COMMONWEALTH OF VIRGINIA
STATE WATER CONTROL BOARD

FACT SHEET

MODIFICATION OF A GENERAL VPDES PERMIT
TO DISCHARGE TO STATE WATERS AND STATE
CERTIFICATION UNDER THE STATE WATER CONTROL LAW

The State Water Control Board (Board) has approved the modification of a general VPDES watershed permit for total nitrogen and total phosphorus discharges and nutrient trading in the Chesapeake Bay watershed in Virginia. These modifications were made in response to changes to § 62.1-44.19:13, § 62.1-44.19:15 and § 62.1-44.19:18 of the Code of Virginia as approved by the 2012 session of the General Assembly.

Permit Number: VANxx

Name of Permittee: There are three categories of owners required to register for coverage under the general permit:

Every owner or operator of a facility authorized by a Virginia Pollutant Discharge Elimination System permit to discharge 100,000 gallons or more per day from a sewage treatment plant, or an equivalent industrial load, directly into tidal waters, or 500,000 gallons or more per day from a sewage treatment plant, or an equivalent industrial load, directly into nontidal waters, and

Any owner or operator of a facility authorized by a Virginia Pollutant Discharge Elimination System permit to discharge 40,000 gallons or more per day from a sewage treatment plant, or an equivalent industrial load, directly into tidal or nontidal waters, at the time he makes application with the Department for a new discharge or expansion that is subject to an offset or technology-based requirement, and

Any owner or operator of a facility treating domestic sewage authorized by a Virginia Pollutant Discharge Elimination System permit with a discharge greater than 1,000 gallons per day up to and including 39,999 gallons per day that has not commenced the discharge of pollutants prior to January 1, 2011.

Facility Location: Commonwealth of Virginia (except for the Washington, DC - Blue Plains WWTP, which is eligible to exchange nutrient credits under this permit)

Receiving Waters: Surface waters within the Chesapeake Bay watershed.

The board has determined that this category of discharges is appropriately controlled under a general permit. The category of discharges to be included involves facilities with the same or similar need to control nutrient levels in their wastewater discharges. The draft general permit requires that all covered facilities meet standardized effluent limitations, conditions and monitoring requirements and allows the exchange of nitrogen and phosphorus credits between certain covered facilities.

All pertinent information is on file and may be inspected, and arrangements made for copying by contacting Allan Brockenbrough at:

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Board Action:

On June 25, 2012, the State Water Control Board approved modifications to the general permit included made in response to changes to § 62.1-44.19:13, § 62.1-44.19:15 and § 62.1-44.19:18 of the Code of Virginia as approved by the 2012 session of the General Assembly. The modifications included:

1. Allowing smaller "non-significant" permittees to generate compliance credits and fully participate in the trading market.
2. Eliminating a redundant annual reporting requirement.
3. Provisions to allow new or expanding facilities to offset increased nutrient loads with compliance credits
4. Provisions recognizing the planned development of nonpoint source credit certification regulations by the Department of Conservation and Recreation.

Activities Covered by this Permit:

This general permit authorizes wastewater discharges of nitrogen and phosphorus from wastewater treatment facilities located in the Chesapeake Bay watershed that are already authorized by a Virginia Pollutant Discharge Elimination System permit. Although no additional action will be required of many facilities across the Commonwealth, three categories of facilities are required by law to register for coverage under this general permit:

- Sewage treatment works authorized to discharge 100,000 gallons or more per day (or an equivalent load from industrial processes), directly into tidal waters, or 500,000 gallons or more per day (or an equivalent load from industrial processes) directly into non-tidal waters. These facilities have already been identified during the development of the Chesapeake Bay Tributary Strategy; further, these facilities are listed in the Water Quality Management Plan (WQMP) regulation and have been assigned waste load allocations for nitrogen and phosphorus, to be regulated as annual mass loading limits in the general permit. These facilities are required by law to register for general permit coverage upon the effective date of the general permit.

