

WATERSHEDS: UPPER CAPE Fiddlers Cove and Rands Harbor



The Problem

The Massachusetts Estuaries Project (MEP) technical report (available at www.oceanscience.net/estuaries/) indicates that Fiddlers Cove and Rands Harbor exceed their critical thresholds for nitrogen, resulting in impaired water quality. Both are impaired at the inlets and in the upper portions. Both upper and lower reaches of Fiddlers Cove and Rands Harbor have degraded ecological health that requires nitrogen reduction. A nutrient total maximum daily load (TMDL) has not yet been established by MassDEP and US EPA.

Fiddlers Cove

- **MEP TECHNICAL REPORT STATUS:** Final
 - **TMDL STATUS:** In Progress
 - **TOTAL WASTEWATER FLOW:** 13 MGY (Million Gal/Per Year)
 - Treated WW Flow: 0 MGY
 - Septic Flow: 13 MGY
 - **UNATTENUATED TOTAL NITROGEN LOAD (MEP):** 1,664 kg/Y (kilograms per year)
 - **ATTENUATED TOTAL NITROGEN LOAD (MEP):** 1,648 kg/Y
- (Fiddlers Cove and Rands Harbor have a limited number

of opportunities for natural attenuation, most of which is achieved through small ponds.)

- **SOURCES OF CONTROLLABLE NITROGEN (MEP):**
 - 78% Septic Systems
 - 17% Lawn Fertilizer
 - 5% Stormwater From Impervious Surfaces

CONTRIBUTING TOWN

- **FALMOUTH**

THE MEP RESTORATION SCENARIO

- **WATERSHED TOTAL NITROGEN REDUCTION TARGET:** 22%
- **WATERSHED SEPTIC REDUCTION TARGET:** 29%
(The scenario represents the aggregated sub-embayment percent removal targets from the MEP technical report)

FIDDLERS COVE ESTUARY

- **EMBAYMENT AREA:** 14 acres
- **EMBAYMENT VOLUME:** 4.8 million cubic feet
- **2012 INTEGRATED LIST STATUS:** Category 5 for nutrient/eutrophication biological
- **INDICATORS**
 - Category 5: Waters requiring a TMDL
 - www.mass.gov/eea/docs/dep/water/resources/07v5/12list2.pdf

The Fiddlers Cove and Rands Harbor embayments have shorelines located entirely in the town of Falmouth. Fiddlers Cove is a narrow harbor with a marina that extends up to one half mile landward. The upper quarter mile has private docks and piers. Rands Canal is also a narrow harbor with private docks and piers that splits into two extensions of one quarter to one half mile inland. The harbors generally support a variety of recreational uses including boating, swimming, shell fishing and fin fishing.

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FIDDLERS COVE WATERSHED

- ACRES: 268
- PARCELS: 201
- % DEVELOPED RESIDENTIAL PARCELS: 76%
- PARCEL DENSITY: 1.3 acres per parcel (approx.)
- WASTEWATER TREATMENT FACILITIES: 0

Rands Harbor

- MEP TECHNICAL REPORT STATUS: Complete
- TMDL STATUS: Not established
- TOTAL WASTEWATER FLOW: 25 MGY
 - Treated WW Flow: 0 MGY
 - Septic Flow: 25 MGY
- UNATTENUATED TOTAL NITROGEN LOAD (MEP): 2,519 kg/Y
- ATTENUATED TOTAL NITROGEN LOAD (MEP): 2,269 kg/Y
- SOURCES OF CONTROLLABLE NITROGEN (MEP):
 - 75% Septic Systems
 - 8% Lawn Fertilizer
 - 17% Stormwater From Impervious Surfaces

CONTRIBUTING TOWNS

- FALMOUTH: 100%
- BOURNE (JBCC): N/A
- SANDWICH (JBCC): N/A
- DISCUSSION: The land area in Bourne and Sandwich is not in the control of the towns 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

- TOTAL NITROGEN REDUCTION TARGET: 27%
- WATERSHED SEPTIC REDUCTION TARGET: 37%
(The scenario represents the aggregated sub-embayment percent removal targets from the MEP technical report)

RANDS HARBOR ESTUARY

- EMBAYMENT AREA: 10 acres
- EMBAYMENT VOLUME: 2.7 million cubic feet
- 2012 INTEGRATED LIST STATUS: Category 5 for nutrients and eutrophication biological indicators
 - Category 5: Waters requiring a TMDL
 - www.mass.gov/eea/docs/dep/water/resources/07v5/12list2.pdf

RANDS HARBOR WATERSHED

- ACRES: 1,245
- PARCELS: 447
- % DEVELOPED RESIDENTIAL PARCELS: 68%
- PARCEL DENSITY: 2.8 acres per parcel (approx.)
- WASTEWATER TREATMENT FACILITIES: 0

Freshwater Sources

PONDS

- IDENTIFIED SURFACE WATERS: 10
- NUMBER OF NAMED FRESHWATER PONDS: 3
- PONDS WITH PRELIMINARY TROPHIC CHARACTERIZATION: 0
(Listed In Appendix 4C, Ponds With Water Quality Data)
- 2012 INTEGRATED LIST STATUS: None listed

FIDDLERS COVE AND RANDS HARBOR

- DISCUSSION: Two ponds contained within these watersheds have water quality data; however, there has been no interpretation for trophic status.

