# CHAPTER 1 INTRODUCTION

The Virginia Department of Environmental Quality (DEQ) is a comprehensive agency responsible for protecting and improving the environment for the well-being of all Virginians. The agency administers state and federal environmental laws and regulations pertinent to air and water quality, water supply, and waste management. This report is produced by the Water Division, which administers the federal Clean Water Act and enforces state laws that protect and improve the quality of Virginia's surface and ground water. Water monitoring programs, the water quality standards program, water quality assessment, the Virginia Pollution Discharge Elimination System permitting program, and Total Maximum Daily Load plans are vital instruments DEQ uses to carry out its duties. Please visit the Water Division website to learn more about these programs and others.

## *Objectives and Federal Requirements*

Under the Clean Water Act, EPA requires that each state develop a program to monitor the quality of its surface and ground waters and prepare a report every two years describing the status of its water quality. Each state identifies waters of concern as having observed effects and schedules additional monitoring, if appropriate, to determine if designated uses are being met. EPA issues guidelines for states to use during the reporting cycle for national consistency purposes. States are encouraged to use these guidelines to prepare these water quality reports for EPA. EPA compiles the data from the state reports, summarizes them, and transmits the summaries to Congress, including an analysis of water quality nationwide. This 305(b)/303(d) Integrated process is the principal means by which the EPA, Congress, and the public evaluate current water quality, the progress made maintaining and restoring water quality, and the extent of remaining work to be done. Many states, including Virginia, rely on the 305(b)/303(d) process for information needed to conduct water quality planning. The 305(b)/303(d) process is an integral part of Virginia's water quality management program, requirements which are set forth in 40 CFR 130.

Section 305(b) of the Clean Water Act requires each state to submit a biennial report to EPA describing the quality of its navigable waters. The 305(b) report provides DEQ's best overall assessment of water quality conditions and trends in the Commonwealth. The report is intended to be used as a tool in planning and management (40 CFR 130, page 4) of waters in Virginia. The report also directs continuous planning and implementation activities in coordination with the State Water Quality Management Plan and the Continuous Planning Process (CPP).

Primary objectives of a 305(b) report are:

1. To educate and inform citizens and public officials about Virginia's overall water quality.

2. To analyze water quality data to determine the extent to which Virginia's waters are supporting the designated uses for all state waters and to compare the results to water quality standards and other appropriate criteria and guidelines.

3. To determine the causes non-attainment of designated uses in the State's waters.

4. To determine the nature and recognizable extent of point and nonpoint source impacts in accordance with state and federal guidelines.

Section 303(d) of the Clean Water Act and the Environmental Protection Agency's regulation 40 CFR, Section 130.7 (d) requires each state to submit a Total Maximum Daily Load (TMDL) Priority List to EPA on April 1 of even numbered years. This list is provided in Appendix 1a.

Category 4 includes waters that are "effluent-limited" and other waters not needing a TMDL, such as those deemed as naturally impaired. Effluent-limited waters are those waters where standards are expected to be met with the application of effluent control technology associated with secondary and/or "best practice" treatment. Waters receiving effluent from facilities with water quality standards-based

effluent limits in their Virginia Pollution Discharge Elimination System (VPDES) permits and have schedules of compliance to meet these limits within the next reporting cycle or within the current permit cycle (five years) are classified as category 4B (impaired but not needing a TMDL). It is assumed that water quality standards will soon be met for these waters once pollution control requirements of the permitee are enacted. Waters that have compliance schedules extending past the current permit cycle or the reporting period are placed on the 303(d) impaired waters list (category 5E). It is assumed that a facility associated with a category 5E water needs additional compliance review and tracking until the compliance schedule of its permit falls within the next reporting or permitting cycle.

In summary, the Integrated Report provides the following information relating to:

- the delineation of water quality assessment units (AUs) based on National Hydrography Dataset (NHD);
- the status of and progress toward achieving comprehensive assessments of all waters;
- the attainment status of designated uses for every AU assessed;
- additional monitoring that may be needed to determine designated use support status and, if necessary, to assist development of TMDLs for each pollutant/AU combination;
- schedules for additional monitoring planned for AUs;
- pollutant/AU combinations still requiring TMDLs; and
- TMDL development schedules reflecting the priority ranking of each pollutant/AU combination.
- "Effluent Limited" Waters.

