

Barnstable's Estuary, Lake, Pond, and River Monitoring and Management Programs

May 23, 2024
Town Hall Hearing Room



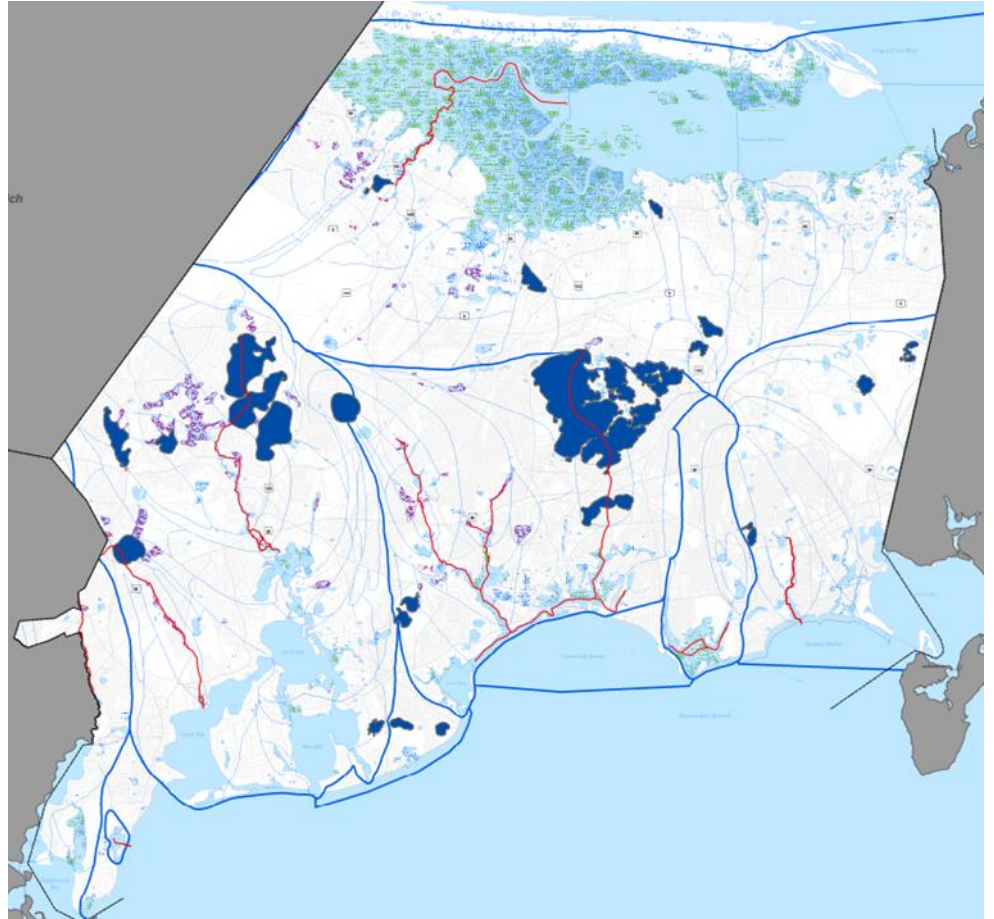
Town of Barnstable
Department of Public Works



