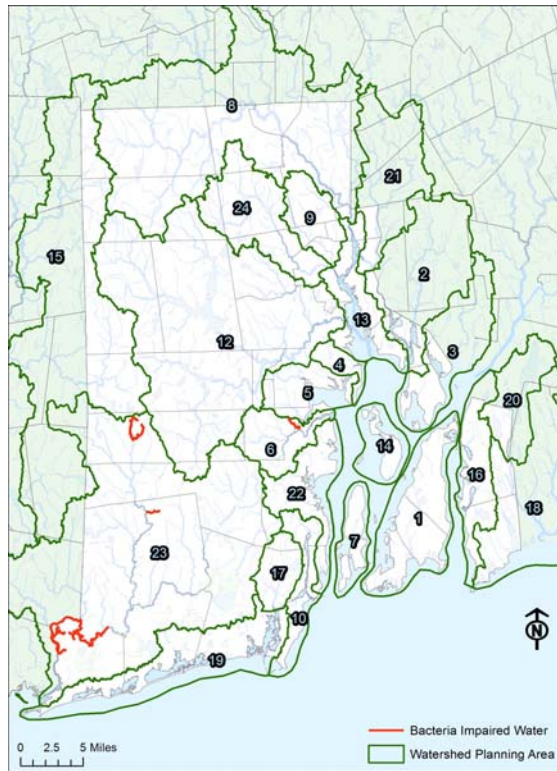


Updates to the Rhode Island Statewide Total Maximum Daily Load (TMDL) for Bacteria Impaired Waters



**Final Report
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1.0 Introduction

1.1 Overview of 303(d) List and TMDLs

Section 303(d) of the Federal Clean Water Act and Federal Water Quality Planning and Management Regulations (40 CFR Part 130) require states to place waterbodies that do not meet established water quality standards on a list of impaired waterbodies, commonly referred to as the ‘303(d) List.’ In Rhode Island, the Department of Environmental Management (RIDEM) is responsible for the 303(d) listing process. The 303(d) List is updated and issued for public comment every two years with the final list submitted to the United States Environmental Protection Agency (USEPA) for final approval. Surface waters placed on the 303(d) List have one or more designated uses impaired by one or more pollutants and require a Total Maximum Daily Load (TMDL) study for each pollutant causing an impairment (RIDEM, 2009). EPA approved the RIDEM 2012 303(d) List on September 27, 2012.

A TMDL establishes the allowable contributions for specific pollutants that a waterbody can receive without exceeding water quality standards (USEPA, 2001). Water quality standards include numeric and narrative criteria that must be met to protect the designated uses of the surface water, described in greater detail below. The TMDL process maps a course for states, municipalities, private landowners, and other stakeholders to follow an iterative process leading to the ultimate restoration of the impaired water and its uses.

1.2 Purpose of this Report

On September 22, 2011, RIDEM received approval from the USEPA for a Statewide Total Maximum Daily Load (TMDL) for Bacteria Impaired Waters (2011). Bacterial contamination of surface waters may result from a variety of sources including waste from humans via failing onsite wastewater treatment systems or malfunctioning sewer infrastructure, farm animals, waterfowl, wildlife, and domestic pets. In coastal systems, illicit discharges from boat waste can also be a concern. Bacterial contamination can degrade aquatic ecosystems and negatively affect public health, and may ultimately result in closures of shellfish beds, beaches, and drinking water supplies (MADEP, 2007).

The 2011 Statewide Bacteria TMDL report established the allowable bacterial contributions for Rhode Island’s surface waters, provided documentation of impairment, and specified the pollutant reductions needed to meet water quality standards. The goal of these TMDLs is

attainment of water quality standards. The Statewide Bacteria TMDL addressed 57 bacteria impaired surface water segments that were on the 2010 303(d) List of Impaired Waters. Since 2011, RIDEM has collected additional data on several waterbodies and identified additional bacteria impaired waters on the 2012 303(d) list.

The purpose of this document is to provide TMDLs for six bacteria impaired waterbodies on the 2012 303(d) list. This update is organized by watershed planning area (WPA). RIDEM has established 24 WPAs that include all of the Rhode Island and some hydrologically-connected parts of Massachusetts and Connecticut. Figure 1-1 provides a map of Rhode Island with WPAs indicated by number and outlined with green boundaries. The figure also illustrates the locations of bacteria impaired segments addressed by this update, shown as red lines. A list of Rhode Island’s WPAs is provided in Table 1-1, along with a compilation of bacteria impaired segments in each WPA. As shown in Table 1-1, the impaired segments covered by this TMDL Update are spread among 2 of the 24 planning areas in Rhode Island, with five segments situated in Wood-Pawcatuck Rivers WPA and one segment in the Hunt River WPA. A complete list of waterbodies is provided in Table 1-2. Table 1-2 provides the impaired waterbody name, waterbody identification number (WBID#), water use classification, town(s), and specific indicator bacteria used for each impaired segment. All of the impaired segments in this update are fresh waterbodies.

