



The Problem

The MEP technical report (available at www.oceanscience.net/estuaries/) indicates the Phinneys Harbor system exceeds its critical nitrogen threshold, resulting in impaired water quality. Following the critical nitrogen load put forth in the MEP report, a Total Maximum Daily Load (TMDL) has been published for Phinneys Harbor by the MassDEP and USEPA.

- **MEP TECHNICAL REPORT STATUS:** Final
- **TMDL STATUS:** Final TMDL
- **TOTAL WASTEWATER FLOW:** 35 MGY (million gal per year)
 - Treated WW Flow: 0 MGY
 - Septic Flow: 35 MGY
- **UNATTENUATED TOTAL NITROGEN LOAD (MEP):** 13,620 kg/Y (kilograms per year)
- **ATTENUATED TOTAL NITROGEN LOAD (MEP):** 12,903 kg/Y
- **SOURCES OF CONTROLLABLE NITROGEN (MEP):**
 - 79% Septic Systems
 - 17% Lawn Fertilizer
 - 4% Stormwater From Impervious Surfaces

CONTRIBUTING TOWNS

- **BOURNE**
- **SANDWICH (JBCC)**
- **DISCUSSION:** The land area in Sandwich, and a portion of the land area in Bourne, is not in the control of the town as it is part of Joint Base Cape Cod (JBCC), which is served by a wastewater treatment facility and discharged outside of the watershed.

THE MEP RESTORATION SCENARIO

- **WATERSHED TOTAL NITROGEN REDUCTION TARGET:** 34%
- **WATERSHED SEPTIC REDUCTION TARGET:** 46%
(The scenario represents the aggregated sub-embayment percent removal targets from the MEP technical report)

PHINNEY'S HARBOR ESTUARY

- **EMBAYMENT AREA:** 424 acres
- **EMBAYMENT VOLUME:** 185 million cubic feet
- **2012 INTEGRATED LIST STATUS:** Category 4a for nitrogen, fecal coliform
 - Category 4A TMDL is completed
 - www.mass.gov/eea/docs/dep/water/resources/07v5/12list2.pdf

Phinneys Harbor is an embayment system with shoreline located in the Town of Bourne. The Back River system comprises the system's upper inland reaches. The Back River was designated as an Area of Critical Environmental Concern (ACEC), a state designation that creates a framework for local and regional stewardship. The embayment system supports a variety of recreational uses including boating, swimming, shell fishing and fin fishing.

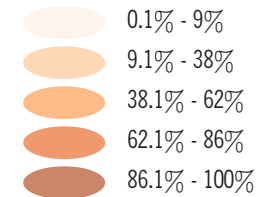
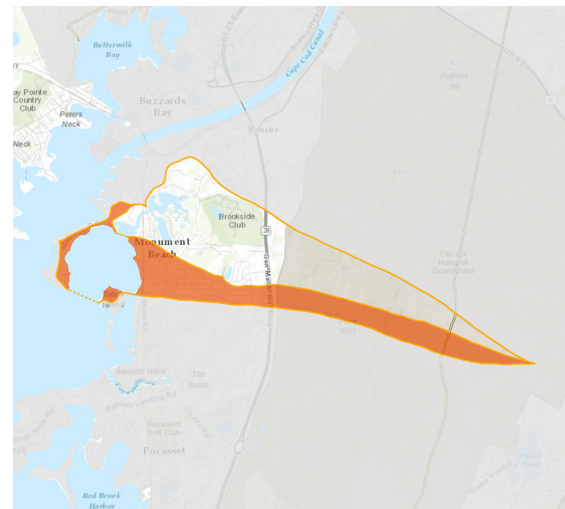
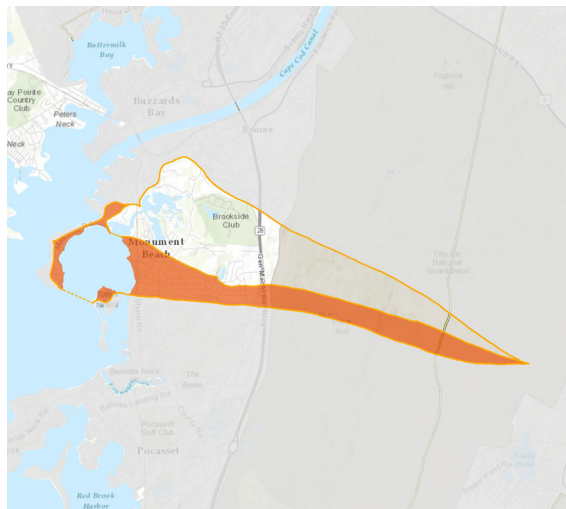
PHINNEY'S HARBOR WATERSHED