### *Assessment Scheme*

The 305(b) process assesses six primary designated uses, as appropriate for a particular waterbody, based on water quality standards:

**Aquatic Life Use:** supports the propagation, growth, and protection of a balanced indigenous population of aquatic life which may be expected to inhabit a waterbody. In Chesapeake Bay waters (mainstem and tributaries), this use is divided into sub-uses that target specific aquatic life assemblages.

**Recreation Use:** supports swimming, boating, and other recreational activities.

**Fish Consumption Use:** supports game and marketable fish species that are safe for human health.

**Shellfishing Use:** supports the propagation and marketability of shellfish (clams, oysters, and mussels).

**Public Water Supply Use:** supports safe drinking water.

**Wildlife Use:** supports the propagation, growth, and protection of associated wildlife.

The 2012 EPA Integrated Report Guidance and Assessment Database (ADB V2.3.1) continues to use five categories ("category 4" having three subcategories) in which every assessment unit (AU) should be placed based on designated use attainment. Additionally, Virginia has devised several sub-categories to supplement the federal categories, enabling a more precise system of tracking and reporting.

Below are the EPA defined categories followed by associated Virginia defined subcategories**:**

**<u>*FULLY SUPPORTING* - Waters are supporting one or more designated uses</u>**

- **EPA Category 1 -** Attaining all associated designated uses and no designated use is threatened

  **Va. Category 1A -** waters are attaining all uses and a TMDL has been developed for one or more uses.

- **EPA Category 2 –** Available data and/or other information indicate that some, but not all of the designated uses are supported.

  **Va. Category 2A -** waters are supporting all of the uses for which they are monitored.

  **Va. Category 2B -** waters are of concern to the state but no water quality standard exists for a specific pollutant, or the water exceeds a state screening value or toxicity test.

  **Va. Category 2C -** waters are now attaining the use(s) for which they were originally 303(d) listed and the TMDL is EPA approved but other applicable use(s) were not monitored and assessed.

***INDETERMINATE* - Waters needing additional information**

- **EPA Category 3 -** Insufficient data and/or information to determine whether any designated uses are met.

  **Va. Category 3A -** no data are available within the data window of the current assessment to determine if any designated use is attained and the water was not previously listed as impaired.

  **Va. Category 3B -** some data exist but are insufficient to determine support of designated uses. Such waters will be prioritized for follow-up monitoring, as resources allow.

  **Va. Category 3C**- data collected by a citizen monitoring or another organization indicating water quality problems may exist but the methodology and/or data quality has not been approved for a determination of support of designated use(s). These waters are considered as having insufficient data with observed effects. Such waters will be prioritized by DEQ for follow-up monitoring.

  **Va. Category 3D** - data collected by a citizen monitoring or other organization indicating designated use(s) are being attained but the methodology and/or data quality has not been approved for such a determination.

***IMPAIRED* - Waters are impaired or threatened but a TMDL is not required.**

- **EPA Category 4A –** water is impaired or threatened for one or more designated uses but does not require a TMDL. A new TMDL is not necessary to address the newly identified impaired tributaries if TMDL modeling, source identification and reductions cover the entire watershed and the TMDL has been approved by EPA. These waters are primarily related to shellfish and/or recreational bacteria impairments but could include benthic impairments.

- **EPA Category 4B -** water is impaired or threatened for one or more designated uses but does not require the development of a TMDL because other pollution control requirements (such as VPDES limits under a compliance schedule) are reasonably expected to result in attainment of water quality standards by the next reporting period or permit cycle.

- **EPA Category 4C -** water is impaired or threatened for one or more designated uses but does not require a TMDL because the impairment is not caused by a pollutant and/or is determined to be caused by natural conditions.

