

Department of Natural Resources and Environmental Control

Division of Water Resources

Statutory Authority: 7 Delaware Code, Chapter 60

Total Maximum Daily Load (TMDL) for Nanticoke River and Broad Creek, Delaware

Secretary's Order No. 98-W-0045

Date of Issuance: November 6, 1998

Re: Proposed TMDLs for nitrogen and phosphorus for the Nanticoke River and Broad Creek

Effective Date of TMDL: December 10, 1998

I. BACKGROUND

A public hearing was held on September 9, 1998, at the Boy's and Girl's Club of Western Sussex in Seaford, to receive comment on a proposed Total Maximum Daily Load (TMDL) regulation for the Nanticoke River and Broad Creek because Section 303(d) of the Clean Water Act (CWA) as amended by the Water Quality Act of 1987 requires states to identify those waters within their boundaries which are water quality limited, to prioritize them, and to develop TMDLs for pollutants of concern. A water quality limited water is a waterbody in which water quality does not meet applicable water quality standards, and/or is not expected to meet applicable standards, even after application of technology-based effluent limitations for Publicly Owned Treatment Works and other point sources. The Nanticoke River and Broad Creek in Delaware have been identified as water quality limited waters, included in Delaware's 1996 and 1998 303(d) list, and targeted for development of TMDLs. The major environmental problems in the subbasin are nutrient overenrichment and low dissolved oxygen levels caused by point source discharges and nonpoint sources.

To develop a TMDL for the Nanticoke River and Broad Creek, intensive water quality monitoring was conducted from 1991 through 1994. During this period, water quality and quantity data were collected for the Nanticoke River and its major tributaries. The result of this monitoring activity was used to develop and calibrate a hydrodynamic and water quality model of the Nanticoke River and Broad Creek. The U.S. Environmental Protection Agency's Water Analysis Simulation Program modeling framework was used for this purpose. The Nanticoke River Model was calibrated to water quality and hydrodynamic conditions of the year 1992 (baseline).

Using the calibrated model of the Nanticoke River, several point and nonpoint source loading scenarios were considered for the subbasin. The results of the analysis showed that to improve water quality conditions of the Nanticoke River, pollutant loads to the River should be significantly reduced. Based on the results of these scenario runs, DNREC proposed TMDLs for the Nanticoke River and Broad Creek. The proposed TMDLs call for implementation of the following action plans:

- A. Implement Biological Nutrient Removal in the three large municipal wastewater treatment plants in the subbasin. These facilities include: Seaford STP, Bridgeville STP and Laurel STP.
- B. Cap pollutant loads from the remaining sewage treatment plants in the subbasin to their present permitted loads.
- C. Develop and implement Best Management Practices for all land use activities in the entire subbasin, so that nonpoint source nitrogen loads are reduced by 30 percent and nonpoint source phosphorus loads are reduced by 50 percent (from the 1992 baseline).

As a result of requests during the hearing, the deadline for submitting further comments was extended from September 18 to October 2, 1998. Following the hearing, the Department submitted a Response Document, addressing each public comment which is part of the record and is incorporated into this Order along with Exhibits A through L introduced by the Department at the hearing. The Hearing Officer prepared his Report and Recommendation dated November 5, 1998, which is also expressly incorporated herein.

II. FINDINGS AND CONCLUSIONS

A. Findings

1. Proper notice of the proceeding was provided as required by law and efforts to secure public participation went beyond the minimum requirements to include an extensive public outreach program as set forth in the introduction to the Response Document, attached hereto.
2. The following waterbodies are the subject of this rulemaking: Lower Nanticoke River (DE-240-001), Upper Nanticoke (DE-240-002) and Broad Creek (DE-50-001). These waterbody segments are over enriched with nitrogen and phosphorus and polluted with biochemical oxygen demanding (BOD) materials from point and nonpoint sources to an extent that requires significant reductions to achieve and maintain designated uses.
3. Consideration of financial or economic effects is not required under 303(d) of the Clean Water Act in setting TMDLs. However such factors will be included in establishing Pollution Control Strategies.

