Clear River (Segment 5C)

Watershed Description

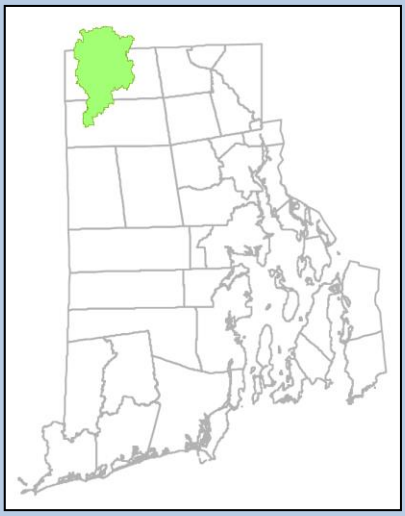
This **TMDL** applies to the Clear River assessment unit (RI0001002R-05C), a 9.7-mile long impaired river segment located in Burrillville, RI (Figure 1). The Town of Burrillville is located in the northwestern corner of Rhode Island. The Clear River is located in the center of town. The Clear River watershed is presented in Figures 2 and 3 with land use types indicated.

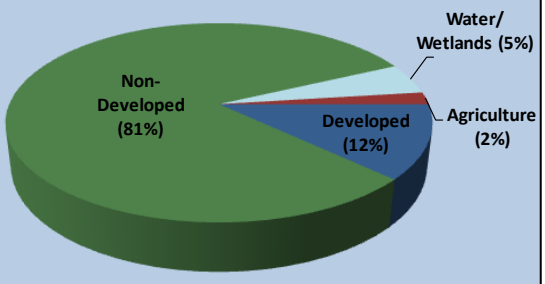
The headwaters of the Clear River begin in the western portion of Burrillville and flow east into the Wilson Reservoir. This impaired segment of the Clear River begins at the outlet of the Wilson Reservoir, near Wallum Lake Road. The river then flows east through several small impoundments, and is joined by an impaired tributary from the south. The river flows under Centennial Street and meets the Pascoag River north of Shea Lane in the Village of Pascoag. It then flows under RI Route 107 (Pascoag Main Street) into Harrisville Pond after flowing through the downtown section of the Village of Harrisville. This impaired segment of the Clear River then leaves the pond, passes under East Avenue, and ends before the Burrillville Wastewater Treatment Facility. Another impaired segment of the Clear River begins at the wastewater treatment facility and eventually empties into the Branch River in the Village of Mapleville.

This segment of the Clear River watershed covers 44.8 square miles. As shown in the aerial image of Figure 4, forested lands occupy a large portion (80%) of the watershed. Developed uses (including residential and commercial uses) occupy approximately 12% of the land area. Impervious surfaces cover a total of 4.7%. Wetland and surface waters occupy 5%, and only a very small portion of the watershed (2%) is used for agriculture.

Assessment Unit Facts (RI0001002R-05C)

- **Town:** Burrillville
- **Impaired Segment Length:** 9.7 miles
- **Classification:** Class B
- **Direct Watershed:** 44.8 mi² (28,672 acres)
- **Impervious Cover:** 4.7%
- **Watershed Planning Area:** Branch - Blackstone (#8)





