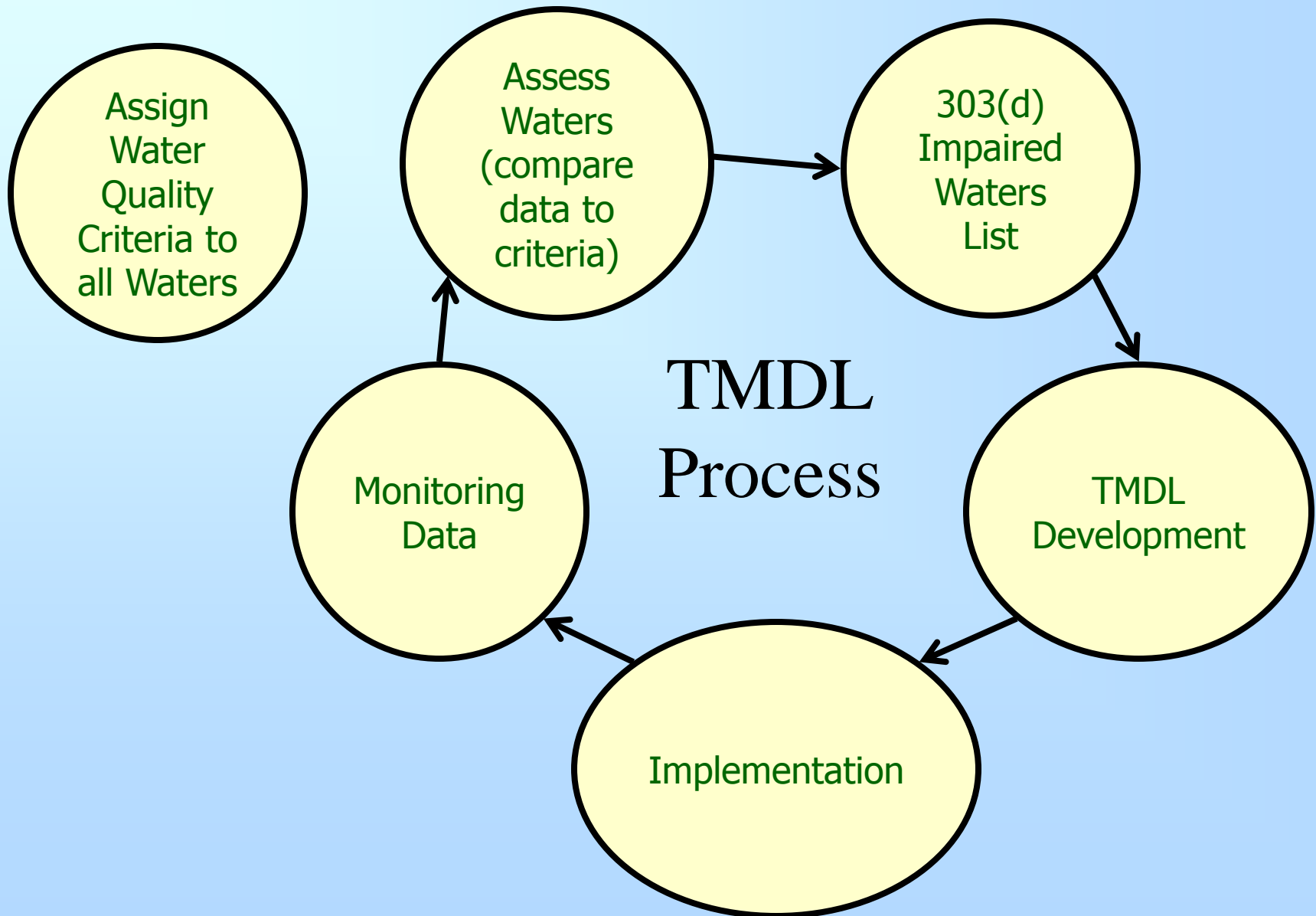


Hunt River Watershed Bacteria TMDL Studies



Heidi Travers - RI DEM

29-May-2014



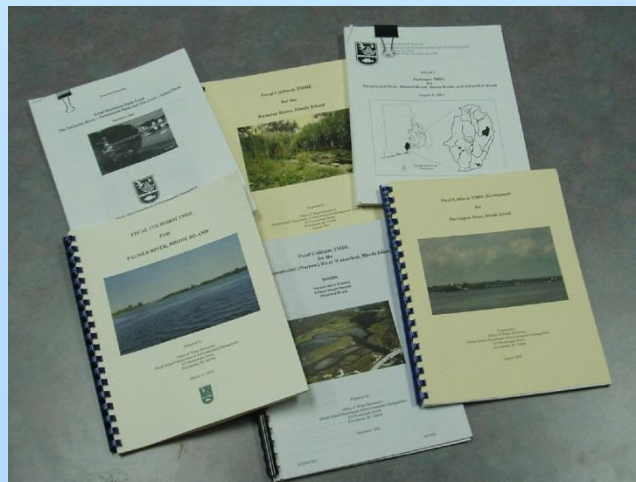
TMDL Studies

- A Total Maximum Daily Load (TMDL) is a prescription designed to restore the health of polluted waters by:
 - Calculating the amount of a pollutant that a waterbody can receive and still meet its water quality standards.
 - Allocating the allowable amount of the pollutant to the its sources.

