



Chepachet River

Watershed Description

This **TMDL** applies to the Chepachet River assessment unit (RI0001002R-03), a 6.6-mile long impaired river segment located in Glocester and Burrillville, RI (Figure 1). The Chepachet River is located in the north-central section of Glocester, and flows into the south-central corner of Burrillville. The Chepachet River watershed is presented in Figure 2 with land use types indicated.

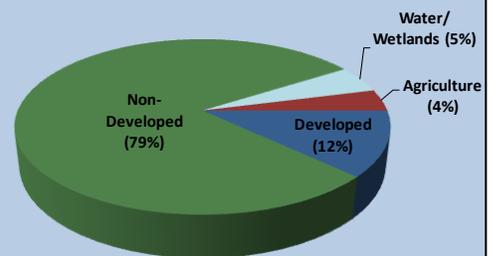
The headwaters of the Chepachet River originate in several areas in Glocester and Burrillville. The impaired segment of the river begins at the outlet of New Pond in Glocester and flows north where it meets a major tributary on the northern side of Douglas Hook Road. The river continues north through a large wooded area and crosses into Burrillville. Another impaired tributary to the river flows into the main stem just north of a quarry at the intersection of Gazza Road and Peach Orchard Road in Burrillville. The river continues north under Gazza Road and flows into Gilleran Pond. As the river leaves the pond, it flows north under Main Street into an unnamed impoundment and is met by two small impaired segments, before it joins with the Clear River to form the Branch River in Burrillville.

The Chepachet River is a well known scenic and historic river in New England. Congress established the Blackstone River Valley National Heritage Corridor in 1986, which includes the Chepachet River (NPS, 2003). It is also a well known fly fishing destination in Rhode Island, and is one of the designated trout waters stocked by RIDEM's Division of Fish & Wildlife (Fish & Wildlife, 2010).

The Chepachet River watershed covers 21.3 square miles. Non-developed lands cover a large portion (79%) of the watershed. Developed uses occupy approximately 12% of the land area. Wetland and surface waters contribute 5%, and agriculture uses 4%.

Assessment Unit Facts *(RI0001002R-03)*

- **Town:** Glocester & Burrillville
- **Impaired Segment Length:** 6.6 miles
- **Classification:** Class B
- **Direct Watershed:** 21.3 mi² (13,62 acres)
- **Impervious Cover:** 4.9%
- **Watershed Planning Area:** Branch - Blackstone (#8)



