Report

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RD683 - 2019-2020 Report on Toxics Reduction in State Waters – January 1, 2021

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Enabling Authority: Code of Virginia - § 62.1-44.17:3 (B.)

Executive Summary:

The Virginia Department of Environmental Quality (DEQ), on behalf of the State Water Control Board, submits a Toxics Reduction in State Waters (Toxics) Report to the Governor and designated committees of the Virginia General Assembly by January 1st of each odd-numbered year, in accordance with § 62.1-44.17:3 of the Code of Virginia. Submission of this 2021 report was delayed due to the Covid-19 pandemic.

The Report: Toxics Reduction in State Waters

The primary objective of the Toxics Report is to document the state’s commitment to improving water quality, more specifically in relation to chemical contamination which may induce toxic effects on aquatic life, other wildlife or on human health.

This commitment includes the following actions:

1. The prevention of contamination of the Commonwealth’s waters by toxics,

2. The persistent monitoring of those waters for the presence of toxics, and

3. The implementation of remedial measures to reduce and/or eliminate toxics found in the state’s waters.

Although the reduction of toxics in the state’s waters is primarily the responsibility of DEQ, various other agencies and organizations participate in the process, including the Virginia Department of Conservation and Recreation (DCR), the Virginia Department of Health (VDH), the Environmental Protection Agency’s (EPA) Interstate Chesapeake Bay Program Office (CBPO), and the U.S. Geological Survey (USGS). This report summarizes the results of current activities directed toward toxics reduction and provides guidance on how to access further resources and information on specific subjects. DEQ submitted the first Toxics Report in January 1998. The January 1999 report provided basic background information related to the report’s objectives and a basic model for its continued evolution. The current, twentieth Toxics Report (January 2021) provides a summary of the toxics-related prevention, monitoring and remediation activities of the previous two State Fiscal Years (SFY) and contains tables of both raw data and statistical summaries of SFY19 and SFY20 monitoring results (July 1 2018-June 30-2020). For programs with time lags between data collection and reporting periods, the most recent information available was used.

Historical summaries of results from 1997 through the present are available on the agency’s website at https://www.deq.virginia.gov/water/water-quality/monitoring.

Functional Definitions: Toxics, Toxicity,

The Code of Virginia (Chapter 3.1, Title 62.1, § 62.1-44.17:2) defines toxics or toxic substance as “any agent or material listed by the USEPA Administrator pursuant to § 307(a) of the Clean Water Act and those substances on the ‘toxics of concern’ list of the Chesapeake Bay Program as of January 1, 1997." It further defines toxicity as “the inherent potential or capacity of a material to cause adverse effects on a living organism, including acute or chronic effects on aquatic life, detrimental effects on human health or other adverse environmental effects." This definition is rather broad, since an excess or even a deficit of many non-toxic substances can also cause adverse effects, both acute and chronic, on living organisms. This report consequently restricts the definition of toxicity to include only those substances that are directly and chemically detrimental to living organisms when they are in excess. Direct chemical effects would exclude the physical effects of excess sedimentation or the indirect effects of nutrient enrichment, for example, both of which would also be detrimental to aquatic life. Furthermore, the concept of “other adverse environmental effects" must be defined in biological terms, since toxicity can only be observed, described, and quantified in relation to living organisms. The classification of chemical substances (i.e., a material) within the category of toxics (i.e., those that cause toxicity) is always based on the observed effects of their presence on specific living organisms. In fact, the concept of excess itself is defined in terms of the concentrations at or above which living organisms experience detrimental effects. Toxicity varies considerably among chemical substances and can increase or decrease (synergism and antagonism) in the environment based on interactions within pollutant mixtures. Generally toxicity is a function of chemical concentration or dose, and duration of exposure time. Species, life stage, and environmental variables (e.g., temperature, hardness, organic carbon) can impact toxicity in addition to dose and exposure time. The Federal Clean Water Act (CWA) defined the responsibility of the Environmental Protection Agency in identifying the critical concentrations at which distinct chemical substances begin to elicit a specified degree of deleterious effect, and establishing the associated water quality criteria that the states adapt as water quality standards to identify impaired waters.

