Municipality/Organization: **Town of Eastham, MA**

EPA NPDES Permit Number: **MAR041110**

MassDEP Transmittal Number: **W- 040891**

Annual Report Number & Reporting Period: **Year 13** **April 1, 2015– March 31, 2016**

NPDES PII Small MS4 General Permit Annual Report (Due: May 1, 2016)

Part I. General Information

Contact Person: Jane Crowley Title: Health Agent

Telephone #: (508) 240-5900 Email: jcrowley@eastham-ma.gov

Mailing Address: 2500 State Highway, Eastham, MA 02642

Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: Sheila Vanderhoef

Printed Name: Sheila Vanderhoef

Title: Town Administrator

Date: July 11, 2016

Part II. Self-Assessment

The Town of Eastham has completed the required self-assessment and has determined that our municipality is in compliance with all permit conditions.

Part III. Summary of Minimum Control Measures

1. Public Education and Outreach

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 13 (Reliance on non-municipal partners indicated, if any)	Planned Activities
1.1	Educational Brochures	DPW, Health	Development of Brochures	Updated brochures; disseminated brochures concerning hazardous waste disposal days. Continued to coordinate with Cape Cod Commission on informational campaign. Drug Drop Box located in Police Department available 24/7 to remove medication from waste stream.	Continue to update educational brochures as new information arises; provide information on hazardous waste disposal days. Continue efforts to educate the public about proper disposal of unwanted medical waste.
Revised	Brochures educate the public about proper disposal of medical waste and prescription medication for unwanted and unused medical waste drop off box available to the public Participate in Drug Take Back Day and offer Drop Off box open 24 hours, 7 days a week. Participate in National Drug Take Back Day	Health, Police	Proper disposal of prescription and non prescription drugs		
1.2	Mailings to Homeowners	Health	Distribution of Brochures	Homeowner mailings regarding importance of septic system maintenance.	Continue annually. 3,413 number of mailings have been sent in 2015 to homeowners who have not pumped septic system in 3 or more years to encourage proper maintenance
Revised	http://www.eastham-ma.gov/Public_Documents/EasthamMA_Health/index septic pumping brochure				
1.3	Mailing to all Property Owners Paricipate in Regional Waste water Planning efforts with Cape Cod Commission 208 Project	Health	Distribution of Brochures and educational presentation on wastewater management	Homeowner mailings regarding importance of wastewater management plan including storm water.	Air local wastewater presentation and educational video on local cable and website video on demand

1.4	Coastal/Pond Clean-up Remediation of Herring Pond conducted October 2012 with Alum Treatment Alum Treatment of Great Pond conducted October 2013 Adopted Comprehensive Plan to Protect Pond Water Quality November 18, 2014	ConCom, DPW, Health Dept., Water Management Committee Water Management Committee	Conducting Clean-up Pond water quality monitoring for phosphorus + A1 profiles. Also monitor D.O./PH/ALK dissolved; see attached. Establish proprieties and objectives	Private owners clean pond areas and test fresh water. DPW cleans as necessary. Mutt-mitt project for dog waste has been implemented and continued. Enhanced enforcement of pet regulations. Form local Citizens Advisory group to facilitate compliance Alum Treatment has improved water quality Adopted Fertilizer Regulation Worked with Orleans to establish water quality monitoring stations to be tested summer 2016	DPW continues to clean up as necessary. Possible expansion of mutt-mitt program to other areas of town. Review pond report from CCC: Water quality monitoring to continue. Current water quality data for Great Pond and Herring Pond 2054 shows continued improvement. Continue Community Volunteer Education Outreach and Appreciation Program. Establish community engagement to conduct sampling.

1.5	Office Brochure	NR, DPW, Planning	Availability of Brochures	Brochures with local contact information corresponding with 1.1 displayed in NR, DPW, and Town Hall. Distribute educational materials from Cape Cod Water Protection Collaborative or Massachusetts Estuaries Project. Updated brochures; disseminated brochures concerning hazardous waste disposal days. Continued to coordinate with Cape Cod Commission on informational campaign.	Continue to update brochures and informational/educational brochures in Year 13, including information on fertilizers and other potential contaminants. Review grant-funded Pleasant Bay Watershed Management Plan for cross-applicability. Continue strategies to reduce TMDLs as required in Draft Mass Estuaries Report for Rock Harbor. Final reports on TMDL for Nauset expected 2015. Continue to update educational materials as new information arises; provide information on hazardous waste disposal days.
Revised					

1a. Additions

1.6	Post information on Countywide Rain Barrel Distribution Program http://www.eastham-ma.gov/Public_Documents/EasthamMA_Planning/rainflyer10.pdf	DPW, NR, Planning	Availability of rain barrels	Disseminate information from the Cape Cod Groundwater Guardian Team	Continue indefinitely
1.7	Beach Signage	Health	Post signage	Inspect condition of signage at every marine & freshwater beach to enforce compliance with state beach regulations, noting contact info, testing data and periods of testing. Include signage on Invasive Species	Continue indefinitely

2. Public Involvement and Participation

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 13 (Reliance on non-municipal partners indicated, if any)	Planned Activities
2.1	Stormwater Management Program	NR, DPW, ConCom, Planning, Health, WMC	Development of Program, including prioritization of sites	Program has been developed and sites have been identified. Catchbasins and discharge pipes have been mapped in GIS database, based on paper maps. http://www.eastham-ma.gov/Public_Documents/EasthamMA_Planning/NPDES/Maps/	Continue contact with Mass State Highway about stormwater drainage into Salt Pond and Minister Pond in attempt to mitigate impact to ponds and develop best management practices.
	Town is developing GIS based mapping of the storm water system	DPW, Planning, Health Con Com WMC	Map all structures (manholes, Catch basins)	Maps developed for planning and future drainage improvement projects. Begin development of computer People Form GIS for inventory tracking http://www.eastham-ma.gov/Public_Documents/EasthamMA_Planning/NPDES/Maps/	Sturctures being inspected for connectivity, condition, determining size, material of construction and condition of the network
2.2	Pollution Reporting	NR, DPW, Pond Stewards	Visual Monitoring / Recording	Continue routine monitoring of marine areas conducted by NR staff 7 times per week, daily monitoring of drainage system/road network by DPW, and monitoring of fresh surface waters by Eastham Pond Stewards. Monitoring capabilities augmented for summer months in Rock Harbor (marina) by seasonal employee. NR monitoring of Town Cove bacteria levels with MA Division of Marine Fisheries.	Continue with monitoring as described; receive report from Cape Cod Commission's monitoring efforts for action. Pond Report implementation strategies reviewed. http://www.barnstablecountyhealth.org/bseastham.htm
Revised					
	Attend 208 Regional Planning Summit	Health, DPW, Planning	Water Shed Reports for 5 estuaries	5 Watershed reports submitted to CCC in compliance with EPA requirements for Waste Management Agencies	Complete hybrid evaluation of Nauset Estuary
Revised					

2a. Additions

2.3	Wiley Park Demonstration Project	NR	Educate public about alternative low impact sustainable landscape options	Project implementation. Project installed 2014.	Continue maintenance.
2.4	Pond Associations	NR, Health	Conduct outreach for Pond Remediation Project	2 Private pond associations formed to support Pond issues. Work to educate and gain support for pond remediation and continue to encourage best management practices	Continue indefinitely. Bi annual Association Meeting Planned to update developments on best management practices and pond remediation strategies.

3. Illicit Discharge Detection and Elimination

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 13 (Reliance on non-municipal partners indicated, if any)	Planned Activities
3.1	Map Outfalls	NR, DPW	Comprehensive Map GIS/GPS	Program has been developed and sites have been identified.	Continue to Refine and enhance source point/waterways map. Asset Management Program underway.
Revised					
3.2	Detection of Non-Stormwater Discharge	NR, Health	Correction of Discharges	Continue to identify no stormwater discharges and remedy situations as they arise, depending on the source of the discharge	Continue project indefinitely. Update map as needed
Revised					
3.3	Dry Weather Flow Screening	NR, Health	Screening Testing; Correction of Discharges	Incorporate dry weather flow screening into the routine monitoring of marine areas conducted by NR staff 5x per week spring through fall.	Continue project indefinitely.
Revised					
3.4	Reporting Line	NR, DPW, Fire	Document complaints	Reports involving oil or hazardous waste is reported to the Fire Dept, and MA DEP.	Continue project indefinitely.
Revised	*A team is assembled when an illicit discharge is confirmed (DPW, Health, Fire, Building Inspector)*				
3.5	Hazardous Product Collection	Health, DPW, Recycling	Conducting Collection Day	Hazardous waste collection day's schedules for July 16, 2016 and September 17, 2016. Planned Medical Waste take back day conducted in conjunction with DEA. Drop Box available in Police Department 24/7	Continue project indefinitely. Planned for July 16, 2016 and September 17, 2015 conducted in reciprocal agreement with Orleans to allow residents additional opportunity to dispose of HHW.
Revised	Medical Waste Disposal Day	Health, Police	Conduct Collection Day		

3a. Additions

3.6	Outfall Elimination	DPW	Reduction of outfalls contributing to bodies of water	Projects Completed	Maintenance and Operations Plan
3.7	IDDE	DPW Board of Health	Found and Eliminated	Continue monitoring	Continue monitoring

4. Construction Site Stormwater Runoff Control

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 13 (Reliance on non-municipal partners indicated, if any)	Planned Activities
4.1	Construction Site Runoff Control Bylaw	Planning	Developed Bylaws	Bylaw adopted by Planning Board and Town Meeting	Implement bylaw
Revised					
4.2	Enact Construction Site Runoff Control Bylaw	ConCom, Planning, Town Meeting	Implement Bylaw	Continue to discuss the creation of a bylaw to be incorporated into local wetland control bylaw and local subdivision rules and regulations.	Continue to work on the development and implementation of bylaws. There is a policy, but not a bylaw.
Revised					
4.3	Sand Nourishment	ConCom	Regulations	Continuation of goal for better compliance and quality of sand. NR agent frequently meets with applicants.	Homeowners required to do sand nourishment must do so with sand of comparable grain size to what is natural with no debris.
Revised					
4.4	Conceptual Salt Pond Storm water design complete	DPW	Developed Plans	Complete final plans	Pursue funding
Revised					

4a. Additions

4.5	Ground water Protection Regulation	Health and Planning	Regulations	Adopted Ground Water Protection Regulations/Bylaw http://www.eastham-ma.gov/Public_Documents/EasthamMA_Health/groundwaterregs/	Implement BOH Regulations and Zoning Bylaw

5. Post-Construction Stormwater Management in New Development and Redevelopment

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 13 (Reliance on non-municipal partners indicated, if any)	Planned Activities
5.1	Construction Site Runoff Control Bylaw	ConCom,	Develop Bylaws	Implement bylaw which was incorporated into local wetland control bylaw and local subdivision control rules and regulations.	Continue to work on the development and implementation of a bylaw. Review bylaw for adoption at town meeting for ConCom. Continue "Limit of Work" in Order of Conditions for project as well as use hay bales &/or silt fence until area is stabilized.
Revised					
5.2	Amend Site Plan Review	Planning	Bylaw	Bylaw adopted.	Goal achieved
Revised					
5.3	Enact Construction Site Runoff Control Bylaw	ConCom, Planning, Town Meeting, Bd. Of Highway Surveyors	Implement Bylaw	Enacted bylaw which was incorporated into local wetland control bylaw and local subdivision rules and regulations.	Enforce bylaw. Work on the development and implementation of bylaws completed
Revised					
Revised					

5a. Additions

6. Pollution Prevention and Good Housekeeping in Municipal Operations

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 13 (Reliance on non-municipal partners indicated, if any)	Planned Activities
6.1	Annual Training	NR, DPW, Planning, Fire, Health	Training Session	Annual training on best practices for pollution prevention and mitigation.	Annual training for worker safety, attend educational workshops for employees or public given by CCC or WBNERR, Barnstable County Health
Revised	Right to Know Employee Training on Hazards and STS/GHS				
6.2	Review of Town Properties	DPW, Building Maintenance	Monitor and Correct Problems	Audit conducted by MIIA.	Continue indefinitely.
Revised					
6.3	Review of Town Operations	DPW, Facilities Manager	Monitor and Correct Problems	Pollution Prevention Control	Ongoing project
Revised					
6.4	Catch basin Cleaning	DPW	Updated Log	Clean all town-owned catch basins in spring and fall 2016	Continue to Clean and inspect all town-owned catch basins
Revised	http://www.eastham-ma.gov/Public_Documents/EasthamMA_Planning/NPDES/DPW%20Street%20Sweeping%20 and%20Catchbasin%20Policy.pdf				
6.5	Street Sweeping	DPW	Record areas swept	Sweep all town-owned roadways and parking lots in spring and fall 2016. Received beneficial use determination based on testing.	Sweep all town-owned roadways and parking lots in Spring and Fall 2016
Revised					
6.6	Remediation of existing outfall	DPW	Elimination of stormwater discharge	One discharge site identified: Cole Road. Design complete. Permitting underway.	Complete permitting and bid.
Revised					
6.7	Drainage Alterations	DPW	Catch basin Replacement	Catch basins identified for replacement or closure. Design underway for Governor Prence Road. Project permitted	Construct project
Revised					
6.8	Fuel Tanks	Fire	Fuel Tank Removal	Goal achieved.	Goal achieved
Revised					

6.9	Stormwater/Flooding Remediation	DPW	Replace culvert Campground Beach	Design Plans complete	Begin Permitting.
Revised					

6a. Additions

6.10	Pesticide/Fertilizer Policy	Board of Health	Fertilizer and Pesticide reduction	Adopted Fertilizer Regulation. Town documented opposition to Eversource pesticide use.	Policy adopted and enforced. Conduct community education program to include residents and businesses
6.11	Beach Cleaner Purchased	DPW	Aerate sand and remove debris	Operated June through September	Continue Beach Cleaning
6.12	Vegetation management with goats	DPW	Elimination of Herbicide	Pilot project complete	Publicize program

7. BMPs for Meeting Total Maximum Daily Load (TMDL) Waste Load Allocations (WLA) *<<Not applicable>>*

BMP ID #	**BMP Description**	**Responsible Dept./Person Name**	**Measurable Goal(s)**	**Progress on Goal(s) – Permit Year 13** (Reliance on non-municipal partners indicated, if any)	**Planned Activities**
Revised					
Revised					
Revised					

