Huntinghouse Brook

Watershed Description

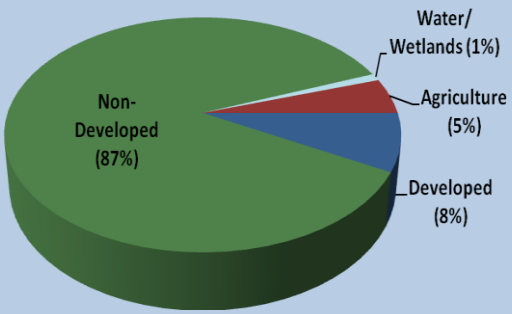
This **TMDL** applies to the Huntinghouse Brook assessment unit (RI0006015R-11), a 4-mile long stream located in Scituate and Glocester, RI (Figure 1). The Towns of Scituate and Glocester are located in the northwestern portion of the state. The impaired segment is a tributary to the Scituate Reservoir. The Huntinghouse Brook watershed is presented in Figure 2 with land use types indicated.

Huntinghouse Brook begins in a forested area in the southern portion of Glocester, south of Snake Hill Road. The brook flows southeast, parallel to low-density residential developments along Huntinghouse Brook Road. The brook crosses Rocky Hill Road just east of Gleaner Chapel Road and continues east parallel to Rocky Hill Road. Mosquitohawk Brook joins Huntinghouse Brook just before it crosses Elmdale Road. Huntinghouse Brook empties into the Scituate Reservoir at the northern end of the eastern arm of the reservoir.

The Huntinghouse Brook watershed covers 6.4 square miles and is largely non-developed, as shown in Figures 2 and 3. Non-developed land accounts for 87% of watershed area. Developed areas occupy 8% of the land area, and consist mostly of medium-density residential neighborhoods. Most of the development is located near the downstream end of the brook along Rocky Hill Road and Quaker Lane. Agricultural uses occupy 5% of the land area and are concentrated in the northern portion of the watershed near the headwaters of Mosquitohawk Brook. Surface water and wetlands account for 5% of the watershed area.

Assessment Unit Facts (RI0006015R-11)

- **Town:** Scituate and Glocester
- **Impaired Segment Length:** 4 miles
- **Classification:** Class AA
- **Direct Watershed:** 6.4 mi² (4,069 acres)
- **Impervious Cover:** 3.4%
- **Watershed Planning Area:** Pawtuxet (#12)