Federal Water Quality Criteria

The CWA first described the scope and purpose of water quality standards and defined the authority and responsibility of EPA and the various states in relation to the requirements for, submission of, and establishment of, such standards. Since then, EPA has published various lists of toxic materials for which the movement, use, and/or release into the environment must be documented or for which concentrations in the environment must be monitored and their effects assessed and subsequently controlled. EPA reviews the results of published studies (both academic and commercial) and conducts its own research to determine what concentrations of chemical substances are detrimental to aquatic life, other wildlife and human health, and to what degree. Based on the results of this evaluation, water quality criteria may be established for freshwater, saltwater, or drinking water, identifying the concentrations that induce direct chronic or acute toxic effects on aquatic life, subsequent poisonous effects on wildlife or humans, or long term carcinogenic (cancer producing) effects on human health.

On December 22, 1992, the EPA published in the Federal Register a comprehensive list of 126 chemical substances for which it had established water quality criteria related to aquatic life in freshwater and saltwater and/or to human health risks. Subsequent studies often (1) identified additional toxics for which criteria were established, or (2) resulted in the establishment of new criteria for previously defined toxics. The list has been repeatedly modified during the ensuing years. On June 22, 2016, President Obama signed the Frank R. Lautenberg Chemical Safety for the 21st Century Act, which updated the Toxic Substances Control Act. Additional modifications of existing criteria, as well as the establishment of criteria for new substances, continue to update the EPA list and help maintain or improve the quality of the nation’s waters.

Supplemental Information:

EPA provides its most recent complete list of nationally recommended water quality criteria for both priority (P) and non-priority (NP) toxic pollutants in electronic form on the EPA website at: https://www.epa.gov/wqc.

For information about updates to the Toxic Substances Control Act, please visit: https://www.epa.gov/laws-regulations.

Detailed information on recent updates concerning Aquatic Life may be found at: https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table

Virginia’s Water Quality Standards – WQS

Once federal water quality criteria have been established for a chemical substance, it is the responsibility of the individual states to establish water quality standards that are protective of the designated use(s) assigned to each body of water in each state’s laws and regulations. The most common designated uses include the support of aquatic life, other wildlife, fish consumption, shellfish consumption, human primary contact (swimming) or secondary contact (fishing, boating) recreation, and public water supplies (where applicable). The Commonwealth of Virginia has established and periodically revises water quality standards, which EPA reviews and must approve prior to their application. These standards are set forth at 9VAC25-260 (Virginia Administrative Code Title 9. Environment, Agency 25. State Water Control Board, Chapter 260). Virginia’s designated uses are recreational uses, e.g., swimming and boating; the propagation and growth of a balanced, indigenous population of aquatic life, including game fish, which might reasonably be expected to inhabit them; wildlife; and the production of edible and marketable natural resources, e.g., fish and shellfish.

The most recent revisions to the Water Quality Standards Regulation included amendments to 94 human health criteria, which represent specific levels of chemicals or conditions in a water body that are not expected to cause adverse effects to human health due to water or fish tissue ingestion. The amendments were based on EPA’s nationally recommended criteria updates issued in 2015, which reflected the latest scientific information and EPA policies, including revised body weight, drinking water intake, health toxicity values, fish consumption rate, bioaccumulation factors, and relative source contributions. EPA has approved Virginia’s human health criteria amendments and they became effective on October 21, 2020. These criteria will be used in water quality assessments in the 2022 Water Quality Assessment Integrated Report.

Virginia’s Water Quality Standards are available online at: https://law.lis.virginia.gov/admincode/title9/agency25/chapter260/.

Federal Reporting Requirements

In addition to the biennial 305(b)/303(d) Water Quality Integrated Report, federal law requires reporting procedures for the production, movement, storage, use, and release of many of these toxic substances. These procedures, as well as Virginia’s annual Toxics Release Inventory (TRI) Report, are discussed more fully in Chapter 3.

DEQ’s activities directed toward the reduction of toxics in state waters fall into three general categories: the prevention of toxic inputs to the Commonwealth’s waters, the monitoring for toxics in water, sediment and fish tissues, and the implementation of remediation activities to reduce or eliminate toxics found in the state’s waters.