Watershed Land Uses

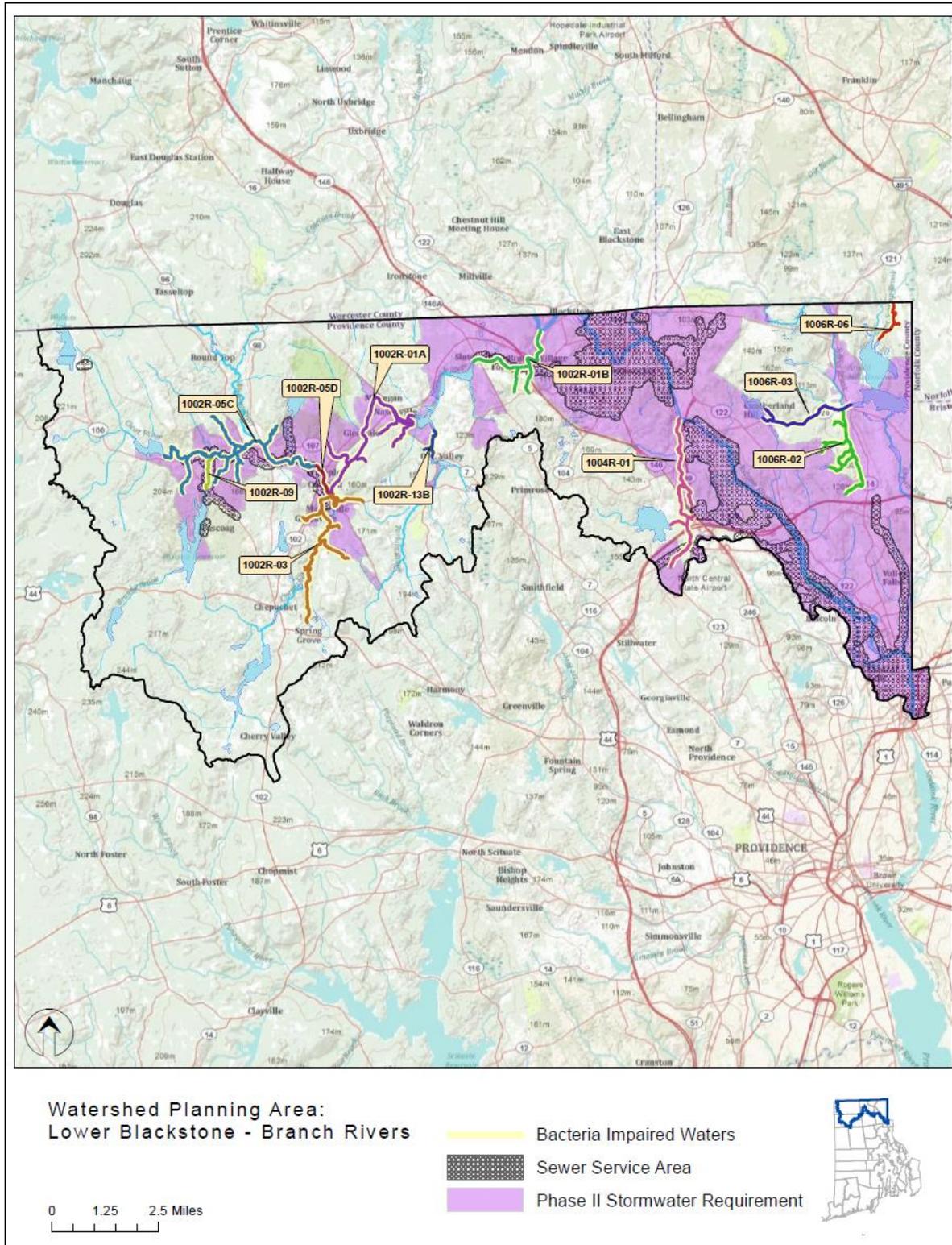


Figure 1: Map of the Branch and Blackstone Watershed Planning Area with impaired segments addressed by the Statewide Bacteria TMDL, sewered areas, and stormwater regulated zones.