7a. Additions

7b. WLA Assessment

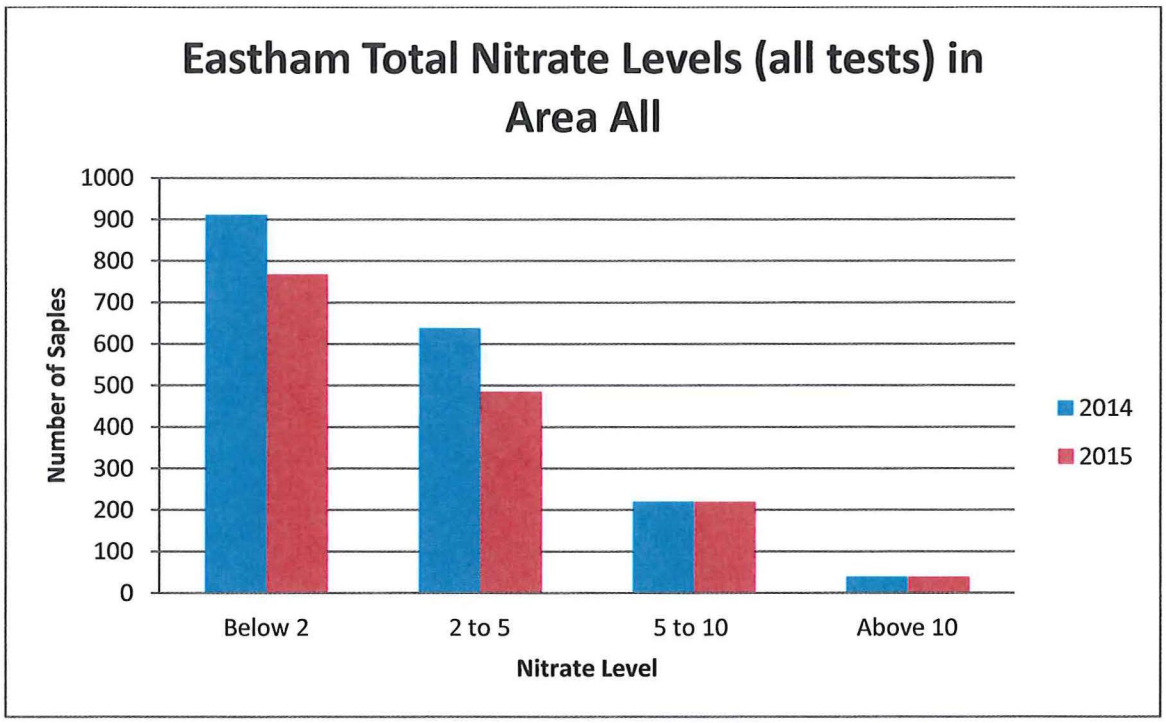
Part IV. Summary of Information Collected and Analyzed

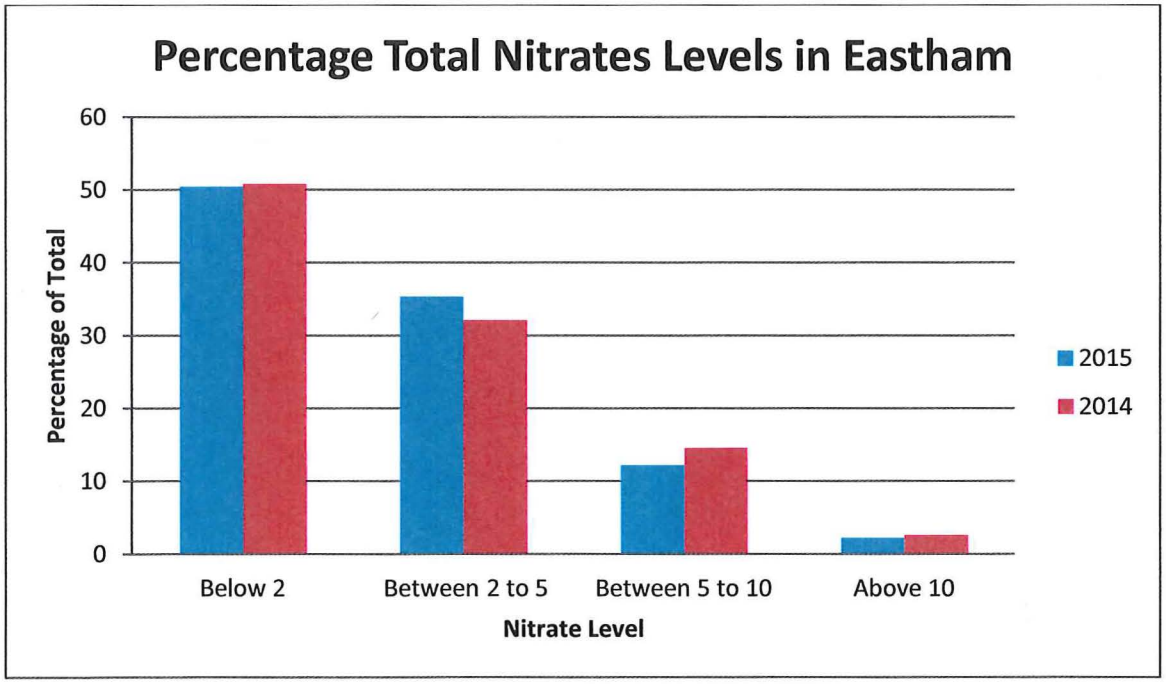
Freshwater Sampling – The Cape Cod Pond and Lake Stewardship (PALS) are continually sampling the Eastham ponds in an effort to identify possible pollutant and recommend best management practices for containing and eliminating possible pollutants. Eastham has a total of 12 ponds currently being sampled. (http://www.capecodcommission.org/water/PALS/home.htm). See attached.

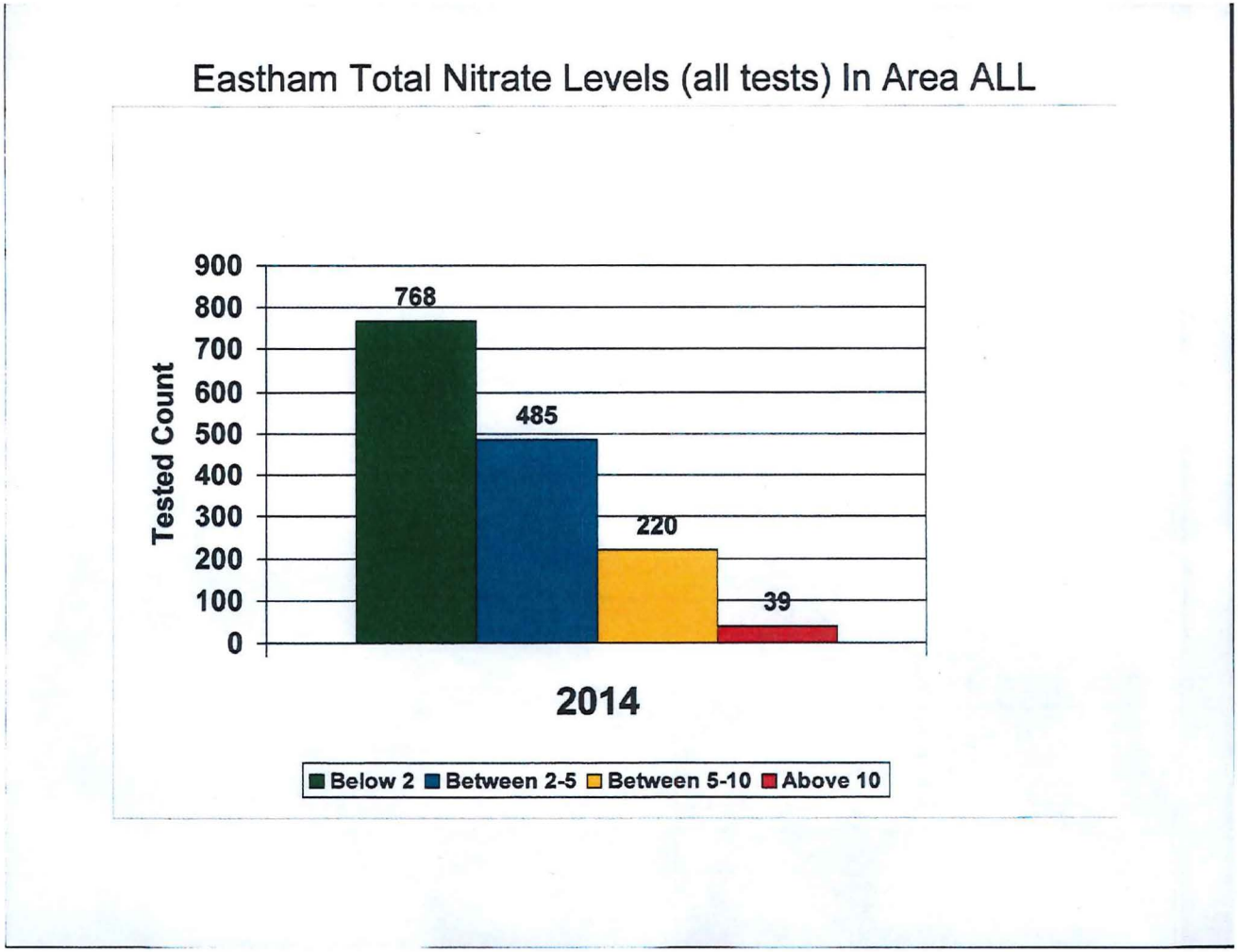
Beach Sampling – Sixteen Eastham beaches (12 saltwater and 6 freshwater) were sampled during the summer months by the Barnstable County Department of Health and Environment. In 2015 over 238 samples were tested for E. Coli or Enterococci as applicable. Samples exceeding the limits result in the posting of swimming advisory notices and posting on our website. In 2015 only samples 4 excedences were detected. Total percentage failure for Maine Beaches was 1.75%. Fresh Water Beached had 1.41% failure. Repeat samples taken the following day were within acceptable limits in all cases but 1 and the beaches were reopened to the public when standards were achieved. (http://www.barnstablecountyhealth.org/bseastham.htm). See attached.

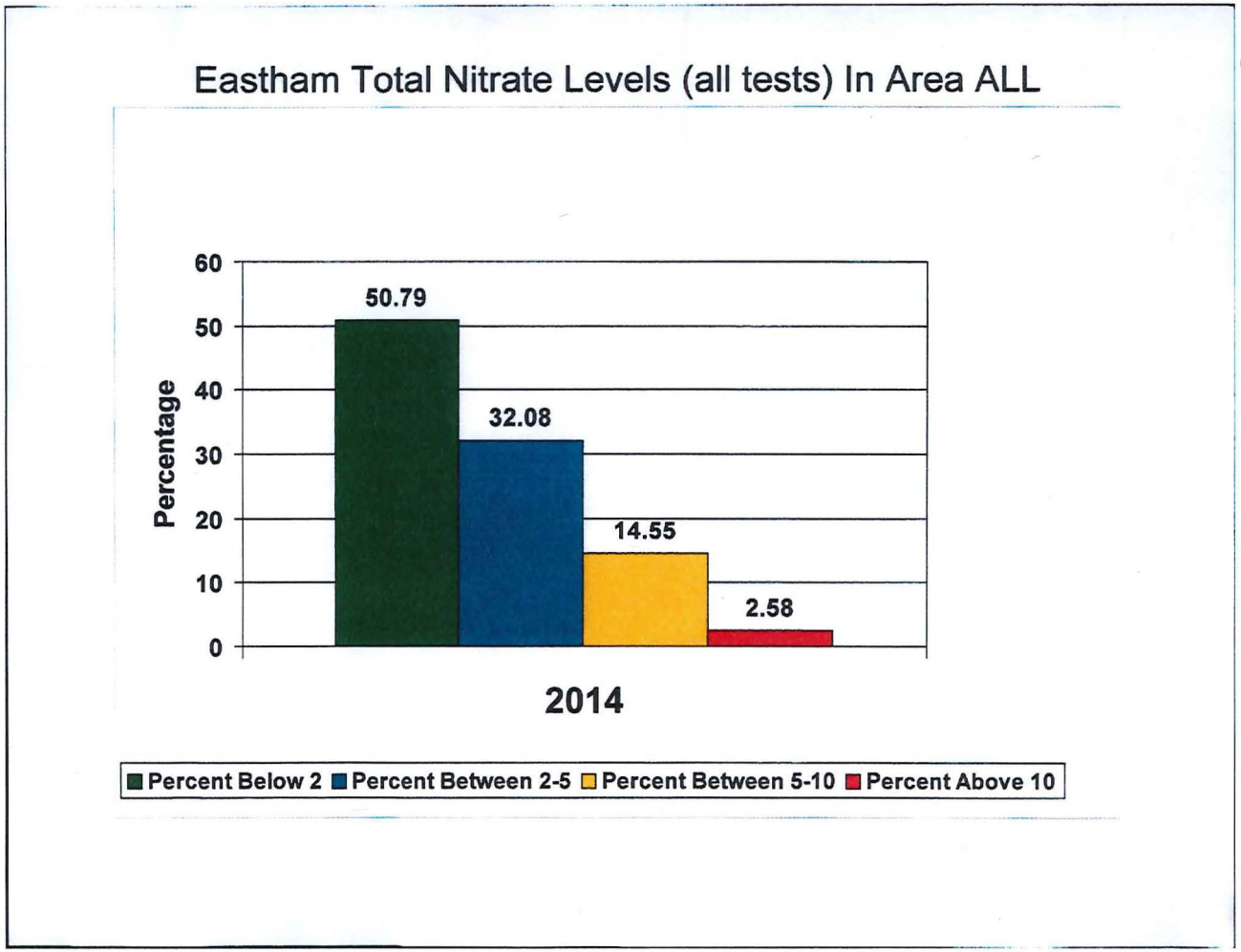
Groundwater Sampling – The town continued its voluntary sampling project to evaluate levels of nitrate in residential wells. Each year one-third of the town is sampled allowing for a three-year sampling rotation schedule. We are experiencing a return of approximately 60% of the vials mailed.

