMDL is an assessment of the maximum amount of a pollutant or pollutants that a body of water can accept, while still achieving water quality standards. The Chesapeake Bay TMDL sets reduction targets to reach acceptable levels, or allocations, for nitrogen, phosphorous, and sediment.

Impairments are based on monitoring for compliance with state water quality standards. Waters identified as impaired are required under the Federal Water Pollution Control Act to have a TMDL, which must identify the total pollutant loading allowable to protect the receiving waters, and allocate that loading to the different source sectors. These sectors include wastewater treatment plants, agriculture, forest, urban/suburban stormwater runoff, onsite/septic and air.

The term "Chesapeake Bay TMDL" is actually a bit of a misnomer. The Bay and its tributaries are made up of 92 segments identified by EPA. Each of these segments, including the 40 that are all or in part in Virginia, is considered impaired and will have a TMDL and WIP developed.

The goal of this preliminary plan is to broadly identify how to meet water quality standards by 2025 with interim target loads met by 2017. It seeks to improve water quality conditions including water clarity and dissolved oxygen levels needed to sustain underwater grasses, finfish, shellfish and other aquatic organisms. EPA also expects this plan to meet "reasonable assurance requirements" for the Chesapeake Bay TMDL. To satisfy these requirements the plan must include identification of gaps between needed controls and existing capacity; a commitment to systematically fill gaps; a commitment to track, monitor, and assess progress at set times; and a commitment to identify and implement contingency actions if milestones are not met.

This plan represents Phase I of an ongoing effort to implement actions needed to restore the Chesapeake Bay and the tidal portions of its tributary rivers. EPA guidance states that Chesapeake Bay states (Virginia, Maryland, Pennsylvania, West Virginia, Delaware and New York) and the District of Columbia develop Phase I WIPs that divide nutrient and sediment target loads among nonpoint source sectors and individual permitted sources within impaired

segments. EPA guidance also calls for the plan to describe the authorities, actions, and control measures that will be implemented to achieve nonpoint and point source allocations.

Beyond the Phase I and Phase II expectations, EPA expects jurisdictions to develop Phase III Watershed Implementation Plans in 2017 with refined actions and controls. This Phase III planning process is part of an adaptive management approach that seeks to ensure that the actions needed to meet water quality standards are implemented by 2025.

SECTION 2: INTERIM LOAD TARGETS AND FINAL NUTRIENT AND SEDIMENT ALLOCATIONS

The following tables show the proposed TMDL allocations by source sector and river basin for the year 2025 and the target loads for the year 2017 which represent 60% of the 2025 allocations.

Table 2.1: VIRGINIA CHESAPEAKE BAY TMDL ALLOCATIONS: NITROGEN - 2025 [Million Pounds/Year]

THESE SECTOR ALLOCATIONS WILL BE REVIEWED/ADJUSTED IN 2017

Source Sector	Potomac	Rappahannock	York	James	Eastern Shore	VA TOTAL
Agriculture	6.359	2.515	1.404	4.253	0.890	15.421
Urban Runoff[1]	2.635	0.403	0.445	2.534	0.050	6.067
Wastewater[1]	3.743	0.640	1.201	12.491	0.087	18.162
On-Site[1]	0.597	0.322	0.487	0.923	0.076	2.405
Forest	4.197	1.886	1.782	6.048	0.162	14.076
Non-Tidal Dep	0.103	0.073	0.089	0.320	0.032	0.617
Total	17.634	5.839	5.409	26.569	1.297	56.748
Basin Allocations	~~**17.464**~~[2] **17.634**	**5.840**	**5.410**	**23.480**[4]	~~**1.210**~~[3] **1.297**	**53.662**[4]

[1]Allocations for these source sectors can be attained through expansion of the VA Nutrient Credit Exchange Program
[2]For Potomac, a portion of the TP allocation is transferred to the TN allocation using 1:5 ratio [added 170,000 lbs/yr of TN]
[3]For E Shore, a portion of the TP allocation is transferred to the TN allocation using 1:5 ratio [added 90,695 lbs/yr of TN]
[4] Refer to James River Strategy section of the WIP for Virginia's approach to conform with EPA's draft July 1 TMDL allocations by 2025; 3.3 MPY will be included in the TMDL as an aggregated allocation for reduction in the wastewater sector; adjustments in sector allocations will be made, as warranted, in 2017 following completion of scientific review of chlorophyll standards

Table 2.2: VIRGINIA CHESAPEAKE BAY TMDL ALLOCATIONS: PHOSPHORUS - 2025 [Million Pounds/Year]

THESE SECTOR ALLOCATIONS WILL BE REVIEWED/ADJUSTED IN 2017

Source Sector	Potomac	Rappahannock	York	James	Eastern Shore	VA TOTAL
Agriculture	0.674	0.533	0.157	0.622	0.111	2.097
Urban Runoff[1]	0.273	0.094	0.090	0.528	0.009	0.994
Wastewater[1]	0.278	0.079	0.155	0.967	0.008	1.487
On-Site[1]	0	0	0	0	0	0
Forest	0.205	0.183	0.126	0.543	0.015	1.072
Non-Tidal Dep	0.008	0.007	0.009	0.030	0.002	0.056
Total	1.438	0.896	0.538	2.690	0.145	5.707
Basin Allocations	**~~1.472~~[2] 1.439**	**0.900**	**0.540**	**2.340[4]**	**~~0.163~~[3] 0.145**	**5.357[4]**

[1]Allocations for these source sectors can be attained through expansion of the VA Nutrient Credit Exchange Program

[2]For Potomac Basin, a portion of the TP allocation is transferred to the TN allocation using 1:5 ratio [removed 34,000 lbs/yr from TP]

[3]For E Shore, a portion of the TP allocation is transferred to the TN allocations using 1:5 ratio [removed 18,139 lbs/yr from TP]

[4] Refer to James River Strategy section of the WIP for Virginia's approach to conform with EPA's draft July 1 TMDL allocations by 2025; 0.35 MPY will be included in the TMDL as an aggregated allocation for reduction in the wastewater sector; adjustments will be made, as warranted, in 2017 following completion of scientific review of chlorophyll standards

Table 2.3: VIRGINIA CHESAPEAKE BAY TARGET LOADS: NITROGEN - 2017 [Million Pounds/Year]

Source Sector	Potomac	Rappahannock	York	James	Eastern Shore	VA TOTAL
Agriculture	7.379	3.021	1.754	4.728	1.102	17.984
Urban Runoff[1]	2.733	0.426	0.475	2.700	0.054	6.388
Wastewater[1, 3]	3.312	0.515	0.977	11.382	0.078	16.264
On-Site[1]	0.614	0.333	0.508	0.962	0.078	2.495
Forest	4.118	1.876	1.773	6.021	0.161	13.349
Non-Tidal Dep	0.102	0.072	0.089	0.316	0.031	0.610
Total	18.258	6.243	5.576	26.109	1.504	57.690
Target Loads[2]	**18.624**	**6.291**	**5.789**	**26.109**	**1.538**	**58.352**

[1]Allocations for these source sectors can be attained through expansion of the VA Nutrient Credit Exchange Program

[2]Draft Target Loads for each basin set at 60% of 2025 Allocations; each sector may vary.

[3]Wastewater loads are expected to be below 2025 allocations which will aid in meeting the Commonwealth's 2017 target loads

Table 2.4: VIRGINIA CHESAPEAKE BAY TARGET LOADS: PHOSPHORUS - 2017 [Million Pounds/Year]

Source Sector	Potomac	Rappahannock	York	James	Eastern Shore	VA TOTAL
Agriculture	0.796	0.604	0.194	0.761	0.131	2.486
Urban Runoff[1]	0.292	0.100	0.098	0.573	0.009	1.072
Wastewater[1, 3]	0.254	0.060	0.142	0.775	0.005	1.236
On-Site[1]	0	0	0	0	0	0
Forest	0.203	0.182	0.128	0.554	0.013	1.080
Non-Tidal Dep	0.009	0.008	0.009	0.030	.001	0.057
Total	1.554	0.954	0.571	2.693	0.159	5.931
Target Loads[2]	**1.643**	**0.974**	**0.574**	**2.720**	**0.159**	**6.070**

[1]Allocations for these source sectors can be attained through expansion of the VA Nutrient Credit Exchange Program

[2]Draft Target Loads for each basin set at 60% of 2025 Allocations; each sector may vary.

[3]Wastewater loads are expected to be below 2025 allocations which will aid in meeting the Commonwealth's 2017 target loads

SECTION 3: ALLOCATION PROCESS

3.1. Process for Developing Wasteload Allocations (WLAs) and Load Allocation (LAs)

This Section describes the process by which LAs and WLAs were established by Virginia for the TMDL.

3.1.1. Municipal Separate Storm Sewer Systems (MS4s)

Waste load allocations for Phase II MS4 programs in Virginia were developed based the calculated acreage for each urban land classification and further classified by land river segment, segment–shed, U.S. Census Bureau Urbanized Areas, city or county. The proxy for the MS4 WLA is equal to the accumulated land area multiplied by the treated load/acre (treatment efficiencies defined by land classification) within a U.S. Census Bureau-defined urbanized area but discounted by the industrial stormwater WLA. The proxy for the MS4 load allocation is equal to the acres of low intensity pervious urban land multiplied by the treated load/acre discounted by the industrial stormwater LA, plus the remainder of the area in the defined urbanized area. Barren land WLA is transferred to the construction general permit.

In counties where there are presently no MS4s except for Virginia Department of Transportation (VDOT) roadways, use VDOT impervious area plus pervious area. VDOT's load share for counties with other MS4s can be estimated using the same methodology as above, if necessary in future phases. All extractive land use goes to the Department of Mines, Minerals and Energy (DMME) permit WLA. Disturbed land use goes to Erosion and Sediment Control (E&S) WLA.

3.1.2. Industrial Stormwater

There are 889 facilities with industrial activity stormwater discharges in the Chesapeake Bay watershed that are provided permit coverage under the VPDES Industrial Stormwater General Permit. In addition there are 2 facilities with individual VPDES permits regulating only industrial activity stormwater discharges. Very limited individual data on facility size, urban land use, and nutrient and sediment loadings is known. Physical location, receiving stream and the primary SIC code are the only information known for each facility. The EPA contractor Tetra Tech assisted the VADEQ with facility area estimations.

Tetra Tech developed loading estimates based on estimated facility acreage derived from GIS delineations of selected industrial stormwater facilities. The VADEQ supplied Tetra Tech with a list of 87 selected facilities. Tetra Tech delineated 29 facilities at random (one urban and one rural for each SIC code grouping) to determine the average acreage of industrial stormwater facilities by SIC code grouping. DEQ supplemented this data with actual facility acreage data supplied by 120 facilities with their storm water general permit applications.

Where there was no delineation for a particular SIC grouping, Tetra Tech and DEQ used an average for the first digit of the SIC groups that had been estimated. For those SIC groups with

no common first digit (i.e., no data for a SIC group at all) Tetra Tech and DEQ averaged all 149 delineations and applied it to these remaining facilities (2 facilities).

The industrial stormwater loads are aggregate. Aggregate loads are appropriate because actual facility data was not used to develop the entire individual facility loading, and these industrial stormwater discharges have low nutrient and sediment loadings.

Virginia's Bay watershed Industrial Stormwater VPDES facilities are as follows:

Table 3.1.1: Number of Industrial Stormwater VPDES facilities

Basin	Number of Facilities
Shen.-Potomac	253
Rappahannock	68
York	87
James	473
Eastern Shore	10
Total	891

Aggregate loadings for industrial stormwater VPDES permits will be included as part of the local load allocation for regulated MS4s.

3.1.3. Construction General Permit

The proxy for the barren land WLA is developed as a component of the process defined in section 5.2.1. This regulated pollution load functions in a transient nature as countless components of the load are being issued or retired as site-by-site development occurs and permits for each site are issued or closed. Authority for permitting is granted to the Virginia Stormwater Management Program and Erosion and Sediment Control Program. Permit issuance must be consistent with the assumptions used in the development of the WLA for regulated construction activities.

3.1.4. Confined Animal Feeding Operations

The Chesapeake Bay Program Watershed Model (WSM) will be used to estimate current nutrient and sediment loads associated with the production area of animal feeding operations (AFOs) (refer to EPA's guidance outlined in "A Guide for EPA's Evaluation of Phase I Watershed Implementation Plans" dated April 2, 2010). In order to comply with this element, on November 29, 2010 Virginia submitted a revised input deck for the WSM. The input deck includes the number of animals by type and county associated with 100 percent of the AFO and CAFO operations.

All AFOs and CAFOs are currently covered by VPA permits, with CAFOs that discharge or propose to discharge being converted to VPDES permit coverage over the next 18 months. Currently, Virginia has 898 AFOs/ CAFOs covered by a VPA permit in the Chesapeake Bay Watershed. Of the 898 facilities, 116 operations are EPA defined Large CAFOs. The table below indicates the number and type of permits along with estimates for future permit coverage in the Bay watershed.

CURRENT PERMIT COVERAGE	ESTIMATED NO. OF VPA SIZE FACILITIES	ESTIMATED NO. OF VPDES SIZE (LARGE) FACITILIES	TOTAL FACILITIES IN BAY WATERSHED
VPA GP AFO	55	15	70
VPA GP POULTRY	727	101	828

3.1.5. Significant Wastewater Facilities

Enforceable nutrient waste load allocations have been adopted under state law and regulations promulgated in 2005-06 for Virginia's bay wastewater treatment facilities, covering both municipal and industrial plants. Implementation is ongoing to comply with these requirements. Individual WLA were assigned to each of Virginia's 125 bay watershed Significant Dischargers, and an allowance ("Permitted Design Capacity") for the Nonsignificant Discharger's was included in 2005 legislation establishing the Nutrient Credit Exchange Program (VA Code §62.1-44.19:12). Further reductions are proposed from the significant dischargers in the James for total nitrogen and total phosphorus, and for total phosphorus in the York through more stringent treatment requirements. These modifications will be reflected in the Watershed General Permit.

3.1.6. Non-significant Municipal Facilities

Non-significant municipal discharges with individual VPDES Permits have coverage under the Chesapeake Bay Nutrient Watershed general permit. The WLAs for non-significant municipal facilities are based upon the 2005 permitted design capacity. The watershed general permit controls the non-significant municipal facilities as follows:

- Existing smaller facilities that propose to expand up to a design flow of 0.039 MGD are allowed and no GP registration is or offset is required.
- Existing non-significant municipal facilities that expand to a design of 0.04 MGD or more are required to register under the GP and offset any increase in TN or TP load.
- New municipal facilities with a design flow greater than 1,000 gpd are required to register under the GP and offset their entire nutrient load.

Non-significant Discharges with Coverage under the Domestic Discharges less than 1,000 GPD VPDES General Permit

Domestic Discharges less than 1,000 GPD do not have coverage under the Chesapeake Bay Nutrient Watershed general permit. WLAs for Virginia's general permit for domestic discharges less than 1,000 gpd are based upon the 1,000 gpd flow authorized by the permit and effluent concentrations of 18.7 mg/l TN and 2.5 mg/l TP. Actual flows from these facilities are typically about one third of the permitted capacity, creating ample excess allocation to accommodate new dischargers in this category for the foreseeable future.

3.1.7. Non-significant Industrial Facilities

Non-significant Industrial Discharges with Individual VPDES Permits

Non-significant industrial discharges with individual VPDES Permits have coverage under the Chesapeake Bay Nutrient Watershed general permit. The WLAs for non-significant industrial facilities are estimates of current loads using limited Discharge Monitoring Report data and typical effluent concentrations established by Standard Industrial Classification (SIC) codes. The industrial non-significant estimates are considered to be very conservative and the Commonwealth expects actual loads to be considerably less. The watershed general permit controls the non-significant industrial facilities as follows:

- Existing smaller facilities that propose to expand and increase loading up to 2,300 pounds of TN and 300 pounds P per year are allowed and no GP registration or offset is required.
- Existing non-significant industrial facilities with that expand to loadings greater than 2,300 pounds of TN or300 pounds of TP per year are required to register under the GP and offset any increase in nutrient load.
- New non-significant industrial facilities with loadings greater than 2,300 pounds of TN or 300 pounds of TOP are required to register under the GP and offset all nutrient loads.

Non-significant Industrial Discharges with Coverage under a Car Wash, Concrete, Cooling Water, and Nonmetallic Mineral Mining VPDES General Permit

Facilities with coverage under a Car Wash, Concrete, Cooling Water, and Nonmetallic Mineral Mining VPDES General Permit do not have coverage under the Chesapeake Bay Nutrient Watershed general permit. WLAs for these discharges were based upon conservative assumptions (design flow, 365 days/yr operations, etc.) so the existing non-significant dischargers are expected to discharge less than their aggregate WLA.

3.2. Table of Target Loads by Sector and Watershed

Final Nutrient and Sediment Target Loads

Final, enforceable nutrient WLA have been adopted under state law and regulations promulgated in 2005-06 for Virginia's bay wastewater treatment facilities, covering both municipal and industrial plants, and implementation is ongoing to comply with these requirements. Individual WLA were assigned to each of Virginia's 125 Bay watershed Significant Dischargers, and an allowance ("Permitted Design Capacity") for the Non-significant Dischargers was included in 2005 legislation establishing the Nutrient Credit Exchange Program (VA Code §62.1-44.19:12).

In summary, the discharged and delivered nutrient and sediment load caps for Virginia's Bay watershed wastewater plants are as follows:

Table 3.2.1: Significant Dischargers' Discharged and Delivered Total Nitrogen WLA

(NOTE: Delivered loads will be added based on EPA model results)

Basin	TN WLA Discharged (million lbs/yr)	TN WLA Delivered (million lbs/yr)
Shen.-Potomac	5.22	
Rappahannock	0.60	
York	1.06	
James	12.65	
Eastern Shore	0.04	
Total	19.57	

Table 3.2.2: Significant Dischargers' Discharged and Delivered Total Phosphorus WLA

Basin	TP WLA Discharged (million lbs/yr)	TP WLA Delivered (million lbs/yr)
Shen.-Potomac	0.255	
Rappahannock	0.045	
York	0.123	
James	0.942	
Eastern Shore	0.002	
Total	1.367	

Table 3.2.3 Significant Dischargers' Discharged and Delivered Total Suspended Solids WLA

Basin	TSS WLA Discharged (million lbs/yr)	TSS WLA Delivered (million lbs/yr)
Shen.-Potomac	36.66	
Rappahannock	4.71	
York	16.51	
James	75.05	
Eastern Shore	0.19	
Total	133.12	

Table 3.2.4: Non-significant Dischargers' Discharged and Delivered Total Nitrogen WLA

Basin	TN WLA Discharged (million lbs/yr)	TN WLA Delivered (million lbs/yr)
Shen.-Potomac	0.931	
Rappahannock	0.303	

York	0.385	
James	1.190	
Eastern Shore	0.047	
Total	2.856	

Table 3.2.5 Non-significant Dischargers' Discharged and Delivered Total Phosphorus WLA

Basin	TP WLA Discharged (million lbs/yr)	TP WLA Delivered (million lbs/yr)
Shen.-Potomac	0.146	
Rappahannock	0.049	
York	0.061	
James	0.207	
Eastern Shore	0.006	
Total	0.469	

Table 3.2.6: Non-significant Dischargers' Discharged and Delivered Total Suspended Solids WLA

Basin	TSS WLA Discharged (million lbs/yr)	TSS WLA Delivered (million lbs/yr)
Shen.-Potomac	6.136	
Rappahannock	0.911	
York	3.872	
James	7.695	
Eastern Shore	0.071	
Total	18.685	

Aggregate Wasteload Allocations for Non-significant Individual VPDES Permits - The non-significant TN and TP wasteload allocations contained in this WIP are considered aggregate allocations and will not be included in individual VPDES permits. This approach has been approved by EPA in instances where a class of dischargers is included in a general permit. All non-significant dischargers with individual permits in existence as of July 1, 2005 are covered by rule under the watershed general permit. New or expanding non-significant facilities that trigger the offset requirements established under the Code of Virginia will be required to register under the watershed general permit and will be assigned individual wasteload allocations consistent with the permitted design capacity and/or offsets provided.

The TSS wasteload allocations included in the WIP are also considered to be aggregate WLAs. TSS limits will be included in individual VPDES permits as required by technology-based requirements of the Clean Water Act. However as long as the aggregated TSS permitted loads for all dischargers is less than the aggregate TSS load in the WIP, the individual VPDES permit will be considered to be consistent with the TMDL.

Aggregate Wasteload Allocations for Non-significant Discharges with Coverage under the Domestic Discharges less than 1,000 GPD VPDES General Permit

The non-significant TN and TP wasteload allocations contained in this WIP are considered aggregate allocations and will not be included in Domestic Discharges less than 1,000 GPD VPDES General Permit. Actual flows from these facilities are typically about one third of the permitted capacity, creating ample excess allocation to accommodate new dischargers in this category for the foreseeable future. At the time of reissuance of this general permit regulation Virginia will determine if additional requirements will be needed for new discharges to meet for Stage II of requirements of the TMDL.

Non-significant Industrial Discharges with Coverage under a Car Wash, Concrete, Cooling Water, and Nonmetallic Mineral Mining VPDES General Permit

The non-significant TN and TP wasteload allocations contained in this WIP are considered aggregate allocations and will not be included in these Industrial general permits**.** WLAs for these discharges were based upon conservative assumptions (design flow, 365 days/yr operations, etc.) so the existing non-significant dischargers are expected to discharge less than their aggregate WLA. Should the reserve capacity inherent in the WLAs prove to be inadequate to accommodate growth in this sector, Virginia will determine if additional requirements will be needed during the reissuance of each general permit regulation to address new discharges to meet for Stage II of requirements of the TMDL.

Combined Sewer Systems

Table 4.2.7: Combined Sewer System Discharged and Delivered WLAs

Locality[1]	CSS WLA Discharged			CSS WLA Delivered		
	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)	TN (lbs/yr)	TP (lbs/yr)	TSS (lbs/yr)
Alexandria CSO[2]	5,201	690	62,355	5,201	690	62,355
Alexandria Sanitation Authority CS-C[3]	7,309	329	54,820	7,309	329	54,820
Richmond Aggregate CSS[2],[3]	409,557	31,642	3,396,550	409,557	31,642	3,396,550
Lynchburg Aggregate CSS[2],[3]	58,575	5,677	677,741			

Notes: (1) Richmond, Lynchburg, and ASA dry weather flow waste load allocations are based on permitted dry weather design capacity of 45 mgd, 22 mgd, and 54 mgd, respectively.

(2) The combined sewer overflow (CSO) portion of the Aggregate CSS WLA is based on the annual average CSO volume for the period 1991 through 2000 multiplied by TN, TP, and TSS concentrations of 8.0 mg/L, 1.0 mg/L, and 130 mg/L, respectively, for Richmond and Lynchburg; and TN, TP, and TSS concentrations of 5.88 mg/L, 0.78 mg/L, and 70.5 mg/L, respectively, for Alexandria.

(3) The combined sewage captured (CS-C) portion of the Aggregate CSS WLA is based on the annual average CS-C volume for the period 1991 through 2000 multiplied by TN, TP, and TSS wet weather concentrations of 8.0 mg/L, 0.4 mg/L, and 30 mg/L, respectively, for Richmond and Lynchburg; and TN, TP, and TSS wet weather concentrations of 4.0 mg/L, 0.18 mg/L, and 30 mg/L, respectively, for ASA.

The proposed nutrient and total suspended solids CSS WLAs presented above in Tables 4.2.8 through 4.2.9 and their associated WLA language are based on the following information:

Alexandria Combined Sewer Overflow (CSO) Outfalls WLAs:

These WLAs are for estimated annual average loads discharged by the City's permitted CSO outfalls. The WLAs are based on (1) the City collection system's capacity to convey CSS flow to the Alexandria Sanitation Authority's (ASA's) wastewater treatment plant and the CSS treatment capacity of the ASA plant, (2) annual average rainfall data from the 1991-2000 period used to develop the TMDLs, and (3) event mean concentration data for the City's CSS.

These WLAs are estimated loads derived from modeling and because actual annual average CSO outfall loads will vary from year-to-year due to weather pattern variables, including rainfall intensities, duration, soil antecedent moisture conditions, rainfall frequencies, spatial and time distribution, and ground coverage. Therefore, it is not feasible to use these WLAs to calculate numeric mass loads for the CSO discharges. Rather, these effluent limits should be expressed in terms of best management practices, which are the nine minimum controls in the case of CSOs (per CSO Control Policy section IV.B.2 and 40 CFR 122.44(k).

Compliance with the City's VPDES permit (including the Nine Minimum Controls (NMCs) provisions as required by the CSO Control Policy) will ensure that use of the City's CSS conveyance and storage capacity is maximized and that source controls such as street sweeping and catch basin cleaning are employed to minimize pollutant loads entering the CSS. Therefore, compliance with the NMCs and the other CSS-related requirements in the City's permit will provide reasonable assurance that the WLAs will be achieved in years when rainfall conditions are the same as the rainfall condition used to develop the TMDLs.

Alexandria Sanitation Authority CSS Flow WLAs:

These WLAs are for loads in CSS flows from the City of Alexandria's CSS that are treated and discharged by ASA's treatment plant. The WLAs are based on (1) the ASA plant's capacity to treat CSS flows, (2) average rainfall data from the 1991-2000 period used to develop the TMDLs, and (3) total nitrogen, total phosphorus, and suspended solids concentrations of 4.0 mg/l, 0.18 mg/l, and 30 mg/l, respectively.

Permit writers should avoid including these WLAs as mass load limits in ASA's VPDES permit because the WLAs are estimated loads derived from modeling and because actual average annual CSS loads will vary from year-to-year due to weather pattern variables, including rainfall intensities, duration, soil antecedent moisture conditions, rainfall frequencies, spatial and time distribution, and ground coverage.

The WLAs reflect ASA's use of its treatment capacity to treat the City's CSS flows under annual average rainfall conditions from the 1991-2000 period used to develop the TMDLs and average annual total nitrogen, total phosphorus, and suspended solids concentrations listed above. Therefore, compliance with permit limits reflecting these concentrations will provide reasonable

assurance that the WLAs will be achieved in years when rainfall conditions are the same as the rainfall condition used to develop the TMDLs, consistent with 40 CFR 122.44(d)(1)(vii).

Lynchburg and Richmond Aggregated CSS WLA:

These WLAs are for loads discharged by the cities' CSS and reflect estimated annual average loads discharged from both their permitted CSO outfalls and CSS flows discharged by their treatment plants. The WLAs are based on (1) the current design capacities of each city's CSO control (conveyance, storage and treatment) facilities (including combined flows eliminated thus far by sewer separation), (2) annual average rainfall data from the 1991-2000 period used to develop the TMDLs, (3) event mean concentration data for each city's CSS for the CSO outfall WLAs, and (4) total nitrogen, total phosphorus, and suspended solids concentrations of 8 mg/l, 0.4 mg/l, and 30 mg/1, respectively, for CSS flows discharged by the treatment plants. Although both cities will be installing additional CSO controls in the future, they have already achieved almost all of the nutrient load reductions and much of the sediment load reductions associated with their CSO control programs by virtue of having maximized CSS flows through complete treatment at their treatment plants. The aggregated CSS WLAs will accommodate the transfer of nutrient and sediment loads from the cities' CSO outfalls to their treatment plants as additional CSS conveyance, storage, and treatment capacity is constructed in the future. Further, it is anticipated that a portion of these aggregated WLAs will need to be transferred to the MS4s at some point in the future to reflect combined sewer separation projects completed after establishment of the TMDLs.

These WLAs are estimated loads derived from modeling and because actual annual average CSS loads will vary from year-to-year due to weather pattern variables, including rainfall intensities, duration, soil antecedent moisture conditions, rainfall frequencies, spatial and time distribution, and ground coverage. Therefore, it is not feasible to use these WLAs to calculate numeric mass loads for the CSO discharges. Rather, these effluent limits should be expressed in terms of best management practices, which are the nine minimum controls in the case of CSOs (per CSO Control Policy section IV.B.2 and 40 CFR 122.44(k).

The CSO outfall WLAs reflect estimated loads in CSS flows that exceed the cities' existing CSS conveyance, storage and treatment capacities under annual average rainfall conditions for the 1991-2000 period used to develop the TMDLs. Compliance with the NMCs required by EPA's CSO Control Policy and the cities' VPDES permits will ensure that use of this capacity is maximized and that source controls such as street sweeping and catch basin cleaning are employed to minimize pollutant loads entering the CSS. Therefore, compliance with the NMCs and the other CSS-related requirements in the cities' permits will provide reasonable assurance that the CSO outfall WLAs will be achieved in years when rainfall conditions are comparable to the rainfall condition used to develop the TMDLs.

The WLAs for CSS flows discharged from the cities' treatment plants reflect compliance by the cities with their NMC permit requirements to maximize conveyance, storage, and treatment capacity under the average annual rainfall condition from the 1991-2000 period used to develop the TMDLs and effluent total nitrogen, total phosphorus, and total suspended solids concentrations of 8.0 mg/l, 0.4 mg/l, and 30 mg/l, respectively. Therefore, compliance with annual average concentration-based permit limits using these values will provide reasonable

assurance that the WLAs for CSS flows discharged from the cities' treatment plants will be achieved in years when rainfall conditions are the same as the rainfall condition used to develop the TMDLs, consistent with 40 CFR 122.44(d)(1)(vii).

SECTION 4 WASTEWATER

4.1. Current Programs and Capacity

As previously described, the basis for the wastewater facilities' WLAs is contained in Virginia Code (§62.1-44.19:12) and two regulations: the Water Quality Management Planning Regulation (9 VAC 25-720) and the 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), commonly referred to as the watershed general permit or nutrient trading regulation. These are enforceable provisions that "cap" the dischargers' TN and TP loads, and allow for nutrient credit exchange to achieve compliance. Additional reductions, below the current allocations in State regulations, are proposed from the significant dischargers in the James for total nitrogen and total phosphorus, and for total phosphorus in the York through more stringent treatment requirements. These modifications will be reflected in the Watershed General Permit and are further detailed after Table 4.1.1.

