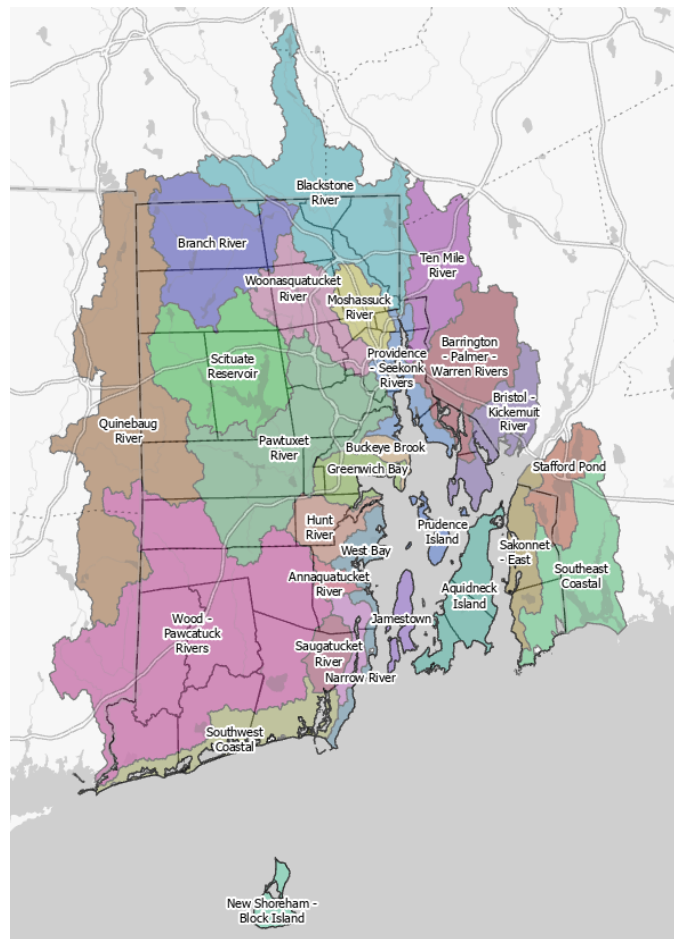


# Updates to the Rhode Island Statewide Total Maximum Daily Load (TMDL) for Bacteria Impaired Waters



**Final Report  
September 2023**

**RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
OFFICE OF WATER RESOURCES  
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**Table of Contents**

List of Tables ..... 2

List of Figures ..... 2

1.0 Introduction..... 3

    1.1 Overview of 303(d) List and TMDLs ..... 3

    1.2 Purpose of this Report..... 3

    1.3 Where to Find TMDL Information for the 3 Impaired Waterbodies ..... 6

2.0 Watershed-Specific Bacteria Data Summaries and Reduction Estimates ..... 8

    2.1. Bacteria Impaired Segments ..... 8

    2.2 Margin of Safety ..... 9

    2.3 Watershed-Specific Bacteria Data Summaries ..... 10

3.0 Public Participation..... 11

4.0 References ..... 12

Section 5.0 Additional TMDL Implementation for Nonquit Reservoir Tributaries ..... 13

    5.1 Agricultural Best Management Strategies ..... 13

Section 6.0 Response to Comments Received During the Public Comment Period ..... 19

**List of Tables**

Table 1. Number of Impaired Segments per Watershed Planning Area (WPA) in TMDL Update 4

Table 2. Bacteria Impaired Segments Included in the Statewide Bacteria TMDL Update ..... 6

Table 3. Where to Find Information for Each TMDL Element..... 7

Table 4. Summary of Estimate Percent Reductions for Bacteria Impaired Segments..... 8

Table 5. Agricultural-Related Sources of Pollutants and Proposed and Existing BMPs ..... 15

**List of Figures**

Figure 1. Rhode Island Watershed Planning Areas with Bacteria Impaired Waters Addressed in this TMDL in Red..... 5

## **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 typically require a Total Maximum Daily Load (TMDL) study for each pollutant causing an impairment.

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).

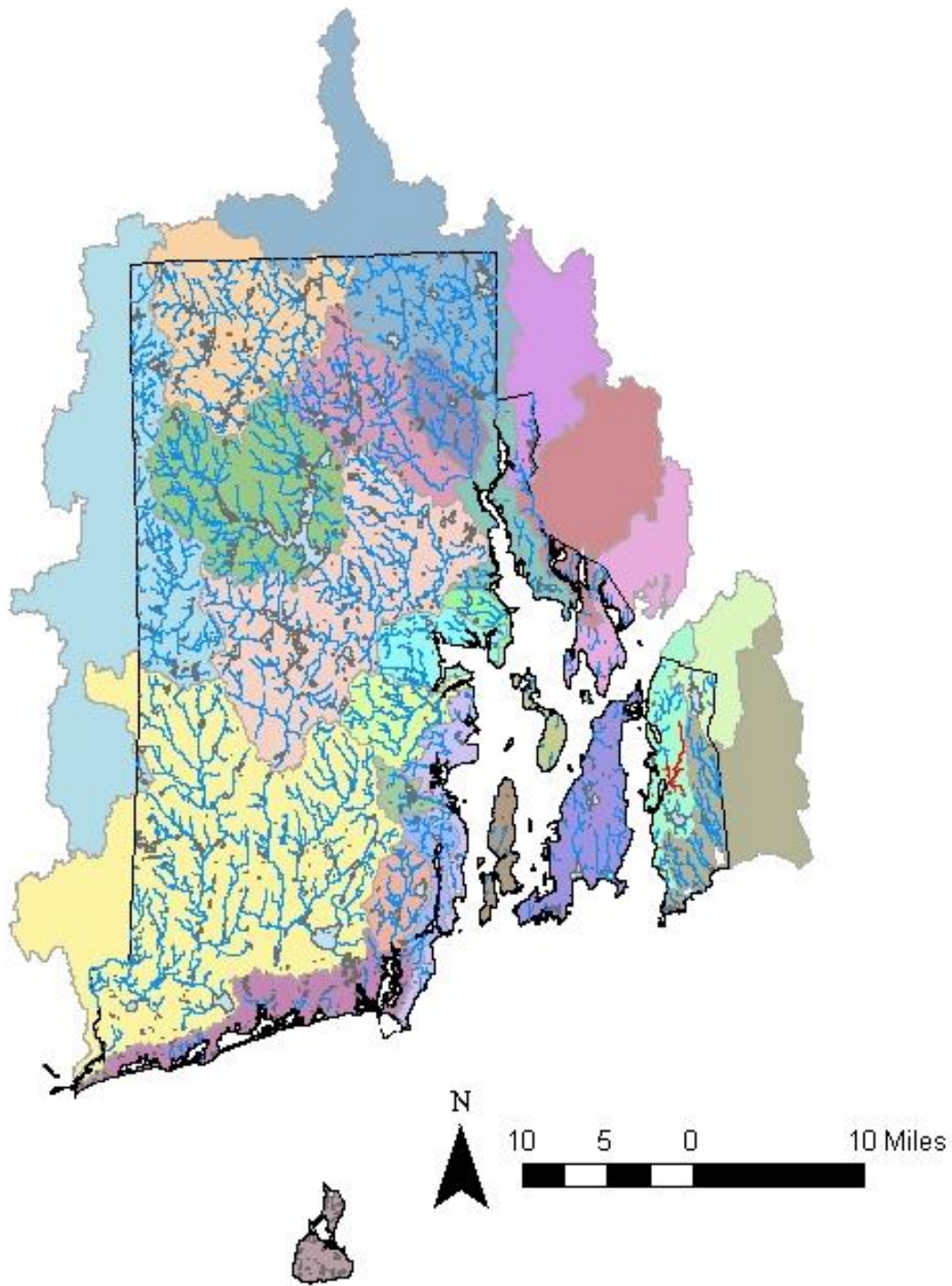
The 2011 Statewide Bacteria TMDL report established the allowable bacterial contributions for Rhode Island’s surface waters, provided documentation of impairment, and specified the pollutant reductions needed to meet water quality standards. The goal of these TMDLs is attainment of water quality standards. The Statewide Bacteria TMDL addressed 57 bacteria impaired surface water

segments that were on the 2010 303(d) List of Impaired Waters, and an update to the Statewide Bacteria TMDL in 2014 addressed six impaired surface water segments.