Presentation Overview

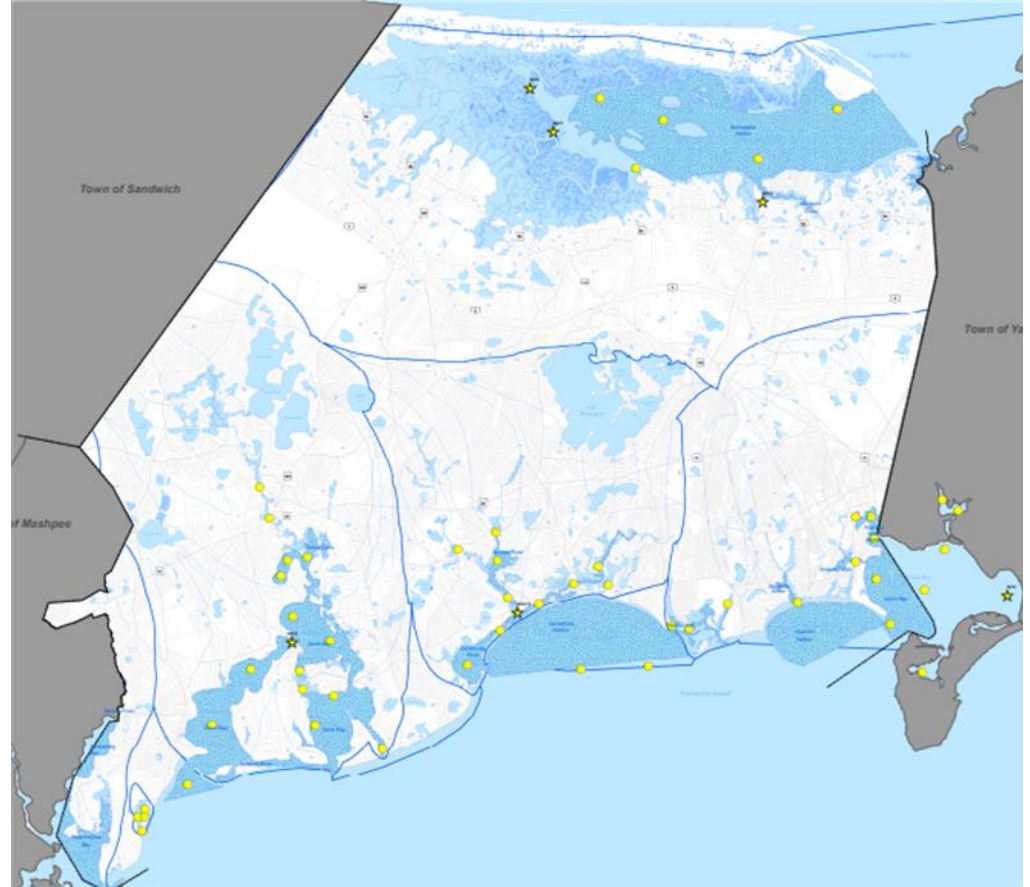
Water Resources Monitoring
and Management Programs for:

1. Salt / Brackish Waterbodies
2. Fresh Waterbodies



Estuaries – Embayment Monitoring Program

- Initiated in 2002
- 70 stations sampled annually
- Collaborative effort involving:
 - Town staff (DPW, MEA, and Health)
 - Citizen volunteers
 - Barnstable Clean Water Coalition
 - Adjacent Towns, and
 - UMass Dartmouth School for Marine Science and Technology
- 100,000+ data points



Embayment Monitoring Program - Field Sampling

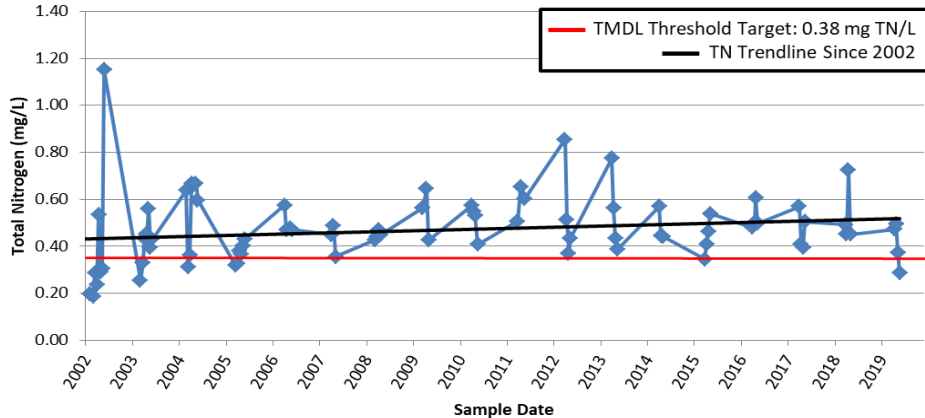
- Annual training for 25-30 samplers divided among ~15 teams
- Samples collected four times on mid-ebb tide at 6-9AM from July – Sept
- Field data collected for water clarity, dissolved oxygen, and temperature
- ~ 300 samples collected annually and delivered to SMAST for sample processing



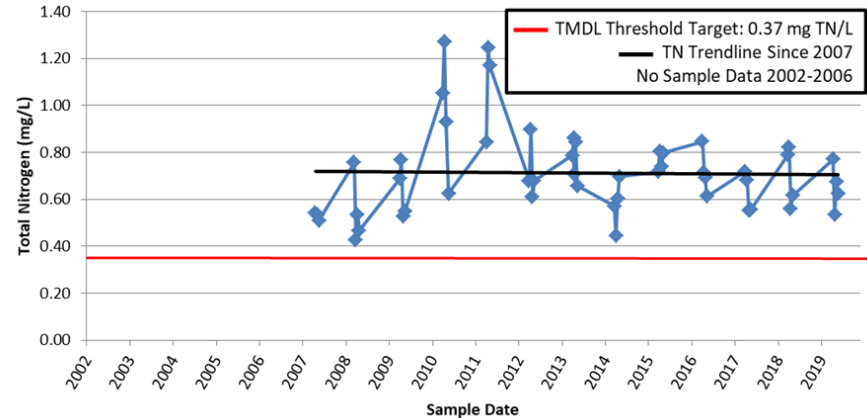
Embayment Monitoring Program - Results

- Lewis Bay and Centerville River water quality is impaired due to excess nitrogen
- Total nitrogen levels at the sentinel stations are above the nitrogen threshold identified as representative of healthy ecosystems