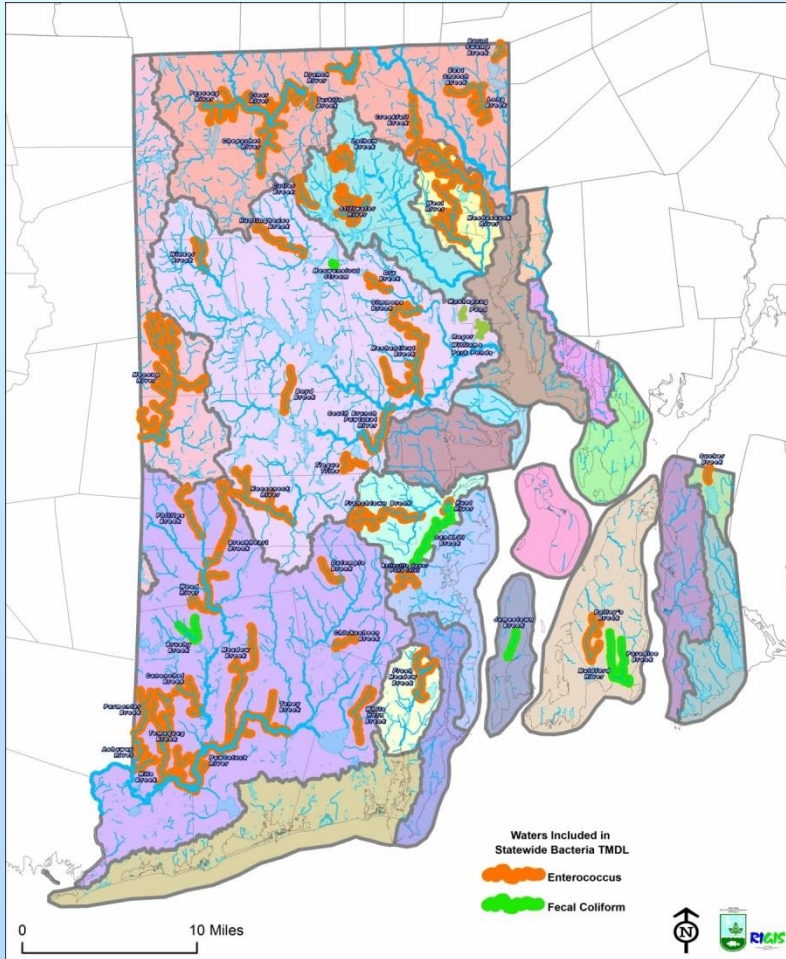
$$\text{TMDL} = \text{Point Source} + \text{Nonpoint Source} + \text{Background} + \text{Margin of Safety}$$

TMDL Studies

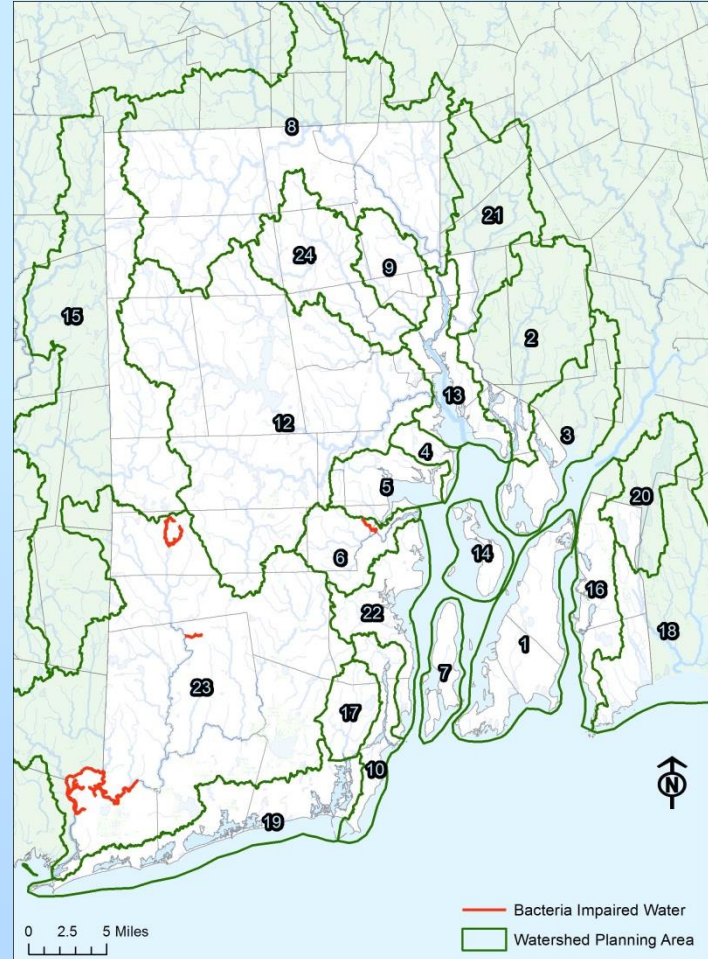
- End goal of TMDL process is a waterbody that meets Rhode Island Water Quality Standards.
- Provides a plan and guidance to concerned parties for implementation efforts to meet water quality goals.
- TMDL studies are both waterbody and pollutant specific.



RI Statewide Bacteria TMDL 57 Waterbody Segments - 2011



RI Statewide Bacteria TMDL Updates 6 Waterbody Segments - 2014



2014 RI Statewide Bacteria TMDL Updates

Impaired Water	Impairment / Pollutant	Municipality
Watershed Planning Area 6: Hunt River		
Pierce Brook (RI0007028R-07)	Enterococci	East Greenwich, Warwick
Watershed Planning Area 23: Wood - Pawcatuck Rivers		
Pawcatuck River (RI0008039R-18D)	Enterococci	Hopkinton, Westerly
Pawcatuck River (RI0008039R-18E)	Enterococci	Hopkinton, Westerly
Spring Brook (RI0008039R-41)	Enterococci	Westerly
Acid Factory Brook (RI0008040R-01)	Enterococci	West Greenwich
Baker Brook (RI0008040R-18)	Enterococci	Richmond

Statewide Bacteria TMDL Components

Core TMDL Document

- Background and Reference

Appendix A

- Individual Waterbody Summaries

Appendix B

- Waterbody specific details

Appendix C

- TMDL Goals


Appendix . .

- Current Activities

- Recommended Actions

Waterbody Summary (Appendix) Content

- Watershed Description
- Maps
- Monitoring Data Description
- Actual/Potential Sources of Bacteria in the Watershed
- Existing Management and Recommended Next Steps
- Data Summary Tables and Necessary Pollutant Reductions



Pawcatuck River Segment 18E

Watershed Description


This TMDL applies to the segment of the Pawcatuck River from Route 3 to Main Street Bridge crossing in downtown Westerly (RI0008039R-18E), an 11.36-mile long stream segment located in Hopkinton and Westerly, RI (Figure 1). The Pawcatuck River watershed is presented in Figures 2 and 3 with land use types indicated.