4. The Pollution Control Strategy will consider appropriate and cost effective measures designed to improve water quality.
5. Based on literature values and best professional judgment, nutrient concentrations of 3.0 mg/l nitrogen and 0.1 mg/l phosphorus are appropriate targets for these waters. Furthermore the application of a confidence limit of 20 percent for establishing the TMDLs is appropriate.
6. Nutrients in the Delaware portions of the Nanticoke River and Broad Creek originate from Delaware sources.
7. Differentiation between nonpoint sources of nutrients is not necessary to establish a TMDL which is concerned with the total loads entering the Nanticoke River and Broad Creek.
8. Point sources in these waters have made significant reductions in their discharges as a result of improvement of their treatment processes, however further reductions are necessary to meet the goals of the Clean Water Act.
9. The Clean Water Act and its implementing regulations require TMDLs for all water body segments that do not meet water quality standards, regardless of the fact that some local areas or downstream segments may meet standards.
10. Based on comments received, DNREC made a number of adjustments to its assumptions and data used in the model with regard to nutrient inputs from the S.C. Johnson plant. None of those changes affected the proposed TMDL.
11. Some facilities use groundwater sources for noncontact cooling water. These cooling waters are adding loads of nitrogen and phosphorus when they are discharged to the Nanticoke River and Broad Creek. Nutrient loads from these facilities are capped at their current levels in the proposed TMDL.
12. The modeling tool used to develop the proposed TMDL was developed by the U.S. EPA and has been widely used for similar systems. This model is an appropriate model for the Nanticoke River and Broad Creek.
13. The nonpoint source loading assumptions made for the model are appropriate and were validated when field data matched predicted results.
14. Appropriate field data and assumptions were used in the model. Furthermore, the assumptions used, load reduction scenarios and proposed TMDL were peer reviewed by the Interagency TMDL Workgroup.
15. Wastewater treatment plants that are meeting their waste load allocations established by this proposed TMDL are in compliance; further upgrades of these facilities will not be required. For those facilities not meeting their waste load allocations, any equivalent technology that will result in meeting the targets will be acceptable.

16. There is a sufficient margin of safety in the proposed TMDL for dissolved oxygen and nutrients based on the conservative assumptions used in developing the model and establishing the proposed TMDL.
17. The DuPont Gut is a tidally influenced tributary of the Nanticoke River with known beneficial uses. Due to its tidal nature, this tributary would exist regardless of DuPont's discharge. Hence DuPont Gut is considered to be waters of the State.
18. The Pollution Control Strategy will incorporate extensive stakeholder input into consideration of economic impacts and practicability for all measures determined to be necessary for compliance along with reasonable and achievable timetables.
19. The Clean Water Act does not require an implementation schedule as part of a TMDL; however, DNREC will proceed expeditiously in establishing the Pollution Control Strategy and to fully involve all stakeholders.
20. Concerns about disproportionate allocation of the burden of compliance with this TMDL will be addressed in the Pollution Control Strategy.
21. Failure to adopt the proposed TMDL will result in EPA action to usurp state management of the process and to impose the same requirements by the federal government.

B. Conclusions

Based on credible evidence in the record, the Department has a reasonable basis upon which to adopt the TMDL regulation as proposed at the hearing, notwithstanding some evidence in the record to the contrary.

III. ORDER

In view of the above findings and conclusions, it is hereby ordered that the proposed TMDLs as set forth in the record be adopted in final form and that the regulatory promulgation process move forward as required by law.

IV. REASONS

The record in this matter provides a reasonable basis to support the Department's proposed TMDL regulation, the adoption of which is necessary to remedy the existing severe nutrient overenrichment and low dissolved oxygen problems in the affected waterbodies.