Lewis Bay, Eastern End, Station BHY3 - Sentinel Station

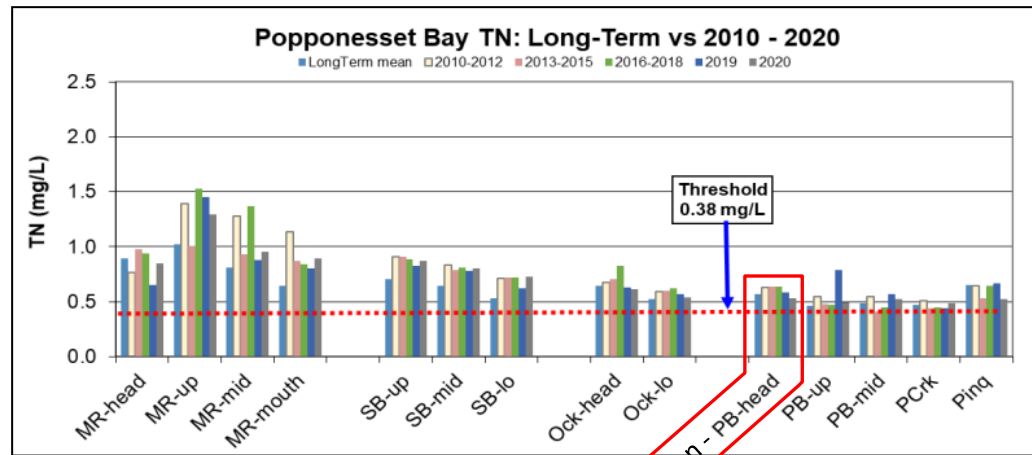
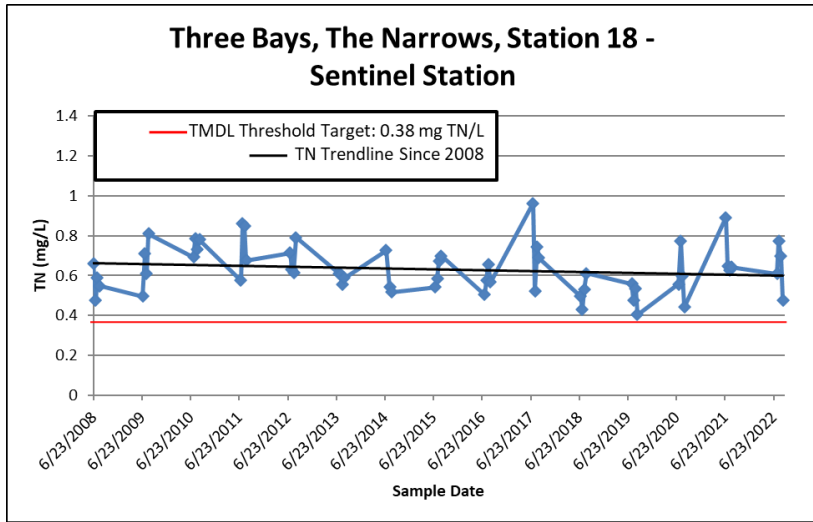


Centerville River, Confluence of Bumps River and C'ville East Branch, Station BCSS - Sentinel Station



