

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) FACILITIES	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 or 300 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/l, 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).