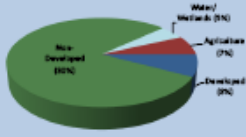
The headwaters of the Pawcatuck River are located in Wordens Pond in South Kingstown. Just west of Route 2 and Great Swamp near the Village of Kenyon begins one of two impaired segments that were addressed in 2011 as part of the Statewide Bacteria TMDL. The first of these segments (RI00080439R-18B) ends just before Route 112, while the second (RI00080439R-18C) extends from just west of Route 112 near the border of Richmond and Charlestown in the Village of Carolina to the Village of Bradford, along the Hopkinton and Westerly border. The next downstream segment of the Pawcatuck River (RI00080439R-18D) travels from the Bradford Dying discharge point west to the Route 3 bridge crossing. This segment is also impaired for bacteria (RIDEM, 2011).

This TMDL covers the furthest downstream segment (RI00080439R-18E) of the freshwater Pawcatuck River from the Route 3 Bridge crossing to the Main Street Bridge in downtown Westerly. At Route 3, the river travels north towards Potter Hill where the river becomes the boundary between Rhode Island and Connecticut. From Potter Hill, the River travels southwest in a semi-circle towards downtown Westerly, RI and Pawcatuck, CT. This segment of the Pawcatuck River has less development and more agricultural land and forests upstream of its crossing with Route 78. As the River travels downstream of Route 78, the watershed becomes more urbanized and developed.

Assessment Unit Facts
(RI0008039R-18E)

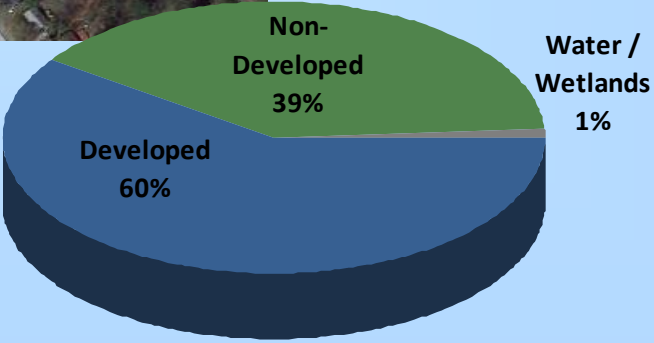
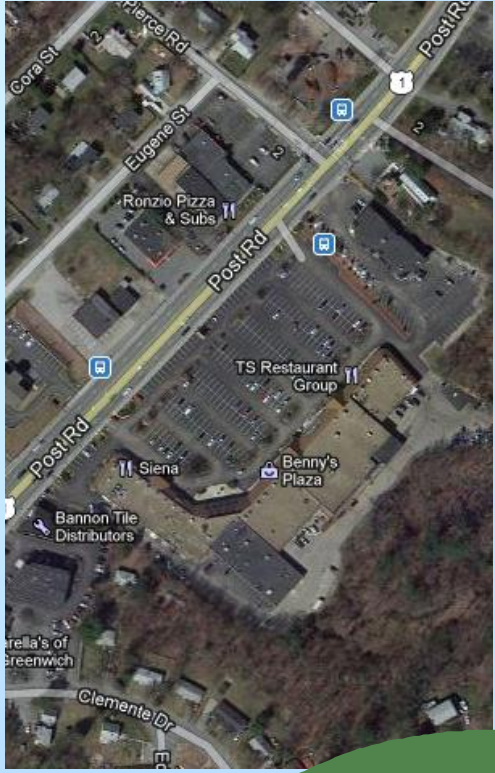
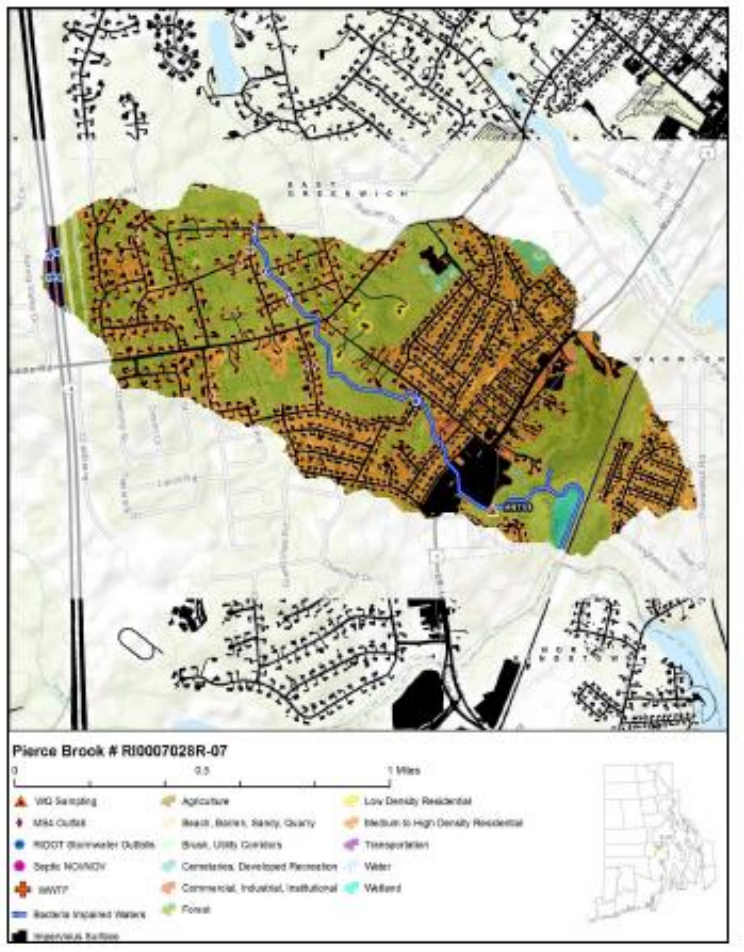
- > Towns: Hopkinton, and Westerly
- > Impaired Segment Length: 11.36 miles
- > Classification: Class B
- > Direct Watershed: 295 mi² (189,079 acres)
- > Impervious Cover: 2.9%
- > Watershed Planning Area: Pawcatuck – Pawcatuck (#23)





Watershed Land Uses

Pierce Brook



Water Quality Standards

Rhode Island uses enterococci to determine risk associated with primary and secondary contact recreation activities in all the state's fresh and salt waters.

