

Year 1 Annual Report
Massachusetts Small MS4 General Permit
Reporting Period: May 1, 2018-June 30, 2019

Please DO NOT attach any documents to this form. Instead, attach all requested documents to an email when submitting the form

Unless otherwise noted, all fields are required to be filled out. If a field is left blank, it will be assumed the requirement or task has not been completed.

Part I: Contact Information

Name of Municipality or Organization: Town of Topsfield

EPA NPDES Permit Number: MAR041227

Primary MS4 Program Manager Contact Information

Name: David Bond

Title: Highway Superintendent

Street Address Line 1: DPW Facility

Street Address Line 2: 279 Boston Street

City: Topsfield

State: MA

Zip Code: 01983

Email: dbond@topsfield-ma.gov

Phone Number: (978) 887-1542

Fax Number: na

Stormwater Management Program (SWMP) Information

SWMP Location (web address): https://www.topsfield-ma.gov/sites/topsfieldma/files/uploads/phase_ii_stormwater_management_plan.pdf

Date SWMP was Last Updated: August 2008

If the SWMP is not available on the web please provide the physical address and an explanation of why it is not posted on the web:

Part II: Self Assessment

First, in the box below, select the impairment(s) and/or TMDL(s) that are applicable to your MS4.

Impairment(s)			
<input checked="" type="checkbox"/> Bacteria/Pathogens	<input type="checkbox"/> Chloride	<input type="checkbox"/> Nitrogen	<input type="checkbox"/> Phosphorus
<input type="checkbox"/> Solids/ Oil/ Grease (Hydrocarbons)/ Metals			
TMDL(s)			
<i>In State:</i>	<input type="checkbox"/> Assabet River Phosphorus	<input type="checkbox"/> Bacteria and Pathogen	<input type="checkbox"/> Cape Cod Nitrogen
	<input type="checkbox"/> Charles River Watershed Phosphorus	<input type="checkbox"/> Lake and Pond Phosphorus	
<i>Out of State:</i>	<input type="checkbox"/> Bacteria/Pathogens	<input type="checkbox"/> Metals	<input type="checkbox"/> Nitrogen
			<input type="checkbox"/> Phosphorus
<input type="button" value="Clear Impairments and TMDLs"/>			

Next, check off all requirements below that have been completed. **By checking each box you are certifying that you have completed that permit requirement fully.** If you have not completed a requirement leave the box unchecked. Additional information will be requested in later sections.

Year 1 Requirements

- ☒ Develop and begin public education and outreach program
- ☐ Identify and develop inventory of all known locations where SSOs have discharged to the MS4 in the last 5 years
 - ☐ The SSO inventory is attached to the email submission
 - ☐ The SSO inventory can be found at the following website:

No SSOs in Topsfield.
- ☐ Develop written IDDE plan including a procedure for screening and sampling outfalls
- ☒ IDDE ordinance complete
- ☐ Identify each outfall and interconnection discharging from MS4, classify into the relevant category, and priority rank each catchment for investigation
 - ☐ The priority ranking of outfalls/interconnections is attached to the email submission
 - ☐ The priority ranking of outfalls/interconnections can be found at the following website:

Many of the outfalls have been mapped. None have been prioritized.
- ☒ Construction/ Erosion and Sediment Control (ESC) ordinance complete
- ☐ Develop written procedures for site inspections and enforcement of sediment and erosion control measures
- ☐ Develop written procedures for site plan review
- ☒ Keep a log of catch basins cleaned or inspected
- ☐ Complete inspection of all stormwater treatment structures

Annual Requirements

- ☐ Annual opportunity for public participation in review and implementation of SWMP
- ☐ Comply with State Public Notice requirements
- ☐ Keep records relating to the permit available for 5 years and make available to the public
- ☒ Properly store and dispose of catch basin cleanings and street sweepings so they do not discharge to receiving waters
- ☐ Annual training to employees involved in IDDE program
- ☒ All curbed roadways have been swept a minimum of one time per year

Bacteria/ Pathogens (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)

Annual Requirements

*Public Education and Outreach**

- ☐ Annual message encouraging the proper management of pet waste, including noting any existing ordinances where appropriate
- ☐ Permittee or its agents disseminate educational material to dog owners at the time of issuance or renewal of dog license, or other appropriate time
- ☐ Provide information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria

** Public education messages can be combined with other public education requirements as applicable (see Appendix H and F for more information)*

Use the box below to input additional details on any unchecked boxes above or any additional information you would like to share as part of your self assessment:

Part III: Receiving Waters/Impaired Waters/TMDL

Have you made any changes to your lists of receiving waters, outfalls, or impairments since the NOI was submitted?

Yes ☒ No ☐

If yes, describe below, including any relevant impairments or TMDLs:

After the NOI was submitted, the reviewers added 2 new impaired river segments: Fish Brook (CAT 5) and Mile Brook (CAT 3). Topsfield has mapped all of the outlets into all sections of the full list of impaired streams and will include these in the updated SWMP. See web map at: <https://www.topsfield-ma.gov/sites/topsfieldma/files/uploads/drainsystemaug2018.pdf>

Part IV: Minimum Control Measures

Please fill out all of the metrics below. If applicable, include in the description who completed the task if completed by a third party.

MCM1: Public Education

Number of educational messages completed during the reporting period: 7

Below, report on the educational messages completed during the first year. For the measurable goal(s) please describe the method/measures used to assess the overall effectiveness of the educational program.

BMP: Rain Garden Brochure

Message Description and Distribution Method:

Informational brochure on the function and importance of Rain Gardens and stormwater filtration. Construction instructions and plant suggestions also included.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition & Stormwater coordinator

Measurable Goal(s):

500 made available in town hall. Distributed by Salem Sound Coastwatch and Ipswich River Watershed Association at many community events. PDF available for download at www.greenscapes.org/resources-brochures/

Message Date(s): Nov 2018

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

BMP: LID Workshop

Message Description and Distribution Method:

Workshop/Seminar reintroduced the basics of low impact development and its importance. MS4 requirements, as they relate to LID were discussed and Fred Civian (MassDEP) provided tips for designing and passing municipal ordinances to promote LID.