Table 1-1: Number of Impaired Segments per Watershed Planning Area (WPA)

WPA ID	WPA Name	Number of Impaired Segments	WPA ID	WPA Name	Number of Impaired Segments
1	Aquidneck Island	0	13	Providence-Seekonk Rivers	0
2	Barrington-Palmer-Warren Rivers	0	14	Prudence Island	0
3	Bristol-Kickemuit River	0	15	Quinebaug River	0
4	Buckeye Brook	0	16	Sakonnet-East	0
5	Greenwich Bay	0	17	Saugatucket River	0
6	Hunt River	1	18	Southeast Coastal	0
7	Jamestown	0	19	Southwest Coastal	0
8	Branch-Blackstone Rivers	0	20	Stafford Pond	0
9	Moshassuck River	0	21	Ten Mile	0
10	Narrow River	0	22	West Passage	0
11	New Shoreham-Block Island	0	23	Wood-Pawcatuck Rivers	5
12	Pawtuxet River	0	24	Woonasquatucket River	0

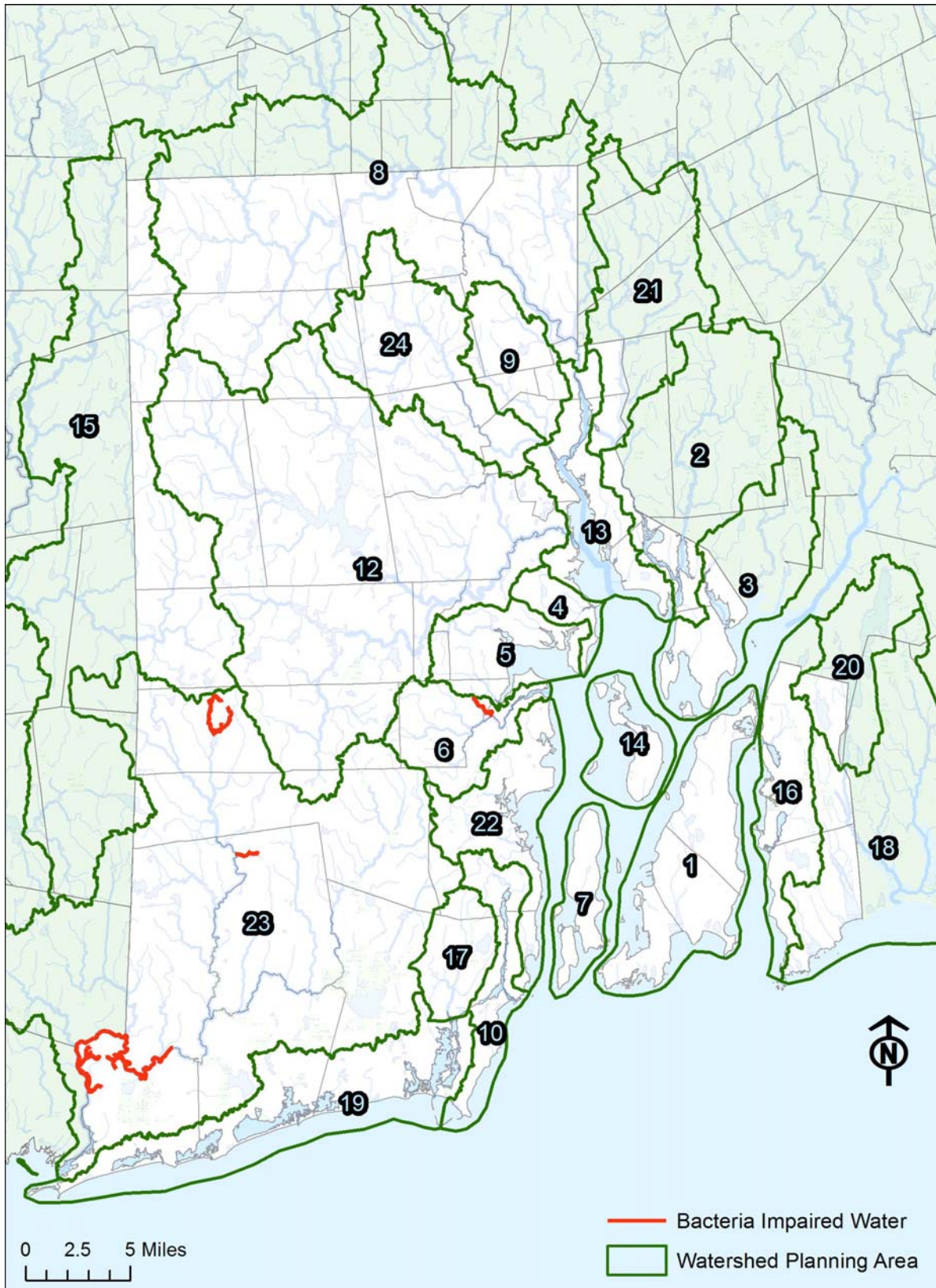


Figure 1-1: Rhode Island Watershed Planning Areas with Bacteria Impaired Waters

Table 1-2: Bacteria Impaired Segments Included in the Statewide Bacteria TMDL Update

Waterbody Name	Waterbody ID	Class	Towns	Impairment
WPA 6: Hunt River				
Pierce Brook	RI0007028R-07	B	East Greenwich, Warwick	Enterococci
WPA 23: Wood-Pawcatuck Rivers				
Pawcatuck River	RI0008039R-18D	B1	Hopkinton, Westerly	Enterococci
Pawcatuck River	RI0008039R-18E	B	Hopkinton, Westerly	Enterococci
Spring Brook	RI0008039R-41	B	Westerly	Enterococci
Acid Factory Brook	RI0008040R-01	A	West Greenwich	Enterococci
Baker Brook	RI0008040R-18	B	Richmond	Enterococci

1.3 Where to Find TMDL Information for the 6 Impaired Waterbodies

This report for six bacteria TMDLs serves as an extension of the approved Statewide Bacteria TMDL. It relies, in part, on portions of the 2011 Statewide Bacteria TMDL to satisfy federal TMDL requirements. A list of the various TMDL elements and where they are addressed is provided in Table 1-2.

Table 1-2: Where to Find Information for Each TMDL Element

TMDL Element	Location
<p>Water Quality Standards for Bacteria - Includes an overview of potential pathogenic impacts of bacteria; the selection of indicator bacteria to assess pathogen levels in waterbodies; and a brief summary of Rhode Island bacteria standards for surface waters.</p>	<p>Statewide Bacteria TMDL - Section 2</p>
<p>Bacteria Pollution Sources - Defines point and non-point sources of bacteria pollution and provides examples of bacteria sources that affect Rhode Island’s waterbodies</p>	<p>Statewide Bacteria TMDL - Section 3</p>
