Pawcatuck River Watershed Bacteria TMDLs

Heidi Travers - RI DEM
Chris Sullivan – CT DEEP
Overview of Presentation

• Introduction to the Statewide Bacteria TMDLs
  – Heidi Travers, RIDEM

• Rhode Island Wood-Pawcatuck Rivers Watershed Statewide Bacteria TMDL Updates
  – Heidi Travers, RIDEM

• Connecticut Pawcatuck River Watershed Bacteria TMDL
  – Chris Sullivan, CT DEEP
Water Quality Management Framework

**Problem Identification**
- Assign Water Quality Standards to Each Waterbody
- Monitor and Assess each Waterbody
- List Impaired Waters (Using all Existing and Readily Available Data)

**Problem Solving**
- Develop TMDL (or Equivalent), Determine Allowable Loading, and Allocate Loading Reductions Needed
  - Point Sources (RIPDES facilities and storm water permits)
  - Nonpoint Sources (BMPs, Technical Assistance, Grants, Loans, etc.)
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 its sources.

• TMDL studies are both waterbody and pollutant specific.
New England Statewide Bacteria TMDL Documents
Statewide Bacteria TMDL Components

• Core Document
  – Explanation of state water quality standards
  – Description of point and nonpoint pollution sources
  – Details of bacteria TMDL development
  – Guidance for implementation efforts

• Individual waterbody-specific summaries
RI Statewide Bacteria TMDL
57 Waterbody Segments - 2011

RI Statewide Bacteria TMDL Updates
6 Waterbody Segments - 2014
Study Approach

Use State Water Quality Standards to Set Limits for Pollutant

Measure or Evaluate Current Water Quality Targets and Identify Pollutant Sources

Calculate the Percent Reductions Needed to Meet Water Quality Standards

Establish Mitigation Methods to Meet Target Reductions

Monitor Water Quality to Ensure that Goals are Met
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. Other states, including Connecticut and Massachusetts use *e-coli* for freshwaters and enterococci for salt waters.

### Enterococci Criteria

<table>
<thead>
<tr>
<th></th>
<th>Geometric Mean colonies/100 mL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Saltwater</strong></td>
<td></td>
</tr>
<tr>
<td>Class SA, SA{b}, SB, SB1</td>
<td>35</td>
</tr>
<tr>
<td><strong>Freshwater</strong></td>
<td></td>
</tr>
<tr>
<td>Class A, B, B1</td>
<td>54</td>
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</tbody>
</table>
Waterbody Summary 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
Information Used to Develop the Waterbody Summaries

- Maps
- Municipal Stormwater Management Plans and MS4 Annual Reports
- Municipal Onsite Wastewater Management Plans
- Municipal Wastewater Facilities Plans
- Municipal Websites
- Existing TMDLs
- Water Quality Data
## 2014 Updates Data Sources

<table>
<thead>
<tr>
<th>Title</th>
<th>Primary Organization</th>
<th>Date of Study</th>
</tr>
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<tbody>
<tr>
<td>Ambient River Monitoring (ARM) Program</td>
<td>Rhode Island Department of Environment Management, Office of Water Resources</td>
<td>Ongoing</td>
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<tr>
<td>TMDL Program</td>
<td>Rhode Island Department of Environment Management, Office of Water Resources</td>
<td>As Needed</td>
</tr>
<tr>
<td>Freshwater Pawcatuck River and Tributary Monitoring</td>
<td>Connecticut Department of Energy and Environmental Protection</td>
<td>2011</td>
</tr>
<tr>
<td>TMDL Analysis for the Pawcatuck River and Little Narragansett Bay Waters: Bacteria Impairments</td>
<td>Rhode Island Department of Environment Management, Office of Water Resources</td>
<td>2010</td>
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</table>
2011 Freshwater Pawcatuck River and Tributaries Monitoring
Data Calculations