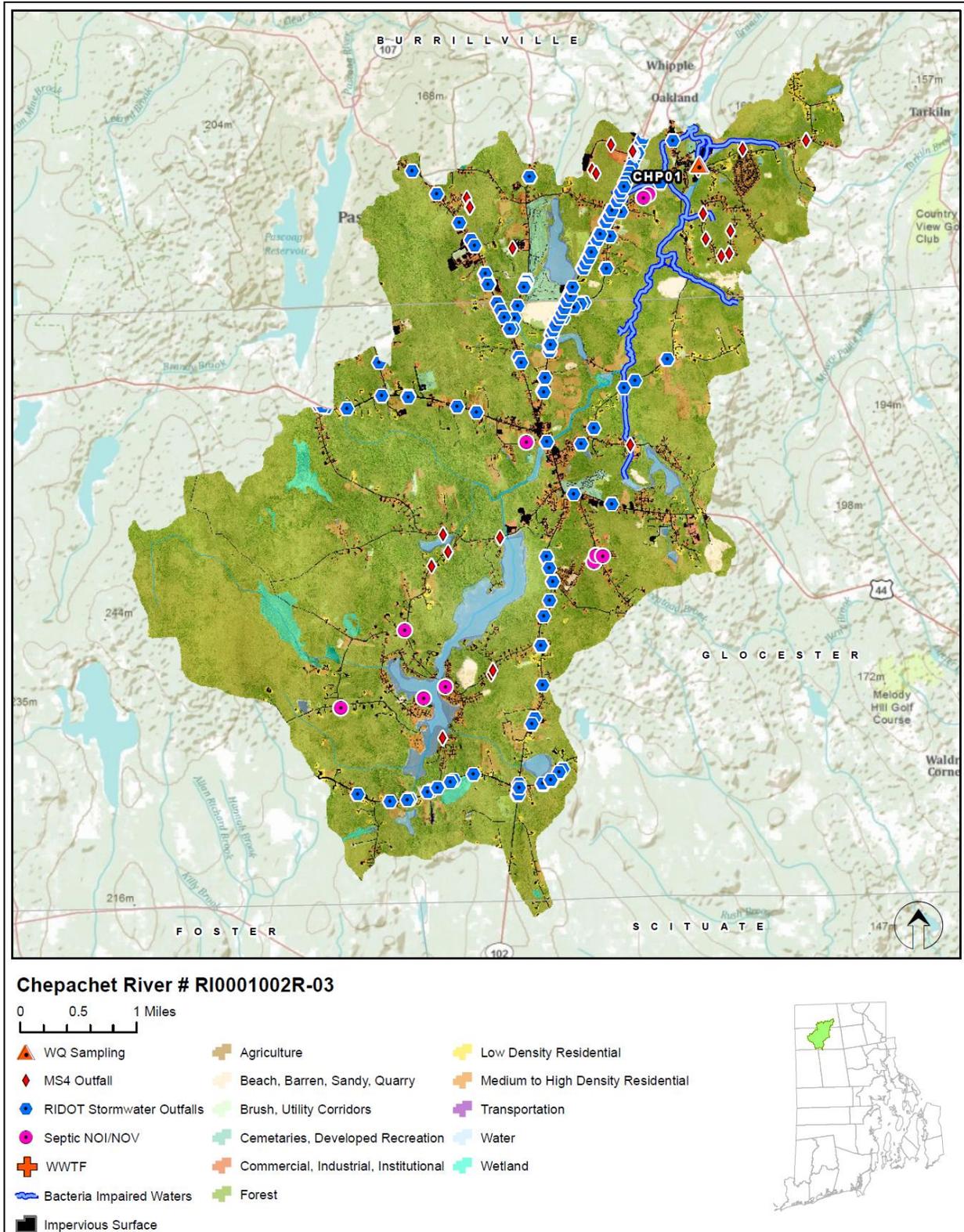


Figure 2: Map of Chepachet River watershed with impaired segment, sampling location, and land cover indicated.

Why is a TMDL Needed?

The Chepachet River is a Class B fresh water 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 (CHP01) 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 CHP01 and exceeded the water quality criteria for enterococci. All samples were collected in dry-weather conditions.

Due to the elevated bacteria measurements presented in Table 1, the Chepachet 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.