- ACRES: 1,116
- PARCELS: 798
- % DEVELOPED RESIDENTIAL PARCELS: 87%
- PARCEL DENSITY: 1.4 acres per parcel (approx.)
- WASTEWATER TREATMENT FACILITIES: 1
 - Brookside Development

Freshwater Sources

PONDS

- IDENTIFIED SURFACE WATERS: 10
 - NUMBER OF NAMED FRESHWATER PONDS: 2
 - PONDS WITH PRELIMINARY TROPHIC CHARACTERIZATION: 0
- (Listed In Appendix 4C, Ponds With Water Quality Data)



Subwatersheds with Total Nitrogen Removal Targets

Figure 4-1 PBE

Subwatersheds with Septic Nitrogen Removal Targets

Figure 4-2 PBE

LOCAL PROGRESS

BOURNE

The Town of Bourne has not engaged in wastewater planning in the Phinneys Harbor watershed beyond the 2007 Needs Assessments/Wastewater Management Study, which identified wastewater needs, including

drinking and surface-water water quality, and Title 5 needs. Presently, Buzzards Bay is the only sewered area in the Town of Bourne. The Town does not own or operate a wastewater treatment facility. All wastewater collected in Buzzards Bay is transferred to the Town of Wareham for treatment and disposal.

SANDWICH

Approximately 18% of the Phinneys Harbor watershed is comprised of land in Sandwich, which falls under the jurisdiction of Joint Base Cape Cod. There is virtually no nitrogen load from Town of Sandwich that contributes to the Phinneys Harbor watershed.

Local efforts in these towns are described in Chapter 6.

PHINNEYS HARBOR

- **2012 INTEGRATED LIST STATUS:** None listed
- **DISCUSSION:** The biggest pond in the watershed is Clay Pond, which is just over 5 acres.

STREAMS

- **SIGNIFICANT FRESHWATER STREAM OUTLETS:** 1
Back River Stream:
 - Average Flow: 1,822 cubic meters per day (m³/d)
 - Average Nitrate Concentrations: .39 milligrams per liter (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

- Bourne Water District
- **GRAVEL PACKED WELLS:** 0
- **SMALL VOLUME WELLS:** 0
- **DISCUSSION:** Phinneys Harbor watershed contains a portion of a Zone II wellhead protection area for the Buzzards Bay Water District

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. The aggregated watershed removal rates for Phinneys Harbor are 34% and 46% for total watershed nitrogen load and septic watershed nitrogen load, respectively. More specifically, the targeted amount of watershed nitrogen reduction required by subwatershed is shown in Figure 4-1 PBE Subwatersheds with Total Nitrogen Removal Targets and Figure 4-2 PBE Subwatersheds with Septic Removal Targets.

WATERSHEDS: UPPER CAPE

The nitrogen load from the watershed exceeds the threshold nitrogen load for Phinneys Harbor, resulting in impairment of 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:** Healthy to Moderately Impaired
- **BACK RIVER (SALT MARSH):** Healthy
- **EEL POND:** Healthy to Moderately Impaired
- **PHINNEYS HARBOR:** Moderately Impaired
- **SENTINEL STATIONS:**
 - Total Nitrogen Concentration Threshold: 0.35 mg/L
 - Total Nitrogen Concentration Existing: 0.37 mg/L (As reported at the MEP sentinel water-quality monitoring stations)