



Mile Brook

Watershed Description

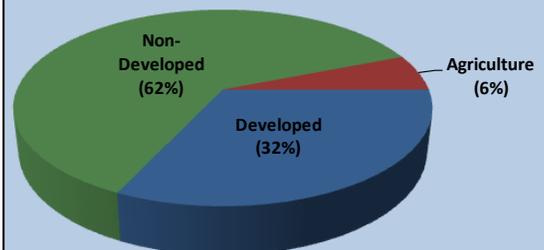
This **TMDL** applies to the Mile Brook assessment unit (RI0008039R-14), a 2-mile long stream located in Hopkinton, RI (Figure 1). The Town of Hopkinton is located in the southwestern corner of the state and is bordered to the east by Connecticut, to the north by Exeter, RI, and to the south by Westerly, RI. Mile Brook is located in the southwestern portion of town. The Mile Brook watershed is presented in Figure 2 with land use types indicated.

The western branch of Mile Brook begins in a medium to high-density residential development near Bayberry Drive in Hopkinton, RI. The eastern branch begins in a low-density residential development and agricultural area near the intersection of Egypt Street and Diamond Hill Road. The two branches join just north of Route 216 and flow southwest. Mile Brook flows through a forested area just south of the Hopkinton Recreational Department fields and into a medium to high-density residential development near Oak Street. The brook then empties into the Pawcatuck River along the border with the Town of Westerly.

The Mile Brook watershed covers 1.2 square miles. Non-developed areas, occupy a large portion (62%) of the watershed. Developed uses (including residential, commercial, and transportation uses) occupy approximately 32%, and are concentrated in the northern portion of the watershed. Most of the developed land is occupied by medium to high-density residential developments. Agricultural land uses cover 6% of the watershed and are concentrated near the eastern branch of Mile Brook. Impervious cover occupies 9.8% of the watershed.

Assessment Unit Facts (RI0008039R-14)

- **Town:** Hopkinton
- **Impaired Segment Length:** 2 miles
- **Classification:** Class B
- **Direct Watershed:** 1.2 mi² (765 acres)
- **Impervious Cover:** 9.8%
- **Watershed Planning Area:** Wood – Pawcatuck (#23)