Watershed Land Uses

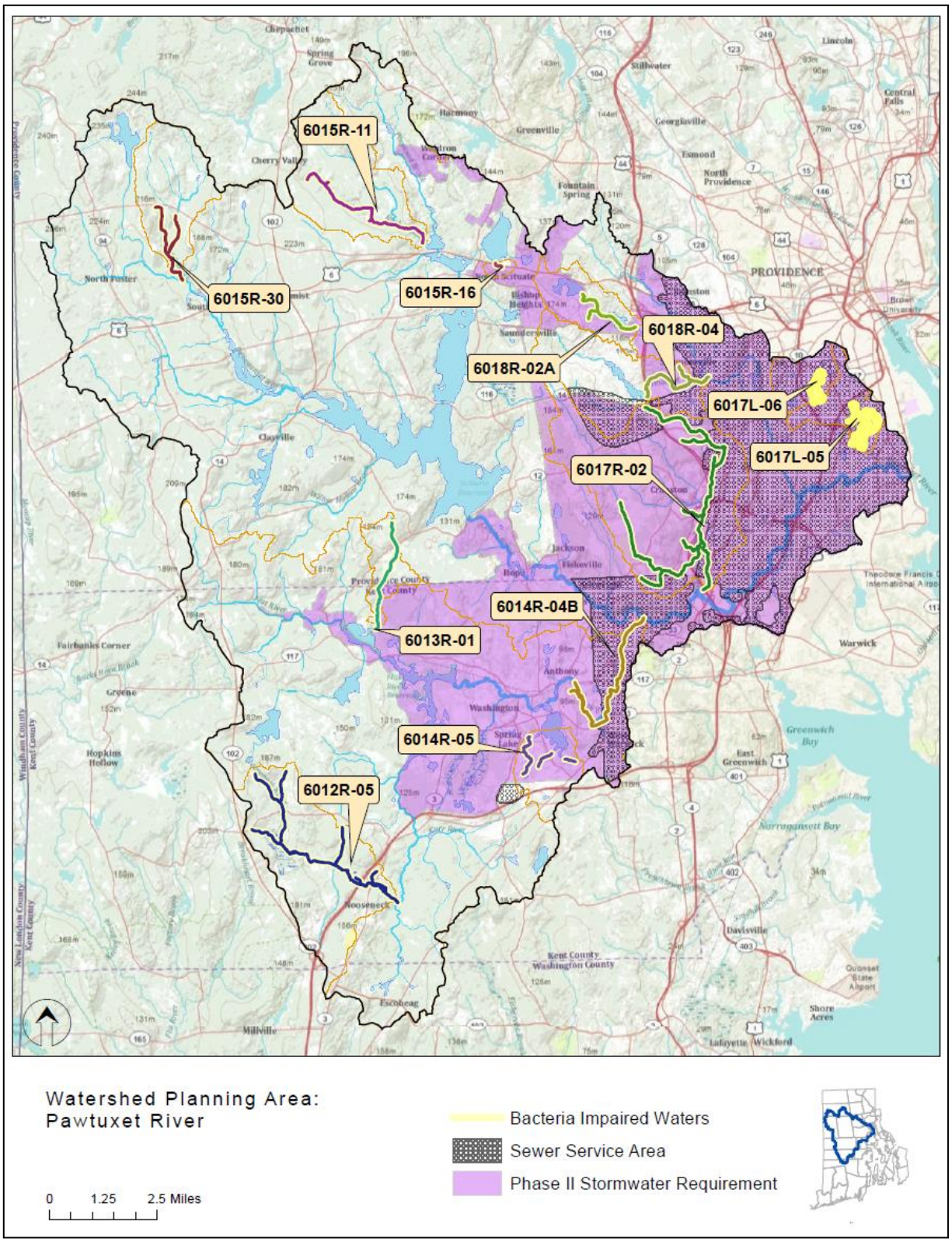


Figure 1: ***Map of the Pawtuxet Watershed Planning Area with impaired segments addressed by the Statewide Bacteria TMDL, sewered areas, and stormwater regulated zones.***