For the purpose of assigning nutrient WLAs, the bay wastewater facilities are designated either as "Significant" or "Nonsignificant Dischargers". These two classifications include both municipal and industrial facilities and are defined in state regulation as follows:

> "Significant discharger" means (i) a point source discharger to the Chesapeake Bay watershed with a design capacity of 0.5 million gallons per day or greater, or an equivalent load; (ii) a point source discharger to the Chesapeake Bay watershed downstream of the fall line with a design capacity of 0.1 million gallons per day or greater, or an equivalent load; (iii) a planned or newly expanding point source discharger to the Chesapeake Bay watershed that is expected to be in operation by 2010 with a permitted design of 0.5 million gallons per day or greater, or an equivalent load; or (iv) a planned or newly expanding point source discharger to the Chesapeake Bay watershed downstream of the fall line with a design capacity of 0.1 million gallons per day or greater, or an equivalent load, that is expected to be in operation by 2010. (9 VAC 25-720-10)
>
> "Non-significant discharger" means (i) a sewage treatment works discharging to the Chesapeake Bay watershed downstream of the fall line with a design capacity of less than 0.1 million gallons per day, or less than an equivalent load discharged from industrial facilities, or (ii) a sewage treatment works discharging to the Chesapeake Bay watershed upstream of the fall line with a design capacity of less than 0.5 million gallons per day, or less than an equivalent load discharged from industrial facilities. (9 VAC 25-820-10)

Under the watershed general permit, the Non-significant Dischargers with an individual VPDES permit were given a "Permitted Design Capacity", which is defined as follows:

> "Permitted design capacity" or "permitted capacity" means the allowable load (pounds per year) assigned to an existing facility that is a nonsignificant discharger, that does not have a waste load allocation listed in 9VAC25-720-50 C, 9VAC25-720-60 C, 9VAC25-720-70 C, 9VAC25-720-110 C, and 9VAC25-720-120 C of the Water Quality Management Planning

Regulation. The permitted design capacity is calculated based on the design flow and installed nutrient removal technology (for sewage treatment works, or equivalent discharge from industrial facilities) at a facility that has either commenced discharge, or has received a Certificate to Construct (for sewage treatment works, or equivalent DEQ approval for discharges from industrial facilities) prior to July 1, 2005. This mass load is used for (i) determining whether the expanding facility must offset additional mass loading of nitrogen and phosphorus and (ii) determining whether the facility must acquire credits at the end of a calendar year. For the purpose of this regulation, facilities that have installed secondary wastewater treatment (intended to achieve BOD and TSS monthly average concentrations equal to or less than 30 milligrams per liter) are assumed to achieve an annual average total nitrogen effluent concentration of 18.7 milligrams per liter and an annual average total phosphorus effluent concentration of 2.5 milligrams per liter. Permitted design capacities for facilities that, before July 1, 2005, were required to comply with more stringent nutrient limits shall be calculated using the more stringent values. (9 VAC 25-820-10)

When Virginia's point source nutrient discharge control regulations were adopted in late 2005, the annual TN and TP WLA for Significant Dischargers were based on a combination of total design flow and stringent nutrient removal technology (NRT). The level of NRT applied to the regions of the Bay tributaries varied somewhat, in consideration of:

- delivery factors affecting loads discharged above the fall line and reaching tidal waters
- modeled water quality response and compliance with tidal water quality standards
- the combined size of the discharges and resulting loads
- available technology
- equivalent treatment in terms of comparable "level of effort" between municipal and industrial facilities

These assumed TN and TP annual average effluent concentrations were primarily* used to calculate WLA for Significant Dischargers in the Water Quality Management Planning Regulation (9 VAC 25-720) adopted in 2005 with subsequent amendments and the Chesapeake Bay Watershed General Permit Regulation (9 VAC 25-820) adopted in 2006:

Table 4.1.1: VA Basin Effluent Concentrations (mg/l) in Current Regulations

Bay Tributary Region	Effluent TN Conc. (mg/l)	Effluent TP Conc. (mg/l)
Shenandoah and Potomac AFL	4.0	0.3
Potomac BFL	3.0	0.3
Rappahannock	4.0	0.3
York	6.0	0.7
James AFL	6.0	0.5
James Tidal Fresh	5.0	0.5
Lower James	12.7	1.0
Eastern Shore	4.0	0.3

Notes: "AFL" = above fall line; "BFL" = below fall line
* - existing, more stringent permit limits were unaffected, and there were exceptions (e.g., Combined Sewer System localities, individual considerations for industrials)

Additional nitrogen reductions of about 2.6 mp/y are proposed in this Plan for the significant dischargers in the lower James basin, with an aggregate WLA for the Hampton Roads Sanitation District facilities based on an annual average TN concentration of 6.0 mg/l. An additional 0.45 mp/y phosphorus reduction will be required from the James' significant dischargers that are publicly owned treatment plants based on an annual average TP concentration of 0.4 mg/l.

In the York basin, phosphorus loads are proposed to be further reduced from the significant dischargers that are publicly owned treatment plants based on an annual average TP concentration of 0.4 mg/l, along with an additional 20% reduction in the loads from significant industrial dischargers.

The current wastewater loading baseline, with earlier years presented to demonstrate progress achieved since the inception of the Chesapeake Bay Program, is presented in the following:

Table 4.1.2: VA Basin Loads – Wastewater Sector Delivered Nitrogen Loads (million lbs/year)

Basin	1985 TN Load	2002 TN Load	2009 TN Load	TN WLA
Shen.-Potomac	9.78	7.93	4.29	3.286
Rappahannock	0.61	0.58	0.39	0.475
York	1.43	1.21	1.17	0.957
James	24.72	16.09	14.09	13.565

Eastern Shore	0.35	0.21	0.22	0.04
Total	36.90	26.02	20.16	18.324

Table 4.1.3: VA Basin Loads – Wastewater Sector Delivered Phosphorus Loads (million lbs/year)

Basin	1985 TP Load	2002 TP Load	2009 TP Load	TP WLA
Shen.-Potomac	0.58	0.42	0.260	0.195
Rappahannock	0.20	0.10	0.043	0.042
York	0.46	0.17	0.106	0.157
James	4.17	1.73	0.953	1.088
Eastern Shore	0.05	0.03	0.004	0.003
Total	5.46	2.45	1.306	1.485

Virginia has adopted and implemented two permitting regulations to control wastewater nutrient discharges applicable to the Bay TMDL:

1. Nutrient Trading Regulation - 9 VAC 25-820-10 et seq
   General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia

   The so-called "Nutrient Trading" Regulation or "watershed general permit" requires that all significant dischargers and any new or expanding non-significant discharger with an individual VPDES permit and a design flow of 0.04 MGD or more must register under the watershed general permit and meet an annual load limitation. These loads are capped and any expansion beyond the current wasteload allocation must be offset in accordance with the terms of the permit. This permit allows point sources to exchange TN and TP credits at the end of every calendar year as an extra measure to ensure compliance. New and expanding facilities may acquire wasteload allocations from other point sources or acquire non-point source offsets to accommodate future growth. 125 significant dischargers and 41 non-significant dischargers are currently included in the watershed general permit.

   As described in the overview of Virginia's plan at the beginning of this document, the enabling legislation also authorized the formation of the Virginia Nutrient Credit Exchange Association. Membership in The Exchange is voluntary and its role is to facilitate trading under the watershed general permit. To date, 46 Exchange member facilities have signed contracts guaranteeing TN and TP trades beginning in 2011. The combination of nutrient trading in a watershed general permit, the formation of The Exchange and an unprecedented investment in wastewater infrastructure has resulted in a robust market that will allow Virginia to meet its TN and TP aggregate wasteload allocation for the wastewater sector beginning in 2011. In addition, this existing

   Virginia has a critical need under the TMDL to maintain the ability of dischargers to exchange or trade nutrient credits to comply with their WLA, as authorized under State law (VA Code §62.1-44.19:12). Trades are allowed among dischargers only within the

same basin with one exception. The 2010 General Assembly amended the credit exchange law to allow facilities on the Eastern Shore to acquire credits from dischargers in the Potomac and Rappahannock basins. TMDL implementation must recognize that trades among segment-shed TMDLs within each river basin are permitted, so long as local water quality is protected and the basin's total WLA is achieved.

2. Technology Regulation - 9 VAC 25-40-10 et seq
Regulation for Nutrient Enriched Waters and Dischargers within the Chesapeake Bay Watershed

The so-called "Technology" Regulation requires the installation of minimum nutrient treatment technologies at new or expanding facilities in the Chesapeake Bay watershed and compliance with an annual concentration limitation in the permittee's individual VPDES permit. Existing facilities that are not expanding are not required to install treatment however any facility that does install nutrient removal (to meet annual load limitations in the watershed general permit discussed above) is required to meet an annual concentration limitation consistent with the technology installed. These technology-based annual concentration limits serve to maximize the return on investments in wastewater treatment infrastructure as well as ensure a steady supply of credits under the watershed general permit.

100% of the significant dischargers are registered under the watershed general permit and are subject to final WLAs as of January 1, 2011. Existing non-significant facilities with individual VPDES permits are covered by rule under the watershed general permit until such time as they expand. The watershed general permit currently includes 41 non-significant dischargers. All other non-significant facilities have coverage under the appropriate VPDES general permit (e.g. domestic discharges less than 1,000 gpd, Car Wash, Concrete, Cooling Water, Nonmetallic Mineral Mining)

Details on DEQ's inspections (http://www.deq.virginia.gov/vpdes/checklist.html) and enforcement (http://www.deq.virginia.gov/enforcement/homepage.html) programs are available on DEQ's website.

Combined Sewer System

Portions of three Virginia localities -- Alexandria, Lynchburg and Richmond -- are served by a CSS (sewer pipes conveying both domestic wastewater and storm water). Under rainfall-induced high flow conditions, these systems may overflow with a combination of sanitary wastewater and storm water discharged into streams and rivers. CSS nutrient and sediment loads in the CSO must be accounted for in the Bay TMDL. This includes both the discharges from CSO outfalls and the portion of combined sewer flow above the dry-weather design capacity that is conveyed and treated at the wastewater plant. CSS communities must strike a balance between: (1) treating the maximum amount of combined flow at their wastewater plant to avoid overflows that could cause bacterial contamination of surface waters; and (2) not overloading the plant with dilute wastewater that could have long-term impacts on treatment efficiency.

The following information reflects estimated nutrient and sediment load data for these combined systems and consists of annual nutrient and sediment loads for (1) discharges from the CSO outfalls and (2) the captured combined sewer flows that are conveyed, treated, and discharged from the wastewater plants serving the CSS communities. The load data are based on the current design capacities of each community's CSO control facilities (including combined flows eliminated thus far by sewer separation). With the exception of Alexandria, where the LTCP consists of the Nine Minimum Controls (NMC) (including maximizing combined sewer flows to the Alexandria Sanitation Authority's advanced wastewater treatment plant), these loads generally represent LTCP implementation to date. Therefore, the loads reflect existing control facilities and operations within the CSS rather than complete implementation of the controls and operations described in the approved LTCPs. The Alexandria CSO discharge volumes and loads reflect their approved post-LTCP conditions. It is important to note that the communities have already achieved virtually all of the nutrient load reductions and much of the sediment load reductions associated with their CSO control programs by virtue of having maximized combined flows through complete treatment. Therefore, little additional nutrient and sediment reductions are expected from continued implementation of Richmond's and Lynchburg's LTCPs.

In accordance with EPA Guidance (EPA 2009), the loads are expressed as mass loads (lbs/yr). Additional notes are provided (Element 8) to give direction to permit writers so that the combined sewer flow WLAs are properly addressed in the communities' permits.

As noted under Element 1, the load data are based on the current design capacities of each community's CSO control facilities (including combined flows eliminated thus far by sewer separation). The proposed WLAs are based upon each community's CSS models using conditions reflective of the current status of their CSO LTCP implementation. These WLAs are also based on the average of the 10 year period (1991-2000). The CSS conditions are based on the LTCPs and NPDES permit requirements to provide reasonable assurance that the WLAs for the CSS will be achieved.

Alexandria's approved LTCP employs a capture and treat approach to CSO control. The City also continues implementing the Nine Minimum Controls (NMC) (weblink to this and other details on these controls are provided in Element 6), including maximizing flow to the Alexandria Sanitation Authority's (ASA) advanced water reclamation plant, as a requirement of its permit. The City also is required by its permit to conduct an extensive post-construction monitoring program for the remainder of its combined sewer system. Lynchburg's LTCP originally called for complete sewer separation, but the LTCP is now being updated and may be revised to provide for conveyance and treatment of combined flow in the downtown area rather than separating that part of its system. Richmond's LTCP calls for conveyance, storage, and treatment of combined flows as well as limited sewer separation.

The communities are at different stages in the implementation of their LTCPs. Alexandria has completed LTCP implementation and is now conducting its post-construction monitoring program as required by EPA's CSO Control Policy. Lynchburg has separated approximately half of its combined system as required by its VPDES permit and State consent special order. Richmond has completed construction of extensive combined sewer conveyance, storage and treatment facilities. Both the Richmond and Lynchburg orders establish schedules for construction of the controls in their LTCPs. Neither city is expected to complete construction

until after 2025 given the magnitude of the estimated remaining costs ($340 million for Lynchburg, and $500 million for Richmond in today's dollars). Both of these cities are required by their VPDES permits to continue implementing the NMC, including maximizing combined flows to their wastewater treatment plants.

The communities' discharge combined sewer flows from both individual CSO outfalls and from the wastewater treatment plants serving their combined sewer systems. Discharges from CSO outfalls occur during rainfall events that produce combined flows exceeding the wet weather design capacities of the conveyance, storage and treatment facilities. In order to meet the applicable water quality-based requirements, the communities have either significantly reduced or are in the process of significantly reducing the volume, duration and number of discharges from their CSO outfalls. This is accomplished by conveying, storing and treating the combined flows and/or by separating parts of their combined sewer systems. Combined flows that do not exceed the design capacities of the conveyance, storage, and treatment facilities are conveyed to and treated at the treatment plants serving the communities. Currently, combined flows conveyed to the treatment plants receive complete treatment. Consistent with EPA's CSO Control Policy, however, future controls will include treatment and/or removal of combined sewer flows to address local bacteria-related water quality impacts.

This proposed approach is consistent with the CSO Policy because both the Policy and this proposed approach call for permits for combined sewer systems to use narrative requirements and performance standards (including requirements to implement the Nine Minimum Controls) in lieu of numeric effluent limits to ensure that the CSO controls are operated as designed and constructed. This approach is also consistent with EPA's memorandum "Establishing TMDL WLAs for Storm Water Sources and NPDES Permit Requirements Based on those WLA" (November 22, 2002) (Element 6). As a result, this approach provides the reasonable assurance required of the TMDLs because (1) each community's CSO control program is incorporated in its VPDES permit, (2) the WLAs will be based on the 1991-2000 rainfall period used to develop the TMDLs, and (3) compliance with the communities' CSO control programs can be expected to limit any exceedance of the WLAs to years that are wetter than or involve rainfall patterns different from those that occurred during the critical rainfall period.

4.2. Accounting for Growth

EPA guidance for development of the Bay TMDL and WIPs provides two approaches to account for growth:

- Designate explicit target loads in the TMDL for anticipated growth; this decreases allocations available for existing sources; OR,
- Do not designate explicit target loads for growth, but "offset" any new or increased loads in the future with reductions elsewhere.

WLA for Significant Facilities

The WLAs for significant facilities have been set at 2010 design capacity of wastewater plants to recognize planning and investment made to provide treatment for future growth into the foreseeable future. These significant WLAs have some built-in growth allowances, being based on total design flow and concentrations that are in most cases less stringent than the current

limits of technology. A recent review of the compliance plans submitted annually by the dischargers subject to the Chesapeake Bay Watershed General Permit shows that sufficient nutrient credits are expected to be available over the next 5 to 10 years. This is due to a combination of the municipal plants currently using only about 65% of their design capacity and several plants being upgraded with NRT that exceeds the performance basis of their WLA
.

WLA for Non-significant Facilities with Individual VPDES Permits

The WLAs for non-significant facilities with individual VPDES permits are based upon the 2005 permitted design capacity. New municipal facilities with a design flow greater than 1,000 gpd are required to offset their entire load and register under the watershed general permit.

The WLAs for non-significant industrial facilities with individual permits are estimates of current loads using limited Discharge Monitoring Report data and typical effluent concentrations established by Standard Industrial Classification (SIC) codes. The industrial non-significant estimates are considered to be very conservative and the Commonwealth expects actual loads to be considerably less once data is collected from these facilities.

DEQ will begin requiring periodic nutrient monitoring from industrial non-significant facilities to compare with the aggregate WLAs included in the WIP. Non-significant municipal loads will continue to be estimated using discharged flows and default nutrient concentrations. As these load estimates are refined, the WIP may be modified to include more accurate WLAs. Until the gaps identified in Element 4 are addressed, DEQ will also track the addition of any new loads for new or expanding non-significant facilities that are not currently subject to the offset requirements in the current watershed general permit to ensure that the overall aggregate WLAs are maintained.

WLAs for Non-significant Discharges with Coverage under the Domestic Discharges less than 1,000 GPD VPDES General Permit

WLAs for Virginia's general permit for domestic discharges less than 1,000 gpd are based upon the 1,000 gpd flow authorized by the permit and effluent concentrations of 18.7 mg/l TN and 2.5 mg/l TP. Actual flows from these facilities are typically about one third of the permitted capacity, creating ample excess allocation to accommodate new dischargers in this category for the foreseeable future.

WLA for Non-significant Industrial Discharges with Coverage under a Car Wash, Concrete, Cooling Water, and Nonmetallic Mineral Mining VPDES General Permit

WLAs for these discharges were based upon conservative assumptions (365 days/yr operations, etc.) so the existing non-significant dischargers are expected to discharge less than their aggregate WLA. Should the reserve capacity inherent in the WLAs prove to be inadequate to accommodate growth in this sector, Virginia will determine if additional requirements will be needed during the reissuance of each general permit regulation to address new discharges to meet for Stage II of requirements of the TMDL.

Other Options to Meet WLAs

As basin caps are approached into the future, additional facilities will need to install more stringent NRT treatment, as well as explore options such as reclamation/reuse and point to

nonpoint source trading. Virginia has adopted a Water Reclamation and Reuse Regulation (9 VAC 25-740) (http://www.deq.virginia.gov/vpa/waterreuse.html) and is actively promoting reuse as a water management tool and as means of accommodating growth under the nutrient caps. Virginia has also adopted guidance for the generation of offsets from agricultural Best Management Practices (http://www.deq.virginia.gov/export/sites/default/vpdes/pdf/VANPSTradingManual_2-5-08.pdf). The combination of adequate wasteload allocations, more advanced nutrient removal technologies, water reclamation and reuse, and point-to-nonpoint source trading is expected to provide adequate capacity to accommodate growth in the wastewater sector through Stage II of the TMDL.

Combined Sewer System

This is discussed under WIP Section 6.A.3. For significant dischargers' WLA CSS loads are not expected to grow simply because construction of new combined sewers is prohibited. It is also possible that allocations will be adjusted in 2017 to account for improved stormwater management practices in the watershed that feed the CSS systems. Improved infiltration and control of stormwater will reduce the flow to these systems and potentially reduce the frequency of overflows and the resultant nutrient loads discharged into Virginia waters.

4.3. Gap Analysis

Current Virginia law, regulation and permits generally provide the assurance needed to meet the wastewater nutrient target loads. Legislation passed in 2010 provided two new authorities:

- HB1290: Eastern Shore facilities can acquire credits from facilities in the Potomac and Rappahannock basins.
- HB1135: New municipal dischargers (greater than 1,000 gallon per day (gpd) but less than 39,999 gpd) commencing discharge after January 1, 2011, must offset their nutrient loads.

However, there are some minor "gap" issues in the existing regulations that need to be addressed. For example, the 2010 legislation doesn't cover existing plants with a design flow less than 40,000 gpd that are expanding but will still be under 40,000 gpd. Also not addressed are smaller, new municipal wastewater systems under 1,000 gpd and industrial plants below 40,000 gpd. The possibility for legislative or regulatory amendments to resolve these issues will be evaluated as implementation under the Bay TMDL proceeds, further described in the next element.

For existing facilities, the "gap" that exists is the ability of the significant dischargers to meet their final wasteload allocations. As discussed under Element 2, these facilities are all permitted under the watershed general permit and are on schedule to meet the aggregate WLA beginning in 2011. Existing non-significant facilities have been assigned WLAs equal to their "permitted design capacity" as discussed under Element 2. Due to the reliance on design flow in establishing permitted design capacities, the existing non-significant dischargers are expected to discharge less than their aggregate WLA. The only "gap" that exists therefore is the ability to accommodate future growth.

Combined Sewer System

This is discussed under WIP Section 6.A.4 for significant dischargers' WLA. The communities have already achieved almost all of the nutrient load reductions and much of the sediment load reductions associated with their CSO control programs by virtue of having maximized combined flows through complete treatment. Furthermore, independent of their CSO control obligations discussed above (Element 2), the communities are currently on target to achieve nutrient reductions at their treatment plants by the end of 2010 as called for by the Chesapeake Bay Tributary Strategy. While Richmond's LTCP (and possibly Lynchburg's LTCP) calls for the installation of additional capacity to treat larger combined flow volumes in the future, this capacity is associated with disinfection facilities. This additional treatment capacity will transfer some of the nutrient and sediment load now discharged from CSO outfalls to the treatment plant.

4.4. Strategy to Fill Gaps

2011 - Continue Existing Water Quality Management Planning Regulation (9 VAC 25-720) and Chesapeake Bay Watershed General Permit Regulation (9 VAC 25-820) with current loading allocations with additional pre-2017 reduction in the James River.

Non-significant Facilities with Individual VPDES Permits

Wastewater dischargers in the Bay watershed operate under both individual discharge and Watershed General permits; the Commonwealth's overall commitment of ensuring compliance is through administration and enforcement of these permits. The following new and expanding facilities are required to register under the watershed general permit and offset any increase in nutrient load:

- New municipal facilities with a design flow greater than 1,000 gpd
- Expanding municipal facilities with a design flow of 0.04 MGD or more
- New or expanding industrial facilities with a TN or TP load greater than or equal to that of a 0.04 MGD municipal facility

Historically, Virginia has seen very few applications for (1) municipal expansions less than 0.04 MGD or (2) industrial discharges of nutrients. It is believed that with the conservative assumptions in the permitted design capacity calculations (e.g. design flow, 365 day/year operations, etc.) there is ample capacity in the aggregate Nonsignificant wasteload allocations to accommodate any new applications in these two categories during Phase I of the TMDL (until 2017). DEQ will be gathering additional information of the existing loads as well as tracking new applications. The strategy of accommodating any new loads in these two categories within the existing aggregate wasteload allocation will be further evaluated.

- Seek legislative changes to establish requirement for offsetting loads for discharger that expand to less than 40,000 gpd.

Non-significant Discharges with Coverage under the Domestic Discharges less than 1,000 GPD VPDES General Permit

Actual flows from these facilities are typically about one third of the permitted capacity, creating ample excess allocation to accommodate new dischargers in this category for the foreseeable future. More long term the Commonwealth will:

- Seek legislative changes necessary to require offsets for nutrient loads of less that 1000 gpd either as separate legislation or as a component of amendments to the Nutrient Credit Exchange.

WLA for Non-significant Industrial Discharges with Coverage under a Car Wash, Concrete, Cooling Water, and Nonmetallic Mineral Mining VPDES General Permit
Should the reserve capacity inherent in the WLAs form these general permits prove to be inadequate to accommodate growth in this sector, Virginia will determine if additional requirements will be needed during the reissuance of each general permit regulation to address new discharges to meet for Stage II of requirements of the TMDL.

4.5. Contingencies

DEQ's Compliance and Enforcement Program for wastewater permit requirements is the mechanism that will be employed to ensure timely implementation to achieve waste load allocations.

- Contingency: Offsets Among Source Sectors
    - Assessing compliance with 2-year milestones will be based upon total loadings, not by compliance with individual source sector allocations.
    - Wastewater treatment plants can operate below their assigned allocations:
        - During early years, treatment efficiency is better while wastewater flows are below the design capacity.
        - Meeting permitted nutrient concentrations is attainable using installed technology and treatment facilities are typically operated at levels below the limits to ensure compliance.
    - Excess "credits" from the wastewater sector can be used to offset loads in other sectors that exceed their allocations; this will aid in meeting the Commonwealth's overall target load until 2017.

Combined Sewer System

Although all of the communities have adopted the demonstration approach in their LTCPs, each is implementing a different DEQ-approved CSO control program based on local factors and circumstances as presented under Element 2.

Below are links to their websites for additional information.
http://www.richmondgov.com/dpu/projectCombinedSewerOverflowTimeline.aspx

http://www.lynchburgva.gov/index.aspx?page=3326
http://alexandriava.gov/tes/oeq/info/default.aspx?id=3844

VPDES Permits issued to municipalities with CSSs that have CSOs require implementation of the NMCs and LTCPs. The NMCs are developed and implemented on a site-specific basis to minimize the impact of CSOs on receiving water bodies, while the LTCPs are designed to provide for additional CSO controls where needed to achieve compliance with applicable water quality standards. The NMCs and LTCPs are imposed as enforceable requirements of the communities NPDES permits. DEQ's Compliance and Enforcement Program for wastewater permit requirements is the mechanism that will be employed to ensure compliance with the with the requirements of the VPDES permit, including water quality-based effluent limits that are based on the waste load allocations.

4.6. Tracking and Reporting Protocols

Wastewater dischargers are required to track and report under their discharge permits, both the Watershed General Permit for annual loads and individual permits for concentration-based nutrient limits.

The specifics of current annual reporting requirements for dischargers under the Watershed General Permit are:

> On or before February 1 each year, the permittee shall either individually or through the Virginia Nutrient Credit Exchange Association file a report with DEQ. The report shall identify:
>
> - The annual mass load of total nitrogen and the annual mass load of total phosphorus discharged by each of its permitted facilities during the previous calendar year;
> - The delivered total nitrogen load and delivered total phosphorus load discharged by each of its permitted facilities during the previous year; and
> - The number of total nitrogen and total phosphorus credits for the previous calendar year to be acquired or eligible for exchange by the permittee

As mentioned previously, all dischargers under the Watershed General Permit are also required to annually submit to DEQ, either individually or through the Virginia Nutrient Credit Exchange Association, an update to their compliance plans for approval. The compliance plans must contain any capital projects and implementation schedules needed to achieve total nitrogen and phosphorus reductions sufficient to comply with the individual and combined waste load allocations of all the dischargers in the tributary as soon as possible.

Discharge Monitor Reports of annual TN and TP load limits (calendar year) are required in the Nutrient Watershed GP for registered facilities. The permit allows for trading of compliance credits to provide dischargers additional flexibility in meeting their annual load limitations. As of April 1st of each year, DEQ publishes an annual discharge report listing TN and TP loads from all the facilities covered by the general permit in the previous calendar year. The facilities then

have two months (until June 1st) to complete any trades and notify DEQ. By July 1st, DEQ will publish an annual load compliance report listing trades of compliance credits and identify facilities that are in excess of their annual load limit. For any facility that discharged in excess of their annual load limit, compliance cannot be determined until the DEQ publishes this annual load compliance report the following July 1st. Both of these reports are made available on DEQ's nutrient trading webpage (http://www.deq.virginia.gov/vpdes/nutrienttrade.html) and all documents relating to the exchanges are available to any person requesting them.

As discussed under Element 3, the aggregate TN and TP wasteload allocations for non-significant industries are considered to be conservative "placeholders" at this time. DEQ will adopt procedures to add nutrient reporting requirements to non-significant industrial permits to establish better estimates of these loads over the coming years. Once better estimates of these loads are generated, the WIP may be adjusted accordingly.

DEQ does not have the capability to provide EPA electronic information through PCS for the Nutrient Watershed GP. DEQ is a full-batch state and currently faces an enormous challenge of development and implementation of data transmission to ICIS for individual Major and Nonmajor VPDES permits. It is anticipated that this project will take until 2014. DEQ does not expect to have the resources to develop the capability for providing Nutrient Watershed general permit data through ICIS in the foreseeable future. Separately from the PCS/ICIS database, DEQ will provide facility permit limit, compliance schedule, compliance, and annual discharge information contained in the Nutrient Watershed GP module of DEQ's Comprehensive Environmental Data System (CEDS). DEQ will also provide EPA the April 1 and the July 1 DEQ reports as well as Nutrient Watershed GP annual load information as part of EPA's milestone calendar year based reporting schedule. In addition, grant funding has been requested for the development of software programming to more easily generate reports on annual nutrient loads from DEQ's CEDS to facilitate tracking of nutrient loads.

Combined Sewer System

The CSS conditions are based on the LTCPs and NPDES permit requirements to provide reasonable assurance that the WLAs for the CSS will be achieved. According to EPA's CSO Control Policy (below), permitting authorities are instructed to include LTCP-derived performance standards and requirements based on average design conditions in NPDES permits issued to those CSO communities that have developed LTCPs using the demonstration approach.

Instead of requiring real-time effluent monitoring for individual CSS outfalls, the communities' VPDES permits provide for monitoring based on calibrated system flow modeling and event mean concentrations ("EMC") data from sampling at representative outfalls. The modeled flows and EMC data are used to calculate and report discharged loads on either a system-wide or individual CSO outfall basis for each rainfall event. The compliance demonstration is based on reported system performance compared to the LTCP-derived performance standards and requirements in the permit and the results of the post-construction monitoring program.

USEPA's Combined Sewer Overflows – Nine Minimum Controls Control Policy:
http://cfpub.epa.gov/npdes/cso/cpolicy.cfm?program_id=5

Other Useful Links:

- USEPA, National Pollutant Discharge Elimination System: Combined Sewer Overflows http://cfpub.epa.gov/npdes/home.cfm?program_id=5
- USEPA, National Pollutant Discharge Elimination System: Combined Sewer Overflows – CSO Control Policy, Elements of a Long-Term Control Plan. http://cfpub.epa.gov/npdes/cso/ltplan.cfm?program_id=5
- USEPA, Combined Sewer Overflow: Guidance for Permit Writers, Washington, DC: August 1995. http://cfpub.epa.gov/npdes/cso/guidedocs.cfm
- USEPA "Establishing TMDL WLAs for Storm Water Sources and NPDES Permit Requirements Based on those WLA" (November 22, 2002). http://www.epa.gov/owow/tmdl/stormwater/

4.7 Outstanding Issues That Need To Be Addressed

This section was constructed based on information provided by EPA and other sources. The following are issues that require additional investigation and data improvement.

1) The watershed model (V5.3) contains incorrect CSO acreage for Virginia's three facilities.
2) In order to properly characterize and capture loads, time-series data are needed for the dry water flow plus CS-capture. Based on multiple conversations (July 27, August 11, and November 10, 2010), EPA is aware of this problem but indicated that WWTP flow and load in the WIP will be applied as a constant value for the period 1991-2000 for the purpose of testing the WLAs during Phase I. Appropriate action is needed to incorporate these changes in Phase II.
3) The watershed model (V5.3) contains incorrect Lynchburg's CSS loads.

SECTION 5 AGRICULTURE

5.1. Current Programs and Capacity

Agricultural BMP Cost-Share Program

The Virginia Agricultural Cost-Share Program (VACS) provides financial incentives statewide to agricultural landowners and operators for the implementation of DCR approved BMPs. BMPs are implemented on crop and pasture lands, and address animal feeding operations. All implemented BMPs improve water quality. DCR has administered this program since 1985 when it was initiated with a single practice –filter strips on crop fields. Today, program guidance and detailed standards and specifications for all BMPs are contained within the VACS BMP Manual. The manual is updated annually to address changes in program guidance and the revision, removal or addition of specific BMPs. The state's 47 soil and water conservation districts (SWCDs) deliver this program across the state within the jurisdictions they serve (see § 10.1-546.1., Code of Virginia).