STREAMS

FIDDLERS COVE

- SIGNIFICANT FRESHWATER STREAM OUTLETS: 0
RANDS HARBOR
- SIGNIFICANT FRESHWATER STREAM OUTLETS: 2
Cedar Lake:
 - Average Flow: 2,417 cubic meters per day (m3/d)
 - Average Nitrate Concentrations: 0.314 milligrams per liter (mg/L)Flax Pond:
 - Average Flow: 1,626 cubic meters per day (m3/d)

LOCAL PROGRESS

FALMOUTH

The Town of Falmouth contributes 100% of the attenuated nitrogen load to Fiddlers Cove and Rands Harbor. The Town of Falmouth has an approved comprehensive wastewater management plan (CWMP) (2014). It contains a Targeted Watershed Management Project for Little Pond to install a sewer collection system and a tidal inlet widening to improve flushing of Bourne Pond. Further decisions are deferred to evaluate a series of pilot projects for non-traditional technology.

Local efforts are described in more detail in Chapter 6.

FIDDLERS COVE AND RANDS HARBOR

- Average Nitrate Concentrations: 0.462 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
 - Falmouth Water Department
- **GRAVEL PACKED WELLS:** 0
- **SMALL VOLUME WELLS:** 0

- **DISCUSSION:** Residents in Fiddlers Cove and Rands Harbor receive drinking water from the Falmouth Water Department. There are no community or non-community drinking water wells located within the Fiddlers Cove or Rands Harbor watersheds.

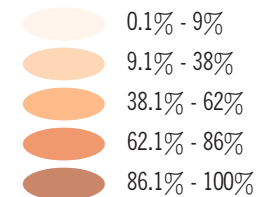
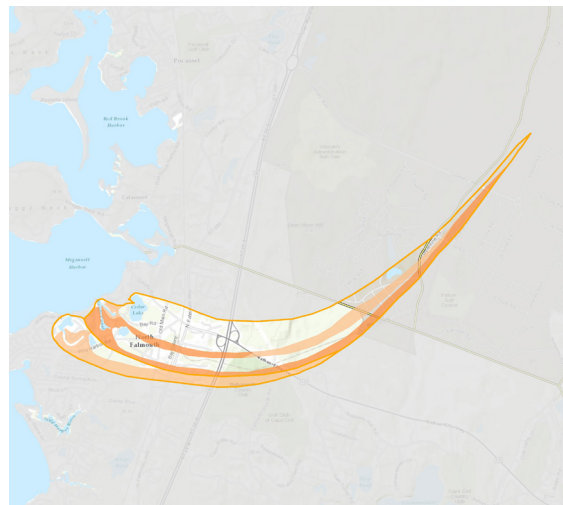
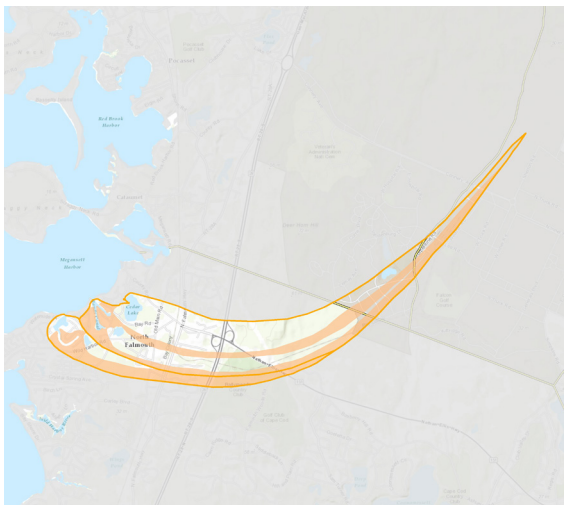
Degree of Impairment and Areas of Need

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. Fiddlers Cove requires a 37% reduction of septic load or a 22% reduction of total load, while Rands Harbor requires a 29% reduction of septic load or a 27% reduction of total load. The MEP technical report also provides a specific targeted amount of nitrogen reduction required by subwatershed as shown in

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Figure 4-1 FR Subwatersheds with Total Nitrogen Removal Targets and Figure 4-2 FR Subwatersheds with Septic Nitrogen Removal Targets.

The nitrogen load from these watersheds exceeds the thresholds for Fiddlers Cove and Rands Harbor, resulting in impaired water quality. Both upper and lower reaches of Fiddlers Cove and Rands Harbor have degraded ecological health that requires nitrogen reduction. 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.



Subwatersheds with Total Nitrogen Removal Targets

Figure 4-1 FR

Subwatersheds with Septic Nitrogen Removal Targets

Figure 4-2 FR

MEP ECOLOGICAL CHARACTERISTICS AND WATER QUALITY

■ FIDDLERS COVE:

- Overall Ecologic Condition: Healthy to Moderately Impaired
- Main Basin: Healthy to Moderately Impaired
- Canal: Moderately Impaired

Sentinel Stations:

- Total Nitrogen Concentration Threshold: 0.50 mg/L
- Total Nitrogen Concentration Existing: 0.56 mg/L
(As reported at the MEP sentinel water-quality monitoring stations)

■ RANDB CANAL:

- Overall Ecologic Condition: Moderately Impaired
- North Branch: Moderately Impaired
- South Branch: Moderately Impaired

Sentinel Stations:

- Total Nitrogen Concentration Threshold: 0.50 mg/L
- Total Nitrogen Concentration Existing: 0.57 mg/L
(As reported at the MEP sentinel water-quality monitoring stations)