Embayment Monitoring Program - Results

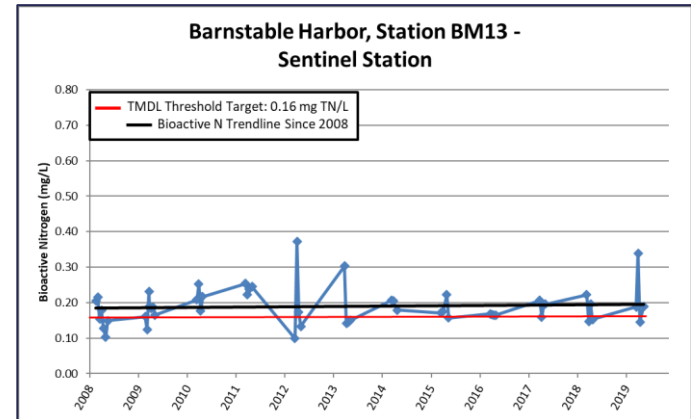
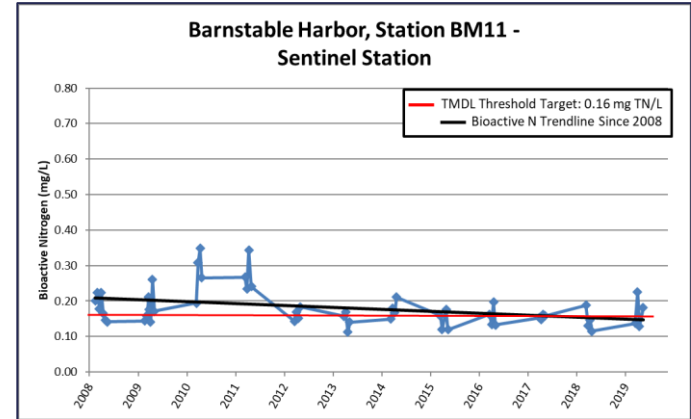
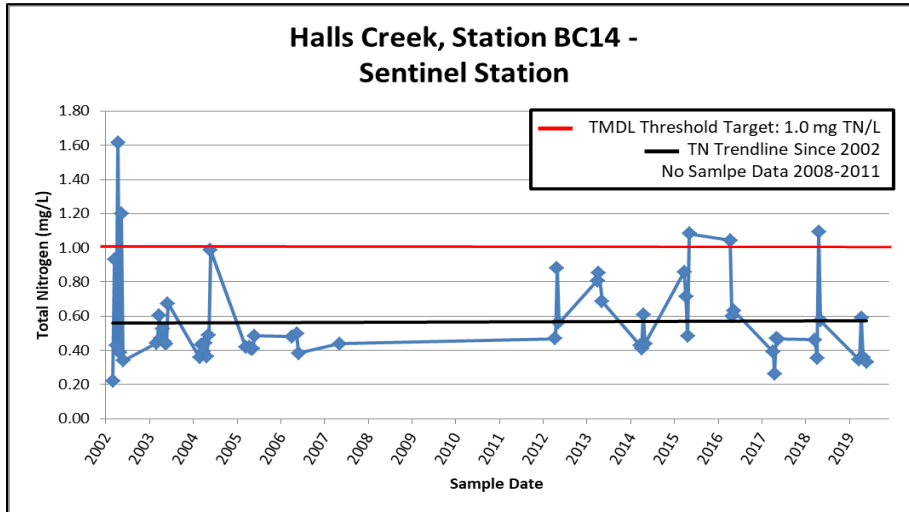
- Three Bays and Popponeset Bay water quality is impaired due to excess nitrogen
- Total nitrogen levels at the sentinel stations are above the nitrogen threshold identified as representative of healthy ecosystems