Enterococci Criteria

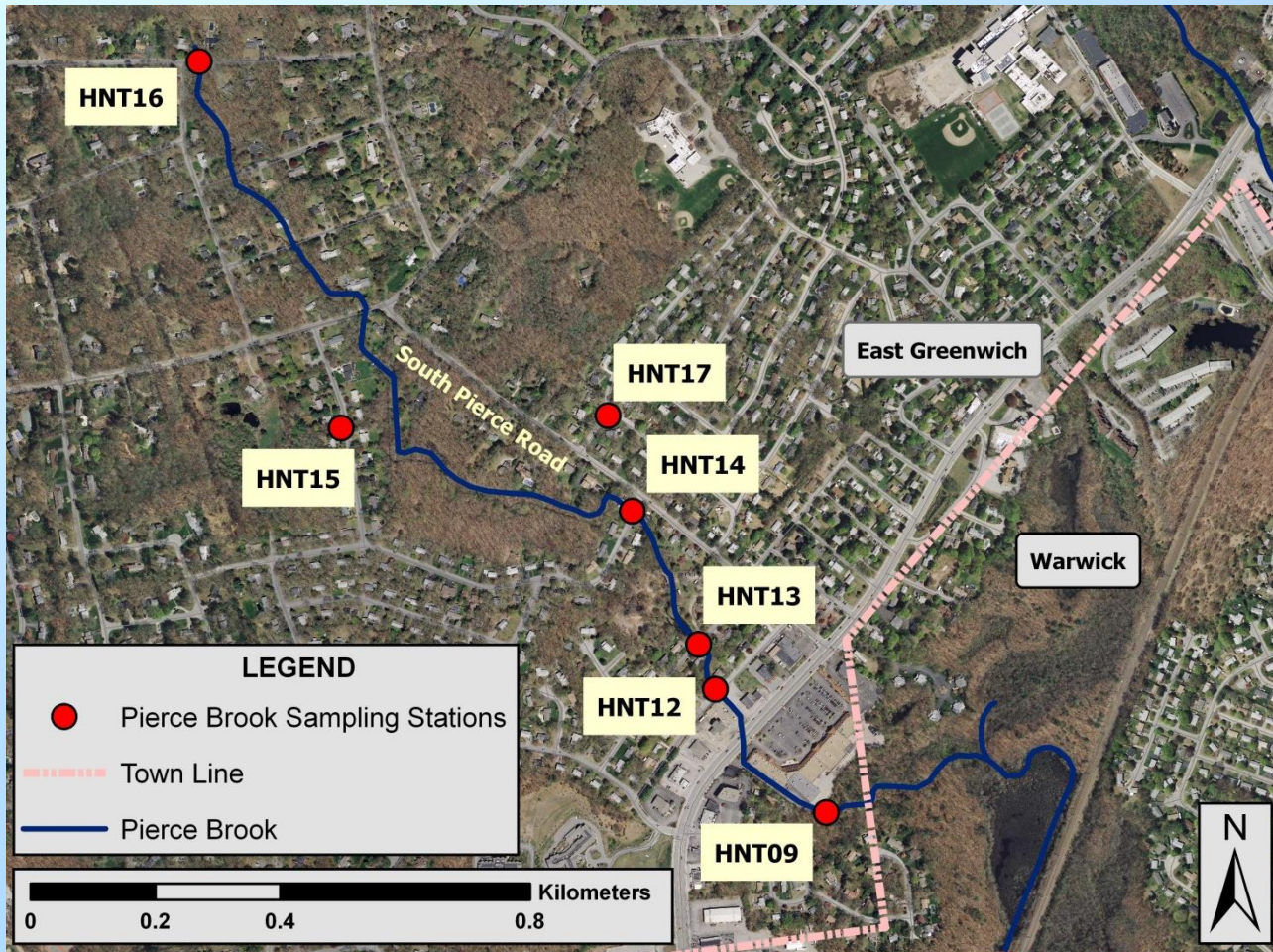
	Geometric Mean colonies/100 mL
Saltwater Class SA, SA{b}, SB, SB1	35
Freshwater Class A, B, B1	54

Data Calculations

- Geometric Mean
- Percent Reduction to Meet TMDL Target

$$\text{Percent Reduction} = \frac{\text{Geometric Mean} - \text{Criteria}}{\text{Geometric Mean}} \times 100$$

2013 Pierce Brook Monitoring



Data Calculations

Table 1: Pierce Brook Bacteria Data

Waterbody ID: RI0007028R-07

Watershed Planning Area: 6 – Hunt River

Characteristics: Freshwater, Class B, Primary and Secondary Contact Recreation, Fish and Wildlife Habitat

Impairment: Enterococci (colonies/100mL)

Water Quality Criteria for Enterococci: Geometric Mean: 54 colonies/100 mL

Percent Reduction to meet TMDL: **95.8% (Include 5% Margin of Safety)**

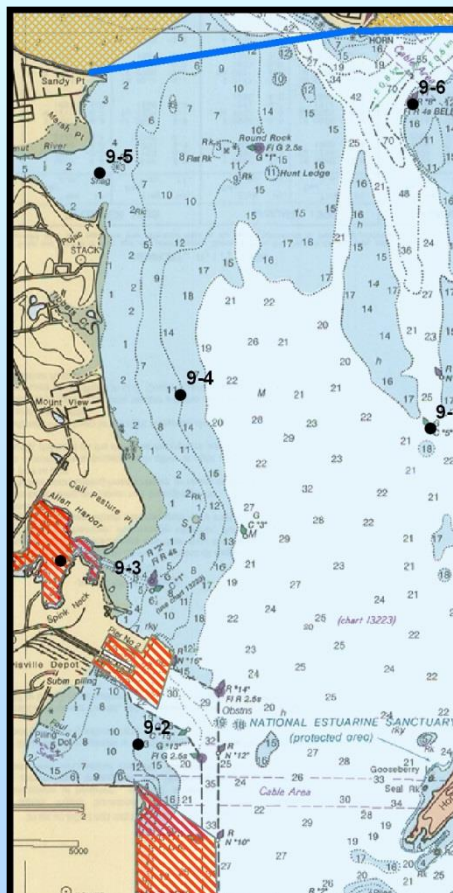
Data: 2012 and 2013 from RIDEM

Single Sample Enterococci (colonies/100 mL) Results for Pierce Brook (2012) with Geometric Mean Statistics

