Pascoag River

Watershed Description

This **TMDL** applies to the Pascoag River assessment unit (RI0001002R-09), a 0.8-mile long impaired river segment located in Burrillville, RI (Figure 1). The Pascoag River is located in the northern section of Glocester and the south-central section of Burrillville. The Pascoag River watershed is presented in Figure 2 with land use types indicated.

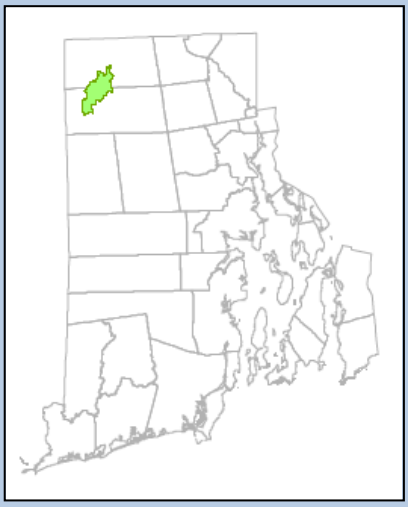
The headwaters of the Pascoag River originate in a wetland area between Willie Woodhead Road and Durfee Hill Road in Glocester, RI. The headwaters run north through Tepee Pond and under Durfee Hill road into the Burlingame Reservoir. The river then flows out of the reservoir and travels north under RI Route 44 (Putnam Pike) before flowing into the Pascoag Reservoir under Jackson Schoolhouse Road in Glocester.

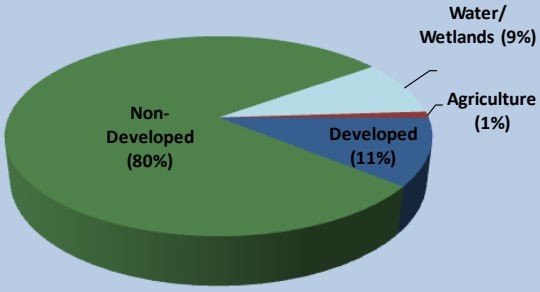
The impaired segment of the Pascoag River begins at the outlet of the Pascoag Reservoir. The river leaves the reservoir on the western side of a commercial area, near the intersection of Main Street and South Main Street in the Village of Pascoag. The river runs through the downtown section of Pascoag, passing under Sayles Avenue and Bridge Way before flowing into a forested area to the west of Veterans Memorial Park. The Pascoag River continues north and passes under Grove Street into a wetland area to the north of Shea Lane. At the northern end of the wetland area, the river flows into a tributary of the Branch River.

The Pascoag River watershed covers 8.5 square miles. As shown in Figure 3, non-developed lands occupy a large portion (80%) of the watershed. Developed uses occupy approximately 11% of the land area. Wetland and surface waters occupy 9% and 1% is used for agriculture.

Assessment Unit Facts (RI0001002R-09)

- **Town:** Burrillville
- **Impaired Segment Length:** 0.8 miles
- **Classification:** Class B
- **Direct Watershed:** 8.5 mi^2 (5,446 acres)
- **Impervious Cover:** 4.5%
- **Watershed Planning Area:** Branch - Blackstone (#8)