★ Sentinel station - PB-head

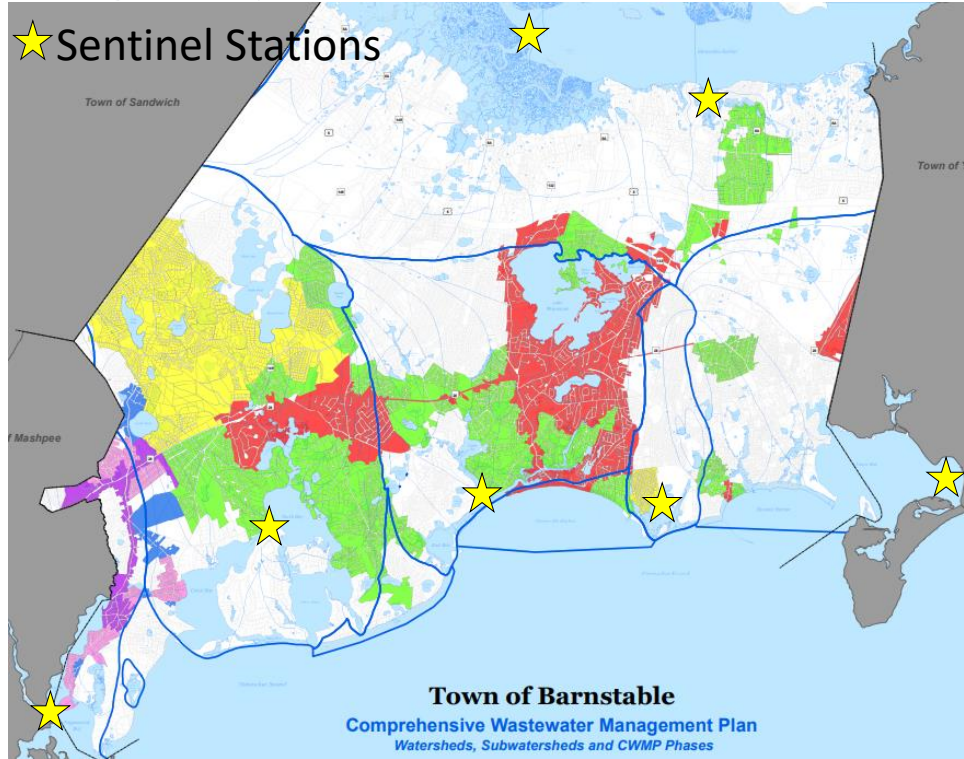
Embayment Monitoring Program - Results

- Halls Creek and Barnstable Harbor water quality is not impaired due to excess nitrogen



Embayment Monitoring Program – Looking Forward

- This monitoring program provides the baseline data for our estuaries and the ability to track nitrogen improvements as we implement the CWMP



Freshwater Programs

1. Ponds and Lakes Snapshot Monitoring
2. Cyanobacteria Monitoring
3. Pond and Lake Management Program
4. Rivers and Streams Monitoring and Restoration Projects



Ponds and Lakes – Monitoring Program

- Annual monitoring program
- Data collected from 40 ponds annually
- Initiated 2002 as PALS
- Collaborative effort involving:
 - Town staff
 - Citizen volunteers, and
 - Barnstable Clean Water Coalition
- 40,000+ data points



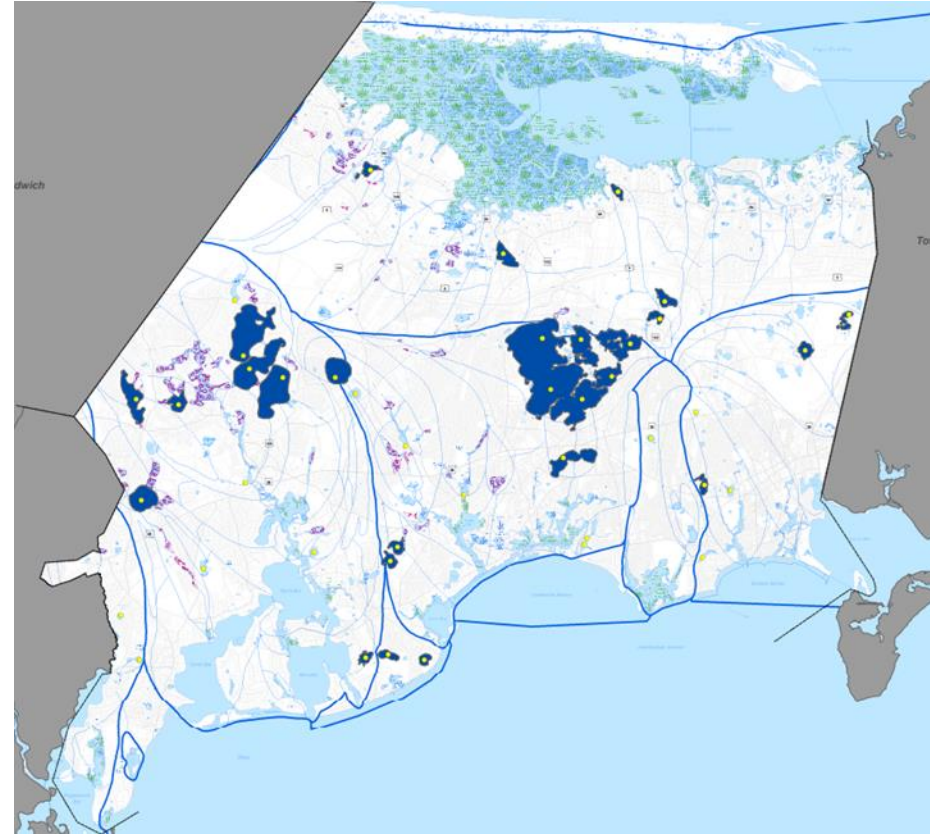
Ponds and Lakes – Monitoring Program

- Annual sampling of all Great Ponds each April
- Annual sampling of all Great Ponds and an additional 14 ponds late summer (mid-August to mid-September)
- Field data collected for water clarity, dissolved oxygen, temperature
- ~180 samples collected annually over the spring and late-summer sampling events
- Samples delivered to SMAST for determination of total phosphorus, total nitrogen, and chlorophyll-a concentrations and pH and alkalinity



