# SECTION 10. IMPLEMENTATION AND ADAPTIVE MANAGEMENT

## 10.1 FUTURE GROWTH

As an assumption of the Chesapeake Bay TMDL, EPA expects Chesapeake Bay jurisdictions to account for and manage new or increased loadings of nitrogen, phosphorus, and sediment.

### *10.1.1 Designating Target Loads for New or Increased Sources*

Where the TMDL does not provide a specific allocation to accommodate new or increased loadings of nitrogen, phosphorus, or sediment, a jurisdiction may accommodate such new or increased loadings only through a mechanism allowing for quantifiable and accountable offsets of the new or increased load in an amount necessary to implement the TMDL and applicable WQS in the Chesapeake Bay and its tidal tributaries. Therefore, the Chesapeake Bay TMDL assumes, and EPA expects, that the jurisdictions will accommodate new or increased loadings of nitrogen, phosphorus, or sediment that do not have a specific allocation in the TMDL with appropriate offsets supported by credible and transparent offset programs subject to EPA oversight.

### *10.1.2 Offset Programs*

EPA expects that new or increased loadings of nitrogen, phosphorus, and sediment in the Chesapeake Bay watershed that are not specifically accounted for in the TMDL's WLA or LA will be offset by loading reductions and credits generated by other sources under programs that are consistent with the definitions and common elements described in Appendix S. These definitions and common elements are important to ensure that offsets are achieved through reliable pollution controls and that the goals of the Chesapeake Bay TMDL are met.

EPA expects the jurisdictions to develop offset programs that are credible, transparent, consistent with the definitions and common elements set out in Appendix S, and subject to EPA and public oversight. Any such offsets are expected to account for the entire delivered nitrogen, phosphorus, or sediment load after accounting for location of the sources, delivery factors affecting pollutant fate and transport, equivalency of pollutants, and the certainty of any such reductions. In addition, such offsets may not cause an exceedance of local WQS or local TMDLs. The offsets are to be in addition to reductions already needed to meet the allocations in the TMDL and must be consistent with applicable federal and state laws and regulations.

For nonpoint sources, this assumption and expectation is based on the fact that any new or increased nonpoint source loadings not accounted for in the TMDL's LA will have to be offset by appropriate reductions from other sources if the TMDL's pollutant loading cap and applicable WQS are to be met. For permitted point sources, the assumption and expectation also is based on the statutory and regulatory requirements that effluent limits for any such discharges be derived from and comply with all applicable WQS and be consistent with the assumptions and

requirements of any available WLAs [CWA sections 301(b)(1)(C), 303(d); 40 CFR 122.44(d)(1)(vii)(A) & (B)].

In addition, CWA section 117(g) authorizes EPA to ensure that management plans are developed and implementation is begun to achieve and maintain the Bay's nutrient goals. If jurisdictions authorize new or increased loadings without a specific TMDL allocation, an offset is a necessary component of any management plan designed to meet those goals. Accordingly, the Bay TMDL assumes that new point source dischargers, without an allocation in the TMDL (or in other words, with a zero allocation), will find offsets large enough to compensate for their entire loading. The TMDL similarly assumes that point source dischargers that increase pollution loading will find offsets large enough to compensate for the entire increase in their loading and to meet their Water Quality Based Effluent Limit (WQBEL) consistent with the WLA in the TMDL. In the case of new or increased loading from sources other than permitted point source dischargers, jurisdictions are expected to estimate loadings and ensure offsets that fully compensate for this estimated increase in pollutant load.

Although EPA assumes that there can legitimately be some flexibility in the design and content of Bay jurisdiction offset programs, EPA encourages and expects that the jurisdictions will generally develop and implement programs for offsetting new and increased loadings consistent with the definitions and common elements described in detail in Appendix S. EPA also encourages and expects jurisdictions with existing trading programs that address new or increased loadings (such as several jurisdictions have), to ensure that their programs address new or increased loads consistent with the definitions and common elements in Appendix S.

### 10.1.3 Additional Offset Program Features

The jurisdictions also may consider using the following features to build their offset programs for new or increased loadings of nitrogen, phosphorus, and sediment:

*Net Improvement Offsets:* For purposes of the Bay TMDL, this means an offset at a ratio greater than merely accounting for the entire new or increased load. The jurisdiction's offset program would need to provide the authority and procedures for invoking such a provision. This tool might be considered as a means to accelerate load reductions where a jurisdiction is not on a schedule to ensure that nitrogen, phosphorus, and sediment controls are in place by 2017 and 2025 to meet interim and final target loads, respectively. This may be determined based on an EPA evaluation of a jurisdiction's progress on its WIP and 2-year milestones, as discussed in EPA's December 29, 2009 letter (USEPA 2009d). Net improvement offsets also might be considered, in the case of permitted point sources, to offset new or increased loads from nonpoint sources or from point sources not expected to be permitted.