- Sewage treatment works that, as a result of new construction or expansion, are proposed to discharge 40,000 gallons or more per day (or an equivalent load from industrial processes) directly into tidal or nontidal waters. These facilities are required to register for coverage under the general permit at the time of application with the Department for an individual VPDES permit, should that permit authorize new discharge or expansion that is subject to an offset or technology-based requirement. These facilities will not receive a waste load allocation for the increased (or new) discharges; expanding facilities will receive an annual load limit based on the facility design flow and nutrient removal technology that existed as of July 1, 2005.

- New sewage treatment works that are permitted to discharge greater than 1,000 gallons per day and less than 40,000 gallons per day that have not commenced the discharge of pollutants prior to January 1, 2011. These facilities are required to register for coverage under the general permit prior to commencing a discharge. These facilities will not receive a waste load allocation for the new discharges and will be required to offset and new Total Nitrogen and Total Phosphorus load.

The general permit establishes annual effluent loading limits for nitrogen and phosphorus, and establishes the conditions by which credits (the difference in pounds between the facility's limit and the mass actually discharged) may be exchanged. The permit also establishes how new or expanding facilities may acquire additional wasteload allocation to offset any increase in nutrient load from the discharge.

Effluent Limitations and Monitoring Requirements:

This permit supersedes the requirements of the registrants' individual VPDES permits pertaining to total nitrogen and total phosphorus load limits except where site specific conditions necessitate more restrictive limits.

The Department maintains a registration list of facilities covered by the general permit. This list contains the load limits for the facilities; these limits are enforceable under the general permit.

Basis for Limitations and Monitoring Requirements:

The Chesapeake Bay Tributary Strategy established goals for the reduction of point source discharges of nitrogen and phosphorus from "significant" dischargers (sewage treatment works discharging 100,000 gallons or more per day to tidal waters, or an equivalent industrial load, or sewage treatment works discharging 500,000 gallons or more per day to nontidal waters, or an equivalent industrial load). The Water Quality Management Plan Regulation (9 VAC 25-720) codified the point source goals in the Tributary Strategy as waste load allocations for the respective dischargers. More recently, the U.S. EPA established the Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment (the TMDL) on December 29, 2010.

§62.1-44.19.12 et seq. of the Code of Virginia, requires that this general permit be developed and specifies the minimum contents of the general permit. The general permit incorporates the waste load allocations in the Water Quality Management Planning Regulation (9 VAC 25-270) and the Chesapeake Bay TMDL as effluent limitations (loading caps) for nitrogen and phosphorus. In the case of conflicts between the Water Quality Management Planning Regulation and the TMDL, the more limiting wasteload allocation is used. The TMDL also includes wasteload allocations for sediment. Sediment allocations are implemented in the form of Total Suspended Solids limitations in individual VPDES permits and are not included in the watershed general permit.

Implementation of the Phase 1 Watershed Implementation Plan for EPA's Chesapeake Bay Total maximum Daily Load for Nitrogen, Phosphorus and Sediment

During the first 5-year term of the watershed general permit (1/1/2007 - 12/31/2011), wasteload allocations were established by the Water Quality Management Planning (WQMP) Regulation (9VAC25-720). The allocations in the regulation were developed from the Commonwealth of Virginia Chesapeake Bay Nutrient and Sediment Reduction Tributary Strategy (January 2005). On December 29, 2010, the USEPA established the Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment (the TMDL). Virginia's implementation strategy for the TMDL is outlined in the Commonwealth of Virginia Chesapeake Bay TMDL Phase I Watershed Implementation Plan (WIP) dated November 29, 2010.