Ponds and Lakes – Monitoring Program Results

- 32 ponds have at least five years of data and were evaluated for impairment based on MassDEP regulations and Cape Cod pond thresholds
- Of the 32 ponds:
 - 23 are impaired,
 - 7 are borderline impaired, and
 - 2 are unimpaired
- Ponds can be impaired due to excess nutrients (particularly phosphorus), algal blooms, poor water clarity, and low dissolved oxygen



Ponds and Lakes – Cyanobacteria Monitoring Program

- Initiated 2008, annual monitoring program late May through September
- Monitoring at 38 sites covering 28 ponds
 - Includes all freshwater public and semi-public beaches
- Collaborative effort involving:
 - Association to Preserve Cape Cod
 - Town staff (DPW & Health)



Ponds and Lakes – Cyanobacteria Monitoring Program

- Monitoring conducted weekly to monthly – frequency depends on cyanobacteria levels and historic occurrence of blooms
- Advisory postings made within 48-hours of sample collection



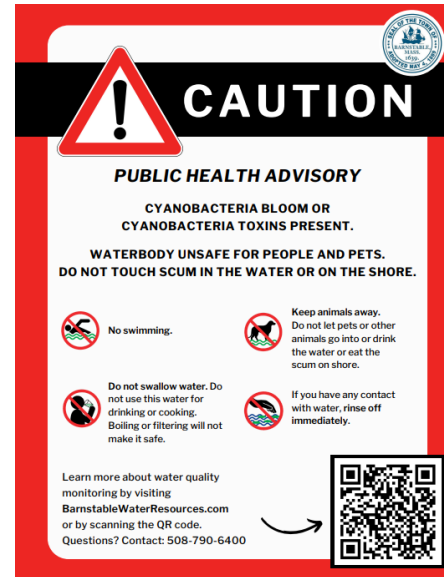

PET ADVISORY


**CYANOBACTERIA / BLUE GREEN ALGAE
MAY BE PRESENT IN THE WATER.**

**PROCEED WITH CAUTION.
WHEN IN DOUBT STAY OUT.**

-  You can swim in this water, but stay away from algae and scum in the water.
-  Do not let pets or other animals go into or drink the water or eat the scum on shore.
-  Keep children away from algae in the water or on the shore.
-  Do not drink this water or use it for cooking.
-  For fish caught here, throw away the guts and clean fillets with tap or bottled water before cooking.
-  Do not eat shellfish from this water.

Learn more about water quality monitoring by visiting BarnstableWaterResources.com or by scanning the QR code.
Questions? Contact: 508-790-6400








CAUTION


PUBLIC HEALTH ADVISORY

**CYANOBACTERIA BLOOM OR
CYANOBACTERIA TOXINS PRESENT.**

**WATERBODY UNSAFE FOR PEOPLE AND PETS.
DO NOT TOUCH SCUM IN THE WATER OR ON THE SHORE.**

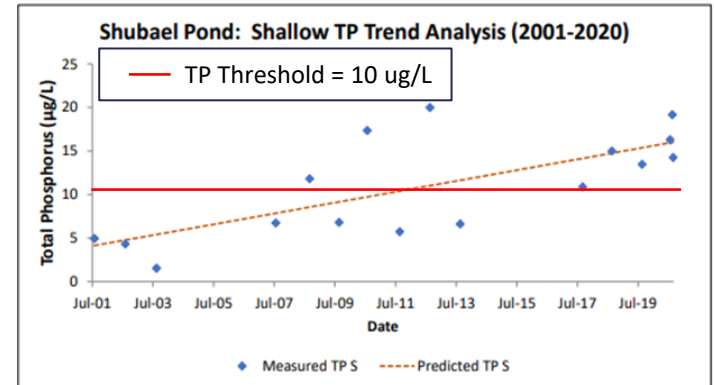
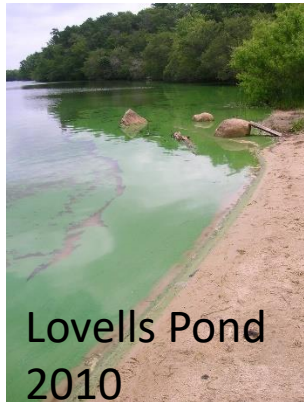
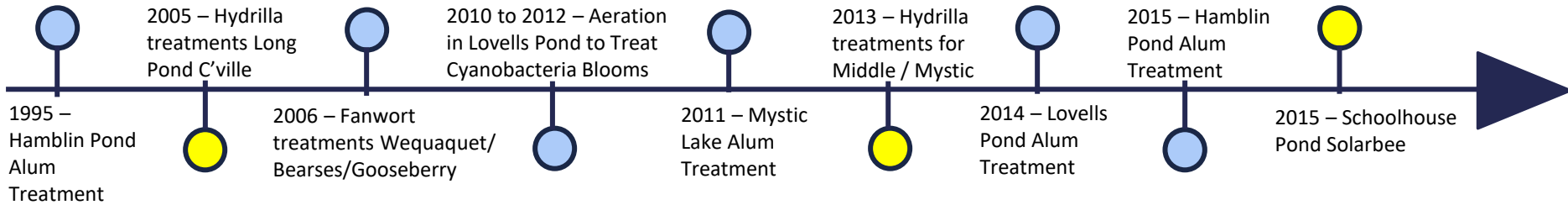
-  No swimming.
-  Keep animals away. Do not let pets or other animals go into or drink the water or eat the scum on shore.
-  Do not swallow water. Do not use this water for drinking or cooking. Boiling or filtering will not make it safe.
-  If you have any contact with water, rise off immediately.