In 1997 the Virginia Water Quality Improvement Fund (see § 10.1-2128. Code of Virginia) was established to "…provide Water Quality Improvement Grants to local governments, soil and water conservation districts, state agencies, institutions of higher education and individuals for point and nonpoint source pollution prevention, reduction and control programs…" and other appropriate efforts. In 2008 a "Subfund" was established as the Virginia Natural Resources Commitment Fund (see § 10.1-2128.1 Code of Virginia), "… solely for the Virginia Agricultural Best Management Practices Cost-Share Program administered by the Department of Conservation and Recreation." Since 2006, funds deposited in the Water Quality Improvement Fund and the Subfund for implementation of agricultural BMPs has exceeded $80 million. An action by the 2010 General Assembly established a dedicated revenue stream that will place monies in the Subfund. The funds arise from an increase (from $10 to $20 per transaction) in the recordation fee for land transactions. The projected annual revenue is $9.1 million.

In 2005 DCR began to place greater emphasis on certain BMPs that were designated as "priority practices". These priority practices now represent five suites of BMPs that address:

- Nutrient Management,
- Vegetative Buffers (grass and forest),
- Conservation Tillage,
- Cover Crops, and
- Livestock Stream Exclusion.

DCR directs districts to spend no less than 80 percent of their VACS funding on these practices. The 20 percent balance may be spent on other practices (not within the five suites of priority practices) such as animal waste storage structures. The program provides a mix of flat-rate financial incentives and for practices that are cost-shared with the participant, usually at a maximum rate of 75 percent of implementation costs. Participants must have a conservation plan

to receive approval of cost-share funds and a nutrient management plan is required for many of the practices.

SWCDs employ technical staff that perform "on the farm assistance" with approved BMPs. The Commonwealth supports the cost of employing a workforce exceeding 70 full time technical staff among the 47 SWCDs. Monies supporting the staff are partially provided through a provision in the Virginia Natural Resources Commitment Fund, and also from annual appropriations of state monies by the General Assembly. Staff employed by districts collect and enter data for all approved BMPs in a newly updated computerized data entry program (Virginia Agricultural BMP Tracking Program). The database provides practice details that include reductions in nonpoint source pollutants, the BMP location, funds expended and other significant data. Stored data exist for over 20 years of BMP implementation. The current levels of district staff are expected to be sufficient for VACS delivery for the current state biennium (FY11-12), given the funds available for implementation of agricultural BMPs.

Agricultural BMP Tax Credit Program

This incentive program provides for a 25 percent state income tax credit up to $17,500 annually to encourage farmers to install eligible BMPs. To qualify, the BMP must be listed in and comply with the specifications contained in the *Virginia Agricultural Cost Share (VACS) BMP Manual*. All practices must be approved by the local soil and water conservation district. For all BMPs that are approved to receive the state income tax credit, documentation is provided to the agricultural producer and retained by the district, specifying the financial limits of the credit.

Code Reference:
§58.1-339.2 and §58.1-439.4 Code of Virginia

Agricultural Stewardship Act

This regulatory program allows for enforcement of a number of agricultural BMPs. The Commissioner of Agriculture and Consumer Services will respond to any complaint alleging water pollution from an agricultural activity on an un-permitted farming operation (operations not covered under a current Virginia Pollution Abatement (VPA) or Virginia Pollutant Discharge Elimination System (VPDES) Permit). If the agricultural activity is causing or will cause water pollution, the ASA gives the owner or operator an opportunity to correct the problem. The owner or operator will be asked to develop a plan containing the best management practices necessary to prevent the water pollution. Once the plan is developed, the local Soil and Water Conservation District (SWCD) has the opportunity to review it and make recommendations to the Commissioner. If the Commissioner approves the plan, he will then ask the owner or operator to implement the plan within a specified period of time. If the owner or operator fails to implement stewardship measures after a plan is approved, enforcement action under the ASA will be taken against the owner or operator. Enforcement actions include the issuance of a corrective order and civil penalties if the measures in the corrective order are not completed.

Even in cases where the ASA investigation does not produce sufficient evidence to support the conclusion that the agricultural activity in question is causing a water quality problem, the investigator will offer suggestions on how the owner or operator might improve his management practices to prevent future complaints. In most cases, technical assistance is provided to the

operator regarding resource management on their operation, even if outside the scope of the investigation.

Inspections typically occur throughout several phases of implementation of the plan. Following plan implementation, subsequent site visits continue to occur in order to ensure compliance; their frequency depends upon the nature of the complaint, as many cases will require less frequent inspections.

The ASA program receives complaints from citizens, state agencies, local governments, and conservation organizations. Typical water quality issues may include manure management issues and erosion and sedimentation issues on all types of animal agriculture operations (dairy operations, beef cattle farms, horse operations, swine farms, etc.) that do not meet the thresholds which require a VPA or VPDES permit. Also addressed are water quality complaints concerning non-animal operations such as crop farms.

By analyzing the trends of the water quality issues encountered, VDACS staff has been able to target various audiences and commodity groups with additional outreach and education on environmental compliance. These efforts are also focused on specific geographic regions based on trends. This has proven successful in the past, resulting in a decrease in associated water quality problems. For example, by working with the aforementioned state and local agency partners and focusing outreach efforts on land conversion issues (converting forested land to agricultural land), the program has witnessed a decline in sedimentation issues relating to land conversion. These efforts resulted in stronger enforcement of existing state and local programs. Our most recent focus has been equine operations as an increase in water quality issues on these farms has been documented.

VDACS, in close cooperation with local SWCDs, administers this program. Assistance is also provided by DEQ, the Virginia Department of Conservation and Recreation, the Virginia Department of Forestry, the Virginia Cooperative Extension, the Natural Resources Conservation Service, and local governments. In the thirteen year history of the program, over 200 plans have been successfully implemented on farms across Virginia.

Additional information on the ASA Program can be found at the following link:
http://www.vdacs.virginia.gov/stewardship/index.shtml

Code Reference:
§3.2-400 et. seq. *Code of Virginia*

Biosolids VPA Regulations

These regulations and adopted standards govern the land application as well as distribution and marketing of biosolids. Treated sewage sludge, commonly referred to as biosolids is sewage sludge that has been treated for pathogen control and contains acceptable levels of pollutants in accordance with an issued permit.

DEQ has regulatory oversight of all land application permits for biosolids. DCR is cited in the law and regulations with specific roles involving nutrient management of biosolids. The code

and regulations require a number of controls regarding biosolids permitting and management, including a nutrient management plan meeting DCR standards for all sites receiving biosolids.

Site inspections occur before, during and after applications on a significant number of application sites. Part of this inspection process is compliance with the nutrient management plan that governs many of the nutrient and sediment control criteria. These criteria include timing and loading rates for nitrogen applications, as well as phosphorous control criteria like the phosphorous index. Setback distances from features like streams and wells are also incorporated into the plan; verification of these is also part of the inspection process.

A treatment works may apply biosolids on land permitted under its own VPDES permit. However if a treatment works assigns responsibility for off-site land application of biosolids to a third party, a VPA permit is issued to that contractor. Land covered under VPA permits, which are specific to the county and contractor, can receive biosolids applications from numerous sources including those from out of state. VPDES permitted application sites are specific to the permitted treatment works.

As part of statutory law a non-reverting fund was established from the fees paid by land appliers of biosolids. This fund is used to administer the DEQ biosolids program as well as two biosolids nutrient management oversight positions at DCR. A process to amend the regulations to further improve the management of land receiving biosolids has been initiated. This amendment is currently proceeding through the administrative process and is expected to take effect in 2011, at the earliest.

Code Reference:
§62.1-44.19:3, §10.1-104.2 Code of Virginia, Regulations 9VAC25-31-10 et. seq, 9VAC25-32-10 et. seq, 4VAC 5-15-10 et. seq.

Chesapeake Bay Preservation Act

The regulations pertaining to the Chesapeake Bay Preservation Act, which apply to 84 localities within the Tidewater region of Virginia, contain several provisions addressing pollutant loadings resulting from agricultural practices. These provisions are required to be carried out by the local governments that are responsible for the implementation of the Bay Act in a manner that is consistent with these regulations. One key provision is the requirement all active agricultural lands have a soil and water quality conservation assessment conducted. This assessment is to evaluate the effectiveness of existing soil erosion and sediment control and nutrient management practices. Where necessary a plan may outline additional practices to ensure that water quality protection is being accomplished.

Another key provision of the Bay Act regulations allows for agricultural encroachments into the required 100-foot buffer adjacent to streams, wetlands and tidal shores provided that, in the opinion of the soil and water conservation district, adequate nutrient management, pest chemical or control erosion control is being implemented on the adjacent land.

Code Reference:
§ 10.1-2103 Code of Virginia, 9VAC 10-20-120 9; 9VAC 10-20-130 5 b.

Nutrient Management Training and Certification Program

This program is operated to train and certify persons who prepare nutrient management plans. To be eligible for certification, an individual must meet education and experience requirements, achieve a passing score on both a core and practical examination and maintain the required continuing education requirements.

Agriculture and turf and landscape certifications are offered. Individuals certified to develop nutrient management plans are required to develop plans consistent with promulgated technical criteria and must provide summary reports to DCR annually. Planners from both categories must use criteria applicable to the specific plan they are writing.

Nutrient management plans developed by certified planners must be developed consistent with Virginia Nutrient Management Training and Certification regulations and the Virginia Nutrient Management Standards and Criteria, Revised October 2005, which is promulgated by reference. The regulations were revised in 2005 to require timing of nutrient applications that correspond more closely to times of maximum crop nutrient uptake and to require that all NMPs be nitrogen and phosphorus based. These 2005 revisions expanded the Standards and Criteria to give planners additional information needed to write all the components of a nutrient management plan. Examples of these additions include the description of environmentally sensitive sites for potential nutrient loss, including a table identifying environmentally sensitive sites by soil type; a table listing Phosphorus Crop Removal to establish coefficients for many crops and vegetables and equations to convert Mehlich III phosphorus soil tests to Mehlich I so all phosphorus recommendations are determined by the same standard. This Standards and Criteria manual also describes in detail three acceptable methods of determining phosphorus applications when dealing with the application of organic materials to crops.

There are 329 planners in the agriculture category, most of who practice within the Chesapeake Bay watershed. Certified planners are subject to random inspections of plans prepared to check compliance with promulgated plan criteria. Certificates may be revoked if plans do not meet the criteria contained in the Nutrient Management Training and Certification Regulations (4 VAC-5-15-10 et. seq.). Nutrient management plans are required to be developed by certified nutrient management planners in all instances where NMPs are currently required in Virginia, including VPDES and VPA animal and poultry waste permits, biosolids use permits, state cost-share program recipients for practices requiring NMPs. A software program (NutMan) is available to certified nutrient management planners to assist them in developing NMPs.

Code Reference:
§10.1-104.2 Code of Virginia, Regulation 4 VAC 5-15-10 et. seq.

Nutrient Management Plan Requirement for State Owned Lands

The Code of Virginia requires that all state agencies, state colleges and universities, and other state governmental entities that own land upon which fertilizer, manure, sewage sludge or other compounds containing nitrogen or phosphorus are applied to support agricultural, turf, plant growth, or other uses shall develop and implement a nutrient management plan for such land. For all state-owned agricultural and forestal lands where nutrient applications occur, state agencies, state colleges and universities, and other state governmental entities must submit site-specific

individual nutrient management plans prepared by a DCR-certified nutrient management planner. The code provides for a partial exemption where state agencies are conducting research specifically involving nutrient application rate and timing on state-owned agricultural and forestal lands. In that case, such lands still require a nutrient management plan but are exempt from the application rate and timing provisions.

For all state-owned lands other than agricultural and forestal lands where nutrient applications occur, state agencies, state colleges and universities and other state governmental entities must submit nutrient management plans prepared by a certified nutrient management planner. State agencies, state colleges and universities, and other state governmental entities are required to maintain and properly implement any such nutrient management plan or planning standards or specifications on all areas where nutrients are applied. DCR has authority to conduct periodic inspections as part of its responsibilities authorized under this section.

Code Reference:
§10.1-104.4 Code of Virginia

Poultry Waste Permits

Poultry operations with at least 200 animal units (the equivalent of 20,000 chickens or 11,000 turkeys) that do not require a Virginia Pollutant Discharge Elimination System permit have been required since 2001 to operate in compliance with VPA poultry waste permits. This also applies to smaller poultry-producing operations that might be deemed to cause water pollution.

The permits require producers to implement enforceable DCR-approved, site-specific nutrient management plans, proper waste storage methods, and waste tracking and accounting procedures. The regulations also govern use of poultry litter that has been transferred off the production site by specifying such things as approved application rate determination methods, timing of application, storage provisions and recordkeeping requirements for the end-user(s) of the litter.

Registration with the state is also required for brokers of poultry waste. They must also comply with recordkeeping and storage requirements. Virginia Pollution Abatement poultry waste permits have a maximum term of 10 years. However, nutrient management plans required by the permits must be revised every three years if land application is included or every five years if all litter is transferred off-site. Permitted poultry-producing farms are inspected at least annually. In addition to complying with all conditions of the permits, producers and brokers must attend training sessions at least once every five years.

As of April, 2010, there are 865 poultry operations with VPA permits and active nutrient management plans in the Commonwealth of Virginia.

Code Reference:
§62.1-44.17:1.1 and §62.1-44.17:1.1 *Code of Virginia*, Regulation 9 VAC 25-630-10 et. seq.

Precision Nutrient and Pesticide Application Equipment Tax Credit

This incentive program provides a 25 percent state income tax credit up to $3,750 annually to encourage farmers to purchase more accurate nutrient and pesticide application equipment, which meet state specifications. Eligible equipment categories include: manure spreaders, pneumatic fertilizer applicators, sprayers for pesticides or liquid fertilizers, tramline equipment, and starter fertilizer attachments for planters. The program also requires the farmer to have a nutrient management plan.

Code Reference:
§58.1-337 and §58.1-436 *Code of Virginia*

Virginia Pollutant Discharge Elimination System Animal Waste Permits

CAFOs, as defined by the EPA CAFO Rule, are regulated in Virginia under the Virginia Pollutant Discharge Elimination Permit Program. A CAFO which discharges or proposes to discharge has a duty to apply for coverage under a VPDES general or individual permit. In response to the changes to the EPA CAFO Rule which became effective in December 2008, Virginia amended the VPDES Regulation which became effective March 3, 2010. In a letter dated June 14, 2010, EPA approved the VPDES CAFO Regulatory provisions of the Permit Program. In order to conform to these regulatory changes, DEQ is in the process of modifying the CAFO permit program with input from EPA Region III and our environmental and agricultural stakeholders.

More information regarding the DEQ animal waste permit and inspection program can be found at the following link: http://www.deq.virginia.gov/vpa/cafo.html.

Code Reference:
§62.1-44.15 and §62.1-44.17:1 *Code of Virginia;* Regulation 9 VAC 25-191-10 et. seq.

Virginia Pollution Abatement (VPA) Animal Waste Permits

The DEQ animal waste program is regulated under both the Virginia Pollution Abatement Permit Regulation Program and the Virginia Pollutant Discharge Elimination Permit Regulation Program (see above).

> An *animal feeding operation (AFO)* is defined as a lot or facility where animals are stabled or confined for a total of 45 days or more in any 12-month period, and where crops or vegetative growth is not maintained in the normal growing season over the lot or facility.

Animal feeding operations that confine more than 300 animal units of livestock and handle liquid manure are required to obtain coverage under either a VPA general or individual permit.

Poultry operations that confine more than 200 animal units of poultry (20,000 chickens or 11,000 turkeys) must register for coverage under the Virginia Pollution Abatement General Permit for Poultry Waste Management. In addition, poultry litter, which is transferred from a poultry grower in Virginia, must be utilized and stored in accordance with 9VAC25-630 et seq.

Recordkeeping is required for the land application and transactions of poultry which is transferred offsite of the generator.

Code Reference:
§62.1-44.17:1 *Code of Virginia;* Regulation 9 VAC 25-32-10

Virginia Revolving Loan Fund

Agricultural BMPs are eligible for funding under the Virginia Revolving Loan Fund. The 1999 General Assembly approved legislation allowing the Virginia Resource Authority with recommendations by DEQ to provide low interest loans to address nonpoint source pollution from agricultural activities.

DEQ will prioritize applications for loan assistance on a statewide basis. Applications for practices that are expected to provide the greatest water quality benefit will be given the highest funding priority. Applications considered to impact segments on the 303(d) Impaired Waters List receive high priority. Those impacting waters on the 305(b) Threatened List, DCR high priority waters, or the Nutrient Enriched Waters List will receive a medium priority rating. All other applicants are given lower priority.

Code Reference:
62.1-229.1, §58.1-337 and 58.1-436 *Code of Virginia*

5.2. Accounting for Growth

Most agricultural land uses are decreasing as land is converted to other uses in Virginia's Chesapeake Bay watershed. There are however, a few sub-sectors of agriculture that are projected to experience growth. Sod farms, nurseries, vineyards and biofuel feedstock are all growing agricultural sub-sectors. It is expected that most of this growth will result from the conversion of row crop, hay or pasture land uses.

To address the potential for increasing loads, we will investigate these growing sub-sectors and study a variety of BMPs to reduce their loads. New sod farms may need to develop and implement nutrient management plans and new nurseries may need to implement runoff and leachate containment and reuse systems to reduce TN and TP losses by 75 percent from standard practices. New vineyards are normally sited on former agricultural lands. Due to low nutrient usage, they are not expected to increase nutrient losses but would be subject to soil erosion control conservation plans to control sediment losses. The resulting loads are projected to produce no net increase over the previously existing land use as a result of growth.

CAFO is another growing sub-sector of agriculture. Statewide, the number of farms has been decreasing steeply, but the total number of animals has been declining only slightly. The result is an increase in the number of animals per farm. This growth is likely to result in the conversion of non-CAFO animal agriculture to CAFOs and a shift from load allocation to waste load allocation. Because the total number of animals statewide is declining slightly, the growth is not expected to produce a net increase in load. To accommodate this shift toward fewer, but larger

farms, the WLA/LA for AFO Acres will be reserved for potential future WLA for larger CAFOs that need a NPDES permit.

Virginia recognizes the ideal approach would be to track growth separately in each of the segment-sheds. However, this approach would be overly cumbersome to administer and presents potential inequities across the state. Therefore, growth will be tracked at the major basin scale.

5.3. Gap Analysis

Significant progress has been achieved to date through a variety of programs detailed in section 5.1 and specific initiatives. Several tables in Section 5.4 show estimates of current 2009 progress loads and associated BMP levels for nitrogen, phosphorus, and sediment, as well as agriculture target loads for 2017 and the agriculture allocations for 2025.

Agricultural Stewardship Act

The following are found to be existing gaps in the ASA Program:

1. Limited resources. ASA staff has been able to keep up with current workloads, but additional staffing is needed to ensure that the increasing number of active ASA plans are implemented and maintained. The number of site visits and compliance inspections continue to increase.

2. The current amount of time dedicated to outreach depends upon new case workload and staffing resources. ASA staff recognizes the importance of providing education and outreach opportunities to the agricultural community.

3. VDACS and DEQ recognize there are AFOs which may require technical assistance but fall below the existing regulatory threshold which requires a VPA or VPDES permit.

5.4. Strategy to Fill Gaps

Significant progress has been made to date through a variety of programs and specific initiatives. Much remains to be done in order to achieve the reductions necessary to meet 2017 and 2025 allocation loads. The goal of this section is describe alternatives that would meet final reduction targets.

For more than six years Virginia has focused considerable resources on the implementation of "Five Priority Practices". Each "practice" is more accurately described as a suite of BMPs, each having certain distinct, unique specifications. These practices have been identified as being those that are the most efficient and effective in reducing nutrients and sediments from entering state waters. The priority practices are

- Nutrient Management,
- Vegetative Buffers (grass and forest),
- Conservation Tillage,
- Cover Crops, and
- Livestock Stream Exclusion.

Virginia has advanced the implementation of these practices through:

- An aggressive voluntary nutrient management program and mandatory requirements for farms having confined animal permits or biosolids permits
- The "ramping" up of considerable technical staff employed by 47 soil and water conservation districts that work directly with agricultural producers across the state. The staff assists with BMP implementation whether practices are implemented voluntarily or with incentives from state, federal and other incentive programs.
- Financial incentives (cash and tax credits) offered through the Virginia Agricultural BMP Cost-Share Program
- An extensive marketing/PR campaign primarily focused in the Chesapeake Bay basin using the expertise of a private marketing firm

Within the groups and agencies that represent agricultural and conservation interests there is growing acceptance that the state's suite of five priority practices provides a broad, comprehensive approach in achieving many natural resource improvements including water quality. In the past six years Virginia has dedicated more than $100 million toward incentives and technical assistance for implementing agricultural BMPs. Significant levels of the priority practices have been achieved, but much more remains to be done.

As consideration is given to establishing broader BMP expectations, a phased approach including communication and education efforts to reach affected agricultural producers will be necessary. During this multi-year period, producers will be encouraged to participate in agricultural incentive programs to help offset the cost of BMP implementation. Financial incentives and tax credits may be altered or expanded to support increasing BMP implementation.

Further, there is growing recognition that farmers are voluntarily implementing significant quantities of priority practices and other BMPs without acceptance of incentives from state or federal programs. In other cases, there are practices in place currently required by laws and regulations which have not been fully accounted for in state progress reporting. To better assess the magnitude of BMPs implemented by independent actions of farmers across the state, Senate Bill 346 was enacted during the 2010 session of the Virginia General Assembly.

Be it enacted by the General Assembly of Virginia:

1. That the Code of Virginia is amended by adding in Article 7 of Chapter 2 of Title 2.2 a section numbered 2.2-220.3 as follows:

§ 2.2-220.3. Development of strategies to collect land use and conservation information.

The Secretary of Natural Resources, with assistance from the Secretary of Agriculture and Forestry, shall establish and maintain a database of the critical data attributes for onsite best management practices implemented in the Commonwealth that limit the amount of nutrients and sediment entering state waters. The database shall document voluntary actions taken by the agricultural and silvicultural sectors and should enable the application of the collected data towards projections of progress towards Virginia's water quality goals by sharing the data with the appropriate federal or state agencies. To the extent possible or appropriate, the database shall (i) be uniform in content and format to applications in the other states of the Chesapeake Bay watershed, (ii) maintain the confidentiality of information, and (iii) use existing methods of data collection including reports to the U.S. Department of Agriculture's Farm Service Agency, soil and water conservation districts, and localities for the purpose of land use valuation. Any information collected pursuant to this section shall be exempt from the Freedom of Information Act (§ 2.2-3700 et seq.).

2. That the Secretary of Natural Resources, by November 1, 2010, shall submit a report to the Governor and the Chairmen of the House Agriculture, Chesapeake and Natural Resources Committee and the Senate Agriculture, Conservation and Natural Resources Committee on the establishment of the database and associated costs and responsibilities for its long-term maintenance.

3. That an emergency exists and this act is in force from its passage.

DCR, under direction of the Secretary of Natural Resources, is taking the lead to pursue this action. The report was submitted in November 2010 summarizing the strategy and resources needed to collect, store and report such voluntary agricultural and forestry BMP data. While better quantification of existing BMPs will be helpful in making progress toward nutrient and sediment reduction goals, it will not fully close the gap. The BMP data collected will be limited to the list of BMPs that are recognized by EPA for the Chesapeake Bay model and for other impaired water with TMDLs statewide. All reportable practices must meet the required USDA Natural Resources Conservation Service standards and specifications for agricultural BMPs or Virginia Department of Forestry (DOF) stands and specifications for Forest Harvesting BMPS and be field verified. Virginia's 47 Soil and Water Conservation Districts will be the primary mechanism for collection, verification and data entry for agricultural BMPS. DOF will collect, verify and report voluntary forest BMP data. DCR's web-based Agricultural BMP Tracking Program is currently used by all 47 SWCDs and will be modified for voluntary BMP entry, storage and reporting. The strategy calls for a multi-phased approach with Phase I pilot effort beginning in 2011 and the Phase II expansion statewide effort beginning in 2012 and continuing with Phase III in 2013.

Additional staff resources will be sought for the Agricultural Stewardship Program by VDACS to better respond to the increasing number of water quality inquiries. Increases in state and federal cost-share funding, as well as an increase in the number of SWCD technical staff will help ensure compliance.

VDACS and DEQ plan to seek assistance from agricultural organizations such as the Virginia Farm Bureau, Virginia Agribusiness Council, other agricultural commodity groups, local governments, Soil and Water Conservation Districts, and others interested in water quality issues regarding an increase in education and outreach efforts. The goal would be to enhance the environmental awareness among their respective memberships and stakeholders regarding the Chesapeake Bay TMDL, utilization of the ASA, and the importance of implementing conservation practices.

VDACS has a successful working relationship with the DEQ Animal Waste Permit Program staff regarding the response to water quality issues, as well as working out jurisdictional issues involving small AFOs. Currently underway is a plan for a memorandum of agreement (MOA) between the two agencies on how to enhance this relationship to better respond to water pollution issues involving small, un-permitted AFOs. This MOA will detail the partnership and allow both agencies to better utilize their existing programs and resources regarding these operations. It is anticipated that this agreement will be completed in early 2012 and implemented immediately thereafter.

Implementation of agricultural BMPs approaching the highest practicable levels is necessary to achieve nutrient and sediment reduction thresholds. Table 5.4-1 summarizes the list of BMPs included in Virginia's input deck for the WIP. The table specifies BMP by BMP, the needed percentage of implementation and also provides the framework that is expected to be necessary to achieve the implementation.

Table 5.4-1 Current Progress and Projected Agriculture BMP Implementation Levels for 2017 and 2025 using P5.3 Model

Input Deck BMPs	2009 % Treatment	2017 Coverage Level	2025 Coverage Level
Forest Buffers Riparian Cropland and Specialty Crops	1.3 %	3 %	5 %
Forest Buffers Riparian Hay	0 %	1 %	5 %
Forest Buffers Riparian Pasture	8 %	10 %	10 %
Grass Buffers Riparian Cropland and Specialty Crops	9 %	30 %	90 %
Grass Buffers Riparian Hay	0 %	1 %	90 %
Grass Buffers Riparian Pasture	12 %	15 %	20 %
Land Retirement Ag	3 %	5 %	5 %
Upland Tree Planting Ag	0.7 %	5 %	5 %
Wetland Restoration	0.05 %	0.15 %	0.20 %
Continuous No-Till	11 %	35 %	60 %
Conservation Till (includes CNT acres)	57 %	80 %	90 %
Conservation Plan Cropland and Specialty Crops	60 %	65 %	95 %
Conservation Plan Hay	7 %	40 %	95 %
Conservation Plan Pasture	41 %	50 %	95 %
Cover Crop Standard planting	4 %	10 %	10 %
Cover Crop Early planting	3 %	10 %	20 %
Commodity Cover Crop Early planting	4 %	10 %	15 %
Stream Protection with Fencing (linear feet)	15 %	45 %	95 %
Alternative Water Pasture	2 %	2 %	0 %
Prescribed Grazing Pasture	20 %	40 %	60 %
Animal Waste Management System	25 %	34 %	95 %
Nutrient Management Cropland & Specialty Crops	59 %	90 %	95 %
Nutrient Management Hay	18 %	90 %	95 %
Nutrient Management Pasture	5 %	15 %	20 %
Non Urban Stream Restoration (linear feet)	0.02%	0.11%	0.22%
Poultry Mortality Composters	-	100%	100%
Swine Mortality Composters	-	95 %	95 %
Water Control Structures	-	-	1,000 acres
Manure Transport (Exported from Rockingham & Page to Outside Bay Watershed)	-	5,000 tons	75,000 tons
Manure Transport (Exported from Rockingham & Page but within Chesapeake Bay Watershed)	-	75,000 tons	75,000 tons
Poultry Phytase Phosphorus 30% Reduction in Broilers and Turkeys	60 %	100 %	100 %
Swine Phytase Phosphorus 35% Reduction	60 %	100 %	100 %
Precision / Decision Agriculture on Cropland	-	50,000 acres	50%
Container Nursery and Greenhouse Runoff / Leachate Recovery	-	-	95%

Following is a summary of eventual program delivery mechanisms believed necessary to attain the BMP coverage levels for 2017 and 2025.

Table 5.4-2 Expected Eventual Program Delivery Mechanism to Achieve Agriculture BMP Implementation Levels

Input Deck BMPs	Incentives	Requirements / Other Mechanisms
Forest Buffers Riparian Cropland and Specialty Crops	v	
Forest Buffers Riparian Hay	v	
Forest Buffers Riparian Pasture	v	
Grass Buffers Riparian Cropland and Specialty Crops	v	v
Grass Buffers Riparian Hay	v	v
Grass Buffers Riparian Pasture	v	v
Land Retirement Ag	v	
Upland Tree Planting Ag	v	
Wetland Restoration	v	
Continuous No-Till	v	
Conservation Till (includes CNT acres)	v	v
Conservation Plan Cropland and Specialty Crops	v	v
Conservation Plan Hay	v	v
Conservation Plan Pasture	v	v
Cover Crop Standard planting	v	
Cover Crop Early planting	v	
Commodity Cover Crop Early planting	v	
Stream Protection with Fencing (linear feet)	v	v
Alternative Water Pasture	v	
Prescribed Grazing Pasture	v	
Animal Waste Management System	v	v
Nutrient Management Cropland & Specialty Crops	v	v
Nutrient Management Hay	v	v
Nutrient Management Pasture	v	v
Non Urban Stream Restoration (linear feet)	v	
Poultry Mortality Composters	v	v
Swine Mortality Composters	v	v
Water Control Structures	v	
Manure Transport (Outside Bay Watershed)	v	v
Manure Transport (Exported from Rockingham & Page)		v
Poultry Phytase Phosphorus 30% Reduction in Broilers and Turkeys		v
Swine Phytase Phosphorus 35% Reduction		v
Precision / Decision Agriculture	v	
Container Nursery and Greenhouse Runoff / Leachate Recovery		v

The agriculture community is committed to reducing nutrient and sediment loads through priority practices and other best management practices. To assist in achieving the implementation of the reductions from agriculture, a fully implemented resource management plan (RMP) will be deemed to be in compliance with the WIP and any associated law or regulation, and may include implementation of the following relevant practices as outlined below to address the individual water quality issues of each farming operation in the Commonwealth.

For all cropland or specialty crops, the RMP shall include the following components as needed, based upon an individual on-farm assessment to determine which practices will result in needed nutrient and sediment reductions: (1) a nutrient management plan that meets the specifications of DCR's Nutrient Management Program; (2) 35 foot minimum forest or grass buffer meeting NRCS practice specifications 390 or 391 between cropland and all perennial streams; (3) a soil conservation plan that achieves a maximum soil loss rate of "T," as defined by USDA-NRCS; (4) cover crops meeting specifications of DCR's Agricultural Best Management Practices (BMP) Manual planted following all summer annual crops such as corn, cotton, vegetables, and tobacco if such summer annual crops received at least 50 pounds per acre of nitrogen; (5) an assessment of all BMPs currently in place, whether as part of a cost-share program or through voluntary implementation to determine their adequacy in meeting nutrient and sediment reduction objectives; and (6) such other BMPs as may be developed and credited in the Bay Model.

For all hayland, the RMP shall include the following components as needed, based upon an individual on-farm assessment to determine which practices will result in needed nutrient and sediment reductions: (1) a nutrient management plan that meets the specifications of DCR's Nutrient Management Program; (2) 35 foot minimum forest or grass buffer meeting NRCS practice specifications 390 or 391 between hayland and all perennial streams; (3) a soil conservation plan that achieves a maximum soil loss rate of "T," as defined by USDA-NRCS; and (4) an assessment of all BMPs currently in place, whether as part of a cost-share program or through voluntary implementation to determine their adequacy in meeting nutrient and sediment reduction objectives; and (5) such other BMPs as may be developed and credited in the Bay Model.