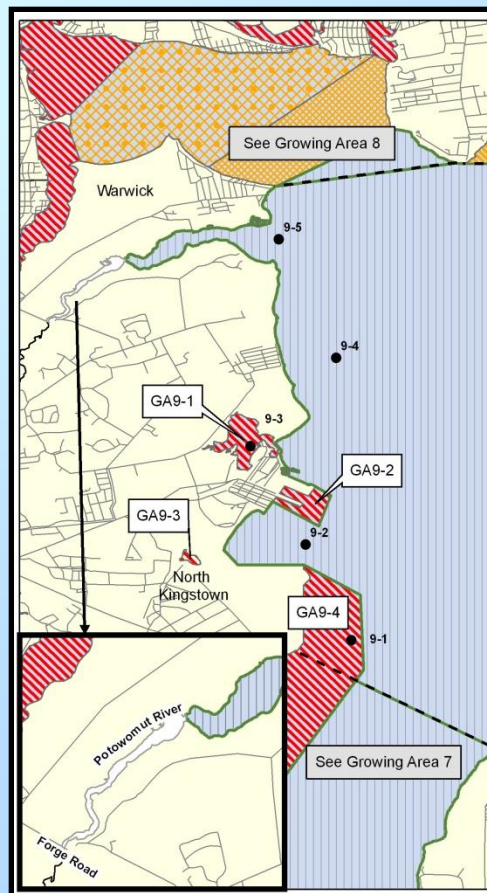
Station Name	Station Location	Date	Result	Wet/Dry	Geometric Mean
HNT09	Pierce Brook Downstream of Post Rd (Rte 1)	10/15/13	119	DRY	588.7
HNT09	Pierce Brook Downstream of Post Rd (Rte 1)	08/01/13	2420	DRY	
HNT09	Pierce Brook Downstream of Post Rd (Rte 1)	07/05/13	1300	DRY	
HNT09	Pierce Brook Downstream of Post Rd (Rte 1)	12/13/12	89.2	DRY	
HNT09	Pierce Brook Downstream of Post Rd (Rte 1)	11/20/12	120	DRY	
HNT09	Pierce Brook Downstream of Post Rd (Rte 1)	09/27/12	1990	DRY	
HNT09	Pierce Brook Downstream of Post Rd (Rte 1)	09/20/12	770	WET	
HNT09	Pierce Brook Downstream of Post Rd (Rte 1)	09/11/12	461	DRY	
HNT09	Pierce Brook Downstream of Post Rd (Rte 1)	06/26/12	2430	WET	
HNT09	Pierce Brook Downstream of Post Rd (Rte 1)	06/12/12	727	DRY	

Shaded cells indicate an exceedance of water quality criteria. Value in red was reported as greater than the detection limit. For the purpose of mathematical calculations, the value was increased one significant number (NSSP, 2007).

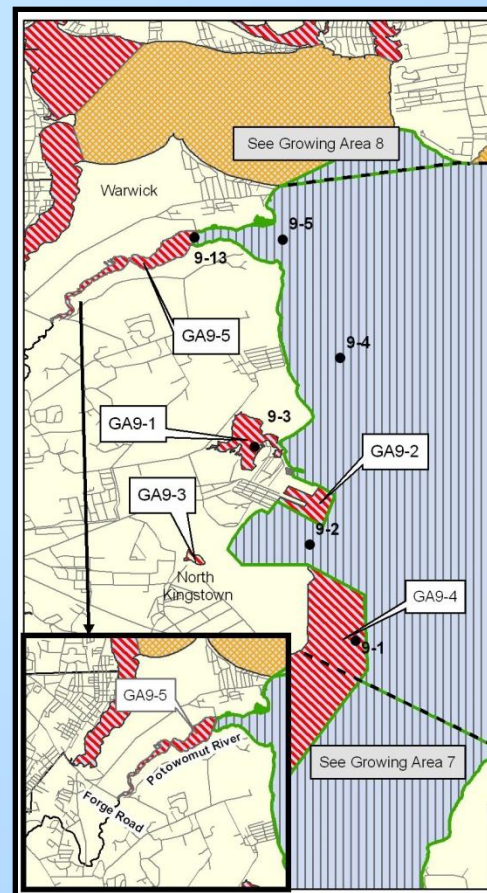
Potowomut River - Shellfish Closure Lines