Learn more about water quality monitoring by visiting BarnstableWaterResources.com or by scanning the QR code.
Questions? Contact: 508-790-6400



Ponds and Lakes – History of Management

Traditionally, management of ponds completed as a reaction to a visual problem, such as Harmful Cyanobacteria Blooms and Invasive Species



Requires annual operation and maintenance cost

Ponds and Lakes – Management Plan Program

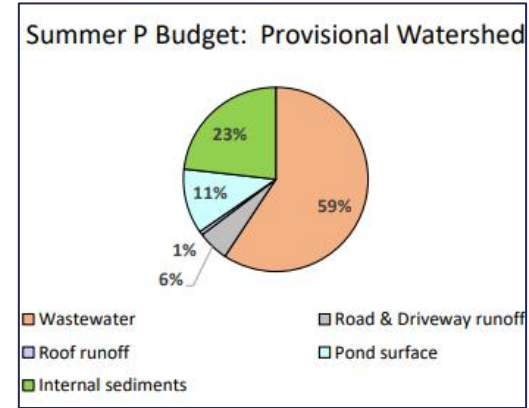
- From 2015 onward, there continued to be water quality issues in ponds including:
 - Cyanobacteria blooms
 - Excessive macrophytes (plants)
 - Low Dissolved Oxygen
 - Diminishing habitat for migratory fish, cold-water fish, and rare species
 - Poor water clarity
- In 2017, Water Resources Advisory Committee recognized a lack of information on freshwater ponds to appropriately identify management solutions and take action to improve water quality

Ponds and Lakes – Management Plan Program

- In 2020, Ponds and Lakes Monitoring and Management Plan Program established by Town Council, providing for management plan development:
 - 2020 – Shubael Pond
 - 2021 – Long Pond Marstons Mills
 - 2022 – Lovells Pond
 - 2023 – Wequaquet Lake, Bearses Pond, and Gooseberry Cove
 - 2024 – Long Pond Centerville
- Management plans developed over two phases:
 - Year 1 – Monitoring Phase
 - Water quality sampling
 - Stormwater sampling
 - Stream sampling
 - Sediment nutrient regeneration analysis
 - Bathymetry, mussel, and macrophyte mapping
 - Phytoplankton enumeration and composition
 - Year 2 – Management Plan Report
 - Combines field and water quality data with land use analysis to develop recommended management strategies to improve water quality

Ponds and Lakes – Management Plan Program

- 2022 – Shubael Pond Management Plan recommends phosphorus management of:
 - Septic Systems with sewers
 - Internal Sediments with Alum
 - Road runoff with stormwater improvements

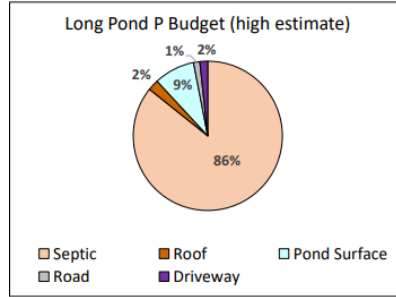


Ponds and Lakes – Management Plan Program

- 2022 – Long Pond MM

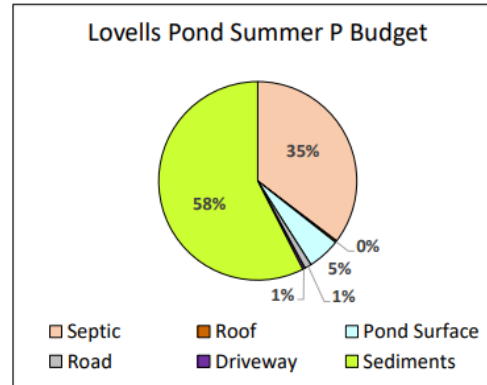
Management Plan recommends:

- Sewers to address phosphorus loading from septic systems
- Floating Treatment Wetlands to remove phosphorus through plant growth



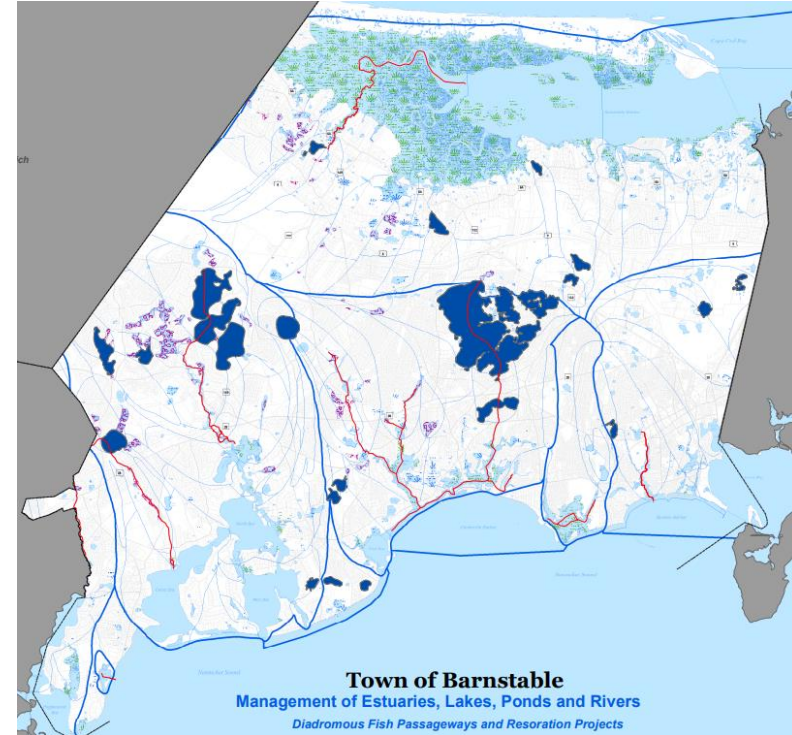
- 2023 – Lovells Pond Management Plan *draft* findings:

- Primary source of phosphorus load is from the sediments
- Septic systems contribute 35% of the phosphorous load



Rivers, Streams, Channels, and Fish Passage

- 11 diadromous fish passageways:
 - Centerville River
 - Little River
 - Lake Elizabeth Stream
 - Santuit River
 - Bumps River
 - Stewarts Creek
 - Skunknett River
 - Halls Creek
 - Marstons Mills River
 - Boat Cove Creek
 - Rushy Marsh Culvert
- Annual herring counts at Long Pond Centerville Outlet, Mill Pond Fish Ladder, and Middle Pond Fish Ladder
- Water level monitoring at Lovells Pond, Long Pond, Middle Pond, and Mill Pond
- Marstons Mills River monitoring by Barnstable Clean Water Coalition



Fish Passage Restoration Projects

- Projects undertaken since 2020:
 - Marstons Mills River Fish Run
 - Rosa Lane Culvert Improvements
 - Mill Pond Fish Ladder
 - Little River Fish Passage Feasibility
 - Long Pond Centerville Outlet
 - Long Pond Lower Channel
 - Lake Elizabeth Fish Ladder
- Collaborative effort between DPW, MEA, Cape Cod Conservation District, and USDA Natural Resources Conservation Service on all projects
- Additional collaboration with Association to Preserve Cape Cod, Barnstable Clean Water Coalition, and Red Lily Pond Protective Association





Thank You!

MA Department of Environmental Protection | Cape Cod Commission | Barnstable Clean Water Coalition | Barnstable Land Trust | Association to Preserve Cape Cod

Alice	Nicole	Jacob Santos	Jared B	Don	Robert	Jackie Clayton	John Nichols	Tim P.	Jonathan	Cate	Bill
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Patrick Reidy	Kevin	Condon	Christina Martin	Jarod	Jay	Cara	Kenny	Hemnila	Bella	Liv	Kaisers
O'Brien	Vancleef	Dave Farsiulo	J. Eldridge	Hayes	Dave Dawson	Materne	Walls	Yaroch	Chris M	Chris Adams	McClusky
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Questions?



Resources