



The Problem

The Massachusetts Estuaries Project (MEP) technical report (available at www.oceanscience.net/estuaries/) indicates the West Falmouth Harbor system exceeds its critical nitrogen threshold, resulting in impaired water quality. Following the critical nitrogen load identified in the MEP report, a total maximum daily load (TMDL) for nitrogen has been established for West Falmouth Harbor by MassDEP and US EPA.

- **MEP TECHNICAL REPORT STATUS:** Final
- **TMDL STATUS:** Final TMDL
- **TOTAL WASTEWATER FLOW:** 196 MGY (million gal per year)
 - Treated WW Flow: 146 MGY
 - Septic Flow: 50 MGY
- **UNATTENUATED TOTAL NITROGEN LOAD (MEP):** 20,434 kg/Y (kilograms per year)
- **ATTENUATED TOTAL NITROGEN LOAD (MEP):** 16,210 kg/Y
- **SOURCES OF CONTROLLABLE NITROGEN (MEP):**
 - 23% Septic Systems
 - 2% Lawn Fertilizer
 - 6% Stormwater from Impervious Surfaces
 - 69% Wastewater Treatment Facilities

CONTRIBUTING TOWN

- **FALMOUTH**

THE MEP RESTORATION SCENARIO

- **WATERSHED TOTAL NITROGEN REDUCTION TARGET:** 56%
- **WATERSHED SEPTIC REDUCTION TARGET:** 43%
(The scenario represents the aggregated sub-embayment percent removal targets from the MEP technical report)

WEST FALMOUTH HARBOR ESTUARY

- **EMBAYMENT AREA:** 178 acres
- **EMBAYMENT VOLUME:** 40 million cubic feet
- **2012 INTEGRATED LIST STATUS:** Category 4A for fecal coliform, estuarine bioassessments and nitrogen
 - Category 4A: TMDL is completed
 - www.mass.gov/eea/docs/dep/water/resources/07v5/12list2.pdf

The West Falmouth Harbor estuary and embayment system has shoreline located entirely in the Town of Falmouth. The Harbor receives tidal flow from Buzzards Bay and extends $\frac{1}{2}$ mile inland, where it divides and extends approximately $\frac{3}{4}$ of a mile north past Snug Harbor to Mashapaquit Creek and approximately $\frac{3}{4}$ mile south into Harbor Head and Oyster Pond. The Harbor supports a variety of recreational uses including boating, swimming, shell fishing and fin fishing.

WATERSHEDS: UPPER CAPE

WEST FALMOUTH HARBOR WATERSHED

- ACRES: 1,702
- PARCELS: 876
- % DEVELOPED RESIDENTIAL PARCELS: 73%
- PARCEL DENSITY: 1.9 acres per parcel (approx.)
- WASTEWATER TREATMENT FACILITIES: 1
 - Falmouth Wastewater Treatment Facility

Freshwater Sources

PONDS

- IDENTIFIED SURFACE WATERS: 4
- NUMBER OF NAMED FRESHWATER PONDS: 0
- PONDS WITH PRELIMINARY TROPIC CHARACTERIZATION: 0
(Listed In Appendix 4C, Ponds With Water Quality Data)
- 2012 INTEGRATED LIST STATUS: None listed

STREAMS

- SIGNIFICANT FRESHWATER STREAM OUTLETS: 1
 - Stream : Upper Mashapaquit Creek
 - Average Flow: 1,681 cubic meters per day (m³/d)
 - Average Nitrate Concentrations: 0.654 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.

WEST FALMOUTH HARBOR

DRINKING WATER SOURCES

- WATER DISTRICTS: 1
 - Falmouth Water District
- GRAVEL PACKED WELLS: 0
- 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. These were referred to as 43% of the septic nitrogen load and 56% of the total nitrogen load. The MEP technical report also provides a specific targeted amount of nitrogen reduction required by subwatershed as shown in Figure 4-1 WFH Subwatersheds with Total Nitrogen Removal Targets and Figure 4-2 WFH Subwatersheds with Septic Nitrogen Removal Targets.

LOCAL PROGRESS

FALMOUTH

The Town of Falmouth Comprehensive Wastewater Management Plan (CWMP) was approved under Joint Massachusetts Environmental Policy Act (MEPA)/Development of Regional Impact (DRI) review in early 2014 and received town meeting and ballot vote approval in Spring 2014. The first phase includes the sewerage of the Little Pond watershed, upgrades to the wastewater treatment facility and construction of a new discharge site outside of the West Falmouth Harbor watershed. The

plan also includes a series of pilot projects that will be conducted concurrently with the sewerage project over the next 5 years at which time the Town will re-evaluate its options for comprehensive wastewater management.

