

TMDLs in Plain English

Abbreviations are handy. All of us – scientists, regulators, even shoe salesmen – use them because they save time. To the layman, however, these unpronounceable strings of letters often look more or less like alphabet soup.

Pollution control has its share of abbreviations. The abbreviation *TMDL*, which stands for *total maximum daily load*, is a good case in point. The phrase is somewhat confusing. For starters, it sounds like it has more to do with trucking than water pollution control.

Plus, although *daily* is part of the phrase, the *load* isn't necessarily daily. *Daily* once fit it nicely, but things have changed. Lastly, the abbreviation covers more than just a load. Regulators often use it to describe a plan to reduce water pollution, too.

Some of the confusion is because TMDL initially addressed mainly point source pollution. That type of pollution comes from an easily identified source – a *point* – such as wastewater treatment plants, factories, refineries, etc. At such places, it is possible to assign acceptable, maximum daily loads for the source's pollutants. That is, one can determine how much of a pollutant a given body of water can receive and still support *beneficial uses*. Such uses include aquatic life, fisheries, drinking water, recreation, etc.

Like all states, Virginia is required by the federal Clean Water Act to inventory its waterways and their health. This inventory is called a *303(d) list*. Each waterway is characterized in the list as *fully supporting, impaired or threatened*.

What about nonpoint source pollution?

TMDL fit point source pollution control well because point sources are relatively easy to find. Their discharge is likewise relatively easy to control. The fit, however, is not as neat for *nonpoint* source pollution. This is because nonpoint source pollution enters waterways mainly when it rains. Storm water runoff leaves farms, construction sites, parking lots, roads, etc., and pollution is carried in that runoff. Because this type of pollution comes from vast, varied and diffuse sources, and because rain doesn't abide by the clock, it's harder to tackle.

Even so, the TMDL process provides a logical framework in which an *implementation plan* (IP) that addresses both types of water pollution can be written. Water quality targets and strategies to attain those targets are spelled out in such plans.

The watershed connection

The abbreviation TMDL has been around for years, so why is it suddenly so important? It's because these plans generally cover a watershed, which, put simply, is the land that drains into a given waterway or segment thereof. Luckily for us, one of America's biggest watersheds is the Chesapeake Bay's, and about three-fifths of Virginia drains into the bay. Despite decades of work, it's still unhealthy so the EPA decided to increase pressure on states with land that drains into the bay. EPA expects bay states to write and implement clean-up plans, using the TMDL approach. It's unclear what will happen if the states don't meet EPA's expectations, but the states suppose it would be unpleasant. It could involve funding cuts.

EPA says the bay has 92 "segments." Each segment has its watershed, and EPA expects each one to have an watershed implementation plan (WIP). Thirty-five of the 92 segments are in Virginia, so there will be 35 TMDL IPs here. The 35 plans will be merged into a master document for Virginia. Other bay states – Maryland, Pennsylvania, etc., and the District of Columbia – also will have master WIP documents.

Lightening the load

In terms of TMDL, the word *load* refers to how much of a given pollutant will be allowed into a waterway. It's also called a *load cap*. The difference between what's actually entering the waterway and what's allowed is called a *load reduction*. They can be expressed in pounds, as is the case for phosphorus, or in tons, as is the case for sediment. Although EPA has given bay states preliminary load figures – that is, pollutant reduction loads – those figures will probably change.

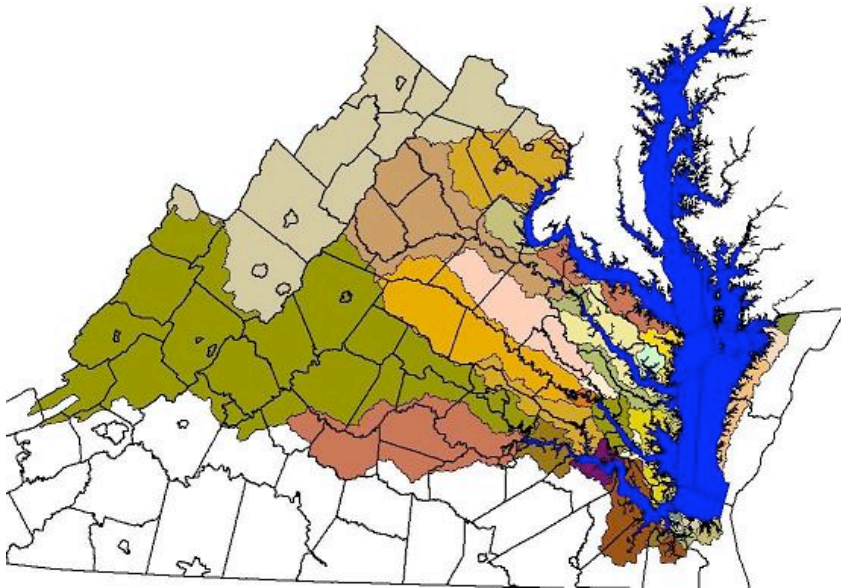
EPA derived the numbers by using modeling software that predicts how the bay and its tributaries would respond if people acted to reduce pollution... if they lightened the load, so to say. For example, let's say a farmer puts up a fence to keep cattle away from a certain creek. This would keep some nitrogen, phosphorus and sediment out of the creek. In turn, that would make life in the waterway more diverse, plentiful and healthy. And that, after all, is what the TMDL process is all about. The modeling software enables officials predict which measures would work best and where they should go.