Watershed Land Uses

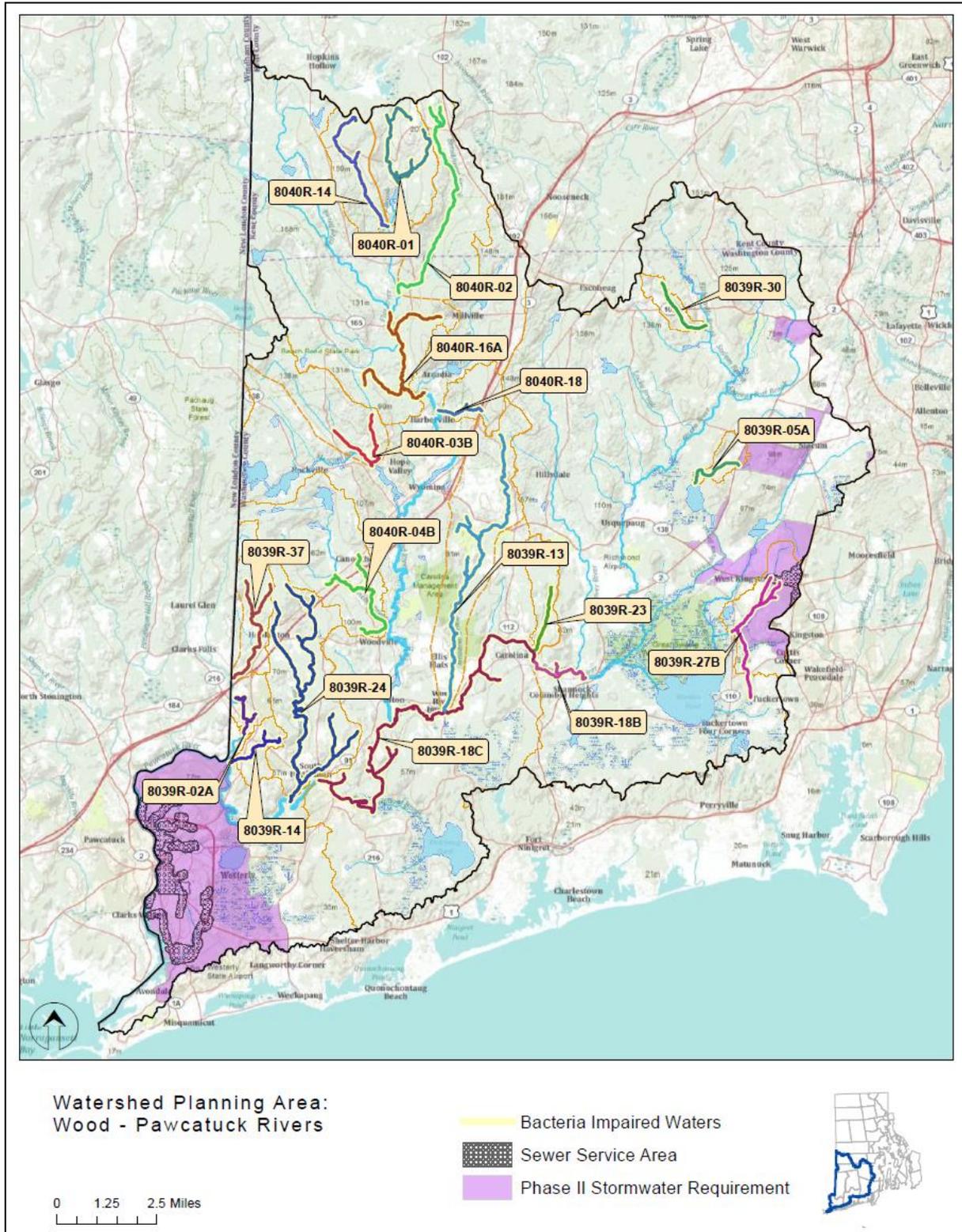


Figure 1: Map of the Wood-Pawcatuck Watershed Planning Area with impaired segments addressed by the Statewide Bacteria TMDL, sewered areas, and stormwater regulated zones.