<p>Bacteria Impaired Waters - Provides a brief introduction to bacteria impaired waters in Rhode Island (based on the <i>2008 303(d) List</i>). This section also includes an overview of the 303(d) listing process; a summary of agencies that collect bacteria data in Rhode Island; and, a description of the TMDL prioritization process.</p>	<p>Statewide Bacteria TMDL - Section 4</p>
<p>TMDL Development - Provides a description of the TMDL calculation process including the key required elements for TMDL development and includes concentration-based TMDLs and associated wasteload and load allocations for freshwaters (primary contact recreation) and tidal waters (primary contact recreation and shellfish consumption). The TMDL goal is set to the water quality criteria.</p>	<p>Statewide Bacteria TMDL - Section 5</p>
<p>Implementation Plan - Provides a description of the implementation process, including coordination with local stakeholders and development of watershed based plans, and a menu of mitigative actions (organized by type of source) to reduce bacteria loadings.</p>	<p>Statewide Bacteria TMDL - Section 6</p>
<p>Funding and Community Resources - Provides a description of funding sources available to address impaired waters in Rhode Island.</p>	<p>Statewide Bacteria TMDL - Section 7</p>
<p>Watershed-Specific Bacteria Data Summaries, Reductions, and Implementation - Organized by Watershed Planning Area, this section and the appendices include available bacteria data, reductions needed for each impaired segment, and GIS maps of watersheds and land cover.</p>	<p>This document - Section 2 and Appendix B and Appendix K</p>
<p>Public Participation - Includes a review of the process used to solicit public comment and DES’ response to comments.</p>	<p>This document - Section 3</p>
<p>TMDL Expressed as a Daily Load</p>	<p>Statewide Bacteria TMDL - Appendix M</p>

2.0 Watershed-Specific Bacteria Data Summaries and Reduction Estimates

This section provides an overview of Rhode Island’s Watershed Planning Areas (WPAs) and its bacteria impaired segments. The specific reductions required for each of the six impaired segments are presented.