Watershed Land Uses

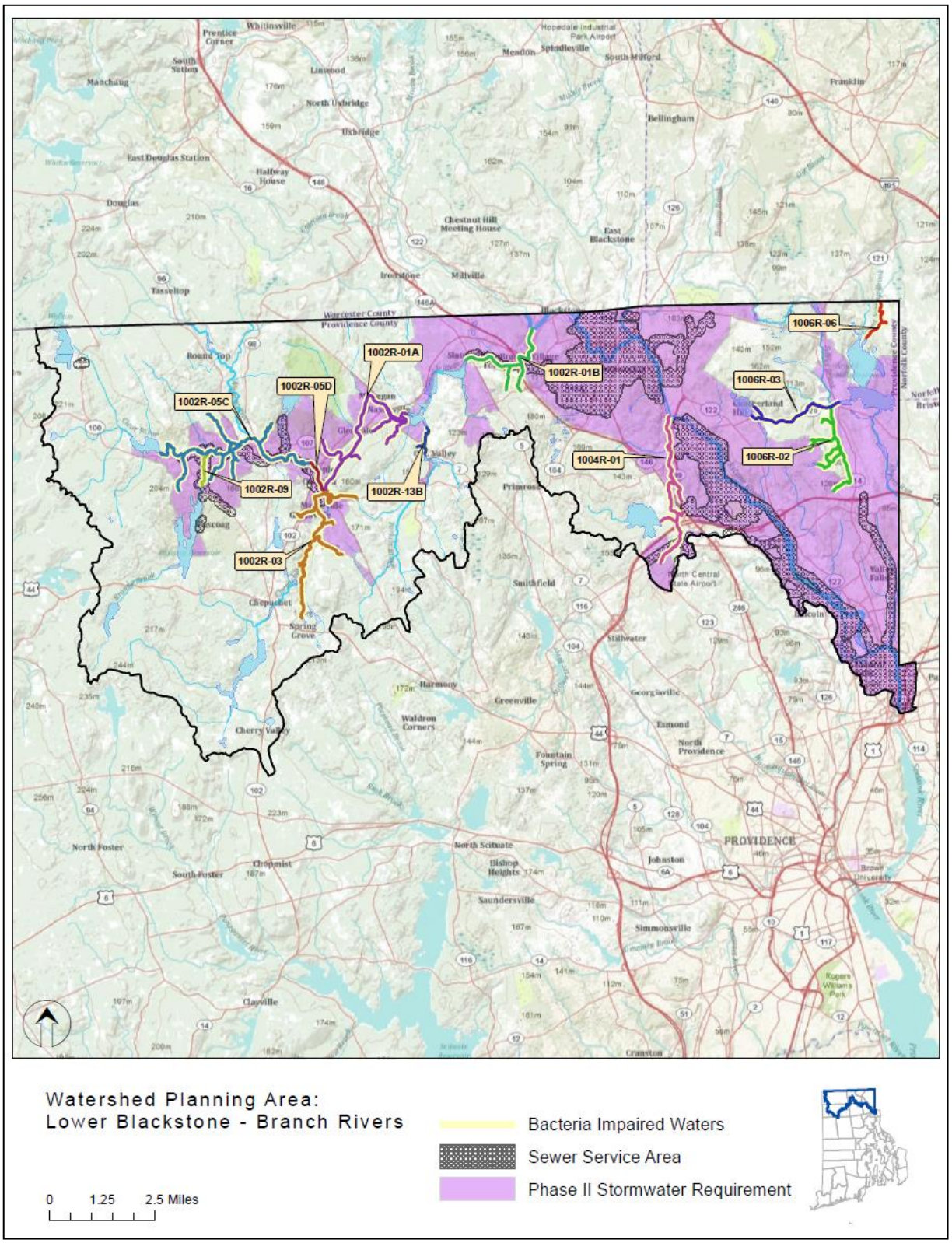


Figure 1: ***Map of the Branch and Blackstone Watershed Planning Area with impaired segments addressed by the Statewide Bacteria TMDL, sewered areas, and stormwater regulated zones.***