For all pasture, the RMP shall include the following components as needed, based upon an individual on-farm assessment to determine which practices will result in needed nutrient and sediment reductions: (1) a nutrient management plan that meets the specifications of DCR's Nutrient Management Program if the pasture received any application of mechanically applied manure, poultry litter, or biosolids within the past three years or will receive such applications in the future; (2) a livestock stream exclusion system;(3) a pasture management plan or soil conservation plan that achieves a maximum soil loss rate of "T," as defined by USDA-NRCS; (4) an assessment of all BMPs currently in place, whether as part of a cost-share program or through voluntary implementation to determine their adequacy in meeting nutrient and sediment reduction objectives; and (5) such other BMPs as may be developed and credited in the Bay Model.

Except for existing requirements, implementation will be by voluntary means until such time as agricultural load targets are not achieved for a particular milestone period. If the agriculture sector load for a milestone period exceeds the target sector load, authorization to develop and implement mandatory actions or programs will be requested from the legislature, provided cost-share funding sufficient to achieve the milestone load reductions had been made available to producers during the same milestone period. Virginia, along with expected NRCS funding levels, has sufficient funding to cover the agricultural BMP funding needs identified in the WIP through much of the 2013 milestone. Additional federal EQIP funding will be needed. However, the system for accounting of voluntary BMPs is expected to significantly contribute to accomplishments for the 2013 milestone and beyond.

In assessing any shortfall, DCR, in consultation with VDACS, will consider the existence of extraordinary circumstances (such as natural disaster or market conditions), the provision of adequate cost-share funding, and the provision of adequate technical assistance and determine which legislative action is appropriate. The request for legislative action will be considered to be proposed legislation requested to the Governor by DCR.

In deciding the specific practices for which a legislative action would be proposed in response to a milestone shortfall, DCR will assess, in consultation with VDACS, which of the following approaches or combination of approaches best addresses the shortfall on farms that have not implemented a current RMP to meet necessary water quality improvements:

Potential Action
• Legislative request for mandatory Nutrient Management Plans sufficient to ensure achievement of 2017 and 2025 targeted percentage of acreage for NMPs.
• Legislative request for mandatory Soil Conservation Plans to control soil loss to "T" or less sufficient to ensure achievement of this practice on 2017 and 2025 targeted percentage of acreage for Soil Conservation Plans.
• Legislative request for mandatory livestock stream exclusion sufficient to ensure achievement of this practice on 2017 and 2025 targeted percentage of treatment.
• Legislative request for mandatory grass or forest buffers between all cropland, specialty crop, and hay fields sufficient to ensure achievement of this practice on 2017 and 2025 targeted percentage of treatment.

The magnitude of any agricultural sector shortfall; using the average for nitrogen, phosphorus, and sediment; in achieving a particular 2- year milestone will also be a factor in determining which of the specific legislative proposals will be pursued. Finally, if agricultural load reductions exceed the goal of a specific milestone period, such further reduction will be credited toward achievement of the successive milestone reduction targets.

Table 5.4-4 Agriculture Sector Target Loads by Milestone Period

Milestone Year Ending Year	2009 Progress	2013	2015	2017	2025
Agricultural Sector Load Targets (Sum of All Basins)					
Nitrogen (Lbs)	21,595,047	20,669,972	19,436,539	17,894,747	15,427,881
Phosphorus (Lbs)	3,090,060	2,941,112	2,742,514	2,494,267	2,097,071
Sediment (Tons)	1,066,368	1,023,703	966,816	895,707	781,933

Note: this table applies the following percentage reductions for the milestone periods through 2017:

Ending 2013: 5% + 10% = 15%

Ending 2015: 5% + 10% + 20% = 35%

Ending 2017: 5% + 10% + 20% + 25% = 60%

Descriptions of Input Deck Levels and Practices

- **Nutrient Management:** Nutrient management plans are already required for VPDES and VPA confined livestock and poultry permits and for biosolids application sites. The state will consider broader incentives and requirements for nutrient management plans if needed, written by Virginia certified nutrient management planners, to cover 90 percent of available cropland, specialty crops and hay with implementation by 2017 and 95% by 2025. This action is necessary to achieve implemented nutrient management on 95 percent of the available cropland, specialty crops, and hay acreage.

  Since pasture acres are frequently under fertilized unless manure or biosolids are used, the Commonwealth will not focus efforts on pastures that receive only commercial fertilizer. Nutrient management plans will be expected on all pasture receiving biosolids or manures.

  A phased in approach focusing on the largest farms first would help ease the burden on producers, allowing more adjustment time for the smaller operations and spreading technical service provider workload over a longer period of time. Federal and state financial incentives to help defray costs for the nutrient management component of resource management plans developed by certified individuals. This will assist producers in transitioning to a system where nutrient management plans are expected.

- **Vegetative Buffers (grass and forest)**: To achieve 95 percent implementation of 35' forest and grass buffers on crop and hay lands it will be necessary to pursue an expectation for buffers. Otherwise, it could be incorporated as a component of state resource management plans. Farmers would have the option to choose between grass and forested buffers, with grass buffers being the minimum expected. Federal or state incentives could be provided to encourage producers to "upgrade" to a forested buffer. The Commonwealth believes that fulfillment of grass and forest buffers on 30 percent of pastures that border riparian waterways can be achieved through farmer participation in financial incentive programs, assuming there is a concurrent commitment for livestock stream exclusion. Implementation of such buffers could begin during the 2011-2017 period, but would not be expected to reach maximum implementation until the 2017 to 2025 period.

  Such buffers would only be required along perennial surface waters (blue line features on pre-1994USGS topographic maps), unless a farmer chose to use the phosphorus index to determine phosphorus applications, in which case buffers or application setbacks from intermittent streams would also be required if needed to justify a specific rate of phosphorus application.

- **Conservation Tillage and Soil Conservation Plans:** At the level of 90 percent implementation of conservation tillage on cropland and 95 percent for soil conservation plans on cropland, hay, and pasture, it will be necessary to establish an expectation for implemented soil conservation plans to achieve a maximum soil loss rate of "T," as defined by USDA-NRCS as the tolerable rate of soil loss expressed as tons per acre. In addition to this being incorporated into resource management plans, other structural practices such as grass waterways will be needed.

The Commonwealth believes that either expectation above for soil conservation plans along with other voluntary and incentive practices would result in conservation tillage being implemented on 90 percent of cropland (inclusive of specialty cropland). The expectation for a soil conservation plan, or a soil conservation component to resource management plans should be staged to be implemented on the largest farms by 2017, with moderate and smaller size farms to follow during the 2017 to 2025 period.

- **Cover Crops:** Establishing and managing a cover crop to salvage the residual nutrients comes at considerable expense to agricultural producers, with limited financial return. Achieving cover crops with standard planting dates on 10 percent of the available cropland, 20 percent with early planting dates and 15 percent of harvestable (commodity) cover crops will be accomplished through financial incentive programs and the accounting of acreage farmers planted voluntarily.

- **Livestock Stream Exclusion:** Achieving livestock stream exclusion on 95 percent of perennial waterways will require significant increases in financial and technical assistance. According to the 2007 Census of Agriculture, approximately 27,000 farms in Virginia manage roughly 1.5 million cattle. Slightly less than half of these farms (42%) manage 20 cows or less. These smaller operations account for only 6% of the state's cattle. Under an expectation that farms with 20 cows or more will exclude livestock by 2025, 94% of the cattle (impacting 58% of all farms that manage cattle), would be excluded from riparian waterways. Achieving livestock exclusion on 95% of riparian waterways will require the establishment of a new expectation within resource management plans.

Concurrent with the establishment of an implementation expectation, the Commonwealth would establish a cost-share payment schedule that rewards early adopters by paying a larger percentage of practice installation costs in the first few years.

Other Agricultural BMPs contained in the input deck:

- **Prescribed Grazing**: The Commonwealth expects that fulfilling prescribed grazing on 60 percent of available pasture acres will be accomplished using education, technical guidance from trained personnel, and financial incentives offered through state and federal programs, coupled with an expectation for livestock stream exclusion and pasture conservation planning.
- **Agricultural Land Retirement** to account for approximately 5 percent of available lands is expected to be achieved through a combination of financial incentives provided through state and federal programs such as CRP and normal attrition of farmland, excluding land to be developed.
- **Upland Tree Planting** on 5 percent of agricultural lands may also be accomplished through the use of financial incentives coupled with expected conversion of farmland, particularly highly erodible lands.
- **Animal Waste Management Systems** may be installed and managed on 95 percent of the concentrated livestock and poultry operations. Better accounting for practices already

required, such as proper poultry litter storage presently required by the Poultry Waste Management Regulation, will need to occur before 2017. Full achievement may not be accomplished without establishing new expectations for farms below current permit thresholds, but this would not be initiated until the 2017 – 2025 period.

- **Continuous No-Till** consists of implementing a no-tillage program for a minimum of 5 consecutive years that maintains a minimum of 60% residue cover at all times with no soil disturbance during the 5 year period. Implementation of this practice is expected to be achieved on 35 percent of available cropland acres by 2017 through a more accurate accounting of acreage voluntarily managed through this cultivation system, through farmer acceptance of financial incentives offered through state and federal programs, and trends increasing the use of this system due to fuel and labor savings. Projected potential coverage by 2025 is 60% of cropland. DCR believes that EPA needs to allow for "stacking" of this BMP with other practices such as cover crops and nutrient management, and requests that the practice be reevaluated by the Chesapeake Bay Program to allow stacking with other BMPs.
- **Water Control Structures** will be promoted though financial incentives and is expected to result in a total of 1,000 acres of managed water control structures targeted to the following counties/cities: Accomack, Chesapeake, Gloucester, Northampton, and Virginia Beach.
- **Poultry Mortality Composters**: The Poultry Waste Management Act and related regulations require proper disposal of poultry mortality and does not allow burial of dead birds except under extraordinary circumstances. Therefore, complete compliance with this requirement is expected to be achieved by 2017. Incineration or rendering of dead birds is considered to be at least as beneficial in nutrient reduction as is mortality composting, so will be reported in aggregate with the composting practice.
- **Swine Mortality Composters**: Proper disposal of swine mortality and prohibition of burial will be achieved through enforcement of existing state laws and regulations to achieve 95 percent of the industry by 2017. Incineration or rendering of swine is considered to be at least as beneficial in nutrient reduction as is mortality composting, so will be reported in aggregate with the composting practice.
- **Poultry Manure Transport (Outside Bay Watershed)** from Rockingham and Page counties to destinations outside the Chesapeake Bay Watershed will be achieved for 5,000 tons annually of poultry litter by 2017 through a joint incentive program between the Commonwealth and the poultry integrator companies. The Commonwealth is in the exploratory stages with a major energy firm to determine the impact and feasibility of a potential poultry litter to energy project in the Shenandoah Valley which would burn litter and export or landfill the residual materials. By 2025, this practice would impact 75,000 tons annually provided the residual materials are landfilled or exported outside the watershed.
- **Poultry Manure Transport (Within Bay Basin)** from Rockingham and Page counties to destinations inside the Chesapeake Bay Watershed, but beyond these two source counties will be achieved for 75,000 tons annually by 2017 and thereafter through enforcement of the grower and end-user requirements of the Poultry Waste Management regulations. Tracking data to verify this transport will be collected by DEQ staff on their annual inspections of regulated poultry farms.

- **Poultry Phytase Phosphorus Reductions** may be achieved to result in a net reduction of phosphorus in broiler and turkey manure by 30 percent, including an expected reduction of approximately 24 percent in concentration of phosphorus in broiler manure coupled with a volume reduction of approximately 6 percent in broiler litter generation due to changes in management as compared to early 1990s pre-Phytase production practices. The 30 percent net reduction is expected to be achieved by 2014 through continuation of individual MOAs between DCR and each poultry integrator company. If the 30 percent reduction is not achieved by 2014, additional measures could be considered.
- **Precision / Decision Agriculture** is expected to be implemented on a pilot basis on 50,000 acres of cropland by 2017 and has potential to be implemented on 50% of cropland by 2025 through a combination of fertilizer industry cooperation and incentives, if needed.
- **Container Nursery and Greenhouse Runoff and Leachate Collection and Reuse** will be implemented by 95 percent of the area producing commercial nursery and greenhouse stock by 2025. This level would likely require additional authorities. Initially focusing on new or expanding production facilities as a way to manage increases in nutrient and sediment losses. Followed by expectations for existing operations to adopt collect and reuse runoff and leachate between 2017 and 2025. Approval of a new BMP efficiency for this practice will be sought from the Chesapeake Bay Program. The practice will specify lined return ditches or similar collection methods to lined holding ponds retaining all excess irrigation water runoff or leachate and capturing the first one-half to one-inch of stormwater runoff. Water would be recirculated for irrigation in nursery and greenhouse operations or irrigated at the proper times of year on other vegetation capable of trapping nutrients, such as cool season grasses.
- **Non Urban Stream Restoration** will be achieved through federal and state incentive programs.
- **Wetland Restoration** of prior converted wetlands will be achieved through federal and state incentive programs.

Resource Needs

Implementation of these strategies will require significant increases in dedicated federal and state cost-share funding. An expanded work force will be needed to design and administer the needed levels of agricultural BMPs, many of which will be implemented with financial incentives. Taking a somewhat conservative approach, one full time employee or contractor will likely be needed at each of the 28 soil and water conservation districts located within the Chesapeake Bay watershed. Many variables not presently understood will impact where needs for additional staff resources will be the greatest. So after some initial opportunity to employ, train and focus the initial staff, a more comprehensive assessment of workload and needs will be performed to determine where the additional staff needs are the greatest.

In addition to significant increases in cost-share funding and the building of trained technical Soil and Water Conservation District staff, there is need to carry out a campaign of communication and outreach to connect with agricultural producers to convey expectations and ensure implementation of agricultural BMPs. Use of previously developed marketing products and tools will be utilized.

Virginia's estimates of needed agricultural BMP cost-share funding were projected and summarized in a report submitted to the Chairmen of the House and Senate Finance committees of the Virginia General Assembly in October, 2010. The report (*Annual Funding Needs For Effective Implementation Of Agricultural Best Management Practices (BMPS))* depicts a "ramp up" of funding needed in the Chesapeake Bay basin that begins in 2011 with a need of $22 million and increases each year to a maximum of approximately $63 million with an expectation that this level must be sustained thereafter through at least 2025. These needs include both state and federal funding. In addition, farmer share of the cost of BMPs ranges from 25% to 50% of these costs and would be in addition to the projected needs. This report is updated annually and will need to be revised in 2011 after the TMDL is published to reflect final agriculture allocations.

CHESAPEAKE BAY WATERSHED AG BMP COST-SHARE FUNDING: PROJECTED NEEDS (in millions)

FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25
$22	**$24.3**	**$26.6**	**$28.9**	**$31.2**	**$33.9**	**$36.1**	**$38.4**	**$40.7**	**$43**	**$54**	**$56.3**	**$58.6**	**$60.9**	**$63.2**

Agricultural Stewardship Act

1. VDACS is seeking additional resources to better respond to the increasing number of water quality inquiries. Significant increases in state and federal cost-share funding, as well as an increase in the number of SWCD technical staff will help ensure compliance.

2. VDACS and DEQ plan to seek assistance from agricultural organizations such as the Virginia Farm Bureau, Virginia Agribusiness Council, other agricultural commodity groups, local governments, Soil and Water Conservation Districts, and others interested in water quality issues regarding an increase in education and outreach efforts. The goal would be to enhance the environmental awareness among their respective memberships and stakeholders regarding the Chesapeake Bay TMDL, utilization of the ASA, and the importance of implementing conservation practices.

3. VDACS has a successful working relationship with the DEQ Animal Waste Permit Program staff regarding the response to water quality issues, as well as working out jurisdictional issues involving small AFOs. Currently underway is a plan for a memorandum of agreement (MOA) between the two agencies on how to enhance this relationship to better respond to water pollution issues involving small, un-permitted AFOs. This MOA will detail the partnership and allow both agencies to better utilize their existing programs and resources regarding these operations. It is anticipated that this agreement will be completed in early 2011 and implemented immediately thereafter. See Section 5.7 for additional information.

5.5. Contingencies

Many approaches are described above in Section 6.4 to implement agricultural BMPs on significant acreage. Within that section, alternative approaches for several BMPs are presented. If adequate progress is not achieved using those approaches, other additional measures may be considered.

To encompass more area within the Chesapeake Bay Preservation Act, amendments to the law could be considered to designate entire localities as preservation areas under the act to strengthen and require enforcement of agricultural provisions. Also, expanding the act to cover additional localities could be considered.

In addition, the legislature could consider amending §58.1-3231 to require certain best management practices to be used on land enrolled in local use value assessment and taxation programs. Land used for agriculture, horticulture or forestry purposes may be taxed using a special assessment based on current use rather than market value if the local governing body has adopted an ordinance in accordance with §58.1-3230 et. seq. or if such land lies within an agricultural district, forestal district, or an agricultural and forestal district established under §15.2-4300 et. seq. The value of this alternative real estate taxation is significant and almost all counties in the Chesapeake Bay watershed offer this reduced tax option on significant acreage. A condition that implementation of practices including livestock stream exclusion, and nutrient management, and soil conservation components of resource management plans be required for any lands eligible for such local use value assessment and taxation programs could be considered. This would provide an incentive to manage such lands in a manner protective of water quality.

5.6. Tracking and Reporting Protocols

Virginia DCR Cost-Share Technical Requirements, Field Verification & Spot Check Procedures

All reported agricultural BMPs fulfill USDA NRCS standards and specifications that are documented through the USDA Field Office Technical Guide (FOTG), or the BMPs fulfill comparable practice requirements imposed by the commonwealth for such BMPs as nutrient management and forest management. Reported BMPs are certified as meeting the specific practice requirements by technical staff of agencies and organizations that include NRCS, VDOF, SWCDs and DCR.

All reported BMPs are field verified to ensure they fulfilled required standards and specifications. For BMPs that receive state financial incentives, those practices must be fully completed and certified by technical staff before payment is issued to a participating farmer.

BMPs that receive state financial incentives through the Virginia Agricultural BMP Cost Share Program or the Tax Credit Program are subject to field spot checks for the practice lifespan. Spot check guidance and procedures are documented in the Virginia Agricultural Cost Share BMP Manual (BMP Manual). In short:

- A five percent random sample of BMPs installed in the previous program year is conducted. Additionally, five percent of the multi-year BMPs implemented in prior program years that remain within lifespan are sampled
- Annual, agronomic BMPs are not spot checked since the technical oversight and their establishment is verified in the year they are implemented.
- For all BMPs with lifespan greater than one year, field inspections performed by spot checks verify each BMP's existence. Further, field observations allow staff to determine if a BMP is damaged and not performing its intended purpose. Spot checks are performed by SWCD technical staff under the oversight of DCR's Conservation District Coordinators (CDCs)
- Results of all spot checks are reported to DCR. When BMPs are discovered to be damaged or missing, the BMP Manual provides guidance for restoration of such practices, or recovery of the appropriate portion of state financial incentives.

In addition to field review of randomly selected BMPs, DCR staff periodically examines SWCD files and office documents that pertain to implementation of Cost Share and Tax Credit incentive programs to provide greater surety the procedures and guidance specified within the DCR BMP Manual are satisfactorily fulfilled. Another view of program compliance as it relates to each district's administration of financial incentives is performed by an independent auditor under contract with DCR to audit every SWCD no less than once every two years. When audits are performed, the audit begins where the last audit ended so that no break in the audit of each district's financial records occurs.

USDA – NRCS Spot Check Procedures

Spot checking procedures for NRSC cost-share programs are contained in the USDA-NRCS General Manual for Virginia, Title 450 – Technology, Subpart C, VA407.20 Procedure. The procedure requires spot checking of five percent of all practices installed or reported in the state, except where practice exceeds 400 total installations, in which case only 20 installations of that practice need to be checked.

Reporting implemented BMPs

Currently, agricultural BMPs are reported through the Agriculture Cost Share Program Tracking Program. This web based reporting system is supported with an extensive database of BMPs implemented for over 20 years. Data comes directly from the districts and NRCS to quantify conservation practices on the ground. This information is ready for inclusion in the National Environmental Information Exchange Network (NEIEN). Voluntary practices need to be tracked and reported and conservation districts are working on including this data for the tracking program. Nutrient management plan acres need to be included in NEIEN and work is underway to add data in a digital format. DEQ currently tracks poultry litter transport between counties in Virginia. Improvements to this effort need to include transport within county boundaries and direct reporting to NEIEN by DEQ for their program. DEQ also needs to track and report biosolids applications to agricultural fields directly to NEIEN. All Water Quality Improvement Fund (WQIF) projects are tracked and as appropriate recorded in the agricultural cost share

program tracking database, however this data is not added consistently on a quarterly basis like the cost share practices.

Agricultural Stewardship Act

Currently only the BMPs implemented through the state or federal cost-share programs are tracked and reported by the Bay Model and DCR. It is estimated that less than half of the ASA plans contain reported practices. Often the producer chooses to implement the necessary measures on his own, without cost-share assistance. Being able to report more of the practices included in ASA plans through the development of a voluntary BMP database will help facilitate the representation of the actual progress toward nutrient and sediment reduction goals in the Bay Model (see Section 6.4 for additional explanation of Senate Bill 346 and the voluntary BMP database).

5.7 ANIMAL FEEDING OPERATIONS/CONCENTRATED ANIMAL FEEDING OPERATIONS

The DEQ Animal Waste Program falls under both the Virginia Pollution Abatement Permit Regulation (VPA) and the Virginia Pollutant Discharge Elimination Permit Regulation (VPDES). Specifically, the Animal Waste Program utilizes the VPA Permit Regulation 9VAC25-32, the VPA General Permit Regulation For Animal Feeding Operations (AFOs) 9VAC25-192, the VPA General Permit Regulation For Poultry Waste Management 9VAC25-630 and the VPDES Permit Regulation 9VAC25-31 to implement its permit and inspections programs. The DEQ Animal Waste Program, in existent since the 1970's, has evolved into a well established program that EPA has acknowledged for its effectiveness.

The following is a summary of statutory and regulatory program requirements; more information regarding the DEQ animal waste permit and inspection program can be found at the following link: http://www.deq.virginia.gov/vpa/cafo.html.

State Water Control Law - (§62.1-44.15, §62.1-44.17.1, §62.1-44.17.1.1)

§62.1-44.15.(5) of the State Water Control Law provides the DEQ, under the direction of the State Water Control Board, the authority to permit animal feeding operations which do not otherwise meet the criteria stipulated in §62.1-44.17.1 or §62.1-44.17.1.1 which mandate animal feeding operations to obtain coverage under a VPA permit. DEQ uses this authority to permit operations which fall below the mandated VPA criteria, or operations which DEQ determines are unable to comply with the requirements of the general permit regulations. DEQ makes such permit determinations for small AFOs using the designation procedures outlined in 9VAC25-32-250 B.; these procedures include on-site inspections used to identify various site specific factors contributing to potential or actual water pollution.

VPA Permit Regulation - (9VAC25-32, §62.1-44.15)

The VPA Regulation provides the framework for the program and is the mechanism used to issue VPA Individual Permits (IP) to AFOs when coverage under a general permit is not possible. Individual permits include the minimum requirements contained in the AFO and Poultry Waste General Permit (GP) regulations, as well as additional site-specific requirements. The VPA IP is typically utilized when it is determined that additional requirements are necessary in order to protect water quality or when it is determined that the facility is unable to comply with the requirements of the GP.

VPA General Permit for AFOs - (9VAC25-192, §62.1-44.17.1)

> An *animal feeding operation (AFO)* is defined as a lot or facility where animals are stabled or confined for a total of 45 days or more in any 12-month period, and where crops or vegetative growth is not maintained in the normal growing season over the lot or facility.

AFOs that confine more than 300 animal units of livestock and handle liquid manure are required to obtain coverage under a VPA general permit. This general permit regulation was first promulgated in 1994 and is now in the second ten year permit cycle, which expires on November 15, 2014. DEQ will initiate a rulemaking to extend coverage for another ten year term prior to that expiration date. Permit requirements include proper handling and storage of animal waste; monitoring of waste, soils, and groundwater; development and compliance with a site-specific DCR approved Nutrient Management Plan; land application recordkeeping and completion of DEQ approved training for the permittees.

VPA Regulation and General Permit for Poultry Waste Management - (9VAC25-630, §62.1-44.17.1.1)

Poultry operations that confine more than 200 animal units of poultry (20,000 chickens or 11,000 turkeys) must register for coverage under the VPA General Permit for Poultry Waste Management. The VPA General Permit and Regulation first became effective on December 1, 2000 with a ten year permit term. The regulation and general permit has been approved for reissuance for another ten year term with an effective date of December 1, 2010.

Permit requirements include proper storage of poultry waste; monitoring of waste, soils, and groundwater; development and compliance with a site-specific DCR approved Nutrient Management Plan; recordkeeping of poultry waste transactions and land applications and the fulfillment of DEQ approved trainings for the permittees. Poultry Waste Brokers have additional requirements for recordkeeping and reporting of poultry waste transactions. DEQ recently completed a regulatory action, effective January 1, 2010, to amend the general permit regulation to include utilization and storage requirements for transferred poultry waste (litter). These amendments ensure that poultry waste is being used in a manner in which state waters are being protected from improper use or storage of poultry waste, not only on permitted farms, but on farms that receive transferred material. These amendments require that persons receiving transferred poultry waste abide by certain minimum requirements, found in 9VAC25-630 -60 through 9VAC25-630-80 regarding land application rates, land application timing, storage and

recordkeeping of land application activities and poultry waste transactions. In addition, the amendments include the option to require a poultry waste end-user or poultry waste broker to obtain a permit if they are found to be non-compliant with the requirements of the regulation.

VPDES CAFO Regulation - (9VAC25-31)

Concentrated Animal Feeding Operations (CAFOs), as defined by the EPA CAFO Rule, are regulated in Virginia under the VPDES Permit Program. A CAFO which discharges or proposes to discharge has a duty to apply for coverage under a VPDES general or individual permit. In response to the changes to the EPA CAFO Rule which became effective in December 2008, Virginia amended the VPDES Regulation effective March 3, 2010. In a letter dated June 14, 2010, EPA approved these VPDES CAFO Regulatory provisions. Permit requirements mirror those found in the EPA 2008 CAFO Rule, and also include additional Virginia regulatory requirements pertinent to the type of operation. For instance, VPDES CAFO permits covering poultry operations would also contain the requirements related to poultry waste transfers in accordance with the amendments to VPA Regulation and General Permit for Poultry Waste Management.

The following sections address the questions, issues and types of information organized in the eight elements as described in A Guide for EPA's Evaluation of Phase I Watershed Implementation Plans dated April 2, 2010:

5.7.1: Final Nutrient and Sediment Target Loads

Final nutrient and sediment target loads will be estimated using the Chesapeake Bay Program Watershed Model. Virginia is waiting to receive this information based on results of Element 2.

5.7.2 Current Loading Baseline and Program Capacity

The Chesapeake Bay Program Watershed Model (WSM) will be used to estimate current nutrient and sediment loads associated with the production area of animal feeding operations (refer to EPA's guidance outlined in "A Guide for EPA's Evaluation of Phase I Watershed Implementation Plans" dated April 2, 2010). In order to comply with this element, on November 29, 2010 Virginia submitted a revised input deck for the WSM. The input deck includes the number of animals by type and county associated with 100 percent of the AFO and CAFO operations.

All AFOs and CAFOs are currently covered by VPA permits, with CAFOs that discharge or propose to discharge being converted to VPDES permit coverage over the next 18 months. Currently, Virginia has 898 AFOs/ CAFOs covered by a VPA permit in the Chesapeake Bay Watershed. Of the 898 facilities, 116 operations are EPA defined Large CAFOs. The table below indicates the number and type of permits along with estimates for future permit coverage in the Bay watershed.

CURRENT PERMIT COVERAGE	ESTIMATED NO. OF VPA SIZE FACILITIES	ESTIMATED NO. OF VPDES SIZE (LARGE) FACITILIES	TOTAL FACILITIES IN BAY WATERSHED
VPA GP AFO	55	15	70
VPA GP POULTRY	727	101	828

All permitted AFOs covered under either the DEQ VPA or VPDES Permit Programs must obtain and implement a site specific nutrient management plan which is then enforceable through the DEQ permit. The NMP must be developed by a Nutrient Management Planner certified by the Department of Conservation and Recreation (DCR) in accordance with §10.1-104.2 of the Code of Virginia and approved by the DCR. More information regarding the DCR Nutrient Management Plan Requirements and Regulations can be found at the following link: http://www.dcr.virginia.gov/soil_and_water/nutmgt.shtml.

The DEQ Animal Waste Permit and Inspections Program is implemented both centrally and regionally. The Animal Feeding Operations Program Coordinator is headquartered in the Central Office; this position is charged with statewide oversight of the program to ensure consistent implementation of the permit, inspection, compliance and enforcement procedures. Staff in the DEQ Regional Offices handle the day to day permitting, inspections, compliance and enforcement aspects of the program. Currently, inspections are completed by seven regional staff positions. Section 62.1-44.15.(5a) of the Code of Virginia requires that annual inspections be completed by a Virginia Certified Nutrient Management Planner; each of the DEQ inspectors, many of the permit staff, and the AFO Program Coordinator hold this certification. This certification facilitates a greater understanding of nutrient management practices and regulatory requirements related to AFOs, and along with on the job training, supports a stronger Animal Waste Program.

Annual inspections are completed for all operations covered under the DEQ animal waste permit program. The scope of these inspections includes animal confinement areas, animal waste and nutrient storage, as well as land application activities and records. In addition, more narrowed scope inspections of these operations may occur for reasons such as a follow-up to an earlier inspection, or in response to a complaint. The table below indicates the number and type of inspections which have occurred over the last three federal fiscal years (FFY) on permitted AFO and CAFO operations.

INSPECTIONS PERFORMED	FFY08	FFY09	FFY10
ANNUAL (TECHNICAL)	962	994	998
COMPLIANCE/ COMPLAINT	150	66	61

Operations which are found in noncompliance with the requirements as outlined by the permit regulations are required to achieve compliance within a reasonable period of time. DEQ staff utilizes the established guidelines and procedures for determining compliance as well as determining the appropriate compliance and enforcement actions (Water Compliance Strategy, Water Compliance Auditing Manual, Enforcement Manual and Division of Enforcement Guidance). Civil penalties may be levied for violations of permit requirements, nutrient management plan requirements and water quality standards. The table below indicates the

number and type of compliance and enforcement actions, including those with civil penalties, which were taken over the last three FFYs.

COMPLIANCE AND ENFORCEMENT ACTIONS	FFY08	FFY09	FFY10
WARNING LETTERS	89	38	42
NOTICE OF VIOLATIONS (NOVs)	30	3	3
NOVs REFERRED TO ENFORCEMENT	27	1	1
CIVIL PENALTIES	$1000.00	$1250.00	$6500.00

5.7.3 Accounting for Growth

Concentrated Animal Feeding Operations (CAFOs) are another growing sub-sector of agriculture. Statewide, the number of farms has been decreasing steeply and the number of animals has been declining only slightly. The result is an increase in the number of animals per farm. This growth is likely to result in the conversion of non-CAFO animal agriculture to CAFOs and a shift from load allocation to waste load allocation. However, because the total number of animals statewide is declining slightly, the growth is not expected to produce a net increase in load.