The purpose of this document is to provide TMDLs for three bacteria impaired waterbodies on the 303(d) list by updating the Statewide Bacteria TMDL document. In the Statewide Bacteria TMDL core document, RIDEM established 24 WPAs that include all of the Rhode Island and some hydrologically-connected parts of Massachusetts and Connecticut. Some of these planning areas have been further subdivided for management and planning purposes. Figure 1 provides a map of Rhode Island with WPAs. 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, along with a compilation of bacteria impaired segments in each WPA. Table 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. Number of Impaired Segments per Watershed Planning Area (WPA) in TMDL Update**

WPA Name	Number of Impaired Segments	WPA Name	Number of Impaired Segments
Aquidneck Island	0	Providence-Seekonk Rivers	0
Barrington-Palmer-Warren Rivers	0	Prudence Island	0
Bristol-Kickemuit River	0	Quinebaug River	0
Buckeye Brook	0	Sakonnet-East	3
Greenwich Bay	0	Saugatucket River	0
Hunt River	0	Southeast Coastal	0
Jamestown	0	Southwest Coastal	0
Branch River	0	Stafford Pond	0
Blackstone River	0	Scituate Reservoir	0
Moshassuck River	0	Ten Mile	0
Narrow River	0	West Passage	0
New Shoreham-Block Island	0	Wood-Pawcatuck Rivers	0
Pawtuxet River	0	Woonasquatucket River	0



**Figure 1. Rhode Island Watershed Planning Areas with Bacteria Impaired Waters Addressed in this TMDL in Red**

**Table 2. Bacteria Impaired Segments Included in the Statewide Bacteria TMDL Update**

Waterbody Name	Waterbody ID	Class	Towns	Impairment
<b>WPA: Sakonnet - East</b>				
Borden Brook	RI0010031R-01	AA	Tiverton, Little Compton	Enterococci
Quaker Creek	RI0010031R-04	AA	Tiverton	Enterococci
Tributary to Nonquit Pond	RI0010031R-20	AA	Tiverton	Enterococci

### 1.3 Where to Find TMDL Information for the 3 Impaired Waterbodies

This report for three 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 3.

**Table 3. Where to Find Information for Each TMDL Element**

TMDL Element	Location
<p><b>Water Quality Standards for Bacteria</b> - 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><b>Bacteria Pollution Sources</b> - 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><b>Bacteria Impaired Waters</b> - 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><b>TMDL Development</b> - 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><b>Implementation Plan</b> - 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 This document – Section 6</p>
<p><b>Funding and Community Resources</b> - Provides a description of funding sources available to address impaired waters in Rhode Island.</p>	<p>Statewide Bacteria TMDL - Section 7</p>
<p><b>Watershed-Specific Bacteria Data Summaries, Reductions, and Implementation</b> - 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 Statewide Bacteria TMDL - Appendix O</p>
<p><b>Public Participation</b> - Includes a review of the process used to solicit public comment and DEM’s response to comments.</p>	<p>This document - Section 3</p>
<p><b>TMDL Expressed as a Daily Load</b></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 percent reductions to meet the TMDL of geomean of 54 enterococci colonies/100mL for each of the three impaired segments are presented.

### 2.1. Bacteria Impaired Segments

Table 4 provides the waterbody name, ID, the endpoint needed to meet criteria, and the estimated percent reduction. All of the impaired segments in this update are fresh waterbodies that are impaired for enterococci bacteria.

**Table 4. Summary of Estimate Percent Reductions for Bacteria Impaired Segments**

Waterbody Name	Waterbody ID	Class	Impairment	Geometric Mean TMDL Endpoint*†	Percent Reduction to meet TMDL Endpoint^
<b>WPA: Sakonnet - East</b>					
Borden Brook	RI0010031R-01	AA	Enterococci	54	78%
Quaker Creek	RI0010031R-04	AA	Enterococci	54	98%
Tributary to Nonquit Pond	RI0010031R-20	AA	Enterococci	54	77%
*Enterococci (colonies/100 mL)					
† TMDL endpoint is set to the water quality standard					



## 2.2 Margin of Safety

As noted in the Statewide Bacteria TMDL core document, the margin of safety (MOS) is a required TMDL component designed to account for assumption or lack of knowledge about linking loading allocations with water quality impairment. The MOS can be either explicit (i.e. expressed in the TMDL as a portion of the loadings) or implicit (i.e. conservative assumptions). For these waterbodies, an implicit MOS was applied with the following conservative assumptions:

- Pathogen organisms ordinarily have limited capability of surviving outside of their hosts, and instream processes such as bacteria die-off and settling, which are known to reduce instream bacteria concentrations, are not accounted for in the TMDLs. A rate of pollutant decay could be developed and applied. No rate of decay is included in the TMDLs to provide for greater protection of water quality.
- Many different environmental factors affect the survival of pathogens (e.g. sunlight, temperature, etc.)<sup>1</sup>. These factors vary by waterbody, and therefore it would be difficult to assert that the rate of decay caused by environmental factors was sufficient to meet the water quality bacteria criteria. Thus, it is more conservative to apply the water quality criteria as the TMDL, because the criteria must be met at all times under all environmental conditions.
- The TMDLs are set equal to the appropriate water quality criteria (i.e. enterococci geomean) for each waterbody segment. Based on the above considerations, the use of the water quality criteria to set the WLA and LA is a more conservative approach than developing an explicit MOS.
- Compliance with criteria will be measured in the ambient water.

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<sup>1</sup> Protocol for Developing Pathogen TMDLs (EPA 841-R-00-002)  
<https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=20004QSZ.TXT>

## 2.3 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 Appendix will be added with specific information concerning the three impaired waterbodies included in this update.

### Appendix O – Sakonnet - East

Each appendix contains segment-specific summaries for all 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 90<sup>th</sup> percentile calculations (as appropriate) and reductions to meet water quality standards.

### **3.0 Public Participation**

USEPA regulations require that calculations to establish TMDLs be subject to public review as defined in the State Continuing Planning Process (40 CFR 130.7 (c) (1) (ii)). In 2023, RIDEM hosted a public meeting 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 meeting was held virtually on January 30, 2023. Approximately 20 people representing the general public, state agencies, and local organizations attended the meetings.

The public meeting began the public comment period, which ended on March 1, 2023. The meeting was publicized in a press release and public notices, and an email with the press release was sent to key stakeholders, such as municipal officials and local organizations. RIDEM posted the draft TMDLs on its website more than two weeks before the public meeting. RIDEM received comments from Rhode Island Department of Transportation during the public comment period. The RIDEM response to these comments is found in Section 6. 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 (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.

## Section 5.0 Additional TMDL Implementation for Nonquit Reservoir Tributaries

The core document of the Statewide Bacteria TMDL describes implementation activities addressing common sources of bacterial pollution including onsite wastewater management, MS4-specific requirements, waterfowl, wildlife, domestic animals, and agriculture. Those pollution abatement strategies may apply to the waterbodies included in this update. This section outlines additional required and recommended best management practices (BMP's) that will need to be implemented in the Nonquit Reservoir Tributaries watersheds to meet the water quality targets established in this TMDL. Existing water quality improvement activities/plans are described in further detailed in:

- Nonquit Pond Watershed Plan – Prepared by Atlantic States Rural Water and Wastewater Association for The Tiverton Conservation Commission  
<https://dem.ri.gov/sites/g/files/xkgbur861/files/programs/benviron/water/quality/nonpoint/pdfs/nonquit-wsp.pdf>

### 5.1 Agricultural Best Management Strategies

Well managed farms can operate with minimal adverse impacts on water resources. However, agricultural operations have the potential to adversely impact the State's water resources (surface water, groundwater and wetlands) and aquatic environment. The potential water quality contaminants associated with agricultural operations include nutrients (from fertilizers and animal wastes), pathogens and organic materials (primarily from animal wastes), sediment (from field erosion), pesticides, and petroleum products. In addition, the need for irrigation water can place high demands on local groundwater or surface water supplies which, in turn, can cause a low flow condition in streams potentially resulting in dramatic negative impacts on stream ecology. Further details on agricultural activities in each tributary watershed are included in the associated watershed appendix.