Year	# Samples Returned 2015	# Samples Returned 2014
	1808	1512
Below 2	911	768
2 to 5	638	485
5 to 10	220	220
Above 10	39	39


Eastham Total Nitrate Levels (all tests) in Area All
1000
900
800
700
600
500
400
300
200
100
0
Number of Saples
Below 2
2 to 5
5 to 10
Above 10
Nitrate Level
2014
2015


Percentage Total Nitrates Levels in Eastham
60
50
40
30
20
10
0
Percentage of Total
Below 2
Between 2 to 5
Between 5 to 10
Above 10
Nitrate Level
2015
2014


Eastham Total Nitrate Levels (all tests) In Area ALL
Tested Count
900
800
700
600
500
400
300
200
100
0
768
485
220
39
2014
Below 2
Between 2-5
Between 5-10
Above 10



Shellfish Sampling – The Natural Resources Office continues to test for Red Tide and participate in shellfish sampling in coordination with Massachusetts Division of Marine Fisheries on a weekly basis through the spring, summer and Fall.

Part V. Program Outputs & Accomplishments (OPTIONAL)
(Since beginning of permit coverage unless specified otherwise by a **, which indicates response is for period covering April 1, 2009 through March 31, 2014)

Programmatic

	(Preferred Units)	Response
Stormwater management position created/staffed	(y/n)	
Annual program budget/expenditures **	($)	
Total program expenditures since beginning of permit coverage	($)	
Funding mechanism(s) (General Fund, Enterprise, Utility, etc)		

Education, Involvement, and Training

Estimated number of property owners reached by education program(s)	(# or %)	
Stormwater management committee established	(y/n)	
Stream teams established or supported	(# or y/n)	
Shoreline clean-up participation or quantity of shoreline miles cleaned **	(y/n or mi.)	
Shoreline cleaned since beginning of permit coverage	(mi.)	
Household Hazardous Waste Collection Days		
▪ days sponsored **	(#)	
▪ community participation **	(# or %)	
▪ material collected **	(tons or gal)	
School curricula implemented	(y/n)	

Legal/Regulatory

	In Place Prior to Phase II	Reviewing Existing Authorities	Drafted	Draft in Review	Adopted
Regulatory Mechanism Status (indicate with "**X**")					
▪ Illicit Discharge Detection & Elimination					
▪ Erosion & Sediment Control					
▪ Post-Development Stormwater Management					
Accompanying Regulation Status (indicate with "**X**")					
▪ Illicit Discharge Detection & Elimination					
▪ Erosion & Sediment Control					
▪ Post-Development Stormwater Management					

Mapping and Illicit Discharges

	(Preferred Units)	Response
Outfall mapping complete	(%)	
Estimated or actual number of outfalls	(#)	
System-Wide mapping complete (complete storm sewer infrastructure)	(%)	
Mapping method(s)		
▪ Paper/Mylar	(%)	
▪ CADD	(%)	
▪ GIS	(%)	
Outfalls inspected/screened **	(# or %)	
Outfalls inspected/screened (Since beginning of permit coverage)	(# or %)	
Illicit discharges identified **	(#)	
Illicit discharges identified (Since beginning of permit coverage)	(#)	
Illicit connections removed **	(#); and (est. gpd)	
Illicit connections removed (Since beginning of permit coverage)	(#); and (est. gpd)	
% of population on sewer	(%)	

% of population on septic systems	(%)	

Construction

	(Preferred Units)	Response
Number of construction starts (>1-acre) **	(#)	
Estimated percentage of construction starts adequately regulated for erosion and sediment control **	(%)	
Site inspections completed **	(# or %)	
Tickets/Stop work orders issued **	(# or %)	
Fines collected **	(# and $)	
Complaints/concerns received from public **	(#)	

Post-Development Stormwater Management

Estimated percentage of development/redevelopment projects adequately regulated for post-construction stormwater control	(%)	
Site inspections (for proper BMP installation & operation) completed **	(# or %)	
BMP maintenance required through covenants, escrow, deed restrictions, etc.	(y/n)	
Low-impact development (LID) practices permitted and encouraged	(y/n)	

Operations and Maintenance

Average frequency of catch basin cleaning (non-commercial/non-arterial streets) **	(times/yr)	
Average frequency of catch basin cleaning (commercial/arterial or other critical streets) **	(times/yr)	
Qty of structures cleaned **	(#)	
Qty. of storm drain cleaned **	(%, LF or mi.)	
Qty. of screenings/debris removed from storm sewer infrastructure **	(lbs. or tons)	
Disposal or use of screenings (landfill, POTW, compost, beneficial use, etc.) **	(location)	

Basin Cleaning Costs		
• Annual budget/expenditure (labor & equipment)**	($)	
• Hourly or per basin contract rate **	($/hr or $ per basin)	
• Disposal cost**	($)	
Cleaning Equipment		
• Clam shell truck(s) owned/leased	(#)	
• Vacuum truck(s) owned/leased	(#)	
• Vacuum trucks specified in contracts	(y/n)	
• % Structures cleaned with clam shells **	(%)	
• % Structures cleaned with vactor **	(%)	

	(Preferred Units)	Response
Average frequency of street sweeping (non-commercial/non-arterial streets) **	(times/yr)	
Average frequency of street sweeping (commercial/arterial or other critical streets) **	(times/yr)	
Qty. of sand/debris collected by sweeping **	(lbs. or tons)	
Disposal of sweepings (landfill, POTW, compost, beneficial use, etc.) **	(location)	
Annual Sweeping Costs		
• Annual budget/expenditure (labor & equipment)**	($)	
• Hourly or lane mile contract rate **	($/hr. or ln mi.)	
• Disposal cost**	($)	
Sweeping Equipment		
• Rotary brush street sweepers owned/leased	(#)	
• Vacuum street sweepers owned/leased	(#)	
• Vacuum street sweepers specified in contracts	(y/n)	
• % Roads swept with rotary brush sweepers **	%	
• % Roads swept with vacuum sweepers **	%	

Reduction (since beginning of permit coverage) in application on public land of: ("N/A" = never used; "100%" = elimination)		
▪ Fertilizers	(lbs. or %)	
▪ Herbicides	(lbs. or %)	
▪ Pesticides	(lbs. or %)	
Integrated Pest Management (IPM) Practices Implemented	(y/n)	

	(Preferred Units)	Response
Average Ratio of Anti-/De-Icing products used ** (also identify chemicals and ratios used in specific areas, e.g., water supply protection areas)	% NaCl % $CaCl_2$ % $MgCl_2$ % CMA % Kac % KCl % Sand	
Pre-wetting techniques utilized **	(y/n or %)	
Manual control spreaders used **	(y/n or %)	
Zero-velocity spreaders used **	(y/n or %)	
Estimated net reduction or increase in typical year salt/chemical application rate	(±lbs/ln mi. or %)	
Estimated net reduction or increase in typical year sand application rate **	(±lbs/ln mi. or %)	
% of salt/chemical pile(s) covered in storage shed(s)	(%)	
Storage shed(s) in design or under construction	(y/n or #)	
100% of salt/chemical pile(s) covered in storage shed(s) by May 2008	(y/n)	

Water Supply Protection

Storm water outfalls to public water supplies eliminated or relocated	# or y/n	
Installed or planned treatment BMPs for public drinking water supplies and their protection areas	# or y/n	
• Treatment units induce infiltration within 500-feet of a wellhead protection area	# or y/n	

Please See Additional Information Below

Update to Board of Selectmen on Cape Cod Commission Watershed Reports, June 21, 2016

This update is intended to provide background information and a summary of Eastham's Watershed Reports that are due to be submitted to the Cape Cod Commission by June 30, 2016. Patty Daley of the Cape Cod Commission presented to the Board of Selectmen on January 20, 2016 and provided a timeline of required actions by the Town as shown below. The status of the items is noted next to the required action.

DESIGNATION OF TOWNS AS WMAs
- 12 months to complete watershed reports

→ **Status:** Complete – Eastham is designated WMA

WATERSHED REPORTS
- Collection Scenario
- Non-Collection Scenario
- Hybrid Scenario

→ **Status:** Developed and will be submitted on 6/22/2016

DEFAULT WATERSHED REPORT
- Prepared by CCC if not completed by WMA

→ **Status:** Not Applicable – Eastham is developing Watershed Reports

IMPLEMENTATION REPORT
- Post 12 month period
- Reporting WMA actions

→ **Status:** Next Step for Town (Technical Memoranda 3 and 4 will outline next steps for implementation)

Why are Watershed Reports Required?

The Cape Cod Commission and Towns are obligated under the settlement agreement between the Conservation Law Foundation (CLF) and United States Environmental Protection Agency (EPA). The Cape Cod Commission (as part of this settlement) has submitted the Section 208 Cape Cod Area Wide Water Quality Management Plan Update (208 Plan Update). Watershed Reports are due to be submitted to the EPA one year following the 208 Plan Update submission (June 2016).

How Many Watershed Reports is Eastham Required to Develop?

Eighty Nine (89) estuaries were identified as part of the Massachusetts Estuaries Project (MEP) and each one is required to have a watershed report developed as part of the 208 Plan. Five (5) of the 89 watersheds are located in Eastham. They are:

- Boat Meadow
- Herring River
- Wellfleet Harbor
- Rock Harbor
- Nauset Harbor (including Salt Pond and Town Cove)

What are Watershed Reports?

The 208 Plan Update provides a Watershed Report template, and watershed information and data for the Town's use in development of Watershed Reports. The Town and GHD have taken this template and background information previously developed by the CCC and developed five separate Watershed Reports summarizing possible approaches to address nitrogen TMDLs. In general the Watershed Reports each include:

- MEP and Total Maximum Daily Load (TMDL) status
- Sources of controllable nitrogen
- Contributing Towns
- Watershed reduction targets
- General estuary and watershed information (area, # of parcels, % residential, etc.)
- Stream and pond information
- Drinking water sources
- Overall ecological condition and degree of impairment
- Nitrogen management approaches (traditional, non-traditional, and hybrid approaches)

What are the Nitrogen Management Approaches for the Five Watersheds?

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 Watershed Reports can be categorized as follows based on the status of MEP Technical Report development and whether a TMDL exists:

WATERSHED	MEP REPORT STATUS	TMDL	NITROGEN MANAGEMENT APPROACH
BOAT MEADOW	None; not being studied currently	No; no MEP data	No approach; no evidence of water quality impairment at this time.
HERRING RIVER	None; not being studied currently	No; no MEP data	No approach; no evidence of water quality impairment at this time.
WELLFLEET HARBOR	Pending; data collection phase	No; in progress	No approach; no evidence of water quality impairment at this time.
ROCK HARBOR	Completed	No; in progress	Approaches include those options identified in the 2009 Final Interim Needs Assessment & Alternatives Screening Report and reclassification.
NAUSET HARBOR	Completed	No; in progress	Approaches are based on Draft Technical Memoranda Nos. 3 and 4 currently under development. No cost information is being provided in Watershed Report at this time.

Next Steps of this project:

An Implementation Report is going to be required 12 months after submission of the Watershed Reports. The Town of Eastham will be able to report the following progress for their watersheds:

Boat Meadow, Herring River, Rock Harbor, and Wellfleet Harbor: Fertilizer Bylaw in place, Board of Health Regulations for nitrogen reducing septic systems in environmentally sensitive areas, and public education newsletters.

Nauset Harbor: Fertilizer Bylaw in place, Board of Health Regulations for nitrogen reducing septic systems in environmentally sensitive areas, and public education newsletters. In addition:

- Collaboration between Eastham and Orleans on expanding water quality monitoring for Nauset Estuary – 3-years at 15 stations.
- Finalization of Technical Memorandum No. 3 for Salt Pond and Technical Memorandum No. 4 for Town Cove which outline the Town's approach for nitrogen management in these subwatersheds. This effort supports the 2016 submitted Watershed Report.
- Non-traditional technology development: Permeable Reactive Barrier (PRB) grant funded investigation work at the Cape Cod National Seashore (CCNS) Salt Pond Visitor Center.
- Continued coordination with the CCNS on determining a baseline loading for the Salt Pond Visitor Center's septic system.

TOWN OF EASTHAM
GROUNDWATER PROTECTION DISTRICT BYLAW

SECTION 1: INTRODUCTION AND PURPOSE OF DISTRICT

1.1. The Groundwater Protection District is an overlay district superimposed on the zoning districts. This overlay district shall apply to all new construction, reconstruction, or expansion of existing buildings and new or expanded uses. Applicable activities and uses in a portion of one of the underlying zoning districts that fall within the Groundwater Protection District must additionally comply with the requirements of this bylaw. Uses prohibited in the underlying zoning districts shall not be permitted in the Groundwater Protection District.

1.2. The purpose of this Groundwater Protection District is to:

a. promote the health, safety, and general welfare of the community by ensuring an adequate quality and quantity of drinking water for the Town of Eastham;

b. preserve and protect existing and potential sources of drinking water;

c. conserve natural resources in the Town of Eastham; and

d. prevent temporary and permanent contamination of the environment.

SECTION 2: DEFINITIONS

Automobile Graveyard: An establishment that is maintained, used, or operated for storing, keeping, buying, or selling wrecked, scrapped, ruined, or motor vehicle parts as defined in MGL c.140B, s.1.

Aquifer: A geologic formation composed of rock, sand or gravel that contains significant amounts of potentially recoverable water.

CMR: Code of Massachusetts Regulations.

Commercial Fertilizer: Any substance containing one or more recognized plant nutrients which is used for its plant nutrient content and which is designed for use, or claimed to have value in promoting plant growth, except un-manipulated animal and vegetable manures, marl, lime, limestone, wood ashes, and gypsum, and other products exempted by state regulations.

Discharge: The accidental or intentional disposal, deposit, injection, dumping, spilling, leaking, pouring, or placing of toxic or hazardous material or hazardous waste upon or into any land or water such that it may enter the surface or ground waters.

Groundwater Protection District: The land area consisting of aquifers and Zone II recharge areas as identified on a map and adopted pursuant to this bylaw.

Hazardous Material: Any substance in any form which because of its quantity, concentration, or its chemical, corrosive, flammable, reactive, toxic, infectious or radioactive characteristics, either separately or in combination with one or more substances, constitutes a present or potential threat to human health, safety, welfare, or to the environment, when improperly stored, treated, transported, disposed of, used, or otherwise managed. Hazardous material includes, without limitation, synthetic organic chemicals, petroleum products, heavy metals, radioactive or infectious materials, and all substances defined as toxic or hazardous under MGL c. 21E. This term shall not include hazardous waste or oil.