***IMPAIRED* - Waters are impaired or threatened and require a TMDL**

- **EPA Category 5 - Waters are impaired or threatened and a TMDL is needed.**

  **Va. Category 5A -** a water quality standard is not attained. The water is impaired or

threatened for one or more designated uses (excluding shellfish use) by a pollutant(s) and requires a TMDL (303d list).

**Va. Category 5B -** the water quality standard for shellfish use is not attained. One or more pollutants causing impairment require TMDL development.

**Va. Category 5C** - the water quality standard is not attained due to "suspected" natural conditions. The water is impaired for one or more designated uses by a pollutant(s) and may require a TMDL (303d list). Water quality standards for these waters may be re-evaluated due to the presence of natural conditions.

**Va. Category 5D** - the water quality standard is not attained where TMDLs for a pollutant(s) have been developed but one or more pollutants are still causing impairment requiring additional TMDL development.

**Va. Category 5E** - effluent limited facilities are not expected to meet compliance schedules by next permit cycle or reporting period.

**Va. Category 5F** - the water quality standard is attained for a pollutant(s) with a TMDL and 303(d) delisting approved but the water remains impaired for additional pollutant(s) requiring TMDL development.

- **EPA Category 5M** – the water quality standard is not attained for mercury primarily due to atmospheric deposition.

### *Data Used To Determine Water Quality*

There are two basic types of water quality data used in the assessment process. The primary type is "monitored" data approved through the quality assurance/quality control process (QA/QC). The data come from the analysis of chemical, biological, and/or physical samples collected by DEQ or by individuals and organizations that have been approved by DEQ. These data are considered to be of the highest quality. Generally, states compile their lists of impaired waters using only monitored data, which are generated using EPA-accepted sampling and analytical methods. All non-DEQ monitoring data submittals used in an assessment, except chemical data submittals from the U.S. Geological Survey (USGS), must include a sampling and analysis protocol for DEQ review.

The second type of data used in the assessment is considered "evaluated" data. These physical, chemical, and biological data are primarily obtained from sources without an EPA-approved or DEQ-accepted sampling protocol. These data are considered to be of lower quality than monitored data. Normally, these data are not used directly for listing waters as impaired, but may be used to identify observed effects that may trigger additional follow-up monitoring.

Non-DEQ water quality data continue to be tremendously valuable to the assessment process. The data generated by citizen groups, the private sector, and other governmental agencies extend the reach of DEQ's monitoring network. Quality assurance and quality control (QA/QC) continue to be a concern for regulatory use of "outside" data, and DEQ has made a considerable effort to improve the data quality of outside data providers by reviewing monitoring protocols and holding training events. DEQ's objective is to certify additional non-DEQ QA/QC data, with the consent of contributors, for future designated use determination in the overall statewide water quality assessment.

DEQ welcomes submission of both monitored and evaluated data. Data submittals are accepted continuously. Data should be submitted for review through March 30$^{th}$ of the previous odd-year to be considered for inclusion in the next even-year assessment report. Chapter 3.5 provides more information about DEQ's citizen monitoring program.

