WATER THREAT LEVEL

HIGH

WATERSHEDS: LOWER CAPE

Swan Pond River

The Problem

The Massachusetts Estuaries Project (MEP) indicates the Swan Pond River system exceeds its critical threshold for nitrogen, resulting in impaired water quality. While a critical nitrogen load has been identified by MEP, a total maximum daily load (TMDL) for nitrogen has not been established.

- **MEP TECHNICAL REPORT STATUS:** Final
- **TMDL STATUS:** In Progress
- **TOTAL WASTEWATER FLOW:** 30 MGY (million gal/year)
  - Treated WW Flow: 0 MGY
  - Septic Flow: 30 MGY
- **UNATTENUATED TOTAL NITROGEN LOAD (MEP):** 16,816 Kg/Y (kilograms/year)
- **ATTENUATED TOTAL NITROGEN LOAD (MEP):** 16,707 Kg/Y
- **SOURCES OF CONTROLLABLE NITROGEN (MEP):**
  - 77% Septic Systems
  - 7% Lawn Fertilizer
  - 13% Stormwater From Impervious Surfaces
  - 3% Landfill

CONTRIBUTING TOWNS

- **DENNIS**
- **HARWICH**

THE MEP RESTORATION SCENARIO

- **WATERSHED TOTAL NITROGEN REDUCTION TARGET:** 75%
- **WATERSHED SEPTIC REDUCTION TARGET:** 100% (The scenario represents the aggregated sub-embayment percent removal targets from the MEP technical report)

SWAN POND RIVER ESTUARY

- **EMBAYMENT AREA:** 181 acres
- **EMBAYMENT VOLUME:** Unknown
- **2012 INTEGRATED LIST STATUS:** Category 5 for fecal coliform
  - Category 5: Waters requiring a TMDL
  - www.mass.gov/eea/docs/dep/water/resources/07v5/12list2.pdf

SWAN POND RIVER WATERSHED

- **ACRES:** 1,901
- **PARCELS:** 2,374
- **% DEVELOPED RESIDENTIAL PARCELS:** 81%
- **PARCEL DENSITY:** 0.8 acres per parcel (approx.)
- **WASTEWATER TREATMENT FACILITIES:** 0

The Swan Pond embayment system is largely located in the Town of Dennis with a small portion in Harwich. It is comprised of a large inland basin that is connected to Nantucket Sound by a 1.8 mile tidal river. Because the tidal flushing is so restricted, Swan Pond has had a history of eutrophic events that have impacted the summer community. The estuary supports a variety of recreational uses including boating, swimming, shell fishing and fin fishing.

Freshwater Sources

PONDS

- **IDENTIFIED SURFACE WATERS:** 7
- **NUMBER OF NAMED FRESHWATER PONDS:** 2
- **PONDS WITH PRELIMINARY TROPHIC CHARACTERIZATION:** 1
  (Listed In Appendix 4C, Ponds With Water Quality Data)
- **2012 INTEGRATED LIST STATUS:** None listed
- **DISCUSSION:** The Town of Dennis has been a participant in the Pond and Lake Stewardship (PALS) program that has helped establish baseline water quality. Additionally, a Town of Dennis ponds report was completed with funding from Barnstable County through the Cape Cod Commission in 2009, providing detailed information for a number of Dennis ponds.

STREAMS

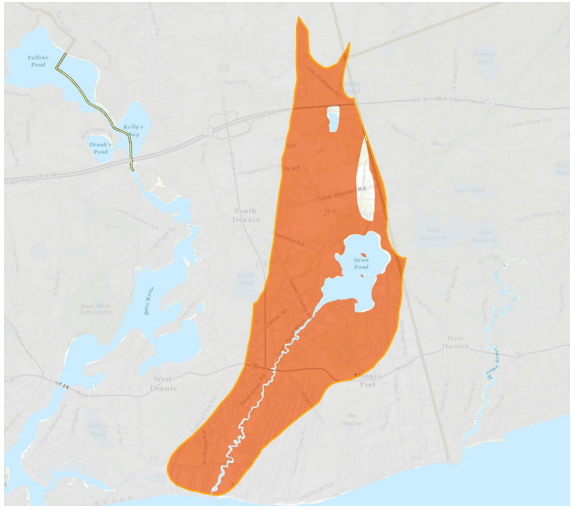
- **SIGNIFICANT FRESHWATER STREAM OUTLETS:** 1
  Stream: Hyda Way Creek
  - Average Flow: 453 cubic meters per day
  - Average Nitrate Concentrations: 0.218 mg/L
  - **DISCUSSION:** Characterization of fresh water streams like these is a regular part of the MEP technical reports. These concentrations are higher than areas of the aquifer with less than 0.05 mg/L background concentrations that are evident in public supply wells located in pristine areas. This provides evidence of the impact of non-point source nitrogen pollution from residential areas on the aquifer and receiving coastal waters.