The watershed general permit implements wasteload allocations (WLAs) that are contained in both the WQMP Regulation and the TMDL. In cases where there is a conflict between the two documents, the more limiting condition is used in the watershed general permit. For the Potomac River, Rappahannock River and Eastern Shore Basins, the wasteload allocations in the two governing documents are identical with the exception of a few individual facilities for which amendments to the WQMP Regulation are planned or in progress. In the York River and James River Basins, more recent water quality modeling performed for the development of the TMDL established that nutrient reductions beyond those required by the WQMP Regulation would be necessary to meet water quality standards. Strategies for meeting reduced WLAs in the York and James Basins are as follows:

York River Basin:
The TMDL Total Phosphorus WLAs in the York River Basin represent a 43% reduction to the WLAs included in the WQMP Regulation. The watershed general permit implements the TMDL WLAs with a 4-year schedule of compliance. The existing WQMP Regulation WLAs remain in the watershed general permit as interim effluent limitations. The TMDL includes no additional reductions to the Total Nitrogen included in the WQMP Regulation.

James River Basin:
The Chesapeake Bay TMDL includes significant changes to the control strategy previously included in Commonwealth of Virginia Tributary Strategies and the WQMP Regulation. The tidal James River is unique in that includes water quality criteria for Chlorophyll-a. The Chlorophyll-a criteria were adopted by the State Water Control Board in 2005 along with amendments to the WQMP Regulation consisting of Total Nitrogen and Total Phosphorus WLAs for 125 significant wastewater dischargers throughout the Bay watershed. Water quality modeling performed by EPA at that time indicated that the 125 significant WLAs along with needed non-point source reductions would achieve all of the new water quality standards.

More recent water quality modeling performed by EPA in developing the TMDL established that additional nutrient reductions are necessary in the James River Basin in order to meet current water quality criteria for both Dissolved Oxygen and Chlorophyll-a. The newly required reductions are significantly more stringent than those established during the 2005 development and adoption of the WQMP Regulation and the water quality criteria for Chlorophyll-a. In order to address the challenges created by this new goal, the Commonwealth is implementing a phased implementation strategy for the James River Basin. This strategy is outlined in Section 1.6 of the Commonwealth's Phase I WIP (see Attachment No. 1) and is recognized in Appendix X to the Chesapeake Bay TMDL (see Attachment No. 2).

Dissolved Oxygen
As outlined in the Phase I WIP and Appendix X to the TMDL, the following additional reductions beyond the WLAs included in the current WQMP Regulation are necessary to meet Dissolved Oxygen criteria in the James River Basin:

TMDL Dissolved Oxygen-based WLA Reductions

	Total Nitrogen		Total Phosphorus		
	Reduction (lbs/yr)	Facility	Reduction (lbs/yr)	Facility	Deadline
Phase I	1,600,000	HRSD James River Aggregate	200,000	HRSD James River Aggregate	12/31/2016
Phase 2	1,000,000	HRSD James River Aggregate	250,000	Unassigned	12/31/2021
Total Reductions	2,600,000		450,000		

The deadlines listed above are established in the Phase I WIP and Appendix X of the Chesapeake Bay TMDL. Actual schedules of compliance are established when the wasteload allocations are added to the watershed general permit and require compliance as soon as possible in accordance with 40 CFR 122.47 and §62.1-44.19.14.C.2 of the Code of Virginia. This permit cycle includes the Phase I goals listed above with reductions assigned to each of the seven Hampton Roads Sanitation District James River facilities on a flow weighted basis. A 5-year schedule of compliance is included for Total Nitrogen reductions consistent with the Phase I WIP deadline above. No schedule of compliance is included for the Total Phosphorus reductions as it was established that the HRSD James River Aggregate facilities are currently capable of meeting the reduced WLA. The additional Phase 2 reductions will be included in the next permit cycle (beginning 1/1/2017) with appropriate schedules of compliance established at that time. This will require the establishment of new individual Total Phosphorus WLAs to meet the additional 250,000 lb/yr reduction.

Chlorophyll-a
Water quality modeling performed in developing the TMDL indicates that reductions of 3 million lbs/yr of Total Nitrogen and 0.3 million lbs/yr of Total Phosphorus beyond those identified above for Dissolved Oxygen are necessary to meet the current Chlorophyll-a criteria in the James River. These reductions will require treatment at many facilities to levels considered to be at or below the current "limit of technology". Individual allocations to meet these allocations have not been established. The TMDL includes a Chlorophyll-a based aggregate WLAs of 8,968,864 lbs/yr of Total Nitrogen and 545,558 lbs/yr of Total Phosphorus for the 39 significant James River dischargers with a compliance deadline of January 1, 2023.