Historical High Groundwater Table Elevation: A groundwater elevation determined from monitoring wells and historical water table fluctuation data compiled by the United States Geological Survey.

Hazardous Waste: A substance or combination of substances, which because of quantity, concentration, or physical, chemical or infectious characteristics may cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness or pose a substantial present or potential hazard to human health, safety, or welfare or to the environment when improperly treated, stored, transported, used or disposed of, or otherwise managed. This term shall include all substances identified as hazardous pursuant to the Hazardous Waste Regulations, 310 CMR 30.000.

Impervious Surface: Material or structure on, above, or below the ground that does not allow precipitation or surface water runoff to penetrate into the soil.

Interim Wellhead Protection Area (IWPA): The MassDEP designated protection radius around a public water well that lacks a Zone II.

Junkyard: An establishment that is maintained, operated, or used for storing, keeping, buying, or selling junk, or for the maintenance or operation of an automobile graveyard, as defined in MGL c.140B, s.1.

Landfill: A facility established in accordance with a valid site assignment for the purposes of disposing solid waste into or on the land, pursuant to the Solid Waste Regulations, 310 CMR 19.006.

MassDEP: Massachusetts Department of Environmental Protection.

MGL: Massachusetts General Law.

Petroleum Product: Includes, but not limited to, fuel oil; gasoline; diesel; kerosene; aviation jet fuel; aviation gasoline; lubricating oils; oily sludge; oil refuse; oil mixed with other wastes; crude oils; or other liquid hydrocarbons regardless of specific gravity. Petroleum product shall not include liquefied petroleum gas including, but not limited to, liquefied natural gas, propane or butane.

Non-Sanitary Wastewater: Wastewater discharges from industrial and commercial facilities containing wastes from any activity other than collection of sanitary sewage including, but not limited to, activities specified in 310 CMR 15.004(6).

Open Dump: A facility operated or maintained in violation of the Resource Conservation and Recovery Act 42 U.S.C. 4004(a)(b), or state regulations and criteria for solid waste disposal.

Recharge Areas: Land areas, such as a Zone II or Interim Wellhead Protection Area, where precipitation and surface water infiltrates into the ground to replenish groundwater and aquifers used for public drinking water supplies.

Septage: The liquid, solid, and semi-solid contents of privies, chemical toilets, cesspools, holding tanks, or other sewage waste receptacles. This term shall not include any material that is a hazardous waste, as defined by 310 CMR 30.000.

Sludge: The solid, semi-solid, and liquid residue that results from a process of wastewater treatment or drinking water treatment including wastewater residuals. This term shall not include grit, screening, or grease and oil which are removed at the head-works of a facility

Treatment Works: Any and all devices, processes and properties, real or personal, used in the collection, pumping, transmission, storage, treatment, disposal, recycling, reclamation, or reuse of waterborne pollutants, but not including any works receiving a hazardous waste from off the site of the works for the purpose of treatment, storage, or disposal.

Utility Works: Regulated activities providing for public services, including roads, water, sewer, electricity, gas, telephone, transportation and their associated maintenance activities. This term shall include the installation of detention and retention basins for the purpose of controlling storm water.

Very Small Quantity Generator: Any public or private entity, other than residential, which produces less than 27 gallons (100 kilograms) a month of hazardous waste or waste oil, but not including any acutely hazardous waste as defined in 310 CMR 30.136.

Waste Oil Retention Facility: A waste oil collection facility for automobile service stations, retail outlets, and marinas which is sheltered and has adequate protection to contain a spill, seepage, or discharge of petroleum waste products in accordance with MGL c.21. s.52A.

Zone I: The protective radius around a public water supply well or well field that must be owned by the water supplier, or controlled through recorded conservation restriction. In most cases, it is a four hundred (400) foot radius around the well (less for wells pumping less than one hundred thousand (100,000) gallons per day (gpd)).

Zone II: The delineated recharge area to a public drinking water well as approved by MassDEP and defined under the Massachusetts Drinking Water Regulations 310 CMR 22.00. The area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at safe yield with no recharge from precipitation), as defined by 310 CMR 22.00 and as approved by the Massachusetts Department of Environmental Protection (DEP).

SECTION 3: ESTABLISHMENT AND DELINEATION OF GROUNDWATER PROTECTION DISTRICT

3.1. For the purposes of this bylaw, there is hereby established within the Town of Eastham a Groundwater Protection Overlay District. This area is delineated on a map entitled Town of Eastham Groundwater Protection Overlay District dated January 7, 2016 which is hereby made part of the Groundwater Protection District Bylaw and is on file in the office of the Town Clerk.

SECTION 4: SPECIAL PERMIT

4.1. The Planning Board may issue a special permit for any use prohibited within the Groundwater Protection District, as set forth in Section 6 hereof, if the applicant can adequately demonstrate to the Planning Board that the groundwater beneath the parcel and the water runoff from the parcel does not contribute to existing or potential sources of drinking water. Any application for a special permit for this purpose shall be accompanied by adequate documentation.

4.2. The burden of proof shall be upon the applicant to demonstrate that the groundwater beneath the parcel and the water runoff from the parcel does not contribute to existing or potential sources of drinking water. The Town may engage professional engineers, hydrologists, geologists, or soil scientists to determine more accurately the boundaries of the groundwater watershed with respect to a particular parcel(s) of land, and may charge the owner for the cost of the investigation in accordance with Eastham Zoning Bylaw Section XII(G). If determined that a particular parcel does not in fact contribute to an existing or potential source of drinking water, a special permit may be granted subject to such conditions as the Planning Board deems necessary and appropriate. The grant of a special permit does not alter the boundary of the Groundwater Protection District. Changes to the boundaries of the Groundwater Protection District require town meeting approval.

4.3. Where the boundary line of the Groundwater Protection District divides a lot or parcel, the requirements established by this bylaw shall apply to the entire lot or parcel.

SECTION 5: PERMITTED USES

5.1. All uses permitted in the underlying zoning districts are permitted in the Ground Water Protection District except those specifically prohibited in Section 6 of this bylaw.

5.2. All property used for municipal purposes by or on behalf of the Town of Eastham are exempt the regulations of this bylaw.

SECTION 6: PROHIBITED USES

6.1. The following land uses and activities are prohibited unless such uses and activities comply with the specified conditions provided herein:

a. landfills and open dumps;

b. automobile graveyards and junkyards;

c. facilities that generate, treat, store, or dispose of hazardous waste that are subject to MGL c.21C and 310 CMR 30.000, except for:

1. very small quantity generators as defined under 310 CMR 30.000;
2. household hazardous waste centers and events under 310 CMR 30.390;
3. waste oil retention facilities required by MGL c. 21, s.52A;
4. water remediation treatment works approved by MassDEP for the treatment of contaminated waters.

e. petroleum, fuel oil, and heating oil bulk stations and terminals including, but not limited to, those listed under North American Industry Classification System (NAICS) Codes 424710 and 454311, except for liquefied petroleum gas.

f. storage of liquid hazardous materials and/or liquid petroleum products unless such storage is above ground level and on an impervious surface and either:
   1. in container(s) or above ground tank(s) within a building; or
   2. outdoors in covered container(s) or above ground tank(s) in an area that has a containment system designed and operated to hold either; 10% of the total possible storage capacity of all containers or 110% of the largest container's storage capacity, whichever is greater.

   however, these storage requirements shall not apply to the replacement of existing tanks or systems for the keeping, dispensing or storing of gasoline provided the replacement is performed in a manner consistent with state and local requirements;

g. storage of sludge and septage, unless such storage is in compliance with 310 CMR 32.30 and 310 CMR 32.31;

h. storage of deicing chemicals unless such storage, including loading areas, is within a structure designed to prevent the generation and escape of contaminated runoff or leachate;

i. storage of animal manure unless contained within a structure designed to prevent the generation and escape of contaminated runoff or leachate;

j. storage of commercial fertilizers unless such storage is within a structure designed to prevent the generation and escape of contaminated runoff or leachate;

k. stockpiling and disposal of snow and ice containing deicing chemicals brought in from outside the Groundwater Protection District;

l. earth removal, consisting of the removal of soil, loam, sand, gravel, or any other earth material to within 4 feet of historical high groundwater as determined from monitoring wells and historical water table fluctuation data compiled by the United States Geological Survey, except for excavations for building foundations, roads, utility works or wetland restoration work conducted in accordance with a valid Order of Condition issued pursuant to MGL c. 131, s.40; and

m. treatment or disposal works subject to 314 CMR 5.00, for non-sanitary wastewater, including those activities listed under 310 CMR 15.004(6), except for:
   1. treatment works approved by MassDEP designed for the treatment of contaminated ground or surface water and operating in compliance with 314 CMR 5.05(3) or 5.05(13); and

2. publicly owned treatment works.

n. The use, generation, storage, treatment or disposal of toxic or hazardous materials or wastes, including but not limited to: pesticides, herbicides, fungicides, rodenticides, nitrate fertilizers in quantities greater than those associated with normal household use or as regulated in the underlying zoning district.

o. rendering impervious any lot or parcel more than 15% or 2,500 square feet, whichever is greater; unless artificial recharge, that will not degrade water quality, is provided using methods demonstrated to be capable of removing contaminants from storm water and which are consistent with methods described in MassDEP's Stormwater Handbook, Vol. I, II and III, as amended.

SECTION 7: ENFORCEMENT

7.1. Written notice of any violations of this bylaw shall be given by the Building Commissioner to the responsible person as soon as possible after detection of a violation or a continuing violation. Notice to the assessed owner of the property shall be deemed notice to the responsible person. Such notice shall specify the requirement or restriction violated and the nature of the violation, and may also identify the actions necessary to remove or remedy the violations and preventive measures required for avoiding future violations and a schedule of compliance.

7.2. A copy of such notice shall be submitted to the Town of Eastham Water Commissioners, the Eastham Board of Health and the Eastham Planning Board. The cost of containment, clean-up, or other action of compliance shall be borne by the owner/operator of the premises.

7.3. A person aggrieved by a notice of violation may appeal said notice to the Eastham Zoning Board of Appeals. All appeals shall be brought within thirty (30) days from the date of the notice which is being appealed.

SECTION 8: SEVERABILITY

8.1. If any provision of this bylaw is held invalid by a court of competent jurisdiction, the remainder of the bylaw shall not be affected thereby. The invalidity of any section or sections or parts of any section or sections of this bylaw shall not affect the validity of the remainder of this bylaw.