2.1. Bacteria Impaired Segments

A list of the six bacteria impaired segments included in this update to the Statewide Bacteria TMDL is provided in Table 2-1. Table 2-1 provides the waterbody name, ID, the endpoint needed to meet criteria and the required percent reduction. All of the impaired segments in this are fresh waterbodies that are impaired for enterococci bacteria.

Table 2-1: Summary of Estimate Percent Reductions for Bacteria Impaired Segments

Waterbody Name	Waterbody ID	Class	Impairment	Geometric Mean TMDL Endpoint*†	Percent Reduction Needed to meet TMDL Endpoint^
WPA 6: Hunt River					
Pierce Brook	RI0007028R-07	B	Enterococci	54	96%
WPA 23: Wood – Pawcatuck Rivers					
Pawcatuck River	RI0008039R-18D	B1	Enterococci	54	26%
Pawcatuck River	RI0008039R-18E	B	Enterococci	54	83%
Spring Brook	RI0008039R-41	B	Enterococci	54	99%
Acid Factory Brook	RI0008040R-01	A	Enterococci	54	56%
Baker Brook	RI0008040R-18	B	Enterococci	54	45%
*Enterococci (colonies/100 mL)					
† TMDL endpoint is set to the water quality standard					
^ Includes Margin of Safety					

2.2 Watershed-Specific Bacteria Data Summaries

Appendices A through L of the Statewide Bacteria TMDL were organized by WPA. Each of the appendices provided bacteria data and information for each of the impaired segments. The following two Appendices will be updated with specific information concerning the six impaired waterbodies included in this update.

Appendix B - WPA 6: Hunt River

Appendix K – WPA 23: Wood – Pawcatuck

Each appendix contains segment-specific summaries for all of the bacteria impaired segments in that WPA.

Each segment-specific summary provides the following information:

- A description of the watershed for each impaired segment (size, location, and major features) and an overview of available information related to bacteria;
- A watershed map showing the locations of impaired segments and the land area draining to the impaired segment (i.e., the watershed);
- A land cover map showing land cover types within the watershed; and
- Data tables with recent (within 10 years) bacteria data for each impaired segment, with geometric mean and 90th percentile calculations (as appropriate) and reductions needed to meet water quality standards.

3.0 Public Participation

USEPA regulations require that calculations to establish TMDLs be subject to public review (40 CFR 130.7 (c) (ii)). In May 2014, RIDEM hosted two public meetings to present the draft updates to the Rhode Island Statewide TMDL for Bacteria Impaired Waters for public review and comment. Presentations included information about the development of the core document and appendices, data sources and calculations, and the implementation requirements of the TMDL. The first meeting was held on May 14, 2014 at the Westerly Public Library in Westerly, RI, and the second meeting was held on May 29, 2014 at the East Greenwich Police Station in East Greenwich, RI. Approximately twenty people representing the general public and the following organizations attended the meetings:

- Audubon Society
- CUSH (Clean-up Stonington Harbor)
- North End Community Development, Inc.
- Town of East Greenwich
- Town of North Kingstown
- Town of West Greenwich
- Town of Westerly
- Rhode Island Water Resources Board
- Save the Bay
- Watch Hill Conservancy
- Westerly Sun
- Wood-Pawcatuck Watershed Association

The public meetings began the public comment period, which ended on Friday, June 20, 2014. Letters were sent by email to key stakeholders in advance of this meeting. In addition, the meeting was publicized in a press release and public notices, which were posted at the RIDEM offices and at the Westerly and East Greenwich Libraries. RIDEM posted the draft TMDL on its website more than two weeks before the public meeting. RIDEM received comments from Save the Bay during the public comment period. The RIDEM response to these comments is found in Appendix A. Where appropriate, the document was revised in response to comments received.

4.0 References

MADEP (2007). *Final Pathogen TMDL for the Charles River Watershed*. January, 2007. Massachusetts Department of Environmental Protection, Division of Watershed Management. CN 0156.0.

RIDEM (2009). *State of Rhode Island and Providence Plantations 2010 Consolidated Assessment and Listing Methodology for Section 305(b) and 303(d) Integrated Water Quality Monitoring and Assessment Reporting*. June, 2009. Rhode Island Department of Environmental Management.