Why are load figures likely to change? It's because the computer model the EPA uses to set the goals is being improved. In any case, the states needed something to work with; hence EPA's "interim" load figures. They're imperfect, but it's a starting point.

Revisiting childhood

Think about when you were a kid watching letters swirl around in you alphabet soup. Every now and then they'd line up to spell something meaningful, such as "cat" or "foot" or "hippo." Now that you've read this, you can add "TMDL" to the list of acceptable words.

Virginia Chesapeake Bay Drainage Segments



For the purposes of developing a TMDL, the Chesapeake Bay's tidal waters have been divided into 92 tidal water segments. There are 35 segments controlled by Virginia and another five Maryland owned segments that include Virginia drainage areas. What are shown by the different colors on the map are Virginia lands that drain to each of those tidal segments.

To understand how the segments are determined we need to remember that the Chesapeake Bay is an estuary or an ecosystem where fresh and salt waters meet. The different water segments are determined by their varying degrees of salinity.

So, the upstream segments that are primarily what we would consider fresh water are much larger (For example, all of the Upper and Middle James drain to the "tidal fresh" segment just above Richmond). Once you get closer to the Bay, with the influx of salt water, the salinities change more frequently, which accounts for the smaller segments.

Bay TMDL Virginia Frequently Asked Questions

Will there be one TMDL for Virginia's portion of the Bay or multiple TMDLs?

The tidal portions of the Chesapeake Bay, tidal tributaries and embayments have been divided into 92 segments. Thirty-five of these are in Virginia. In each one, loads for nitrogen, phosphorus and sediment will be allocated to either point source *wasteload allocations* (WLAs) or to nonpoint source *load allocations* (LAs). Each segment is considered a separate TMDL. There will be, however, one implementation plan that addresses concerns of all 35 segments.

How will Virginia's allowable nitrogen, phosphorus and sediment loads be determined?

The Chesapeake Bay Program, led by EPA, will use Bay Program models to set Virginia's nitrogen, phosphorus and sediment load caps that meet the state's water quality standards. The data will be used to further distribute EPA-assigned state caps among the major river basins and the 35 segments that make up Virginia's Bay watershed. The general philosophy in distributing these loads is that watersheds that contribute the most to the problem should achieve the greatest reductions. However, meeting water quality standards and achieving the desired living resource response is the ultimate driver. Initial drafts of state, basin and segment cap loads are expected in spring 2010. These loads will then be allocated to sources in each of Virginia's 35 segments.

There have been many local TMDLs written in Virginia's Chesapeake Bay watershed. How do they relate to this Bay TMDL?

The local TMDLs were done to address local water quality issues. The Bay TMDL is being developed to address the larger Bay watershed. While some previously approved local TMDLs were based on reducing nutrients or sediment, most were written for other pollutants. In contrast, the Bay TMDL will be based on protecting the Chesapeake Bay and its tidal waters from excessive nitrogen, phosphorus and sediment. For waters with both local and Bay TMDLs for nitrogen, phosphorus, and sediment, the more stringent of TMDL will apply. In some cases, reductions required to meet local conditions shown in existing TMDLs may be more stringent than those required for the Bay requirements. In other cases, the opposite will be true. In waters within the Bay watershed where TMDLs have been developed for other pollutants, those TMDLs will remain active alongside the Bay TMDL to address the nitrogen, phosphorus and sediment impairments.

What are the expected consequences if a segment or basin fails or exceeds an assigned loading level, or if it doesn't meet two-year milestones?

Virginia plans to adopt an "adaptive management" approach. This includes the development of two-year milestones and contingencies to adjust plans that fall short of expectations to ensure successful implementation. If these state actions fall short, EPA is prepared to impose consequences to assure progress is made. The specifics of the federal consequences are expected to be formally communicated by EPA before the end of the year in a document commonly referred to as the *Consequences Letter*. Together, the adaptive management, milestones, contingencies and consequences form a strong framework of accountability.

How will unimpaired bodies of water or watersheds be treated in this TMDL process?