Christophe A. G. Tulou, Secretary

Total Maximum Daily Load (TMDL) Regulation for Nanticoke River and Broad Creek, Delaware

A. INTRODUCTION and BACKGROUND

Intensive water quality monitoring performed by the Department of Natural Resources and Environmental Control (DNREC) and studies performed by others have shown that the Nanticoke River and Broad Creek are highly enriched with the nutrients nitrogen and phosphorus. Although nutrients are essential elements for both plants and animals, their presence in excessive amounts cause undesirable conditions. Symptoms of nutrient enrichment in the Nanticoke River and Broad Creek have included frequent phytoplankton blooms and large daily swings in dissolved oxygen levels. These symptoms threaten the future of the Nanticoke River Subbasin - very significant natural, ecological, and recreational resources of the State.

A reduction in the amount of nitrogen and phosphorous reaching the Nanticoke River and Broad Creek is necessary to reverse the undesirable effects. These nutrients enter the rivers from point sources and nonpoint sources. Point sources of nutrients are end-of-pipe discharges coming from municipal and industrial wastewater treatment plants and other industrial uses. Nonpoint sources of nutrients include runoff from agricultural and urban areas, seepage from septic tanks, and ground water discharges.

Section 303(d) of the Federal Clean Water Act (CWA) requires States to develop a list (303(d) List) of waterbodies for which existing pollution control activities are not sufficient to attain applicable water quality criteria and to develop Total Maximum Daily Loads (TMDLs) for pollutants of concern. A TMDL sets a limit on the amount of a pollutant that can be discharged into a waterbody and still protect water quality. TMDLs are composed of three components, including Waste Load Allocations (WLAs) for point source discharges, Load Allocations (Las) for nonpoint sources, and a Margin of Safety (MOS).

DNREC listed the Nanticoke River and Broad Creek on the State's 1996 and 1998 303(d) Lists and proposes the following Total Maximum Daily Load regulation for nitrogen and phosphorous.

B. Total Maximum Daily Loads (TMDLs) Regulation for the Nanticoke River and Broad Creek, Delaware

Article 1. Biological Nutrient Removal (BNR), or equivalent, processes shall be employed in three large municipal wastewater treatment plants in the Nanticoke River and Broad Creek Sub-basin. These three facilities include Seaford Sewage Treatment Plant, Bridgeville Sewage Treatment Plant, and Laurel Sewage Treatment Plant. This shall result in reducing nitrogen load from these three facilities from the current permitted load of 199 kilograms per day (439 pounds per day) to 100 kilograms per day (221 pounds per day). Reduction of phosphorous loads from these three

facilities will be from the current permitted load of 33 kilograms per day (73 pounds per day) to 25 kilograms per day (55 pounds per day).

- Article 2. For the remaining wastewater treatment plants in the watershed, discharge of nitrogen and phosphorous loads shall be capped at their current permitted loads. These loads are 568 kilograms per day (1252 pounds per day) of nitrogen and 1.0 kilograms per day (2.2 pounds per day) of phosphorous.
- Article 3. The nonpoint source nitrogen load to the Nanticoke River and Broad Creek shall be reduced by 30 percent (from the 1992 base-line). This shall result in reduction of nitrogen loads during a normal rainfall year from 2274 kilograms per day (5013 pounds per day) to 1723 kilograms per day (3799 pounds per day).
- Article 4. The nonpoint source phosphorus load to the Nanticoke River and Broad Creek shall be reduced by 50 percent (from the 1992 base-line). This shall result in reduction of phosphorous loads during a normal rainfall year from 54 kilograms per day (119 pounds per day) to 36 kilograms per day (79 pounds per day).
- Article 5. Based upon hydrodynamic and water quality model runs and assuming implementation of reductions identified by Articles 1 through 4, DNREC has determined that, with an adequate margin of safety, water quality standards will be met in the Nanticoke River and Broad Creek.
- Article 6. Implementation of this TMDL Regulation shall be achieved through development and implementation of a Pollution Control Strategy. The Strategy will be developed by DNREC in concert with the Department's ongoing Whole basin management Program and the affected public.