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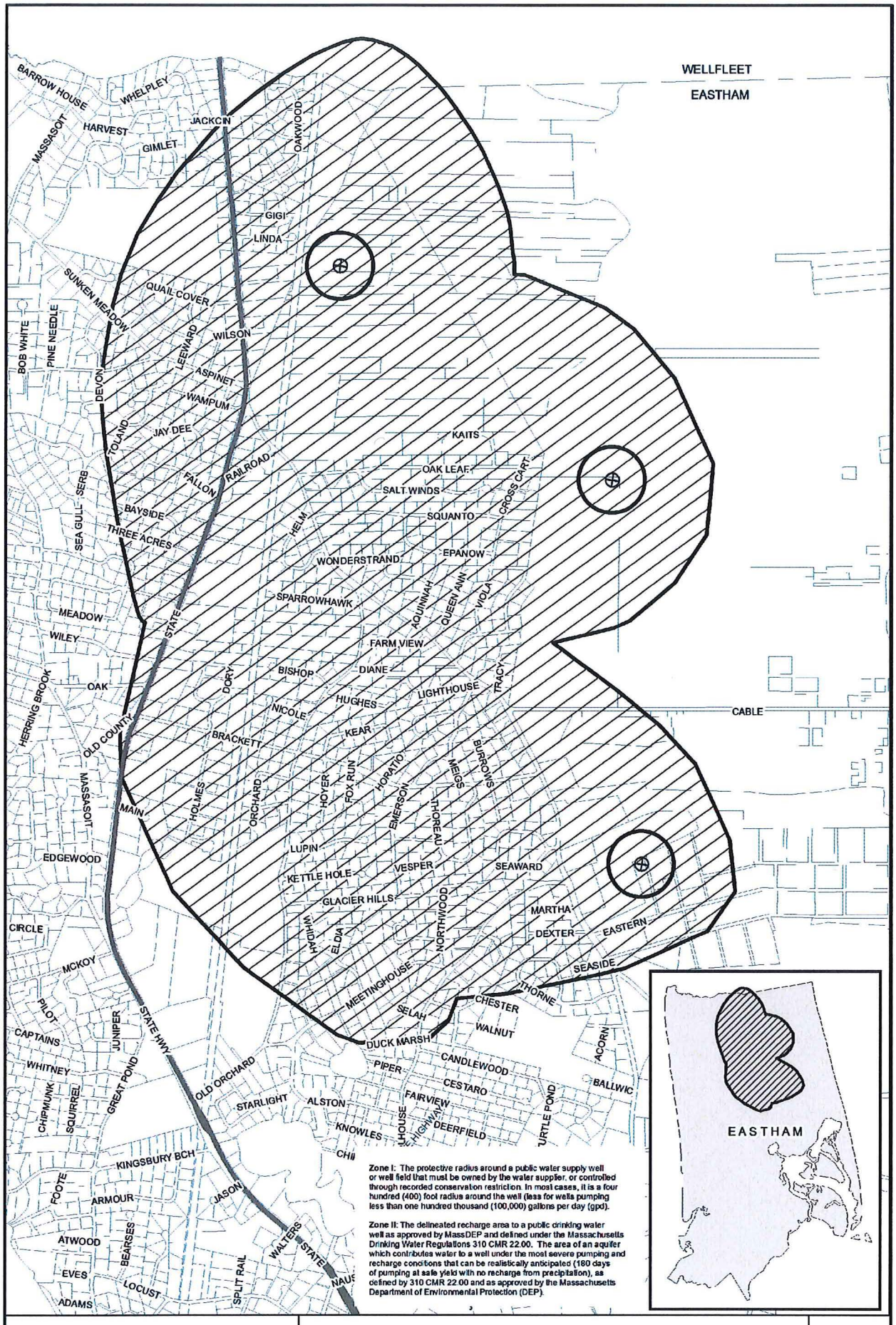
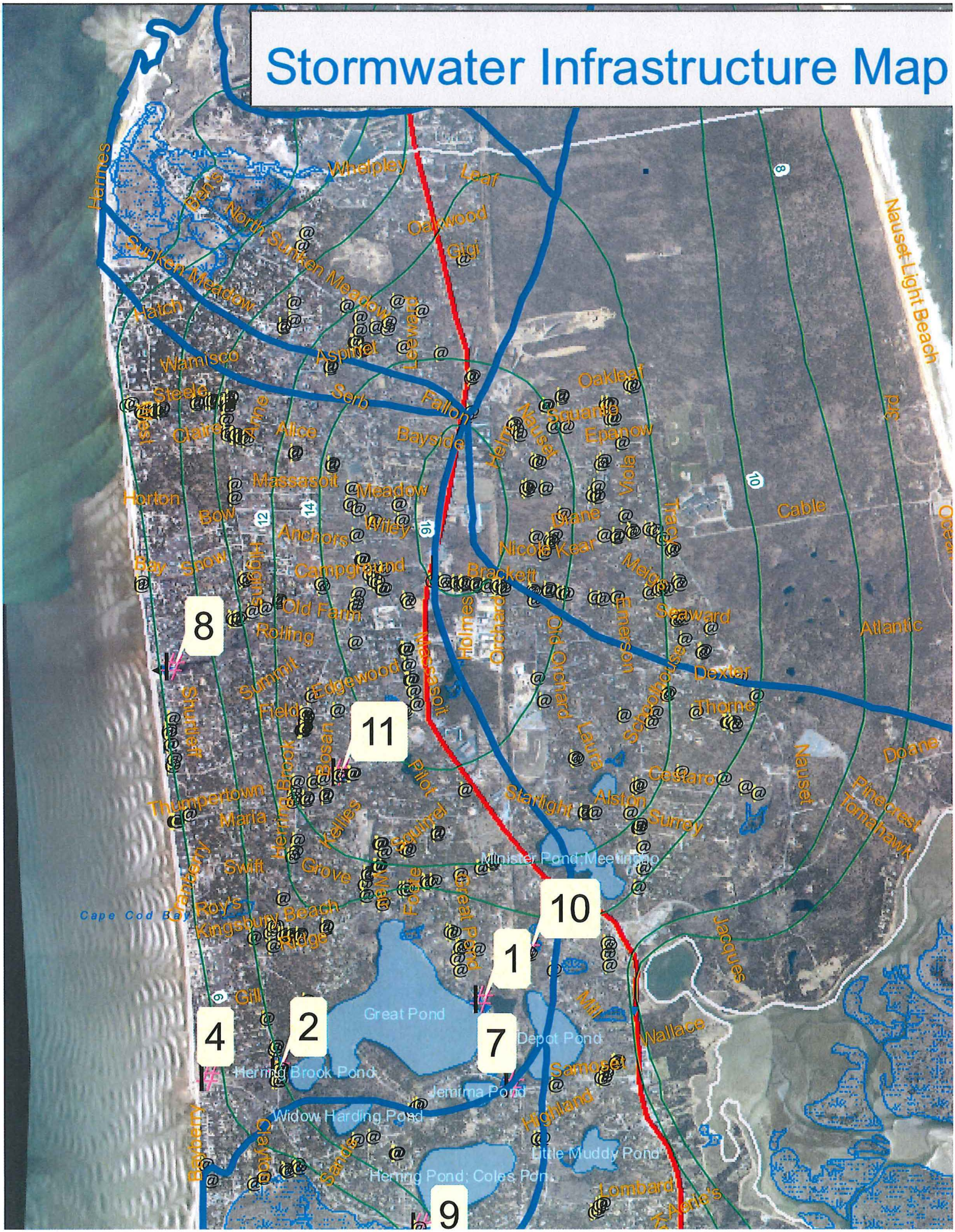

WELLFLEET
EASTHAM
BARROW HOUSE
WHELPLEY
HARVEST
GIMLET
MASSASOIT
JACKCIN
OAKWOOD
GIGI
LINDA
SUNKEN MEADOW
QUAIL COVER
LEEWARD
WILSON
BOB WHITE
PINE NEEDLE
DEVON
ASPINET
WAMPUM
TOLAND
JAY DEE
KAITS
OAK LEAF
SALT WINDS
CROSS CART
RAILROAD
TALLON
SERB
SEA GULL
BAYSIDE
THREE ACRES
HELM
SQUANTO
EPANOW
WONDERSTRAND
SPARROWHAWK
AQUINNAH
QUEEN ANN
VIOLA
STATE
MEADOW
WILEY
FARM VIEW
DIANE
BISHOP
DORY
TRACY
LIGHTHOUSE
HERRING BROOK
OAK
NICOLE
HUGHES
CABLE
OLD COUNTY
KEAR
BRACKETT
BURROWS
MEIGS
HORATIO
FOX RUN
HOYER
ORCHARD
HOLMES
EMERSON
THOREAU
MAIN
LUPIN
EDGEWOOD
KETTLE HOLE
VESPER
SEAWARD
GLACIER HILLS
NORTHWOOD
MARTHA
DEXTER
EASTERN
CIRCLE
WHIDAH
ELDIA
MCKOY
SEASIDE
THORNE
MEETINGHOUSE
CHESTER
SELAH
PILOT
JUNIPER
STATE HWY
WALNUT
CAPTAINS
DUCK MARSH
ACORN
WHITNEY
PIPER
CANDLEWOOD
BALLWIC
CESTARO
OLD ORCHARD
GREAT POND
STARLIGHT
ALSTON
FAIRVIEW
CHIPMUNK
SQUIRREL
KNOWLES
HOUSE
HIGHWAY
DEERFIELD
TURTLE POND
KINGSBURY BCH
FOOTE
ARMOUR
JASON
ATWOOD
BEARSES
WALTERS
STATE
EVES
LOCUST
SPLIT RAIL
ADAMS
EASTHAM
Zone I: The protective radius around a public water supply well or well field that must be owned by the water supplier, or controlled through recorded conservation restriction. In most cases, it is a four hundred (400) foot radius around the well (less for wells pumping less than one hundred thousand (100,000) gallons per day (gpd).
Zone II: The delineated recharge area to a public drinking water well as approved by MassDEP and defined under the Massachusetts Drinking Water Regulations 310 CMR 22.00. The area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at safe yield with no recharge from precipitation), as defined by 310 CMR 22.00 and as approved by the Massachusetts Department of Environmental Protection (DEP).
Well Locations
Zone I
Groundwater Protection Overlay District (Zone II)
TOWN OF EASTHAM
GROUNDWATER PROTECTION OVERLAY DISTRICT MAP
JANUARY 7, 2016
N

Stormwater Infrastructure Map



Stormwater Infrastructure Map 5/1/0

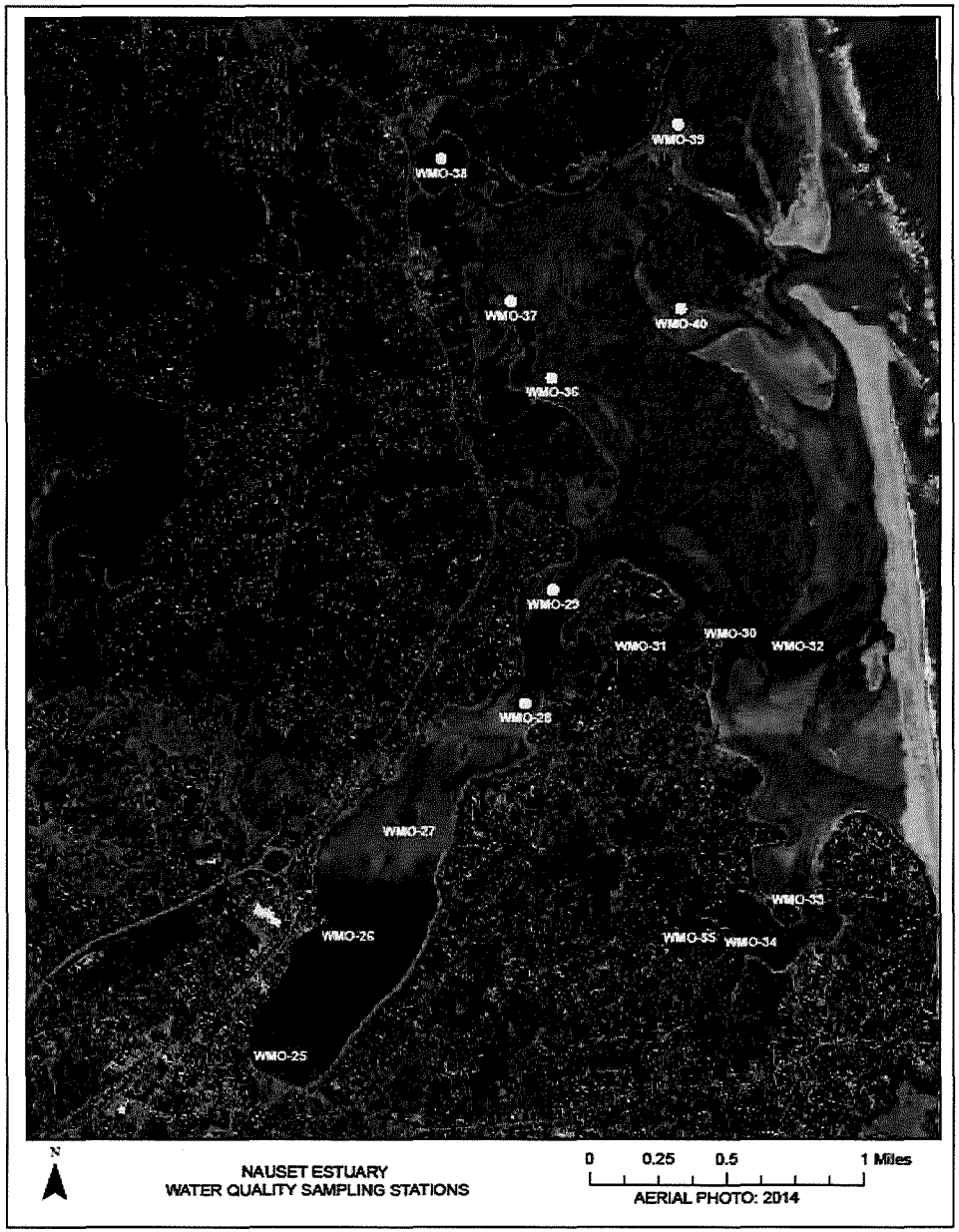
Eastham Public Beaches - 2015

	Days since rain:	0	1	3	1	2	0	0	1	5	0	2	1	0	0	1	5	0	6	7	
	Rain Event?	YES	NO	NO	NO	NO	YES	YES	NO	NO	YES	NO	NO	YES	YES	NO	NO	YES	NO	NO	
EPA ID #	Sampling Date:	6/3	6/4	6/10	6/17	6/18	6/24	6/29	6/30	7/8	7/15	7/22	7/29	8/5	8/12	8/13	8/19	8/26	8/31	9/1	# Samples
			RT			RT			RT							RT					
	Marine Beaches																				
MA813829	Boat Meadow	<2		4	8		6	44		<2	<2	<2	<2	2	14		<2	4		<2	14
MA113854	Campground Beach	28		<2	140	14	6	52		2	<2	<2	60	<2	<2		<2	2		4	15
MA562661	Cole Road Beach	<2		<2	8		<2	16		6	4	<2	<2	2	12		<2	2		6	14
MA408301	Cook's Brook	<2		<2	<2		4	8		<2	<2	<2	50	<2	2		<2	4		2	14
MA957865	Dyer Prince	2		<2	10		2	22		10	<2	<2	<2	<2	4		<2	6		60	14
MA687258	First Encounter Beach	<2		<2	10		<2	40		<2	<2	<2	<2	2	6		2	<2		2	14
MA377157	First Encounter River	<2		8	2		2	80		<2	2	<2	2	<2	4		<2	4		<2	14
MA789600	Kingsbury	<2		<2	<2		2	28		<2	2	<2	<2	<2	<2		<2	<2		2	14
MA125754	S. Sunken Meadow	4		<2	12		<2	4		<2	<2	<2	54	<2	2		<2	<2		4	14
MA827016	Thumpertown	<2		<2	2		<2	304	4	<2	<2	<2	2	<2	6		<2	<2		<2	15
MA272144	Town Cove	<2		<2	4		<2	8		8	<2	<2	40	<2	42		<2	<2		<2	14
	Salt Pond	136	16	4	34		30	34		24	<2	2	<2	2	54		<2	2		<2	15
EPA ID #	Sampling Date:	6/3	6/4	6/10	6/17	6/18	6/24	6/29	6/30	7/8	7/15	7/22	7/29	8/5	8/12	8/13	8/19	8/26	8/31	9/1	# Samples
	Fresh Water		RT			RT			RT							RT					
MAFW3386	Great Pond	<4		4	4		<4	12		<4	4	4	4	4	100		8	<4	4		14
MAFW3387	Herring Pond	<4		<4	4		<4	4		<4	4	4	8	<4	4		4	<4	<4		14
MAFW3388	Long Pond (Depot St)																				0
MAFW3389	Minister Pond	12		8	28		44	88		16	16	4	4	32	260	32	4	12	4		15
MAFW3392	Wiley Park	<4		<4	<4		<4	4		28	<4	4	<4	4	44		<4	<4	<4		14
	Jemima Pond	8		4	4		24	40		4	28	<4	8	40	20		24	8	4		14

# Marine Beach Samples	**171**
# Marine Beach Failures	**3**
% Marine Failures	**1.75%**
# Fresh Water Samples	**71**
# Fresh Water Failures	**1**
% Fresh Water Failures	**1.41%**

Eastham Public Beac	
Days since rain:	
Rain Event?	
Sampling Date:	**# Failures**
Marine Beaches	
Boat Meadow	0
Campground Beach	1
Cole Road Beach	0
Cook's Brook	0
Dyer Prince	0
First Encounter Beach	0
First Encounter River	0
Kingsbury	0
S. Sunken Meadow	0
Thumpertown	1
Town Cove	0
Salt Pond	1
Sampling Date:	**# Failures**
Fresh Water	
Great Pond	0
Herring Pond	0
Long Pond (Depot St)	0
Minister Pond	1
Wiley Park	0
Jemima Pond	0
# Marine Beach Samples	
# Marine Beach Failures	
% Marine Failures	
# Fresh Water Samples	
# Fresh Water Failures	
% Fresh Water Failures	