May 2006 – May 2007

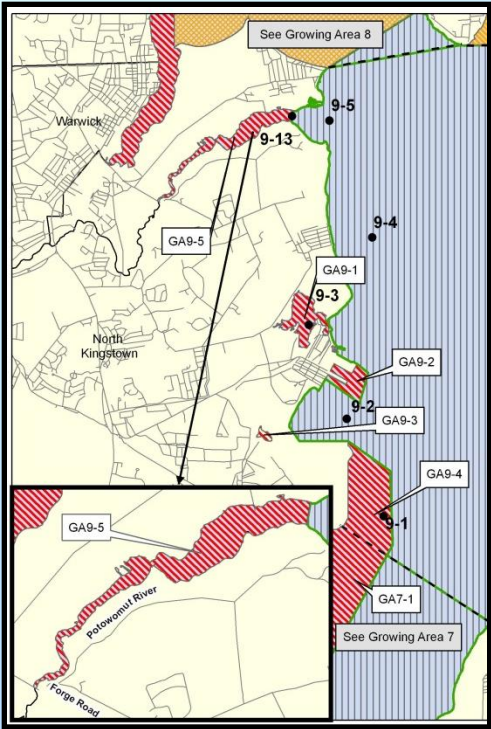


May 2007 – May 2008

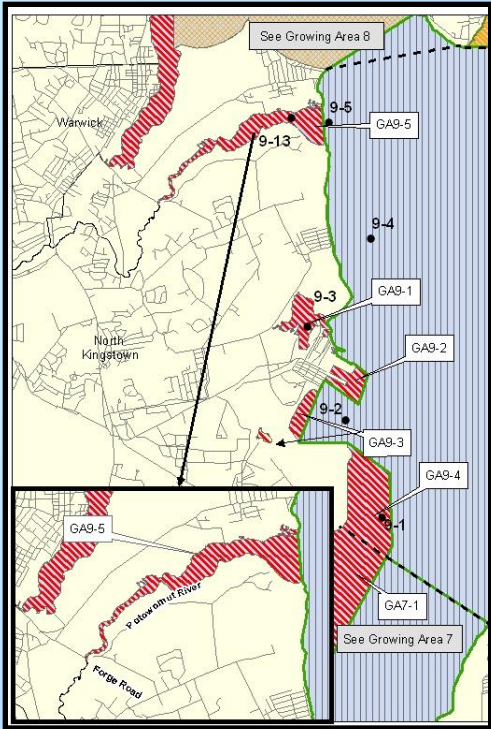


May 2009 – May 2010

Potowomut River - Shellfish Closure Lines

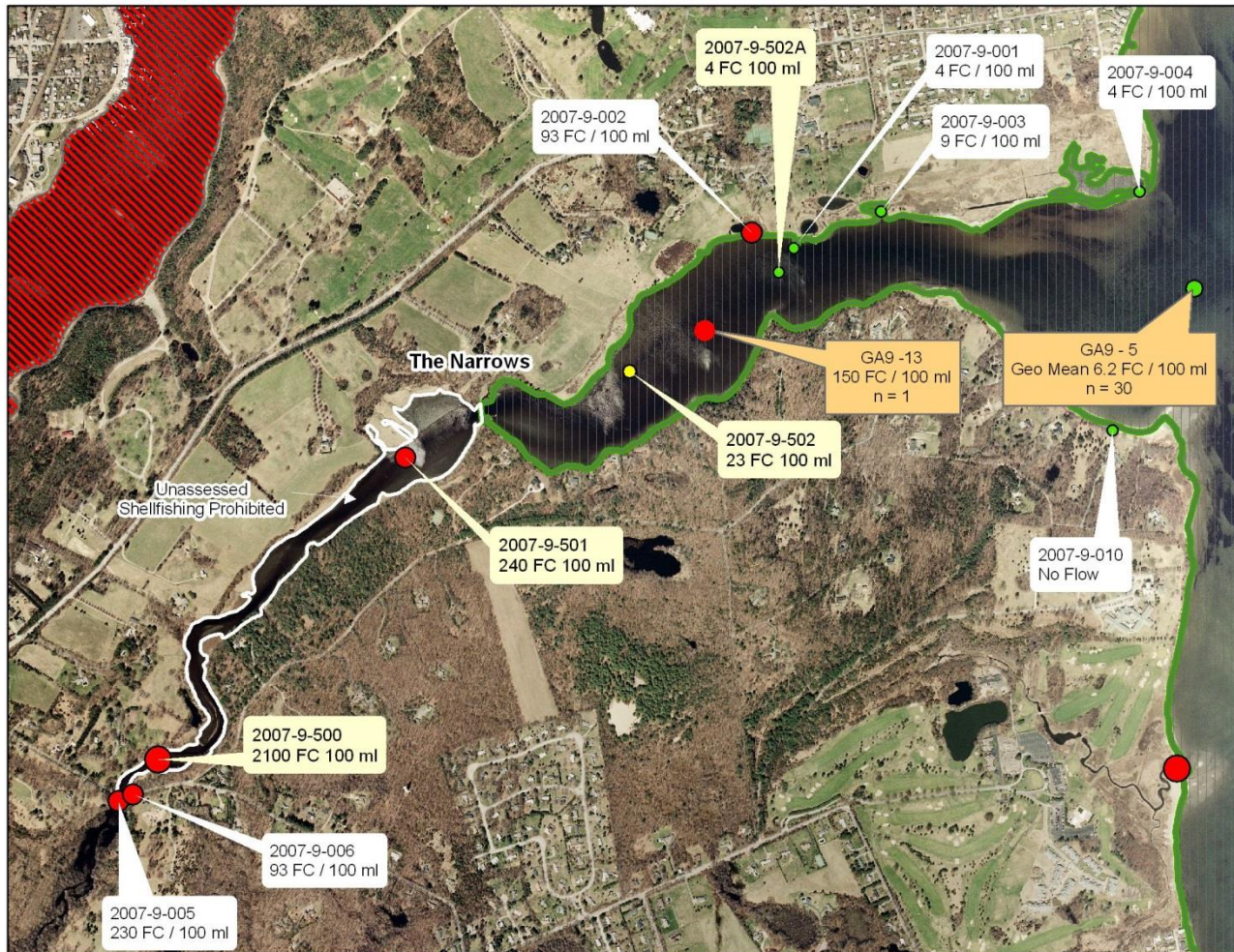


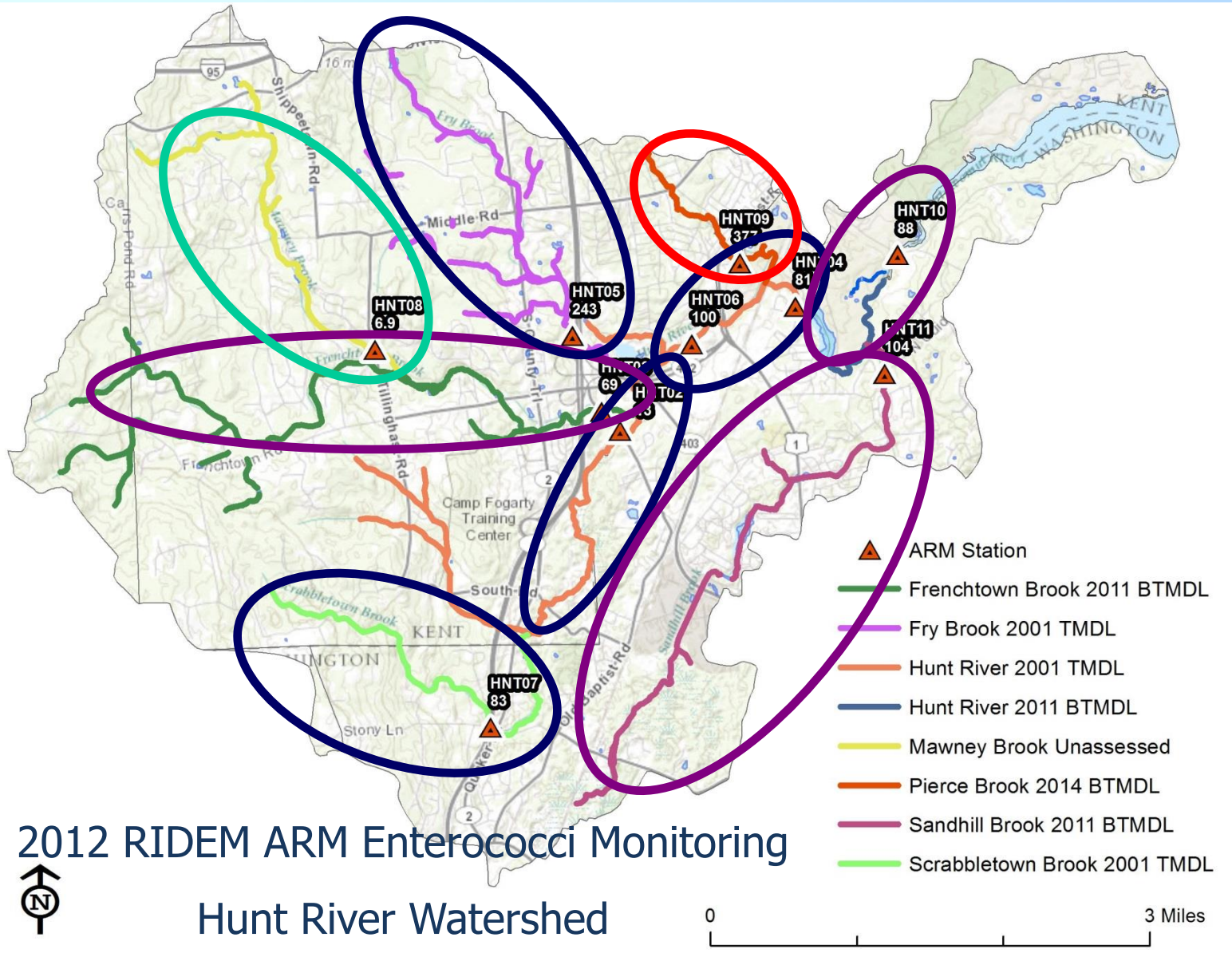
May 2010 – May 2011



May 2011 – Present

Potowomut River Bacteria Source Investigation





Bacteria Sources

Hunt River Headwaters



Fry Brook



Scrabbletown Brook
Sandhill Brook
Frenchtown Brook
Fry Brook

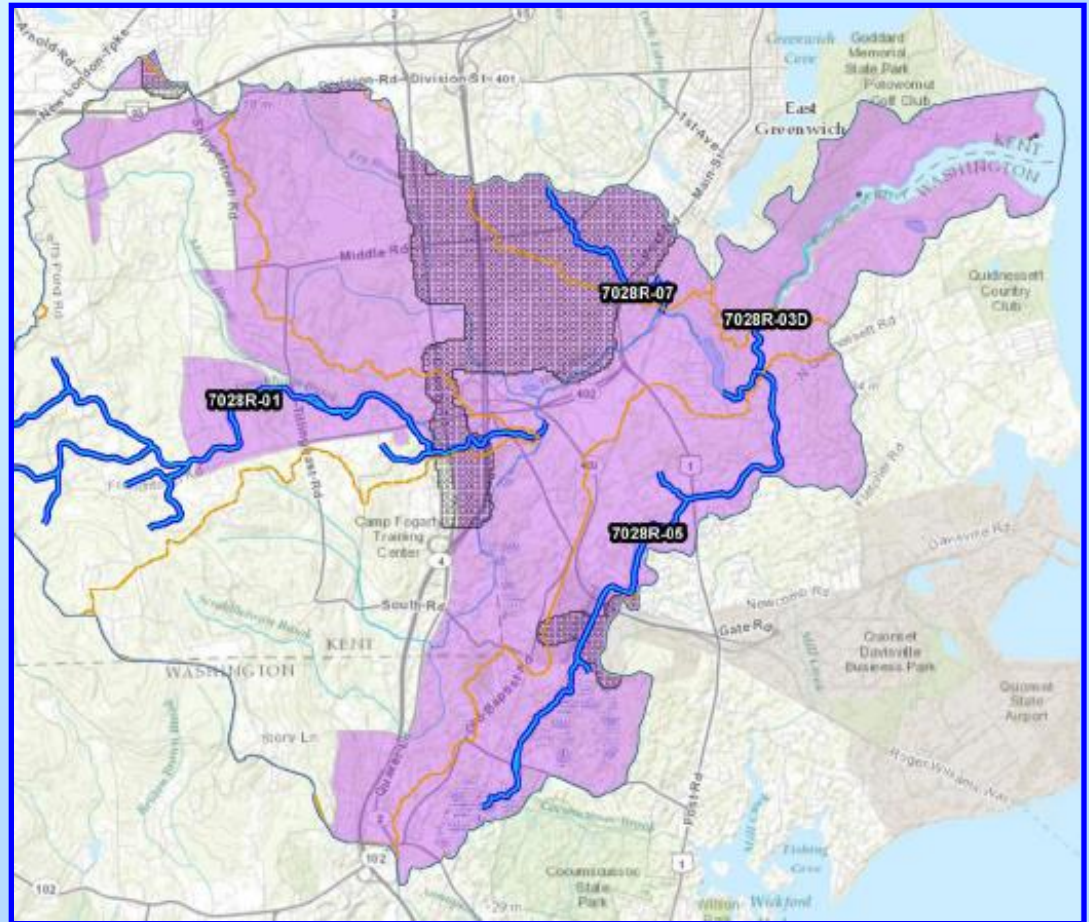
Scrabbletown Brook



Entire Watershed

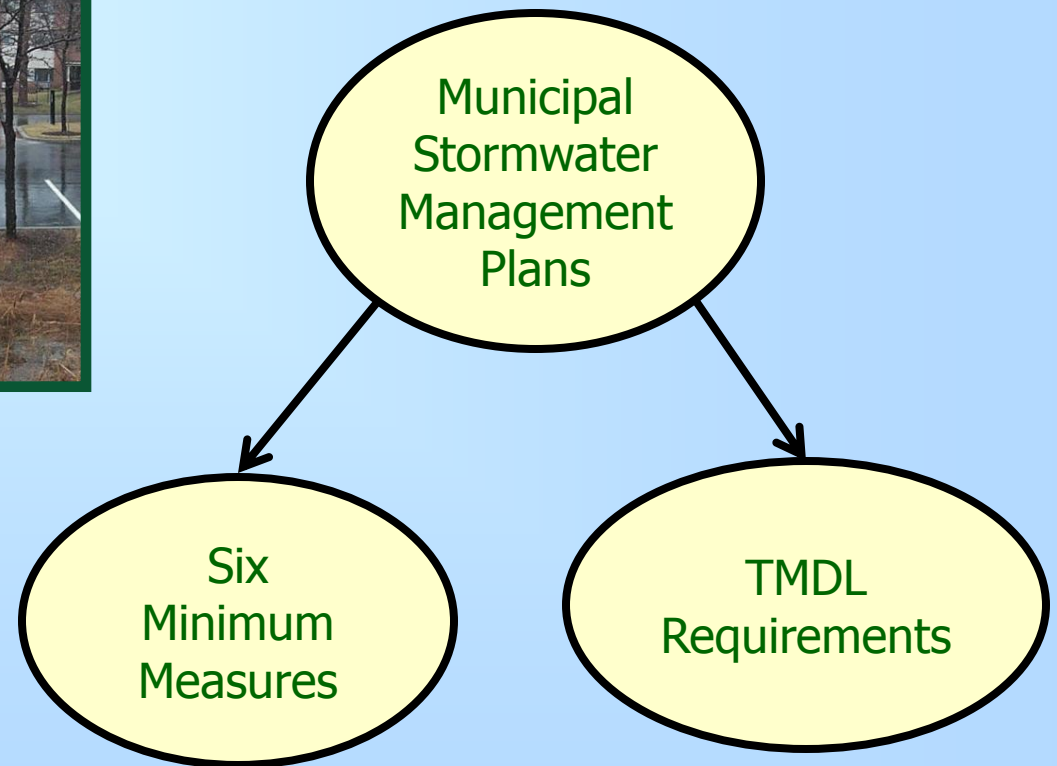


Wastewater



Stormwater

Entire Watershed



Municipal Stormwater Management Plans

Six Minimum Measures

Public Education



Public Involvement

Pipe from Dishwashing Station



Illicit Discharge

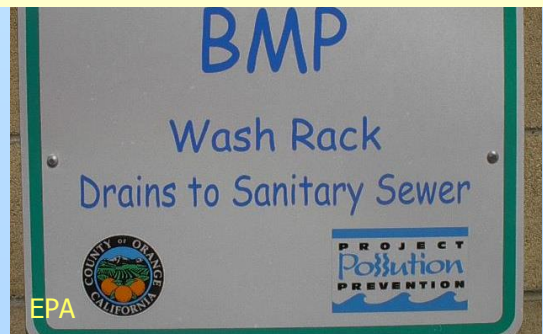
Construction



Good Housekeeping