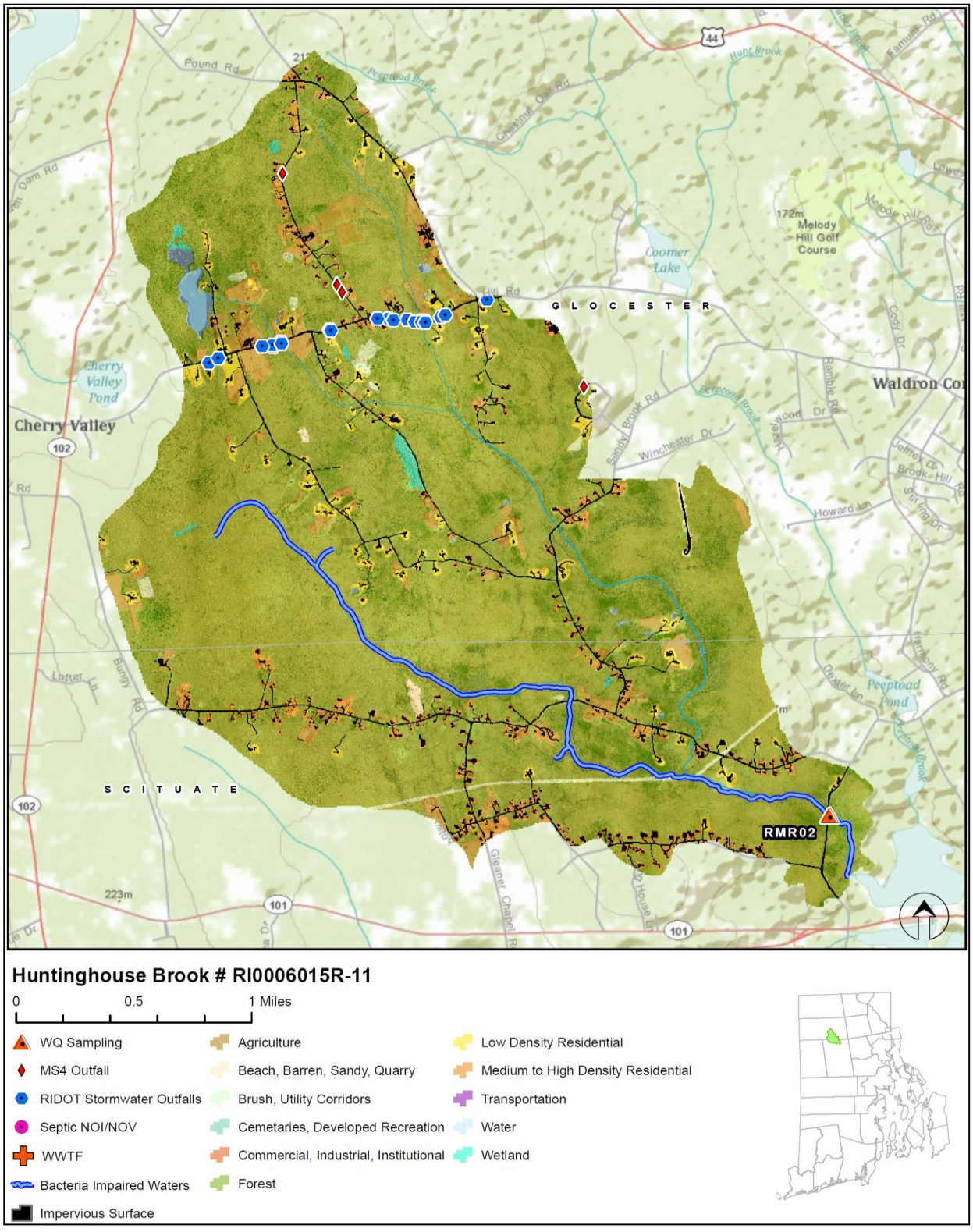


Figure 2: ***Map of the Huntinghouse Brook watershed with impaired segment, sampling location, and land cover indicated.***

Why is a TMDL Needed?

Huntinghouse Brook is a Class AA fresh water stream and is a tributary within the Scituate Reservoir watershed, which is the source of supply to the Providence Water Supply Board public drinking water supply system. However, as it is not a terminal reservoir, its applicable designated uses are primary and secondary contact recreation (RIDEM, 2009). Due to its designation as an ecological habitat and a critical habitat for rare and endangered species, Huntinghouse Brook has been designated by RIDEM as a Special Resource Protection Water (SRPW) providing it with special protections under RIDEM's Antidegradation Provisions. SRPWs are high quality surface waters that have been identified as having significant ecological or recreational uses and/or are public water supplies.

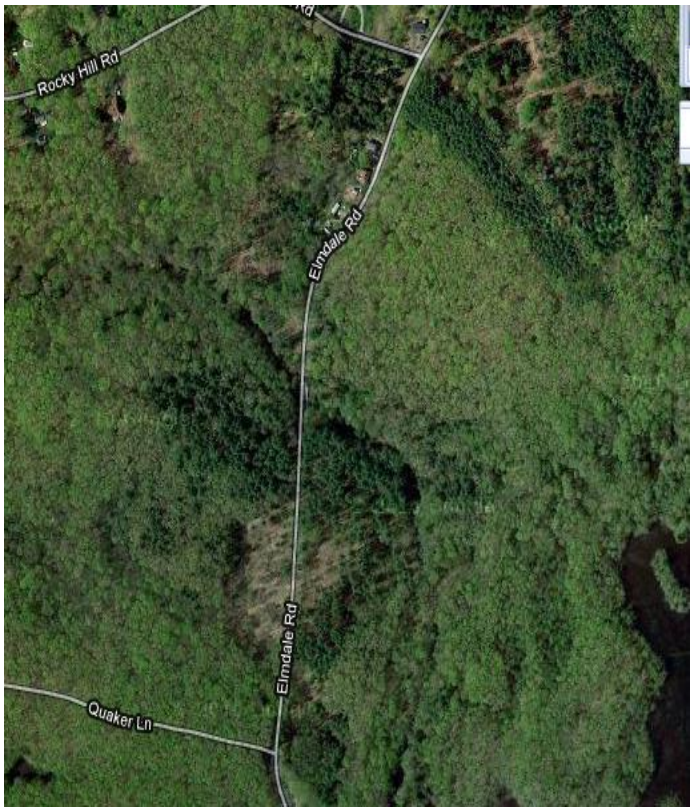


Figure 3: ***Partial aerial view of the Huntinghouse Brook watershed. (Source: Google Maps)***

From 2007-2008, water samples were collected from one location (RMR02) and analyzed for the indicator bacteria, enterococci. The water quality criteria for enterococci, along with bacteria sampling results from the 2007-2008 study and associated statistics are presented in Table 1. The geometric mean was calculated for Station RMR02 and exceeded the water quality criteria for enterococci. All samples were taken in dry-weather conditions.