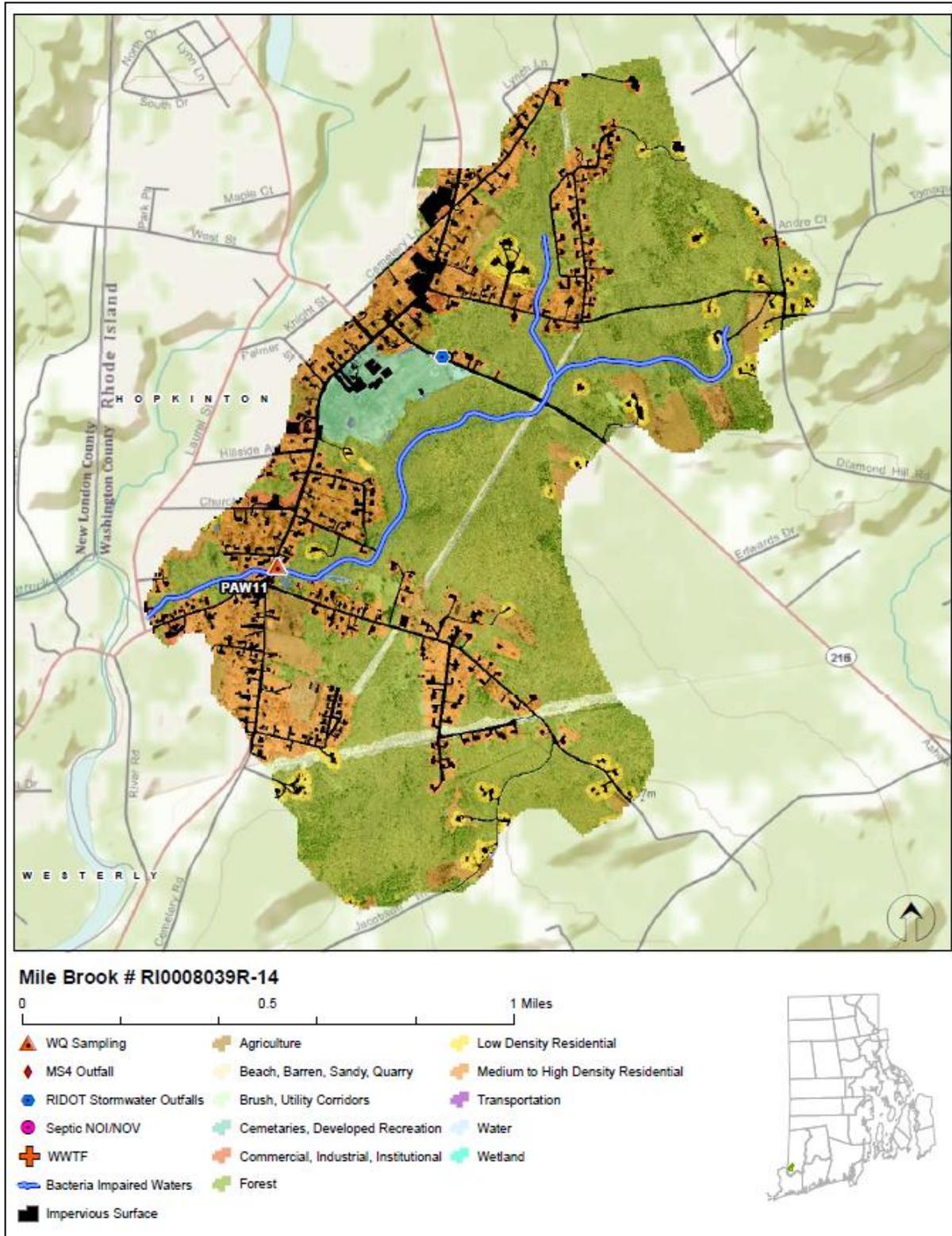


Figure 2: Map of the Mile Brook watershed with impaired segment, sampling location, and land cover indicated.

Why is a TMDL Needed?

Mile Brook is a Class B fresh water stream, and its applicable designated uses are primary and secondary contact recreation and fish and wildlife habitat (RIDEM, 2009). From 2005-2006, water samples were collected from one sampling location (PAW11) and analyzed for the indicator bacteria, enterococci. The water quality criteria for enterococci, along with bacteria sampling results from 2005-2006 are presented in Table 1. The geometric mean was calculated for station PAW11 and exceeded the water quality criteria for enterococci. All samples were taken in dry-weather conditions. Possible dry and wet weather sources are described in the sections below. Potential sources include improperly operating onsite wastewater treatment systems (OWTS), wastes from agriculture activities, as well as wastes from waterfowl, wildlife, and domestic pets.

