TMDL DEVELOPMENT

What is a TMDL? A Total Maximum Daily Load (TMDL) is a term used to describe the amount of pollution a stream can receive and still meet Water Quality Standards. Water quality standards are regulations based on federal or state law that set numeric or narrative limits on pollutants. TMDLs are required for water bodies that are determined to be impaired. The Virginia TMDL program is governed by a federal court order Consent Decree which lays out a schedule for TMDL development through 2010.

What are the mandated elements of a TMDL? A TMDL is required under the Clean Water Act and its implementing regulations to contain the following 7 elements:

- be developed to meet the applicable water quality standard
- contain a waste load allocation for permitted point sources, a load allocation for nonpoint (or diffuse) sources
- contain a margin of safety to account for uncertainties in TMDL development
- be developed for critical stream conditions
- consider seasonal variation
- consider background contributions
- be subject to public participation

TMDLs also contain reasonable assurances for implementation.

What is the purpose of a TMDL Study? A TMDL Study identifies sources of pollution and reductions needed to attain water quality standards. A TMDL considers point sources such as residential, municipal, or industrial discharges and non-point sources such as residential, urban, or agricultural runoff. Virginia’s goal is that all streams attain the appropriate beneficial uses. These beneficial uses are described by the following use goals: drinking water use, swimming use, fishing use, shellfishing use, and aquatic life use. These uses are protected by application of the state’s water quality standards.

How does Virginia determine what is an “Impaired Water”? Through water quality monitoring and assessment (i.e. comparing the monitoring data to the applicable water quality standards), the Virginia Department of Environmental Quality (DEQ) determines whether a water body is impaired or not. Every even numbered year, Virginia submits a list of the waters found to be impaired, the so-called 303(d) list of impaired waters, to the Environmental Protection Agency. Currently, 636 waters are impaired statewide. Most impaired waters require TMDLs.

How will the public participate in TMDL development? A series of meetings will be held. The first meeting will inform the public about the impairment, the TMDL process, and obtain public comment. Any subsequent meetings will discuss the on-going TMDL study, including pollutant sources and amounts and the status of its implementation.
of the modeling work. Additional small meetings may be held with stakeholders to ensure the information used in the study is accurate. The final meeting will present the draft TMDL study, including reduction targets, for public review and comment prior to submittal to EPA. Public meetings will be advertised in local newspapers, through direct mailings, and in the Virginia Register.

What kind of input can stakeholders provide during the process? Public participation is important because landowners know much of the information needed to help clean up the stream. Such information can be the location of public sewers, septic systems and straight pipes as well as the condition of the septic systems. Other information can be the confirmation of livestock and wildlife numbers and locations in the area. Stakeholders are encouraged to provide input into the study process so that the final report is as accurate as possible.

What happens after the TMDL Study is complete? The TMDL Study will be submitted to EPA where they will have 30 days to review and approve the TMDL. Then a TMDL Implementation Plan will be developed to bring the impaired water body up to standards. Implementation Plans include a schedule of actions, costs, and monitoring. Implementation Plan development typically starts within a year of EPA approval of the TMDL Study. Virginia state law requires the development of an Implementation Plan.

What roles do different state agencies have in developing TMDLs? TMDL development is a collaborative effort between several state agencies. DEQ is the lead agency in the TMDL process and develops the list of impaired waters, TMDLs for these waters, and Implementation Plans for the TMDLs. DEQ administers the TMDL process including the public participation component and formally submits the TMDLs to EPA and the State Water Control Board for approval. The Virginia Department of Conservation and Recreation (DCR) is the lead for nonpoint source pollution control activities and may be responsibility for this component of TMDLs, including the final allocations, with the exception of mineral extraction. DEQ awards and manages the contractual services for the development of TMDLs. The Virginia Department of Mines, Minerals and Energy (DMME) signed a Memorandum of Understanding (MOU) agreeing to a cooperative effort in the TMDL process as it relates to mining impairments. DMME administers the mineral extraction component of the TMDL process, awards and manages contractual services for TMDL development and special TMDL related studies. The Virginia Department of Health (VDH) is responsible for classifying shellfish growing waters and monitoring the waters for fecal coliform bacteria. Also, VDH conducts shoreline surveys to determine potential sources of contamination and uses that information to determine the areas that are open or restricted for shellfish harvesting. DEQ then places the restricted areas on the 303(d) List of Impaired Waters for TMDL development.

