

Oyster Pond

Comprehensive Wastewater Management Plan

August 1, 2019

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Oyster Pond CWMP

Driven by Massachusetts Estuaries Project (MEP) Total Maximum Daily Load (TMDL) Study for Nitrogen

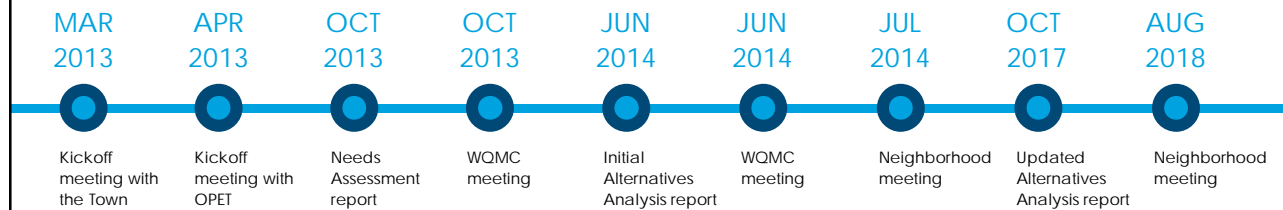
Targeted Comprehensive Wastewater Management Plan (CWMP) to:

- Identify water quality needs
- Identify options/solutions
- Identify funding and schedule

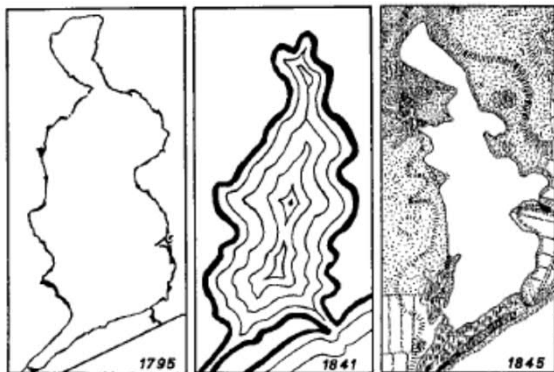
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2

Oyster Pond CWMP Timeline



Oyster Pond Background Information

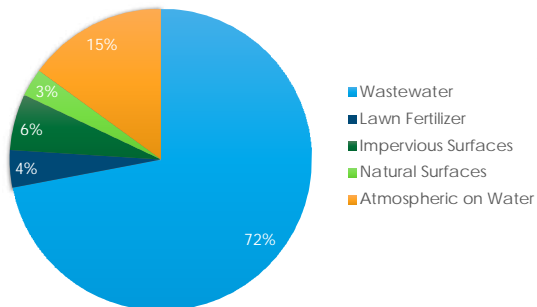


Source: "A Coastal Pond", K.O. Emery, Fig 4

- Size
 - 63 acres
 - 0 to 6 meters deep
 - 2 to 7 ppt salinity (typ.)
- History
 - 1700's – Longshore Drifts
 - 1800's – Railroad
 - 1900's – Oysters no longer survive
 - 1980's – New Culvert
 - 1998 – Weir to manage salinity
 - 2006 – Listed as impaired water by DEP

Oyster Pond Nitrogen Loads

Current Load
5.2 kg/day ~ 4,200 lbs/year

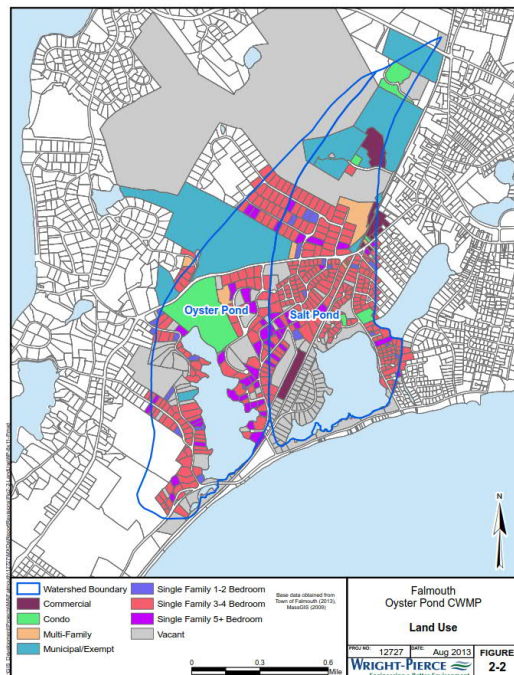


Source: MEP Technical Report and TMDL Report

- MEP Technical Report (2006)
 - Current Load = 5.2 kg/day, ~ 4,200 lbs/year
- MEP TMDL Report (2008)
 - Target Load = 1.4 kg/day, ~ 1,250 lbs/year