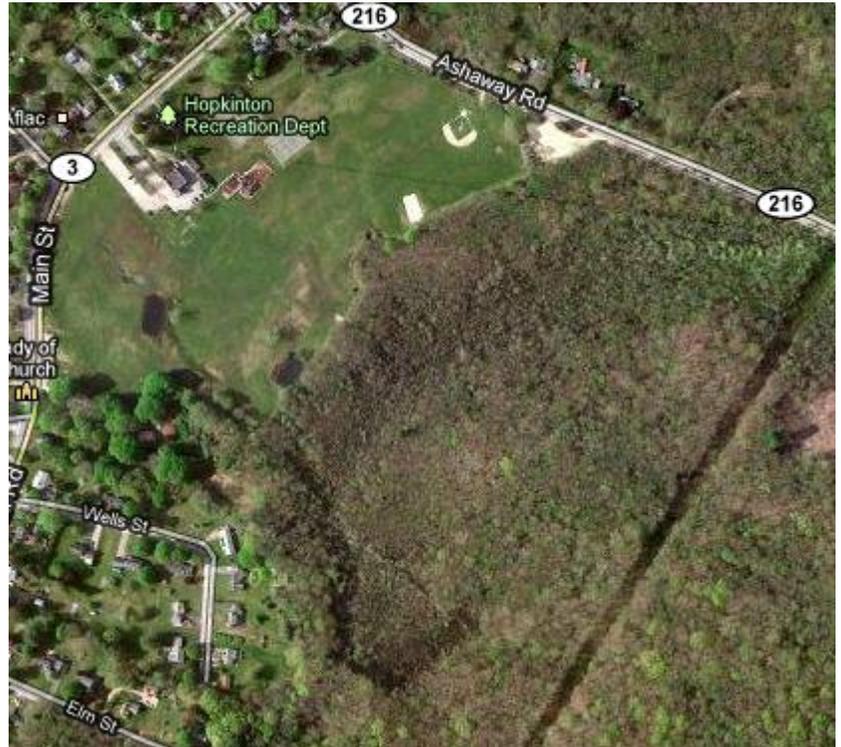


Figure 3: Partial aerial view of the Mile Brook watershed (Source: Google Maps)

Due to the elevated bacteria measurements presented in Table 1, Mile Brook does not meet Rhode Island's bacteria water quality standards, is identified as impaired, and was placed on the 303(d) list (RIDEM, 2008). The Clean Water Act requires that all 303(d) listed waters undergo a TMDL assessment that describes the impairments and identifies the measures needed to restore water quality. The goal is for all waterbodies to comply with state water quality standards.

Mile Brook has previously been assessed by RIDEM as impaired for iron. No TMDLs have been completed to address these impairments.

Potential Bacteria Sources

There are several potential sources of bacteria in the Mile Brook watershed including malfunctioning onsite wastewater treatment systems, stormwater runoff from developed areas, agricultural activities, and waterfowl, wildlife, and domestic animal waste.

Onsite Wastewater Treatment Systems

All residents in the Mile Brook watershed rely on onsite wastewater treatment systems (OWTS) such as cesspools and septic systems. Failing OWTS can be significant sources of bacteria by allowing improperly treated waste to reach surface waters (RI HEALTH, 2003). If systems are improperly sized, malfunctioning, or in soils poorly suited for septic waste disposal, microorganisms such as bacteria, can easily enter surface water (USEPA, 2002). As shown in Figure 2, there have been no OWTS Notices of Violation/Notices of Intent to Violate (NOV/NOI) issued by the RIDEM Office of Compliance and Inspection in the Mile Brook watershed.

Developed Area Stormwater Runoff

Most of the development in the Mile Brook watershed is concentrated in the northern portion of the watershed. The watershed has an impervious cover of 9.8%. Impervious cover is defined as land surface areas, such as roofs and roads that force water to run off land surfaces, rather than infiltrating into the soil. Impervious cover provides a useful metric for the potential for adverse stormwater impacts. While runoff from impervious areas in the developed portions of the watershed may be contributing bacteria to Mile Brook, as discussed in Section 6.3 of the Core TMDL Document, as a general rule, impaired streams with watersheds having less than 10% impervious cover are assumed to be caused by sources other than urbanized stormwater runoff.

As part of Phase II requirements, the Rhode Island Department of Transportation (RIDOT) has identified and mapped stormwater outfalls within the Town of Hopkinton. As shown in Figure 2, one outfall is found in the Mile Brook watershed.

Agricultural Activities

Agricultural operations are an important economic activity and landscape feature in the state's rural areas. The Mile Brook watershed has multiple agricultural operations in the eastern portion of the watershed. Agricultural runoff may contain pollutants, such as bacteria. Agricultural practices such as allowing livestock to graze near streams, crossing livestock through waterbodies, spreading manure as fertilizer, and improper disposal of manure can contribute to bacterial contamination.

Waterfowl, Wildlife, and Domestic Animal Waste

Most of the central and southern portions of the Mile Brook watershed are undeveloped and is predominately forested. Wildlife, including waterfowl, may be a significant bacteria source to surface waters. With the construction of roads and drainage systems, these wastes may no longer be retained on the landscape, but instead may be conveyed via stormwater to the nearest surface water. As such these physical land alterations can exacerbate the impact of these natural sources on water quality.

Residential development is concentrated in the northern portion of the watershed. Waste from domestic animals, such as dogs, in these residential neighborhoods may also be contributing to bacteria concentrations in Mile Brook.