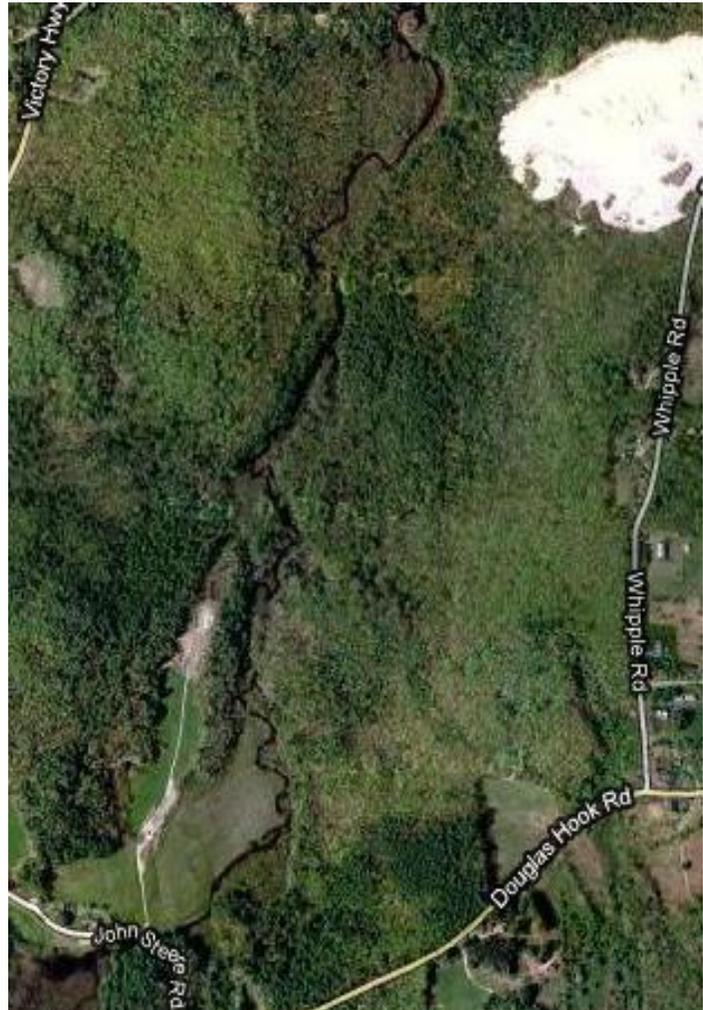


Figure 3: Partial aerial view of the Chepachet River watershed (Source: Google Maps)

Potential Bacteria Sources

There are several potential sources of bacteria in the Chepachet 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

Glocester, which occupies a larger portion of the watershed than Burrillville, relies solely on onsite wastewater treatment systems (OWTS), such as septic systems and cesspools, to treat their wastewater (Glocester, 2001). Only a small section of the watershed in the Village of Mapleville in Burrillville is serviced by a municipal wastewater system (Figure 1). Mapleville is located near the mouth of the river, where the Chepachet River joins with the Clear River to form the Branch River.

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, are malfunctioning, or are in soils poorly suited for septic waste disposal, bacteria can easily be transported to surface waters (USEPA, 2002). As shown in Figure 4, the soils in much of the Chepachet 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; Edwards and Kelcey, 2004). The Chepachet River flows through the middle of Chepachet Village in the Town of Glocester. A study conducted in 2003 found that within the village, seven percent of the lots were unsuitable for conventional septic waste disposal due to a combination of lot size and soil constraints (Edwards and Kelcey, 2004). 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 within the watershed in both Glocester and Burrillville.

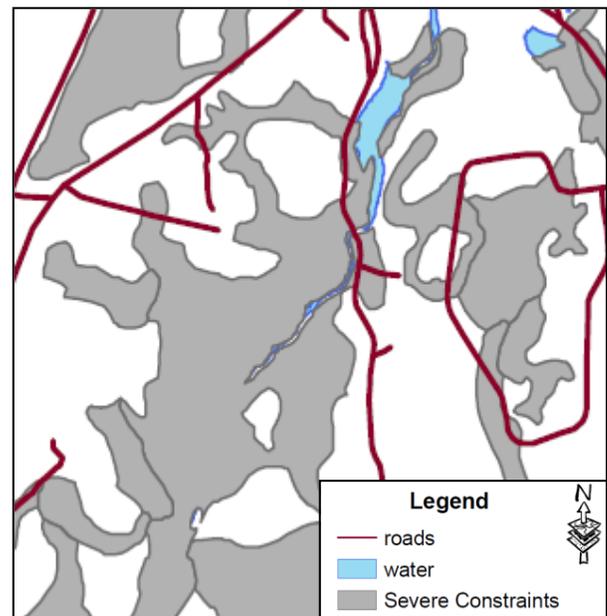


Figure 4: Map in a portion of the Chepachet River watershed in Burrillville that shows soils with severe constraints for development and septic disposal (in gray). (Source: Town of Burrillville, 2005)

Sewer Leaks

As previously noted, the only municipal wastewater system within the watershed provides service to the Village of Mapleville. If there are any leaks within this sewer line, the waste from the sewer, could easily enter the river. Spills and leaks from municipal sewer systems can cause human health issues due to high bacteria levels, and can cause potentially significant ecological damage (Mallin *et. al.*, 2007).