As discussed in Appendix X to the TMDL, Virginia DEQ will be performing an engineering cost analysis to help establish individual Total Nitrogen and Total Phosphorus WLAs for the 39 significant James River dischargers. Annual compliance plan updates for the 39 James River facilities are expected to provide information for the engineering analysis. The individual WLAs are to be established in the Phase III WIP (currently scheduled for late 2017) and incorporated in the watershed general permit at that time.

In developing the current water quality criteria for Chlorophyll-a in 2005, DEQ evaluated attainability of the proposed criteria since the other lines of evidence did not clearly point to specific and defensible criteria levels. The new water quality modeling performed in developing the TMDL calls into question the conclusions of the previous attainability determination. Beginning in 2011, VA DEQ is undertaking a 3 to 4-year study to ensure the Commonwealth's Chlorophyll-a criteria are appropriately protective of the river's designated uses and are based on the best scientific information and data currently available. In the event the study demonstrates that amendments to the current criteria are appropriate, DEQ plans by 2015 to present the State Water Control Board with a proposal in accordance with the Virginia Administrative Process Act to consider amending the Chlorophyll-a criteria. As part of the study, DEQ will also review the modeling framework used to predict Chlorophyll response to changes in nutrient and sediment inputs in the James River. Any improvements to the model as well as any changes to the Chlorophyll-a criteria and the engineering cost analysis discussed above are expected to provide the basis for a local James River basin TMDL to be completed consistent with the schedule included in Appendix X of the Chesapeake Bay TMDL. Any EPA approved local TMDL would replace the current goals for the James River basin in the Chesapeake Bay TMDL and would be included in the Phase III WIP.

EPA's TMDL also established new Total Nitrogen and Total Phosphorus delivery factors. These delivery factors are shown on the Registration List for each basin and have changed significantly for some facilities. Because the Virginia Nutrient Credit Exchange Association (the Exchange) has prepared a compliance plan that includes trade agreements through 2015, the new delivery factors will not be phased in until 2016. To phase in the new delivery factors any sooner would negate the Exchange compliance plan and require that trade agreements be redeveloped for their 105 member facilities.

Permitting of Nutrient Loads from Combined Sewer Overflow Communities
Waste load allocations (WLAs) were specified in the Chesapeake Bay TMDL for significant facilities as individual annual loads, with the exception of aggregate WLAs assigned to the wastewater dischargers in the James River. For each community with combined sewers, these loads included loads from dry weather flows (DWFs) and from combined sewer captured (CS-C) flows that are treated and discharged at the POTW. Separate WLAs were assigned to the combined sewer overflows (CSOs).

The Virginia Water Quality Management Plan (WQMP) Regulation does not address allocations for the direct CSOs or CS-C flows. The regulation does recognize the concept of CS-C flows for Richmond and Lynchburg by indicating that the WLAs are based upon the dry weather flow capacity at each facility and that technology based requirements apply during wet weather flow events. For Richmond and Lynchburg the CS-C loads are to be addressed in the individual VPDES permits for those facilities.. The loads associated with the DWFs will continue to be accounted for in the VA Watershed GP.

Because the WQMP Regulation does not recognize any wet weather flow provisions for the Alexandria Sanitation Authority, the watershed general permit will include the DWF WLA for Alexandria Sanitation Authority and the WLA will apply regardless of weather conditions. This is consistent with how the WLA was implemented in the first cycle of the watershed general permit. Upon modification of the WQMP to address wet weather flows at Alexandria, the watershed general permit registration list and the individual VPDES permit will be modified as appropriate.

Information used to develop the WLAs are used to establish effluent limitations and to develop permits consistent with the assumptions and requirements of the Chesapeake Bay TMDL WLAs [40 CFR 122.44(d)(1)(vii)(B)].