Sample 2 times/mo July, Aug, Sept. for next 3 years



Parameters include: Physical and Chemical properties

Yellow=Eastham
Red=Orleans

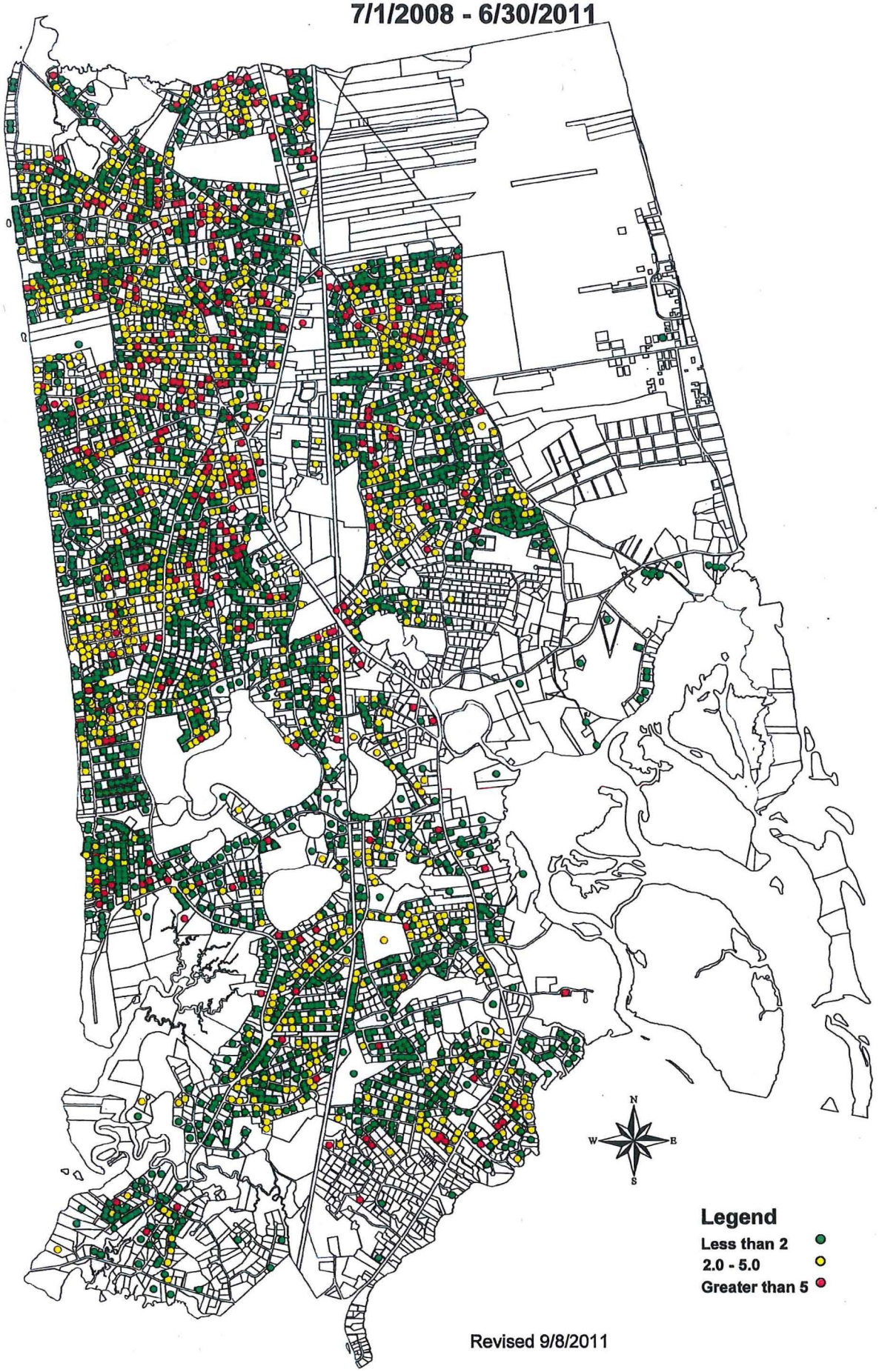
Estimated cost analysis and equipment $9000.00/yr

Eastham Nitrate Levels Summary

Fiscal Year - 2016

Map 1	Total Tests: 20	Max. Level: 4.60	Avg. Level: 1.42
Map 10	Total Tests: 193	Max. Level: 9.80	Avg. Level: 2.81
Map 11	Total Tests: 216	Max. Level: 27.00	Avg. Level: 2.24
Map 12	Total Tests: 115	Max. Level: 18.00	Avg. Level: 2.71
Map 13	Total Tests: 57	Max. Level: 9.70	Avg. Level: 2.58
Map 14	Total Tests: 45	Max. Level: 5.50	Avg. Level: 1.14
Map 15	Total Tests: 34	Max. Level: 9.20	Avg. Level: 2.79
Map 16	Total Tests: 2	Max. Level: 4.40	Avg. Level: 4.40
Map 17	Total Tests: 60	Max. Level: 9.80	Avg. Level: 1.49
Map 18	Total Tests: 61	Max. Level: 7.50	Avg. Level: 1.77
Map 19	Total Tests: 20	Max. Level: 12.00	Avg. Level: 1.51
Map 2	Total Tests: 29	Max. Level: 11.00	Avg. Level: 3.22
Map 20	Total Tests: 57	Max. Level: 12.00	Avg. Level: 2.06
Map 21	Total Tests: 44	Max. Level: 23.00	Avg. Level: 2.65
Map 23	Total Tests: 11	Max. Level: 2.40	Avg. Level: 1.45
Map 24	Total Tests: 6	Max. Level: 1.70	Avg. Level: 0.84
Map 25	Total Tests: 11	Max. Level: 1.70	Avg. Level: 0.51
Map 4	Total Tests: 142	Max. Level: 14.00	Avg. Level: 2.86
Map 5	Total Tests: 123	Max. Level: 17.00	Avg. Level: 3.65
Map 6	Total Tests: 50	Max. Level: 15.00	Avg. Level: 3.85
Map 7	Total Tests: 136	Max. Level: 14.00	Avg. Level: 2.77
Map 7A	Total Tests: 9	Max. Level: 6.10	Avg. Level: 3.43
Map 8	Total Tests: 189	Max. Level: 140.00	Avg. Level: 4.08
Map 9	Total Tests: 181	Max. Level: 18.00	Avg. Level: 2.25
	Total Tests: 1811	Max. Level: 140.00	Avg. Level: 2.70

Eastham Water Survey Program - Nitrate Analysis
7/1/2008 - 6/30/2011



Revised 9/8/2011

Wastewater Management Planning Project

NEWSLETTER

Eastham Moves Forward with Wastewater Planning

The Town of Eastham is continuing with wastewater planning to address the need to protect public health and the environment. The installation of the public water system is underway to address the most pressing public health need, and we are focusing on freshwater pond treatments in the initial effort to address one area of the environmental need. The town is working with the Cape Cod Commission as it updates the Cape Cod Area Wide Water Quality Management Plan, often referred to as the 208 Plan, and is now designated as a Waste Management Agency (WMA). Eastham as a WMA is responsible for developing and implementing a plan to improve water quality resulting from nitrogen that enters the groundwater from land within the watershed that contributes to the impacted estuaries. The estuaries that Eastham is "responsible" for include Salt Pond, Town Cove, and Rock Harbor. As a result of the availability of new nitrogen loading information developed as a part of the Massachusetts Estuaries Program, we would like to expand the environmental focus and develop some hybrid solutions to wastewater management, especially in the areas of Town Cove and Salt Pond.

Planning Effort History

As part of Eastham's 2009 planning efforts, two reports entitled, "Interim Needs Assessment Report and Alternatives Screening Analysis Report" and "Wastewater Management Planning Project Plan Evaluation Report" were developed by Stearns & Wheler (now GHD). Two key factors defined the Town's wastewater challenges:

1. Human Health Needs

2. Environmental Health Needs

To address the Human Health Needs, the Town is currently implementing the Eastham Municipal Water Project which will establish a town-wide municipal water system with two well fields, a storage tank and miles of distribution piping. Please see the project link for additional information. **http://easthamwaterproject.weebly.com/**

To address the Environmental Health Needs, the Town has implemented remediation efforts at both Herring and Great Ponds. Ongoing monitoring occurs at these ponds and the water quality results continue to support that the alum treatments were successful. Please visit the Health Department's website for more information **http://www.easthamma.gov/Public_Documents/EasthamMA_Health/pondsreports/**

A second category under the Environmental Health Needs is the declining health of the estuaries due to excessive nitrogen loading. Both Nauset-Town Cove Estuary and Rock Harbor were identified as needing advanced treatment, with Rock Harbor also being identified for re-classification from an estuary to a boat basin.

Current Planning Efforts

Current planning efforts include a series of Technical Memorandums and this summary newsletter. The purpose of these Technical Memorandums is to update the Needs Assessment Report and to update the Alternatives Screening Analysis Report, respectively. A public meeting was held on February 16, 2016 to brief the Board of Selectmen on Wastewater Planning in Eastham. We encourage you to view the presentation on the Town's on-demand system at: **http://www.eastham-ma.gov/Public_Documents/Easthamma_VOD/video.**

Update to Wastewater and Nitrogen Management Needs Assessment: This document updates the information developed prior to the Massachusetts Estuaries Project (MEP) Draft Report for Nauset Harbor Embayment System. This was most important for Nauset Estuary, as the watershed boundaries were adjusted as part of the MEP efforts and estimates of nitrogen loading from wastewater were provided.

Based on this new information Figure 1 shows the estimated wastewater removal needed from the MEP (denoted in circled percentage) and the estimated percent responsibility assigned by the Cape Cod Commission of that load for each Town (denoted in diamond-shaped percentage). For example Town Cove has an estimated nitrogen removal of 75 percent and it is estimated that 25 percent of that load is the responsibility of Eastham based on water use assumptions.

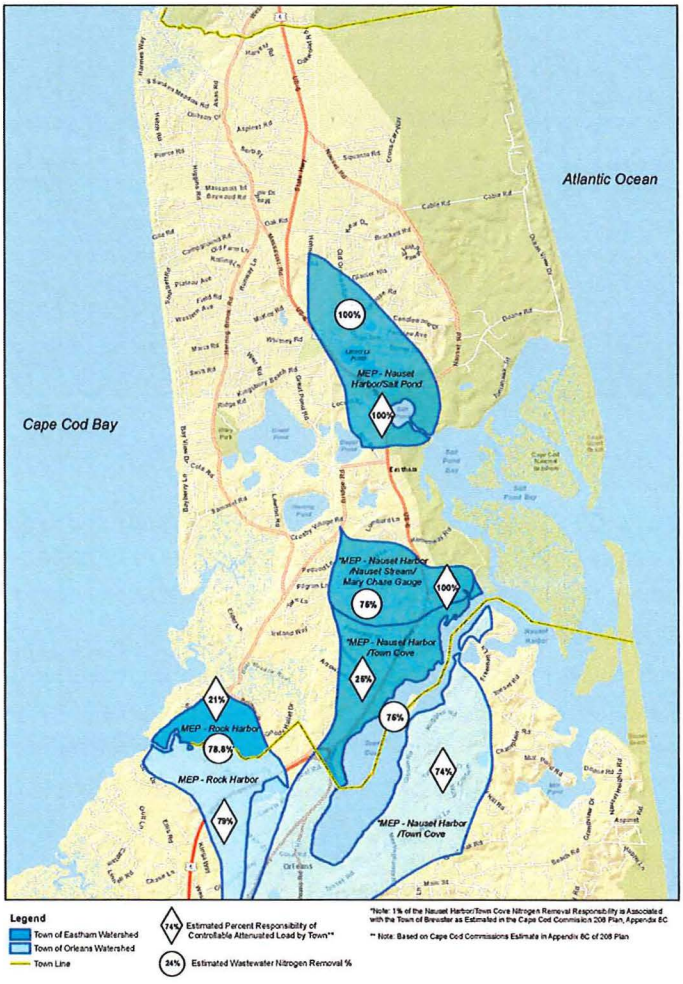


Figure 1 – Estimated Nitrogen Removal Percentages and Percent Responsibility

The updates as part of this effort also included revising estimated wastewater generation rates to correlate with the revised watershed boundaries and the Town's current drinking water supply system estimates.

Update to Wastewater and Nitrogen Management Alternatives Screening Analysis: This update expanded upon the technologies and approaches considered in 2009 and reexamined specific technologies based on additional information provided as part of the Cape Cod Commissions 208 Planning efforts. In addition, a brief summary of the CCC's preliminary evaluations of alternatives for both non-traditional and traditional technologies is provided and how this new information can be used as part of a hybrid approach that blends the aspects of traditional collection system and treatment technologies for wastewater with other alternatives to manage nitrogen. Traditional technologies in the 208 Plan include gray infrastructure (wastewater collection, treatment, and recharge) in addition to fertilizer and stormwater reduction. Non-traditional technologies are considered alternative approaches, ranging from coastal habitat restoration to source-reducing toilets. For those interested in comparing technologies considered in 2009 with those identified as part of the 208 planning process, a significant portion of the update summarizes that information in Table form. The table includes headings of:

- Technologies Considered in 2009
- Technologies Considered as part of the 208 Plan
- 2009 Recommendations
- Updated Recommendations

In order to advance the project and develop hybrid approaches for Salt Pond and Town Cove, the following graphic shows some of the technologies considered.

Green Infrastructure	Stormwater BMPs Natural Treatment Systems
Innovative & Resource Management Technologies	Shellfish Aquaculture/Propagation PRBs
Waste Reduction Toilets	Composting, Incinerating, Waterless, Tight Tanks
Non-Structural Approaches	Fertilizer Reductions Stormwater BMPs
System Alternatives	Coastal Habitat Restoration Pond Treatment
On-Site Systems, Treatment Systems, Collection Systems, Effluent Disposal, Solids Processing	On-Site Treatment (I/A) Centralized Treatment Etc.