Table 5 summarizes the agricultural-related sources of pollutants, including enterococcus, to the major tributaries to Nonquit Pond. As documented in the table and the watershed-specific appendices, agricultural runoff and erosion have been documented at many sites within the sampled watersheds. The impact of these observed pollution sources on water quality are confirmed by the results of sampling conducted up- and down- stream of these sites.

Beginning in 2014, RIDEM OWR partnered with the Rhode Island Natural Resources Conservation Service (NRCS) to focus NWQI water quality investigations in several tributaries within the Newport reservoir watersheds. These included: 1) the Maidford River (tributary to Paradise Pond and Gardiner Pond), 2) Paradise Brook (tributary to Paradise Pond), and 3) Quaker and Borden Brook and two other unnamed tributaries (all tributaries to Nonquit Pond).

The streams were sampled for turbidity, total suspended solids, nutrients, and pathogens under both dry and wet weather conditions. The NWQI surveys were conducted targeting three wet weather and three dry weather surveys. Sampling stations were located upstream and downstream of agricultural areas, to help identify agricultural sources of pollution. In addition, DEM staff field inspected the entire length of all of the tributaries, to visually identify potential sources of pollution. The main pollutant sources identified were excessive erosion from farm fields and livestock access to streams, adjacent wetland areas, or areas subject to flooding. Agricultural sources of pollution, field observations, and existing and proposed best management practices for all reaches of Quaker Creek, Borden Brook, and unnamed tributaries to Nonquit Pond, are shown in Table 5. It should be noted that the information contained in Table 5 reflects improvements and proposed improvements as of 2019. Additional improvements may have been made in 2020 and beyond. Individual watershed appendices detail visual surveys conducted in September 2022 to confirm any changes in potential bacteria sources in readily accessible locations.

**Table 5. Agricultural-Related Sources of Pollutants and Proposed and Existing BMPs**

Waterbody	River Reach	Downstream Station	Exceedances of Criteria/Guidance (Most Upstream Station) and Significant (>20%) Pollutant Increases (Downstream Stations)		Potential Agricultural Sources	Field Observations	Existing BMP's/Comments after site visit	Comments
			Dry Weather	Wet Weather				
			Quaker Creek	Q2 to Q3				
Flooded Paddocks on both sides of stream								
Erosion from paddocks sand parking area/ drive, and bus depot.								
Equestrian Center	Uncovered Manure Pile	Need a site visit by RIECD and Division of Ag.						
Dairy Farm	Livestock have access to Stream	The livestock are watered via a well-fed watering trough. Proposing a 50–75-foot vegetated buffer along the stream, including fencing. Working on grazing plan with NRCS.	Owner working with NRCS.					
Q3 to Q4	Station Q4, East Road	Organic Nitrogen	Total Phosphorus	Dairy Farm	Cows have access to farm pond west of stream.	The pond on the property is no longer accessed by livestock. The field surrounding the pond is proposed to be fenced off from the cows. The livestock are watered via a well-fed watering trough. Working on grazing plan with NRCS.	Owner working with NRCS.	

**Table 5. Agricultural-Related Sources of Pollutants and Proposed and Existing BMPs (continued)**

Waterbody	River Reach	Downstream Station	Exceedances of Criteria/Guidance (Most Upstream Station) and Significant (>20%) Pollutant Increases (Downstream Stations)		Potential Agricultural Sources	Field Observations	Existing BMP's/Comments after site visit	Comments
			Dry Weather	Wet Weather				
Tributary to Borden Brook	Headwaters to Bt	BtTerminus of Tributary	Total Nitrogen Organic Nitrogen	Total Nitrogen Organic Nitrogen	Cow farm	Large silage pile adjacent to headwaters	Silage pile cannot be moved without ruining the silage through oxidation. Silage pile will be reduced by feeding cows onsite and looking for buyers in the local area. Owner intends to invest in bagging system for silage. NRCS to suggest covering the existing silage pile.	Owner has met with Ken Ayres and is working with NRCS.
						Cows have access at headwaters.	NRCS to finish the fencing to restrain cow access by 10/18/18	OK. Fencing will be completed by 10/18/18. Field survey in Sep 2022 verified fence was completed.
					Livestock pen	Livestock have Access to Stream (a Few Animals)	All of these animals were fenced in their respective areas with no access to stream during subsequent field inspection.	Need a manure management plan.
	Headwaters to Bth	Bth Headwaters of tributary Wet-weather targeted sample taken immediately downstream of adjacent silage pile.	Turbidity Total Phosphorus Ammonia Organic Nitrogen Enterococci	Cow farm	Dense growth of filamentous algae with white scum downstream of silage	Silage pile cannot be moved without ruining the silage through oxidation. Silage pile will be reduced by feeding cows onsite and looking for buyers in the local area. Owner intends to invest in bagging system for silage. NRCS to suggest covering the existing silage pile.	Owner has met with Ken Ayres and is working with NRCS.	



**Table 5. Agricultural-Related Sources of Pollutants and Proposed and Existing BMPs (continued)**

Waterbody	River Reach	Downstream Station	Exceedances of Criteria/Guidance (Most Upstream Station) and Significant (>20%) Pollutant Increases (Downstream Stations)		Potential Agricultural Sources	Field Observations	Existing BMP's/Comments after site visit	Comments
			Dry Weather	Wet Weather				
Borden Brook	B1 TO B2	B2 East Road	No significant pollutant increases.	No Significant Pollutant Increases	Silage pile	Silage Pile adjacent to East Road	The majority of this material has been removed. Owner advised us in the field that the remainder of the material will be removed shortly.	OK. No further action needed.
					Chicken pen	Chicken coop adjacent to East Road ditch.	This coop has been removed from the area of concern.	OK. No further action needed.
					Dairy farm	Livestock access to stream		Owner is going to meet with NRCS to discuss fencing the cows out of the stream
	B2 to B3	B3 Main Road	Total Phosphorus Total Nitrogen Organic Nitrogen	Total Nitrogen Organic Nitrogen	Small livestock farm	Livestock access to stream		Have spoken with owner to set up meeting. Needs follow-up.
						Manure pile 30 ft. from stream		
						Erosion		
Unnamed Tributary to Nonquit Pond	Headwaters to N1	N1 Northeastern Fork at Barnswallow	Total Phosphorus Total Nitrogen Organic Nitrogen	Total Phosphorus Total Nitrogen Organic Nitrogen	Dairy farm	Cows have access to flooded areas adjacent to stream and stream itself.		OK. Fencing will be completed by 10/18/18. Field survey in Sep 2022 verified fence was completed.
	N1 to N2	N2 Peaceful Way	Nitrate	Turbidity Total Nitrogen Organic Nitrogen Enterococci	Crop field	Western fork bisects crop field with inadequate buffer (15 ft.)	The field has been seeded with hay. Provided the field is stable with grasses, and not subject to plowing and/or disturbances, regular application of fertilizer is not expected to significantly contribute to water quality concerns. If the site is returned to regular field production, it is recommended that a vegetated buffer be established.	OK. No further action is needed.
			Eastern fork flows along border of hay field and crop field.					
				Erosion especially at northern end of cropfield.				

Since the NWQI report was released, the Rhode Island office of the US Department of Agriculture has been working with the owners of the properties identified in the report. As of April 2023, improvements in land management and conservation techniques have been initiated on these properties. Table 6 shows the different conservation practices that are now in place or have been done and the amount of area affected. There is a link to the Conservation Practices and Physical Affects table below that identifies the practice code and the various effects for each conservation technique applied.