Since the 2006 Massachusetts Estuaries Project (MEP) technical report, the Town and Buzzards Bay Coalition ordered a number of new watershed scenarios with an implicit goal to find the upper limit of discharge capacity of the treatment facility at a 3 mg/L treatment level, if the watershed was not sewerage. The results were debated through a settlement agreement and the revised 2012 Groundwater Discharge Permit (GWDP). According to

the GWDP, DRI approval and conditions of the settlement agreement, the treatment facility is permitted to receive, treat and discharge 570,000 GPD, if wastewater is not collected from the West Falmouth Harbor watershed. The treatment capacity is allowed to increase to 800,000 GPD if 230,000 GPD is collected from development in the West Falmouth Harbor watershed to offset the increase. These capacities are predicated on the facility achieving a treatment efficiency of 3 mg/L total nitrogen and approximate a watershed total nitrogen load of 6,576 kg/yr.

Local efforts in these towns are described in Chapter 6.

WEST FALMOUTH HARBOR

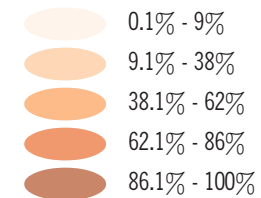
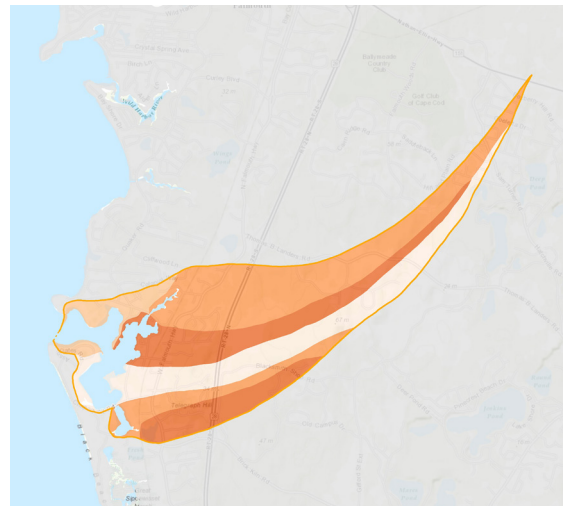
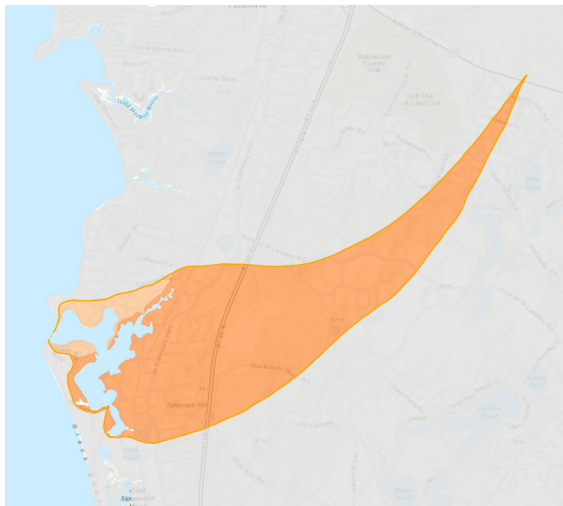
However, these values have since been revised as discussed in the Local Progress section.

The West Falmouth Harbor system exceeds its critical threshold for nitrogen, resulting in impaired water quality. While lower portion of the embayment, near the inlet, are healthy, upper reaches including Mashapaquit Creek, Harbor Head and Oyster Pond suffer from significant ecological impacts. 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. Monitoring as required under the CWMP, GWDP and DRI and will assess improvements as a result of the upgrades at the wastewater treatment facility.

WATERSHEDS: UPPER CAPE

MEP ECOLOGICAL CHARACTERISTICS AND WATER QUALITY

- **OVERALL ECOLOGIC CONDITION:** Healthy to Severely Degraded
- **MASHAPAQUIT CREEK:** Significantly Impaired
- **SNUG HARBOR:** Significantly Impaired
- **SOUTH BASIN:** Moderately to Significantly Impaired
- **HARBOR HEAD:** Significantly Impaired
- **OYSTER POND:** Significantly Impaired to Severely Degraded
- **OUTER HARBOR-MID:** Moderately Impaired
- **OUTER HARBOR-OUTER:** Healthy Habitat Conditions
- **SENTINEL STATIONS:**
 - Total Nitrogen Concentration Threshold: 0.35 mg/L
 - Total Nitrogen Concentration Existing: 0.46 mg/L (As reported at the MEP sentinel water-quality monitoring stations)



Subwatersheds with Total Nitrogen Removal Targets

Figure 4-1 WFH

Subwatersheds with Septic Nitrogen Removal Targets

Figure 4-2 WFH