Targeted Audience: Developers via Topsfield Stormwater coordinator

Responsible Department/Parties: Greenscapes North Shore Coalition

Measurable Goal(s):

Attended by 35. Presentation PDF and "Tip Sheet" sent to municipal contacts and was temporarily available

on Greenscapes website.

Message Date(s): January 17, 2019

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

BMP: Keeping Water Clean School Program

Message Description and Distribution Method:

Program engages 5th grade students in several activities designed to raise their stormwater and water conservation awareness. Students learn about what a watershed is, what stormwater, groundwater and wastewater are, how they can negatively or positively impact these water systems, along with more details about each system and how it should be protected/maintained.

Targeted Audience: Residents

Responsible Department/Parties: Conservation Commission

Measurable Goal(s):

Conducted at all 5th grade classes in Topsfield.

Message Date(s): April 2019

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

BMP: Yard Waste Management

Message Description and Distribution Method:

Social media post describing the best ways to properly dispose of leaf litter and yard waste, keeping your yard clean and our water resources safe. Composting leaves, leaving them on the lawn for nutrient deposition, or having them picked up by the town are described as good options.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition, Stormwater coordinator

Measurable Goal(s):

Sent to 70 municipal contacts for further dissemination, posted on partner social media platforms (Facebook &

Twitter) and available at www.greenscapes.org/resources-social-media/

Message Date(s): October 2018

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

BMP:Keep Drains Clean

Message Description and Distribution Method:

Social media post describing the importance of keeping storm drains clear of leaf debris and litter.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition, Stormwater coordinator

Measurable Goal(s):

Sent to 70 municipal contacts for further dissemination, posted on partner social media platforms (Facebook & Twitter) and available at www.greenscapes.org/resources-social-media/

Message Date(s): November 2018

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

BMP:Greenscapes Table Events

Message Description and Distribution Method:

Provided Greenscapes informational brochures at Town gatherings including Strawberry Festival and Grow Spring Expo.

Targeted Audience: Residents, Developers

Responsible Department/Parties: Greenscapes North Shore Coalition

Measurable Goal(s):

Communication with over 6,000 attendees.

Message Date(s): April 2019 and June 2019

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

BMP:New Greenscapes Guides

Message Description and Distribution Method:

A revised version of the comprehensive Greenscapes Guide. A new 24 page magazine (PDF) outlining the importance of small-scale stormwater management and sustainable landscaping. Project ideas, plant suggestions and best practices included.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition

Measurable Goal(s):

Promoted by Conservation Commission and Planning Board staff.

Message Date(s): June 2019

Message Completed for: Appendix F Requirements ☐ Appendix H Requirements ☒

Was this message different than what was proposed in your NOI? Yes ☐ No ☒

If yes, describe why the change was made:

Add an Educational Message

MCM2: Public Participation

Describe the opportunity provided for public involvement in the development of the Stormwater Management Program (SWMP) during the reporting period:

Members of the Road Commissioners and the Stormwater Committee reviewed the NOI for comments prior to submission.

Was this opportunity different than what was proposed in your NOI? Yes ☐ No ☒

Describe any other public involvement or participation opportunities conducted during the reporting period:

MCM3: Illicit Discharge Detection and Elimination (IDDE)

Sanitary Sewer Overflows (SSOs)

Below, report on the number of SSOs identified in the MS4 system and removed during this reporting period.

Number of SSOs identified:

Number of SSOs removed:

Below, report on the total number of SSOs identified in the MS4 system and removed to date. At a minimum, report SSOs identified since 2013.

Total number of SSOs identified:

Total number of SSOs removed:

MS4 System Mapping

Describe the status of your MS4 map, including any progress made during the reporting period:

Mapping of Topsfield's drainage system began in 1997 with a comprehensive survey of all surface drainage structures. That GIS project has been maintained to the present. In the fall of 2018, Topsfield completed its mapping of all, public record, underground drain pipes and associated outlets. It was this inventory that was used to identify the outlets to impaired surface waters. <https://www.topsfield-ma.gov/sites/topsfieldma/files/uploads/drainsystemaug2018.pdf>

Screening of Outfalls/Interconnections

If conducted, please submit any outfall monitoring results from this reporting period. Outfall monitoring results should include the date, outfall/interconnection identifier, location, weather conditions at time of sampling, precipitation in previous 48 hours, field screening parameter results, and results from all analyses.

- ☒ The outfall screening data is attached to the email submission
☐ The outfall screening data can be found at the following website:

Below, report on the number of outfalls/interconnections screened during this reporting period.

Number of outfalls screened: 0

Below, report on the percent of total outfalls/ interconnections screened to date.

Percent of total outfalls screened: 0

Catchment Investigations

If conducted, please submit all data collected during this reporting period as part of the dry and wet weather investigations. Also include the presence or absence of System Vulnerability Factors for each catchment.

- ☒ The catchment investigation data is attached to the email submission
☐ The catchment investigation data can be found at the following website:

Below, report on the number of catchment investigations completed during this reporting period.

Number of catchment investigations completed this reporting period: 5

Below, report on the percent of catchments investigated to date.

Percent of total catchments investigated: 40%

Optional: Provide any additional information for clarity regarding the catchment investigations below:

The Howlett Brook catchment has been divided into 4 segments to isolate potential contributions of E coli. As our NOI presumes, some of the potential pollution may be coming from non-point sources like horse farms and not from illicit discharge into an drain system.

IDDE Progress

If illicit discharges were found, please submit a document describing work conducted over this reporting period, and cumulative to date, including location source; description of the discharge; method of discovery; date of discovery; and date of elimination, mitigation, or enforcement OR planned corrective measures and schedule of removal.