**Table 6. Conservation Practices Applied in the Nonquit Pond Watersheds Since 2019.**

Practice Code	Practice Name	Applied Amount	Units
328	Conservation Crop Rotation	200.2	Ac.
329	Residue and Tillage Management, no till	1.1	Ac.
340	Cover Crop	201.5	Ac.
342	Critical Area Planting	0.7	Ac.
391	Riparian Forest Buffer	1.4	Ac.
430	Irrigation Pipeline	2029	Ft.
441	Irrigation System, Micro-irrigation	1.5	Ac.
449	Irrigation Water Management	3.3	Ac.
484	Mulching	3.8	Ac.
512	Pasture and Hay Planting	12.3	Ac.
570	Stormwater Runoff Control	0.1	Ac.
612	Tree/Shrub Establishment	1.5	Ac.
614	Watering Facility	2	No.
666	Forest Stand Improvement	15.6	Ac.

Link: [Conservation Practices Physical Effects \(CPPE\) \[efotg.sc.egov.usda.gov\]](https://efotg.sc.egov.usda.gov)

## **Section 6.0 Response to Comments Received During the Public Comment Period**

The following comments were received by RIDEM during the public comment period for the draft documents: Total Maximum Daily Load Analysis for the Tributary to Nonquit Pond (RI0010031R-20), Quaker Creek (RI0010031R-04), Borden Brook (RI0010031R-01), and Updates to the Rhode Island Statewide Total Maximum Daily Load (TMDL) for Bacteria Impaired Waters, Draft Reports, December 2022. The complete text of all comments received is on file in the Office of Water Resources at RIDEM.

### **Rhode Island Department of Transportation (RIDOT)**

Received via email March 1, 2023

#### **Comments on Tributary to Nonquit Pond**

1. Page 2: Figure 1 incorrectly identifies the location of the Sampling Station N1. Sampling Stations are not identified on Figure 1 in either Borden or Quaker TMDL

**RIDEM Response:**

Figure 1 corrected on the Tributary to Nonquit Pond TMDL to be the same as the Borden and Quaker TMDLs.

2. Page 4: Did RIDEM reach out to property owners or NRCS to discuss recent agricultural improvements? Perhaps electric fencing was put in place as part of education and outreach that NRCS completed.

**RIDEM Response:**

RIDEM contacted Eastern Rhode Island Conservation District (ERICD) which provided the majority of the information in the table and no updates are available as of March 2023. RIDEM also contacted NRCS and an update was provided April 2023, which was added as a separate table to the cover document. Additionally, accessible sites were surveyed visually by RIDEM in September 2022. Updates from those visual surveys are reflected in Table 5.

3. Page 8: **Is one year of data sufficient to substantiate the waste load allocation and reduction targets? (Especially as it is before 5 years of agricultural education & outreach and BMP improvements?)**

RIDEM Response:

RIDEM acknowledges the limited data set available for certain waters included in the TMDL; however, all data are in compliance with the data quality and quantity requirements for use in conducting water quality assessments and impaired water listings in the “Rhode Island Consolidated Assessment and Listing Methodology” (CALM).

4. Page 8: Table 1 Dates should be ordered in same order as Quaker and Borden TMDLs (earliest data to latest data).

RIDEM Response:

Table corrected to show earliest to latest rainfall data.

5. Page 9: **Stormwater Runoff**

a. The impervious cover in the Tributary to Nonquit Pond watershed is 3%. This, along with the visual and sampling evidence of agricultural practices being the source, indicates that **urbanized stormwater runoff is not the source of impairments to the watershed.**

RIDEM Response:

In the first sentence of the first paragraph, RIDEM acknowledges that stormwater runoff can come from urban and rural areas. This section points out that pollutants can come from several sources within a watershed. Impacts from potential illicit discharges are possible in urban and rural areas. No changes have been made to the document.

b. **RIDOT disagrees with the assessment** “These locations (2 RIDOT outfalls on Main Road; 1 Town outfall on Peaceful Way) are likely sources of bacteria” and that they should be considered “TMDL Priority Outfalls”. There is no evidence given in the TMDL document that bacteria is entering the tributaries through these outfalls or that illicit discharges are likely. **In fact, the lack of exceedances during Dry Weather sampling (page 12, Table 2) indicates that illicit discharges to the drainage systems are not likely.**

**RIDEM Response:**

Although there was no outfall sampling data to quantify the bacterial loading from the RIDOT and Town stormwater outfalls, it has been determined that, given the size of the outfalls and the associated drainage area, the outfalls have the potential to be significant sources of bacteria if illicit discharges are present. Therefore, these outfalls have been designated priority outfalls which must be evaluated for the presence of illicit discharges. Dry and wet weather sampling shall be conducted, if flow is present. If any illicit discharges are identified, the evaluation must include a proposed schedule to eliminate them. The document has been updated to indicate that “Given the size of these outfalls and connection to the waterway, which is a tributary to a drinking water supply, it has been determined that they may be sources of bacteria to the Tributary to Nonquit Pond, and they have been designated priority outfalls and must be sampled in dry and wet weather, if flow is evident, and evaluated for the presence of illicit discharges using Illicit Discharge Detection and Elimination (IDDE) protocols. All illicit discharges shall be eliminated.”. RIDOT provided information on April 5, 2023 that no inspection has occurred on these outfalls to date.

6. Page 11: Reasonable Assurance - **Why did RIDEM not take samples in September 2022 while performing inspections?** This would confirm actions have been successful in bacteria reductions, &/or shown that further actions are required, but with a more accurate load reduction.

**RIDEM Response:**

The September 2022 fieldwork was to evaluate land use changes in the watershed. RIDEM expects to resample the watersheds in its ambient river monitoring (ARM) program in 2025. No changes have been made to the document.

7. Page 12: Table 2. Tributary to Nonquit Pond - This should be Table 3 (Table 2 is on page 9 (Priority Outfalls)).

**RIDEM Response:**

Correction made to Table 3.

### Comments on Quaker Creek

8. Page 2: It appears that the northern portion of RIDEM WBID RI0010031R-04 is not included in the watershed. The reasoning behind this should be explained in document (and/or fixed in RIDEM Surface Water layers).

#### RIDEM Response:

Field investigations conducted in March 2023 confirmed that the stream system flows north into Nannaquaket Pond from the area adjacent to Tiverton Historical Cemetery No. 4, confirming the mapping in the TMDL. The watershed boundary has been corrected in RIDEM GIS. No changes have been made to the document.

9. Page 3: Table numbering is difficult to follow. Table numbers should be sequential.

#### RIDEM Response:

Corrected text by removing reference to the table with the sampling station locations.

10. Page 6: Table 1: why doesn't Table 1 include 3/22/17 sampling date?

#### RIDEM Response:

A sample was not collected at Station LDF on that date. The table has been updated to include "Not Sampled" for 3/27/17 at LDF.

11. Page 7: Landfill closure information and permit requirements should be finalized.

#### RIDEM Response:

The Tiverton landfill stopped accepting waste in November 2022. It is currently undergoing the final closure and capping process within the licensing program of RIDEM's Office of Land Revitalization and Sustainable Materials Management. It is expected that the process will be complete by September 2023. The RIPDES permit is expected to be issued following the completion of the closure and capping. No changes have been made to the document.

12. Page 8: Physical addresses should be used to describe properties, not RI landmarks.

#### RIDEM Response:

Given that the properties in question are private properties, RIDEM did not provide identifying physical addresses to protect privacy in a public document. RIDEM maintains a spreadsheet internally of the physical addresses. No changes have been made to the document.

13. Page 11: Consider including Sampling Station Q4 map.

**RIDEM Response:**

Station Q4 is shown in Figure 2, which has the locations of all mainstem stations. No changes have been made to the document.

14. Page 13: Stormwater Runoff

a. The impervious cover in the Borden Brook<sup>2</sup> watershed is 5%. This, along with 90% of the watershed being undeveloped land (wetlands, forests), indicates that urbanized stormwater runoff is not a significant source of impairments to the watershed.