How will the TMDLs be implemented? DEQ and DCR intend for nonpoint source TMDLs to be implemented through Best Management Practices (BMPs) and expect that implementation will occur in stages. The benefits of staged implementation are:

- As stream monitoring continues to occur, it allows for water quality improvements to be recorded as they are being achieved;
- It provides a measure of quality control, given the uncertainties which exist in any model;
- It provides a mechanism for developing public support;
- It helps to ensure the most cost effective practices are implemented initially; and
- It allows for the evaluation of the adequacy of the TMDL in achieving the water quality standard.

Additional information can be found at:
- www.deq.state.va.us/water
- www.dcr.state.va.us
- www.dmme.state.va.us
- www.vdh.state.va.us
**Bacteria** TMDL IMPLEMENTATION

**What happens after the TMDL Study is complete?** The TMDL Study will be submitted to EPA where they will have 30 days to review and approve the TMDL. Then a TMDL Implementation Plan (IP) will be developed to bring the impaired water body up to standards. Virginia state law requires the development of an IP. The plans are required to include a schedule of actions, costs, and monitoring. Ideally, IP development starts within a year of EPA approval of the TMDL Study. In addition to state-led plan development, DEQ and DCR are currently developing a framework for implementation plans that can be used by local stakeholders.

**What funding will be available to help support the stakeholders' efforts in implementing the TMDLs?** DEQ fully realizes that Best Management Practices (BMPs) implementation is a costly undertaking. There are several sources of funding such as the Virginia Revolving Loan Fund, USDA’s CREP and EQIP programs, and Virginia’s Agricultural Cost-Share Program. The state agencies involved in TMDL development (DEQ, DCR, DMME and VDH) projected an estimated cost to the Commonwealth of almost $60 million to develop TMDLs for the waters throughout the State and a cost of more than $500 million to implement the TMDLs over the next 10-15 years. While it is not possible at this time to estimate specific dollar amounts that will be made available, it is not DEQ’s intention to impose an unreasonable financial burden on the stakeholders.

**How will TMDLs be implemented?** DEQ and DCR intend for nonpoint source TMDLs to be implemented through Best Management Practices (BMPs) and expect that implementation will occur in stages. The benefits of staged implementation are:
- As stream monitoring continues to occur, it allows for water quality improvements to be recorded as they are being achieved;
- It provides a measure of quality control, given the uncertainties which exist in any model;
- It provides a mechanism for developing public support;
- It helps to ensure the most cost effective practices are implemented initially, and
- It allows for the evaluation of the adequacy of the TMDL in achieving the water quality standard.

**What if it is not feasible to reach Water Quality Standards due to nature or uncontrollable factors?** DEQ’s focus in this area is to ensure that the water quality goals we are trying to achieve are appropriate and worth the resources that will need to be spent to achieve them. In some of the streams, fecal coliform bacteria counts contributed by wildlife result in standards violations. In order to address this issue, the Commonwealth is currently reviewing its water quality standards with respect to fecal coliform bacteria. The issues under review are 1) indicator species,
and 2) designated uses. Another option that EPA allows is for states to adopt site specific criteria based on natural background levels of fecal coliform. The state must demonstrate that the source of fecal contamination is natural and uncontrollable by effluent limitations and BMPs through a so-called Use Attainability Analysis (UAA). All site-specific criteria or designated use changes must be adopted as amendments to the water quality standards regulations.