Wildlife and Domestic Animal Waste

Domestic animals within the Chepachet River watershed represent a 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, with outfalls directly on the river. If residents are not properly disposing of pet waste, the bacteria from that waste could enter and contaminate the stream.

Sections of the Chepachet River watershed consist of large tracts of contiguous forest land, in both Glocester and Burrillville, which provide sanctuary to a variety of wildlife including squirrel, deer, and waterfowl (Town of Burrillville, 2005; Glocester, 2001). 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 Chepachet River watershed has an impervious cover of 4.9%. 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 Chepachet 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 Chepachet River watershed (Figure 2) (Town of Glocester, 2006). As of March 2010, nearly all of the storm drain outfalls within Burrillville were mapped as part of their Phase II requirements (MS4). The Chepachet River was shown to receive discharges from multiple stormwater outfalls (Figure 2). An area of particular concern is the high-density commercial and residential development surrounding the impaired segment in the Village of Mapleville.

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 Chepachet River watershed. These activities could include sampling at several different locations and under different weather conditions (e.g., wet and dry). Additional focus areas for sampling should be the reaches of the unimpaired segment of the river in Glocester. 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 Chepachet 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 septic systems pose to the town's water resources, including the Chepachet 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 ordinances are enforced by the district. 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.

Sewer Leaks

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 within the watershed. Animal wastes should be disposed of away from any waterway or stormwater system. Both towns should work with volunteers from their town to map locations where animal waste is a significant and chronic problem. This work should be incorporated into their 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, 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 Chepachet River and can harm human health and the environment. Glocester and Burrillville should ensure that mention of this regulation is included in their SWMPPs.

Stormwater Management

The Town of Burrillville (RIDPES permit RIR040001) and RIDOT (RIPDES permit RIR040036) are municipal separate storm sewer system (MS4) operators in the Chepachet 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 Chepachet 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).

In 2009, Glocester created a draft illicit discharge detection and elimination (IDDE) ordinance. The town also has procedures aimed at detecting illicit discharges (Town of Glocester, 2006). Burrillville has also adopted an illicit discharge detection and elimination ordinance (RIDEM, 2010a). These types of ordinances prohibit illicit discharges to the MS4 and provide an enforcement mechanism. Detecting these discharges is a central component of the IDDE program. Illicit discharges can be a significant source of bacterial contamination and towns should continue to have thorough procedures in place for detection (Town of Glocester, 2006). 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. Storm Water Pollution Prevention Plans (SWPPP) 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 Chepachet 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 Chepachet River.

Land Use Protection

There are large sections of protected forest within the Chepachet River watershed. Glocester has made preserving the natural character of the town one of its priorities (Glocester, 2001). Glocester should focus its preservation efforts on wetland and woodland areas surrounding the Chepachet River. Within the Town of Burrillville's Comprehensive Plan, specific policies were proposed to preserve natural areas. Over 7,000 acres are zoned for conservation and open space, and there is over 10 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 because woodland and wetland areas within the Chepachet 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 82% of the land use in the Chepachet River watershed, it is important to continue the preservation of these undeveloped areas, and 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 Chepachet River.

Table 1: Chepachet River Bacteria Data

Waterbody ID: RI0001002R-03

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: 15% (Includes 5% Margin of Safety)

Data: 2008-2009 from RIDEM

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

Station Name	Station Location	Date	Result	Wet/Dry	Geometric Mean
CHP01	Chepachet River at Mapleville Main St	8/20/2009	275	Dry	60 (15%)*
CHP01	Chepachet River at Mapleville Main St	7/20/2009	150	Dry	
CHP01	Chepachet River at Mapleville Main St	7/15/2009	29	Dry	
CHP01	Chepachet River at Mapleville Main St	5/20/2009	31	Dry	
CHP01	Chepachet River at Mapleville Main St	9/18/2008	22	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 CHP01

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
CHP01	Chepachet River at Mapleville Main St	2008-2009	0	5	60	NA	60

Shaded cells indicate an exceedance of water quality criteria

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

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