

WATER THREAT LEVEL  
**MODERATE**

WATERSHEDS: LOWER CAPE  
**Herring River (Harwich)**



## The Problem

According to the Draft Massachusetts Estuaries Project (MEP) technical report (available at [www.oceanscience.net/estuaries/](http://www.oceanscience.net/estuaries/)) the Herring River system exceeds its critical threshold for nitrogen, resulting in impaired water quality. A nitrogen total maximum daily load (TMDL) has not been established by MassDEP and US EPA for the Herring River system.

- **MEP TECHNICAL REPORT STATUS:** Final
- **TMDL STATUS:** In Progress
- **TOTAL WASTEWATER FLOW:** 272 MGY (million gal per year)
  - Treated WW Flow: 5 MGY
  - Septic Flow: 267 MGY
- **UNATTENUATED TOTAL NITROGEN LOAD (MEP):** 41,340 Kg/Y (kilograms per year)
- **ATTENUATED TOTAL NITROGEN LOAD (MEP):** 23,164 Kg/Y
- **MEP SOURCES OF CONTROLLABLE NITROGEN**
  - 68% Septic Systems
  - 5% Lawn Fertilizer
  - 7% Stormwater from Impervious Surfaces
  - 4% Cranberry Fertilizer
  - 6% Farm Animal Loads
  - 10% Landfill

## CONTRIBUTING TOWNS

- BREWSTER
- HARWICH
- DENNIS

## THE MEP RESTORATION SCENARIO

- **WATERSHED TOTAL NITROGEN REDUCTION TARGET:** 24%
- **WATERSHED SEPTIC REDUCTION TARGET:** 38%  
(The scenario represents the aggregated sub-embayment percent removal targets from the MEP technical report)

## HERRING RIVER (HARWICH) ESTUARY

- **EMBAYMENT AREA:** 44 acres
- **EMBAYMENT VOLUME:** 26 million cubic feet
- **2012 INTEGRATED LIST STATUS:** Category 4A for fecal coliform
  - Category 4a: TMDL is completed
  - [www.mass.gov/eea/docs/dep/water/resources/07v5/12list2.pdf](http://www.mass.gov/eea/docs/dep/water/resources/07v5/12list2.pdf)

## HERRING RIVER (HARWICH) WATERSHED

- **ACRES:** 9,514
- **PARCELS:** 5,302
- **% DEVELOPED RESIDENTIAL PARCELS:** 72%

The Herring River is a large estuary with shoreline located in the Town of Harwich. The Herring River has a tidal reach that extends approximately 3 miles to West Reservoir. The River is fed by freshwater streams including the upper Herring River that extends through Hinckley Pond to Long Pond, and Coy Brook that extends east to Walker Pond. According to the Massachusetts Estuaries Project (MEP), the Herring River is functionally a wetland with salt marsh dominant along the river's lower and mid reaches and brackish to fresh water in its upper marsh.

# WATERSHEDS: LOWER CAPE

- **PARCEL DENSITY:** 1.8 acres per parcel (approx.)
- **WASTEWATER TREATMENT FACILITIES:** 2
  - Cranberry Point Condominiums
  - Harwich Middle and Elementary Schools

- **2012 INTEGRATED LIST STATUS:** 2 (Long Pond and Hinckleys Pond)

# HERRING RIVER (HARWICH)

- Lothrop Road:
- Average Flow: 20,533 m<sup>3</sup>/d
  - Average Nitrate Concentrations: 0.15 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.

## Freshwater Sources

### PONDS

- **IDENTIFIED SURFACE WATERS:** 44
- **NUMBER OF NAMED FRESHWATER PONDS:** 27
- **PONDS WITH PRELIMINARY TROPHIC CHARACTERIZATION:** 18  
(Listed In Appendix 4C, Ponds With Water Quality Data)

### STREAMS

- **SIGNIFICANT FRESHWATER STREAM OUTLETS:** 2  
Herring Run:
  - Average Flow: 42,111 cubic meters per day (m<sup>3</sup>/d)
  - Average Nitrate Concentrations: 0.12 milligrams per liter (mg/L)

## LOCAL PROGRESS

### HARWICH

The Town of Harwich contributes approximately 90% of the attenuated wastewater nitrogen load to the Herring River watershed. 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.