**Is there a list of Best Management Practices that might be employed in urban areas?** Each TMDL is specifically tailored to address the conditions and circumstances that pertain to that impaired water. Many urban area BMPs used in the past to reduce human bacteria loading from failing septic systems and leaking sewer lines include education on septic-pump-outs and a sanitary sewer inspection and management program. Also beneficial are controlling urban wash-off from parking lots and roads by implementing more restrictive ordinances to reduce fecal loads from pets, improved garbage collection and control, and improved street cleaning. More detailed information can be found at [http://h2osparc.wq.ncsu.edu/info/bmps.html](http://h2osparc.wq.ncsu.edu/info/bmps.html)

**Is there a list of Best Management Practices that might be employed in agricultural areas?** Again, each TMDL is specifically tailored to address the conditions and circumstances that pertain to that impaired water. Many agricultural BMPs used successfully in the past to lower bacteria levels in streams include livestock exclusion from streams, reducing stormwater run-off of barnyards and feedlots by additional buffering in the riparian zone, and manure management practices. As in urban areas, addressing failing septic systems and straight pipes has been very effective. In general, near-stream (or riparian) restoration activities have been shown to be the most effective. More detailed information can be found at [http://h2osparc.wq.ncsu.edu/info/bmps_for_agtns.html](http://h2osparc.wq.ncsu.edu/info/bmps_for_agtns.html)

**What requirements may be added to a MS4/VPDES permits as a result of TMDLs?** The regulatory basis linking NPDES permits and TMDLs is 40 CFR §122.44(d)(vii) of the Code of Federal Regulations. EPA Region III has stated that the loading from stormwater covered by an MS4 permit needs to be expressed as a Wasteload Allocation (WLA). EPA Headquarters is currently developing guidance on the connection between TMDLs and MS4 storm water permits. EPA Region III staff have stated verbally that in the context of this guidance, MS4 permits will be reviewed on a case-by-case basis. At this time, DEQ expects to apply the BMP option to address TMDLs in waters covered by MS4 permits. Revisions of the MS4/VPDES permits that apply to waterbodies with TMDLs would then require implementation of BMPs to specifically address the TMDL pollutants of concern.

**What requirements may be added to individual VPDES permits as a result of TMDLs?** Federal and state regulations require effluent limits to be “consistent with the assumptions and requirements of any available waste load allocation prepared by the State and approved by EPA pursuant to” the federal TMDL regulations. For bacteria TMDLs, the WLA is calculated as the maximum permitted annual discharge and the permitted bacteria concentration limit, i.e. 200 counts/100mL. Functioning waste water treatment plants typically do not contribute to bacteria pollution in streams. However, if a treatment plant is considering an expansion, that expansion would not meet the WLA at 200 counts/100mL. Therefore, the TMDL would have to be re-opened, or the facility could voluntarily agree to a lower effluent limit.

**Additional information can be found at:**

[www.deq.state.va.us/water](http://www.deq.state.va.us/water)
[www.dcr.state.va.us](http://www.dcr.state.va.us)
[www.vdh.state.va.us](http://www.vdh.state.va.us)

Please send comments to jschneider@deq.state.va.us

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PROACTIVE APPROACH TO RESTORING WATERS IMPAIRED BY Bacteria

What is the Proactive Approach for Restoring Impaired Waterbodies? The Proactive Approach aims to clean impaired water bodies through voluntary methods in order to avoid the costly and time-consuming process of developing Total Maximum Daily Loads, or TMDLs, and TMDL implementation plans (see fact sheet on TMDL Development for definitions).

What is the basis for the Proactive Approach in waters impaired by bacteria? A number of bacteria TMDLs have been developed throughout Virginia and the nation. The findings for bacteria impairments have consistently demonstrated a commonality in the corrective actions that are needed to restore the stream so that it meets water quality standards. In rural agricultural areas, the elimination of cattle access to streams is the single most important corrective action, followed by the repair and/or replacement of failing septic systems. In rural residential areas, repair and/or replacement of failing septic systems and the elimination of straight pipes top the list of corrective actions. In urban areas, the maintenance of wastewater infrastructures and the control of pet waste are the top two items. Because of the consistent findings in the TMDL studies to date, the proactive approach proposes the implementation of corrective actions in advance of the TMDL. More detailed information on bacteria control strategies can be found at the following web site. http://h2osparc.wq.ncsu.edu/info/

How does the Proactive Approach work? The Proactive Approach utilizes the “two-year look-back requirement” which mandates that an impaired water body would have to be meeting water quality standards for two years before qualifying for removal from the 303(d) list of impaired waters. Because in many cases, sources of bacteria pollution are obvious, and because bacteria pollution tends to respond rapidly to the implementation of Best Management Practices, or BMPs, waters impaired by bacteria are particularly suitable for the proactive approach. The three components of the proactive approach are as follows:

- The proactive approach for a water body impaired by bacteria would be initiated by a search for in or near stream sources of bacteria. This can be done by stream walks or with help from local experts from DEQ, VDH, DCR, USDA and other local, state and federal agencies.
- Restoration efforts would then be targeted at these visible pollution sources for a limited number of years, e.g. one or two. Screening methods to identify hot spots might also be used.
- At the end of that time period, DEQ’s ambient monitoring over a two year period would allow an evaluation of water quality improvements. If the water quality standard is being met, a TMDL would no longer be necessary and the water body would qualify for removal from the impaired waters list. If the water quality standard is not being met, more intensive monitoring and TMDL development would need to occur. As with...
the listing process and TMDL development, the U.S. Environmental Protection Agency is the approving authority for delisting a waterbody from the 303(d) list of impaired waters.

What are the limitations with the Proactive Approach? The biggest limitation might well be funding because almost all state resources at this time are focused on TMDL development. This is because Virginia is required to submit a certain number of TMDLs every biennium and currently has no funds to support the proactive approach. However, numerous other funding sources are available that may be applied to this approach. The second limitation is organizational – in order for the approach to work, a watershed group or locality has to commit time and resources to focus and keep track of the restoration activities. On the other hand, this limitation also provides for the flexibility at the local level to address water quality problems in a targeted way. The third limitation is timing. All waters listed on Virginia’s 1998 303(d) list of impaired waters need to be meeting water quality standards or have a TMDL by 2010. With the “2-year look back requirement”, this does not allow much time for restoration activities.

How can the public participate in the Proactive Approach? Because the proactive approach relies on voluntary implementation of corrective actions, the public’s participation in the process is crucial. The public can participate in several ways:

- Nominate potential candidates for the proactive approach to your local DEQ TMDL Coordinator or water quality planner (see address list below): Do you know of any watersheds where a lot of work is on-going or has been done recently? Is there a lot of momentum for water quality improvements in your watershed?
- Find a sponsor for the proactive approach in your watershed and develop a Proactive Action Plan (see below).
- Participate in streamwalks and other data collection activities to help identify major sources of bacteria pollution
- Implement corrective actions on your property or help others to do so.

What are the steps toward a Proactive Approach? First, identify a sponsor for the approach. This might be a locality or watershed group. Second, identify the visible bacteria sources in the watershed. Third, develop a cost estimate and reasonable timeline (no more than 3 years) for eliminating the sources. These three steps comprise the Proactive Action Plan. Lastly, contact your local DEQ office with the Proactive Action Plan and nominate the watershed for the proactive approach.

Contact information for DEQ TMDL Coordinators:

- Valley Regional Office, Harrisonburg
  Sandy Mueller           540-574-7848
- Northern Regional Office, Woodbridge
  Kate Bennett          703-583-3800
- S. Central Regional Office, Lynchburg
  April Grippo           434-582-5120
- W. Central Regional Office, Roanoke
  Jason Hill          540-562-6724
- Piedmont Regional Office, Richmond
  Jennifer Palmore        804-527-5058
- Southwest Regional Office, Abingdon
  Nancy Norton         540-676-4807
- Tidewater Regional Office, VA Beach
  Roger Everton         757-518-2150

Further information on

- Virginia’s TMDL Program at [www.deq.state.va.us/TMDL](http://www.deq.state.va.us/TMDL)
- Virginia’s Citizen Monitoring Program at [www.deq.state.va.us/cmonitor](http://www.deq.state.va.us/cmonitor)
- Virginia’s Agricultural BMP Cost-Share and CREP Programs at [www.dcr.state.va.us](http://www.dcr.state.va.us)
- Virginia’s Community Stewardship Program at [www.dcr.state.va.us](http://www.dcr.state.va.us)
- Virginia’s USDA Grant Programs at [www.usda.nrcs.gov](http://www.usda.nrcs.gov)
- Virginia’s Community Development Grant Programs at [www.dhcd.va.us](http://www.dhcd.va.us)