Watershed Land Uses

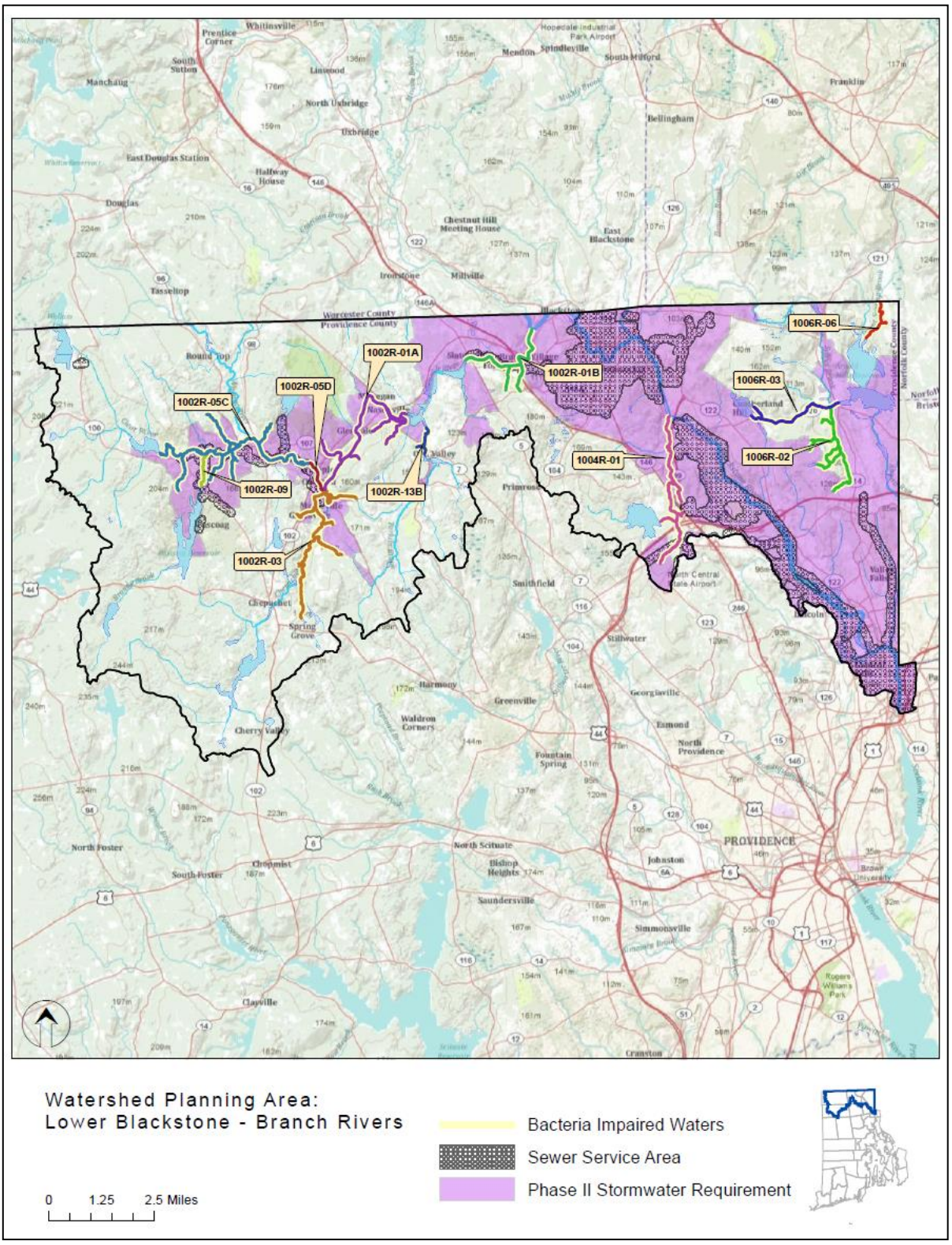


Figure 1: ***Map of the Branch-Blackstone Watershed Planning Area with impaired segments addressed by the Statewide Bacteria TMDL, sewered areas, and stormwater regulated zones.***