*On-going Refinement to the Assessment Process*

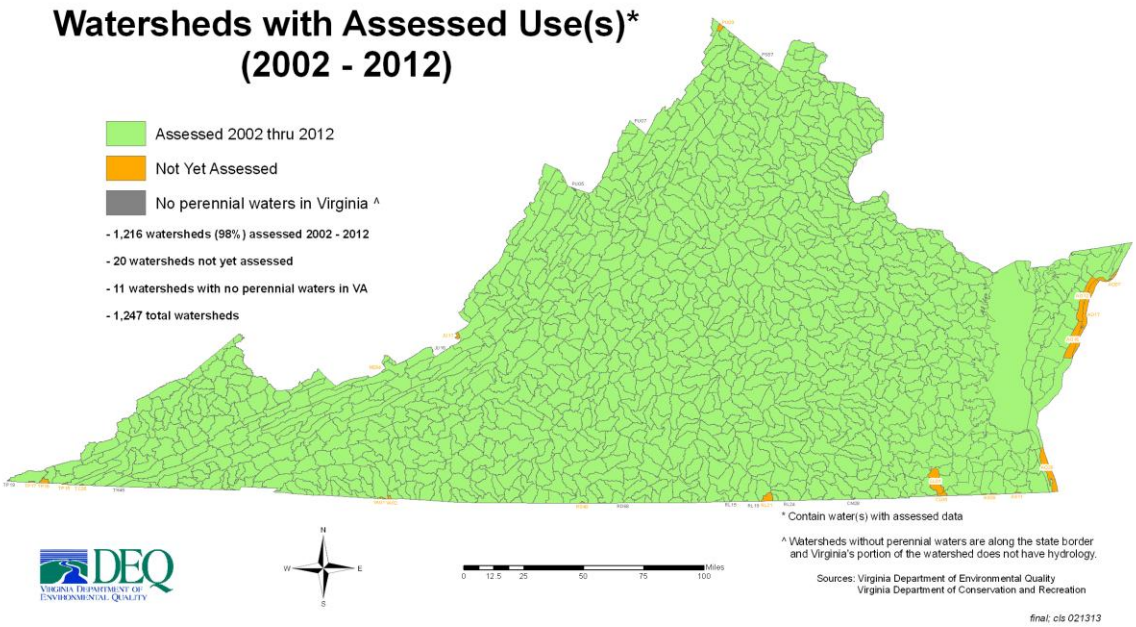
In an on-going effort to increase assessment accuracy, Virginia is refining its GIS data using high-resolution imagery. This work allows for the delineation of AUs based on the US Geological Survey National Hydrography Dataset, which provides the most up-to-date characterization of the size, shape, and flow of surface waters. For the 2010 assessment, there were size changes in lakes/reservoirs acres compared to what was reported in previous assessments, and this was primarily due to the use of more refined GIS layers. Virginia has made significant progress and will continue to put resources towards this work.

DEQ has again used a six-year assessment data window for the 2012 report. This data window follows a 2006 update to the ambient water monitoring strategy for Virginia, which has incorporated all 1,247 12-digit (6$^{th}$ Order) sub-watersheds into the existing rotating watershed monitoring approach. This approach uses a two-year, semi-monthly monitoring scheme, as described in Chapter 3.1, prior to rotating to another sub-watershed. This approach is designed to cover one-third of these smaller sub-watersheds throughout the state every two years. Thus, after six years, almost every sub-watershed within the state is scheduled to be monitored. This is the third assessment report to fully reflect this updated watershed rotation scheme. Figure 1 shows the spatial coverage of DEQ's ambient water monitoring program since 2002.

Water quality standards and assessment protocols for the Chesapeake Bay are frequently reviewed and adjusted as new knowledge about this complex system is acquired. New water quality standards for dissolved oxygen (DO) and submerged aquatic vegetation (SAV) in the Chesapeake Bay and its tidal tributaries were adopted and assessed for the first time in the 2006 Integrated Report. Additional refinements have been added to the Bay standards based on the most recent Chesapeake Bay Criteria Addendum (2010). The 2012 assessment results found in Chapter 4.4 are based on these refined protocols.

Additionally, DEQ regularly reviews and revises, when necessary, Virginia's water quality standards. The amendments proposed in the last Triennial Review of Standards became effective February 1, 2010 and have been used accordingly for this assessment.

**Figure 1. Map with sub-watersheds assessed since the 2002 report**



*Planning through 2012 and Beyond*

Funding for the monitoring program has been greatly reduced due to the economic conditions of Virginia. Fish tissue analysis has been temporarily suspended and other monitoring programs have had to be modified. However, during the summer of 2010, an Atlantic coastal waters monitoring initiative was conducted. DEQ, with the assistance of EPA, sampled the near shore waters off of the coast of Virginia for the first time and collected baseline data for future comparison. Additionally, an initiative to update the monitoring strategy based on current economic conditions has begun. The revised strategy will be implemented in 2013 and used for the 2016 assessment.