**RIDEM Response:**

There was a typo stating Borden Brook is 90% undeveloped. Borden totals 80% combined undeveloped/ wetlands. The typo has been corrected in the document. RIDEM acknowledges that stormwater runoff can come from urban and rural areas. Impacts from potential illicit discharges are possible in urban and rural areas. No changes have been made to the document.

b. RIDOT Outfall – 9100447 – is a one catch basin system with no interconnection. There is a pipe that connects one stormwater conveyance & catch basin on the west side of Main Rd to the east side of Main Rd. This outfall is also 1200-ft away from the creek, with no channelized flow, through a pervious field. Outfalls were inspected in 2019 during dry weather with no evidence of dry weather flow or contamination. Inspection records are available upon request. This should not be considered a priority source.

**RIDEM Response:**

RIDEM has reviewed this comment and the outfall 9100447 and concurs that it is not likely this outfall will reach Quaker Creek. This outfall has been removed from the table as a priority outfall.

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<sup>2</sup> The comment was in the section referencing Quaker Creek. RIDEM answered this question in the order in which is appeared in the comment document. The comment was referencing Borden Brook, and the correction was made to the Borden Brook document.

c. RIDOT Outfall – 9100446 - is a one road culvert. There is a pipe that connects a stormwater conveyance on the west side of Main Rd to the east side of Main Rd. This outfall is also 1200-ft away from the creek, with no channelized flow, through a pervious field. Outfalls were inspected in 2019 during dry weather with no evidence of dry weather flow or contamination. Inspection records available upon request. This should not be considered a priority source.

**RIDEM Response:**

RIDEM has reviewed this comment and the outfall 9100446. It has been determined that, given the size of the outfalls and the associated drainage area, the outfalls have the potential to be significant sources of bacteria if illicit discharges are present. Therefore, these outfalls have been designated priority outfalls which must be evaluated for the presence of illicit discharges. Dry and wet weather sampling shall be conducted, if flow is present. If any illicit discharges are identified, the evaluation must include a proposed schedule to eliminate them. The document has been updated to indicate that “Given the size of this outfall and connection to the waterway, which is a tributary to a drinking water supply, it has been determined that it may be a source of bacteria to the Quaker Creek, and it has been designated as a priority outfall and must be sampled in dry and wet weather, if flow is evident, and evaluated for the presence of illicit discharges using Illicit Discharge Detection and Elimination (IDDE) protocols. All illicit discharges shall be eliminated.” RIDEM reviewed recent IDDE inspection reports submitted to RIDEM by RIDOT (March 2020 to present) and could not locate results from the dry weather inspection referenced in the comment. RIDOT provided information on April 5, 2023 that no inspection has occurred on this outfall to date.

d. RIDOT outfall – 9100450 + 9009399 – outfalls were inspected in 2019 during dry weather with no evidence of dry weather flow or contamination. Inspection records available upon request. This should not be considered a priority source.

**RIDEM Response:**

RIDEM has reviewed this comment and the outfalls 9100450 and 9009399 (aka NARR273) concurs that it is not likely these outfalls will reach Quaker Creek. Additionally, RIDOT provided information April 4, 2023 that the most recent inspection found outfall 9100450 is buried. RIDEM reviewed recent IDDE inspection reports submitted to RIDEM by RIDOT (March 2020 to present) and found notation that 9009399 could not be located during wet weather due to vegetation; however, an investigation memo notes no flow during a 10/10/2019 investigation date. These outfalls have been removed from the table as a priority outfalls.



RIDEM notes outfall 9009399 (aka NARR273) is a priority outfall in the Newport Water Supply Reservoir TMDL.

15. Page 15: “Over ninety percent of the watershed is undeveloped”. This is not consistent with the pie chart on page 1.

RIDEM Response:

The percentage was corrected to reflect the values in the pie chart from pg. 1.

16. Page 16: Although RIDEM methodology states that the highest geomean is to be used to calculate the Percent Reduction Target, considering the 5 years of NRCS public education, outreach, and agricultural improvements, **RIDEM should consider using the most recent 2021 data to be more reflective of the watershed and calculating more appropriate Target Reductions.**

RIDEM Response:

RIDEM notes that the target is the TMDL, which is the water quality criteria of a geomean of 54 enterococci colonies/100 mL. The percent reductions are calculated for implementation purposes. The full dataset was used to capture a variety of weather and watershed conditions over several years. The data used was all collected within the last ten years, which is reflective of current conditions. No changes have been made to the document.

**17. Landfill contributions should have its own section under "Exceedances and Potential Sources."** According to the TMDL documentation for the City of Newport Reservoirs (RIDEM, 2021), "The landfill swale is a stormwater conveyance to Quaker Creek and is therefore considered to be a point source to a water of the state." Additionally, "the landfill swale was documented to convey leachate containing TSS, ammonia, and dissolved organic carbon (DOC) during dry weather. Stormwater runoff from the upper portions of the landfill during wet weather is elevated in TSS, total phosphorus, total nitrogen (primarily as ammonia), DOC, and Enterococci. Actions to mitigate this point source should be addressed explicitly within this documentation.

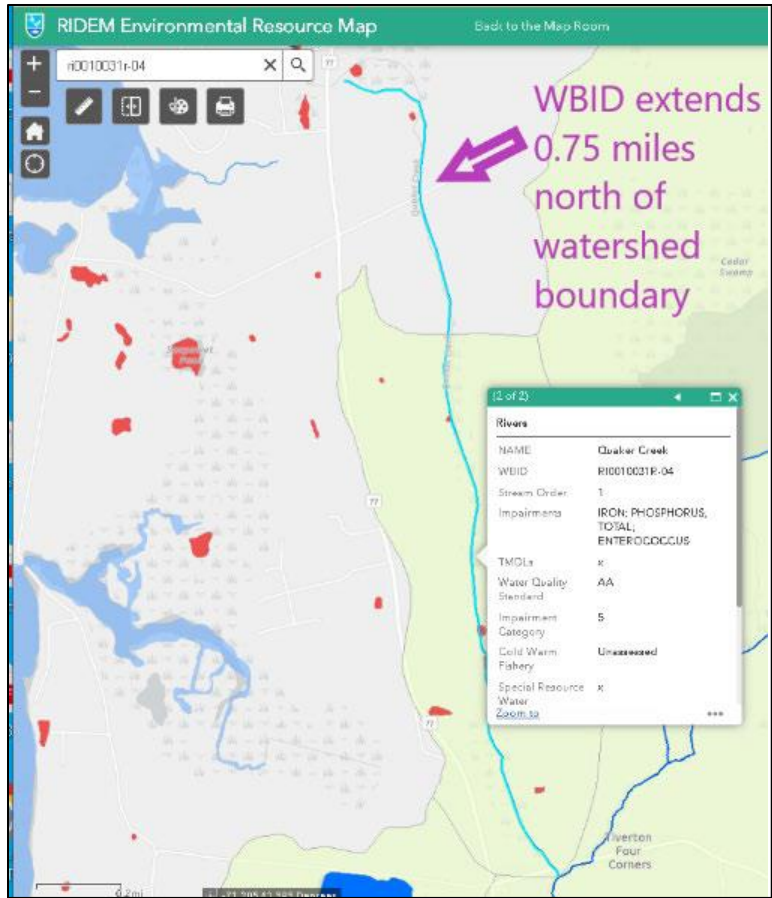
**RIDEM Response:**

The Tiverton Landfill is currently undergoing the final closure and capping process within the licensing program of RIDEM's Office of Land Revitalization and Materials Management. It is expected that the process will be complete by September 2023. The RIPDES permit is expected to be issued following the completion of the closure and capping. The final closure and capping of the landfill will manage any stormwater or other discharges from the landfill that could impact Quaker Creek. No changes have been made to the document.

