

7400 Watershed Assessment Section

7407 TMDLs for Nutrients for the Indian River, Indian River Bay and the Rehoboth Bay

1.0 Introduction and Background

- 1.1 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.
- 1.2 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 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.
- 1.3 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).
- 1.4 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 proposes the following Total Maximum Daily Load regulation for nitrogen and phosphorous.

2.0 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 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.