*Aggregated Programmatic Credits:* For purposes of the Bay TMDL, this means defining a programmatic solution for over-control of nitrogen, phosphorus or sediment beyond the basic WIP strategies to achieve the TMDL allocation. In essence, it is an aggregation of credits from reductions by a class or subclass of sources where such reductions have been achieved by the jurisdiction or another duly authorized body. The jurisdiction may consider making such credits available to offset new or increased loadings. In some circumstances, such class reductions also

could be applied as a reallocation of loadings under the TMDL. Such reallocation may require modification of the TMDL.

*Reserve-Offset Hybrid:* For purposes of the Bay TMDL, this applies where a jurisdiction reserves a portion of its allocations for future growth and, once that allocation is depleted, uses an offset program as described herein.

### 10.1.4 EPA's Oversight Role of Jurisdictions' Offset Programs

EPA encourages jurisdictions to consult with EPA throughout the development of their offset programs to facilitate alignment with the CWA and the Bay TMDL. EPA has various oversight responsibilities under the CWA, MOUs for authorization of jurisdictions' NPDES programs, and the TMDL/Executive Order 13508, including approval of revisions to WQS, review of NPDES permits, and provisions for reviewing and making recommendations regarding revisions to a jurisdiction's water quality management plans through the continuing planning process.

EPA intends to maintain regular oversight of jurisdictions' offset programs through periodic audits and evaluations. EPA will report its findings to the respective jurisdiction. EPA's first such review of jurisdictional offset and trading programs will take place in calendar year 2011. EPA expects that the findings of this evaluation will inform offset and trading provisions included in the jurisdictions' Phase II WIPs. Such oversight generally will be conducted on a programmatic basis, not an individual offset basis. EPA reserves its authority, however, to review any individual offset (including an NPDES permit containing an offset) and to comment on, object to, or issue the permit as needed if EPA determines that the offset is not consistent with the Clean Water Act or EPA's regulations. When questions or concerns arise, EPA will use its oversight authorities to ensure that offset programs are fully consistent with the CWA and its implementing regulations. EPA recognizes the value of implementing a strategy for offsets that, wherever possible, is consistent among the jurisdictions to increase credibility, scalability, and broader regional implementation such as interstate trading.

## 10.2 WATER QUALITY TRADING

EPA recognizes that a number of Bay jurisdictions already are implementing water quality trading programs. EPA supports implementation of the Bay TMDL through such programs, as long as they are established and implemented in a manner consistent with the CWA, its implementing regulations, and EPA's 2003 *Water Quality Trading Policy*[1] (USEPA 2003e) and 2007 *Water Quality Trading Toolkit for NPDES Permit Writers*[2] (USEPA 2007d). An assumption of this TMDL is that trades may occur between sources contributing pollutant loadings to the same or different Bay segments, provided such trades do not cause or contribute to an exceedance of WQS in either receiving segment or anywhere else in the Bay watershed. EPA does not support any trading activity that would delay or weaken implementation of the Bay TMDL, that is inconsistent with the assumptions and requirements of the TMDL, or that would cause the combined point source and nonpoint source loadings covered by a trade to exceed the applicable loading cap established by the TMDL.

[1] See http://www.epa.gov/owow/watershed/trading/finalpolicy2003.pdf.
[2] See http://www.epa.gov/owow/watershed/trading/WQTToolkit.html.

In Section 10.1, EPA explains how Bay jurisdictions may accommodate new or increased loadings of nitrogen, phosphorus, and sediment either through a specific TMDL allocation or by offsetting those loadings with quantifiable and accountable reductions necessary to implement applicable WQS in the Bay and its tidal tributaries. In Appendix S, EPA discusses a number of definitions and common elements that EPA encourages and expects the jurisdictions to include and implement in their offset programs. EPA believes the definitions and common elements in Appendix S also constitute important components of trading programs in the Chesapeake Bay watershed. EPA anticipates using these Appendix S definitions and elements in reviewing jurisdictions' trading programs.

