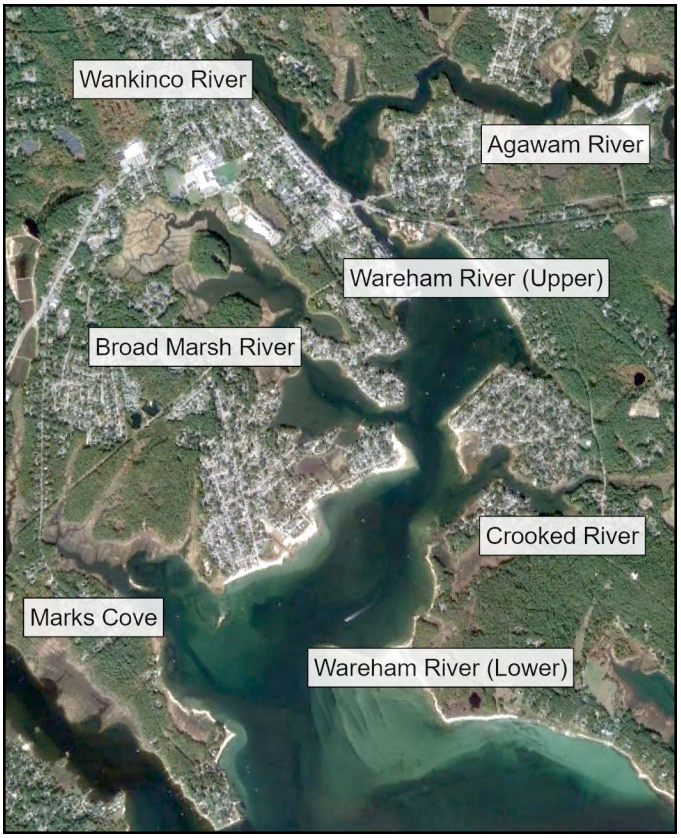
Wareham River Estuary System
Total Maximum Daily Load for Total Nitrogen
TMDL Fact Sheet

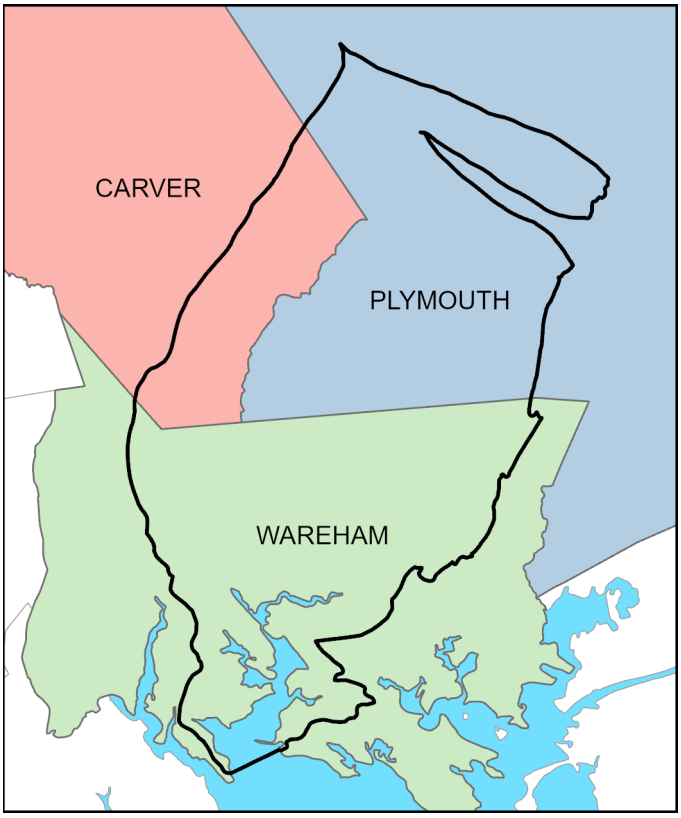
Introduction

The Massachusetts Department of Environmental Protection (MassDEP) is responsible for monitoring the waters of the Commonwealth, identifying those waters that are impaired, and developing a plan to bring them back into compliance with the Massachusetts Surface Water Quality Standards (314 CMR 4.00). MassDEP is then required by the federal Clean Water Act (CWA) to develop a Total Maximum Daily Load (TMDL) to restore the health of impaired waterbodies.

Waterbodies

The Wareham River is a complex estuarine system tributary to Buzzards Bay on its northwestern shore. Its major tributaries include the Agawam River and the Wankinco River, and its smaller tributaries include Broad Marsh Cove, Crooked River, and Marks Cove. The TMDL covers this interconnected set of waterbodies referred to as the Wareham River Estuary System.