While ideally growth in this sector would be tracked separately in each of the 39 segment-sheds, this is not possible to manage with the current DEQ data collection. Therefore growth in this sector will be tracked at the state scale.

5.7.4 Gap Analysis

Virginia has identified the following gaps in the regulatory program for this sector:

.

1. Currently there are no CAFOs covered under the VPDES permit as DEQ is in the process of development of guidelines for switching coverage from the state VPA permit to a VPDES permit for those AFOs that fall under the CAFO definition.

2. Due to limited resources and inspection mandates for all permitted AFOs, DEQ is able to conduct only a limited number of additional inspections on operations which may benefit from additional scrutiny.

3. DEQ recognizes there are AFOs which may require technical assistance but fall below the existing regulatory threshold for permitting.

4. DEQ and VDACS recognize that all AFOs and CAFOs may benefit from additional education and outreach efforts related to good farm management for water quality protection and preservation.

5.7.5 Commitment and Strategy to Fill Gaps

1. In response to the changes to the EPA CAFO Rule which became effective in December 2008, Virginia amended the VPDES Regulation effective March 3, 2010. In a letter dated June 14, 2010, EPA approved the VPDES CAFO Regulatory provisions of the Permit Program. Virginia has utilized a public participatory approach and established a Regulatory Advisory Panel (RAP) which includes EPA Region III representation as well as Virginia environmental and agricultural stakeholders. Currently, the RAP is assisting DEQ staff in the development of a permit template. Implementation guidance is being developed concurrently with the permit template. DEQ staff will present the permit template for discussion at the next meeting of the RAP planned for early 2011. DEQ anticipates the completion of a permit template along with implementation guidance by mid 2011. Upon completion of the permit template, all CAFOs which have submitted a

complete permit application and require coverage under the VPDES permit will be migrated from their VPA permit. DEQ anticipates this process to be completed in early 2012. Annual inspections will continue to be performed by DEQ regional staff, as the facilities which require VPDES permit coverage will be held to the same level of compliance with the Virginia's regulatory requirements. In addition, DEQ staff will provide technical assistance to permittees on whether they require a VPDES versus VPA permit. The AFO Program Coordinator has and will continue to provide educational and technical assistance to the agricultural community regarding the animal waste program through the delivery of presentations at various outreach opportunities, prepared handouts and the following DEQ web pages: http://www.deq.virginia.gov/vpa/cafo.html, http://www.deq.virginia.gov/vpa/agriculture.html.

2. Currently, the DEQ is mandated by §62.1-44.15. (5a) of the Code of Virginia to complete annual inspections of all AFOs covered by a VPA permit. The DEQ is considering changes to the inspection program in order to provide DEQ with the flexibility to use limited resources more efficiently through a risk based inspection strategy, which would more effectively and efficiently ensure program compliance and protect water quality. DEQ has established and implemented criteria for risk-based inspections which include criteria for poultry and livestock operations covered under the animal feeding operations permit program, including any CAFOs. The criteria for increased and decreased inspections are outlined in the risk-based strategy. With input from EPA Region III, DEQ is planning to amend its criteria for risk-based inspections of CAFOs covered under a VPDES permit.

3. It may appear that there are deficiencies with regards to DEQ regulatory authority for smaller AFOs that fall below permitting thresholds; however, the State Water Control Law provides DEQ the authority to permit smaller AFOs under the VPA regulation. In addition, DEQ has the authority to designate small CAFOs in accordance with the 2008 EPA CAFO Rule.

   DEQ and the Virginia Department of Agriculture and Consumer Services (VDACS) currently have a working relationship to handle complaints and corresponding investigations related to unpermitted agricultural operations, including AFOs. This relationship has facilitated successful resolution of water quality issues found at these unpermitted facilities. In order to increase the effectiveness of this approach to address environmental concerns at unpermitted AFOs, DEQ and VDACS are partnering to enhance the relationship between the existing VDACS Agricultural Stewardship Act (ASA) Program and the DEQ Animal Waste Permit Program.

   DEQ and VDACS will specifically define how the agencies will respond to complaints or concerns associated with small unpermitted AFOs, and will detail the criteria by which decisions will be made regarding the investigation, appropriate corrective measures and ultimate resolution of the water quality issues or concerns.

This approach will supplement the existing complaint driven VDACS Agricultural Stewardship Act (ASA) program by incorporating a proactive evaluation of environmental problems on small farms, with remedies that will include as appropriate:

a. Voluntary implementation of BMPs with follow-up for reasonable assurance;
b. Resolution through the VDACS - ASA;
c. VPA permitting through DEQ; or
d. Designation and VPDES CAFO permitting through DEQ.

There are approximately 800 AFOs in Virginia which fall below the permitting threshold for the VPA program. Approximately 75% are dairy farms and the remainder confined poultry farms. As noted above, DEQ currently conducts an average of just over 1000 inspections annually with current compliance staff resources. If additional staff became available, it would require one person approximately six years or two persons approximately three years to complete the evaluations. Alternatively, assuming that a shift to risk-based inspections could reduce permit compliance inspections by 30%, existing permit staff could complete a systematic evaluation of unpermitted AFOs in less than three years.

Following each individual evaluation, the most appropriate remedy to solve environmental issues would be employed. For farms that discharge or propose to discharge pollutants, and the operator could not implement corrective action within 180 days to control the problem, permitting under a DEQ program would be the most likely course of action.

Further details regarding this strategy will be finalized by mid 2011 and will result in the development of a Memorandum of Agreement (MOA) between DEQ and VDACS. The agencies expect to finalize this MOA in early 2012. Concurrently, the agencies will evaluate the existing program protocols and procedures and where appropriate make changes in order to facilitate a more efficient and effective implementation of the MOU or MOA. Evaluations of the universe of unpermitted AFOs will be completed by early 2015.

4. DEQ and VDACS will seek assistance, from agricultural organizations such as the Virginia Farm Bureau, Virginia Agribusiness Council, other agricultural commodity groups, local governments, Soil and Water Conservation Districts, and others interested in water quality issues, regarding an increase in education and outreach efforts. The goal would be to enhance the environmental awareness among their respective memberships and stakeholders regarding the Chesapeake Bay TMDL, water quality protection and preservation, utilization of the ASA, and the importance of implementing conservation practices. This will be in addition to educational opportunities which both agencies already capitalize on during inspections of permitted and non-permitted farms and in both formal and informal settings.

5.7.6 *Tracking and Reporting Protocols*

The tracking and reporting by the permitted CAFOs will be consistent with the requirements of part 122.42 of 40 CFR. In addition, DEQ would require reporting related to the implementation and performance of any Best Management Practices that are required by the CAFO permit.

Currently, DEQ regulations require recordkeeping by permitted poultry growers and poultry waste brokers and end-users of poultry waste transactions and land application activities. In addition, the poultry waste broker must report annually his records regarding those transfers. The requirements relating to recordkeeping of transferred poultry waste by poultry growers will be added to the VPDES CAFO permits. Additionally, strategies to report the poultry waste transactions to the National Environmental Information Network (NEIN) are being considered. (See 9VAC25-630 for additional information)

5.7.7 *Contingencies for Slow or Incomplete Implementation*

DEQ does not anticipate a delay in implementation of requirements to meet the nutrient and sediment reductions. DEQ's Compliance and Enforcement Program is the mechanism that will be employed to ensure timely implementation to achieve waste load allocations for the production area of the CAFOs.

5.7.8 *Targets and Schedule for CAFO Permit Coverage*

DEQ anticipates that the all operations which are defined as EPA Large CAFOs and *propose to discharge or discharge* or EPA defined Medium CAFOs will be covered under a VPDES permit before 2017. Furthermore, any operations which are designated as Small CAFOs will also be required to obtain coverage under a VPDES permit within a timely manner.

Outstanding Issues That Need To Be Addressed

1. Correct differences between animal types in the Virginia data compared to the model animal types. DEQ uses the following terms when referencing animal types for permitting purposes: Chickens, Turkeys, Dairy Cattle, Slaughter and Feeder, Cattle, and Swine. DEQ will resolve the differences in the animal types for WIP Phase II.
2. Correct differences between actual animal numbers reported and those listed in the model. These differences will be resolved for WIP Phase II.

SECTION 6 URBAN/SUBURBAN STORMWATER

6.1. Current Programs and Capacity

Erosion and Sediment Control Program

The Virginia Erosion and Sediment Control (ESC) Law requires that any person engaging in a land-disturbing activity larger than 10,000 square feet, except activities exempt from the law, is required to submit an erosion and sediment control plan for review and approval prior to beginning the activities. Cities, towns and counties are authorized by the Virginia Soil and Water Conservation Board to operate local ESC programs. These local programs may implement a threshold of less than 10,000 square feet for land-disturbing activity. Once the plan is approved, it is the responsibility of the owner to ensure its implementation.

The ESC law mandates that local ESC programs handle administration, plan review and approval, project inspection and enforcement responsibilities on private and municipal development projects. The ESC law mandates that DCR has responsibility for overseeing local government programs. This oversight responsibility includes an evaluation of the consistency of local government implementation with minimum standards of effectiveness as required by the regulations. DCR performs reviews of all local ESC programs every five years, requiring the local program to operate consistently with the state program in the four component areas of administration, plan review, inspection and enforcement. DCR is also mandated to inspect and enforce state agency and utility company annual plan projects.

In addition, DCR operates a training and certification program issuing certificates of competence, required for local ESC program personnel and for any person who is in charge of and responsible for an individual land-disturbing activity. DCR has developed and maintains an Erosion and Sediment Control Handbook which contains conservation standards to guide the development and implementation of ESC plans.

Code reference: Erosion and Sediment Control Law §10.1-560 et seq; *Code of Virginia*; Erosion and Sediment Control Regulations 4VAC50-30; Erosion and Sediment Control Certification Regulations 4VAC50-50

Industrial Stormwater

The industrial stormwater VPDES permits control the discharge of storm water runoff to surface waters from industrial operations in 29 industrial sectors. These permits require that facilities within a particular industrial subcategory meet standardized permit conditions and monitoring requirements. All permittees must develop a storm water pollution prevention plan (SWPPP), which must identify potential sources of storm water pollution from the industrial site, and describe and ensure the implementation of management practices to reduce the pollutants in storm water discharges. Industrial stormwater permits are issued and administered by DEQ.

MS4 Permit Program

Stormwater runoff is often collected and discharged through MS4s. MS4s are conveyances, including road drainage systems, municipal streets, catch basins, curbs, gutters, ditches,

manmade channels and storm drains designed to collect and convey stormwater, which are owned or operated by a federal, state or local government entity. MS4s are not systems that are part of a "publicly owned treatment works system" (sewage collection, transportation and treatment) or part of a combined sewer (a system designed to carry both sanitary wastes and stormwater to the sanitary sewer treatment plant). Privately owned and operated drainage systems also are not considered MS4s.

Discharges from MS4s are regulated under the Virginia Stormwater Management Act and the Clean Water Act as point source discharges and administered by DCR. MS4 regulations were developed and implemented in two phases. Implementation of the first phase began in the early 1990s and required that operators of MS4s serving populations of greater than 100,000 people (per the 1990 census) apply for and obtain a permit to discharge stormwater from their outfalls.

Stormwater discharges from Phase I municipal separate storm sewer systems are authorized under individual Virginia Stormwater Management Program (VSMP) permits. Under these permits, the MS4 owner/operator must implement a collective series of programs to reduce the discharge of pollutants from the given storm sewer system to the maximum extent practicable in a manner that protects the water quality of nearby streams, rivers, wetlands and bays.

The programs must include elements to:

- Operate and maintain structural stormwater controls
- Control discharges from areas of development and significant redevelopment
- Operate and maintain public streets, roads and highways
- Identify, monitor and control discharges from municipal waste treatment, storage or disposal facilities
- Control pollutants related to application of pesticides, herbicides and fertilizers
- Implement an inspection program to enforce ordinances, which prohibit illicit connections and illegal dumping into the MS4
- Screen the MS4 for illicit connections and illegal dumping
- Implement standard investigative procedures to identify and terminate sources of illicit connections or discharges
- Prevent, contain and respond to spills that may discharge into the MS4
- Limit the infiltration of sanitary seepage into the MS4
- Identify, monitor and control discharges from municipal landfills; hazardous waste treatment, storage, disposal and recovery facilities; facilities subject to EPCRA Title III, Section 313; and any other industrial or commercial discharge the permittee determines to be contributing a substantial pollutant loading to the MS4
- Control pollutants in construction site runoff
- Conduct public education on stormwater

Virginia has eleven (11) Phase I MS4 localities. The localities are the cities of Chesapeake, Hampton, Newport News, Norfolk, Portsmouth, and Virginia Beach and the counties of Arlington, Chesterfield, Fairfax, Henrico, and Prince William.

The second phase of MS4 regulations became effective March 23, 2003, and requires that operators of small MS4s in "urbanized areas" (as defined by the U.S. Census Bureau's latest decennial census) obtain permit coverage for stormwater discharges.

Small MS4s include storm sewer systems operated by cities, counties, towns, federal facilities such as military bases, Veteran's Affairs hospitals and research facilities, Department of Defense facilities and parkways, and state facilities such as VDOT, community colleges and public universities. Discharges from small MS4s are regulated under the general permit for the Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems.

Under that permit, small MS4s must develop, implement and enforce a program that includes the following "six minimum control measures":

- Public education and outreach on stormwater impacts
- Public involvement and participation
- Illicit discharge detection and elimination
- Construction site stormwater runoff control
- Post-construction stormwater management in new development and redevelopment
- Pollution prevention/good housekeeping for municipal operations

Similar to the Phase 1 programs, small MS4 programs must be designed and implemented to control the discharge of pollutants from their storm sewer system to the maximum extent practicable in a manner that protects the water quality in nearby streams, rivers, wetlands and bays.

Given the wide variability of the amount of pollutants in stormwater at any given time and the difficulty in determining their actual impacts on water quality, MS4 permits are based on an iterative BMP strategy. This strategy, which is consistent with EPA's Interim Permitting Approach for Water Quality-Based Effluent Limitations in Storm Water Permits, takes an iterative approach to reducing pollutants in stormwater. For MS4s, the operator selects and implements BMPs to reduce the pollutant load in the stormwater. These BMPs can be programmatic, such as ordinances, inspections, and educational activities, or project-oriented, such as street sweeping, detention ponds, retention ponds and constructed wetlands.

Once implemented, BMPs are evaluated by the MS4 for effectiveness and efficiency in reducing pollutants in stormwater as well as appropriateness for the specific MS4. When necessary, refinements or modifications are made to how the BMP is implemented. There are many parameters that an MS4 operator can use to evaluate a particular BMP. As the MS4 regulations are water quality based, the effectiveness of the BMP to reduce pollutants in the stormwater discharge must be included.

Virginia has approximately 100 permitted MS4s (11 Phase I and 89 Phase II). An interesting note is that one MS4 system may discharge into another MS4 system or multiple MS4s may discharge into the same waterbody.

Code Reference:
§10.1-603.2 et. seq. Code of Virginia

Construction General Permit

Owners or operators of construction activities disturbing one acre or more or for areas covered by the Chesapeake Bay Preservation Act 2,500 square feet or more, must apply for and obtain coverage under the General Permit for Discharges of stormwater from construction activities. The construction general permit requires best management practices to be implemented that address the quantity and quality of stormwater runoff from the land disturbing activity.

Projects receiving coverage under the construction general permit must develop and implement a site specific stormwater pollution prevention plan (SWPPP). The SWPPP must be developed prior to obtaining construction general permit coverage. The SWPPP outlines the steps and techniques the operator will take to comply with the terms and conditions of the permit, including water quality and quantity requirements that are consistent with the VSMP permit regulations to reduce pollutants in the stormwater runoff from the construction site. The SWPPP also specifies all potential pollutant sources that could enter stormwater leaving the construction site and covers methods used to reduce pollutants in stormwater runoff during and after construction. A complete list of SWPPP requirements is contained in the permit. The major components of the SWPPP are:

- A cover or title page that has the project name and location, operators name and contact information, and SWPPP contacts
- A list of parties responsible for implementing each pollution control measure in the SWPPP including contact information
- A site and activity description, including the function of the project, area to be disturbed, potential pollutant sources, schedule of grading and nearest receiving waters
- A site map indicating drainage patterns, location of structural and nonstructural pollution controls measures identified in the SWPPP, surface waters, stormwater discharges to surface water, locations of off-site support activities (e.g. borrow area, disposal area, concrete or asphalt batch plants, equipment or material storage areas) covered by the SWPPP, location of sanitary waste facilities, and location of potential pollutant sources such as fuel, fertilizer and chemical storage
- Erosion and sediment control (ESC) practices with design calculations (this may be fulfilled by referencing an approved state or local ESC plan)
- A description of post development stormwater management (SWM) measures, including design calculations, to be installed (this may be fulfilled by referencing an approved state or local SWM plan)
- Description and schedule of procedures to maintain controls

- Written records of site inspections performed by a professional engineer or DCR-certified responsible land disturber, inspector or combined administrator, and the follow-up maintenance that is required and performed.

Code Reference:
§10.1-603.2 et. seq. Code of Virginia

Nutrient Management Training and Certification Program

This program is operated to train and certify persons who prepare nutrient management plans. To be eligible for certification, an individual must meet education and experience requirements, achieve a passing score on both a core and practical examination and maintain the required continuing education requirements.

Agriculture and turf and landscape certifications are offered. Individuals certified to develop nutrient management plans are required to develop plans consistent with promulgated technical criteria and must provide summary reports to DCR annually. Planners from both categories must use criteria applicable to the specific plan they are writing.

Planners must use the Virginia Nutrient Management Training and Certification regulations and the Virginia Nutrient Management Standards and Criteria, Revised October 2005. In 2005, Standards and Criteria was expanded to give planners additional information needed to write all the components of a nutrient management plan to meet the regulations. In support of the turf and landscape category, the turf recommendations section was expanded to include detailed recommendations for golf courses, athletic fields, and sod production.

There are currently 360 certified Virginia Nutrient Management Planners. There are 295 planners in the agriculture category, 31 in the turf and landscape planner category and 34 which have both agriculture and turf and landscape categories. The turf and landscape category has been in place for less than one year, so it is quickly expanding with strong support from the turfgrass industry.

Certified planners are subject to random inspections of plans prepared to check compliance with promulgated plan criteria. Certificates may be revoked if plans do not meet the criteria contained in the Nutrient Management Training and Certification Regulations (4 VAC-5-15-10 et. seq.)

Code Reference:
§10.1-104.2 Code of Virginia, Regulation 4 VAC 5-15-10 et. seq.

Stormwater Management Program

The Virginia Stormwater Management Act and the Virginia Stormwater Management Program (VSMP) Permit Regulations were developed to protect citizens, property and natural resources from unmanaged stormwater runoff. The act and VSMP provide requirements for the implementation of stormwater management best management practices to address water quality and the quantity of runoff, the components for a local stormwater management program, the conditions required for the permitting of qualifying land disturbance activities and the permitting of the operation and maintenance of a qualifying municipal separate storm sewer system. In

addition, the act and VSMP provide the ability to manage the quantity and quality of stormwater runoff on a regional or watershed basis.

Code Reference:
§10.1-603.2 et. seq. Code of Virginia

Chesapeake Bay Preservation Act and Regulations

The Virginia General Assembly enacted the Chesapeake Bay Preservation Act in 1988. It is an important element of Virginia's multifaceted response to the Chesapeake Bay Agreements. The Bay Act established a cooperative relationship between the Commonwealth and local governments aimed at reducing and preventing nonpoint source pollution through resource-sensitive land use. At the heart of the Bay Act is the concept that land can be used and developed in ways that minimize negative impacts on water quality. The land use provisions of the act work in concert with the various construction and post construction programs, such as stormwater management and erosion and sediment control, to address all sources of water quality degradation in a comprehensive manner.

Each locality within Virginia's coastal zone must adopt a program that is consistent with Bay Act regulations and ensures that the use and development of land in Chesapeake Bay Preservation Areas is accomplished in a manner that protects the quality of state waters. Elements of this required program include:

- A map delineating Chesapeake Bay Preservation Areas
- Adoption of performance criteria for the use, development and redevelopment of land
- A Comprehensive plan that incorporates water quality protection
- A zoning ordinance that incorporates specific measures to protect water quality
- Subdivision ordinances provisions that protect water quality
- A compliant erosion and sediment control program; and
- An adequate plan of development review process

The lands that make up Chesapeake Bay Preservation Areas (CBPAs) are those that have the potential to affect water quality most directly. CBPAs include Resource Protection Areas (RPAs) and Resource Management Areas (RMAs). Sensitive features such as tidal wetlands, tidal shores, and connected and contiguous nontidal wetlands are included in RPAs as are a 100 foot buffer adjacent to these features and perennial streams. The 100' RPA buffer is required to remain in its natural vegetated condition, ideally containing three trophic layers of vegetation. The regulations specify that the RPA buffer is deemed to achieve a 75 percent reduction in sediments and a 40 percent reduction in nutrients. RMAs are designated contiguous to the entire inland boundary of the RPA and must include floodplains, highly erodible soils, highly permeable soils and nontidal wetlands not included in the RPA.

Within RPAs no land disturbance is permitted (to include the clearing of vegetation) unless specifically exempted within the regulations. Within both RPAs and RMAs localities must

enforce performance criteria that protect water quality. For example, within an RPA and RMA, the threshold for erosion and sediment control requirements is lowered from 10,000 to 2,500 square feet. In addition, there are currently requirements for no-net increase in stormwater pollutant loadings from new development and a 10 percent reduction in stormwater loadings from redevelopment. Best management practices must have maintenance agreements. Septic systems within CBPAs must be pumped out every five years. The regulations also require that the site design criteria of minimizing land disturbance and impervious cover, and preserving indigenous vegetation, be incorporated into the local development review process.

The regulations also require local governments to include in their comprehensive plans clear local land use policies protective of water quality based on an analysis of physical constraints to development, existing and potential sources of water pollution and shoreline and streambank erosion, among other items.

Code Reference:
§10.1-2101 et. seq. Code of Virginia

Virginia Land Use Authorities and Requirements - Title 15.2 –Chapter 22 - Planning, Subdivision of Land and Zoning

Chapter 22 of title 15.2 et. seq. of the Code of Virginia requires localities to adopt zoning and subdivision ordinances and to develop comprehensive plans. This provision is intended to ensure that local governments, through these mechanisms, improve public health, safety, and welfare of its citizens. Therefore some of these provisions provide authorities to local governments to protect water quality.

Comprehensive Plan Requirements

Section 15.2-2223 of Chapter 22 requires local governments to prepare comprehensive plans for the physical development of the territory within their jurisdictions. The plans are to be general in nature and are to "show the locality's long-range recommendations for the general development of the territory covered by the plan."

One of the new mandatory elements required to be included in comprehensive plans is the designation of Urban Development Areas (UDAs). Such areas are to be designated as appropriate for higher density development due to proximity to transportation facilities and the availability of a public water and sewer system. There are no provisions in the code specifying that all or most development is to occur within the designated UDAs, nor is there any requirement that areas outside of the designated UDAs must be less intense or preserved for conservation purposes. UDAs are to be designated in localities with a population of greater than 130,000. Within the UDAs development is to occur at a density of at least eight single-family residences, 12 townhouses, or 24 apartments, condominium units per developable acre and a floor area ratio of at least 0.8 per acre for commercial development.

There are provisions within this section of the state code that call for surveys and studies addressing water quality but there are currently no mandatory provisions calling for recommendations to provide water quality protection. However, the Chesapeake Bay Preservation Act and its implementing regulations provides statutory requirement and authority

for local governments to incorporate specific analyses, policies and implementing measures for the protection of water quality in areas of the Commonwealth encompassed by the act.

Zoning

Section 15.2-2280 et. seq. establishes that any locality may, by ordinance, classify the area under its jurisdiction into zoning districts. Within these established zoning districts, localities are authorized to regulate the use of land, buildings, and other premises for agricultural business, industrial, residential, flood plain and other uses those districts.

Section 15.2-2283 of this section of the code further provides that zoning ordinances are to be for the general purpose of promoting the health, safety or general welfare of the public. The only provisions authorizing localities to address water quality include:

- To provide for the preservation of agricultural and forestal lands and other lands of significance for the protection of the natural environment
- Reasonable provisions, not inconsistent with applicable state water quality standards, to protect surface water and ground water

Section 15.2-2286.1 identifies that localities with a 10 percent growth rate from the next to last decennial census years shall include special provisions in their zoning or subdivision ordinances for the clustering of single-family dwellings and the preservation of open space.

Virginia Water Facilities Revolving Fund

Loans may be made from the Virginia Water Facilities Revolving Fund, at the State Water Control Board's discretion, to a local government for construction of facilities or structures or implementation of best management practices that reduce or prevent pollution of state waters caused by stormwater runoff from impervious surfaces. DEQ will prioritize loan applications based upon several criteria, including projects that reduce a pollutant to an impaired water body.

Code reference:
§ 62.1-229.4. Loans for stormwater runoff control best management practices; Code of Virginia

6.2. Accounting for Growth

It is projected that the vast majority of future growth in Virginia will result from the development of agricultural and forest lands into residential and commercial urban uses. To account for this growth in urban land, Virginia will use a multi-tiered approach. Tier 1 involves the use of load balancing between the pre-development land use and the post-development land use augmented as necessary by offsets for development projects that are not able to meet the pre-development load levels through on-site measures. Tier 2 involves identifying, promoting and requiring, through regulatory mechanisms, if needed, land use practices that minimize development's impact on water quality, particularly in local streams.

The Tier 1 load balancing approach uses the allocation loads for forest, cropland, pasture and hay land uses in the Chesapeake Bay Program's Phase 5.3 Watershed Model to calculate the average pollutant loads from a generic pre-development acre based on the mix of projected land to be developed for Virginia's Chesapeake Bay watershed. Each new development project would be required to meet these pre-development loads upon completion of the project through a combination of site planning, BMPs and, if necessary, offsets. Because the calculation of the generic pre-development acre is based on the allocation loads, the post-development load will produce a no net increase from the average forest cropland, pasture and hay loads after treatment with the suite of agricultural and forest BMPs as previously identified in this WIP. The opportunity to create additional reductions beyond those required, and market them through the Nutrient Credit Exchange Program, will provide an additional incentive for treatment. Virginia recognizes the ideal approach would be to calculate the load balance equation on a segment-shed scale. However, this approach is considered overly cumbersome to administer and presents potential inequities across the state. Growth will be tracked at the Bay watershed scale.

In the event that offsets are warranted, efforts will be made to encourage installation of the offset practices as close to the impacting growth area as possible. This will be required in cases where local waterbody impairments exist. It will also provide some level of local water quality protection and minimize the complexities associated with the geographic differences in nutrient delivery and associated offset reduction calculations. All offset practices will be perpetual with adequate assurances for maintenance and sustainability prior to completion of the project generating the load to be offset. The concept of establishing a "perpetual funding" source for offsets is being evaluated.

While this approach accounts for growth in a manner that is consistent with EPA guidance, it may not provide adequate protection for local streams. Observed local water quality data, experience in the field and a substantial body of scientific evidence, compiled in numerous studies throughout the bay watershed, demonstrate that increases in impervious cover, which will be experienced with a conversion from agricultural and forest to urban land use, results in degradation of local stream ecosystems and water quality. Principally, this degradation is the result of increased stream flow (volume, duration and frequency) causing the banks and bed of the stream to become unstable and erode.

This issue of the volume and velocity of runoff will be addressed through the proposed water quantity criteria in the draft stormwater management regulations. Reduction in impervious cover on a programmatic level, however, can only be achieved through changes in local land use ordinances. There are some local ordinances that require higher levels of impervious cover through parking and road width requirements that are in excess of industry or Virginia Department of Transportations standards. As such, additional actions to better manage growth (comprehensive planning that provides greater water quality protection, subdivision, zoning and other land use and development ordinances) are necessary to minimize the impacts of growth on local waters. These actions will be identified with additional clarity in the Phase 2 WIPs.

The Tier 2 element of Virginia's mechanism for accounting for growth will allow for an accounting of existing programs and practices on the ground that are currently either inadequately tracked or not tracked at all. More significantly, the initiative will allow the state, during the WIP Phase II process, to build upon existing programs and practices rather than

creating whole new programs. Some of the existing practices that are either not being adequately accounted for or not accounted for at all, which are being undertaken in conjunction with the Chesapeake Bay Preservation Act and the MS4 permitting program include:

- Stormwater management practices required to be installed and adequately maintained
- Resource Protection Area buffer restoration projects
- Agricultural practices that have been used in support of permitted agricultural encroachments into the Resource Protection Area, including nutrient management and soil erosion control practices
- Forest conservation achieved through the required maintenance of RPA buffers
- MS4 Education and outreach programs regarding fertilizer use, pet wastes, storm drain stenciling, etc.
- Illicit discharge identification and elimination
- Storm sewer outfall screening
- Both structural and non-structural - "living shorelines" - shoreline management practices

The Chesapeake Bay Preservation Act, which applies to 84 localities within the Tidewater region of Virginia, mandates that local subdivision ordinances, zoning ordinances and comprehensive plans contain measures to protect waters of the state. A significant portion of Virginia's growth is expected to occur in the Tidewater region. Some of the specific land use practices that are currently being implemented by the Bay Act localities include stormwater management practices that minimize the pollutant loads resulting from new development and redevelopment, required BMP maintenance, 100 foot buffers along waterways, and erosion and sediment controls for smaller construction projects among other policies which reduce the impact of growth on water quality.

Virginia is promulgating new stormwater management regulations that are expected to achieve the requirements of the TMDL for new development. A 2010 action by the General Assembly directs that the stormwater regulations be promulgated after the final Chesapeake Bay TMDL is published. This will enable revision of the allowable discharge concentration value for phosphorus, and possibly nitrogen and sediment depending upon which pollutant (N, P or Sediment) is expected to be most restrictive for new development based on the TMDL allocations.

Additionally, the General Permit for Discharges of Stormwater from Construction Activities will be revised soon after finalization of the Bay TMDL to incorporate reference to the resulting waste load allocations and the above-growth provisions. The general permit will also be revised to incorporate the effluent limit guidelines mandated by the federal stormwater regulations. The enhanced water quality and quantity requirements of the general permit will assist in reducing the loads due to growth.

Waste loads for future growth for new or expanding facilities with industrial stormwater discharges can not exceed the nutrient and sediment loadings that were discharged prior to the land being developed for the industrial activity. This approach will result in no net increase of

stormwater nutrient and sediment waste load as a result of the new or expanding industrial activity.

6.3. Gap Analysis

Significant progress has been achieved to date through a variety of programs detailed in Section 8.1 and specific initiatives. Much remains to be done in order to achieve the reductions necessary to meet 2017 and 2025 allocation loads.