## 10.3 FUTURE MODIFICATIONS TO THE CHESAPEAKE BAY TMDL

EPA has established the Chesapeake Bay TMDL, including its component WLAs, LAs, and margin of safety, based on the Bay and tidal tributaries' applicable WQS and the totality of the information available to it concerning Bay Watershed water quality and hydrology, present and anticipated pollutant sources and loadings, and jurisdiction-submitted implementation plans. In establishing the TMDL and making determinations about reasonable assurance, EPA has also relied on facts and assumptions regarding its own ability to ensure and successfully track TMDL implementation through the two-year milestone process and the application, if necessary, of appropriate federal actions. As a result, EPA believes this TMDL is an appropriate and effective framework for the point source and nonpoint source-focused implementation activities that the jurisdictions, EPA, and the other Bay watershed stakeholders must take to meet the Bay's nitrogen, phosphorus, and sediment reduction goals.

EPA recognizes, however, that neither the world at large nor the Bay watershed is static. In a dynamic environment like the Bay watershed, during the next 15 years change is inevitable. It may be possible to accommodate some of those changes within the existing TMDL framework without the need to revise it in whole, or in part. For example, EPA's permitting regulations at 122.44(d)(1)(vii)(B) require that permit WQBELs be "consistent with the assumptions and requirements of any available wasteload allocation for the discharge" contained in the TMDL. As the EPA Environmental Appeals Board has recognized, "WLAs are not permit limits *per se*; rather they still require translation into permit limits." *In re City of Moscow*, NPDES Appeal No. 00-10 (July 27, 2001). In providing such translation, the EAB said that "[w]hile the governing regulations require consistency, they do not require that the permit limitations that will finally be adopted in a final NPDES permit be identical to any of the WLAs that may be provided in a TMDL." Id. Accordingly, depending on the facts of a particular situation, it may be possible for the jurisdictions to write a permit limit that is consistent with (but not identical to) a given WLA without revising that WLA (either increasing or decreasing a specific WLA), provided the permit limit is consistent with the operative "assumptions " (e.g., about the applicable WQS, ambient water quality conditions, the sum of the delivered point source loads, hydrology, implementation strategies , the sufficiency of reasonable assurance) that informed the decision to establish that particular WLA.

There might, however, be circumstances in which the permit authority is not comfortable with, or the CWA would not allow, the degree to which a permit limit might deviate from a WLA in the TMDL such that one or more WLAs and LAs in the Bay TMDL would need to be revised. Or, fundamental assumptions like the nature and stringency of the applicable WQS or a

jurisdiction's legal authority might change. In these cases, it might be appropriate for EPA to revise the Bay TMDL (or portions of it). EPA would consider a request by the jurisdictions to propose such a revision to the TMDL following appropriate notice and comment. Alternatively, a jurisdiction could propose to revise a portion(s) of the Bay TMDL that applies within its boundaries (including, but not limited to specific WLAs and LAs) and submit those revisions to EPA for approval. If EPA approved any such jurisdiction-submitted revisions, those revisions would replace their respective parts in the EPA-established Bay TMDL framework. In approving any such jurisdiction-submitted revisions (or in making its own revisions) EPA would ensure that the revisions themselves met all the statutory and regulatory requirements for TMDL approval and did not result in any component of the original TMDL not meeting applicable WQS.

Based on possible updates to the model and on jurisdictions' WIPs, EPA will consider revising the Chesapeake Bay TMDL, if appropriate, in 2012 and 2017. EPA will also consider revising the TMDL based on other new or additional information provided by the jurisdictions. All revision requests from jurisdictions should be coordinated with EPA to fit within EPA's planned revision time frame.

## 10.4 FEDERAL FACILITIES AND LANDS

Federal lands account for approximately 5.3 percent of the Chesapeake Bay watershed. The federal sector is like other sectors in that EPA expects federal land owners to be responsible for achieving LAs and WLAs through actions, programs, and policies that will reduce the release of nitrogen, phosphorous, and sediment (CWA section 313, 33 U.S.C. 1323).

EPA expects federal agencies with property in the watershed to provide leadership and work with the seven Bay watershed jurisdictions in implementing their Phase I WIPs. Federal agencies have provided information on the spatial boundaries and land use types for facilities in the watershed. EPA used that information to model current pollutant loads from federal facilities and has provided the estimated loads to the jurisdictions. The Federal Strategy also requires federal agencies with property in the Bay watershed to work with the jurisdictions in developing their WIPs by identifying pollutant reductions from point and nonpoint sources associated with federal lands and committing to actions, programs, policies, and resources necessary to reduce nitrogen, phosphorus, and sediment by specific dates.