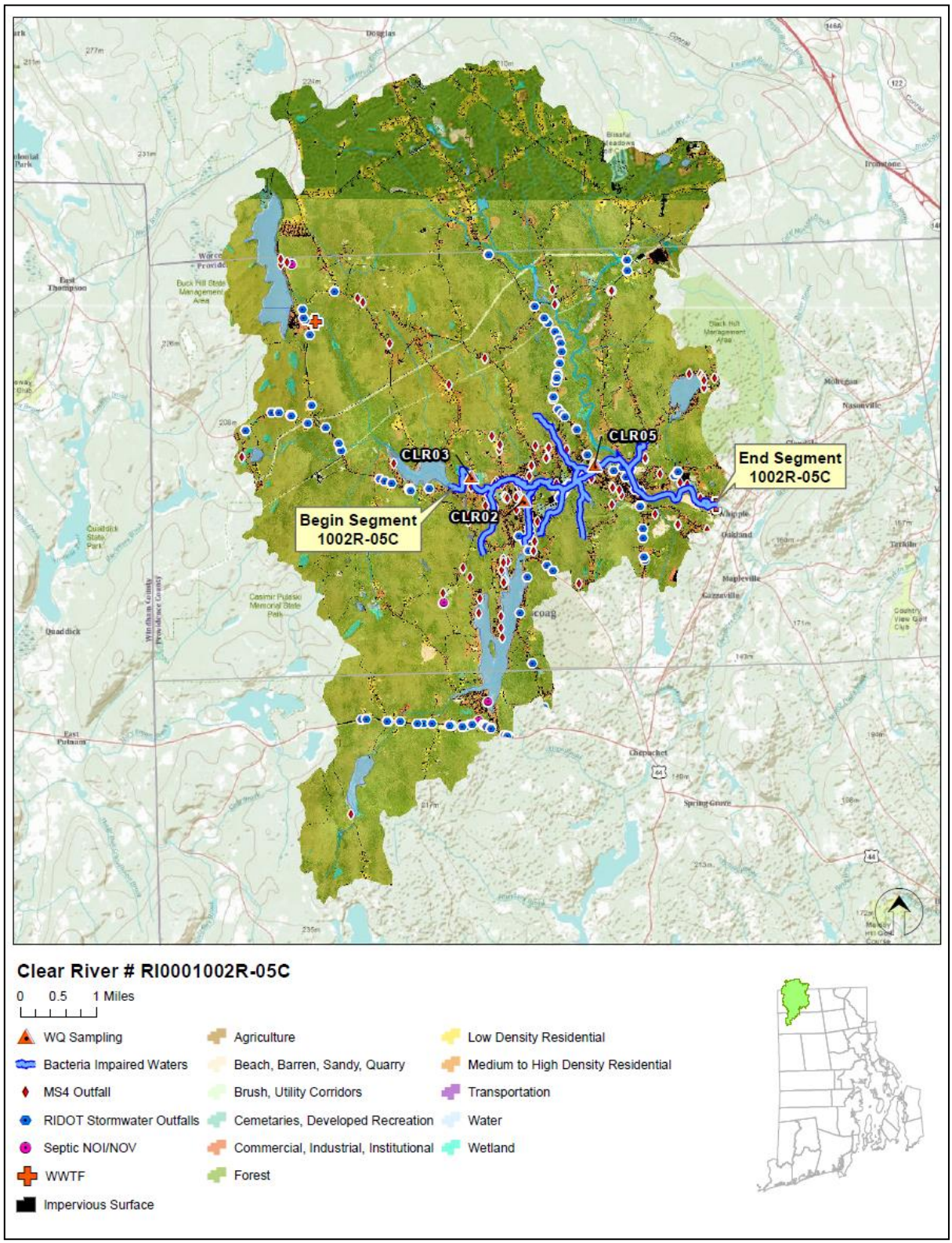


Figure 2: ***Map of Clear River (Segment 5C) watershed with impaired segment, sampling locations, and land cover indicated.***

