



## The Problem

The draft Massachusetts Estuaries Project (MEP) technical report (available at [www.oceanscience.net/estuaries/](http://www.oceanscience.net/estuaries/)) indicates that the Parkers River system exceeds its critical threshold for nitrogen, resulting in impaired water quality. A Total Maximum Daily Load (TMDL) for nitrogen has not yet been established.

- **MEP TECHNICAL REPORT STATUS:** Final
- **TMDL STATUS:** In Progress
- **TOTAL WASTEWATER FLOW:** 209 MGY (million gal per year)
  - Treated WW Flow: 0 MGY
  - Septic Flow: 209 MGY
- **UNATTENUATED TOTAL NITROGEN LOAD (MEP):** 28,402 Kg/Y (kilograms per year)
- **ATTENUATED TOTAL NITROGEN LOAD (MEP):** 25,221 Kg/Y  
(Natural attenuation removes a considerable amount of nitrogen as groundwater flows through freshwater ponds and discharges to streams.)
- **SOURCES OF CONTROLLABLE NITROGEN (MEP):**
  - 85% Septic Systems
  - 7% Lawn Fertilizer
  - 7% Stormwater From Impervious Surfaces
  - 1% Wastewater Treatment Facilities

## CONTRIBUTING TOWN

- **YARMOUTH**

## THE MEP RESTORATION SCENARIO

- **WATERSHED TOTAL NITROGEN REDUCTION TARGET:** 53%
- **WATERSHED SEPTIC REDUCTION TARGET:** 67%
- **DISCUSSION:** The targets listed above reflect an alternative MEP scenario that was run to assess the beneficial effect of increased tidal flow from a proposed widening of the culvert under Route 28. This document assumes that the culvert widening project, that has been funded, is constructed. (If the culvert widening project is not accounted for, the MEP technical report indicates that Parkers River is presently nitrogen overloaded and that 80% of the total nitrogen load from the watershed will need to be removed in order to restore habitat. The MEP technical report indicates that 96% of the nitrogen load from septic systems will need to be removed if no other loads are addressed)

## PARKERS RIVER ESTUARY

- **EMBAYMENT AREA:** 74 acres
- **EMBAYMENT VOLUME:** 29 million cubic feet

Parkers River is an estuary with shoreline located entirely within the Town of Yarmouth. Parkers River estuary extends inland approximately 2 miles to Swan Pond. Tidal flushing of the upper reach of the Parkers River and Swan Pond is impeded by a culvert beneath Route 28. A small tributary emerges from Long Pond that drains to Swan Pond. Parkers River supports a variety of recreational uses including boating, swimming, shell fishing and fin fishing; however, the upper portion experiences exceptional eutrophic conditions.

# WATERSHEDS: MID CAPE

# PARKERS RIVER

- **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)

## PARKERS RIVER WATERSHED

- **ACRES:** 2,729
- **PARCELS:** 3,318
- **% DEVELOPED RESIDENTIAL PARCELS:** 92%
- **PARCEL DENSITY:** 0.82 acres per parcel (approx.)
- **WASTEWATER TREATMENT FACILITIES:** 0

## Freshwater Sources

### PONDS

- **IDENTIFIED SURFACE WATERS:** 14
- **NUMBER OF NAMED FRESHWATER PONDS:** 4
- **PONDS WITH PRELIMINARY TROPHIC CHARACTERIZATION:** 0  
(Listed In Appendix 4C, Ponds With Water Quality Data)
- **2012 INTEGRATED LIST STATUS:** None listed

- **DISCUSSION:** The Town of Yarmouth participates in the regional Ponds and Lakes Stewardship (PALS) program. Data collected under PALS have helped to establish baseline pond water quality conditions in watersheds contributing to estuaries and coastal embayments. While data for Plashes Pond has been gathered, there is not adequate data from the PALs program that allows a preliminary trophic characterization for any of the freshwater ponds in this watershed.

### STREAMS

- **SIGNIFICANT FRESHWATER STREAM OUTLETS:** 3
  - Forest Road:
    - Average Flow: 823 cubic meters per day (m3/d)
    - Average Nitrate Concentrations: 0.46 milligrams per liter (mg/L)
  - Plashes Brook:
    - Average Flow: 3,107 m3/d
    - Average Nitrate Concentrations: 0.41 mg/L
  - Grays Brooks:
    - Average flow and average nitrate concentrations were not evaluated

- **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 further 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
  - Yarmouth Water Department
- **GRAVEL PACKED WELLS:** 5
  - 1 has nitrate concentrations between 0.5 and 1 mg/L
  - 2 have nitrate concentrations between 1 and 2.5 mg/L
  - 1 has nitrate concentrations between 2.5 and 5 mg/L
  - 1 has no nitrate concentration data
- **SMALL VOLUME WELLS:** 0
- **DISCUSSION:** The town water department and land trusts have acquired significant portions of land within wellhead protection areas for water quality protection, which together with adopted land use controls

## LOCAL PROGRESS

### YARMOUTH

The Yarmouth Comprehensive Wastewater Management Plan (CWMP) was voted down by Town Meeting in 2011. The CWMP proposed phased sewerage throughout much of the southern portions of town. At the time, the Massachusetts Estuaries Project (MEP) technical report

for the Bass River had not been published, so the plan emphasized nitrogen reduction needs in the Parkers River and Lewis Bay watersheds.