In their final Phase I WIPs, jurisdictions have established load reduction goals for sectors contributing nitrogen, phosphorus, and sediment loads to the Chesapeake Bay. The TMDL allocations are based almost wholly upon these load reductions; federal lands and installations are expected to contribute to these load reductions. In the Phase II WIPs, the jurisdictions are expected to further distribute LA and WLA allocations among local level target areas such as counties. These more local targets also could include federal facilities. EPA also expects that federal agencies will cooperate with Bay jurisdictions and provide them with information on federal agency actions, programs, policies, and resources necessary to achieve federal facility-specific load reduction targets in jurisdictions' Phase II WIPs.

Like the Bay jurisdictions, federal agencies are expected to create 2-year milestones detailing specific implementation actions to achieve federal lands' and facilities' share of load reductions.

These federal milestones also should support the implementation of jurisdictions' WIPs and two-year milestones through commitments to comply with permit conditions and provide coordination, funding, and technical assistance, as appropriate. The milestones will be the basis for tracking progress and providing transparency on federal sector performance related to agency TMDL responsibilities in the watershed.

Federal facility-specific target loads are expected to be included in the jurisdictions' Phase II WIPs in 2011 via one of two approaches: (a) jurisdictions could establish explicit load reduction expectations for federal facilities as part of the Phase II WIP process; or (b) on the basis of broad load reduction goals established by the jurisdiction, individual federal facilities/installations could develop Federal Facility Implementation Plans (FFIPs), which would explain to the jurisdiction how the facility would achieve needed load reductions in nitrogen, phosphorus, and sediment. The FFIPs would be expected to address, at a minimum, the following in targeting and achieving load reductions:

- Assess properties to determine the feasibility of installing urban retrofit practices and implementing nonstructural control measures that reduce volume and improve quality of stormwater runoff.
- Align cost-effective, urban stormwater retrofits and erosion repairs with the Bay TMDL allocations and jurisdictions' 2-year milestones.
- Assess and implement appropriate nonstructural practices to control stormwater discharges from developed areas and to reduce, prevent, or control erosion from unpaved roads, trails, and ditches.
- Consider the full spectrum of nitrogen, phosphorus, and sediment sources at a facility or installation to assess the ideal approach to achieve the needed nitrogen, phosphorus, and sediment reduction.

In addition, section 501 of Executive Order 13508 and the subsequent Executive Order Federal Strategy (FLCCB 2010) direct each federal agency with land, facilities or installation management responsibilities affecting 10 or more acres in the Bay watershed to implement section 502 guidance on federal land management. Pursuant to section 502 of the Executive Order, EPA issued on May 12, 2010, the Guidance for Federal Land Management in the Chesapeake Bay Watershed (EPA May 12, 2010), EPA 841-R-10-002 (section 502 guidance). EPA's objective in developing the section 502 guidance was to provide information and data on appropriate, proven, and cost-effective tools and practices for implementation on federal lands and at federal facilities.

The section 502 guidance includes chapters addressing agriculture, urban and suburban areas (including turf), forestry, riparian area management, decentralized wastewater treatment systems, and hydromodification. Each chapter contains one or more implementation measures that provide the framework for the chapter. They are intended to convey the actions that will help ensure that the broad goals of the Chesapeake Bay Executive Order are achieved. Each chapter also includes information on practices that can be used to achieve the goals; information on the effectiveness and costs of the practices; where relevant, cost savings or other economic/societal benefits (in addition to the pollutant reduction benefits) that derive from the implementation goals or practices; and copious references to other documents that provide additional information. Federal agencies are expected to incorporate the section 502 guidance as part of

their overall strategy to meet the loading reductions that the jurisdictions in their Phase II WIPs assign to them.

In addition, the Executive Order Federal Strategy calls for federal agencies to adopt an agency-specific policy to ensure implementation of the stormwater requirements in section 438 of the Energy Independence and Security Act (EISA) for new development and redevelopment activities consistent with guidance developed by EPA. Section 438 of EISA requires federal agencies to maintain or restore the predevelopment hydrology (the runoff volume, rate, temperature, and duration of flow that typically existed on the site before human-induced land disturbance occurred) of any project with a footprint that exceeds 5,000 square feet. The agency-specific policy should include mechanisms for producing an annual internal agency action plan and progress report. Implementation of the agency-specific policy is to begin in 2011. The results of each federal agency's actions to comply with section 438 of EISA will be published as part of the annual progress report issued under the direction of the Executive Order discussed above.

## 10.5 FACTORING IN EFFECTS FROM CONTINUED CLIMATE CHANGE

EPA accounted for the potential effects of future climate change in the current Bay TMDL allocations based on a preliminary assessment of climate change impacts on the Chesapeake Bay (see Section 5.11 and Appendix E). There are well-known limitations in the current suite of Bay models to fully simulate the effects of climate change as cited in Section 5.11.