- ☐ The illicit discharge removal report is attached to the email submission
☐ The illicit discharge removal report can be found at the following website:

Below, report on the number of illicit discharges identified and removed, along with the volume of sewage removed during this reporting period.

Number of illicit discharges identified: 0

Number of illicit discharges removed: 0

Estimated volume of sewage removed: 0 gallons

Below, report on the total number of illicit discharges identified and removed to date. At a minimum, report on the number of illicit discharges identified and removed since the effective date of the permit.

Total number of illicit discharges identified: 0

Total number of illicit discharges removed: 0

Optional: Provide any additional information for clarity regarding illicit discharges identified, removed, or planned to be removed below:

Topsfield has been very proactive in identifying illicit discharges in Town. The Town has conducted video monitoring of underground culverts to identify illegal hookups and where found they have been disconnected from the storm drain system. Therefore, it is easy to say we have not found any IDs during this reporting period.

Employee Training

Describe the frequency and type of employee training conducted during the reporting period:

There has been no employee training conducted during this reporting period.

MCM4: Construction Site Stormwater Runoff Control

Below, report on the construction site plan reviews, inspections, and enforcement actions completed during this reporting period.

Number of site plan reviews completed: 4

Number of inspections completed: 20

Number of enforcement actions taken: 0

MCM5: Post-Construction Stormwater Management in New Development and Redevelopment

Ordinance Development

Describe the status of the post-construction ordinance required to be complete in year 2 of the permit term:

Post-development criteria is complete and included within the Topsfield Stormwater & Erosion Control Regulations adopted in March of 2013.

As-built Drawings

Describe the status of the measures the MS4 has utilized to require the submission of as-built drawings and ensure long term operation and maintenance of completed construction sites required to be complete in year 2 of the permit term:

As-built plan criteria is complete and included within the Topsfield Stormwater & Erosion Control Regulations adopted in March of 2013.

Street Design and Parking Lots Report

Describe the status of the street design and parking lots assessment due in year 4 of the permit term, including any planned or completed changes to local regulations and guidelines:

Topsfield received a grant to study downtown parking. This grant was received by the Selectmen and will be conducted with assistance from MAPC.

Green Infrastructure Report

Describe the status of the green infrastructure report due in year 4 of the permit term, including the findings and progress towards making the practice allowable:

The Planning Board has adopted "Low Impact Development Guidelines" in February, 2010.

Retrofit Properties Inventory

Describe the status of the inventory, due in year 4 of the permit term, of permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas and report on any properties that have been modified or retrofitted:

Not addressed in the reporting period.

MCM6: Good Housekeeping

Catch Basin Cleaning

Describe the status of the catch basin cleaning optimization plan:

The catch basin cleaning plan is informal. A long time employee of the Town has been cleaning the catch basins.



If complete, attach the catch basin cleaning optimization plan or the schedule to gather information to develop the optimization plan:

- ☐ The catch basin cleaning optimization plan or schedule is attached to the email submission
- ☐ The catch basin cleaning optimization plan or schedule can be found at the following website:

Below, report on the number of catch basins inspected and cleaned, along with the total volume of material removed from the catch basins during this reporting period.

Number of catch basins inspected:

Number of catch basins cleaned:

Total volume or mass of material removed from all catch basins:

Below, report on the total number of catch basins in the MS4 system, if known.

Total number of catch basins:

If applicable:

Report on the actions taken if a catch basin sump is more than 50% full during two consecutive routine inspections/cleaning events:

Street Sweeping

Describe the status of the written procedures for sweeping streets and municipal-owned lots:

Report on street sweeping completed during the reporting period using one of the three metrics below.

☒ Number of miles cleaned:

☐ Volume of material removed:

☐ Weight of material removed:

If applicable:

For rural uncurbed roadways with no catch basins, describe the progress of the inspection, documentation, and targeted sweeping plan:

Winter Road Maintenance

Describe the status of the written procedures for winter road maintenance including the storage of salt and sand:

All road salt and sand is stored in a covered garage on the grounds of the DPW garage.

Inventory of Permittee-Owned Properties

Describe the status of the inventory, due in year 2 of the permit term, of permittee-owned properties, including parks and open spaces, buildings and facilities, and vehicles and equipment, and include any updates:

There has been no attempt to consolidate an inventory of Town-owned properties and associated vehicle/equipment storage during the reporting period. This is an easy goal to attain because of the Town's comprehensive GIS program. (Once begun, half done.)

O&M Procedures for Parks and Open Spaces, Buildings and Facilities, and Vehicles and Equipment

Describe the status of the operation and maintenance procedures, due in year 2 of the permit term, of permittee-owned properties (parks and open spaces, buildings and facilities, vehicles and equipment) and include maintenance activities associated with each:

Not addressed in this reporting period.

Stormwater Pollution Prevention Plan (SWPPP)

Describe the status of any SWPPP, due in year 2 of the permit term, for permittee-owned or operated facilities including maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater:

Not addressed in this reporting period.

Below, report on the number of site inspections for facilities that require a SWPPP completed during this reporting period.

Number of site inspections completed: 0

Describe any corrective actions taken at a facility with a SWPPP:

None

O&M Procedures for Stormwater Treatment Structures

Describe the status of the written procedure for stormwater treatment structure maintenance:

None

Additional Information**Monitoring or Study Results**

Results from any other stormwater or receiving water quality monitoring or studies conducted during the reporting period not otherwise mentioned above, where the data is being used to inform permit compliance or permit effectiveness must be attached.

- ☐ Not applicable
- ☒ The results from additional reports or studies are attached to the email submission
- ☐ The results from additional reports or studies can be found at the following website(s):

If such monitoring or studies were conducted on your behalf or if monitoring or studies conducted by other entities were reported to you, a brief description of the type of information gathered or received shall be described below:

As part of a long-term dissolved oxygen study of Great Wenham Swamp (began 2010) and the Ipswich River section MA92-06, Biodiversity Consulting LLC did sampling from the confluence of Idlewild Brook and the Ipswich River to Asbury Street. Results were very poor. Dissolved oxygen was less than 1 ppm for the entire section. Water was very turbid and there was no indication of fish.