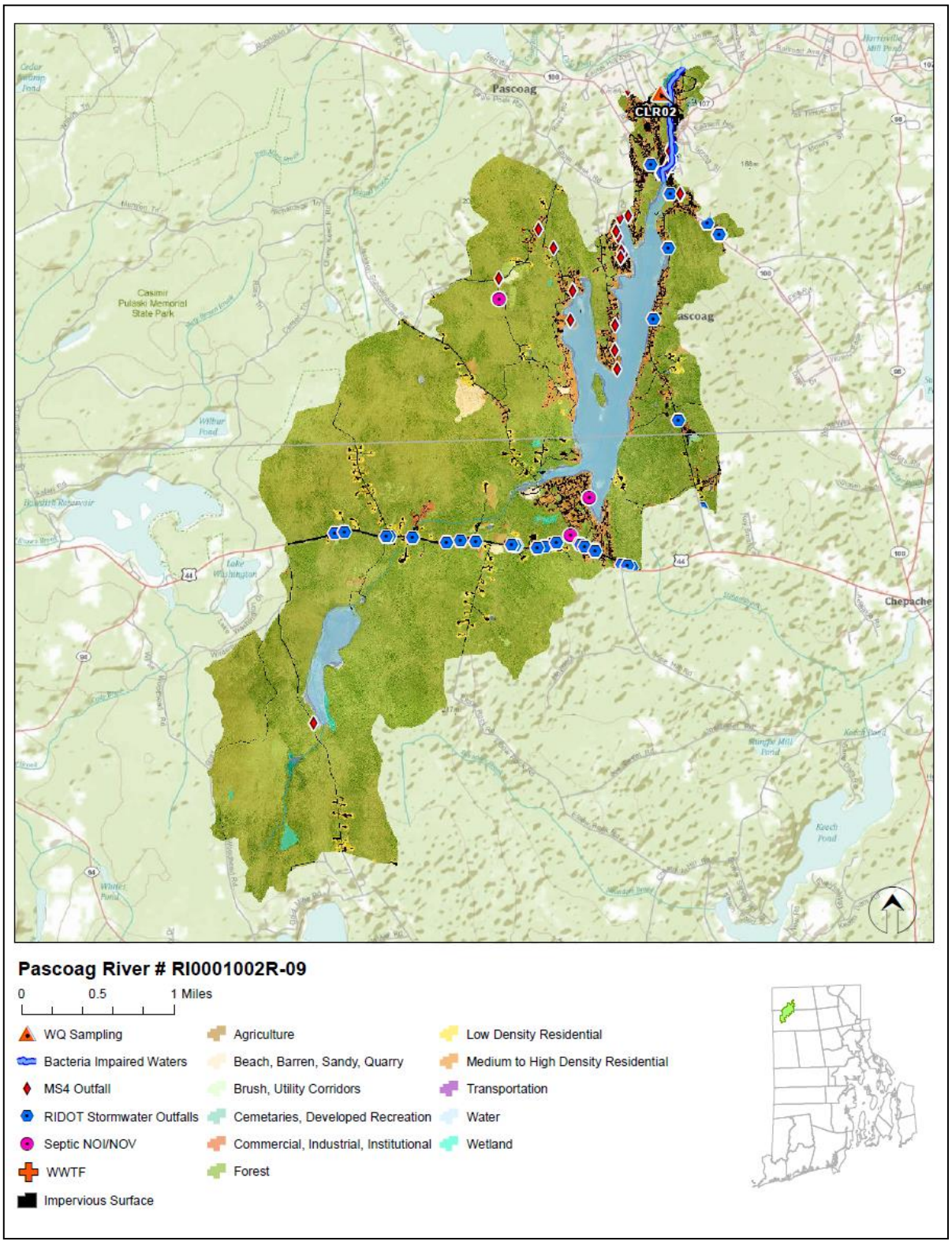


Figure 2: ***Map of the Pascoag River watershed with impaired segment, sampling location, and land cover indicated.***

Why is a TMDL Needed?

The Pascoag River is a Class B freshwater river with applicable designated uses of primary and secondary contact recreation and fish and wildlife habitat (RIDEM, 2009). From 2008-2009, water samples were collected from a single sampling location (CLR02) and analyzed for the indicator bacteria, enterococci. The water quality criteria for enterococci, along with bacteria sampling results from 2008-2009 and associated statistics are presented in Table 1. The geometric mean was calculated for Station CLR02 and exceeded the water quality criteria for enterococci. All samples were taken in dry-weather conditions.

Figure 3: ***Partial aerial view of the Pascoag River watershed (Source: Google Maps)***

Due to the elevated bacteria measurements presented in Table 1, the Pascoag River does not meet Rhode Island's bacteria water quality standards, was 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 impairments and identifies measures needed to restore water quality. The goal is for all water bodies to comply with state water quality standards.

The Pascoag River has also been identified by RIDEM as not meeting water quality standards for biodiversity (RIDEM, 2008). No TMDL has been completed for this impairment.

Potential Bacteria Sources

There are several potential sources of bacteria in the Pascoag River watershed including malfunctioning onsite wastewater treatment systems, illicit discharges, wildlife and domestic animal waste, and stormwater runoff from developed areas.

Onsite Wastewater Treatment Systems

The majority of the Pascoag River watershed is undeveloped and does not have access to Burrillville's municipal wastewater system (Figure 1). The only area of the watershed that is serviced by the municipal system is the small portion of the watershed surrounding the impaired segment. Most residents in the Pascoag River watershed rely on onsite wastewater treatment systems (OWTS) such as septic systems and cesspools. 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, are malfunctioning, or are in soils poorly suited for septic waste disposal, bacteria can easily be transported to adjacent surface waters (USEPA, 2002). The soils in much of the Pascoag River watershed are not well suited for OWTS due to shallow groundwater aquifers, flooding potential, slow percolation, and relatively steep slopes (Town of Burrillville, 2005). As shown in Figure 2, multiple OWTS Notices of Violation/Notices of Intent to Violate have been issued by the RIDEM Office of Compliance and Inspection in the watershed.