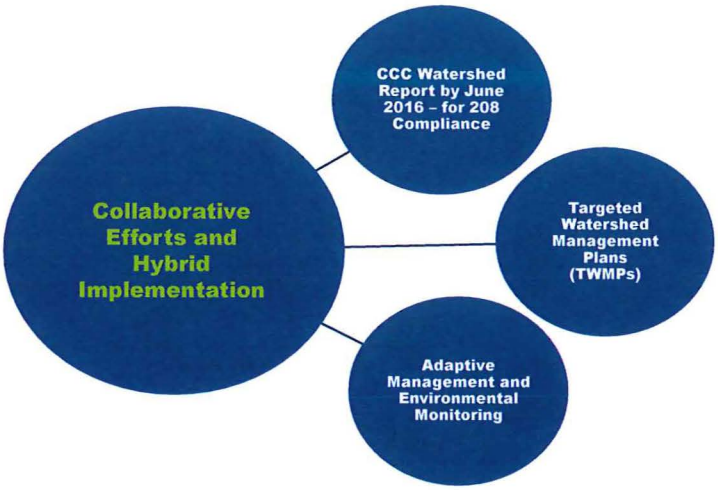
Next Steps under this Current Planning Effort

GHD is currently developing specific technical memorandums to summarize the hybrid evaluations for Salt Pond and Town Cove using Cape Cod Commission's 208 Planning tools

Future Planning

Moving forward a key concept will revolve around collaborative efforts and hybrid evaluations. Work developed as part of Salt Pond and Town Cove evaluations will be used to develop the "Watershed Reports" that are required for 208 Compliance in June 2016.

The Town will continue to look for opportunities for grants, collaboration, and technology piloting opportunities within its watersheds and shared watersheds. This is an opportunity for the Town to move forward with wastewater planning. Please visit the Cape Cod Commission's website www.capecodcommission.org for more information on the 208 Plan Update and continue to check back on the Town's website for upcoming wastewater planning meetings moving forward.



208 Plan Update Terms Glossary

Watershed is an area of land that drains to a common receiving body of water.

Traditional technologies include graywater infrastructure (wastewater collection, treatment, and recharge) in addition to fertilizer and stormwater reduction.

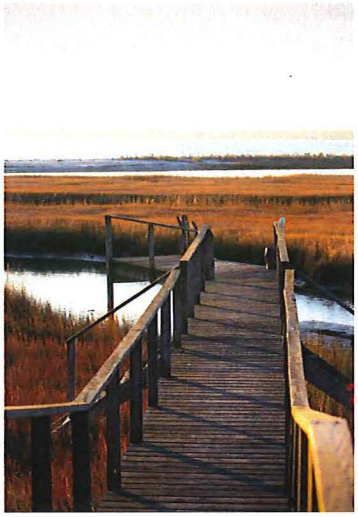
Non-Traditional technologies are considered alternative approaches, ranging from coastal habitat restoration to source-reducing toilets.

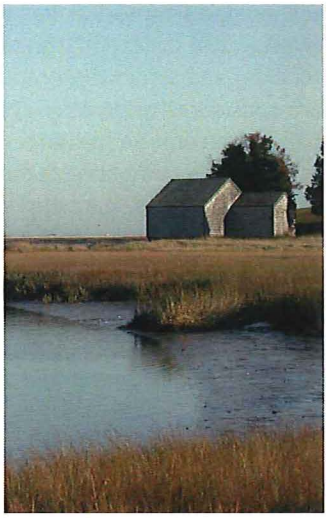
Hybrid evaluation or process considers both traditional and non-traditional technologies together in a watershed.

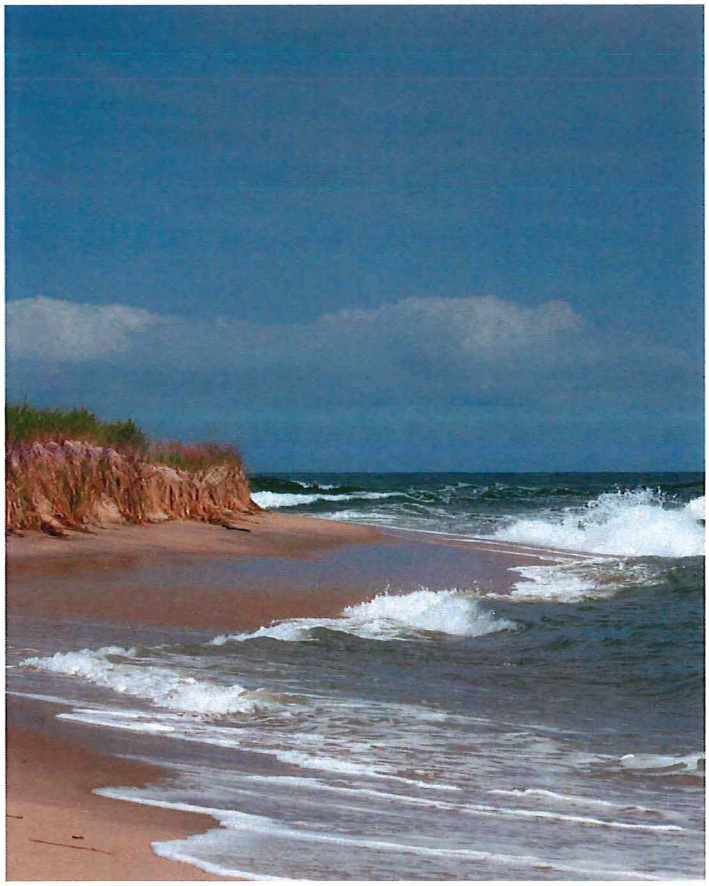
Adaptive Management provides a framework to move forward efficiently with practices that can generate short-term results, and allow for adjustments to optimize the plan over the implementation period.

Contact

Jane Crowley, R.S.,M.S
Eastham Health Agent
office (508)240-5900 ext. 229
jcrowley@eastham-ma.gov







EASTHAM, ORLEANS 2016 SCHEDULE

July 16

9am to Noon
Eastham DPW and Natural Resources Building,
555 Old Orchard Rd.

Sept. 17

9am to Noon
Orleans DPW and Highway Garage,
22 Bay Ridge Lane

Questions?
Visit the Hazardous Materials Program at
www.capecodextension.org

LOVE YOUR LOCAL WATER.
IT'S A CAPE COD THING.

"Love your local water. It's a Cape Cod Thing." is a campaign of Cape Cod Cooperative Extension's Hazardous Waste & Water Quality Department.

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Cape Cod Cooperative Extension
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Barnstable, MA 02630-0367
www.capecodextension.org
508-375-6699

**********ECRWSS***
LOCAL
POSTAL CUSTOMER

HHW Collections are funded by the Towns of Eastham, Orleans, and Barnstable County's Cape Cod Cooperative Extension. Photos by Christopher Harding Photography.

too TOXIC to TRASH

HOUSEHOLD HAZARDOUS WASTE 2016 COLLECTION SCHEDULE

EASTHAM AND ORLEANS

*Small Business disposal accepted. See inside panel for info

LOVE YOUR LOCAL WATER.
IT'S A CAPE COD THING.

SIMPLE & FREE

LOVE YOUR LOCAL WATER.
IT'S A CAPE COD THING.

PROTECT WHAT WE LOVE ABOUT THE CAPE. IT ALL STARTS WITH YOU!

Household hazardous waste (HHW) collections protect what we love about Cape Cod, especially our precious local drinking water. Most chemicals are too toxic to throw away in regular trash or dump down the drain, so FREE collections are being held to take that waste off your hands and keep it out of our water supply.

Are you a small business? Do you use chemicals? To make your state required disposal arrangements and obtain pricing, contact Kalliope Egloff #508-375-6699.

BRING THESE ITEMS TO YOUR COLLECTION

PAINTS, POLISHES & STAINS *NO LATEX*

Alkyd-Based Paint & Stain • Marine Paints & Sealers • Metal & Furniture Polish • Oil-Based Paint & Stain
Paint Thinner & Remover • Solvent-Based Wood Finish • Wood Preservatives • Auto Paint (no latex)

YARD CHEMICALS

Driveway Sealer with Solvent • Fertilizers with Weed Killer • Rodent Poison • Weed Killer
Insecticides • Pesticides

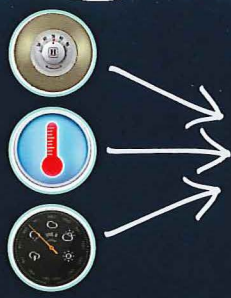
CLEANERS & CHEMICALS

Pool Cleaners & Chemicals Solvents • Photo & Hobby Chemicals • Oven Cleaner • Drain Cleaner
Spot Remover • Acids • Degreasers • Disinfectants

AUTO FLUIDS

Car Cleaner with Solvent • Brake & Power Steering Fluid • Bug & Tar Remover • Camp Fuel
Radiator Flush • Car Polish • Gasoline

For items not listed here visit **www.capecodextension.org** for disposal instruction.



BARNSTABLE COUNTY HHW HOUSEHOLD HAZARDOUS WASTE

It is important to keep mercury out of our environment and water supply. To dispose of household mercury containing products, such as thermometers, thermostats or barometers, bring these items to your local HHW collection. If you come across larger amounts of mercury in your home please contact the Barnstable County Hazardous Waste team at #508-375-6699.

(508) 375-6699

Water is precious and we must take steps to protect it. Good lawn care practices protect this resource while making the most efficient use of fertilizer and soil nutrients. Follow these simple steps for a healthy lawn and a healthy environment.

USE THE BEST ENVIRONMENTAL PRACTICES FOR LAWN FERTILIZING

Measure your lawn and only apply the amount of fertilizer needed.

Be sure your spreader is calibrated and set properly.

Never fertilize dormant or inactive turf.

Never apply fertilizer just before a heavy rain is forecast, or when the soil is saturated or frozen.

Keep fertilizer away from surface water bodies.

Keep fertilizer and clippings away from catch basins, drains, and hard surfaces as these could lead to surface waters. Clean up any that land there and put them back onto the lawn.

Cape Cod Cooperative Extension
P.O. Box 367
Barnstable, MA 02630

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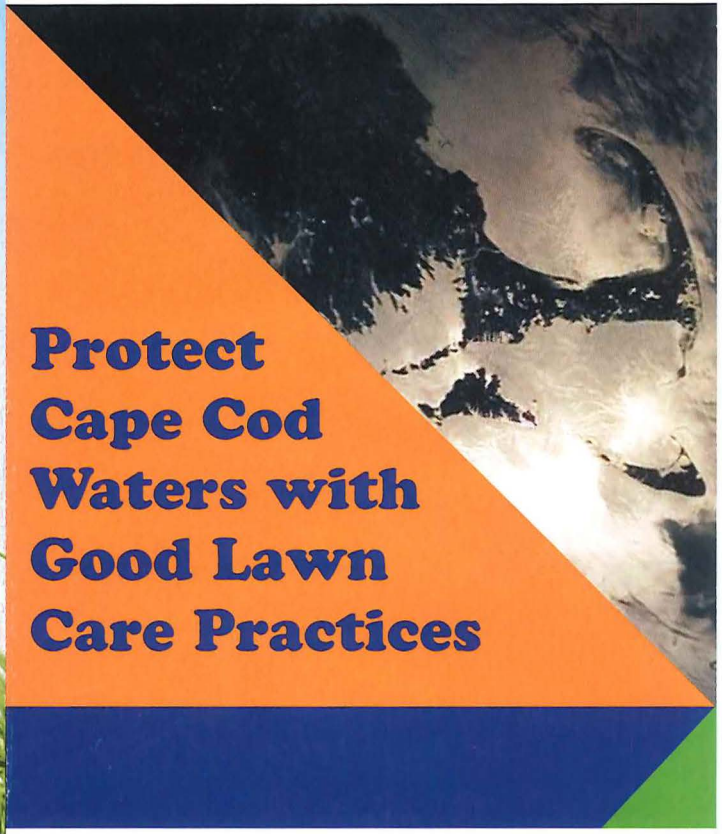


Protect Cape Cod Waters with Good Lawn Care Practices

CAPE COD
Cooperative
Extension

UMass
Extension
CENTER FOR AGRICULTURE

Test the soil at least every three years.

Follow recommendations for pH adjustment and nutrient applications.

Choose the right grasses for your yard based on site conditions and how much you use your lawn.

Whenever possible include low maintenance grasses such as the fine fescues (creeping red, Chewings and hard fescue) that require less fertilizer and water.

Choose pest resistant grasses.

Don't try to grow grasses in places where they may not grow well, such as in heavy shade.

Overseed bare and thin spots to keep grasses growing and to prevent erosion and weed invasion.

Water wisely, providing the lawn with water only when necessary.

Water established lawns deeply and infrequently, moistening the top 6" of soil.

Water new seedings and repaired areas more frequently and less deeply to ensure that small seedlings do not dry out.

Don't overwater! This is wasteful and will result in a poorer, less drought tolerant lawn.

For established low maintenance lawns consider allowing the lawn to go dormant in the summer.

Fertilize in late summer or early fall when growth resumes. Overseed then, too, if the lawn thinned during dormancy.

Use good mowing practices to make your lawn dense and to increase rooting.

Mow high (~3") and follow the "1/3 Rule" (avoid removing more than 1/3 of the grass height with any single mowing event).

Make sure the mower blades are sharp and balanced.

Use a mulching mower and let the clippings remain in the lawn to recycle nutrients and help build the soil. If you return the clippings on a regular basis you will be able to reduce the amount of fertilizer you use over a season.

RESOURCES FOR HOME LAWN CARE

www.capecodextension.org
http://ag.umass.edu/topics/home-lawn-garden
http://soiltest.umass.edu/

Apply fertilizers when grasses are actively growing.