Additional Information

Optional: Enter any additional information relevant to your stormwater management program implementation during the reporting period. Include any BMP modifications made by the MS4 if not already discussed above:

Activities Planned for Next Reporting Period

Please confirm that your SWMP has been, or will be, updated to comply with all applicable permit requirements including but not limited to the year 2 requirements summarized below. (Note: impaired waters and TMDL requirements are not listed below)

Yes, I agree ☒

- Complete system mapping Phase I

- Begin investigations of catchments associated with Problem Outfalls
- Develop or modify an ordinance or other regulatory mechanism for post-construction stormwater runoff from new development and redevelopment
- Establish and implement written procedures to require the submission of as-built drawings no later than two years after the completion of construction projects
- Develop, if not already developed, written operations and maintenance procedures
- Develop an inventory of all permittee owned facilities in the categories of parks and open space, buildings and facilities, and vehicles and equipment; review annually and update as necessary
- Establish a written program detailing the activities and procedures the permittee will implement so that the MS4 infrastructure is maintained in a timely manner
- Develop and implement a written SWPPP for maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater
- Enclose or cover storage piles of salt or piles containing salt used for deicing or other purposes
- Develop, if not already developed, written procedures for sweeping streets and municipal-owned lots
- Develop, if not already developed, written procedures for winter road maintenance including storage of salt and sand
- Develop, if not already developed, a schedule for catch basin cleaning
- Develop, if not already developed, a written procedure for stormwater treatment structure maintenance
- Develop a written catchment investigation procedure (*18 months*)

Annual Requirements

- Annual report submitted and available to the public
- Annual opportunity for public participation in review and implementation of SWMP
- Keep records relating to the permit available for 5 years and make available to the public
- Properly store and dispose of catch basin cleanings and street sweepings so they do not discharge to receiving waters
- Annual training to employees involved in IDDE program
- Update inventory of all known locations where SSOs have discharged to the MS4 in the last 5 years
- Continue public education and outreach program
- Update outfall and interconnection inventory and priority ranking and include data collected in connection with the dry weather screening and other relevant inspections conducted
- Implement IDDE program
- Review site plans of construction sites as part of the construction stormwater runoff control program
- Conduct site inspection of construction sites as necessary
- Inspect and maintain stormwater treatment structures
- Log catch basins cleaned or inspected
- Sweep all uncurbed streets at least annually

Provide any additional details on activities planned for permit year 2 below:

Complete new SWMP that was due on July 1, 2019.

Part V: Certification of Small MS4 Annual Report 2019**40 CFR 144.32(d) 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, I certify that 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.

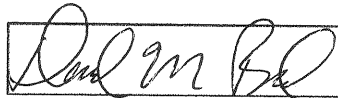
Name:

DAVID M. BOND

Title:

HIGHWAY SPT
STORMWATER COORDINATOR

Signature:



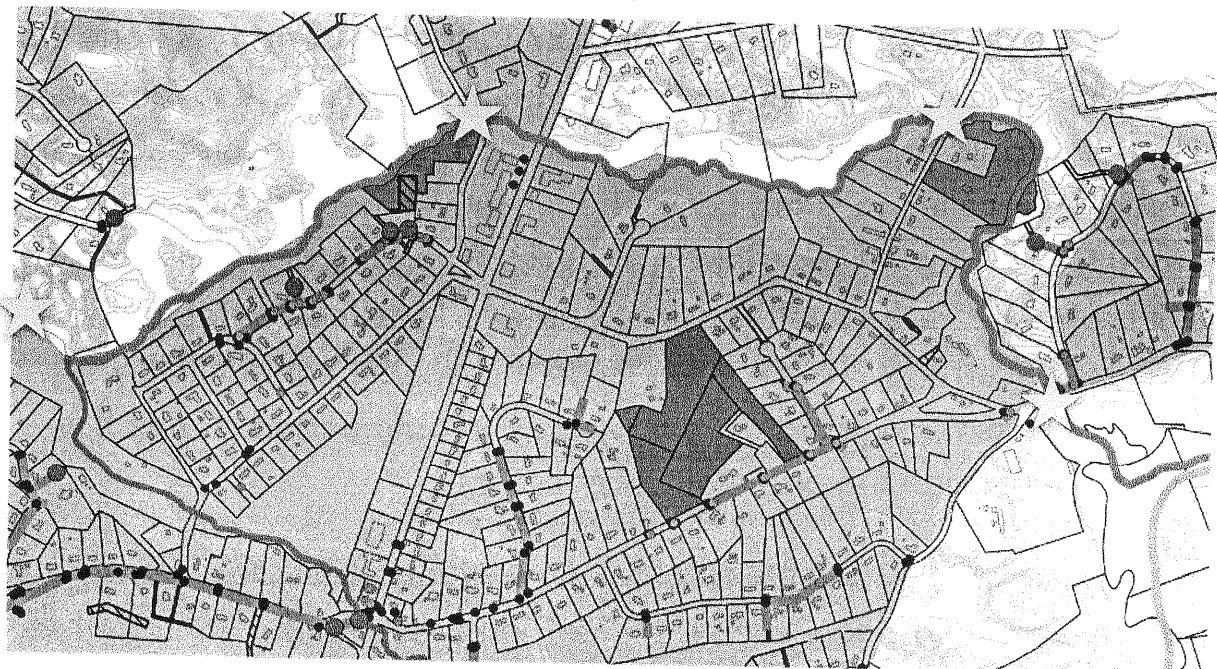
Date:

9-15-19

*[Signatory may be a duly authorized
representative]*

Topsfield's Water Testing

MS4 Water Monitoring FY 2019



Howlett Brook Stormwater Sources

500 0 500 1000 1500 2000 ft

Legend

- | | | | |
|-----------------|------------------|----------------|----------|
| ● Tops_Outlets | ★ mh_pts | Parcels | ■ EPA-UA |
| StreamCL_jsm | ★ MS4-MonStation | ■ Farm | |
| — HOWLETT BROOK | ● catchbasins | ■ Stable | |
| — IPSWICH RIVER | — Drain Pipe | □ Parcel | |
| — MILE BROOK | ▨ easements PAL | — contours_arc | |

Howlett Brook Monitoring Sites

Howlett Brook

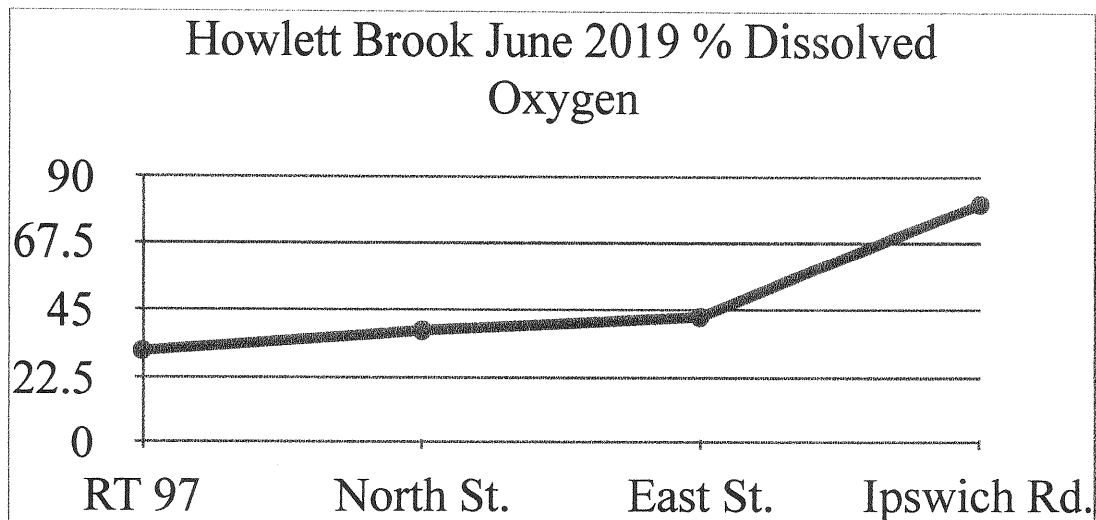
Polluted

The Massachusetts Dept of Environmental Protection determined that Howlett Brook is polluted. Or to use EPA's jargon, "impaired" under the Clean Water Act. Sometime in the 1990's some testing was done that showed that there were high numbers of mammalian intestinal bacteria in Howlett Brook. This type of bacteria is called Coliform bacteria and one in particular is called in short, Ecoli. The recently issued MS4 permit granted to the Town of Topsfield by Mass DEP and the EPA recommends that it is of value to the health of the people of Topsfield to determine where this bacteria is coming from. To do this, we are conducting a number of tests throughout the year and at recommended stream flow events to determine the origin of the pollution.

There are low flow events and high flow events. Last October we conducted some low flow events to check on groundwater contributions to the stream. This June we conducted some tests after a heavy rain storm to determine if there is pollution entering our streams due to stormwater. Some results of the June testing are presented here.

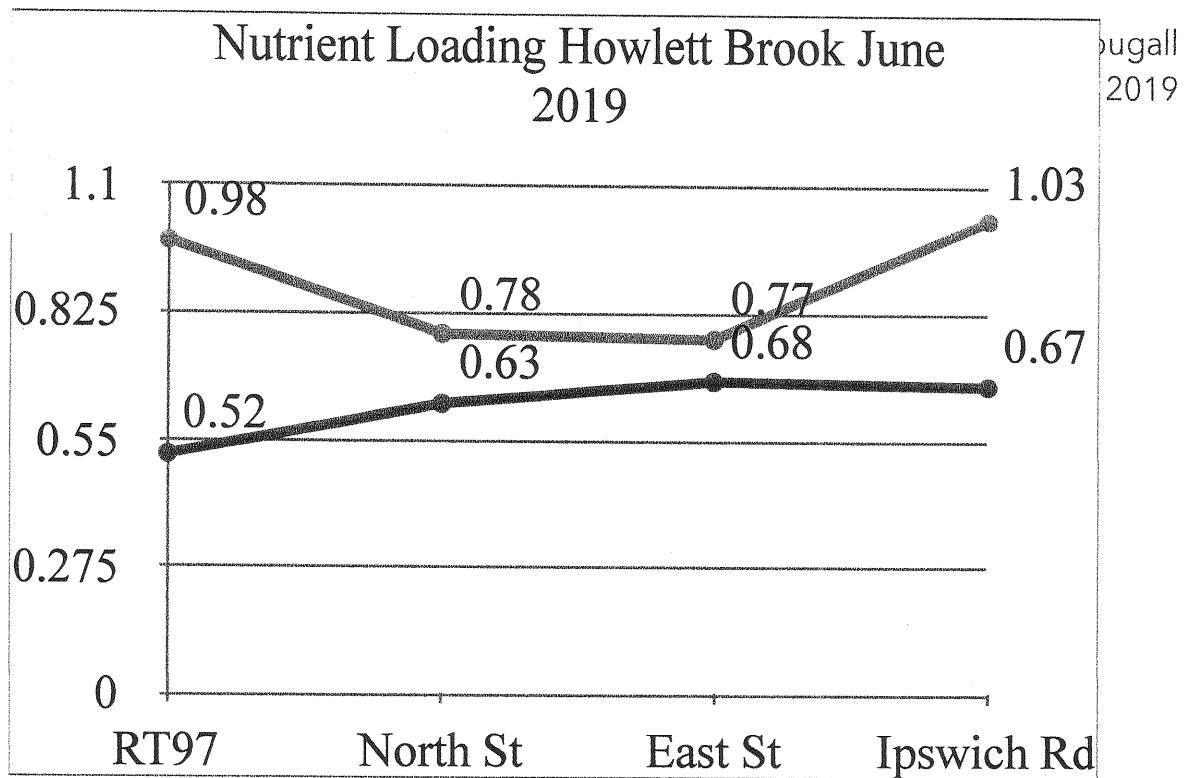
The testing sites are along Howlett Brook where it crosses Washington Street (RT 97), North Street, East Street and Ipswich Road. In October we tested the water for temperature, dissolved oxygen, conductance, total dissolved solids, salinity, chlorides, nitrates and ammonium. In June we conducted the same tests and added a bacteria test at East Street and Ipswich Road.