Sewer Leaks

As the municipal sewer system in the watershed is adjacent to the impaired segment, another potential source of bacterial contamination is leaks in the municipal sewer system. If there are any leaks within this system, the waste from the sewer, containing high levels of bacteria, could enter the river. Spills and leaks from municipal sewer systems can lead to human health issues from high bacteria levels and can potentially cause significant ecological damage (Mallin et. al., 2007).

Wildlife and Domestic Animal Waste

Domestic animals within the Pascoag River watershed represent another potential source of bacteria. High density residential developments are located directly adjacent to the river in several areas, particularly near the impaired segment of the river. Many of these neighborhoods have storm drainage pipes running through them, releasing their stormwater at outfalls on the river. If residents are not properly disposing of pet waste, by either leaving it in an area adjacent to the stream, or on a street with an MS4 outfall on the river, the bacteria associated with that waste could enter and contaminate the stream.

Sections of the Pascoag River watershed consist of large tracts of contiguous forest land that provide sanctuary to a variety of wildlife including squirrel, deer, and waterfowl (Town of Burrillville, 2005). Most of these forested areas surround the unimpaired segment of the river concentrating wildlife around the Pascoag River. 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.

Developed Area Stormwater Runoff

The Pascoag River watershed has an impervious cover of 4.5%. 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 the Pascoag River, 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.

The Town of Glocester and the Rhode Island Department of Transportation (RIDOT) have mapped stormwater outfalls within the Pascoag River watershed (Figure 2) (Town of Glocester, 2006). As of March 2010, nearly all of the storm drain outfalls within Burrillville were mapped. The Pascoag River was shown to receive discharges from multiple stormwater outfalls (Figure 2).

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 Pascoag River 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 would also be beneficial. Based on existing ordinances and previous investigations, the following steps are recommended to support water quality goals.

Onsite Wastewater Management

The majority of residents within the Pascoag River watershed rely on OWTS. The Town of Glocester has taken a number of proactive steps to protect the surface water in town from problems with onsite waste 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 water. The study suggested that 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 2003, the town passed a proposal and created the Glocester WWMD to address the potential issues OWTS pose to the town's water resources, including the Pascoag River (Glocester WWMD, 2003). The WWMD gives the town authority to proactively address wastewater management issues, providing more comprehensive protection for surface and groundwater (Edwards and Kelcey, 2004). As part of the wastewater management planning efforts, the town has passed ordinances that require routine pumping of OWTS and that identify sub-standard systems through mandatory inspections. The district enforces the ordinances. Glocester should continue to ensure that its ordinances are being enforced. To assist with the replacement of failing OWTS, Glocester is eligible for Rhode Island's Community Septic System Loan Program (CSSLP). This program provides loans to towns to use helping citizens to replace their failing or malfunctioning OWTS. Since 2001, the Town of Glocester has received $550,000 through the program.

While Glocester has multiple programs in-place to identify and replace malfunctioning OWTS, the Town of Burrillville does not have an Onsite Wastewater Management Plan or a septic system ordinance. As part of the onsite wastewater planning process, Burrillville 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).

The Town of Burrillville is currently not eligible for CSSLP. It is recommended that the town develop a program to assist citizens with the replacement of older and failing systems.

Illicit Discharges and Sewer Leaks

In 2009, Glocester created a draft illicit discharge detection and elimination (IDDE) ordinance. These types of ordinances prohibit illicit discharges to the MS4 and provide an enforcement mechanism. The town also has 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 a significant source of bacterial contamination and Glocester should continue to have thorough procedures in place for detection (Town of Glocester, 2006). Burrillville has adopted an illicit discharge detection and elimination ordinance (RIDEM, 2010a). These specific types of ordinances prohibit illicit discharges to the MS4 and provide an enforcement mechanism. A focus of detecting illicit discharges should be in the

commercial and residential development around the impaired segment of the river. Illicit discharges can be identified through continued dry-weather outfall sampling and microbial source tracking.

Burrillville should also have measures in place to determine if there are any municipal sewer system leaks in the portion of the watershed surrounding the impaired segment of the river serviced by their municipal sewer system.

Wildlife and Domestic Animal Waste

Glocester and Burrillville's education and outreach programs should highlight the importance of picking up after dogs and other pets and not feeding waterfowl, particularly around the many small ponds and larger reservoirs within the watershed. Animal wastes should be disposed of away from any waterway or stormwater system. Burrillville should work with volunteers from the town to map locations where animal waste is a significant and chronic problem. This work should be incorporated into the municipalities' 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 digester systems in high-use areas such as the Veterans Memorial Park in downtown Pascoag, enacting ordinances requiring clean-up, and targeting educational and outreach programs in problem areas.