6.4. Strategy to Fill Gaps

The bay TMDL will establish a baseline for sediment and nutrient loads that must be met to restore the bay and its tributaries. The sediment and nutrient loads related to urban development can be addressed through the stormwater management, urban nutrient management, and erosion and sediment control programs as well as the suggested expansion of the nutrient credit exchange program suggest in section 1 of this document.

A critical question must be resolved. That is, which BMP efficiency -- Bay model or state regulatory program -- should be used to model future credits for load calculation and reductions? While it is understood that the established model BMP efficiency ensures Bay-wide consistency, individual state regulatory programs will be the means for complying with the TMDL. The efficiency differences between the model and state regulatory program will greatly impact segment-shed response and compliance in meeting the local load and wasteload allocations. While the state program may show that the load and wasteload have been met with the state BMP efficiency, the model may show noncompliance with the segment-shed load and wasteload allocation. Therefore, model and state program BMP efficiencies must be evaluated and if necessary made consistent by the end of the 2013 milestone period.

The existing Erosion and Sediment Control Law and regulations and Chesapeake Bay Preservation Act regulations address sediment and stormwater quantity issues related to land disturbing activities. The statewide threshold for land disturbance is greater than or equal to 10,000 square feet, except in areas covered by the Chesapeake Bay Preservation Act where the minimum disturbance is greater than or equal to 2,500 square feet.

In addition, the law has exceptions for agricultural and forestry activities. One action to improve compliance with the program is to strengthen the agricultural and forestry exceptions in the law (Section 10.1-560.7) by requiring compliance with an agricultural activity conservation plan, or resource management plan, developed and approved by the soil and water conservation district and a forest management plan developed by a professional forester for the timber harvesting activity. The implementation of these requirements would solve the localities' problem of having persons skirting the erosion and sediment control provisions by temporarily converting forest land to agricultural uses just prior to development.

Consistent with the Chesapeake Bay Preservation Act, 84 localities within the Tidewater region of Virginia are currently administering local stormwater management requirements.

The new statewide DCR stormwater management regulations, when implemented, should address the sediment and nutrient loads and stormwater quantity issues with new development and redevelopment over the entire bay watershed. Moreover, Senate Bill 395 enacted during the 2010 session of the Virginia General Assembly establishes that the stormwater regulations will become effective within 280 days of the Chesapeake Bay TMDL being established or by December 1, 2011. The new regulations will impact qualifying new and redeveloped land disturbing projects equal to or greater than one acre, except in areas covered by the Chesapeake Bay Preservation Act where the minimum disturbance is greater than or equal to 2,500 square feet. For redevelopment, 20 percent required phosphorus and associated nitrogen and sediment reduction is anticipated to be incorporated within the Virginia Stormwater Management Regulations. Runoff reduction is one means to achieve this goal.

The new stormwater regulations will not address sediment and nutrient loads associated with existing development, nor does the existing Chesapeake Bay Preservation Act. To fill this gap, new requirements, as well as financial incentives for stormwater BMPs is needed. In addition, the new stormwater regulations are expected to require a 20% reduction in phosphorus loads for areas undergoing redevelopment.

Existing regulatory authority allows for localities to establish stormwater utility fees, service districts, or pro-rata fee programs to address sediment and nutrient loads associated with stormwater runoff pursuant to Section 15.2 et. seq. of the Code of Virginia. The fees, if collected, can be used to finance stormwater management projects to address the quality and quantity of stormwater runoff.

The creation of a state administered stormwater management BMP cost share program could be developed in coordination with a funding mechanism to implement water quality and quantity BMPs. The funds would be made available to BMP owners, private and public, on a competitive basis. Projects funded through the fees would be required to quantify the sediment and nutrient reductions to meet the bay TMDL. The cost share percentage could vary based on the reductions provided by the BMP. For example, a project reducing the load or wasteload from the identified area by 60 percent could be potentially eligible for higher percentage cost-share rate than a project reducing load by 20 percent.

House Bill 1221 enacted by the 2010 Virginia General Assembly allows for loans to be made to a local government from the Virginia Water Facilities Revolving Loan Fund for the purpose of constructing facilities or structures or implementing other best management practices that reduce or prevent pollution of state waters caused by stormwater runoff from impervious surfaces.

Section 10.1-603.7 of the Stormwater Management Act authorizes localities to adopt a more stringent stormwater management ordinance to ensure compliance with the act and attendant regulations. This section also provides guidance under which conditions a locality can adopt a more stringent ordinance. So, localities have the opportunity to develop stricter ordinances requiring the installation of BMPs in existing urban areas, in addition to more stringent criteria for water quality and quantity control to meet the allotted loads and wasteloads for the segment shed.

Stricter local ordinances should be considered to prohibit improper disposal of yard waste, grass clippings, and leaf litter to prevent these sources of nutrients from entering storm drains and drainage ways. Virginia requests that the Chesapeake Bay Program establish a BMP efficiency to account for ordinances that keep materials such as grass clippings and yard wastes out of storm drains and drainage ways. It is likely that localities will consider such ordinances given increased MS4 permit expectations and if appropriate new Chesapeake Bay Program BMPs are developed.

Urban nutrient management represents a cost-effective approach to reduce nutrient loss from land use. Virginia intends to maximize the implementation of urban nutrient management through a combination of actions. Implementation of nutrient management plans is already required by the Code of Virginia on all state owned lands receiving nutrients. Several companies are stepping up to voluntarily reduce the potential for excessive fertilizer run off. For example, Scotts Miracle Gro Company has agreed to eliminate phosphorus in fertilizers for established lawns by 2012. Scotts represents over 50% of the homeowner applied fertilizer market. During 2011, DCR will evaluate the level of voluntary implementation of various nutrient management practices and nutrient management plans. Where the practices show the probability of achieving 90% compliance on a voluntary basis, the practice level would remain voluntary and DCR would continue to track its status. For those practices that do not show a likelihood of 90% compliance by 2017, then DCR will request legislation to:

- Collect and report annual fertilizer applications by lawn care operators through the Voluntary Water Quality Agreements with DCR. Reports would summarize such applications by county/city annually
- Require all municipal / county owned nonagricultural lands receiving nutrients to develop, implement and maintain nutrient management plans
- Requiring nutrient management plans to be implemented on all private and publicly owned golf courses
- Place sales restrictions on do-it-yourself non-agricultural lawn and turf fertilizers to:
    - Ban phosphorus (unless homeowner or property owner is establishing a new lawn, or reestablishing an older lawn; or provides a soil test showing need for phosphorus based fertilizer)
    - Effect time of year use restrictions
    - Consider requiring a significant percentage of slow-release nitrogen
- Prohibit the use of nitrogen containing deicers on paved surfaces
- Require proper storage and disposal of non-agricultural fertilizers by retailers to prevent nutrient losses to ground and surface waters

On developed land the implementation of additional BMPs will be necessary to meet the allocated pollutant reductions. Between 2011 and 2025, additional BMPs will be necessary using practices beyond urban nutrient management. Implementation of this requirement will be costly, necessitating state and local funding through stormwater utilities, service districts or other mechanisms. Actions to achieve these reductions will be pursued through future permits and other means including the Nutrient Credit Exchange Program.

The Phase II WIP process will involve development of local load targets for unregulated stormwater and waste load allocations for regulated stormwater. These local targets will provide the framework to allow local government flexibility, while ensuring accountability, to achieve equivalent levels of reductions through means other than installation of stormwater BMPs or potentially through trading among sectors, including, but not limited to the Nutrient Credit Exchange.

The Commonwealth will utilize MS4 permits to assure BMP implementation on existing developed lands to achieve nutrient and sediment reductions equivalent to Level 2 (L2) scoping run reductions by 2025 for state and local MS4 operators. Level 2 implementation equates to an average reduction of 9 percent of nitrogen loads,16 percent of phosphorus loads and 20% of sediment loads from impervious regulated acres and 6 percent of nitrogen loads, 7.25 percent of phosphorus loads and 8.75 percent sediment loads beyond 2009 progress loads and beyond urban nutrient management reductions for pervious regulated acreage.

Table 6-4.1 provides examples of practices that may achieve the Level 2 load reductions based on Virginia watershed urban land uses listed. The specific practices utilized in the table are for demonstration purposes. Any mix of practices including those not identified in the table to meet the equivalent reduction levels would be acceptable.

Table 6-4.1 Urban / Suburban Stormwater Scoping Scenario Level 2 Effective Net Reductions Using Phase 5.3 Land Loads

Existing Non-federal Urban Lands

Land Use Category	Practice Description	Level 2 Practice % Coverage	Effective Net Reduction Prorated Over Entire Land Use Category Acreage		
			N	P	Sediment
Impervious Urban High and Low Intensity					
	Impervious Cover Reduction	7.5%	0%	5%	6%
	Filtration Practices	7.5%	3%	4%	6%
	Infiltration Practices	8.0%	6%	7%	8%
	Total		**9%**	**16%**	**20%**
Pervious Urban High and Low Intensity					
	Impervious Cover Reduction	-			
	Filtration Practices	5%	2%	3%	4%
	Infiltration Practices	5%	4%	4.25%	4.75%
	Total		**6%**	**7.25%**	**8.75%**

Nutrient Reduction Efficiencies:
Impervious Cover Reduction: 2% N, 65% P, 85% Sediment (based on differences in Phase 5.3 Watershed Model no BMP loads for pervious/impervious average Virginia loads)
Filtration Practices: 40% N, 60% P, 85% Sediment
Infiltration Practices: 80% N, 85% P, 95% Sediment

MS4 permits will provide flexibility in implementation of the specific management technologies employed to meet the required reductions, while stipulating standards and/or objectives. MS4 operators will be able to adjust the levels of reduction between pervious and impervious land uses within their service area, provided the total pollutant load reduction is met. For example, an MS4 could implement a 5% nitrogen load reduction on impervious land uses by implementing a reduction strategy sufficiently greater than 6% nitrogen load reduction on pervious land uses provided the total loads from both land uses are met. In addition, as a means to meet the pollutant reductions, it is anticipated that some permittees may consider incentives such as the Water Quality Improvement Fund and tax credits to encourage additional reductions to the L2 Level where additional reductions are required.

The Commonwealth will utilize enforceable MS4 permit language requiring MS4 operators to develop, implement and maintain Chesapeake Bay TMDL Action Plans (Action Plans)

consistent with the WIP. MS4 operators will be given three full permit cycles (15 years) to implement the necessary reductions to meet the L2 implementation levels for non-federal MS4s and L3 implementation levels for federal MS4s. Baseline efforts for all MS4s will be based upon 2009 progress loads. The baseline effort will be expected to be continued with an expectation of an additional 5% reduction of loads for existing developed lands to be met by the end of the first permit cycle. In addition, MS4 operators will be required to implement urban nutrient management plans on all lands owned and operated by the MS4 operator during the first five-year permit cycle. MS4 operators will also be required to implement the revised stormwater management regulations for new and redevelopment projects by July 1, 2014.

During the first permit cycle, MS4 operators will develop a phased Chesapeake Bay TMDL Action Plan. The plan will include a review of the baseline program and include an outline of the means and methods that will be utilized to meet the L2 level for state and local MS4s and L3 for federal MS4s. The MS4 operator will also review its authorities and adopt and modify the necessary ordinances as well as develop its resources in order to implement the necessary reductions, e.g., develop design protocols, operation and maintenance programs, site plan review criteria, inspection standards, and tracking systems. As a part of reapplication for the second cycle of permit coverage, the MS4 operator will provide a schedule of implementation of the means and methods to implement sufficient reductions to reach 35% of the L2 reductions for state and local MS4s and L3 for federal MS4s. As a part of reapplication for the third cycle of permit coverage, the MS4 operator will provide a schedule of implementation of the means and methods to implement sufficient reductions to reach the remaining L2 reductions for state and local MS4s and L3 for federal MS4s by the end of the third permit cycle.

The Commonwealth will utilize MS4 permits to assure BMP implementation on existing developed regulated federal lands to achieve nutrient and sediment reductions equivalent to Level 3 scoping run reductions by 2025. Level 3 implementation equates to an average reduction of 18 percent of nitrogen loads, 32 percent of phosphorus loads and 40 percent of sediment loads from impervious regulated acres and 12 percent of nitrogen loads, 14.50 percent of phosphorus loads and 17.5 percent of sediment loads beyond urban nutrient management reductions for pervious regulated acreage.

To provide reasonable assurance for the attainment of Level 3 pollutant reductions for regulated and unregulated lands, the Commonwealth cites the following content from the President's Executive Order 13508, Strategy for Protecting and Restoring the Chesapeake Bay Watershed, May 12, 2010: "Waste load and load allocations and reduction plans for individual federal facilities and installations will be set following one of two general approaches: a) states would establish explicit load reduction expectations for individual federal facilities as part of the WIP process; or b) based on broad load reduction goals established by the state, individual federal facilities/installations would develop Federal Facility Implementation Plans that would demonstrate to the state how the facility proposes to achieve needed load reductions. In either case, the states and the District would ultimately decide what loading reductions to propose for federal facilities in its WIP."

Consistent with Presidential Executive Order 13508 and the Energy Independence and Security Act the Commonwealth will expect that all federal facilities control the discharge of pollutants in

stormwater to the maximum extent practicable and any more stringent requirements necessary to meet water quality requirements of the Federal Water Pollution Control Act. Pursuant to federal guidance, 40 C.F.R. section 122.26(d)(2) and 40 C.F.R. section 122.34(b)(5), new and redeveloped federal facilities will be required to manage post construction stormwater to preserve and restore site hydrology and implement BMPs necessary to control the discharge of pollutants in stormwater to the maximum extent practicable and any more stringent requirements necessary to meet water quality requirements of the Federal Water Pollution Control Act and attain water quality standards.

Table 6-4.2 provides examples of practices that may achieve the Level 3 load reductions based on Virginia watershed urban land uses listed. The specific practices utilized in the table are for demonstration purposes. Any mix of practices including those not identified in the table to meet the equivalent reduction levels would be acceptable.

Table 6-4.2 Urban / Suburban Stormwater Scoping Scenario Level 3 Effective Net Reductions Using Phase 5.3 Land Loads

Existing Federal Urban Lands

Land Use Category	Practice Description	Level 3 Practice % Coverage	Effective Net Reduction Prorated Over Entire Land Use Category Acreage		
			N	P	Sediment
Impervious Urban High and Low Intensity					
	Impervious Cover Reduction	15%	0%	10%	13%
	Filtration Practices	15%	6%	9.0%	13%
	Infiltration Practices	15%	12%	13%	14%
	Total		**18%**	**32%**	**40%**
Pervious Urban High and Low Intensity					
	Impervious Cover Reduction	-			
	Filtration Practices	10%	4%	6%	8%
	Infiltration Practices	10%	8%	8.5%	9.5%
	Total		**12%**	**14.5%**	**17.5%**

Nutrient Reduction Efficiencies:
Impervious Cover Reduction: 2% N, 65% P, 85% Sediment (based on differences in Phase 5.3 Watershed Model no BMP loads for pervious/impervious average Virginia loads)
Filtration Practices: 40% N, 60% P, 85% Sediment
Infiltration Practices: 80% N, 85% P, 95% Sediment

6.5. Contingencies

Collectively, the stormwater management programs and actions set forth in this implementation plan represent a significant step forward in managing urban sources of nutrients and sediments. Additional actions that could be employed if allocations are not met could include, but are not limited to the following:

- Consider reducing allowable post development loads further on new development through stormwater management requirements that call for post construction stormwater to preserve and restore site hydrology and implement BMPs necessary to control the discharge of pollutants in stormwater to the maximum extent practicable and any more stringent requirements necessary to meet water quality standards;

- Consider requiring new post development loads to be lower than the transferred load allocation from the average load allocations of the collection of previous land uses prior to development;
- Consider modifying redevelopment criteria to require a level of phosphorus reduction and associated nitrogen and sediment greater than the 20% reduction discussed in Section 7.4;
- Consider establishing impervious cover limits or open space requirements that preserve and restore site hydrology or implement BMPs necessary to control the discharge of pollutants in stormwater to achieve an equivalent level;
- Establish requirements for enhanced vegetation and plantings within required open space and pervious areas to boost function of pervious areas.

6.6. Tracking and Reporting Protocols

One of the missing elements in capturing this sector's contribution has been inconsistent or, in most cases, lack of reporting of the installed practices. A Stormwater Management Enterprise Web site is being proposed as a management tool for the new stormwater management regulations. When the regulations are adopted and implemented, the enterprise website will track project information including: location, size of site, disturbed area, BMPs and area of treatment, date of plan reviews and approvals, inspection and enforcement documentation, permit issuance date, project termination and fees paid. The implementation of the stormwater enterprise website will allow the locality to enter data into the tracking database and allow DCR to consolidate locality data for submission to EPA. The data will be reported and entered on the segment basis for the calculation of reductions within the segment-shed.

DCR is developing the enterprise website to digitally track and report urban/suburban BMPs installed by localities. Funding has been identified to launch phase 1 of the website. Data collected through this website will be provided in a digital format that can be uploaded to NEIEN. Currently, the MS4 localities must report installed BMPs as a condition of their permit, and rather than rely on a paper exercise, the direct input from the localities could greatly improve the contribution of this sector. Modifications to regulations will be necessary to ensure that all localities inventory and report the specific locations and descriptions both existing and newly installed BMPs.

SECTION 7 ONSITE WASTEWATER/SEPTIC

7.1. Current Programs and Capacity

The Virginia Department of Health (VDH) oversees the Onsite Wastewater Program in Virginia. The program encompasses all onsite domestic wastewater systems regardless of size, from single family homes systems to community systems. Onsite sewage systems, by definition, do not directly discharge to surface waters. (Note that industrial discharges to onsite sewage systems are not regulated by the state of Virginia, but by EPA.) In general, the application of domestic wastewater below the soil surface is regulated by VDH and the application of wastewater above the soil surface (spray irrigation, overland flow, etc.) is regulated by DEQ. There are two exceptions: spray irrigation systems for domestic wastewater and subsurface supplemental irrigation systems. Through a cooperative agency agreement, VDH permits spray irrigation sites for domestic wastewater with an average daily flow less than 1000 gallons per day (gpd). Subsurface supplemental irrigation systems are permitted by DEQ under the Water Reclamation and Reuse Regulation (9 VAC 25-740).

Onsite systems in Virginia are generally divided into two groups: conventional and alternative systems. Conventional onsite sewage systems are defined as treatment works consisting of one or more septic tanks with gravity, pumped, or siphoned conveyance to a gravity distributed subsurface drainfield. All other onsite systems are termed 'alternative'. Alternative systems fall in to three main categories:

- **Septic tank effluent systems that utilize pressure dosing (drip dispersal or low pressure distribution) to a subsurface drainfield.** These designs overcome area limitations by providing a reduced drainfield footprint for pressure dosing. Improved effluent distribution throughout the drainfield and periodic dosing improve treatment and dispersal potential.
- **Secondary effluent (30 mg/l BOD (5 day biochemical oxygen demand) and 30 mg/l TSS (total suspended solids average) systems that discharge to gravity, enhanced flow, or pressure dosed drainfields.** Use of secondary effluent provides an additional reduction for the drainfield area, but more importantly, it reduces depth to restrictions.
- **Better than secondary effluent systems that discharge to gravity, enhanced flow, or pressure dosed systems.** These systems may provide an effluent quality that is better than secondary for BOD_5 and TSS and/or may address nutrients, pathogens, or other parameters of concern. Depending on the effluent quality, an additional reduction in drainfield footprint area may be allowed and other reductions may be allowed depending on the site limitation.

Conventional systems that serve single family homes dominate the Virginia inventory of onsite sewage systems. Virginia has approximately 1,015,000 onsite sewage systems statewide. About 60,000 of the systems statewide are alternative systems and the rest are conventional.

Community systems make up less than 1% of the total and include both conventional and alternative system designs. Approximately 536,200 of the onsite sewage systems are located in the Chesapeake Bay Watershed.

There are two additional programs within VDH that support the onsite sewage program in its charge of protecting public health and the environment: the Division of Shellfish Sanitation and the Marina Program. The shellfish program conducts shoreline surveys for failing onsite systems and the Marina Program encourages the proper pumping of sewage from boats, both of which aid in improving water quality and protecting public health.

Onsite systems in Virginia are estimated by the Chesapeake Bay Model to contribute about 4% of the nitrogen (N) load, or 2.9 million pounds per year. No phosphorus is considered to be added by onsite systems due to the ability of soil to retain phosphorus. Conventional systems are assumed to load N at a rate of 8.92 lbs N/person/year at the edge of the drainfield. That poundage has an assumed attenuation rate of 60% to the edge of the stream. That value is further reduced based on the location of the drainfield to the Chesapeake Bay (the delivery factor). Currently all drainfields in Virginia are considered to be conventional for the purposes of the model.

Laws

The laws governing onsite systems in Virginia can be found in Title 32.1 of the Code of Virginia, Chapter 6. The Board of Health is the responsible entity.

Section § 32.1-164 B. states *"The regulations of the Board shall govern the collection, conveyance, transportation, treatment and disposal of sewage by onsite sewage systems and alternative discharging sewage systems and the maintenance, inspection, and reuse of alternative onsite sewage systems. Such regulations shall be designed to protect the public health and promote the public welfare…"*

In addition to the expected requirements for setbacks, design, installation, and operation, there have been several recent additions to § 32.1-164 which will aid VDH in addressing nutrients in the Bay watershed from onsite systems.

- **B.15**. *"Performance requirements for nitrogen discharged from alternative onsite sewage systems that protect public health and ground and surface water quality."*
- **H.** *"The Board shall establish a program for the operation and maintenance of alternative onsite systems."*
- **J.** *"The Board shall establish a uniform schedule of civil penalties for violations of regulations promulgated pursuant to subsection B that are not remedied within 30 days after service of notice from the Department."*

These Code sections provide VDH with the ability to set and enforce N standards for alternative onsite systems and to require operation and maintenance of alternative systems. Similar authorities are not provided for conventional onsite systems.

The civil penalties collected pursuant to this chapter shall be credited to the Environmental Health Education and Training Fund established pursuant to § 32.1-248.3.

§ 32.1-248.3. Environmental Health Education and Training Fund.

There is hereby created the Environmental Health Education and Training Fund whose purpose is to receive moneys generated by the civil penalties collected by the Department pursuant to § 32.1-164 and appropriated by the Commonwealth for the purpose of supporting, training, educating, and recognizing public- and private-sector individuals in all areas of Environmental Health, including Authorized Onsite Soil Evaluators and Department employees. Civil penalties collected by the Department shall be deposited by the Comptroller to this fund to be appropriated for the purposes of this section to the Department by the General Assembly as it deems necessary. The fund may also be used, in the discretion of the Board, for research to improve public health and for protection of the environment.

Legislation approved in 2008 (§ 32.1-163.6) requires VDH to accept designs for onsite treatment works from professional engineers that do not necessarily comply with the regulations that were existing at that time (Sewage Handling and Disposal Regulations). These designs are required to meet certain standards as delineated below.

§ 32.1-163.6. Professional engineering of onsite treatment works.

A. Notwithstanding other provisions of this chapter, for purposes of permit approval, the Board, Commissioner, and Department of Health shall accept treatment works designs from individuals licensed as professional engineers pursuant to Chapter 4 (§ 54.1-400 et seq.) of Title 54.1. The designs shall (i) be compliant with standard engineering practice and performance requirements established by the Board and those horizontal setback requirements necessary to protect the public health and the environment, (ii) reflect that degree of skill and care ordinarily exercised by licensed members of the engineering profession practicing at the time of performance, (iii) be appropriate for the particular soil characteristics of the site, and (iv) ensure that the treatment works will meet or exceed the discharge, effluent, and surface and ground water quality standards for systems otherwise permitted pursuant to the regulations implementing this chapter.

This Code language sets aside most of the prescriptive requirements of the regulations. Legislation approved in 2009 required the Board of Health to promulgate emergency regulations for alternative systems to establish performance standards and operation and maintenance requirements.

Regulations

There are two main regulations that apply to onsite wastewater systems. The first is the Sewage Handling and Disposal Regulations (12 VAC 5-610, SHDR). The current version of these regulations was adopted in 2000. They address permit procedural issues, soil evaluation, site conditions, loading rates for septic tank effluent (gravity and pressure dosed), depth to restrictions, and horizontal setbacks. They also recognize reductions to restrictions with secondary treated effluent. The Emergency Regulations for Alternative Onsite Systems (12 VAC 5-613) became effective April 7, 2010 and will expire April 6, 2011. These regulations address loading rates for higher quality effluents- Treatment Level (TL) 2 (30 mg/l BOD_5 and 30 mg/l

TSS) and TL 3 (10 mg/l BOD_5 and 10 mg/l TSS) - and they set performance requirements for alternative systems. In addition, these regulations address the operation, maintenance, and reporting requirements for all alternative onsite systems regardless of size as required by § 32.1-164 H. This includes an inspection by a licensed alternative onsite wastewater operator at least annually with online reporting of the inspection results to VDH.

Under the Emergency Regulations, only large alternative onsite systems (AOSS) (>1000 gpd) are required to address N. 12 VAC 5-613 70.A.13 states *"Each large AOSS must comply with a total nitrogen limit of 5 mg/l as nitrogen at the project area boundary. Prior to the issuance of a construction permit, the designer shall demonstrate compliance with this requirement through modeling or other calculations. Such demonstration may incorporate multiple nitrogen removal methods such as pretreatment, vegetative uptake (only for AOSS with shallow soil treatment areas), denitrification, and other viable nitrogen management methods."*

While this is the first time that N control has been included in an onsite regulation, it has been the policy of VDH to require N management for all mass drainfields (flows =1200 gpd as defined in the SHDR) since the late 1980's regardless of whether they are conventional or alternative systems. That policy requires demonstration of compliance with the drinking water standard of 10 mg/l nitrate-N in the groundwater. Demonstration is through a variety of methods from treatment prior to land disposal to dilution. The Emergency Regulations make the transition to TN and provide for a safety factor of 5 mg/l TN. The Emergency Regulations do not set load goals or specify how the demonstration for compliance is made, dilution is still an option. The Emergency Regulations apply only to alternative systems and not to conventional systems.

Direct control of N from small onsite systems (<1000 gpd) is difficult. Currently there are no regulations that require N to be considered in these systems, although the Code allows VDH to promulgate N performance requirements for alternative systems only. The SHDR and the Emergency Regulations do, however, encourage the use of secondary and better treatment systems and pressure dosing by providing a smaller footprint for the drainfield and reduced standoff to restrictions. As a result of building trends and the desire to utilize sites with greater limitations, many of the systems in existence along Virginia's coast are secondary treatment systems with the drainfields installed at shallow depths with pressure dosing. All of these factors, along with the new operation and maintenance requirements, improve the potential for N uptake and/or denitrification, and for ensuring that the alternative systems are functioning properly all of which increase the potential for nutrient reduction.

Programmatic

VDH is comprised of local health departments in each county and independent city that are organized into health districts and also a central office. Local health departments issue permits and investigate complaints. As VDH begins implementation of its operation and maintenance (O&M) program, the local health department will be tasked with monitoring for compliance with these requirements and enforcement for deficient systems. The ability of each health department to accommodate these new tasks will vary. In larger health departments, the additional work may be absorbed, but in some health districts, the environmental health specialists are also called on to do restaurant inspections, respond to rabies cases, issue private well permits, and other public health interests such as H1N1.

The Central office, Office of Environmental Health Services (OEHS) and specifically, the Division of Onsite Sewage and Water Services, Engineering, and Marina Programs provide policy and technical assistance to the local health departments for onsite systems. Regulatory development is through the Central office.

Historically VDH's onsite sewage resources have been concentrated on "upfront" permitting activities. Site evaluation, system design, and installation were reviewed in detail. Once the operation permit was issued, however, VDH did not return to a site unless a failure was reported. The recent adoption of the Emergency Regulations shifts the emphasis to ongoing operation, maintenance, and reporting for alternative onsite systems. It will be a challenge for VDH to make the programmatic changes necessary to shift away from designing/reviewing to inspection/enforcement.

The Virginia Environmental Information Systems (VENIS) was brought online in 2004. That system captures all onsite permits issued in the state of Virginia. Legacy systems are being added to the database as time allows. The goal is to capture 10% of the legacy systems each year. VENIS tracks applications for construction permits and operation permits. It will also be used to track maintenance and pumpouts which will be entered in the database electronically by operators. VENIS also has the ability to track nutrient reduction technologies that are installed. As this database is completed, it will enable VDH to provide more accurate information on the number and types of systems installed in the Chesapeake Bay watershed.

Funding

The onsite program is funded through a combination of state general funds, application fee revenue, and local matching funds. No federal funds are involved.

VDH does not administer any funding options for constructing onsite systems. The civil penalties collected pursuant to § 32.1-248.3 may be used for training, educating, supporting and recognizing both private and public sectors in Environmental Health. The funds may also be used to fund research. These funds may not be used for construction.

Other agencies such as DEQ and DCR have funds available at times that may be used for onsite systems, but they are primarily for municipal systems and not individual owners. The State Revolving Fund may be used to provide loans for municipal (publicly owned) large onsite systems, and may be loaned to individuals only by qualified local entities. DCR occasionally has Water Quality Improvement Grant Funding, but it has only recently been opened to onsite systems. In these programs, direct funding to individual home owners has been rare.

Legislation approved in 2009 (§ 32.1-164.1:2) established an eligibility program for betterment loans to repair or replace failing onsite sewage systems.

"A. The Board shall establish a betterment loan eligibility program to assist owners with the repair, replacement, or upgrade of failing or noncompliant onsite sewage systems, and the Board may identify sources for betterment loans to be provided by private lenders, directly or through conduit lenders. In addition, owners may also apply to the Department for betterment loan eligibility to upgrade an onsite or alternative discharging sewage system that is not failing,

provided such upgrade is for the purposes of reducing threats to public health, and ground and surface waters, including the reduction of nitrogen discharges"

The Emergency Regulations for Alternative Onsite Sewage Systems (12 VAC 5-613-70.A.18) has wording that supports the concept of betterment loans. *"For purposes of assisting owners in obtaining such funds as may be available for reducing nitrogen discharges from AOSS, including Betterment Loans and grants from the Water Quality Improvement Fund, the department shall evaluate AOSS designs and establish the nitrogen-reducing capacities thereof."* It is likely that the NSF 245 standard will be used for identifying single family home systems that reduce N.

To date, no financial institutions are offering betterment loans.

Staffing

In the Central Office, the Division of Onsite Sewage and Water Services, Engineering, and Marina Programs, VDH has 15 staff divided between managers, environmental specialists, engineers, soil scientists, and lawyers. In the local health departments, there are approximately 300 individuals with responsibilities in the onsite sewage program. This includes environmental health managers, supervisors, and specialists.

The local health departments do not always have staff that is dedicated to just onsite sewage and their job duties include other environmental health issues such as wells, rabies, restaurant inspections, and lead programs. The staff overall are well trained and the bulk of the onsite environmental health specialists hold a state license as an Onsite Soil Evaluator.

As discussed above, VDH staff must shift focus from initial permitting to ongoing operation, maintenance, and enforcement. VDH environmental health specialists are well trained in soil and site evaluation, but additional training will be needed to accomplish the new goals, related to operation, maintenance, and compliance of onsite systems.