Results for June 2019



The water entering Howlett Brook from Pye Brook has some indications of impairment. The **dissolved oxygen** is low. The graph shows the percent dissolved oxygen at Route 97 is at 38% and it steadily increases to 80% at Ipswich Road. Anything below 40% is not healthy for animals that live in the water. The increase at Ipswich Road is from the cascading water over the Peabody Dam and the riffle zone from there to the Ipswich River. Both the Nutrient Loading graph and the Conductance graph show that the incoming water from Pye Brook is not great.

The blue line on the **Nutrient** graph is for nitrates and the red line is ammonium. The **nitrates** come from fertilizer or manure including septic systems. Ammonium is also an indicator of pollution in concentrations over 0.4 ppm. Because organic nitrogen is a limiting nutrient in plant communities and hence in great demand, an ideally natural stream would have little or no nitrates or ammonium. So when we see even small amounts in surface water, this would indicate overloading of the waterway by nutrients.



Conductance is a catchall test and is representative of ions in the water that will allow the water to conduct electricity. An everyday ion is

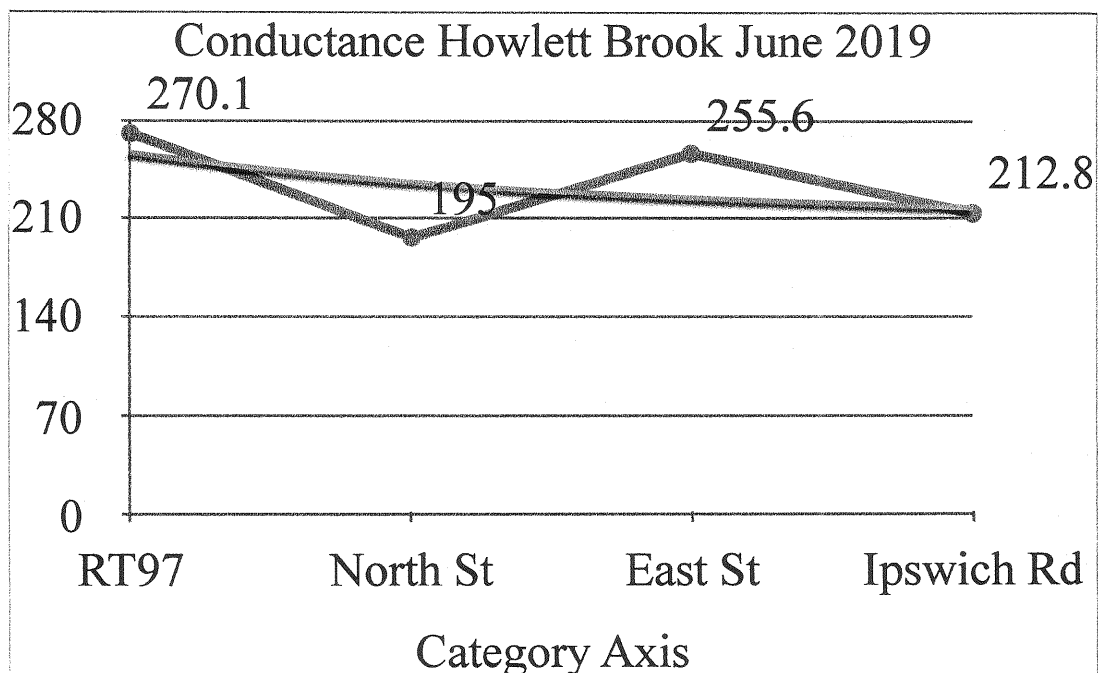
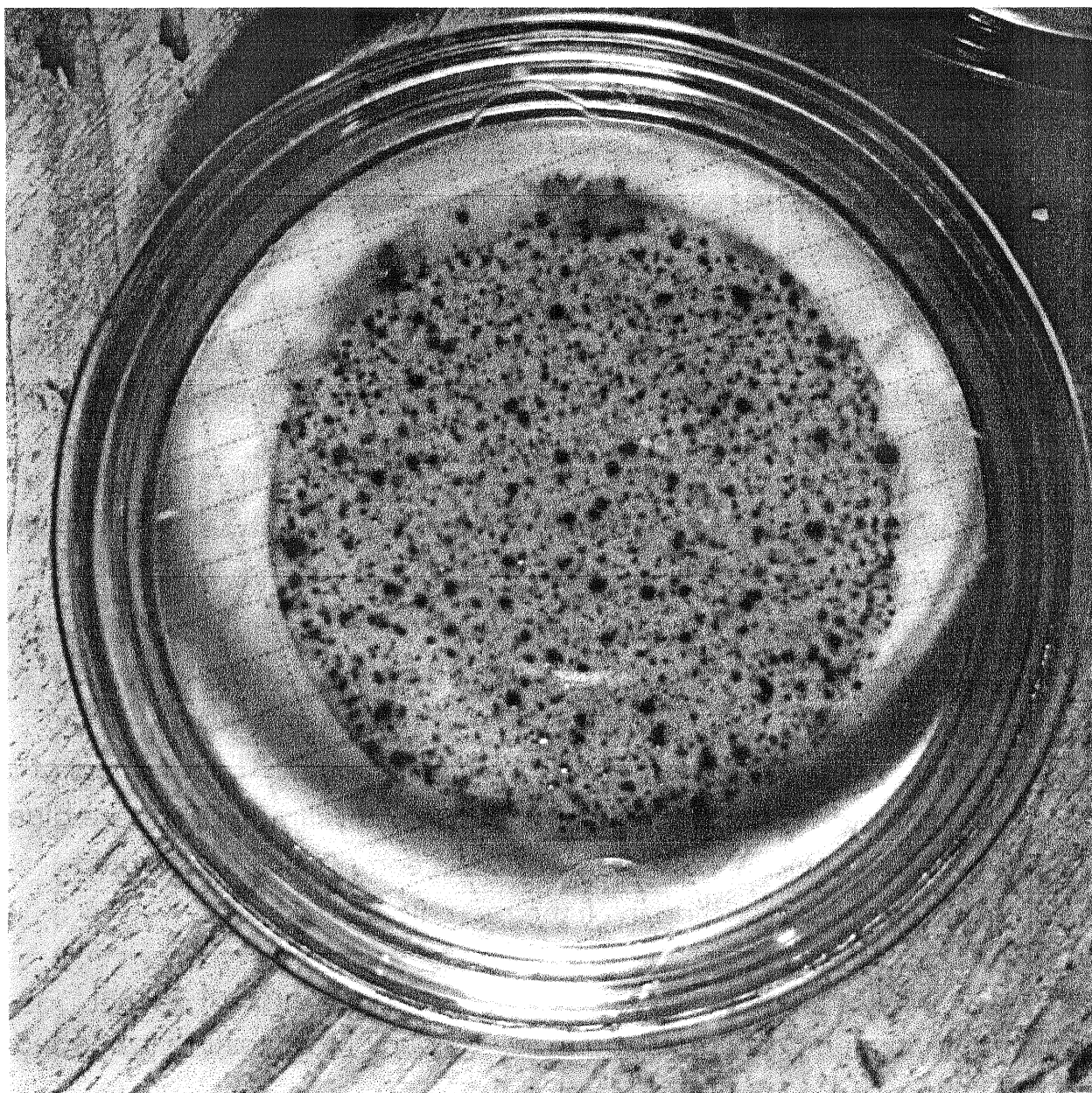