Towns and residents can also take several measures to minimize waterfowl-related impacts. They can allow tall, coarse vegetation to grow in areas along the shores of reservoirs and Ponds, which 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 the Pascoag River and can harm human health and the environment.

Stormwater Management

The Town of Burrillville (RIDPES permit RIR040001) and RIDOT (RIPDES permit RIR040036) are municipal separate storm sewer system (MS4) operators in the Pascoag River watershed and have prepared Phase II Stormwater Management Plans (SWMPP). Most of the watershed area in Burrillville is regulated under Phase II program. Though the Town of Glocester (RIPDES permit RIR040038) is also regulated under the Phase II program, the watershed area within Glocester is outside of the regulated area.

Burrillville's SWMPP outlines goals for the reduction of stormwater runoff to the Pascoag River through the implementation of Best Management Practices (BMPs). Many of these BMPs are now in

place, including mapping all stormwater outfalls, instituting annual inspections and cleaning of the town's catch basins, implementing an annual street sweeping program, adopting construction erosion and sediment control and post-construction stormwater ordinances, and conducting public education activities (RIDEM, 2010a).

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. Storm Water Pollution Prevention Plans (SWMPP) 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 the Pascoag River based on the watershed's imperviousness, Burrillville, Glocester, and RIDOT will have no changes to their Phase II permit requirements and no TMDL Implementation Plan (TMDL IP) will be required at this time.

Burrillville recently took a positive step towards reducing stormwater runoff to surface waters in the town. The town was awarded a $61,000 grant under Rhode Island's Nonpoint Source Program for the installation of porous pavement at the town library's overflow parking lot. The lot is directly adjacent to the Clear River, another river impaired for bacteria, and the pavement was installed in November 2010 (Nonpoint Source, 2010). The town should continue to pursue grants and to support projects that help to reduce the volume of stormwater entering other surface waters, including the Pascoag River.

Land Use Protection

There are large sections of protected forest within the Pascoag River watershed. The Pulaski/ Washington State Forest is situated to the west of the Pascoag Reservoir and is within the watershed. The Town of Burrillville's Comprehensive Plan proposes multiple locations to preserve natural areas. Over 7,000 acres are zoned for conservation and open space and there are over ten square miles of open space within the town, indicating the town's commitment to preserving natural areas (Burrillville, 2004).

Preserving these natural areas is important as woodland and wetland areas within the Pascoag River watershed absorb and filter pollutants from stormwater and help protect both water quality in the stream and stream channel stability. As these areas represent approximately 88% of the land use in the Pascoag

River watershed, it is important to continue the preservation of these undeveloped areas, and to institute controls on development in the watershed.

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

Table 1: Pascoag River Bacteria Data

***Waterbody ID*:** RI0001002R-09

Watershed Planning Area: 8 – Branch - Blackstone

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: **82% (Includes 5% Margin of Safety)**

Data: 2008-2009 from RIDEM

Single Sample Enterococci (colonies/100 mL) Results for the Pascoag River (2008-2009) with Geometric Mean Statistics

Station Name	Station Location	Date	Result	Wet/Dry	Geometric Mean
CLR02	Pascoag River at Grove Ave off of N. Main Street (USGS 01111265)	8/20/2009	5492	Dry	**230 (82%)***
CLR02	Pascoag River at Grove Ave off of N. Main Street (USGS 01111265)	7/20/2009	99	Dry	
CLR02	Pascoag River at Grove Ave off of N. Main Street (USGS 01111265)	7/15/2009	63	Dry	
CLR02	Pascoag River at Grove Ave off of N. Main Street (USGS 01111265)	5/20/2009	14	Dry	
CLR02	Pascoag River at Grove Ave off of N. Main Street (USGS 01111265)	9/17/2008	1414	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 CLR02

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
CLR02	Pascoag River at Grove Ave off of N. Main Street (USGS 01111265)	2008-2009	0	5	230	NA	230

Shaded cells indicate an exceedance of water quality criteria
Weather condition determined from the Weather Underground rain gage in Lincoln, RI

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RIDEM (2007). State of Rhode Island and Providence Plantations 2007 Final Consolidated Assessment and Listing Methodology for 305(b) and 303(d) Integrated Water Quality monitoring and Assessment Reporting. Online: www.dem.ri.gov/programs/benviron/water/quality/surfwq/pdfs/calm.pdf.

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