RIDEM (2011). *Rhode Island Statewide Total Maximum Daily Load (TMDL) for Bacteria Impaired Waters*. September 2011. Rhode Island Department of Environmental Management.

USEPA (2001). *Protocol for Developing Pathogen TMDLs*. January 2001. United States Environmental Protection Agency. EPA 841-R-00-002.

Appendix A Response to Comments Received During the Public Comment Period

The following comments were received by RIDEM during the public comment period for the 2014 Updates to the 2011 Rhode Island Statewide Bacteria Total Maximum Daily Load (TMDL). The complete text of all comments received is on file in the Office of Water Resources at DEM.

Save the Bay David Prescott, South County Coastkeeper (letter sent by email June, 2014)

Save the Bay Comment 1

We agree with your recommendation that further sampling needs to be conducted to identify sources of bacteria within the freshwater segments. We recommend trying to sample more often during wet weather events (as well as the normal dry weather events) to fill in this data gap. We suggest that in addition to this sampling, potential testing for pharmaceuticals, personal care products, etc., could be helpful in identifying illicit discharges.

RIDEM Response

We concur with your recommendations. Our current budget limits the extent of targeted monitoring that we can undertake above and beyond our baseline monitoring efforts. We continue to look for opportunities to partner with other organizations and/or municipalities.

Save the Bay Comment 2

More effort needs to be placed on local municipalities and the state to address the persistent problem with waterfowl. Significant progress over the past several years has been made on both sides of the river in terms of the population of swans and Canada geese. We continue to suggest that a waterfowl management plan should be developed by both state agencies and both neighboring towns in order to reduce this population. Guidance from the USEPA and US Fish and Wildlife will be especially important in this effort. Waterfowl, specifically swans and Canada geese, continue to have a detrimental effect on localized water quality as well as lead to the destruction of coastal habitats, such as salt marshes and coastal buffers.

RIDEM Response

We concur and will look for opportunities to encourage our Fish & Wildlife partners to develop and implement a waterfowl management plan. We thank Save the Bay for their educational efforts regarding an individual who was feeding the waterfowl daily. We believe that this has led to less waterfowl in that particular stretch of the Pawcatuck River.

Save the Bay Comment 3

Outreach to communities further up in the watershed is necessary to educate those municipalities about the bacteria sources affecting the Pawcatuck. At this point, most of the effort has been focused on the towns of Westerly and Stonington. Now is a great opportunity to reach out to these other communities within the watershed (Hopkinton, Richmond etc.), especially those that have a large amount of agricultural lands.

RIDEM Response

RIDEM sent notifications regarding the meetings and the public comment periods to the Town Managers, Town Clerks, Planning Directors, Public Works Directors, Recreation Directors, Conservation Commission, and Town Engineers for all towns located in these watersheds. As noted in the Pawcatuck River Watershed Summary, NRCS has opted to target funds from the National Water Quality Initiative (NQWI) to the Tomaquag Brook watershed. NQWI targets Environmental Quality Incentives Program (EQIP) to priority watersheds in each state. Priority watersheds were selected using input from local partnerships and state water quality agencies (NRCS, 2013). The Tomaquag River has been identified as a bacteria source to the Pawcatuck River.

Save the Bay Comment 4

In terms of recommended next steps, there are additional opportunities for towns to implement green infrastructure (bioswales, rain gardens, permeable pavement, etc.) in certain subwatersheds (such as in the Spring Brook watershed) to deal with the large amount of impervious cover.

RIDEM Response

RIDEM will work with the towns through the Storm Water Phase II Program to implement stormwater improvements. Section 6.4 of the Core Document discusses Low Impact Development (LID) or Green Infrastructure. The section discusses the Rhode Island Stormwater Manual, which incorporates LID as the “industry standard” in Rhode Island.

Save the Bay Comment 5

Finally, open and transparent communication needs to continue to occur between the two states and two towns, especially now that there are TMDLs for both sides of the river. As the towns work to implement some of the strategies outlined in the TMDLs, it is essential that resources are shared, joint funding opportunities are pursued, and information on projects is communicated.

RIDEM Response

RIDEM plans to continue its bi-state efforts in this area. RIDEM thanks Save the Bay for its work in this watershed to bring state and municipal officials, along with local watershed groups to work together to improve water quality in this watershed. RIDEM applauds Save the Bay’s efforts in monitoring the estuarine Pawcatuck River and Little Narragansett Bay in conjunction with the Watershed Watch program and for assisting RIDEM in monitoring the estuary for fecal coliform. We encourage and welcome your continued involvement in coordinating watershed activities and water quality monitoring.