Oyster Pond Key Issues

- Development in the Oyster Pond watershed
 - Current: 225 dwelling units (70% built since 1977)
 - Wastewater = 28,900 gpd
 - Future: 233 dwelling units
 - Wastewater = 31,500 gpd
- Water column total nitrogen (TN) in Oyster Pond
 - Relatively high and variable concentration
- Numerous natural system variables
 - Stratification (thermal and salinity/density)
 - Trunk River "sill elevation"



Alternatives Analysis

- Several non-traditional strategies considered and eliminated:
 - Permeable reactive barriers, aquaculture, inlet modifications, phytobuffers, fertigation, alternative water quality criteria, modification to pond compliance elevation
- Six composite plans identified and evaluated:
 1. Sewer to Blacksmith Shop Road WWTF
 2. Sewer to an expanded WHOI WWTF
 3. Sewer to a new local decentralized WWTF
 4. Enhanced I/A system (TN<13mg/l) and pond mixing
 5. Advanced I/A systems (TN<10mg/l)
 6. No Action

Implementation Plan

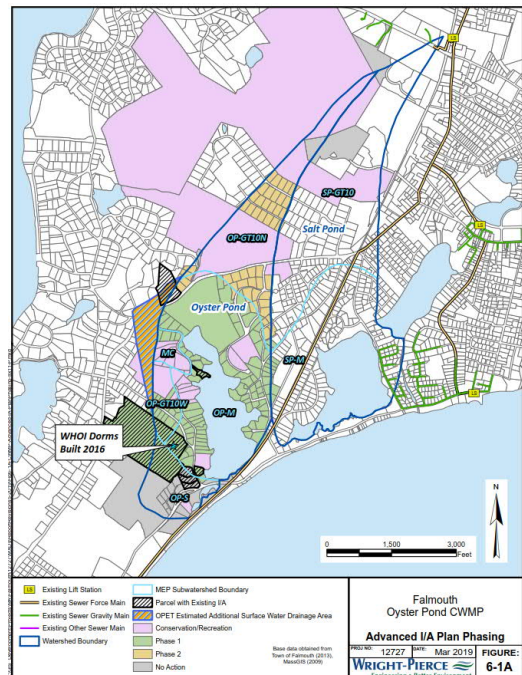
- Actions by Working Group following 2018 Neighborhood Meeting
 - Assess if additional capacity can/will exist at Blacksmith Shop Road WWTF
 - Continue W. Falmouth Harbor Shoreline Septic System Remediation monitoring
 - Affirm Plan 5 watershed monitoring framework with DEP
- Working Group selected Plan 5 (“non-traditional approach”) with Plan 1 as the “traditional backup plan”
- CWMP was developed in manner that is consistent with the CCC 208 Water Quality Management Plan Update

Watershed Permit and RME

- Watershed Permit for hybrid or non-traditional plan
 - Responsible Management Entity
 - Phased Implementation Schedule
 - Environmental Monitoring
 - Traditional Backup Plan
 - Financial Plan
- Responsible Management Entity (RME)
 - Permitting
 - Procurement provisions
 - Monitoring, operations and maintenance
 - Septic pumping
 - Record keeping
 - Reporting to DEP

Advanced I/A Plan

- Wastewater management: 70% N reduction
 - 168 Advanced I/A systems for 233 dwelling units
 - Advanced I/A systems <10 mg/l eff TN
 - Two phases.
- Fertilizer: 25% N reduction
- Stormwater: 25% N reduction
- Atmospheric sources: 40% N reduction
- Benthic flux changes: as predicted by MEP
- Periodic inspections and maintenance dredging of Trunk River



Implementation Timeline

2019 to 2024

- Obtain approvals from MEPA, DEP and CCC
- Obtain Watershed Permit
- Obtain permits and dredge Trunk River
- Implement RME
- Initiate Phase 0 activities and monitoring
- Confirm Advanced I/A Plan or Traditional Backup Plan
- 2024 Town Meeting

2025 to 2029

- Establish start date
- Design, permit and complete installations
- Remove 80% of TMDL required WW N removals (1820 lbs/yr from a total removal of 2280 lb/yr)
- Continue monitoring
- Obtain permits and dredge Trunk River at intervals