Wareham River Estuary System Watershed

Municipalities

The Wareham River Estuary System is located within the Town of Wareham and its upstream watershed area includes the following municipalities:

- Wareham
- Plymouth
- Carver

Nitrogen Loading

Excessive nitrogen (N) originating from a range of sources has impaired the Wareham River Estuary System. In general, excessive N in these waters are indicated by loss of eelgrass beds (which are critical habitats for macroinvertebrates and fish), periodic algae blooms, undesirable increases in macroalgae, periodic decreases in dissolved oxygen concentrations that threaten aquatic life, and reductions in the diversity of benthic animal populations.

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Nitrogen Sources

The N loading that is considered controllable affecting this system originates primarily from the following sources:

- Septic Systems (43%)
- Agricultural Fertilizers (20%)
- Wareham Wastewater Control Facility (16%)
- Impervious Surfaces (11%)
- Lawn Fertilizers (6%)
- Landfills (4%)

TMDL Targets

MassDEP seeks to reduce Total Nitrogen (TN) loads to estuaries in southeastern Massachusetts as part of the longstanding Massachusetts Estuaries Project (MEP). A linked model was used to quantify the local controllable TN loading from sources and establish TN concentration targets at multiple sentinel stations including:

- 0.40 mg/L at the Lower Wareham River (WR-6)
- 0.42 mg/L at the Upper Wareham River (WR-3)
- 0.50 mg/L at the Upper Wareham River (WR-2)
- 0.50 mg/L at Lower Broad Marsh River (BR-4)

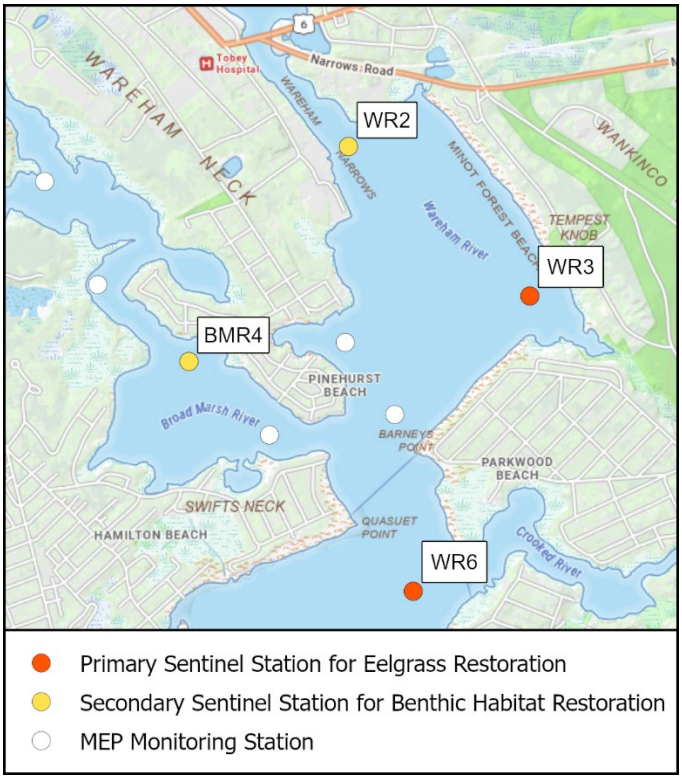
Restoration Goals

The TN concentration targets are based upon the primary goal of restoring eelgrass habitat within the central estuary, with the parallel goal of restoring and protecting benthic habitat throughout the entire system. Based on sampling and modeling analysis provided in the MEP Technical Report, a 38% reduction of the total controllable TN load is required to meet concentration targets.

Implementation

The goal of the TMDL implementation is to lower N concentrations in the Wareham River Estuary System. One load reduction combination* necessary to achieve the threshold N concentrations includes a 79% removal of septic load and a reduction of the N load from the Wareham Wastewater Control Facility to 4,300 kg/year (11.78 kg N/day).

** The communities located within the Wareham River Estuary System watershed are encouraged to evaluate other load reduction scenarios and take any reasonable steps to reduce the controllable N sources. Local officials can explore other load reduction scenarios through additional modeling as part of their Comprehensive Wastewater Management Plan (CWMP).*



Public Participation

An information session to present the results of this TMDL report was held on November 28, 2023. Public comments received during the meeting and comments received in writing within a 30-day comment period following the meeting were considered by the Department. The final version of the TMDL report includes a summary of the public comments, the Department's response to the comments, and attendance records from the virtual meeting and physical meeting room

U.S. EPA Approval

The U.S. EPA approved the TMDL on June 4, 2024.