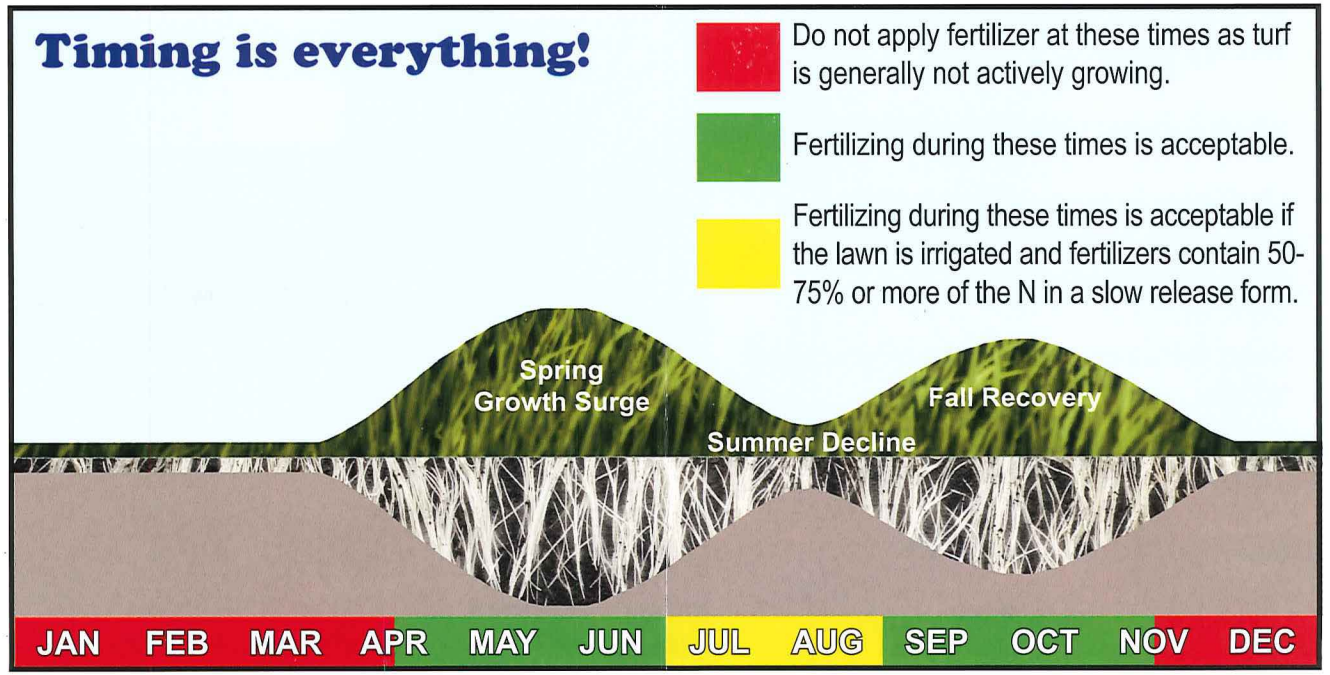
The best time to apply fertilizer is late August to late September, followed by mid- to late spring.

Use no more than 1 lb. of actual nitrogen (N) per 1000 sq ft per application, with an annual maximum of 3.2 lbs. of actual N per 1000 sq ft.

The amount of fertilizer needed may vary from lawn to lawn depending on many factors such as the type of grass, intensity of lawn use, amount of sun and shade, and quality of soil. Many lawns may do well with less than 3.2 lbs. of N per season.

Use a fertilizer that has at least 20% or more of its N in a slow release form.

Use phosphorus (P) containing fertilizers only for new seedings or if a soil test indicates the need. Follow label directions for product application rate and watering in after application.



For more information contact:

www.barnstablecountysepticloan.org

Kendall Ayers

Program Administrator

(508)375-6610

kayers@barnstablecounty.org

Angela Do Carmo

Administrative Assistant

(508)375-6877

adocarmo@barnstablecounty.org

Cinthia Wallace

Billing/Collection Specialist

(508)375-6855

cwallace@barnstablecounty.org

Fax - (508) 375-6854

Barnstable County

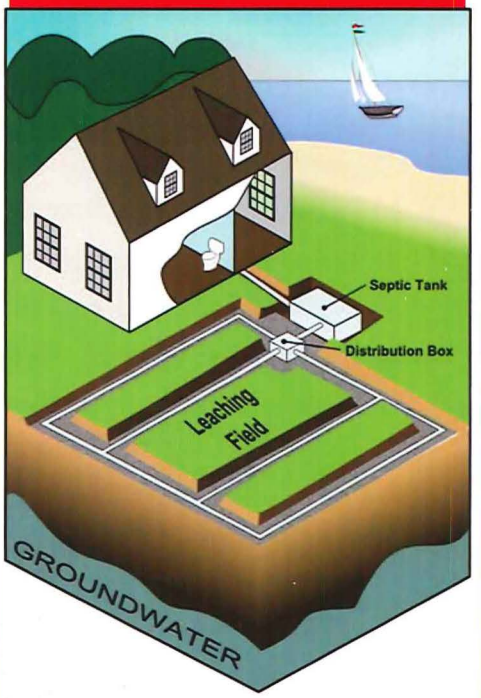
CSMLP

Community Septic Management Loan Program

P.O. Box 427 / 3195 Main Street
Barnstable, MA 02630

www.barnstablecountysepticloan.org

SEPTIC SYSTEM FAILED?



CSMLP

We can help with excellent loan terms!

Attention Residential Homeowners

Financial help with a 5% interest rate betterment loan is now available through the Barnstable County Community Septic Management Loan Program.

- Homeowners can now comply with Title 5 regulations.
- Loans repayable over 20 years, cover all costs directly associated with septic system upgrade.
- Application available online for interested residents.

Program Specifics

Existing septic system must be "failed".

All costs associated with carrying out a project required by Title 5 are eligible.

Eligible projects include alternative septic systems **and** sewer hook-ups.

Reimbursement for costs associated with the project up to 30 days prior to the receipt and approval of a completed application by Barnstable County is possible.

5% interest rate on loan.

Betterment assessment on property secures loan.

Maximum of 20 years repayment term.

Payments are made monthly or quarterly payable to Barnstable County.

Loans to be made only for residential properties.

Residential properties include condominiums and apartments.

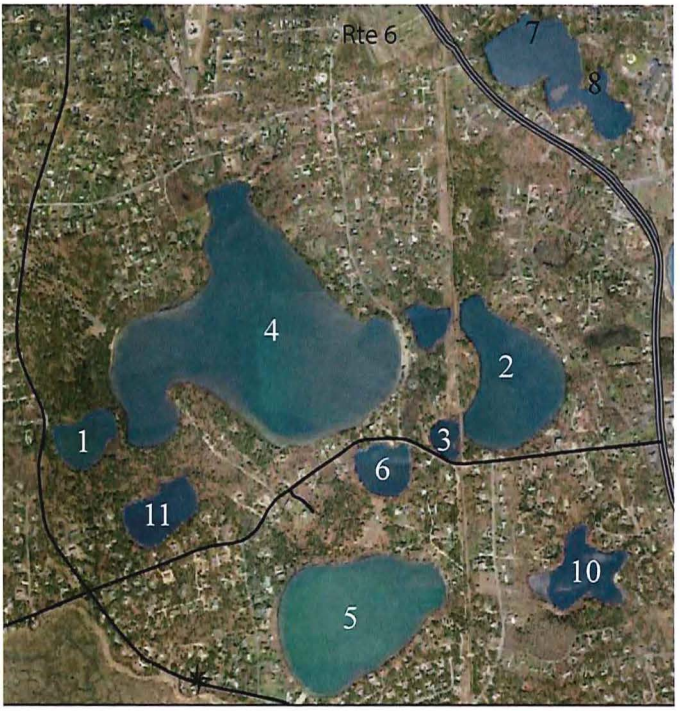
Homeowners obtain written bids for system design and then contracts for work.

Homeowners obtain written bids for system installation and then contracts for work.

Single-party check issued to contractor for work completed.

Certificate of Compliance must be issued before final payment is made.

N↑ Eastham Ponds



#	Pond	Area (Acres)	Priority for treatment
1	Bridge**	6.7	Low
2	Depot	27.9	Medium
3	Little Depot	2.3	Medium
4	Great**	109.7	**High**
5	Herring**	44.2	**High**
6	Jemima	6.4	Medium
7	Ministers	16.8	**High**
8	Schoolhouse	6.8	**High**
9	Molls*	3.4	Low
10	Muddy	10.5	**High**
11	Widow Harding	8.7	Low

*located outside the area of the map

**Herring spawn in Bridge, Great and Herring Ponds

Data taken from Tables 3.1 and 5.2 (updated in 2013), Action Plan for the Town of Eastham Ponds. EcoLogic and GHD, December 2011.

What the Town is doing/has done

- The Town has long avoided use of fertilizer and pesticides on Town managed land. It has now codified that practice in a policy strictly limiting fertilizer and pesticide use.
- The Board of Health is considering adoption of a regulation limiting fertilizer use in town.
- Work is ongoing to eliminate storm water runoff from roads.
- A medicine disposal box is maintained at the Police Station.
- Consultants have been retained to assess both the impact of wastewater on our ponds and other water bodies and our pond water quality. The Town is moving forward with remedial actions recommended.
- Town committees are developing an action plan for pond protection.

Resources:

•Policy on the Content and Application of Fertilizer and Pesticides on Municipal Land in the town of Eastham, 2013.

•Action Plan for the Town of Eastham Ponds. EcoLogic and GHD, 2011.

•Town of Eastham Local Comprehensive Plan, 3rd Edition, 2010, with 2012 revisions.

•Eastham Freshwater Ponds: Water Quality Status & Recommendations for Future Activities, 2009.

•Final Interim Needs Assessment and Alternatives Screening Analysis Report, Stearns & Wheler, 2009.

•The Orleans Blue Pages, Orleans Pond Coalition, 2008.

•The Massachusetts Lake and Pond Guide, Dept. of Conservation and Recreation, 2004.

Keeping Eastham Ponds Healthy

Town of Eastham Water Management Committee

2500 State Hwy
Eastham, MA 02642
508 240 5900
http://www.eastham-ma.gov

Acknowledgements:

Board of Health
Conservation Commission
Natural Resources
Open Space Committee
Recreation and Beach Department

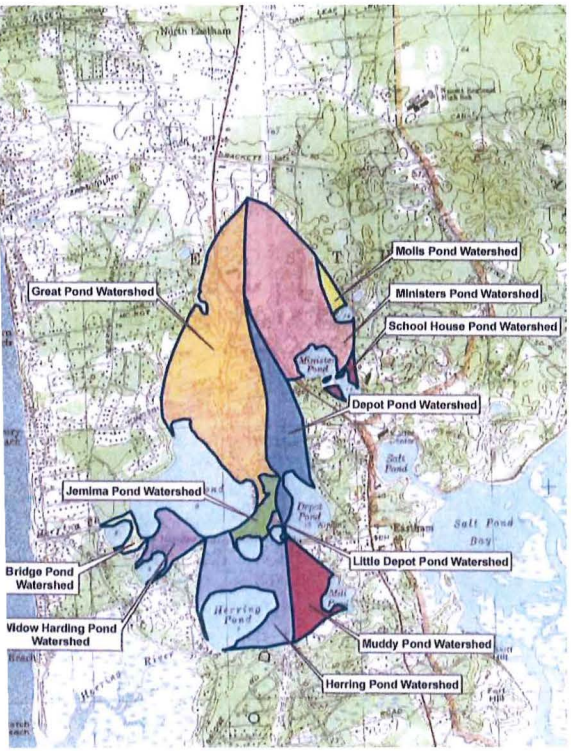
January 2014

What's happening to our ponds?

Eastham's freshwater ponds are kettle ponds in coarse sandy soil fed by groundwater and rain.

Cape Cod obtains all its fresh water from a single aquifer with several separate lens. One of these lens is the source of all the groundwater in Eastham and it contains everything that enters the groundwater in the town.

Each pond has a watershed whose groundwater flows into that pond and most land in Eastham is either in a pond watershed or in the watershed of one of our estuaries. The map shows the watersheds for 11 of our many ponds.



Our ponds are a major recreational resource and keeping them healthy is essential to their continued use. Both Herring and Great Pond have heavily used town beaches.

- The health of a pond depends on its having an adequate supply of oxygen to support fish and shellfish, good clarity and a good balance of native plants and animal habitat
- Massachusetts has established Surface Water Quality Standards (314 CMR 4:05) to ensure the health of ponds.
- If a pond receives too much phosphorus, there is an overgrowth of algae causing loss of clarity, loss of oxygen, potential fish kills and, overall, loss of diverse aquatic habitat.
- Effluent from septic systems, fertilizers, storm water runoffs and bird droppings all contribute phosphorus in our ponds.
- We cannot eliminate phosphorus from our groundwater but we can limit it.
- Volunteers began a program of sampling the water in 11 of our Eastham ponds in 2001. As a result of their findings, these ponds were evaluated by professional consultants in 2010 and all were found to suffer from excess phosphorus.
- Remedial treatment was advised for the most affected of the 11 ponds and taking action in all ponds to reduce future accumulation of phosphorus was recommended.
- Herring, the pond with the highest priority for treatment, was treated in the fall of 2012.
- A second high priority pond, Great Pond, was treated in October 2013.
- Both ponds are showing improvement and close monitoring is continuing.
- The town Water Management Committee is exploring methods for treatment of Ministers/Schoolhouse ponds, another high priority.

What you can do to help?

- Don't flush medications or pour them down the drain. Take them to the Drop Box at the Police Station or follow the Barnstable County guidelines for disposal in the trash. http://www.town.barnstable.ma.us/watersupply/medicationdisposal.pdf
- Dispose of food or grease in the trash.
- Hold hazardous waste until scheduled collection days. Find out what's hazardous at:http://www.barnstablecounty.org/wp-content/uploads/2011/04/
- Clean up after pets and don't feed aquatic birds.
- Prevent runoff from hard surfaces using gutters, drywells, drains or water gardens.
- Enjoy the ease of a natural "Cape Cod" lawn.
- Minimize fertilizer use by using native plants, trees and shrubs.
- Choose low or no phosphorus fertilizers. Labels have three numbers like 5-10-5. The first is nitrogen, the second is phosphorus and the third potassium. Get your soil checked by the County Extension Service to see if you need additional phosphorus.
- GreenCAPE has a table of fertilizers in use on the Cape that shows their phosphorus content. http://www.greencape.org
- Use slow release fertilizers and use sparingly.
- If you live on a pond you should not use fertilizer within 100 feet of it and should create a buffer zone of native plantings to slow runoff after consultation with the Conservation Commission.