Post Construction



Municipal Stormwater Management Plans Statewide Bacteria TMDL Requirements

- <10% Impervious Cover
 - Unless watershed-specific information, bacteria impairments assumed caused by sources other than urban stormwater
 - No change to Phase II Permit Requirements
- Between 10% and 15% Impervious Cover
 - Revise post-construction ordinances
- >15% Impervious Cover
 - Revise post-construction ordinances
 - Evaluate the sufficiency of the minimum measures
- Structural BMP Requirements
 - Determined on a case-by-case basis, generally where specific information identifies significant sources or where previous TMDL has required structural BMPs.

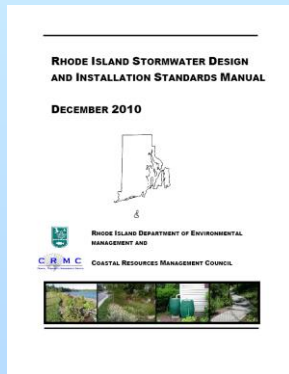


Municipal Stormwater Management Plans TMDL Requirements

Pierce Brook, Hunt River (3D), Sandhill Brook

Revise Stormwater Management Program Plan (SWMPP) in
a TMDL Implementation Plan (TMDL IP).

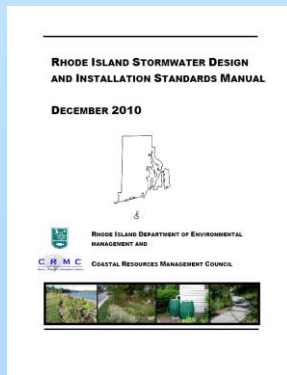
- Revise local ordinances to require:
 - new development sites to use stormwater controls to prevent **any net increase** in bacteria
 - re-development sites to use stormwater controls to reduce bacteria to the **maximum extent feasible**
- Use of LID (Low Impact Development) techniques wherever feasible
- Evaluate the sufficiency of the minimum measures



Municipal Stormwater Management Plans TMDL Requirements

Hunt River (3A), Hunt River (3B), Hunt River (3C),
Scrabbletown Brook, Fry Brook

- TMDLs Approved in 2001 before Municipal Stormwater Permits were Required.
- Revise Minimum Measures
- Structural BMPs





Public Comment Period Ends June 20, 2014

DEM TMDL Program Website

<http://www.dem.ri.gov/programs/benviron/water/quality/rest/index.htm>

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