Segments next to an impaired segment will be assigned an allocation in the TMDL. While some local segments may not be impaired, their nutrients and sediments contribute to poorer water quality conditions of other nearby impaired tidal segments. That's why these associated watersheds will have allocations, too.

How will specific actions needed to clean the Bay be identified and their implementation be planned?

Based on EPA's expectations for the TMDL, the state will write watershed implementation plans (WIPs) to estimate the pollution reductions needed to meet the allocations. The plans will include two-year milestones. An extensive outreach process will be undertaken with localities, soil and water conservation districts, planning districts, permitted dischargers and other stakeholders to identify appropriate and achievable implementation actions for the WIPs. It is anticipated that the final WIP will require a significant expansion and acceleration of existing programs and practices. Also, various new and innovative approaches will be used. As the process progresses, the actions needed in each source sector and segment will become clearer. This in turn will enable the Bay, its tributaries and local waters to meet nutrient and sediment targets and achieve the desired living resource response.

How will the Bay TMDL affect permitted facilities in Virginia, particularly those that fall under the Nutrient Enriched Waters and Nutrient Trading programs?

Potential impacts to permitted facilities will be unknown until final load allocations are detailed in the final TMDL. That document is due by December 2010. As noted above, EPA is working with jurisdictions to develop an adaptive management approach, including contingencies and consequences based on two-year milestones. Because of allowances for alternate compliance methods under the Nutrient Credit Exchange Program, the determination of total nitrogen and phosphorus loads delivered to tidal waters will be based on all dischargers in each Bay tributary basin, not necessarily by individual facility. In a recent letter to the Principal Staff Committee, EPA recognized the need for further discussions with watershed jurisdictions on the methodology for distributing loads.

How will Bay Program modeling data be used to create the TMDL and to track progress?

EPA's Chesapeake Bay Program is working on updating the Bay Watershed Model to version 5.3. The new version will be used along with other Bay water quality models to establish the Bay TMDL. Until then, EPA has given each jurisdiction target load figures based on the current watershed model. These target loads, which are likely to change, are spelled out in [this EPA Bay letter about TMDL loads](#) (PDF). Once approved, version 5.3 will be used to re-calibrate the Bay water quality-estuary model. This should be done during the spring 2010. The complete series of Bay Program models will then be used to establish nitrogen, phosphorus and sediment allocations for the point and nonpoint sources in each of Virginia's 35 segments.

The model will also be used to evaluate proposed implementation actions in draft [watershed implementation plans](#) (WIPs). This will be done to estimate pollution reductions that would result from the planned measures to make sure such measures adequately meet the allocations. A similar process will be used to track two-year milestone progress. Implemented practices will be tested to estimate long-term benefits that will occur. This will be compared with planned milestone targets.

What funding or training will be provided to meet challenges posed by the TMDL?

An important part of developing the implementation plan will be determining just what levels of training and funding, among other resources, will be needed to meet goals of the TMDLs. One reason for the extensive engagement process mentioned above is the need to learn about, from stakeholders, barriers that exist in terms of meeting allocations. Once obtained, this information will be used to develop strategies and timelines to remove those barriers. This should lead to an implementation plan that will include an estimate of implementation costs and a listing of potential funding sources for the various implementation actions.

What opportunities exist for public participation in the Watershed Implementation Planning process?

During development of the tributary strategies, state staff held regional meetings to get data for eventual development of the strategies. Given the accelerated timeframe for the TMDL process, the state is proposing the compilation of land-use data and potential strategies needed for a TMDL and implementation plans. This will be done with the help of experts in on-site wastewater and agricultural and urban best management practices.

This whole process will be developed using a broad range of stakeholder engagement. This will include consultation with a stakeholder workgroup as well as meeting with numerous stakeholder groups, including local governments, planning district commissions, soil and water conservation districts, professional groups and others. For example, a [Stakeholder Advisory Group](#) has been appointed by the Virginia Secretary of Natural Resources. That group will assist throughout this process. The state is also exploring the use of web-based tools to further gather pertinent comments and input as specific implementation actions and two-year milestones are developed. This planning process will maximize transparency and public involvement by following all state requirements for public notice and comment. All meetings will be conducted according to applicable sunshine regulations.

For additional information

- [EPA Chesapeake Bay TMDL](#)
- [EPA Chesapeake Bay Fact Sheet and Key Documents](#)
- [EPA Chesapeake Bay TMDL Frequently Asked Questions](#)
- [Chesapeake Bay TMDL Implementation and Accountability](#)
- [EPA Watershed Implementation Plan Letter - Nov. 4, 2009](#)
- [Chesapeake Bay Modeling](#)
- [Virginia's Nutrient Credit Exchange Program Requirements - VPDES Watershed General Permit for Nutrient Discharges to the Chesapeake Bay \(9 VAC 25-820\)](#)