Since the 2011 vote that rejected CWMP funding, the Town has received funding to reconstruct the culvert beneath Route 28 in order to improve tidal flushing in the Parkers River. In addition to including nitrogen thresholds that reflect current conditions, the MEP incorporated reduced

nitrogen thresholds in its technical report to reflect this future condition.

The Needs Assessment completed in 2011 identified other wastewater needs to address Title 5 compliance and economic development needs, particularly south of Route 28.

Local efforts in Yarmouth are described in Chapter 6.

## PARKERS RIVER

recommended from the 1978 §208 water quality plan, has resulted in excellent drinking water quality.

### 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 reductions are identified above as 53% of the total nitrogen load and 67% of the septic nitrogen load, and more specifically as the targeted amount of nitrogen reduction required by subembayment (Figure 4-1 PAR Subwatersheds with Total Nitrogen Removal Targets and Figure 4-2 PAR Subwatersheds with Septic Removal Targets).

The load from the Parkers River watershed exceeds the nitrogen threshold, resulting in impaired water quality. Head water subembayments of Parkers River, such as Seine Pond are particularly impaired. Lower reaches of the system have

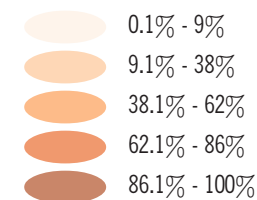
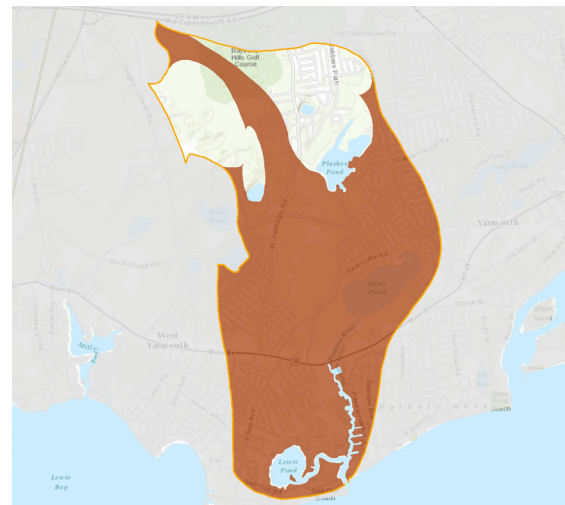
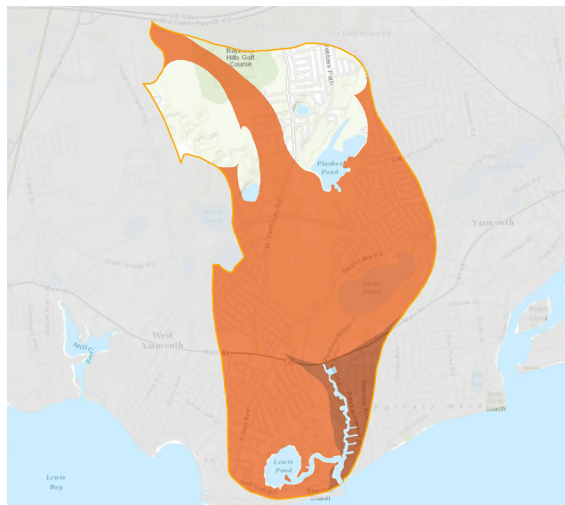
been deemed by the MEP to be severely degraded due to the absence of eelgrass where it historically occurred. The ecological health of a water body is determined from water quality, extent of eelgrass, assortment of benthic fauna, and dissolved oxygen and ranges from 1-severe degradation, 2-significantly impaired, 3-moderately impaired, 4- healthy habitat conditions.

### ECOLOGICAL CHARACTERISTICS AND WATER QUALITY

- **OVERALL ECOLOGIC CONDITION:** Healthy to Significantly Impaired
- **UPPER REACH**
  - Mill Pond: Significantly Impaired
  - Follins Pond: Significantly Impaired
  - Dinah Pond: Moderately to Significantly Impaired
  - Kelleys Bay: Significantly Impaired
- **MID REACH**
  - Mid River: Significantly Impaired

## WATERSHEDS: MID CAPE

- Grand Cove: Significantly Impaired
- **LOWER REACH**
  - Lower River: Significantly Impaired
  - Weir Creek Basin: Healthy to Moderately Impaired
- **SENTINEL STATIONS:**
  - Total Nitrogen Concentration Threshold: 0.42 mg/L
  - Total Nitrogen Concentration Existing: 0.64 mg/L (As reported at the MEP sentinel water-quality monitoring stations)



Subwatersheds with Total Nitrogen Removal Targets

Figure 4-1 PAR

Subwatersheds with Septic Nitrogen Removal Targets

Figure 4-2 PAR