EPA and its partners are committed to conducting a more complete analysis of climate change effects on nitrogen, phosphorus, and sediment loads and allocations in time for the mid-course assessment of Chesapeake Bay TMDL progress in 2017 as called for in Section 203 of the Chesapeake Executive Order 13508 (May 12, 2009), accessible at http://executiveorder.chesapeakebay.net/EO/file.axd?file=2009%2f8%2fChesapeake+Executive+Order.pdf. To do that will require building the capacity to quantify the impacts of climate change at the scale of the Bay TMDL—92 Bay segments and their surrounding watersheds at the scale of the Phase II Watershed Implementation Plans' target loads—and incorporate that information into the full suite of Bay models and other decision support tools.

EPA has committed to take an adaptive management approach to the Bay TMDL and incorporate new scientific understanding of the effects of climate change into the Bay TMDL, in this case during the mid-course assessment.

## 10.6 SEDIMENT BEHIND THE SUSQUEHANNA RIVER DAMS

The dams along the lower Susquehanna River are a significant factor influencing nitrogen, phosphorus, and sediment loads to the Bay because they retain large quantities of sediment and phosphorus, and some nitrogen, in their reservoirs (Appendix T). The three major dams along the lower Susquehanna River are the Safe Harbor Dam, Holtwood Dam, and Conowingo Dam. In developing the TMDL, EPA considered the impact of these dams on the pollutant loads to the Bay and how those loads will change when the dams no longer function to trap nitrogen, phosphorus, and sediment.

The Bay TMDL incorporates the current sediment-trapping capacity of the Conowingo Dam at 55 percent, with nitrogen and phosphorus trapping capacity at 2 percent and 40 percent, respectively. That allows the sediment, nitrogen, and phosphorus allocations to the jurisdictions to reflect the actual input to the Bay. If future monitoring shows a change in trapping capacity in the Conowingo Dam, the 2-year milestone delivered load reductions could be adjusted accordingly. The adjusted loads may be compared to the 2-year milestone commitments to ensure that each jurisdiction is meeting its obligations. For example, if there were a reduction in the sediment-trapping capacity in the reservoir, an upland jurisdiction might need to increase its sediment-reduction efforts to meet the allocations it has been assigned in the Bay TMDL. The jurisdictions' sediment allocation would not necessarily change, but the jurisdictions might need to increase the level of effort in reducing sediment to account for the loss of trapping capacity in the reservoir. Changes in the sediment-trapping capacity are not expected to alter the amount of sediment that the Bay is able to assimilate and, therefore, are not expected to change the allocations in this Bay TMDL.

For the purposes of the Chesapeake Bay TMDL, EPA and the partners assumed the current trapping efficiencies will continue. If future monitoring shows that trapping efficiencies are reduced, Pennsylvania, New York, and Maryland's respective 2-year milestone delivered loads could be adjusted accordingly. Therefore it is imperative that those jurisdictions work together to develop an implementation strategy for addressing the sediment, nitrogen, and phosphorus behind the Conowingo Dam through their respective WIPs, so that they are prepared if the trapping efficiencies decrease.

## 10.7 FILTER FEEDERS

Filter feeders play an important role in the uptake of nitrogen and phosphorus from the Chesapeake Bay and have the potential significantly improve water quality if present in large numbers (Appendix U). The organisms of interest for their ability to improve water quality are the native Eastern oyster, *Crassostrea virginica*, and menhaden fish, *Brevoortia tyrannus*. Each market-sized oyster contains about 0.5 gram of nitrogen and 0.16 gram of phosphorus. Menhaden fish are another filter feeding organism in the Chesapeake Bay. The Chesapeake Bay TMDL incorporates the effects of filter feeders.

EPA is basing the TMDL on the current assimilative capacity of filter feeders at existing populations built into the calibration of the oyster filter feeding submodel of the Chesapeake Bay Water Quality and Sediment Transport Model. Potential future population changes are not accounted for in the Bay TMDL. If future monitoring data indicate an increase in the filter feeder population, the appropriate jurisdiction's 2-year milestone delivered load reductions can be adjusted accordingly. Similarly if reductions in future filter feeder populations are observed that result in reduced nutrient assimilation, the 2-year milestone delivered load reductions can be adjusted to account for the change. The adjusted loads will be compared to the 2-year milestone commitments to ensure that each jurisdiction is meeting its obligations.