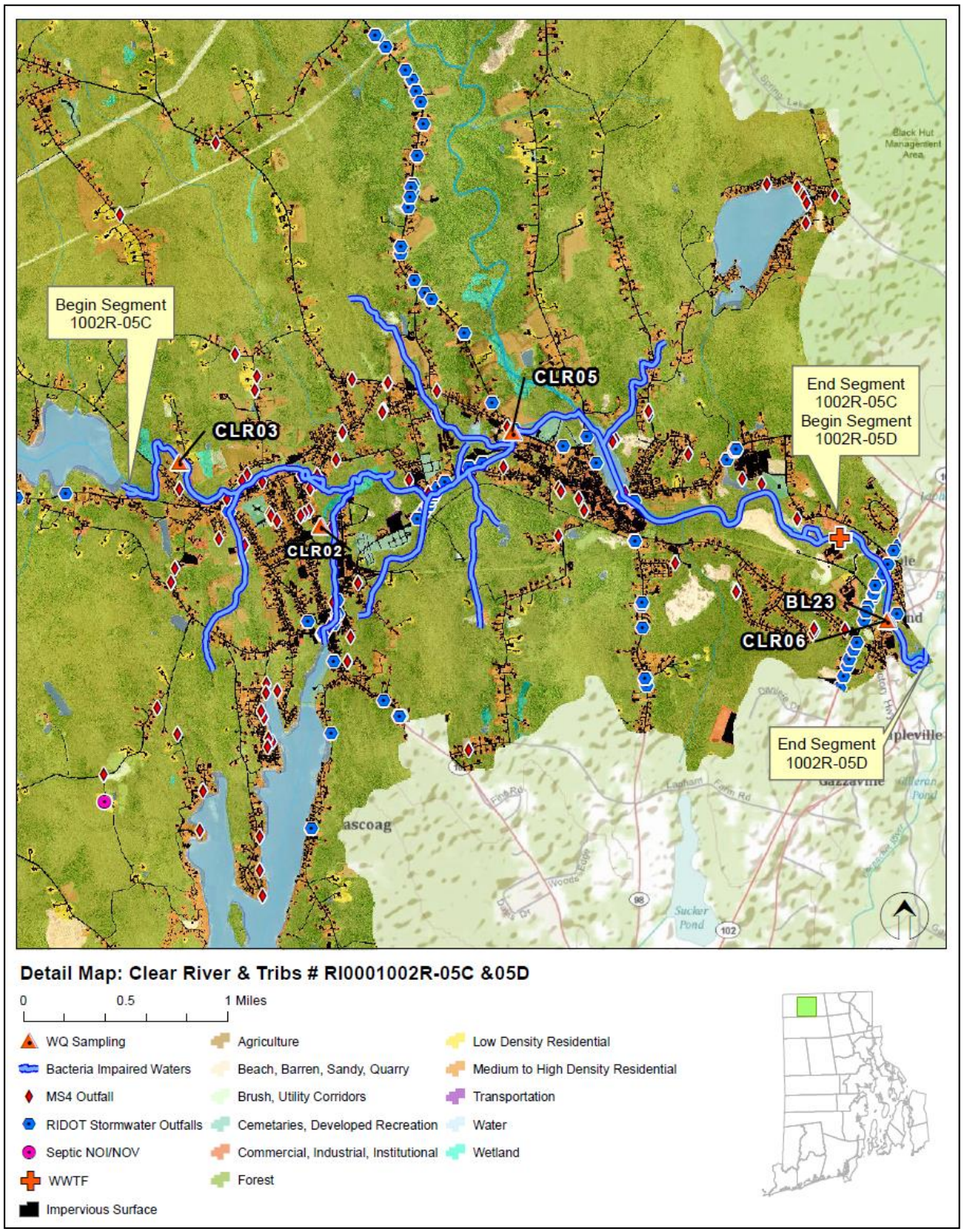


Figure 3: ***Zoomed map of Clear River (Segment 5C) watershed with impaired segments, sampling locations, and land cover indicated.***

Why is a TMDL Needed?

The Clear River Segment 5C 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 two sampling locations (CLR03 and CLR05) 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 stations CLR03 and CLR05 and exceeded the water quality criteria for enterococci. All samples were taken in dry-weather conditions.

Figure 4: ***Partial aerial view of the Clear River (Segment C) watershed (Source: Google Maps)***

Due to the elevated bacteria measurements presented in Table 1, this segment of the Clear 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.

This segment of the Clear River has also been assessed as not meeting water quality standards for non-native aquatic plants (RIDEM, 2008). No TMDL has been completed for this impairment.

Potential Bacteria Sources

There are several potential sources of bacteria in the watershed for this segment of the Clear River, including failing 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 Clear River watershed is undeveloped and does not have access to Burrillville's municipal wastewater system (Figure 1). Small portions of the watershed surrounding the impaired segment of Clear River are serviced by the municipal wastewater system. Failing OWTS, including septic systems and cesspools, 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 Clear 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). Large areas of land consist of soils that present severe limitations on development and septic disposal (Figure 5). As shown in Figures 2 and 3, multiple onsite wastewater treatment system (OWTS) Notices of Violation/Notices of Intent to Violate have been issued by the RIDEM Office of Compliance and Inspection in the Clear River Segment 5C watershed.