Existing Local Management and Recommended Next Steps

Additional bacteria data collection would be beneficial to support identification of sources of potentially harmful bacteria in the Mile Brook watershed. These activities could include sampling at several different locations and under different weather conditions (e.g., wet and dry). Field reconnaissance surveys focused on stream buffers, stormwater runoff, and other source identification may also be beneficial.

Based on existing ordinances and previous investigations, the following steps are recommended to support water quality goals.

Onsite Wastewater Management

All residents of the Town of Hopkinton and the Mile Brook watershed rely on OWTS (septic systems or cesspools). The Town of Hopkinton has a draft Onsite Wastewater Management Plan that provides a framework for managing the OWTS. As part of the wastewater planning process, Hopkinton should adopt ordinances to establish enforceable mechanisms to ensure that existing OWTS are properly operated and maintained. RIDEM recommends that communities create an inventory of onsite systems through mandatory inspections. Inspections help encourage proper maintenance and identify failed and sub-standard systems. Policies that govern the eventual replacement of sub-standard OWTS within a reasonable time frame should be adopted. The Rhode Island Wastewater Information System (RIWIS) can help develop an initial inventory of OWTS and track voluntary inspection and pumping programs (RIDEM, 2010b).

The Town of Hopkinton is not eligible for the Community Septic System Loan Program (CSSLP). The CSSLP program provides low-interest loans to residents to help with maintenance and replacement of

OWTS. It is recommended that the town develop a program to assist citizens with the replacement of older and failing systems.

Stormwater Management

The Rhode Island Department of Transportation (RIDOT) is a municipal separate storm sewer (MS4) operator (RIPDES permit RIR040036) in the Mile Brook watershed and has prepared a Phase II Stormwater Management Plan (SWMPP) for state-owned roads within the state. The Town of Hopkinton is not currently regulated under the Phase II Program.

The Town of Hopkinton does not currently have an ordinance to address illicit discharges. This type of ordinance prohibits illicit discharges to the storm drain system and provides an enforcement mechanism. It is recommended that any stormwater outfalls discharging in the vicinity of the sampling locations be monitored to check for illicit discharges. Illicit discharges can be identified through continued dry weather outfall sampling and microbial source tracking.

RIDOT's SWMPP and its 2011 Compliance Update outline its goals for compliance with the General Permit statewide. It should be noted that RIDOT has chosen to enact the General Permit statewide, not just for the urbanized and densely populated areas that are required by the permit. RIDOT has finished mapping its outfalls throughout the state and is working to better document and expand its catch basin inspection and maintenance programs along with its BMP maintenance program. SWMPPs are being utilized for RIDOT construction projects. RIDOT also funds the University of Rhode Island Cooperative Extension's Stormwater Phase II Public Outreach and Education Project, which provides participating MS4s with education and outreach programs that can be used to address TMDL public education recommendations.

As it is assumed that stormwater runoff is not the major contributor of bacteria to Mile Brook based on the watershed's imperviousness, RIDOT will have no changes to its Phase II permit requirements and no TMDL Implementation Plan (TMDL IP) will be required at this time.

Agricultural Activities

If not already in place, agricultural producers should work with the RIDEM Division of Agriculture, and the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) to develop a conservation plan for farming activities in the watershed. NRCS and the RIDEM Division of Agriculture should continue to work with agricultural operations in the watershed to ensure that there are sufficient stream buffers, have fencing to restrict access of livestock and horses to streams and wetlands, and have animal waste handling, disposal, and other appropriate BMPs in place.

Waterfowl, Wildlife, and Domestic Animal Waste

The Town of Hopkinton should develop education and outreach programs to highlight the importance of picking up after dogs and other pets and not feeding waterfowl. Animal waste should be disposed of away from any waterway or stormwater system. Hopkinton should work with volunteers to map locations where animal waste is a significant and a chronic problem. The town should also evaluate strategies to reduce the impact of animal waste on water quality. This may include installing signage, providing pet waste receptacles or pet waste digester systems in high-use areas, enacting ordinances requiring clean-up of pet waste, and targeting educational and outreach programs in problem areas.