Due to the elevated bacteria measurements presented in Table 1, the Huntinghouse Brook assessment unit does not meet Rhode Island's water quality standards. The segment was identified as impaired and 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.

Potential Bacteria Sources

There are several potential sources of bacteria in the Huntinghouse Brook watershed including malfunctioning onsite wastewater treatment systems, agricultural runoff, waterfowl, wildlife, and domestic animal waste, and stormwater runoff. Each type of potential bacteria source is described briefly below.

Onsite Wastewater Treatment Systems

All residents in Glocester and Scituate, including those within the Huntinghouse Brook watershed, rely entirely on onsite wastewater treatment systems (OWTS) such as septic systems and cesspools for waste disposal. Failing OWTS can be a significant source 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). In Glocester, 14% of the soils are poorly to very poorly drained, while 7% of soils are excessively drained (Town of Glocester, 2006). About 34% of Scituate is restricted from development by seasonally high water tables, or hydric soils (Town of Scituate, 2003). These soil characteristics pose significant risks for septic disposal because high groundwater does not allow for the waste to break down and be disposed of properly. No OWTS Notices of Violation/Notices of Intent to Violate have been issued to residents in the Huntinghouse Brook watershed.

Developed Area Stormwater Runoff

Though the majority of the Huntinghouse Brook watershed is undeveloped, impervious surfaces cover approximately 3.4%, particularly in the residential areas in the southern portion of the watershed. 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 developed portions of the watershed may be contributing bacteria to Huntinghouse 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.

In accordance with Phase II requirements for the Municipal Separate Storm Sewer System (MS4), Scituate and Glocester have identified and mapped outfalls to surface water bodies within their Phase II regulated areas (RIDEM, 2010). The Rhode Island Department of Transportation (RIDOT) has also mapped stormwater outfalls. As shown in Figure 2, numerous RIDOT outfalls were found along Snake Hill Road. Four stormwater outfalls were also found in Glocester. All outfalls are located in the northern half of the watershed.

Agricultural Activities

Agricultural operations are an important economic activity and landscape feature in the state's rural areas. Agricultural land use occupies 8% of the land area in the Huntinghouse Brook watershed. However, most of the agricultural activities in the watershed, including hay fields, pasture, and low-intensity cropland, is located directly adjacent to Huntinghouse Brook and Mosquitohawk Brook, particularly around Snake Hill Road (Figure 2). Manure-based fertilizers may contain harmful amounts of bacteria. If there is not an adequate stream buffer around agricultural lands, polluted runoff from these areas could reach the brook.

Waterfowl, Wildlife, and Domestic Animal Waste

Non-developed land accounts for 87% of the watershed area. Woodland and wetland areas are home to multiple species of wildlife and waterfowl. 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.

Domestic animals within the Huntinghouse Brook watershed represent another potential source of bacteria to the brook. Residential developments are located directly adjacent to the stream in several areas. If residents are not properly disposing of pet waste, the bacteria from that waste could enter and contaminate the stream either directly or through stormwater.

Existing Local Management and Recommended Next Steps

Both Scituate and Glocester have developed and implemented programs to protect water quality from bacterial contamination. Future mitigative activities are necessary to ensure the long-term protection of Huntinghouse Brook. Additional bacteria data collection would be beneficial to support identification of sources of potentially harmful bacteria in the watershed. These activities could include sampling at several different locations and under different weather conditions (e.g., wet and dry). Field reconnaissance surveys focusing on stream buffers, stormwater runoff, and other source identification may also be beneficial.

Both Scituate and Glocester have Comprehensive Plans that provide technical resources for protection of the Huntinghouse Brook watershed. A brief description of existing local programs and recommended next steps are provided below. Stakeholders should review the Comprehensive Plan documents directly for more detailed information.