Basis for Part I. Special Conditions

These special conditions apply to every registrant under this general permit.

A. Authorized activities

Basis: §62.1-44.19.14.C.5 of the Code of Virginia authorizes the discharge of total nitrogen and total phosphorus for facilities already holding an individual VPDES permit and outlines the registration requirements for existing, new and expanded facilities. Facilities holding an individual VPDES permit that are not required to register for general permit coverage are authorized to discharge under this general permit, but are not subject to the general permit requirements until registration is required (most likely by expansion). This section includes new provisions (A.3.) for the continuation of permit coverage that are consistent with the provisions applicable to individual VPDES permits under 9 VAC 25-31-70.

B. Waste load allocations

Basis: §62.1-44.19.14.C.1 of the Code of Virginia specifies that waste load allocations be assigned to each permitted facility (B.1.) and provides additional guidance for how those allocations may be aggregated for owners of multiple facilities (B.2.).

During development of the general permit, consolidation of multiple dischargers into one regional facility was considered to be functionally similar to the aggregation of waste load allocations, and conditions developed accordingly (B.3) to account for consolidation of facilities with, and without, waste load allocations.

Unless demonstrated by facilities on a case-by-case basis, the waste load allocations are considered total loads and not net loads (B.4.), and the entire allocation is considered to be bioavailable (B.5.).

Modifications to the definition of "waste load allocation" were approved by the Board on June 25, 2012 to include permitted capacity for nonsignificant dischargers.

C. Schedule of Compliance

Basis: 9 VAC 25-31-250 allows for schedules of compliance when appropriate requiring compliance with effluent limitations as soon as possible.

D. Annual update of tributary wide compliance plan

Basis: §62.1-44.19.14.C.3 of the Code of Virginia requires annual updates to the plan no later than February 1 of each year.

E. Monitoring and monthly reporting requirements

Basis: §62.1-44.19.14.C.4 of the Code of Virginia authorizes the Department to establish monitoring requirements as necessary to comply with the legislation. Permittees will submit monthly loading data on the same date as is required by their respective individual permits.

F. Annual submittal of discharge information and credits to be bought or sold by the permittee

Basis: §62.1-44.19.18.C of the Code of Virginia requires the submittal of the annual mass load of total nitrogen and total phosphorus loads discharged. Modifications to this reporting requirement were approved by the Board on June 25, 2012 to eliminate the reporting of delivered nutrient loads as well as the number of total nitrogen and total phosphorus credits to be purchased or sold by the permittee. This reporting requirement was considered redundant and the information provided is obtained from the December Discharge Monitoring Report.

G. Requirement to register

Basis: §62.1-44.19.14.C.5 of the Code of Virginia outlines the registration requirements for existing, new and expanded facilities.

H. Registration statement

Basis: §62.1-44.19.14.C.6 of the Code of Virginia requires that the Department have a procedure for efficiently modifying the lists of facilities covered by the General Permit. This section includes a new provision requiring that at the time of registration, new or expanding facilities provide wasteload allocations to offset any increase in nutrient loads for a period of 5 years.

I. Public Notice for registration statements proposing modifications or incorporations of new waste load allocations or delivery factors

Basis: §62.1-44.19.14.C.6 of the Code of Virginia requires that the Department have a procedure for efficiently incorporating new waste load allocations or delivery factors, including the opportunity for public notice and comment.

J.1. Definition of Compliance by permitted facility with individual waste load allocations

Basis: §62.1-44.19.18.A of the Code of Virginia defines compliance as not exceeding the waste load allocations, or acquiring sufficient point source nitrogen or phosphorus credits to offset any exceedance of the waste load allocations, or acquiring credits through payment to the Water Quality Improvement Fund.