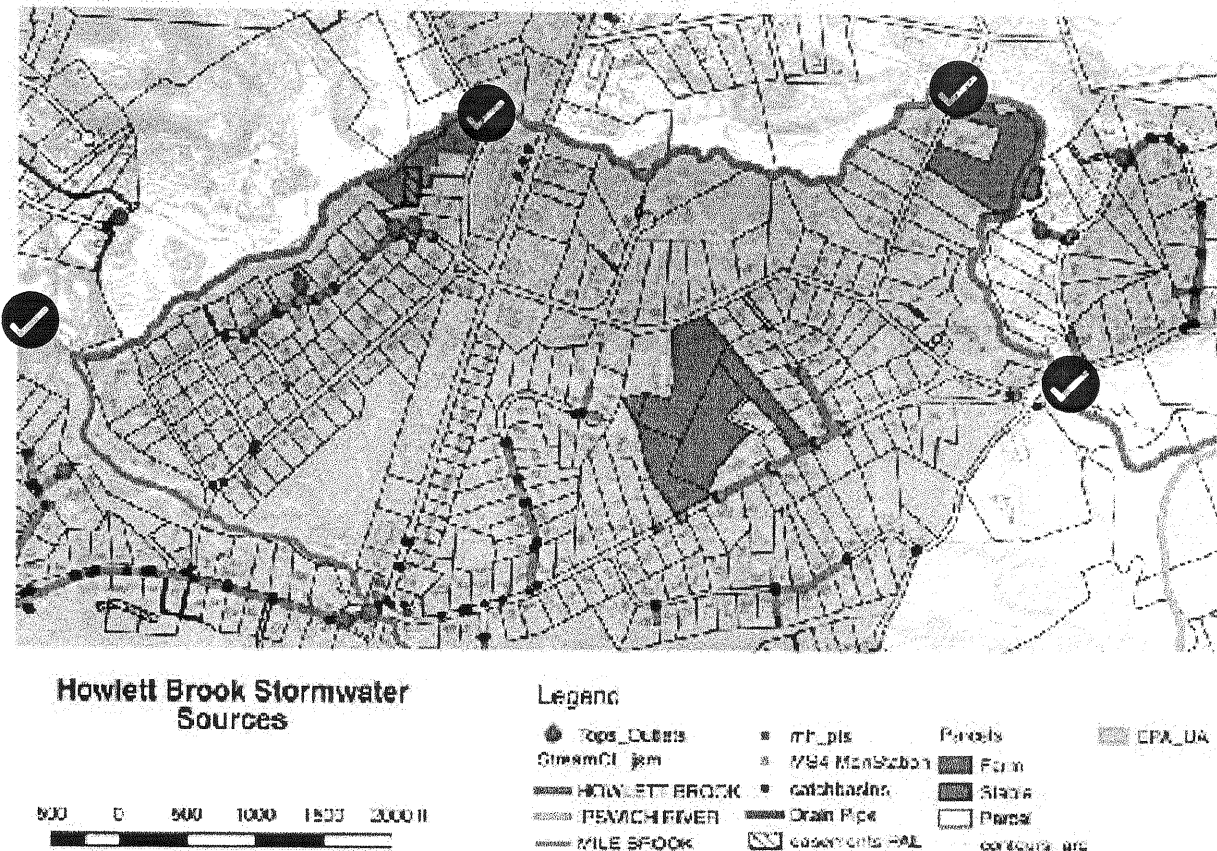
table salt. When dissolved in water it splits into sodium ion and a chloride ion. Many other "salts" do the same with components of iron, manganese and calcium. Our tests show that there is input of ions between North Street and East Street. Our **chloride** test shows that it doubles in this same area. It would be reasonable to conclude that Route One is a source of road salt to Howlett Brook, even into the summer. Road salt in streams is not good. It kills aquatic life. And in areas where we pull water out of the ground to drink, it permanently contaminates the aquifer since it is heavier than freshwater and sinks to the bottom of the well basin until it fills the basin to the bottom of the well.