The town and residents can take several measures to minimize waterfowl-related impacts. They can allow tall, coarse vegetation to grow in areas along the shores of the Mile Brook that are frequented by waterfowl. Waterfowl, especially grazers like geese, prefer easy access to the water. Maintaining an uncut vegetated buffer along the shore will make the habitat less desirable to geese and encourage migration. With few exceptions, Part XIV, Section 14.13, of Rhode Island's Hunting Regulations prohibits feeding wild waterfowl at any time in the state of Rhode Island. Educational programs should emphasize that feeding waterfowl, such as ducks, geese, and swans, contributes to water quality impairments in Mile Brook and can harm human health and the environment.

Land Use Protection

Woodland areas within the Mile Brook watershed absorb and filter pollutants from stormwater runoff, and help protect both water quality in the stream and stream channel stability. As these areas represent 62% of the land use in the Mile Brook Watershed, it is important to preserve these undeveloped areas, and institute controls on development in the watershed. The Hopkinton Land Trust was established in 2004 and has since protected 875 acres of land through property acquisition and conservation easements (Town of Hopkinton, 2011). The town should work with the land trust to protect more of the undeveloped land in Hopkinton, with a focus on lands around Mile Brook.

The steps outlined above will support the goal of mitigating bacteria sources and meeting water quality standards in Mile Brook.

Table 1: Mile Brook Bacteria Data

Waterbody ID: RI0008039R-14

Watershed Planning Area: 23 – Wood-Pawcatuck

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

Impairment: Enterococci (colonies/100mL)

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

Percent Reduction to meet TMDL: 12% (Includes 5% Margin of Safety)

Data: 2004-2005; 2008 from RIDEM

Single Sample Enterococci (colonies /100 mL) Results for Mile Brook (2005-2006) with Geometric Mean Statistics

Station Name	Station Location	Date	Result	Wet/Dry	Geometric Mean
PAW11	Mile Brook at Nooseneck Hill Road (Rt 3) near Maxson St, Hopkinton	10/27/2006	1	Dry	58 (12%)*
PAW11	Mile Brook at Nooseneck Hill Road (Rt 3) near Maxson St, Hopkinton	8/9/2006	410	Dry	
PAW11	Mile Brook at Nooseneck Hill Road (Rt 3) near Maxson St, Hopkinton	5/31/2006	170	Dry	
PAW11	Mile Brook at Nooseneck Hill Road (Rt 3) near Maxson St, Hopkinton	9/21/2005	160	Dry	
Shaded cells indicate an exceedance of water quality criteria *Includes 5% Margin of Safety					

Wet and Dry Weather Geometric Mean Enterococci Values for Station PAW11

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
PAW11	Mile Brook at Nooseneck Hill Road (Rt 3) near Maxson St, Hopkinton	2005-2006	0	4	58	NA	58
Shaded cells indicate an exceedance of water quality criteria Weather condition determined from rain gage at URI in Kingston, RI							

References

- RIDEM (2008). State of Rhode Island and Providence Plantations 2008 303(d) List – List of Impaired Water Bodies. Rhode Island Department of Environmental Management.
- RIDEM (2009). State of Rhode Island and Providence Plantations Water Quality Regulations. Amended December, 2009. Rhode Island Department of Environmental Management.
- RIDEM (2010a). MS4 Compliance Status Report for RI Statewide Bacteria TMDL. Rhode Island Department of Environmental Management.
- RIDEM (2010b). Total Maximum Daily Load Analysis for the Pawcatuck River and Little Narragansett Bay Waters (Bacteria Impairments). Rhode Island Department of Environmental Management.
- RI HEALTH (2003). North Kingstown Drinking Water Assessment Results, Source Water Protection Assessment conducted by the University of Rhode Island for the Rhode Island Department of Health, Office of Drinking Water Quality.
- Town of Hopkinton (2010). Town of Hopkinton Comprehensive Plan 5- Year Update. Online: http://www.hopkintonri.org/pdfs_downloads/Planning/Hopkinton%20Comp%20Plan%20Update%20Oct%201%202010%20FINAL%20-%20amended%20101510.pdf
- USEPA (2002). Onsite Wastewater Treatment Systems Manual – Office of Water, Office of Research and Development – EPA/625/R-00/008. Online: www.epa.gov/owm/septic/pubs/septic_2002_osdm_all.pdf.