Technical Capacity

The technology for controlling N in large onsite systems will mimic the technology for discharging systems, but with the added safety factor of applying to the soil environment. The advantage of an onsite system is that there typically is not the need to remove N or P to the level of technology, currently 3 mg/l total nitrogen (TN) and 0.3 mg/l for total phosphorus (TP), as the system can rely on the soil and plant uptake to remove some of the nutrients. This reduces the need for chemical addition, especially of methanol which has a number of safety considerations associated with it. It also simplifies the operation and maintenance of the sewage treatment works all of which results in onsite systems being a cost effective way to address nutrient removal.

Single family home systems suffer from wide swings in flows and strength of wastewater so that it is difficult to get reliable treatment from any single family home unit. The efficiency of any nutrient removal technology is affected by these swings which are more pronounced in single family homes. The National Sanitation Foundation (NSF) 245 standard provides a process for demonstrating a 50% reduction of N through a treatment system prior to dispersal to the soil. A 50% reduction is about the limit of technology for commercially available single family home

treatment units. This treatment standard is recognized by the Chesapeake Bay model as a Best Management Practice (BMP) resulting in a 50% reduction in N to the Bay from onsite systems.

There are three existing BMPs recognized in the Chesapeake Bay Model for onsite systems: denitrification systems (like the NSF 245 rated systems discussed above), pumpouts of septic tanks, and connecting an onsite system to a central sewer ("hookups"). Of these, pumpouts are currently only tracked for those systems located in the localities affected by the Chesapeake Bay Preservation Act. The new Emergency Regulations require reporting of pumpouts for all alternative systems. That reporting will be conducted electronically. The Emergency Regulations do not address pumpouts of conventional systems. The other two BMPs, hookups and denitrification systems, are not currently tracked by VDH although tracking of installed technology, such as denitrifying treatment units, could be added to the VENIS database.

For the Chesapeake Bay Preservation areas, pumpouts or inspections are required every 5 years for all onsite systems. That has produced an average of 46,000 pumpouts of septic tanks per year. For areas outside the Preservation areas, VDH estimates that an additional 30,400 systems are pumped based on a pumpout frequency of once every 15 years. That results in an average number of septic tank pumpouts of 76,400. While VDH does not track hookups, it is estimated that approximately 975 systems come offline annually.

VDH received the authority to establish a uniform schedule of civil penalties for violations of the regulations. The ability to enforce the new operation and maintenance (O&M) requirements will greatly improve VDH's ability to obtain compliance of onsite systems. Reporting of the O&M requirements are required to be submitted electronically directly into the VENIS database. As a result VDH will have the ability to immediately assess which systems are complying with the inspection and reporting requirements.

7.2. Accounting for Growth

VDH estimates that, on average, about 11,250 onsite systems are installed in the Chesapeake Bay watershed each year. That number is expected to remain steady. Approximately 10% of new applications are alternative systems for which VDH currently has authority to regulate N. An unknown factor is how the presence of a nutrient cap for discharging systems in the Bay watershed will affect the number of onsite applications. VDH is beginning to see an increase in the number of applications for larger onsite systems in the Chesapeake Bay Watershed, but it is difficult to determine if this is a long term trend.

Large onsite systems (>1000 gpd), however, are required to demonstrate compliance with a 5 mg/l TN standard at the project boundary. N can be better managed in large systems and it is anticipated that any load of N from large onsite systems would be negligible as a result. For small systems, use of N reducing strategies is encouraged through the design incentives in the existing regulations. Operation, maintenance, monitoring, and reporting requirements for all alternative onsite systems will ensure proper function and performance.

New systems are tracked through VENIS so the number of new systems, the type of systems and the accompanying nutrient load can be estimated from VENIS. It is predicted that through better

tracking of the type of technologies, the true N reduction from shallow placed dispersal fields, NSF 245 systems, or other BMPs can be captured and reported.

While the N load from large alternative systems can be managed to result in essentially a net zero discharge to the environment, the N load from small systems serving single family homes cannot. Even if nitrogen- reducing technology were mandated for all new small alternative systems, there will still be a net N gain to the environment. Given that the bulk of small systems are conventional systems, a requirement for N reduction on alternative systems will only account for about 10% of the new systems. Currently there is no technology that can be applied to small onsite systems to reduce N to neglible amounts. As a result, the N load from the onsite sector will continue to increase with growth unless the N load is offset, either from another sector or by replacing existing onsite sewage systems with nitrogen-reducing technologies.

7.3. Gap Analysis

VDH has the statutory authority to regulate N from alternative onsite sewage systems which represents about 10% of the new systems being installed in the Chesapeake Bay Watershed. Currently, there is no regulatory requirement to control N in small (<1000 gpd) conventional onsite systems, only for the large alternative onsite systems. VDH has proposed replacement regulations for the Emergency Regulations that will mandate N reduction for all alternative systems in the Chesapeake Bay watershed. The proposed regulations for alternative onsite systems call for small systems to meet a 50% reduction in N and all large systems to meet a <3 mg/l TN at the project boundary. That will reduce N from a small percentage of the total number of systems, but the overall N load from onsite will continue to increase due to the number of conventional systems being installed.

The current regulations encourage designs that, by their nature, tend to remove N. By utilizing available dispersal technologies that allow for shallow placed systems and dosing, the opportunity for uptake/denitrification of N in the upper soil is increased. The wastewater is maintained in the upper soil horizon in the root zone for longer periods of time where there is more carbon available for denitrification and uptake by vegetation is more likely. Research indicates that 50% of N can be lost just by shallow placement and pressure dosing. Ten percent of new systems installed each year and about 15 to 20% of repairs to failing systems are of a design that they are considered N reducing. That results in a target of 10,238 N reducing systems in by 2017 which slows the increase in N from the onsite sector.

Three new BMPs for onsite will be proposed utilizing the above concept. The first BMP will allow for a 25% reduction in N with shallow placed dispersal systems utilizing gravity flow. The second BMP will allow for 50% removal of N with secondary treated effluent to a shallow placed, pressure dosed dispersal system. The third BMP will couple a denitrification system (rated at 50% N removal) and a shallow placed, pressure dosed dispersal system for a 75% N removal rating.

The existing Emergency Regulations for alternative systems require that all large systems (>1000 gpd) are required to demonstrate compliance with a TN of 5 mg/l at the project boundary so it is anticipated that the TN load from large onsite systems will be negligible. There are sufficient treatment and dispersal technologies that are well documented to accomplish this goal. Control

of N in large onsite systems has been a policy of VDH for at least 10 years, but older systems often met the concentration requirement through dilution area. Elimination of the use of dilution to demonstrate compliance is proposed in the replacement regulations, but is currently allowed.

The biggest shortfall will occur from the existing and new conventional systems. VDH has no statutory authority to regulate N from these systems so the load from that subsector will continue to increase.

7.4. Strategy to Fill Gaps

Implement Current Proposals that Utilize Existing Regulatory Authority

The Emergency Regulations for Alternative Onsite Sewage Systems are effective for only one year and replacement regulations have been proposed. VDH is utilizing the Administrative Process Act to take comments and make revisions to those regulations so that the final regulations will be ready as the Emergency Regulations expire. The replacement regulation will go to public comment on December 6, 2010, with a projected adoption of spring 2011. N limits for small alternative onsite systems (50% reduction in N as demonstrated by 4.5 lb N/person/year at the edge of the project boundary), primarily single family home systems, are proposed, as is eliminating the dilution option for demonstration of compliance for large systems. The large alternative systems in the Bay watershed will be held to the more stringent <3 mg/l TN at the project boundary. More stringent design standards are proposed for alternative systems placed in certain sensitive areas. Limiting the use of conventional systems or mandating N reduction for conventional systems would be outside the scope of these regulations and VDH's authority.

There are a number of designs that are already being used by VDH that do promote N removal. VDH will propose these as new BMPs for onsite so that the N reducing potential of these designs is recognized and reported. As the VENIS database is updated, Virginia will have a more accurate accounting of these systems and a truer picture of the input of onsite systems to the Chesapeake Bay nutrient issues.

VDH applied for and received a grant to fund a staff position that will be dedicated to coordinating VDH's activities with regard to the Chesapeake Bay TMDL. This position will work with the local health departments to complete the inventory of systems; serve as a liaison between VDH and the database developers to modify VENIS so that BMPs can be appropriately captured; promote voluntary BMP implementation; seek sources of funding for upgrades; and coordinate with local governments.

Additional Options that would include Code of Virginia changes and interagency cooperation

In order for VDH to control N from all onsite systems in the Bay watershed, including conventional systems, at least two changes would be needed to the Code of Virginia. The first would be to allow the Board of Health to set N limits in the Bay Watershed for conventional onsite sewage systems. This could be done by basing an N reduction requirement on a sensitive area designation such as distance to surface waters. Another alternative would be to mandate shallow placement of the dispersal field for conventional systems in order to achieve a 25% reduction in N. If a shallow-placed system was not feasible due to site constraints, the Board could mandate that a denitrifying treatment unit be installed. However, as noted above,

controlling nitrogen from newly installed onsite systems will slow the growth of the onsite sector's N contribution, but is not sufficient to achieve a reduction in the overall N contribution from the onsite sewage sector.

N is more easily controlled in community systems and a mechanism to encourage or require community systems would result in additional reductions of N to the Bay.

The replacement of existing conventional systems plus the implementation of new N reducing onsite requirements would be encouraged through the use of tax incentives; betterment loans; and grants or other low interest funding sources. Access to the Nutrient Credit Exchange Program to allow offsets to be procured for septic loads from other sectors would provide local flexibility to use the most cost effective nutrient reduction method. Expansion of the septic tank pumpout requirement from the Chesapeake Bay Preservation Act area to the entire Chesapeake Bay watershed would achieve additional reductions.

In summary, this plan proposes the following for the Onsite/Septic Sector:

- Implement amendments to Virginia Department of Health regulations for alternative systems. The proposed amendments require a minimum 50% reduction in delivered N for all new small alternative onsite systems in the Chesapeake Bay watershed resulting in an effective delivered load to the edge of the project boundary of 4.5 lbs TN/person/year. All large alternative onsite systems will demonstrate compliance with <3 mg/l TN at the project boundary.
- As a component of the revisions to the Nutrient Credit Exchange law proposed in 2012, allow for increased loads from onsite/septic to be aggregated at a jurisdictional level and available for offsets
- Seek revisions to the Code of Virginia will be considered to require all new and replacement systems in the Chesapeake Bay watershed to utilize either (1) "shallow-placed" systems capable of reducing nitrogen loss or (2) denitrification technology to reduce nitrogen loss and consider requirements for additional nitrogen reducing technologies in certain defined sensitive areas.
- Seek revisions to the Code of Virginia that will promote the use of community onsite systems which provide a greater reduction of TN
- Seek legislative changes necessary to establish 5 year pumpout requirements for septic tanks in jurisdictions within Virginia's Chesapeake Bay watershed (this mirrors the existing requirement for septic tanks within Chesapeake Bay Preservation Act areas)
- Seek legislative changes necessary to establish tax credits for upgrade/replacement of existing conventional systems with nitrogen reducing systems
- Encourage the use of currently authorized "Betterment Loans" for repairs to existing systems and explore other financial incentives or relief to encourage the upgrade of existing systems especially for low and moderate income households.

7.5. Contingencies

The proposed replacement regulation for alternative onsite sewage systems will slow the growth of this sector. In order to provide flexibility to localities and to recognize the regulatory limits of

the VDH programs, an expansion on the nutrient credit exchange to offset growth in the onsite sector is proposed.

7.6. Tracking and Reporting Protocols

As discussed, VENIS (Virginia Environmental Information System) is a statewide database that captures all new applications for permits. VDH has an internal goal of capturing 10% of the legacy systems per year. Once complete, VDH will have an inventory of all systems with basic site and system descriptions. BMPs could be tracked through this system. The new grant funded staff position discussed in section 8.4 will be key in accomplishing these goals.

An online reporting system is available for operation and maintenance reports, sampling, and pump outs so these tasks will be captured for the alternative systems. Currently conventional systems are not included in the O&M requirement so there is no tracking of maintenance activities for those systems.

Hookups of onsite systems to a central, discharging system, are not tracked. An option for this is to have the utilities notify an agency (VDH or DCR) when an onsite system is taken offline.

DCR currently tracks the septic pump-out practices through the cost share program. DCR also reports on the pump-out progress for all Bay Act localities. All data is submitted to NEIEN by DCR at this time, though greater coordination is needed with VDH to capture additional BMPs not currently tracked by DCR. Another improvement might include the collection of pump-out data directly from the septic haulers.

SECTION 8 FOREST

8.1. Current Programs and Capacity

Virginia Silvicultural Water Quality Law

Enacted by the 1993 Virginia General Assembly with support from the forest industry, the Virginia Silvicultural Water Quality Law is the backbone of the forestry nonpoint source pollution program. This law, which is administered through the Virginia Administrative Processes Act, allows a tiered system of inspections and hearings to prevent nonpoint source pollution. The law also addresses sedimentation in streams. Administration of the law allows for stop-work emergency actions, provision of corrective recommendations and civil penalties where warranted.

The Silvicultural Water Quality Act was amended in 2002 to allow for the issuance of a civil penalty against the operator for failure to notify the Department of Forestry (DOF) of a commercial harvesting operation within 3-days of the start of an operation. This change allows the department to track notification compliance by individual operators. This change gives the State Forester the authority to issue a civil penalty of $250 for the initial violation and up to $1,000 for subsequent violations within a 24-month period.

Code Reference:
Silvicultural Water Quality Law – Code of Virginia Chapter 11 of Title 10.1, article 12 & 10.1-1181.1 through 10.1-1181.7

Water Quality Complaint System

Another process that improves BMP implementation and encourages compliance with the Silvicultural Water Quality Law is the DOF Water Quality Complaint System. DOF personnel investigate all water quality complaints involving forestry operations to document the nature of the problem. In the past, DOF has handled eight to 15 complaints annually with total resolution. This complaint system is a high priority for DOF, ranked second only to forest fire suppression.

Education and Technical Assistance

Through education and technical assistance programs, DOF has heightened water quality awareness among Virginia's forest industry so that it is now institutionalized within the industry. The SHARP Logger Program, an industry-sponsored training program, guides educational efforts with industry and consulting forestry personnel. These programs require a quarterly BMP audit of 60 randomly chosen harvested tracts. In addition all logging jobs exceeding 10-acres are inspected at least twice.

BMP inspections performed by DOF personnel represent the core component of the forestry nonpoint source program. In Virginia there are between 4,000-5,000 logging activities annually that require an average of three (3) inspection trips by staff, resulting in approximately 15,000 inspections annually. Each inspection requires a write-up and data input. Each timber harvesting

activity is compared to acceptable standards as documented in the "Forestry Best Management Practices Manual." Noncompliant owners and/or operators are identified and informed in writing of required corrections. Compliance rates for BMP use has continued to improved since 1989. Moreover, the Streamside Management Zone (SMZ), vital to the maintenance of water quality, continues to be the most well-implemented BMP.

Funding for this program comes entirely through the Commonwealth's general funds with no federal funding support. Some grant money from the Water Quality Improvement Fund program helps to provide support for an innovative logger BMP cost share program administered by DOF.

DOF agency staffing currently consists of an Assistant Director of Forest Management for Water Quality, a Water Quality Program Supervisor at the headquarters level, four (4) Forest Engineers and seven (7) Water Quality Specialists at the Regional and Field levels. There are currently three (3) Water Quality Specialist vacancies within the agency.

8.2. Accounting for Growth

The goal of this section is to describe potential and expectation for growth and how any increased loads will be accounted for and addressed.

Traditional Growth Expectations

In general, the potential for growth in the harvesting of timber is currently dependent on the economy, and in particular, with the number of housing starts. With the need for construction forest products being at an all-time low, the number of timber harvests has been reduced since mid-2008. Housing starts have been cyclic and closely related to the economy. It is expected that if economic growth occurs the number of timber harvests will increase. In conjunction with this, the fragmentation of the forest land base in Virginia has caused the average size of the timber harvest over the past 10 years to decrease from 50 acres in 1999 to 40 acres in 2010. Fragmented forest land results in more individual harvests.

New Growth Potential on the Horizon

Over the past few years there is a growing emphasis on promoting alternative energy generation using woody biomass (biofuels). In addition, there continues to be significant technological advances for nontraditional uses of wood (bedding/absorbents, composites /polymers, laminates, biorefinery products, etc.) resulting in the utilization of more of the forest biomass found in a unit of forest as well as more forested acres. These new forest products will most likely increase over time. As a result, greater utilization of the forest will increase the impact from harvesting in the future, primarily as it relates to sediment loading. This will require DOF and its partners to ensure that the appropriate BMPs are in place to successfully mitigate the impacts from more intensive forest harvesting.

Monitoring and Inspections with Growth

Quarterly monitoring of BMP implementation as well as the harvest inspection process will be the primary methods for directing the program in the future. The monitoring will determine the

sediment loading based upon percent BMP Implementation and the harvest inspection program will determine that actions be taken to direct corrective actions. As the economy improves and biomass harvests increase, this will likely require changes in BMP emphasis, inspections, monitoring and staffing levels.

83. Gap Analysis

The average rate for statewide BMP Implementation is currently 82.4 percent. Of the 240 tracts monitored annually less than 2 percent of the sites have any evidence of "active sedimentation" occurring. The BMP implementation rate is slightly higher in the Chesapeake Bay watershed due in part to more moderate topographical features. It is anticipated that the rate of BMP implementation in the bay watershed will need to increase to 90 percent with active sedimentation values in the one percent category to meet the desired sector sediment reduction targets for forest land.

The bay model calculates reductions for sediment pollution by assigning sediment reduction efficiency to a BMP. This is determined using the Revised Universal Soil Loss Equation (RUSLE) model. It has not been proven that the use of the RUSLE model for calculation of sediment loading based on BMP implementation rates is accurate.

The Southern Group of State Foresters Water Resources Committee is currently funding a study with Auburn University, the University of Georgia and the U. S. Forest Service Southern Research Station utilizing the Water Erosion Prediction Project (WEPP) Model and its potential use in quantifying sediment reductions and BMP rates of implementation. Once this study is complete, there should be a more useable tool available to quantify the sediment reductions tied to BMPs for forestry. Until that time, the most useable number should be the amount of "active sedimentation" that is occurring from forestry operations. This number could be easily calculated using the WEPP Model for tracts where active sedimentation is found during the monitoring process. This is an "outcome-based" approach to calculate the tons of sediment loss actually occurring from forestry operations in the bay watershed.

None of these methods takes into account naturally occurring geological sedimentation from undisturbed forests.

8.4. Strategy to Fill Gaps

Although 100 percent of all known logging jobs are monitored and BMPs are used on all logging jobs with the result that 98 percent of all logging jobs do not result in sedimentation, the DOF reports that 83 percent of the harvested forest acres in the Commonwealth utilize an appropriate combination of BMP harvesting practices. DOF has been requested to increase the use of effective BMP implementation rate to 95 percent as a means to reduce nonpoint source pollution.

To reach the goal of 95 percent implementation of effective BMPs will take much more education and compliance enforcement. This will be difficult in a time when DOF is contemplating a less rigorous approach in these areas due to budget cuts and staffing limitations. With more monitoring and enforcement needed, reaching the 95 percent goal is contingent upon availability of funding for monitoring of forestry BMPs.

Cooperative efforts in logger education need to continue between DOF and the Sustainable Harvesting and Resource Professional (SHARP) Logger Program, The Virginia Cooperative Extension Service, DCR, Virginia Forestry Association and the Virginia Loggers Association to bring the working logging contractors up to date on the latest BMPs. DOF will need to continue and update the Memorandum of Understanding with DCR and others on operational authorities on timber harvesting activities. DOF will also need to continue to educate landowners as to the need for BMPs to be included in timber sale contracts.

8.5. Contingencies

No contingencies are necessary or anticipated

8.6. Tracking and Reporting Protocols

DOF currently has a system in place to monitor BMP implementation as well as compliance with the Commonwealth's Silvicultural Water Quality Law. The data is kept in a spreadsheet, which is not conducive to the large amount of data analysis needed. Existing data needs to be moved into a database for easier data analysis and report generation. The DOF currently has mobile data collection capability, which needs to be increased to capture the information required of the BMP monitoring effort.

Reporting should be done using the format that currently supports data collection for BMP implementation. This presents an opportunity to develop a statewide reporting system that could be expanded to collect relevant data from agriculture community, the urban sector, etc.

An annual report is compiled by DOF and is available on the DOF website or by request. It is anticipated that a 5-year report will also be developed and published for public consumption. This report, or portions of it, could be submitted to EPA or combined with information from the other nonpoint source sectors into a single report for EPA.

SECTION 9: RESOURCE EXTRACTION

9.1. Current Programs and Capacity

In Virginia, resource extraction is broken into three categories: coal mining, gas and oil, and mineral mining. Each of these can contribute pollutants to water resources, such as heavy metals, low pH, and total suspended solids.

Erosion and sedimentation impacts from an active mining site can have detrimental impacts on local streams and the Chesapeake Bay. Abandoned mine sites can contribute sediment, phosphorus and other pollutants to nearby streams. In Virginia, coal mineral mining activities are covered by the VPDES Program, with permits issued by DMME. Mineral mining activities, including the direct discharge of process water and mine pit dewatering, are covered by the VPDES General Permit for Non-metallic Mining (VR 680-14-21) issued by the Department of Environmental Quality. The DMME Divisions of Mined Land Reclamation (DMLR), Mineral Mining (DMM) and Gas and Oil (DGO) deal directly with nonpoint source pollution by conducting reclamation activities and controlling runoff from land disturbance associated with the specific resource extraction method.

While Virginia's coal producing region lies largely outside the Chesapeake Bay watershed, there are locations historically mined near Richmond and Farmville and some in the Shenandoah Valley that might present reclamation opportunities. Mining activities in the bay watershed include sand and gravel operations, quarries (limestone, etc.), and gas and oil drilling operations (potentially Marcellus Shale in Shenandoah) that may be of concern and may present opportunities for improved management techniques to reduce site runoff and sediment discharges to streams. There may also be opportunities for reclamation of historic sites where the resource extraction activity was completed before reclamation and closure laws were enacted.

Operators of active mines and well sites are required by state law to implement management practices that control the release of sediment from the site and meet current state and federal effluent standards for point source discharges.

The primary law regulating the production of non-fuel minerals is the Mining Mineral Law. The primary law regulating the gas and oil industry is the Virginia Gas and Oil Act. Virginia's Orphaned Land Program was enacted in 1978 to alleviate the environmental and public safety hazards associated with abandoned mineral mine sites. It is the primary authority for orphaned mineral mines.

Currently, DMME staffing for the non-coal mining activities includes 11 inspectors, two mineral mining supervisors, 1 permit engineer, 2 Orphaned Land program staff, one of which is the Nonpoint Source Pollution Coordinator employed through a 319 grant from EPA, along with a training supervisor and several support staff. Should the Marcellus Shale project move forward, a staff person from DGO will be needed to cover inspections for erosion and sediment control of the impacted area. The number of active permits in the Chesapeake Bay Watershed is approximately 320.

Code reference
Chapter 16 of Title 45.1, Chapter 22.1 of Title 45.1 Code of Virginia

9.2. Accounting for Growth

With an increase in population growth and the need for an increased number of roads and building materials, it is expected that the demand on quarries and sand and gravel mining would also increase to support that growth. An increase in permits for the management of water discharges would be expected, as would the implementation of management practices that control the release of sediment from the site. Current mines are regulated under Virginia law ensuring that contemporaneous reclamation takes place and best management practices are followed during mining. Growth in the oil/gas and coal extraction industries is driven primarily by regional, national and international markets, including energy and steel, so they do not respond solely to local market forces. An increase in loads could occur from these activities, though it is expected that permitting compliance efforts of DMME and DEQ will reduce that possibility.

9.3. Gap Analysis

While there is no specific target for this program area, it is expected that reductions in sediment from abandoned mine sites would benefit the overall reductions needed in sediment.

9.4. Strategy to Fill Gaps

DMME employs a full time staff person to manage the identification and reclamation of abandoned mineral mines in high priority watersheds through a grant administered by DCR from EPA's 319 program.

Currently, there exists a loss of funding for the Orphaned Land Program, which addresses the reclamation of abandoned mineral sites across the state. To further address the reclamation of abandoned mine sites, considerable and steady funding is needed throughout Virginia's Bay watershed.

The VPDES General Permit, which is currently in the process of being reissued, will include best management practices for mining areas where TMDL Implementation Plans have been completed.

9.5. Contingencies

Increasing the number of inspectors, reclamation sites, and stream restorations may contribute to additional sediment reductions across the Bay watershed.

9.6. Tracking and Reporting Protocols

Tracking the compliance of VPDES general permit holders is currently done by DEQ, while DMME tracks compliance with their own permit holders. Periodically, the facilities are inspected to ensure compliance with their permit conditions. Facilities must report on a regular basis, and

show their schedules for reclamation of disturbed sites. As resources are available, an expansion in the reclamation of older abandoned sites could be pursued to include stream restoration and site stabilization. These reclamation opportunities and their progress would be tracked by DMME and the progress supplied for each bay TMDL milestone reporting. Currently, DMME is developing an inventory of abandoned mines and reclamation work is being driven by local TMDL's.

SECTION 10: OTHER MANAGEMENT PROGRAMS

This section describes additional mechanisms and programs that will be further evaluated to determine nutrient reductions.

Shoreline Erosion Advisory Service

The Shoreline Erosion Advisory Service (SEAS) was created in 1980 by the Virginia General Assembly. The program provides technical assistance to private landowners and local, state and federal agencies owning property experiencing shoreline erosion in tidal Virginia. The SEAS services include: site investigations, written reports, plan reviews, construction inspections, permitting assistance and education.

SEAS staff provides an advisory report that includes erosion control recommendations that are unbiased and tailored to the individual site. The erosion control recommendations may include non-structural or structural protective measures. The non-structural recommendations are provided in low wave energy areas and generally include vegetative practices. Specific planting recommendations are given to establish or enhance vegetation on upland banks as well as fringe marshes. However, structural solutions are often required to abate the shoreline erosion problem in medium to high wave energy areas. These solutions include bulkheads, riprap revetments, sills, breakwaters and groins. Vegetative measures may also be included with the sills, breakwaters and groins.

The implementation of a structural control measure requires a permit(s) from the appropriate regulatory agency. Detailed plans must be prepared. SEAS staff provides minimum design criteria and provides plan review services for designs before they are submitted to the regulatory agencies for review and approval. The staff review provides the property owner with a degree of assurance that the design incorporates sound engineering practices. Once a shoreline project is permitted, SEAS staff can also provide construction inspections for projects that were previously reviewed.

Code Reference:
§ 10.1-701 Code of Virginia

Virginia Clean Marina Program

The Virginia Clean Marina Program (VCMP) is a voluntary program that promotes BMPs at marinas and boatyards to reduce the environmental impacts of daily operations. The VCMP was implemented in 2001 and is housed at the Virginia Institute of Marine Science, Marine Advisory Services in partnership with Virginia Sea Grant. Guidance is provided to marinas and boatyards on reducing nonpoint source pollution. Participating facilities are required to put into practice 100 percent of the legal requirements and 80 percent of the program recommended BMPs outlined in the Clean Marina Guidebook. An initial self assessment by the owner/operator is followed by a site visit from the clean marina staff and then a final review by the Marina Technical and Environmental Advisory Committee (MTEAC). If the MTEAC members agree the facility meets the regulatory and voluntary components of the VCMP program, the marina or boatyard is designated a Clean Marina.

There are ten primary management areas outlined in the guidebook. These areas include: siting and design considerations for new and expanding marinas, marina management, emergency planning, petroleum control, sewage and grey water, waste containment and disposal, vessel maintenance and repair, stormwater management, habitat and species, and boater education.

Program BMP recommendations include; minimizing impervious areas to reduce surface runoff, maintenance of vegetative buffers and collect all maintenance equipment and debris in areas outside of the resource protection area (RPA) as well as conducting all maintenance activities outside of the RPA. All BMPs are designed to filter nutrients and capture any debris and sedimentation before it reaches the waterways or prevent pollution occurrence.

There are currently 65 certified Clean Marinas and 34 marinas that have pledged to work towards becoming certified. The certified marinas are revisited every three years for recertification and to note any additional BMPs that the marina has implemented. The goal of the VCMP is clean water so any level of participation in the program is encouraged and welcome.

No Discharge Zone Program

This EPA program, administered by the Department of Environmental Quality in Virginia can be used as a tool to help restore the quality of shellfish waters where there is poor tidal flushing and smaller volumes of water for waste assimilation. Virginia code was established to define the tidal creeks of the Commonwealth as a "no discharge zone" on July 1, 2009. DEQ has begun the process of establishing No-Discharge Zones (NDZ) in all tidal creeks draining into the Virginia portion of the Chesapeake Bay or its major tributaries.

NDZ designation in a waterbody restricts vessels from discharging waste even after it has been treated by approved marine sanitation devices (MSDs). Under a NDZ designation, vessels operating in smaller tidal bay tributaries would be prohibited from discharging treated waste (discharge of untreated waste is already illegal nationwide). NDZ designation also results in an expansion of enforcement authority and resources to support enforcement actions. EPA designation of NDZs is contingent on an established need for protection, availability of sufficient waste disposal alternatives (i.e. pump-outs), and local stakeholder support.

Though typically used to target bacterial impairments, an NDZ provides some benefit to the reduction of nutrients, particularly nitrogen. The educational benefits include informing boaters about the availability of sanitary pump-out facilities in an area and the detrimental impact that overboard discharge of human waste can have on water quality.

Currently, DEQ is working with local planners to collect the necessary data and apply for the NDZ designation for the tidal creeks of the Northern Neck of Virginia. Funding for this pilot project has been made available through the federal stimulus package of 2009 and it is expected that the methodology will be more refined to be used for designations. At present, there is one staff person at DEQ to administer the program. No-Discharge Zones currently exist in the Lynnhaven River and Deltaville for Virginia's Bay watershed.

Code Reference:
§62.1-44.33, Regulation 9 VAC 25-71

Wildlife Management

It is the mission of the VDGIF to maintain optimum populations of all species to serve the needs of the Commonwealth.

With regard to deer population management, the 2006-2015 Virginia Deer Management Plan directs the Virginia Department of Game and Inland Fisheries to manage deer populations on a management unit (i.e., county or city) basis using regulated hunting. The density and health of Virginia's deer herd is being appropriately managed through this mechanism. Although frequently described as overpopulated, most of Virginia's deer herds are managed through regulated hunting at moderate to low population densities, in fair to good physical condition, and below the biological carrying capacity of the habitat. However, deer herds are above cultural carrying capacity in a number of areas of the state. Regulations on deer hunting are designed purposefully to apply to large areas (i.e., counties), be as simple and uniform as possible, and avoid confusion. When setting regulations on this basis, one assumes that deer habitats, deer densities, hunter pressures, and public demands are similar over the entire affected area. However, these factors often vary within a management unit. To meet the unique management needs and challenges in such areas, alternative site-specific management regulations and programs must be developed and implemented. Programs currently in existence include Deer Management Assistance Program [DMAP], Damage Control Assistance Program [DCAP], Deer Population Reduction Program [DPOP], and out-of season kill permit.