We conducted **bacteria** testing at two sites: East Street and Ipswich Road. The results are 77 and 146 respectively. These tests were conducted according to the EPA protocol using water samples syphoned through a filter, placed in a petri dish with agar (food for bacteria) and then incubated at 35C for 24 hours. Then using a dissecting scope the colonies of bacteria growing in the dish were counted. The numbers of colonies represent the number of Ecoli in a 100 ml sample. They are blue in color. A total coliform count has not been completed. That would include counting and adding in all the red colonies.

The result of these tests shows that there is a source of animal pollution between East Street and Ipswich Road. More testing is needed to isolate this source of pollution.



Howlett Brook Stormwater Monitoring

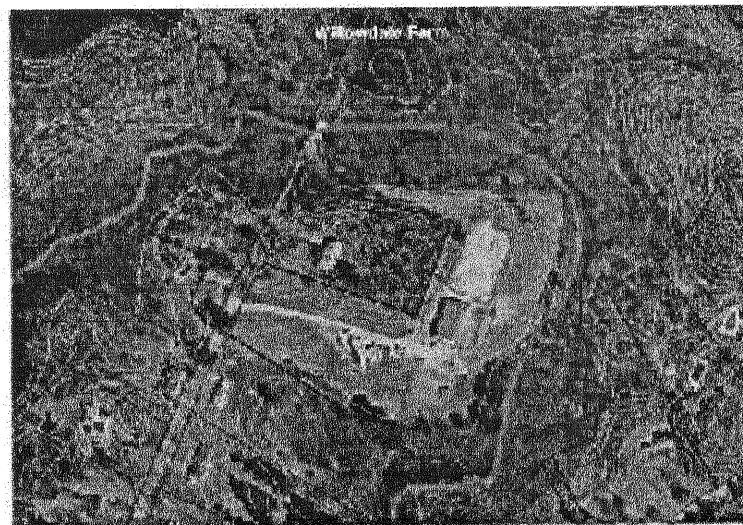
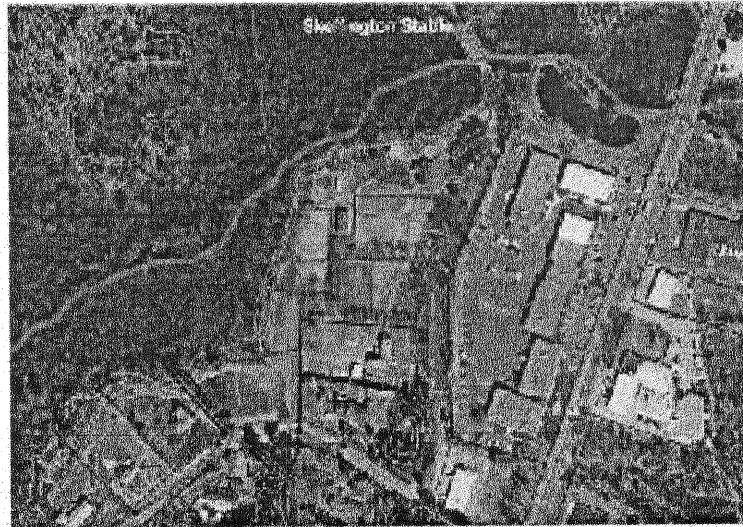


The Massachusetts Department of Environmental Protection has determined that Howlett Brook in Topsfield is contaminated with fecal bacteria. Hence, it is important for Topsfield to develop a monitoring plan for this watershed to isolate the source or sources of this pollution to meet the goals of the MS4 plan and more importantly improve water quality in Topsfield.

The first phase to develop a monitoring program is to map the contributions of stormwater to the Brook. This has been started and 90% of the point sources from road drains have been located and mapped. The remainder of point sources for Route One and Honor Place need to be investigated and

Details of horse stables

2014



documented. Also mapped are horse stables and farms that may be contributing bacteria from overland and groundwater flows.

On the map above, there are 4 monitoring sites marked such:



Topsfield will conduct low flow sampling for Ecoli bacteria using the EPA approved method with m-ColiBlue24 medium. A link to this method can be found at:

<https://www.hach.com/asset-get.download.jsa?id=53201915602>

Simultaneous Detection and Enumeration of Total Coliforms and Escherichia coli using m-ColiBlue24 Membrane Filtration Medium

Summary of Method

A 100 mL water sample of surface water is filtered through a 47-mm, 0.45- μ m pore size cellulose ester filter that retains the bacteria present in the sample. The filter is then transferred to a 50-mm Petri plate containing an absorbent pad saturated with m-ColiBlue24 broth or m-ColiBlue24 agar plate and incubated at 35 C for up to 24 hours. Both red and blue colonies may appear; the blue colonies are specific to the presence of E. coli while the red colonies are specific to non-E. coli coliforms. If the colonies are too numerous to count, a second test may be necessary with appropriate dilution with distilled water to make the number of colonies individually distinct for counting.

Results will be analyzed to isolate pollution contributions to the stream.

Topsfield Stormwater System Map Status August 2018

Legend

- Tops_Outlets
- StreamCL_jsm
- FISH BROOK
- HOWLETT BROOK
- IPSWICH RIVER
- MILE BROOK
- Topsfield_Outline
- catchbasins
- Drain Pipe
- Parcels
- Farm
- Stable
- EPA_UA