**18. Quaker Creek – watershed boundary for WBID RI0010031R-04 does not appear to include the whole WBID.**

**RIDEM Response:**

Field investigations conducted in March 2023 confirmed that the stream system flows north into Nannaquaket Pond from the area adjacent to Tiverton Historical Cemetery No. 4. The watershed boundary has been corrected in RIDEM GIS. No changes have been made to the document.



### Comments on Borden Brook

19. Page 6: The gravel mining operation and the Tiverton Landfill are both required to obtain RIDEM stormwater permits and manage stormwater and discharges that could contribute bacteria to Borden Brook. **Would these changes (along with recommended agricultural improvements) be sufficient for Borden Brook to be listed as a Category 4b on the 303(d) list?**

RIDEM Response:

Category 4B is used when a TMDL is not needed because other pollution control requirements are expected to result in the attainment of applicable water quality standards in a reasonable period of time. Given the diverse nature of bacteria pollution sources in the watershed, RIDEM has determined that a TMDL is the best tool to bringing Borden Brook back into compliance with water quality standards. No changes have been made to the document.

20. Page 9: Table 3 should not be mentioned in text before Table 2.

RIDEM Response:

Corrected. Removed Table 3 text at this location.

21. Page 10: Stormwater Runoff

a. The impervious cover in the Borden Brook watershed is 5%. This, along with 90% of the watershed being undeveloped land (wetlands, forests), indicates that **urbanized stormwater runoff is not a significant source of impairments to the watershed.**

RIDEM Response

RIDEM acknowledges that stormwater can come from urban and rural areas. Pollutants can come from several sources within the watershed. The percentage undeveloped/wetland is 80%. This was corrected on Page 13, last paragraph. However, stormwater is mentioned several times on Page 10, and in sub-watershed B2, the text says that the roads and other areas in this sub-shed provide a means to convey stormwater to the brook. Impacts from potential illicit discharges are possible in urban and rural areas. No changes have been made to the document.

b. RIDOT Outfall – 9100469 – has been inspected and is a “system” of one catch basin to the outfall and it discharges to an isolated wetland on the other side of Bulgarmarsh Road (opposite side of Borden Brook). There are no private interconnections to this basin. **This should not be a TMDL Priority Outfall** – there is no evidence of bacterial pollution entering the system.

**RIDEM Response:**

RIDEM has reviewed this comment and the outfall 9100469 and concurs that it is not likely this outfall will reach Quaker Creek. Additionally, RIDOT provided information April 5, 2023 that the most recent inspection found this outfall is buried. This outfall has been removed from the table as a priority outfall.

c. RIDOT Outfall – NARR249/464 and its associated drainage system has been investigated by RIDOT in 2020 because of Consent Decree requirements. The outfall investigation was closed with no evidence of pollution in both dry and wet weather sampling. Inspection records are available upon request. **This should not be a TMDL Priority Outfall.**

**RIDEM Response:**

It has been determined that, given the size of the outfall and the associated drainage area, the outfall has the potential to be a significant source of bacteria if illicit discharges are present. Therefore, this outfall has been designated a priority outfall which must be evaluated for the presence of illicit discharges. Dry and wet weather sampling shall be conducted, if flow is present. If any illicit discharges are identified, the evaluation must include a proposed schedule to eliminate them. The document has been updated to indicate that “Given the size of these outfalls and connection to the waterway, which is a tributary to a drinking water supply, it has been determined that these outfalls may be sources of bacteria to the Borden Brook, and they have been designated as a priority outfalls and must be sampled in dry and wet weather, if flow is evident, and evaluated for the presence of illicit discharges using Illicit Discharge Detection and Elimination (IDDE) protocols. All illicit discharges shall be eliminated.” RIDEM reviewed recent IDDE inspection reports submitted to RIDEM by RIDOT (March 2020 to present) and noted that two dry weather inspections have occurred. The results reported in an investigation memo note that 464 is a discharge point requiring further source tracking investigation.

d. RIDOT Outfall – NARR249A/9009141 and its associated drainage system has been investigated by RIDOT in 2018/2019 because of Consent Decree requirements. The outfall investigation was closed with no evidence of pollution in both dry and wet weather sampling. Inspection records are available upon request. **This should not be a TMDL Priority Outfall.**

**RIDEM Response:**

It has been determined that, given the size of the outfall and the associated drainage area, the outfall has the potential to be a significant source of bacteria if illicit discharges are present. Therefore, this outfall has been designated a priority outfall which must be evaluated for the presence of illicit discharges. Dry and wet weather sampling shall be conducted, if flow is present. If any illicit discharges are identified, the evaluation must include a proposed schedule to eliminate them. The document has been updated to indicate that “Given the size of these outfalls and connection to the waterway, which is a tributary to a drinking water supply, it has been determined that these outfalls may be sources of bacteria to the Borden Brook, and they have been designated as a priority outfalls and must be sampled in dry and wet weather, if flow is evident, and evaluated for the presence of illicit discharges using Illicit Discharge Detection and Elimination (IDDE) protocols. All illicit discharges shall be eliminated.” RIDEM reviewed recent IDDE inspection reports submitted to RIDEM by RIDOT (March 2020 to present) and noted wet weather sampling conducted by RIDOT on 8/13/2019 had fecal coliform of 31,000CFU/100mL and enterococci of 2,400CFU/100mL. An investigation memo notes that it requires follow-up source tracking investigation.

22. Page 15 Table 3 Typo: Broden Brook instead of Borden Brook.

**RIDEM Response:**

Corrected the spelling error.

23. Page 15 TLC03, B2 and WW554 are the same station according to the text on page 10 but is unclear in Table 3 because the station locations are different.

**RIDEM Response:**

It is unclear what this comment refers to as the station descriptions in the table all describe the same location at East Road. No changes have been made to the document.

24. Page 16 Why is station Bt used for the percent reduction? Consider using a.) one of the stations with more data or b.) a station on the downstream portion of Borden Brook, which makes up the majority of the contributing area.

**RIDEM Response:**

As stated in the document, RIDEM protocol is to use the station with the highest geomean value for the TMDL to ensure the waterbody will come into compliance with water quality standards. No changes were made in the documents.

25. Page 16: Although RIDEM methodology states that the highest geomean is to be used to calculate the Percent Reduction Target, considering the 5 years of NRCS public education, outreach, and agricultural improvements, **RIDEM should consider using the most recent 2021 data to be more reflective of the watershed and calculating more appropriate Target Reductions.**

**RIDEM Response:**

RIDEM notes that the target is the TMDL, which is the water quality criteria of a geomean of 54 enterococci colonies/100 mL. The percent reductions are calculated for implementation purposes. The full dataset was used to capture a variety of weather and watershed conditions over several years. The data used was all collected within the last ten years, which is reflective of current conditions. No changes have been made to the document.

**Comments on Updates to the Rhode Island Statewide Total Maximum Daily Load (TMDL) for Bacteria Impaired Waters, Draft Report, December 2022.**

26. Page 14: “Six surveys were conducted: three wet weather and three dry weather surveys.” This does not match the sampling surveys identified in the individual TMDL documents (4 wet, 1 dry).

**RIDEM Response:**

The cover document has been updated to “The NWQI surveys were conducted targeting three wet weather and three dry weather surveys” to document the sampling design of the NWQI program. Because these TMDLs were developed under the Statewide Bacteria TMDL, the surveys were categorized using the protocols from the Statewide Bacteria to evaluate dry versus wet data. The tables in the TMDLs show the rainfall amounts which determined whether a survey was under dry (less than 0.25 inches of precipitation) or wet (0.25 inches of precipitation or greater) within 48 hours of sampling.

27. Page 14/15: Why not include the 2022 visual survey information in Table 5? If additional agricultural improvements were made in 2020, 2021, and 2022, why did DEM not resample in September 2022 to determine if measures were successful and/or additional actions are required?

**RIDEM Response:**

The 2022 visual survey information has been added to Table 5 in the cover document. The September 2022 fieldwork was to evaluate land use changes in the watershed. RIDEM expects to resample the watersheds in its ambient river monitoring (ARM) program in 2025.

