

APPENDIX A

Department of Natural Resources and Environmental Control

Division of Water Resources

Statutory Authority: 7 Delaware Code, Chapter 60

**Total Maximum Daily Loads (TMDLs) for Indian River, Indian River Bay,
and Rehoboth Bay, Delaware**

Secretary's Order No. 98-W-0044

Date of Issuance: November 6, 1998

Re: Total Maximum Daily Loads (TMDLs) for Indian River, Indian River Bay, and
Rehoboth Bay, Delaware

Effective Date of Regulation: December 10, 1998

I. BACKGROUND

A public hearing was held on September 2, 1998, at the University of Delaware Virden Center in Lewes to receive comment on DNREC's proposal to establish Total Maximum Daily Loads (TMDLs) for nitrogen and phosphorous for Indian River, Indian River Bay and Rehoboth Bay.

As part of the public participation process, DNREC engaged in significant public outreach and then established an interagency TMDL workgroup with representatives from several state and federal agencies. DNREC also organized the TMDL Advisory Committee for the Inland Bays with representatives from many stakeholder groups. The Advisory Committee met on July 28 and August 11, 1998, at which meetings DNREC presented the TMDL proposal and responded to questions and comments. The proposed TMDL Regulations were published in the Delaware Register of Regulations, Vol. 2, Issue, 2, Saturday, August 1, 1998. A workshop was held September 2 and a public hearing was held later that evening. During the workshop, DNREC again presented the proposed regulation and its technical basis and responded to questions and comments from the audience. A number of commentors requested an extension of the deadline to make comments. Therefore, the original deadline to submit comments was changed from September 11 to September 25, 1998.

After the hearing, DNREC prepared a Response Document which summarized each comment and provided the Department's Response. The exhibits introduced at the hearing by the Department (Exhibits A through N), the public comments from the testimony and by letter, and the Department's Response Document are expressly incorporated into this Order. The Hearing Officer prepared his Report and Recommendation dated November 4, 1998, which is also expressly incorporated herein.

II. FINDINGS AND CONCLUSIONS

A. Findings of Fact

1. Proper notice of the proceeding was provided as required by law and efforts to secure public participation went beyond the minimum legal requirements.
2. The water bodies which are the subject of this rulemaking are over-enriched with nitrogen and phosphorous from point and nonpoint sources to an extent that requires elimination or significant reductions in order to achieve and maintain designated uses.
3. 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.
4. Differentiation of nutrient sources is not necessary to establish a TMDL which is concerned with total load entering the Inland Bays.
5. Failure to achieve atmospheric deposition reduction targets, should that occur, will be considered along with progress in other areas of nutrient load reductions in assessing pollution control strategies.
6. Establishment of TMDLs is required under the Clean Water Act and implementing regulations. TMDLs include allocations for both point and nonpoint sources.
7. The modeling tool used for establishing the proposed TMDL was developed by the U.S. Army Corps of Engineers and is a state-of-the-art program that has been applied to several estuarine systems, including the Chesapeake Bay. The data used, the technical assumptions made, and the conclusions drawn during the modeling phase were peer reviewed by the Scientific and Technical Advisory Committee of the Inland Bays National Estuary Program. Furthermore, the results of load reduction scenarios and proposed TMDL were peer reviewed by the Interagency TMDL Workgroup and the Scientific and Technical Advisory Committee.
8. 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.
9. Delaware Water Quality Standards for nutrients cannot be achieved without load reductions from point and nonpoint sources.

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10. Determining land use practices (e.g., zoning) would be outside the scope of DNREC authority, both in this rulemaking as well as in the Pollution Control Strategy.
11. The margin of safety required by § 303(d) of the Clean Water Act has been adequately addressed through conservative modeling assumptions and projections showing concentrations which are better than existing Water Quality Standards.
12. 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.
13. Article 1 of the TMDL Regulation applies to all point sources which add nitrogen and phosphorous loads to the Inland Bays but does not apply to nutrients already contained in intake water.
14. Concerns about disproportionate allocation of the burden of compliance with this TMDL will be addressed in the Pollution Control Strategy.
15. Because of mixing mechanisms and sediment nutrient recirculation in the Inland Bays, nutrient input across the entire watershed must be reduced to achieve Water Quality Standards in four water body segments: Indian River (DE140-004), Upper Indian River Bay (DE140-E01), Lower Indian River Bay (DE140-E02) and Rehoboth Bay (DE280-E01).
16. The elimination of all point source nutrient discharges is a long-term, fundamental objective of the Clean Water Act which will be implemented through the Pollution Control Strategy in an equitable manner.
17. Scenario 69 was selected because it results in the attainment of Delaware Water Quality Standards with the overall least restrictive load reduction targets.
18. Nutrient uptake between point of discharge and impacted waterbodies does not significantly affect assumptions about loadings because total contributions remain the same.
19. 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.
20. Exemptions for certain point sources are not available under the language of the proposed TMDL although the Pollution Control Strategy will be implemented in a manner that should equitably distribute the burdens of compliance by all stakeholders.