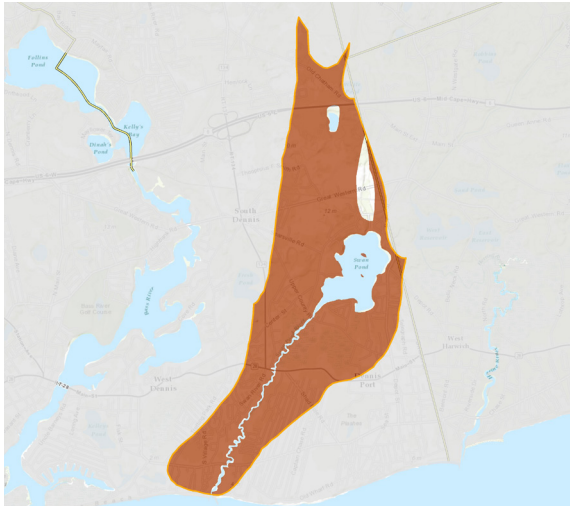
DRINKING WATER SOURCES

- **WATER DISTRICTS:** 1
  - Dennis Water District
- **GRAVEL PACKED WELLS:** 1
  - 1 has nitrate concentrations between 0 and 0.5 mg/L
- **SMALL VOLUME WELLS:** 0

Degree of Impairment and Areas of Need

For the purposes of the §208 Plan Update, areas of need are primarily defined by the amount of nitrogen reduction required as defined by the TMDL and/or MEP technical report. For watersheds that have a MEP technical report, but lack a finalized TMDL, the nitrogen loading information in the report is used. As described above 100% removal of the septic load, or 75% of the total nitrogen load, is required to restore ecological health in the Swan Pond River watershed. The MEP technical report also provides a specific targeted amount of nitrogen reduction required by subwatershed as shown in Figure 4-1 SWP Subwatersheds with Total Nitrogen Removal Targets and Figure 4-2 SWP Subwatersheds with Septic Nitrogen Removal Targets.





0.1% - 9%
9.1% - 38%
38.1% - 62%
62.1% - 86%
86.1% - 100%

Subwatersheds with
Total Nitrogen Removal Target

Figure 4-1 SWP

Subwatersheds with
Septic Nitrogen Removal Target

Figure 4-2 SWP

SWAN POND RIVER

The nitrogen load from the watershed exceeds the threshold identified by MEP for Swan Pond River, resulting in impaired water quality. The ecological health of a water body is determined from water quality, extent of eelgrass, assortment of benthic fauna, and dissolved oxygen and ranges from 1-severe degradation, 2-significantly impaired, 3-moderately impaired, 4- healthy habitat conditions.

MEP ECOLOGICAL CHARACTERISTICS AND WATER QUALITY

- **OVERALL ECOLOGIC CONDITION:** Moderately Impaired to Severely Degraded
- **UPPER SWAN POND RIVER:** Moderately to Significantly Impaired
- **LOWER SWAN POND RIVER:** Moderately Impaired
- **SWAN POND:** Significantly Impaired to Severely Degraded
- **SENTINEL STATIONS:**
  - Total Nitrogen Concentration Threshold: 0.661 mg/L
  - Total Nitrogen Concentration Existing: 0.398 mg/L (As reported at the MEP sentinel water-quality monitoring stations)

LOCAL PROGRESS

DENNIS

Dennis contributes 99% of the attenuated nitrogen load to Swan Pond River. To date, the Town of Dennis submitted a Needs Assessment (2005) listing areas of concern (AOCs) for drinking and wastewater related infrastructure. Dennis identified the AOCs through an analysis of factors including onsite septic system failures and site constraints, shellfish closure areas and, as the Swan Pond River Massachusetts Estuaries Project (MEP) report was not yet published, possible MEP nitrogen loading findings. A number of the AOCs for the Town of Dennis are located in the Swan Pond watershed, including Dennisport.

HARWICH

The town submitted its draft Comprehensive Wastewater Management Plan (CWMP) for review in 2012. The CWMP proposes wastewater collection in the Herring River watershed. The Harwich CWMP proposes treatment and disposal facilities in the Herring River watershed as part of Phases 4, 5, and 7 to be completed by 2029, 2033 and 2043, respectively. The Harwich CWMP includes both structural and non-structural interventions such as use of stormwater best management practices (BMPs), enhanced natural attenuation, and permeable reactive barriers (PRBs) to reduce wastewater collection.

Local efforts in these towns are described in Chapter 6.