28. Page 14/15/16, Table 5: Why only include Agricultural sources in table when individual TMDLs also include stormwater runoff, OWTS, and Animal Waste?

**RIDEM Response:**

Table 3 includes the crosswalk of the TMDL elements with the Statewide Core Document. Bacteria sources are included in Section 3 of the Statewide Bacteria TMDL. Stormwater runoff, OWTS, and Animal Waste as sources are all detailed sufficiently in the Statewide Bacteria TMDL as sources. Given the extensive work conducted by the NWQI in agricultural sources in these watersheds, which is not as detailed in the Statewide Core Document, RIDEM wanted to include a more specific table of the agricultural sources in the cover document.



## General Questions and Comments

29. A premise of the 2011 Statewide Bacteria TMDL core document and individual WBID appendices is that urbanized stormwater is a contributor to the bacterial impairment of the waterbodies when impervious cover of the watershed is greater than 10 percent. The 2023 Update to the Statewide TMDL for Bacteria does not implicate urbanized stormwater as a significant contributor to the bacterial impairments of Borden Brook, Quaker Brook, or the Tributary to Nonquit Pond, however each individual WBID appendix does, even though each watershed is significantly less than 10% impervious cover (3-5%). **Stormwater runoff from agricultural fields, wetlands, forests, and other non-developed land is a different contributor than impervious cover stormwater runoff and should be considered separately in these TMDL documents.**

### RIDEM Response:

RIDEM acknowledges that stormwater can come from urban and rural areas. Pollutants can come from several sources within the watershed. Reductions must be achieved on a watershed basis. In the Reasonable Assurance section, RIDEM acknowledged “In some cases, reductions from individual sources (e.g. manure piles, direct animal access to waterbody) can and should be given greater priority.”

30. There is significant difference between urbanized stormwater runoff (subject to the RIPDES MS4 permit requirements) and stormwater runoff over agricultural &/or non-developed land. The studies that RIDEM cite in previous TMDL documents: “As the level of imperviousness increases in a watershed, more rainfall is converted to runoff rather than infiltrated into the ground. Impervious cover percent, by direct reservoir watershed, ranges from 1% in Gardiner Pond to 30% in Bailey Brook. Studies by the Center for Watershed Protection (CWP 2003) and others (ENSR 2005) have documented water quality and habitat impacts at watershed impervious levels in the 10% and above range.” (From Total Maximum Daily Loads for Phosphorus Newport Drinking Water Reservoirs, RIDEM, 2021).

### RIDEM Response:

RIDEM notes the comment. No changes were requested in this comment and no changes were made to the document.

31. If significant improvements to agricultural practices have been documented and current notes of “owner working with NRCS”, then why not resample streams in 2023 before releasing this TMDL to establish if more action is needed? The RIPDES MS4 TMDL Implementation requirements are based on the percent reduction targets identified in the TMDL. Having reduction target values that are not reflective of significant work in the watershed over the last 3 years may cause undue financial and maintenance burdens to the MS4 for expensive engineered treatment systems that may not be needed if the agricultural practices are improved. **How confident is RIDEM in the reduction targets with the sampling data being collected before the agricultural education and outreach program with NRCS and significant agricultural improvements being made within last 5 years?**

RIDEM Response:

RIDEM expects to resample the watersheds in its ambient river monitoring (ARM) program in 2025. That data would be available for the 2026 303(d) assessment cycle. Should improvements be documented in the data, then the waterbodies would be delisted at that time. No changes have been made to the document.

32. **Could recent and proposed agricultural changes be sufficient for these watersheds to be listed as a Category 4b on the 303(d) list??** Significant improvements to agricultural practices have been documented since sampling and TMDL analysis, and the TMDL also notes that “owner working with NRCS”, so could these be considered “other pollution control requirements”. (Category 4b: Other pollution control requirements are reasonably expected to result in attainment of the water quality standard in the near future. Waterbodies will be placed in this subcategory where other pollution control requirements are stringent enough to implement any water quality standard applicable to the water.) This designation would be in accordance with the Alternatives Goal section in RIDEM’s 303(d) Vision Framework.

RIDEM Response:

Category 4B is used when a TMDL is not needed because other pollution control requirements are expected to result in the attainment of applicable water quality standards in a reasonable period of time. Given the diverse nature of bacteria pollution sources in the watershed, RIDEM has determined that a TMDL is the best tool to bringing these waterbodies back into compliance with water quality standards. No changes have been made to the document.

**33. Please describe the methodology of identifying outfalls as a “Priority Outfall” and requiring IDDE investigations.** A TMDL priority outfall is an outfall that is significant source to the impairment and water quality treatment at the end-of-pipe or within the system would abate the contribution. There should be visual &/or sampling evidence to identify them as “priority”. It appears that every outfall in all of the watersheds is a considered a “priority outfall” with no stated evidence of it being a significant source of pollution. Additionally, the Priority Outfalls are specifically identified for IDDE investigations with no evidence that IDDE is a potential source of the impairment. Consider using the RIDOT Consent Decree (United States of America v. Rhode Island Department of Transportation cv-15-433, 2015) Appendix 7 “System Vulnerability Criteria”, visual evidence, and outfall sampling data as a framework for assigning IDDE to a watershed.

**RIDEM Response:**

In drinking water supply watersheds, outfalls greater than 12” in diameter with a direct or localized discharge to the waterbody or outfalls of any size with evidence of pollutant input to the waterbody (e.g. high sampling results in outfall or high sampling results downstream of the outfall’s input to surface waters) will be considered priority outfalls and require an illicit discharge evaluation under wet and dry conditions.

**34. Why are the Geometric Means calculated using the National Shellfish Sanitation Program protocol?** (There are no shell fishing or designated beaches in watersheds). Also, why are geomeans being calculated using non-detects values of reporting limit (10), instead of the EPA standard non-detect value of half the reporting limit (5)? This inflates the geomean, and therefore the reduction target. <https://www.epa.gov/risk/regional-guidance-handling-chemical-concentration-data-near-detection-limit-risk-assessments>

**RIDEM Response:**

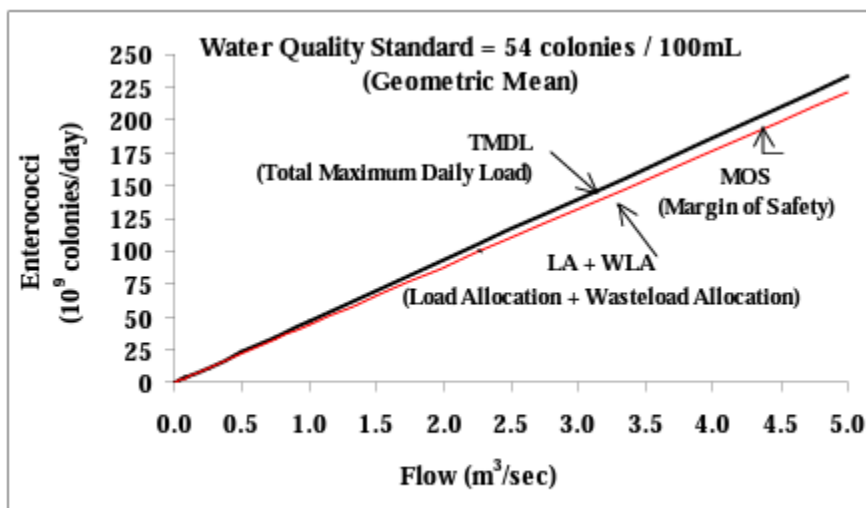
RIDEM acknowledges that no shellfishing waters or designated beaches are included in these TMDLs. The document cited references chemical concentration data, not bacteria data. In order to be conservative and achieve compliance with water quality standards, the reporting limit was used. No changes were made to the document.

35. **How can waste load allocations be calculated without flow data?** Flow data is required to make load reductions meaningful. High concentrations from small volume sources have little impact on receiving waters. For example: a high concentration of bacteria from isolated pet waste is less of a concern than a manure pile that may have a volume of hundreds of cubic yards of potential load. Both sources may result in an individual sample concentration value that has bacteria concentrations above reporting limits or that are too numerous to count using standard analysis techniques. Removing large loads would be more protective of the resource than reducing high concentrations from minor sources.