J.2. Credit acquisition from permitted facilities

Basis: §62.1-44.19.18.A.1 of the Code of Virginia outlines the conditions under which credits may be exchanged between point sources covered by the general permit. This section includes a new provision allowing for Eastern Shore facilities to acquire credits from facilities in the Potomac and Rappahannock tributaries in accordance with §62.1-44.19.18.A.1(ii).. Eastern Shore trading ratios have been established so that credits acquired from the Rappahannock or Potomac Basins provide a water quality benefit equivalent to the impact of the excess load from the Eastern Shore facility in need of the credits.

J.3. Detail of payment to WQIF

Basis: §62.1-44.19.18.A.2. of the Code of Virginia outlines the procedures by which a permittee may purchase credits through payment to the Water Quality Improvement Fund. Prices of credits purchased from the WQIF have been updated to include the cost effectiveness of projects financed by the fund over the previous permit cycle.

J.4. Pretreatment program modifications by POTWs

Basis: §62.1-44.19.14.C.7. of the Code of Virginia authorizes DEQ to include “such other conditions as the Board deems necessary to carry out the provisions of this Chapter and Section 402 of the Clean Water Act”. During the development of the permit, several indirect dischargers requested the inclusion of this condition to allow the extension of market-based compliance flexibility to pretreatment programs, where the POTW imposed additional requirements as part of compliance with this general permit.

Basis for Part II conditions

These special conditions apply only to new and expanding facilities that are subject to this general permit.

A. Offset requirements for expanding and new facilities

Basis: §62.1-44.19.15 of the Code of Virginia requires expanding facilities to obtain offsets above and beyond their currently permitted allocation, and new facilities to obtain offsets for any total nitrogen and total phosphorus discharged. A.1. describes the types of facilities required to offset new and expanded discharges, and A.2. specifies the baselines from which the offset requirements are to be calculated.

B. Acquisition of waste load allocations to offset new or increased delivered Total Nitrogen and delivered Total Phosphorus loads

Basis: §62.1-44.19.15.B of the Code of Virginia prescribes the acquisition of point source nitrogen or phosphorus credits to offset the new or increased loads, acquisition of nonpoint source nitrogen or phosphorus credits, or acquiring credits through payment to the Water Quality Improvement Fund. Modifications to this provision were approved by the Board on June 25, 2012. These modifications made it possible for new and expanding facilities to offset any new or increased nutrient loads with the acquisition of credits. Allocations or credits to offset new or increased nutrient loads must be provided for a period of five years with each registration under the general permit.

Part III

Basis: These conditions are applicable to all VPDES permits in accordance with 9 VAC 25-31-190. These conditions were modified to account for activities not applicable to this general permit (e.g., sludge management).

Administrative:

The general permit will have a fixed term of five (5) years. Every authorization to discharge under this general permit will expire at the same time and all authorizations to discharge will be renewed on the same date.

All persons required to be covered by this general permit must register with the department by filing a registration statement. For all new or expanded facilities that will begin activities after the effective date of this permit, the registration statement must be filed with the application for an individual VPDES permit.

Fact Sheet Attachments

Attachment No. 1	Commonwealth of Virginia Chesapeake Bay TMDL Phase I Watershed Implementation Plan Section 1.6 - James River Strategy Appendix 2 - James River Chlorophyll Study
Attachment No. 2	Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment Appendix X - Staged Implementation Approach for Wastewater Treatment Facilities in the Virginia James River Basin

Attachment No. 1

Commonwealth of Virginia
Chesapeake Bay TMDL Phase I Watershed Implementation Plan

Section 1.6 - James River Strategy
and
Appendix 2 - James River Chlorophyll Study

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

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

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.