Onsite Wastewater Management

All residents in the Huntinghouse Brook watershed rely on OWTS (Figure 1). Both Scituate and Glocester have Onsite Wastewater Management Plans that provide a framework for managing the OWTS.

Glocester has taken a number of proactive steps, including developing an Onsite Wastewater Management Plan to protect the groundwater and surface water in town from problems with onsite wastewater disposal (Edwards and Kelcey, 2004). A 1997 study conducted for the Town of Glocester found that there were concerns with OWTS failing and polluting surface and ground water. The study suggested the town develop a Wastewater Management District (WWMD) to help educate citizens about septic disposal issues, detect failing systems, and enforce ordinances pertaining to testing and maintenance (Fuss & O'Neill, 1997). In 1999, the Town of Glocester created the Glocester Wastewater Management Board to administer the town's Wastewater Management District Ordinance (Town of Glocester, 2011). The ordinance addresses the potential issues OWTS pose to the town's water resources (Glocester WWMD, 2003). Developing such programs gives the town greater authority to proactively address wastewater management issues, providing a more comprehensive protection for surface and groundwater (Edwards and Kelcey, 2004). Routine inspections and record keeping of the location and maintenance history of all OWTS in the town allow Glocester to determine where systems are failing and provide an important enforcement tool in the prevention of bacterial contamination. Glocester's Wastewater Management Board should continue to aggressively locate failing systems and educate citizens.

As part of an onsite wastewater management planning process, Scituate should adopt ordinances to establish enforceable mechanisms to ensure that existing OWTS are properly operated and maintained. RIDEM recommends that all communities create an inventory of onsite systems through mandatory inspections. Inspections 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 can track voluntary inspection and pumping programs (RIDEM, 2010b).

To assist with the maintenance and replacement of malfunctioning OWTS, Glocester is eligible for Rhode Island's Community Septic System Loan Program (CSSLP). CSSLP provides funds to towns for low-interest loans to residents for the replacement and maintenance of OWTS. As of 2010, the Town of Glocester had received $550,000 through the program. Glocester should continue to pursue funds through CSSLP. The Town of Scituate is not currently eligible for CSSLP. It is recommended that Scituate develop a program to assist citizens with the replacement of older and failing systems.

Agricultural Activities

If not already in place, the U.S. Department of Agriculture Natural Resources Conservation Service and the RIDEM Division of Agriculture should work with local agricultural operations, particularly on Snake Hill Road in Glocester, to develop conservation plans for their farming activities in the watershed. These plans should ensure that there are sufficient stream buffers, that fencing exists to restrict access of livestock and horses to streams and wetlands, and that animal waste handling, disposal, and other appropriate BMPs in place. A plan should be developed to evaluate the contributions of these farms and other sites to the bacterial contamination in Huntinghouse Brook.

Waterfowl, Wildlife, and Domestic Animal Waste

Glocester and Scituate's education and outreach programs should highlight the importance of picking up after dogs and other pets and not feeding waterfowl. Animal wastes should be disposed of away from any waterway or stormwater system. Scituate and Glocester should work with volunteers to map locations where animal waste is a significant and chronic problem. This work should be incorporated into the towns' Phase II plans and should result in an evaluation of 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.

Towns 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 Huntinghouse 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, may contribute to water quality impairments in Huntinghouse Brook and can harm human health and the environment.

Stormwater Management

RIDOT (RIPDES permit RIR040036) is a municipal separate storm sewer (MS4) operator in the Huntinghouse Brook watershed and has prepared a Phase II Stormwater Management Plan (SWMPP) for state-owned roads. Though the Towns of Scituate (RIPDES permit RIR040027) and Glocester (RIPDES permit RIR040038) are regulated by the Phase II program, the Huntinghouse Brook watershed is outside of the Phase II regulated area.

In 2009, the Town of Glocester developed a draft illicit discharge detection and elimination (IDDE) ordinance (RIDEM, 2010), while the Town of Scituate has not adopted an IDDE ordinance. This type of ordinance prohibits illicit discharges to the MS4 and provides an enforcement mechanism. Glocester has also developed procedures aimed at detecting illicit discharges (Town of Glocester, 2006). Detecting these discharges is a central component of the IDDE program. Illicit discharges can be significant sources of bacterial contamination and Glocester should continue to have thorough measures in place for detection and elimination (Town of Glocester, 2006). Both towns should make finalizing and adopting the IDDE ordinance a priority in the future and should continue to locate priority areas to identify and eliminate illicit discharges in the Huntinghouse Brook watershed. It is recommended that any stormwater outfalls discharging in the vicinity of the sampling location 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 Huntinghouse Brook based on the watershed's imperviousness, RIDOT, Scituate, and Glocester will have no changes to their Phase II permit requirements and no TMDL Implementation Plan (TMDL IP) will be required at this time.