**RIDEM Response:**

Bacteria TMDLs use concentration data rather than loading data to determine allocations and what is necessary to achieve criteria. As stated in the Statewide Bacteria Core Document, expressing bacteria TMDLs in terms of concentration provides a direct link between existing water quality and numeric water quality criteria, consistent with water quality standards which apply for a range of flow and environmental conditions, and loads for bacteria can difficult to interpret.

Additionally, in the Statewide Bacteria Core Document, Appendix M provides a means to express the concentration targets as daily loads. Figure 1 and Table 1 from Appendix M (reproduced below) provide a general cross-walk for flows between 0.0 and 5.0 m<sup>3</sup>/sec. For flows >5 m<sup>3</sup>/sec Formula 1 (reproduced below on next page) can be used. Full details are documented in Appendix M<sup>3</sup>.



**Figure 1: Enterococci Freshwater Rivers and Streams Daily Loads**

<sup>3</sup> RIDEM Statewide Bacteria Core Document <http://www.dem.ri.gov/programs/benviron/water/quality/swbpdf/coretmdl.pdf>

**Table 1: Enterococci Freshwater Rivers and Streams Daily Loads**

Q Flow m <sup>3</sup> / sec	WQS <sup>1</sup> Water Quality Standard colonies / 100 mL	TMDL Total Maximum Daily Load 10 <sup>9</sup> colonies / day	MOS <sup>2</sup> Margin of Safety 10 <sup>9</sup> colonies / day	LA + WLA Load Allocation + Wasteload Allocation 10 <sup>9</sup> colonies / day
0.005	54	0.233	0.0117	0.222
0.01	54	0.467	0.0233	0.443
0.025	54	1.17	0.0583	1.11
0.05	54	2.33	0.117	2.22
0.075	54	3.50	0.175	3.32
0.1	54	4.67	0.233	4.43
0.25	54	11.7	0.583	11.1
0.5	54	23.3	1.17	22.2
0.75	54	35.0	1.75	33.2
1	54	46.7	2.33	44.3
5	54	233	11.7	222

mL: milliliter; L: Liter, m<sup>3</sup>: cubic meters  
<sup>1</sup>Water quality standard is a geometric mean of the samples.  
<sup>2</sup>Margin of safety is 5% of the water quality standard.

**Formula 1: Enterococci Freshwater Rivers and Streams Daily Loads**

$$TMDL\left(\frac{10^9 \text{ colonies}}{\text{day}}\right) = Flow\left(\frac{m^3}{\text{sec}}\right) \times WQS\left(\frac{\text{colonies}}{100\text{mL}}\right) \times 86,400\left(\frac{\text{sec}}{\text{day}}\right) \times 10\left(\frac{100\text{mL}}{L}\right) \times 1000\left(\frac{L}{m^3}\right) \div 10^9$$

It is assumed that the comment about removing large loads is in reference to the documented manure piles. In the Reasonable Assurance section, RIDEM acknowledged “In some cases, reductions from individual sources (e.g. manure piles, direct animal access to waterbody) can and should be given greater priority.” No changes were made to the document.

36. With clear evidence of agricultural and animal waste sources, **why did RIDEM not include personal care products or human pathogen testing to eliminate OWTS and IDDE as sources?** When an MS4 is identified as a contributing stakeholder in a TMDL report, the requirements (sampling, investigations, engineering/construction/maintenance of water quality treatment units) are not insignificant. If an additional sample could rule out a source, it should be completed at the time of sampling to assist the State and stakeholders in properly identifying the sources.

**RIDEM Response:**

TMDL's potential pollution source descriptions and implementation sections rely upon readily available information on watershed specific pollution sources as well as literature-based information on common sources of bacteria contributing to water quality impairments. Additionally, RIDEM is not the source of the pollution and is not responsible for implementation of the TMDL. The responsibility of pollution clean-up is the source of the pollution. No changes were made to the document.

**General Comments for All Three TMDL Appendices (Quaker, Borden, Unnamed Trib)**

37. RIDEM SURFACE WATER DATA LAYER: Unmapped miles of waterbodies should be added to RIDEM Surface Water data layer.

**RIDEM Response:**

The surface water data layer is utilized for reporting and tracking of assessment units for federal Clean Water Act purposes. During TMDL development, the full characterization of the waterbody is completed. No changes were made to the document.

38. MAP FIGURES - Consider using indicator arrows or locus circles with inset of Study Area for maps. Using the whole state of Rhode Island as a base map with a tiny green polygon or red line segments to indicate study area does not provide a clear location to readers not familiar with the study area.

**RIDEM Response:**

The suggestion is noted. Each individual waterbody summary contains insets with Study Area on the map. No changes were made in the documents.

39. PIE CHARTS - The pie charts indicate that water/wetlands in each watershed is 1 or 2% of the total watershed land use. This is incorrect. The RIDEM data layer for Wetland Type shows that wetland types make up about 30% of the watershed land use (for Trib to Nonquit Pond). See Figure 1 at end of comments. The TMDL document identifies wetlands, wetland corridors as significant potential sources. They should be properly identified on maps and figures. It appears only the RIGIS Land Use & Land Cover data layer was used for pie chart; **the RIDEM Wetland GIS layer should also be used.**

**RIDEM Response:**

The values for the pie charts were generated using the land use attribute data for the coverages that are maintained by the RIDEM GIS Coordinator. No changes were made in the documents.

40. TABLES - Table numbering in the individual TMDL documents are not consistent and do not follow standard naming/identification conventions (first table mentioned should be Table 1; all tables should be mentioned and explained in document).

Tables in the three TMDLs should all have the same format, columns, titles; and include whether the sample is being used as DRY or WET weather.

**RIDEM Response:**

The table numbering order was corrected.

41. PAGE NUMBERING - Page numbering in the in the individual TMDL documents are not consistently formatted and should follow the standard report convention used in the Updates to Statewide Bacteria.

**RIDEM Response:**

The suggestion is noted. The page number for Tributaries to Nonquit Pond were moved to match the other waterbody specific appendices.

42. CITATIONS - Standard citation nomenclature should be used throughout.

**RIDEM Response.**

Suggestion noted. No changes were made to the document.

43. HEADINGS - Standard headings/groupings should be used throughout to clarify headings/subheadings. Stormwater runoff, Waterfowl, Agricultural, etc. should be subheadings under "exceedances and potential sources" not equal headings.

**RIDEM Response:**

Suggestion noted. No changes were made to the document.

44. AVAILABLE DATA - Repeated statement in all documents: "However there is little information, other than pipe diameter, that would allow for evaluation of accurate water quality impacts etc." RIDOT has a public stormwater map (available since 2016) that includes the RIDOT stormwater drainage, roadway, RIDEM data layers, and Stormwater Control Plan (aka TMDL Implementation Plan) data. The data available on the public map includes catch basins, manholes, pipes, outfalls, conveyances, and Stormwater Treatment Units. Each of these data layers have attribute data and metadata, which can be used to accurately assess water quality impacts. RIDOT, with review and coordination with RIDEM and EPA, have developed standard protocols, definitions, calculations, and reports for IDDE, water quality crediting, catchment delineation, and identification of potential sources and contributions of impairments. RIDEM may request this data, training, and investigation information at any time to assist with accurate assessments.



**RIDOT public Stormwater Map**

<https://ridot.maps.arcgis.com/apps/webappviewer/index.html?id=b516ed62a55847e28d0243ac07206856>

**RIDEM Response:**

The document has been updated to reflect some outfalls and acknowledgment that progress has been made. The RIDOT Stormwater Map link has been added as a footnote to that section.

45. RIDEM Wetland layer appears to be significantly more than 1% of land cover.

RIDEM Response:

RIDEM GIS Land use coverage was used for all TMDL documents.