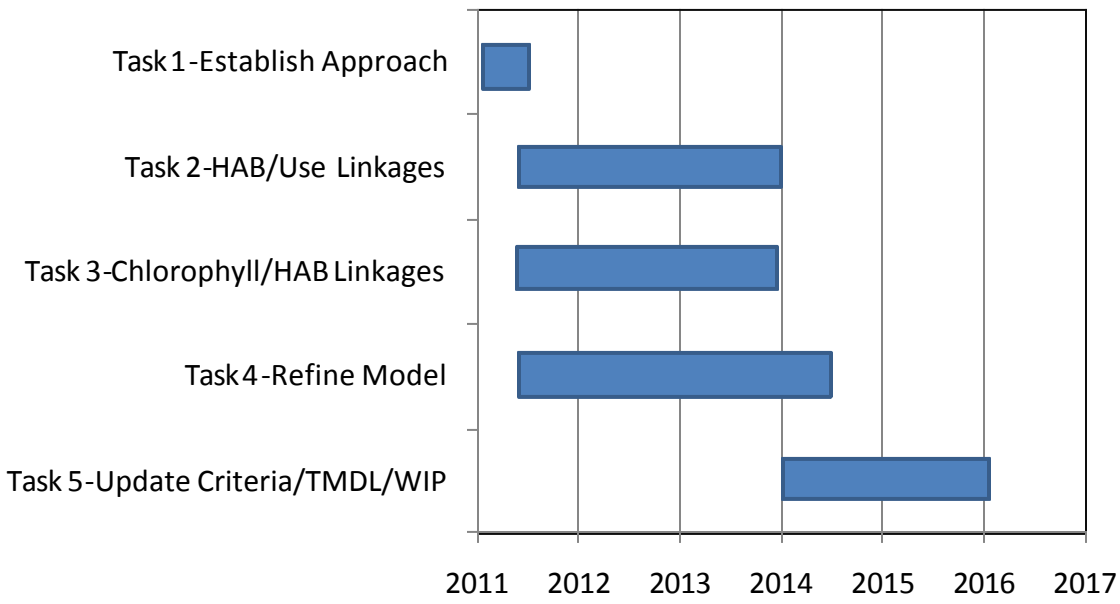

Figure 1—Recommended schedule for chlorophyll-*a* criteria reevaluation process.

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.

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Attachment No. 2

Appendix X to the Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment

Appendix X.
Staged Implementation Approach for Wastewater Treatment Facilities in the Virginia James River Basin

With the exception of one portion of the tidal Potomac River, the tidal James River is unique throughout the Chesapeake Bay watershed in that ten chlorophyll-*a* water quality criteria (5 segments*2 seasons) are applicable to protect local and tidal water quality conditions. In the July 1, 2010 allocation of nutrients, EPA determined that attainment of these numeric chlorophyll a criteria would require achievement of much lower levels of nutrients than previously expected.

Specifically, in the July 2010 letter, EPA determined allocations for the James River in the amounts of 23.48 million pounds per year of total nitrogen and 2.34 million pounds per year of total phosphorus. To achieve the dissolved oxygen and water clarity criteria, EPA had previously calculated that the levels of 26.8 million pounds per year of total nitrogen and 2.69 million pounds per year of total phosphorus would be sufficient. [See TMDL Appendix O - *Setting the Chlorophyll a Criteria-Based Nutrient Allocations for the James River Watershed*] Those higher levels (to achieve DO) are roughly equivalent to the 2003 James River cap load allocation of 26.4 million pounds per year of total nitrogen and 3.41 million pounds per year of total phosphorus. (Secretary Tayloe Murphy, 2003).

Up until the July 2010 allocation, Virginia had been working to implement past strategies to meet the previous, higher 2003 cap load allocations of total nitrogen and total phosphorus for the James. To achieve total nitrogen and total phosphorus allocations sufficient to comply with the current chlorophyll-*a* criteria, absent significant reductions from other pollution sectors, it is estimated that every significant municipal and industrial wastewater treatment facility in the river basin (39 facilities) would have to install nutrient removal technologies at or below limit of technology levels. In addition, due to the geographic location of the James River (southernmost river in the Bay watershed), Bay circulation patterns, and strong tidal flushing from the Atlantic Ocean, total nitrogen, total phosphorus and sediment loadings from the James River have a relatively small impact on water quality in the mainstem Bay. For these reasons, a staged implementation approach has been developed for implementing necessary nutrient reduction controls at wastewater facilities in the James River Basin to achieve the wasteload allocations of the Chesapeake Bay TMDL. As part of that staged implementation approach, EPA is establishing in this TMDL the wasteload allocations (WLA) for significant facilities in the James River as aggregate WLAs for total nitrogen and total phosphorus (Table 9-4 in Section 9 of the TMDL Report).