Resident Canada Goose populations are also managed in Virginia. The resident Canada goose population increased substantially in Virginia during the 1980's and 1990's, and peaked at around 265,000 geese in the late 1990's. Specific management programs were initiated in the 1990's to help control and manage this population. Special September hunting seasons were initiated in 1993 and special late hunting seasons (January – February) were initiated in 1996. These seasons were expanded over the past 10-15 years and have resulted in a 400% increase in the Canada goose harvest during this time period, from around 13,000 birds to 66,000 birds annually. In addition, other control measures have been implemented to help control goose numbers in areas such as residential, urban and industrial areas where hunting is not effective. Direct population control is a program conducted by the U.S. Department of Agriculture, in consultation with VDGIF that is used to remove and destroy Canada geese that are causing problems that are not being solved with other control techniques. These actions have reduced the Resident Canada goose population in the state from over 265,000 in the late 1990's to around 147,000 in 2010. The goal of this program is to manage the resident Canada goose population at a level that will provide aesthetic and recreational benefits to the citizens of the state while reducing economic damages, alleviating nuisance issues, and minimizing threats to human health and safety. A population objective of 125,000-150,000 geese statewide should be maintained to accomplish these goals. On a local level, goose numbers may need to be further reduced in specific areas to address specific conflicts or concerns.

Code Reference:
Title 29.1, Code of Virginia and Virginia Administrative Code Title 4 VAC Agency NO. 15.

Restoration of Oysters and other filter feeders

Increasing Virginia's stock of natural filter feeders, such as oysters, not only provides a valuable fishery but will also help clean the Chesapeake Bay by filtration. Various studies and EPA's modeling have demonstrated that increasing the biomass of filter feeders may produce improvements. Virginia is committed to increasing the population of these natural filters and believes credit for filter feeder restoration and the associated nutrient removal should be recognized in implementing the WIP.

Reduction in Air Deposition

Modeling has estimated that atmospheric sources account for about one third of the nitrogen that reaches the Bay, and that much of this load originates from outside the Chesapeake Bay watershed. As described in general terms in EPA's July 1 letter, additional nitrogen reductions realized through more stringent air pollution controls at the jurisdictional level, beyond minimum federal requirements, may be credited to individual jurisdictions. Virginia expects potentially significant air reductions during the implementation of this plan and will work with EPA to determine the associated nitrogen reductions to water.

Implementation of Alternative Technologies

To achieve the additional nutrient reductions included in the draft TMDL equitably and cost-effectively, the Commonwealth will evaluate, and implement as appropriate and warranted, emerging alternative technologies that are shown to be effective. Examples of potential technologies that are being given serious consideration include Algal Turf Scrubber® and floating wetlands.

APPENDIX 1– TARGET LOAD AND REDUCTION TABLES BY SOURCE-SEGMENT FOR 2017 AND 2025

Development of the final source-segment target load tables for TN, TP and TSS require output from the Chesapeake Bay Watershed Model runs of the final Virginia input deck that was submitted to EPA on November 29, 2010.

APPENDIX 2 JAMES RIVER CHLOROPHYLL STUDY

DRAFT STUDY PLAN FOR REVIEW AND UPDATE OF JAMES RIVER SITE-SPECIFIC NUMERIC CHLOROPHYLL-*A* WATER QUALITY CRITERIA

SUMMARY

DEQ intends to undertake a comprehensive review of the existing James River Site-Specific Numeric Chlorophyll-*a* Criteria for the tidal James River and associated modeling framework. The following draft study plan illustrates how this review and update may be conducted.

Task #1. Identify stressors, stressor indicators, and the technical approach. Recent research indicates high potential to improve chlorophyll-*a* criteria based on linkages with harmful algal blooms (HABs). The first task is to establish the specific approach and focus areas for technical evaluation. Time-frame: 6 months

Task #2: Define relationships between HAB indicators designated use attainment. Perform literature reviews, data analysis, and laboratory testing to determine densities of HABs that impact designated uses such as fish and shellfish, and recreation, and the causes of the impacts. Time-frame: 2.5 years.

Task #3: Develop relationships between HAB cell density and water quality indicators. Complement existing high frequency monitoring with additional phytoplankton identification, cell density evaluations, and toxin monitoring. Use the data to derive water quality thresholds indicative of HAB cell density of concern. Time-frame: 2.5 years (concurrent with Task #2).

Task #4: Develop and apply dynamic model for indicators, nutrient inputs, and HABs. Improve the modeling of nutrient inputs, water quality indicators, and related HABs in the James River. Utilize contemporary high density chlorophyll-*a* data for model development and calibration. Refine the modeling of menhaden and oysters as top-down controls on algae. Explore the capability to either model HAB events or otherwise quantify HAB potential as a function of environmental conditions and management-related variables. Time-frame: 3 years (concurrent with tasks above).

Task #5: Adopt Criteria Update and Related WQMP Regulation/TMDL WIP Revisions. Using the results of Task #1- #4, determine and adopt appropriate revisions to the Site-Specific Numeric Chlorophyll-*a* Criteria and associated point and nonpoint source allocations for nutrients. Time frame: 2 years, partly concurrent with Tasks #4.

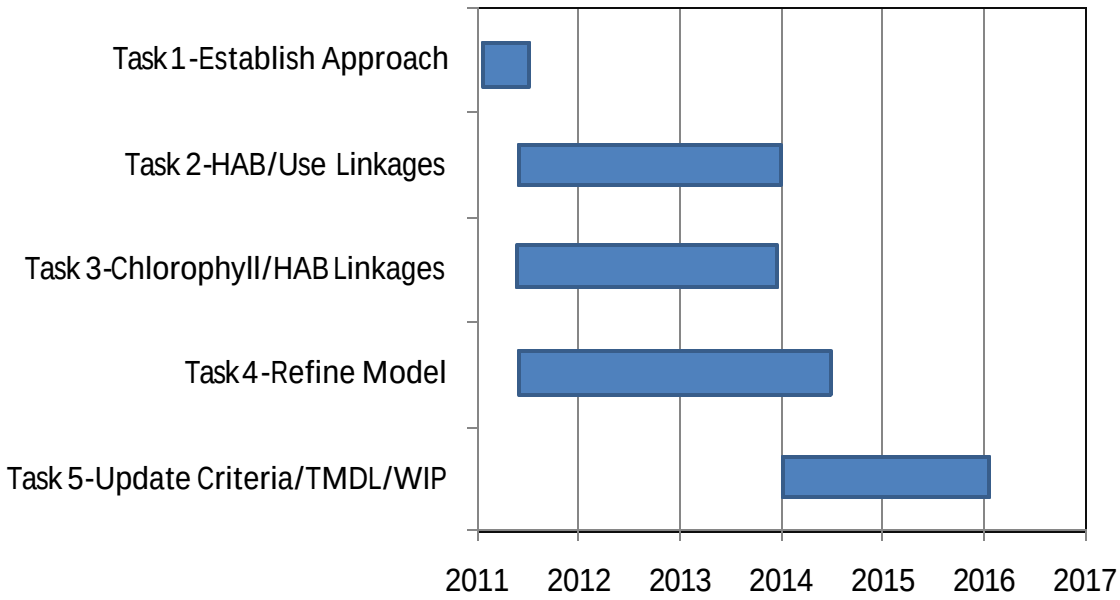

Figure 1—Recommended schedule for chlorophyll-*a* criteria reevaluation process.

Study Period

By many tasks running concurrently (Figure 1), the time period needed for a thorough review and update process is limited to an estimated five years, well within the seven year Stage 1 implementation period associated with the Chesapeake Bay TMDL. The time period for the lower salinity segments might be shorter due to more predictable water quality and algal dynamics.

DETAILED TASK DESCRIPTION

The six tasks identified above are described in greater detail below:

Task #1. Identify stressors, stressor indicators, and technical approach

The first task in the standards revision process would to attain a scientific consensus on the preferred technical basis of refined standards. Although this could take several forms, it is recommended that strong consideration be given to linkages with harmful algal blooms (HABs). Marshall and others (2005) compiled a listing of 30 potentially toxic phytoplankton species in the Chesapeake Bay and its tributaries in Virginia. Several of these taxa are known to occur in either the upper or lower James River estuary.

Of higher-salinity species, blooms of *Cochlodinium polykrikoides* appear to be increasing and have become an annual occurrence in the lower James River during the summer months. Dauer and others (2008) found increasing trends in dinoflagellates in the lower James River, noting blooms of *Cochlodinium polykrikoides* in 2007 accompanying the trend.

Recent laboratory studies have shown this species is toxic to multiple fish species and shellfish in North America (Gobler et al., 2008; Mulholland et al., 2009, Tang and Gobler, 2009). Proportional relationships between *C. polykrikoides* cell density, chlorophyll-*a*, and toxicity provides a potential basis to establish the standard to designated uses. However, additional technical discussion is needed to gain consensus on this overall approach. Additional HAB species beyond *C. polykrikoides* may need to be considered in the standards development. For example, *Heterocapsa triquetra* appears to be the dominant bloom former during the spring on the lower James River but the effects literature on this species appear more limited than for *C. polykrikoides*.

In the lower salinity segments, it would be recommended to consider potential stressors such as the cyanobacteria *Microcystis aeruginosa*, some strains of which have been shown to be harmful to humans or aquatic life (Lampert, 1981; Fulton and Paerl, 1987; Fulton and Paerl, 1988). This would build upon the foundation laid by the *2007 Chlorophyll Criteria Addendum* (USEPA, 2007). Other potential stressors for discussion are the total density or proportion of cyanobacteria, with specific consideration of how these indicators could be used to predict impacts on mesozooplankton, larval fish, or other trophic levels.

It appears most of the reported HABs in the James River are located either in the low or high salinity waters. Also will consider the use and applicability of the phytoplankton IBI (Index of Biological Integrity).

Time-frame: 6 months

Task #2: Define relationships between HAB indicators and designated use attainment.

After HAB indicators are identified, it would be necessary to quantify the relations between HAB indicators (e.g., cell density or toxin concentrations) and designated use attainment. This process would consider the existing literature, supplemented with James River-specific analysis and laboratory testing as necessary.

As previously mentioned for Task #1, literature data is presently available related to *C. polykrikoides* effects on fish and shellfish. However, additional studies may be necessary to confirm and refine those relationships for the Hampton Roads area. Tang and Gobler (2009) found that the toxicity level of *C. polykrikoides* can be affected by factors such as presence of other phytoplankton in the assemblage, growth stage of the organism tested, and whether the tests are performed on culture isolates or natural bloom water. These findings along with variability in reported effects suggest there are some important issues to address if the standard is to be based on cell density. In addition, this task should seek to evaluate the biological mechanisms responsible for toxicity (e.g. toxin generation, type of toxin, physical contact, etc.). With regard to other HAB species, Landsberg (2002) provides a synthesis of effects reported in the literature. Because those results appear limited, additional testing may be needed address them should multiple species need to be considered. Task #2 could also include experimental bioassays conducted by university or contractors experienced in phytoplankton and toxicity testing.

For the lower salinity segments, the *2007 Chlorophyll Criteria Addendum* (USEPA, 2007) summarizes literature findings and some Chesapeake Bay-specific data analysis on relations between *M. aeruginosa*, microcystin concentrations, and potential harmful impacts to humans. It would be recommended to use this information as a starting point, but review and update this information to reflect the most recent literature, and ensure that the risk-based calculations are consistent with Virginia regulations/guidance.

To our knowledge, there are no microcystin concentration data for the upper James River estuary. Not all strains of *M. aeruginosa* produce toxins, and so the presence/absence of this toxin is an important data gap that should be addressed. It would be recommended to include monitoring of microcystin along with other water quality and algal monitoring in the lower salinity segments.

Phytoplankton and zooplankton are routinely monitored only at one station (TF5.5) in the tidal freshwater James River, and one station (RET5.2) in the oligohaline portion. Although these stations provide very useful data, it would also be helpful to have a better spatial/temporal characterization of potential HAB species. For this reason, it is recommended to expand plankton

monitoring to up to 3-5 stations in the lower salinity segments, contingent upon available funding.

Need to also consider the link between HAB indicators and designated uses to include two approaches: 1) food-web and fisheries and 2) public health and socioeconomics. Recent literature shows that HABs can have profound negative impacts on the local economy and public health. A literature and data analysis should be accomplished within ½ year while laboratory testing could take the full 2.5 years planned.

To ensure efficient use of resources, further development of the appropriate laboratory testing for this study is needed.

Time-frame: 2.5 years.

Task #3: Develop relationships between HAB cell density and water quality indicators

Cell density or toxin concentrations would be a more direct measure of HAB-related impairments than chlorophyll-*a* concentration. However, chlorophyll-*a* or other water quality indicators could be more amenable to monitoring and modeling, and could be used as an indicator of HAB potential in conjunction with cell density and/or toxin data. To be used in this fashion, it would be necessary to demonstrate empirical relations between *the* water quality indicators and the HABs of interest.

Recent data indicates a regression relationship exists between *C. polykrikoides* cell density and chlorophyll-*a* (unpublished data). A refinement of this relationship (and for other species if necessary) would provide a connection between chlorophyll-*a* concentration and impairment of designated uses. Available data has been largely collected from peak algal blooms. Additional data may be needed to assess the relationships during pre- and post-bloom conditions when the algal assemblage is more diverse.

For lower-salinity segments, the *2007 Chlorophyll Criteria Addendum* (USEPA, 2007) provides an analysis of relations between *M. aeruginosa* cell density and chlorophyll-*a*, largely drawing on data from northern segments. Owing to its unique characteristics, the James River estuary has different cell density-chlorophyll-*a* relations than observed in other regions (unpublished data). It is recommended to develop these empirical relations using James River-specific data.

To address Task #3 segments, the existing HRSD Dataflow program and similar efforts in the upper estuary should be complemented with extensive phytoplankton identification and cell density results. Although the Dataflow program is very effective at determining chlorophyll concentrations at a high level of temporal and spatial resolution it does not provide data on species composition needed for this aspect of the standards development. Data collected in Task #3 is needed to develop chlorophyll thresholds indicative of HAB cell density of concern.

Potential testing under Task #2 may also address any "cause and effect" between HABs and fisheries. In order to assess the relationship during pre- and post-bloom conditions, a much more

comprehensive monitoring strategy may be needed. Since blooms are highly localized temporally and spatially, a scheduled monitoring program at pre-determined stations may not capture such events. Therefore, a special monitoring plan with rapid response capabilities may be needed.

Time-frame: 2.5 years (concurrent with Task #2).

Task #4: Develop and apply dynamic model for indicators, nutrient inputs, and HABs.

This task is associated with making substantial improvements to the modeling of water quality indicators and related HABs in the lower James River. The Chesapeake Bay Program's existing water quality model was designed to simulate seasonal averages in chlorophyll-*a* and estimate the effects of nutrient reduction on chlorophyll-*a* as step trends. Such a simplistic modeling approach cannot assess the effects of nutrient reduction on short-term bloom events. There is also reason to believe that the lower James River chlorophyll-*a* and algal dynamics may have changed relative to the present 1990-2000 calibration period given the apparent proliferation of *C. polykrikoides.* Because of these issues, there is a strong need to improve our predictive capabilities with respect to HABs. High density chlorophyll-*a* data that is now available for the area (2005-2010) would greatly assist in the development and calibration of models relative of contemporary conditions.

Improvements in modeling of chlorophyll-*a* in the lower James should also address menhaden and oysters as top down controls. Recent modeling work has shown that menhaden migration into the tributaries and associated consumption of algae has the potential to affect chlorophyll-*a*. Although present menhaden and oyster stocks do not appear to dramatically reduce chlorophyll-*a* (as long term averages) incremental effects due to increasing the size of the stock are considered comparable to some levels of nutrient reduction. Additional modeling enhancements should be made such that the menhaden migration and residence time varies according to a food gradient. A number of papers indicate that menhaden consumption of algae increases in areas with higher chlorophyll-*a*. Because the model does not presently capture these foraging effects the available reductions in chlorophyll-*a* due to menhaden (especially during bloom conditions) could be under-estimated.

Recent studies have shown that (a) initiation of *C. polykrikoides* blooms in the summer correlate with intense rains following droughts, (b) formation of blooms appears favored during conditions of vertical stratification, low winds, neap tides, and (c) certain blooms are initiated in the Lafayette and Elizabeth River and are transported to the James River (Mulholland et al., 2009; Morse et al., 2009; Morse et al., 2010). These processes represent factors that are important for the predictive framework to address. The modeling task may also require additional data collection to quantify pulsed storm water loads of nutrients (i.e., daily or weekly sampling of pulses).

It is recognized that attempts to develop and calibrate a James River model to capture short-term variations in chlorophyll-*a* and HABs would be a challenging task. To address this issue a workshop involving modeling experts and contractors is recommended to develop a path forward

and more detailed study plan than is provided here. One possible outcome of this process is that HAB events cannot be modeled or predicted with same degree of confidence normally expected of regulatory models. However, even in this case, it might be possible to better quantify the potential for HABs as a function of environmental conditions and management-related variables.

The time period after 2011 presents an opportunity to statistically evaluate the effectiveness of nutrient controls installed on the James River, particularly due to point source upgrades scheduled to be on-line after this time. This task consists of utilizing available high frequency and fixed site data to assess step trends. The results of trend analysis would be used to assist in validating model enhancements described in Task #5 relative to actual nutrient loading reductions. Dauer and others (2009) noted an apparent disconnect or substantial lag between improvements observed in NPS and PS loadings relative to observed responses in the tributaries and lower segments of the James River. Additional studies may be needed to assess storage of nutrients in sediments or other factors if continued lag-times in response are observed.

Time-frame: 3 years (concurrent with other tasks).

Task #5: Adopt Criteria Update and Related WQMP Regulation/TMDL WIP Revisions

This task is associated with translating the research results of Tasks #1-Task #4 into a water quality criteria framework. It is possible that the revised standard may be based on cell density of specific HABs and/or algal toxins, rather than only chlorophyll-*a* or another water quality indicator. This approach would be consistent with that recommended by USEPA (2007). This task should also consider establishing acceptable limits on the size and duration of HAB events, and natural factors that affect chlorophyll-*a* peaks and phytoplankton succession. The revised modeling framework would be used to determine TMDL allocations and assist the revision of the James River Watershed Implementation Plan.

Time-frame: 2 years, partly concurrent to Tasks #2-4.

Literature Cited

Dauer, D.M., Marshall, H.G., Donat, J.R. Lane, M.F., Doughten, S.C., and F. Hoffman. 2008. Current status and long term trends in water quality and living resources in the Virginia tributaries and Chesapeake Bay mainstem from 1985 through 2007. A report submitted to the Virginia DEQ Chesapeake Bay Program office, Richmond, VA.

Dauer, D.M., Marshall, H.G., Donat, J.R. Lane, M.F., Doughten, S.C., and F. Hoffman. 2009. Current status and long term trends in water quality and living resources in the Virginia tributaries and Chesapeake Bay mainstem from 1985 through 2008. A report submitted to the Virginia DEQ Chesapeake Bay Program office, Richmond, VA.

Fulton III, R. S. and H. W. Paerl. 1987. Toxic and inhibitory effects of the blue-green alga *Microcystis aeruginosa* on herbivorous zooplankton. *Journal of Plankton Research* 9 (5):837-855.

Fulton III, R. S. and H. W. Paerl. 1988. Effects of the blue-green alga *Microcystis aeruginosa* on zooplankton competitive relations. *Oecologia* 76:383-389. Lampert, W. 1981. Inhibitory and toxic effects of blue-green algae on *Daphnia*. *Int. Rev. Gesamten Hydrobiol*. 66:285-298.

Gobler, C.J. Berry, D.L., Anderson, O.R., Burson, A., Koch, F., Rodgers, B.S., Moore, L.K., Goleski, J.A., Allam, B., Bowser, P., Tang, Y., and R. Nuzzi. 2008. Characterization, dynamics, and ecological impacts of harmful *Cochlodinium polykrikoides* blooms on eastern Long Island, NY, USA. Harmful Algae 7: 293-307.

Lampert, W. 1981. Inhibitory and toxic effects of blue-green algae on *Daphnia*. *Internationale Review gesamten Hydrobiologie* 66:285-298.

Landsberg. J.H. 2002. The effects of harmful algal blooms on aquatic organisms. Rev. Fish. Sci. 10: 113-390.

Marshall, H.G. Egerton, T.A. Burchardt, L. Cerbin, S. and Kokocinski, M. 2005. Long term monitoring results of Harmful Algal Populations in Chesapeake Bay and its major tributaries in Virginia, U.S.A. Oceanological and Hydrobiological Studies: Vol. XXXIV Supplement 3: 35-41.

Morse, R.E., Shen, J., Blanco-Garcia, J.L., Hunley, W.S., Fentress, S., Wiggins, M., Mulholland, M.R. 2010. Estuaries and Coasts (submitted). Environmental and physical controls on the formation and transport of the dinoflagellate *Cochlodinium polykrikoides* Margalef in lower Chesapeake Bay and its tributaries.

Morse, R., Blanco, J., Hunley, W. and M. Mulholland. 2009. Physical controls on the formation, development, and transport of *Cochlodinium* blooms in lower Chesapeake Bay and its tributaries. Proceedings of the Ecosystem Based Management (EBM): the Chesapeake Basin & Other Systems. Baltimore Marriott Hotel & Conference Center March 22-25, 2009.

Mulholland, M.R. Morse, R.E., Boneillo, G.E., Bernhardt, P.W., Filippino, K.C. Procise, L.A. Garcia-Blanco, J.L. Marshall, H.G. Egerton, T.A., Hunley, W.S., Moore, K.A. Berry, D.L. and C.J. Gobler. 2009. Understanding the causes and impacts of the dinoflagellate, *Cochlodinium polykrikoides*, blooms in Chesapeake Bay. Estuaries and Coasts. Published online 15 May 2009.

Tang, Y.Z. and C.J. Gobler. 2009. Characterization of the Toxicity of *Cochlodinium polykrikoides* Isolates from Northeast US Estuaries to Finfish and Shellfish. Harmful Algae 8: 454-462.

USEPA Chesapeake Bay Program. 2007. Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity and Chlorophyll a for the Chesapeake Bay and Its Tidal Tributaries: 2007 Chlorophyll Criteria Addendum. 90 p.

APPENDIX 3: DEVELOPMENT OF PHASE I WATERSHED IMPLEMENTATION PLANS AND PUBLIC PARTICIPATION

3.1. Webinars and Public Meetings

Webinars

The EPA hosted a webinar on October 2, 2009 to introduce the Chesapeake Bay TMDL process to stakeholders in the Commonwealth of Virginia. More than 400 people participated, either in person at six Virginia Department of Environmental Quality offices or on online, in the October 2 orientation meeting. They heard EPA and state officials discuss efforts to develop a Chesapeake Bay TMDL report and implementation plan. EPA and state staff answered questions and received comments from attendees.

Starting in February 2010, EPA hosted seven webinars on roughly a monthly basis. These webinars were open to the public throughout the bay watershed. Virginia staff presented an update of their efforts in the February session.

Public Meetings

During the week of December 14-17, 2010, more than 600 people attended Virginia meetings held by the EPA to address the Chesapeake Bay TMDL process. Meetings were held at the following dates and locations:

- December 14 —Falls Church, VA
- December 15 —Chesapeake, VA
- December 15 —Williamsburg, VA
- December 16 —Penn Laird, VA
- December 17 —Fredericksburg, VA

3.2. Expert Panels

As a part of developing components of Virginia's Phase I WIP, state agency staff convened expert panels comprised of subject matter and program delivery experts in three sectors: agricultural conservation, urban stormwater, and onsite/septic to develop Virginia's Enhanced Program Implementation Levels (EPIL). The EPIL was the first attempt to develop a Watershed Model scoping run and was used as a starting point or straw proposal with the Stakeholder Advisory Group and other stakeholder groups.

During panel meetings, the members were presented information on Chesapeake Bay Program Watershed Model structure, calibration, scenarios, segmentation, and outputs. Members were presented the available land for implementing a pollution mitigating BMP, and the current treatment level for that practice by source sector.

Individual panel members were asked to review each practice and associated information to determine, based on their professional experience, how much implementation for each practice could increase. Use of the panels revealed the need for additional BMPs not currently utilized in the Watershed Model for agriculture and onsite/septic.

Although the draft allocations demanded that much higher rates of implementation be considered, this initial process was beneficial in several ways. The EPIL served as an outreach tool to engage stakeholders and illustrated the opportunities and barriers across programs and pollution source sectors. It provided an initial state level pollution reduction strategy allowing a better understand of the ability to meet draft pollution targets. It also provided a framework for distributing Virginia's bay drainage WLA and the Load Allocation (LA). Lastly, it provided sector interest groups and others a clearer understanding of accomplishments needed to meet the Chesapeake Bay TMDL pollutant targets.

3.3. Stakeholder Advisory Group

Late in 2009, the Virginia Secretary of Natural Resources, with input from DCR and DEQ, established the SAG. This group provides a forum for discussion during the development of the Chesapeake Bay TMDL and the WIP. The current administration continued and expanded the SAG to provided additional representation from key stakeholders. The SAG includes representatives from local government, regional planning districts, conservation groups, academia, and other special interests. It offers new, creative approaches to meeting the milestones established in the Chesapeake Bay TMDL. An outside facilitator was contracted to keep the group on task during the meetings and encourage the balanced participation of SAG members.

In its initial meetings the SAG reviewed and evaluated the work of the expert panels. They have also advised on sector pollutant load reductions and the sector allocations that will be used to meet the interim and final goals. They commented on current programs' abilities to meet these allocations and evaluated program expansion or new program development needed to meet current and future pollution reductions by sector. It is anticipated the SAG's will also play a role in Phase 2 in addressing allocations at a more local scale

SAG Members:

VIRGINIA ASSOCIATION OF MUNICIPAL WASTEWATER AUTHORITIES	**CBP LOCAL GOVERNMENT ADVISORY COMMITTEE VA MEMBER**
VIRGINIA MANUFACTURERS ASSOCIATION	**VIRGINIA SEAFOOD COUNCIL**
NAVY – DEPARTMENT OF DEFENSE	**VIRGINIA WATERMEN'S ASSOCIATION**
HOMEBUILDERS OF VIRGINIA	**VIRGINIA ASSOCIATION OF SOIL AND WATER CONSERVATION DISTRICTS**
VIRGINIA MUNICIPAL STORMWATER ASSOCIATION	**CHESAPEAKE BAY COMMISSION**
JAMES RIVER GREEN BUILDERS COUNCIL	**CBP CITIZEN'S ADVISORY COMMITTEE VA MEMBER**
VIRGINIA ASSOCIATION OF PLANNING DISTRICT COMMISSIONS	**CBP SCIENTIFIC AND TECHNICAL ADVISORY COMMITTEE VA MEMBER**
VIRGINIA ASSOCIATION OF COMMERCIAL REAL ESTATE	**CDM**
VIRGINIA CHAMBER OF COMMERCE	**PBS&J**
FOUNTAINHEAD ALLIANCE	**WETLAND STUDIES AND SOLUTIONS**
VIRGINIA AGRIBUSINESS COUNCIL	**CHESAPEAKE BAY FOUNDATION**
VIRGINIA FARM BUREAU FEDERATION	**JAMES RIVER ASSOCIATION**
VIRGINIA POULTRY FEDERATION	**FRIENDS OF THE RAPPAHANNOCK**
VIRGINIA STATE DAIRYMEN'S ASSOCIATION	**SOUTHERN ENVIRONMENTAL LAW CENTER**
VIRGINIA SMALL GRAIN PRODUCERS	**SHENANDOAH RIVERKEEPER**
VIRGINIA FORESTRY ASSOCIATION	**WETLANDS WATCH**
NRCS	**VIRGINIA MUNICIPAL LEAGUE**
RIVANNA RIVER BASIN COMMISSION	**VIRGINIA ASSOCIATION OF COUNTIES**
	RAPPAHANNOCK RIVER BASIN COMMISSION

The SAG met on December 17, 2009 and February 26, June 15, August 24, and November 16, 2010. In addition to these meetings of the entire group, three sector working groups held multiple meetings in July. A steering committee comprised of the chairs of those sector work groups met twice in August. The sectors covered by the working groups were agriculture, wastewater treatment, urban/suburban stormwater and onsite/septic.

In addition to SAG members, working group membership was supplemented with additional individuals with particular sector experience and expertise. They evaluated additional scoping scenario inputs and model results and discussed and proposed various approaches to further address the allocations for agriculture, urban sources, septic systems and wastewater. Their findings were evaluated by the SAG steering committee and presented to the full group for consideration during their Aug. 24 meeting. For more details on the SAG go to http://www.dcr.virginia.gov/soil_and_water/baytmdlsag.shtml.

3.4. Websites and Technology Based Outreach

Three main Web sites have been developed to inform stakeholders and the public of the Bay TMDL:

EPA's Bay TMDL Web site: http://www.epa.gov/chesapeakebaytmdl/

DCR's Bay TMDL Web site: http://www.dcr.virginia.gov/soil_and_water/baytmdl.shtml

DEQ's Bay TMDL Web site: http://www.deq.state.va.us/tmdl/chesapeakebay.html

The sites provide information on upcoming meetings and meeting recaps after the fact. They also feature numerous EPA guidance documents and pages explaining elements of the planning effort including:

- The planning timeframe; and the revised timeframe
- The announcement of draft loading targets
- The EPA "consequences" letter
  - Identification and explanation of the tidal water segments

These websites serve as the primary information portal for the process in Virginia. However, since websites are such a passive form of communication, several more interactive informational tools were developed.

In September 2009, DCR developed a Virginia Bay TMDL listserv to help inform stakeholders of nonpoint source related elements of the TMDL and WIP process. DCR staff pulled together and supplemented existing constituent e-mail lists to develop a listserv of more than 600 names.

To be added to the listserv, interested parties can write to VABAYTMDL@dcr.virginia.gov.

To better elicit comments and feedback on drafts and concepts to be used in the allocation distribution process and in developing the WIP, DCR also worked with the Chesapeake Watershed Network to develop a private VABAYTMDL group discussion area. The group area was created in March.

All members of the VABAYTMDL listserv were notified of the group site and encouraged to join. The discussion area is private from the rest of Chesapeake Network. While everyone on the VABAYTMDL site can see everyone else's comments, the existence of the group nor its

discussions are visible to any other Chesapeake Network members. Initially 125 signed up for the group discussion area.

APPENDIX 4 AGENCY CONTACT INFORMATION

Send inquiries to: VABAYTMDL@dcr.virginia.gov

For More Information, please contact:

Anthony Moore
Assistant Secretary of Natural Resources
804-786-0044
Anthony.moore@governor.virginia.gov
http://www.naturalresources.virginia.gov/

Matt Conrad
Deputy Secretary of Agriculture and Forestry
804-692-2511
Matt.conrad@governor.virginia.gov
http://www.ag-forestry.virginia.gov/

Russ Baxter, Chesapeake Bay Coordinator
Virginia Department of Environmental Quality
804-698-4000
Russ.baxter@deq.virginia.gov
http://www.deq.virginia.gov/

Russ Perkinson, Assistant Division Director for Nonpoint Source Programs
Virginia Department of Environmental Quality
804-786-4382
Russ.perkinson@dcr.virginia.gov
http://www.dcr.virginia.gov/