2029 to 2039

- Continue monitoring
- Obtain permits and dredge Trunk River at intervals

2039

- Evaluate TMDL compliance
- Decide whether to continue with Advanced I/A Plan or modify plan
- Obtain permits and dredge Trunk River at intervals

2040 to 2050

- Implement Phase 2, as necessary

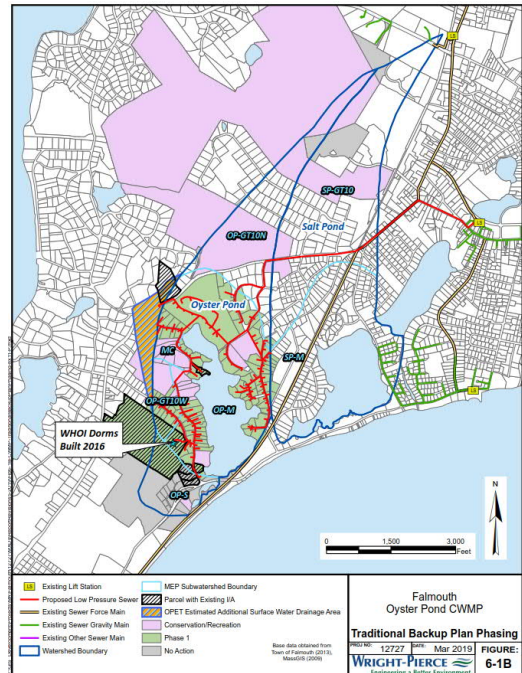
Environmental Monitoring

Environmental Monitoring Program developed to:

- Assess changes in water column nitrogen concentration
- Assess changes in benthic habitat
- Assess Advanced I/A system performance
- Assess changes in atmospheric nitrogen deposition
- Monitor changes in technology

Traditional Backup Plan

- Low pressure sewer (LPS) system for 189 dwelling units in one phase
- LPS system connecting to Shiverick's Pond Lift Station with wastewater flow directed to Blacksmith Shop Road WWTF
- Same baseline approach for fertilizer, stormwater, atmospheric deposition and benthic flux loads



Financing Plan

- **Cost Estimating**
 - Cost for Phase 1 only for Advanced I/A Plan and Traditional Backup Plan
 - Cost estimates developed consistent with approach used for South Coastal Watershed CWMP and presented in 2026 dollars.
 - Estimated capital costs, operations costs as well as costs for the RME.
- **Loans**
 - Massachusetts DEP SRF Loans (0%, 20 yr and 2%, 20 yr)
 - Municipal bonds (4%, 20 yr)
 - Private loans or Barnstable County Septic Management Loan Program (5%, 20 yr)
 - General taxation
- **Grants**
 - None anticipated for this project

Financing Plan

- Cost Allocation

- Advanced I/A Plan

- Town will contribute the cost of the Advanced I/A System.
- Property owners will cover all costs for design, installation and landscaping.
- Municipal debt service will be paid by general taxation.
- Operating costs will be paid by the property owner
- Watershed monitoring costs will be paid by all watershed property owners.
- Trunk River dredging costs will be paid by general taxation (as per current situation).

- Traditional Backup Plan

- Town will cover 100% of infrastructure costs that serve multiple watersheds.
- Town will cover 30% of infrastructure costs that serve the specific neighborhood/watershed
- Property owners will cover the rest of the costs, including landscaping and septic system abandonment
- Municipal debt service, operating costs and watershed monitoring costs are allocated as noted above.

Phase 1 Cost Summary

	Advanced I/A Plan	Traditional Backup Plan
Current Dwelling Units Affected	189	189
Capital Costs	\$9.1M	\$14.4M
Annual Operating Costs	\$536,000	\$248,000
Present Worth (Capital + PW of Operating Costs)	\$17.9M	\$18.5M
Estimated Annual Cost per Dwelling Unit	\$5,200	\$4,900

Costs presented in 2026 dollars.
Plan 5 uses "conservative operations and maintenance assumptions."

Next Steps

- Obtain and address input from WQMC and Select Board
- Submit for MEPA review, DEP comment and CCC 208 Plan Consistency Review
- Budget for “Phase 0” tasks
 - Proof-of-concept for Advanced I/A system and RME approach
 - Continue to advance efforts to secure additional effluent disposal capacity for BSR WWTF
 - Initiate efforts to secure easements for Advanced I/A and Traditional Backup plans
 - Refine financial plan
 - Prepare for 2024 Annual Town Meeting
- Continue environmental monitoring
- Continue Trunk River inspections and maintenance dredging