### BREWSTER

The Town of Brewster contributes approximately 4% of the attenuated wastewater nitrogen load to the Herring River watershed. The significant level of natural attenuation attributed by the MEP to ponds and streams in the upper portions of the Herring River watershed are responsible for the low nitrogen contribution from Brewster reaching the Herring River. The town is presently developing an Integrated Water Resource Management Plan (IWRMP). Phase II of the IWRMP was issued in 2012 with assessments and recommendations addressing nitrogen loading, existing and future drinking water, stormwater and freshwater pond needs.

### DENNIS

The Town of Dennis, specifically portions of Dennisport, contributes approximately 6% of the attenuated wastewater nitrogen load to the Herring River watershed. To date, the Town of Dennis has 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 Herring River Massachusetts Estuaries Project (MEP) technical report was not yet published, possible MEP nitrogen loading findings.

Local efforts in these towns are described in Chapter 6.

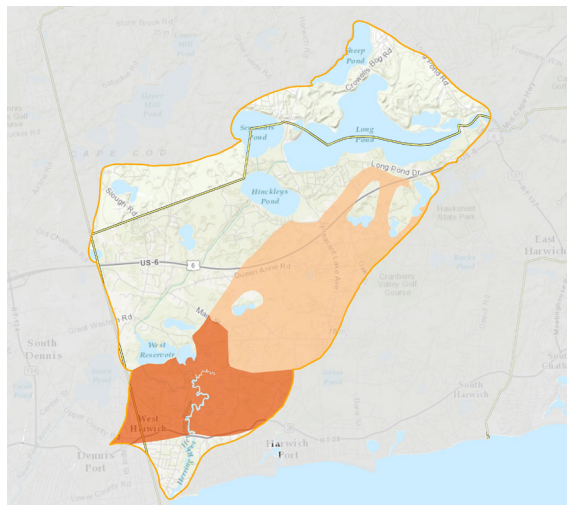
## HERRING RIVER (HARWICH)

### DRINKING WATER SOURCES

- **WATER DISTRICTS: 3**
  - Harwich Water Department
  - Brewster Water Department
  - Dennis Water District
- **GRAVEL PACKED WELLS: 1**
  - 1 have 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. The aggregated watershed removal rates for the Herring River watershed are 24% and 38% for total watershed nitrogen loads and septic nitrogen loads, respectively. More specifically the targeted amount of nitrogen reduction required by



## WATERSHEDS: LOWER CAPE

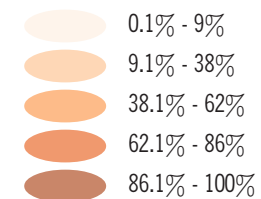
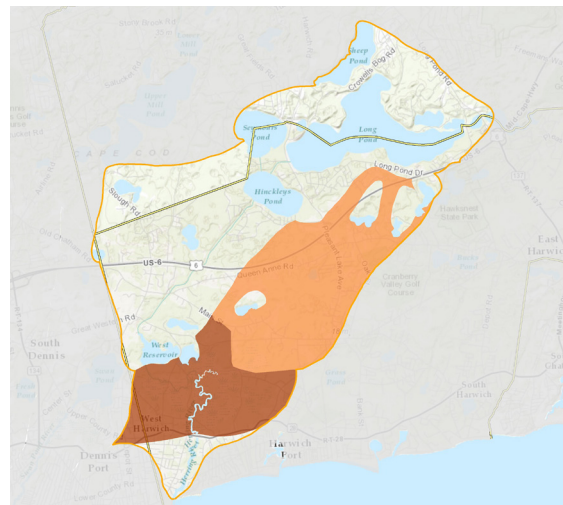
subwatershed is shown in Figure 4-1 HRH Subwatersheds with Total Nitrogen Removal Targets and Figure 4-2 HRH Subwatersheds with Septic Nitrogen Removal Targets.

Habitat in the Herring River system ranges from healthy in the upper marsh system to significantly impaired in the lower portion of the estuary due to eelgrass loss. 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 Significantly Impaired
- Tidal Wetlands (Upper Estuary) – West: Healthy
- Tidal Wetlands (Upper Estuary) – Main Creek: Healthy
- Tidal Wetlands (Upper Estuary) – East: Healthy

- Tidal River (Lower Estuary): Significantly Impaired
- Sentinel Total Nitrogen Concentration Threshold: 0.48 mg/L
- Sentinel Total Nitrogen Concentration Existing: 0.57 mg/L  
(As reported at the MEP sentinel water-quality monitoring stations)



Subwatersheds with Total Nitrogen Removal Targets

Figure 4-1 HRH

Subwatersheds with Septic Nitrogen Removal Targets

Figure 4-2 HRH