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B. Conclusions

Based on credible evidence in the record, the Department has a reasonable basis for promulgating the TMDL Regulation (Articles 1 through 8) regarding excess nutrients in the Inland Bays, notwithstanding that some evidence was offered to the contrary.

IV. 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.

V. 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 problem in the affected waterbodies.

Christophe A. G. Tulou, Secretary

Total Maximum Daily Loads (TMDLs) Regulation

for Indian River, Indian River Bay, and Rehoboth Bay, Delaware

A. INTRODUCTION and BACKGROUND

Intensive water quality monitoring performed by the State of Delaware, the federal government, various university and private researchers, and citizen monitoring groups has shown that the Indian River, Indian River Bay, and Rehoboth Bay are highly enriched with the nutrients nitrogen and phosphorous. Although nutrients are essential elements for both plants and animals, their presence in excessive amounts cause undesirable conditions. Symptoms of nutrient enrichment in the Inland Bays have included excessive macroalgae growth (sea lettuce and other species), phytoplankton blooms (some potentially toxic), large daily swings in dissolved oxygen levels, loss of Submerged Aquatic Vegetation (SAV), and fish kills. These symptoms threaten the future of the Inland Bays - very significant natural, ecological, and recreational resources of the State - and may result in adverse impacts to the local and State economies through reduced tourism, a decline in property values, and lost revenues. Hence, excessive nutrients pose a significant threat to the health and well being of people, other animals, and plants living within the watershed.

A reduction in the amount of nitrogen and phosphorous reaching the Inland Bays is necessary to reverse the undesirable effects. These nutrients enter the Bays from

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several sources including point sources, nonpoint sources, and from the atmosphere. 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. Atmospheric deposition comes from both local and regional sources, such as motor vehicle exhausts and emissions from power plants that burn fossil fuels.

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 standards and to develop Total Maximum Daily Loads (TMDLs) for pollutants or stressors causing the impacts. 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).

The Delaware Department of Natural Resources and Environmental Control (DNREC) listed the Indian River, Indian River Bay, and Rehoboth Bay on the State's 1996 and 1998 303(d) Lists and has established the following Total Maximum Daily Load regulation for nitrogen and phosphorous.

B. Total Maximum Daily Loads (TMDLs) Regulation for Indian River, Indian River Bay, and Rehoboth Bay, Delaware

- Article 1. All point sources which are currently discharging into the Indian River, Indian River Bay, and Rehoboth Bay and their tributaries shall be eliminated systematically.
- Article 2. The nonpoint source nitrogen loads from tributaries in the upper Indian River shall be reduced by 85 percent (from the base-line period of 1988 through 1990). These tributaries include Swan Creek, Iron Branch, Pepper Creek, Vines Creek, and Millsboro Pond. This shall result in reducing nitrogen loads from these tributaries during a normal rainfall year from 1285 kilograms per day (2833 pounds per day) to 193 kilograms per day (425 pounds per day).
- Article 3. The nonpoint source phosphorous loads from tributaries in the upper Indian River shall be reduced by 65 percent (from the base-line period of 1988 through 1990). These tributaries include Swan Creek, Iron Branch, Pepper Creek, Vines Creek, and Millsboro Pond. This shall result in

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reducing phosphorous loads from these tributaries during a normal rainfall year from 38 kilograms per day (84 pounds per day) to 13 kilograms per day (29 pounds per day).

- Article 4. The nonpoint source nitrogen loads from all remaining tributaries to the Indian River, Indian River Bay, and Rehoboth Bay shall be reduced by 40 percent (from the base-line period of 1988 through 1990). This shall result in reducing nitrogen loads from these tributaries during a normal rainfall year from 732 kilograms per day (1614 pounds per day) to 439 kilograms per day (968 pounds per day).
- Article 5. The nonpoint source phosphorous loads from all remaining tributaries to the Indian River, Indian River Bay, and Rehoboth Bay shall be reduced by 40 percent (from the base-line period of 1988 through 1990). This shall result in reducing phosphorous loads from these tributaries during a normal rainfall year from 36 kilograms per day (79 pounds per day) to 22 kilograms per day (49 pounds per day).
- Article 6. The atmospheric nitrogen deposition rate shall be reduced by 20 percent (from the base-line period of 1988 through 1990). This shall result in reducing the atmospheric nitrogen deposition rate from 765 kilograms per day (1687 pounds per day) to 612 kilograms per day (1349 pounds per day).
- Article 7. Based upon hydrodynamic and water quality model runs and assuming implementation of reductions identified by Articles 1 through 6, DNREC has determined that, with an adequate margin of safety, water quality standards will be met.
- Article 8. 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.