- Geometric Mean
- Percent Reduction to Meet TMDL Target

<table>
<thead>
<tr>
<th>Station Name</th>
<th>Station Location</th>
<th>Date</th>
<th>Result</th>
<th>Wet/Dry</th>
<th>Geometric Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAW11</td>
<td>Mile Brook at Nooseneck Hill Road (Rt 3)</td>
<td>10/27/2006</td>
<td>1</td>
<td>Dry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>near Maxson St, Hopkinton</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAW11</td>
<td>Mile Brook at Nooseneck Hill Road (Rt 3)</td>
<td>8/9/2006</td>
<td>410</td>
<td>Dry</td>
<td>58 (12%)*</td>
</tr>
<tr>
<td></td>
<td>near Maxson St, Hopkinton</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAW11</td>
<td>Mile Brook at Nooseneck Hill Road (Rt 3)</td>
<td>5/31/2006</td>
<td>170</td>
<td>Dry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>near Maxson St, Hopkinton</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAW11</td>
<td>Mile Brook at Nooseneck Hill Road (Rt 3)</td>
<td>9/21/2005</td>
<td>160</td>
<td>Dry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>near Maxson St, Hopkinton</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Shaded cells indicate an exceedance of water quality criteria

*Includes 5% Margin of Safety
## Data Calculations

- Wet/Dry Analysis

### Wet and Dry Weather Geometric Mean Enterococci Values for Station PAW11

<table>
<thead>
<tr>
<th>Station Name</th>
<th>Station Location</th>
<th>Years Sampled</th>
<th>Number of Samples</th>
<th>Geometric Mean</th>
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</thead>
<tbody>
<tr>
<td>PAW11</td>
<td>Mile Brook at Nooseneck Hill Road (Rt 3) near Maxson St, Hopkinton</td>
<td>2005-2006</td>
<td>0 Dry 4</td>
<td>58 NA 58</td>
</tr>
</tbody>
</table>

Shaded cells indicate an exceedance of water quality criteria
Weather condition determined from rain gage at URI in Kingston, RI
## 2014 RI Statewide Bacteria TMDL Updates

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

Non-Developed (87%)

Water/Wetlands (3%)

Agriculture (5%)

Developed (5%)
Baker Brook

- Non-Developed (88%)
- Agriculture (2%)
- Other (1%)
- Developed (9%)

Google Maps
RIDEM Pawcatuck River Segment 18D – Bradford Dye to Route 3
Pawcatuck River (18E)

Non-Developed: 79%
Water/Wetlands: 5%
Agriculture: 7%
Developed: 9%

RIDEM Pawcatuck River Segment 18E – Route 3 to Route 1
Spring Brook

Water / Wetlands: 1%
Non-Developed: 56%
Developed: 37%
Agriculture: 6%
Actual and Potential Bacteria Sources
Recommended Pollution Reduction Strategies

• Stormwater Management
  – Municipal Stormwater Management Program Plans (SWMPP)

• Wastewater Management
  – On-site Wastewater Treatment Systems
  – Sewer Infrastructure

• Animal Waste Control

• Land Use Protection
Municipal Stormwater Management Plans
Minimum Measures

- Public education and outreach program
- Public involvement/participation program
- Illicit discharge detection and elimination program
- Construction site stormwater runoff control program for sites disturbing 1 or more acres
- Post-construction stormwater runoff control program for new and re-development disturbing 1 or more acres
- Pollution prevention and good housekeeping program
Municipal Stormwater Management Plans
Requirements for Improving Pollution Control

- **<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

Additional Requirements

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
Pawcatuck River (18E) Implementation: Stormwater

- Impervious Cover is <10% **BUT** developed area is adjacent to River segment and 2010 TMDL identified as a wet weather source
- Partial watershed regulated under the Phase II Program
- Modify Six Minimum Measures to incorporate TMDL recommendations.
  - 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
Pawcatuck River (18E) Implementation: Wastewater

• Watershed is a mix of sewered areas and On-Site Wastewater Treatment Systems.

• On-Site Wastewater Treatment Systems (OWTS)
  – Enforceable mechanisms to ensure the proper operation and maintenance of OWTS in parts of the watershed without sewers.
  – Detailed Property Records
  – Identify and replace sub-standard systems through inspections

• Sewer Infrastructure
  – Continue with inspections and other actions to prevent leaks and overflows
Animal Waste Control

• Domestic Pets
  – Dispose waste away from waters and storm drains
  – Identify problem areas and install signage and receptacles

• Farms
  – Restrict access to wetlands and streams
  – Establish vegetative buffers
  – Use proper animal waste handling, disposal, and storage practices
  – Develop conservation plans.
Animal Waste Control

• Waterfowl
  – Install and maintain vegetative buffers to reduce desirability of natural habitat for waterfowl.
  – Prevent feeding by humans.
  – Develop education programs that emphasize that feeding waterfowl can be harmful to waterfowl, humans, and the environment.
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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