Total nitrogen and total phosphorus allocations from the tributary strategy for the James River sufficient to attain the dissolved oxygen criteria for the James River and Chesapeake Bay do not concurrently provide for the attainment of the James River Chlorophyll *a* criteria. Therefore, it is necessary in the TMDL to allocate more stringent total nitrogen and total phosphorus reductions in the James River than previously expected to attain the Chlorophyll *a* criteria (an additional 3 million pounds per year and 0.3 million pounds per year respectively). To facilitate that staged implementation approach, in this TMDL, EPA is establishing the more stringent wasteload allocations (WLA) for significant facilities in the James River as aggregate WLAs for total nitrogen and total phosphorus (Table 9-4 in Section 9 of the TMDL Report). The key components of the implementation strategy include:

- Near-term (2011-2017) interim effluent limits and controls under the Watershed General Permit for individual facilities implementing current and planned facility upgrades, including sixteen upgrade projects at POTWs, to achieve those portions of the wasteload allocations for total nitrogen and total phosphorus reductions that are based on the DO standards attainment, plus reductions of an additional 1.6 million pounds of total nitrogen and 200,000 pounds of total phosphorus.
- Achievement of 60% of the TMDLs overall total nitrogen and total phosphorus allocations by 2017 and 100% of the wastewater treatment plant component by no later than January 1, 2023.
- Near-term *aggregate* Chlorophyll-*a*-based effluent limits for total nitrogen and total phosphorus that apply under the Watershed General Permit to all 39 significant wastewater facilities to achieve the remaining 40% of the load reductions needed to meet the applicable aggregate wasteload allocations and the applicable Chlorophyll-*a* criteria with compliance as soon as possible pursuant to 40 CFR 122.47. Existing information suggests that compliance with this aggregate limit may not be possible until after 2017, but not later than January 1, 2023.
- Sufficient time for the Commonwealth of Virginia to perform an engineering/cost optimization study to establish which of the 39 facilities under the Watershed General Permit, and in what order, will need to upgrade treatment to meet the aggregate Chlorophyll-a-based limits.
- Establishment in 2017 of *facility-specific* effluent limits necessary to achieve reductions of an additional 1.0 million pounds per year of TN and 250,000 pounds per year of TP by January 1, 2022, and *facility-specific* TN and TP wasteload allocations, to inform the permit requirements of the 2018 Watershed General Permit reissuance, for each of the 39 significant WWTPs as stringent as necessary to achieve the remaining load reductions needed to meet the applicable Chlorophyll-*a* criteria. Also continue the enforceable aggregate Chlorophyll-*a*-based effluent limits for TN and TP that apply to all 39 facilities, with compliance required as soon as possible after 2017, based on present information, and not later than January 1, 2023.
- Establishment in 2018 of *facility-specific* effluent limits for TN and TP based on the facility WLAs established in 2017, as stringent as necessary to achieve the applicable Chlorophyll-*a* water quality criteria, and facility-specific compliance schedules requiring compliance with the effluent limitations for TN and TP limits as soon as possible, but not later than January 1, 2023
- EPA expects Virginia (and Virginia has committed) to reissue the Watershed General Permit and fact sheet in 2012, 2017 and 2018 to include all elements of the staged implementation approach, including any schedule of interim milestones pursuant to 40 CFR 122.47. To guide issuance of adequate permits in the James River, EPA is including the description of the projected schedule of the staged implementation approach in the Chesapeake Bay TMDL as assumptions and requirements of the applicable James River wasteload allocations. Federal law and regulation require that water quality-based effluent limits in permits must be derived from and comply with the applicable water quality standards and be consistent with the assumptions and requirements of TMDL wasteload allocations. 40 C.F.R. 122.44(d)(1)(vii)(A)&(B).