Land Use Protection

The majority of the Huntinghouse Brook watershed is undeveloped, however only a small portion is protected as open space. As source waters to Providence's water supply, preserving these natural areas is particularly important. Woodland areas within the Huntinghouse Brook watershed absorb and filter pollutants from stormwater and agricultural runoff, and help protect both water quality in the stream and stream channel stability. The Town of Scituate has proposed to develop a conservation overlay district around Huntinghouse Brook to protect this resource from development (Town of Scituate, 2003). The Providence Water Supply Board and the Town of Glocester should continue to preserve undeveloped

forest and wetlands around the brook. It is important to preserve these undeveloped areas and institute controls on development in Huntinghouse Brook watershed.

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

Table 1: Huntinghouse Brook Bacteria Data

***Waterbody ID*:** RI0006015R-11

Watershed Planning Area: 12 – Pawtuxet

Characteristics: Freshwater, Class AA, Tributary within a Public Drinking Supply, Primary and Secondary Contact Recreation, SRPW

Impairment: Enterococci (colonies/100mL)

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

Percent Reduction to meet TMDL: **10% (Includes 5% Margin of Safety)**

Data: 2006-2007 from RIDEM

Single Sample Enterococci (colonies/100 mL) Results for Huntinghouse Brook (2007-2008) with Geometric Mean Statistics

Station Name	Station Location	Date	Result	Wet/Dry	Geometric Mean
RMR02	Huntinghouse Brook on Elmdale road	8/18/2008	365	Dry	**57 (10%)***
RMR02	Huntinghouse Brook on Elmdale road	7/16/2008	56	Dry	
RMR02	Huntinghouse Brook on Elmdale road	7/1/2008	276	Dry	
RMR02	Huntinghouse Brook on Elmdale road	5/20/2008	4	Dry	
RMR02	Huntinghouse Brook on Elmdale road	10/30/2007	27	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 RMR02

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
RMR02	Huntinghouse Brook on Elmdale Road	2007-2008	0	5	57	NA	57

Shaded cells indicate an exceedance of water quality criteria

Weather condition determined from the Weather Underground rain gage in Lincoln, RI

References

Fuss & O'Neill (1997). Final Report – Glocester Wastewater Management Study. Prepared for the Town of Glocester, Rhode Island. Prepared by: Fuss & O'Neill Inc. Consulting Engineers.

Fuss & O'Neill (2003). Phase II Stormwater Management Plan: Town of Scituate, Rhode Island (Draft). Submitted by Fuss & O'Neill, Inc, Providence, RI. Revised March 2004.

Glocester (2001). Town of Glocester Comprehensive Community Plan. Online:www.glocesterri.org/ComprehensivePlan.pdf.

Glocester WWMD (2003). Town of Glocester Wastewater Management District Rules & Regulations. Online: www.glocesterri.org/docs/wwmb02-11-04.pdf.

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 (2009b). State of Rhode Island and Providence Plantations Water Quality Regulations. Amended December, 2009. Rhode Island Department of Environmental Management.

RIDEM (2010b). MS4 Compliance Status Report for RI Statewide Bacteria TMDL. Rhode Island Department of Environmental Management.

RIHEALTH (2003). The Scituate Reservoir Source Water Assessment. University of Rhode Island Cooperative Extension in cooperation with Rhode Island Department of Health Source Water Assessment Program, Office of Drinking Water Quality.

Town of Glocester (2006). Town of Glocester, Rhode Island. Phase II Stormwater Management Program Plan (SWMPP). Prepared by Maguire Group with Northern Rhode Island Conservation District.

Town of Glocester (2011). Glocester RI Wastewater Management. Online:http://www.glocesterri.org/wastewater.htm

Town of Scituate (1994). Scituate, Rhode Island Comprehensive Plan. Prepared by the Situate Planning Board and the Successful Communities Advisory Committee and the Conservation Foundation. Updated June 2003.

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.