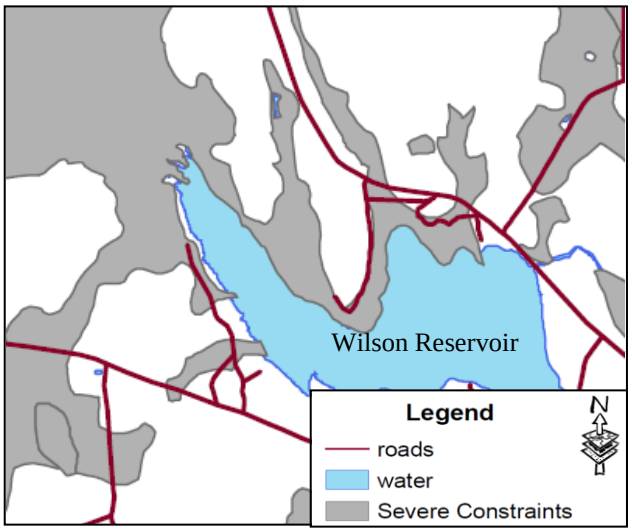


Figure 5: Section of the Clear River watershed in Burrillville showing soils with severe constraints on development. (Source: Town of Burrillville, 2005)

Sewer Leaks

Another potential source of bacterial contamination is leaks within the municipal sanitary sewer system near the Clear River. If there are any leaks within this sewer, the waste from the sewer, containing high levels of bacteria, could easily enter the river. Spills and leaks from sanitary sewer systems can lead to human health issues from high bacteria levels, and can potentially cause significant ecological damage (Mallin *et. al.*, 2007).

Waterfowl, Wildlife, and Domestic Animal Waste

Domestic animals within the Clear River watershed represent a potential source of bacteria. High-density residential developments are located adjacent to the river in several areas, particularly near the impaired segment of the Clear River. If residents are not properly disposing of pet waste, the bacteria from that waste could enter and contaminate the stream.

Sections of the Clear River watershed consist of large tracts of contiguous forest land providing sanctuary to a variety of wildlife including squirrel, deer, and waterfowl (Town of Burrillville, 2005). Many of these forested areas are directly adjacent to the Clear River concentrating wildlife around the banks. 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 Clear River watershed has an impervious cover of 4.7%. 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 Clear 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 Rhode Island Department of Transportation (RIDOT) has identified and mapped stormwater outfalls within the Town of Burrillville. As of March 2010, the Town of Burrillville has identified and mapped nearly all of the stormwater outfalls within the town. The Clear River watershed was shown to receive discharges from multiple stormwater outfalls, particularly in the high-density commercial and residential areas in the Villages of Pascoag and Harrisville (Figures 2 and 3).

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 Clear 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 Clear River watershed rely on OWTS, particularly in the northern and western portions of the watershed. Currently, the Town of Burrillville does not have an Onsite Wastewater Management Plan or a septic system ordinance (RIDEM, 2008b). 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 the Community Septic System Loan Program (CSSLP). CSSLP 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.

Sewer Leaks

Burrillville should implement a program to evaluate its sanitary sewer system to identify if there any leaks and/or overflows.

Waterfowl, Wildlife, and Domestic Animal Waste

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 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 Clear 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 Clear River watershed and have prepared Phase II Stormwater Management Plans (SWMPP). Most of the watershed area is regulated under the Phase II program.

Burrillville's SWMPP outlines goals for the reduction of stormwater runoff to the Clear 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).

Burrillville has adopted an illicit discharge detection and elimination ordinance (RIDEM, 2010a). These ordinances prohibit illicit discharges to the MS4 and provide an enforcement mechanism. Burrillville should focus efforts of detecting illicit discharges in the commercial and residential areas in the Villages of Pascoag and Harrisville near the Clear River. Illicit discharges can also 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 (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 Clear River Segment 5C based on the watershed's imperviousness, Burrillville 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 the Clear River. 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 impaired segment of the Clear River and the pavement was installed in November of 2010 (Nonpoint Source, 2010). The town should continue to pursue grants and to support projects that help to reduce the volume of stormwater entering the Clear River.

Land Use Protection

There are large sections of protected forest within the Clear River watershed. The Town of Burrillville's Comprehensive Plan, outlines specific policies to preserve natural areas. Over 7,000 acres are zoned for conservation and open space and there are over 10 square miles of open space within the town (Burrillville, 2004).

Preserving these natural areas is important because woodland and wetland areas within the Clear 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 85% of the land use in the Clear 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 Clear River.

Table 1: Clear River Segment 5C Bacteria Data

***Waterbody ID*:** RI0001002R-05C

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: **61% (Includes 5% Margin of Safety)**

Data: 2008-2009 from RIDEM

Single Sample Enterococci (colonies/100 mL) Results for the Clear River (Segment 5C) (2008-2009) with Geometric Mean Statistics

Station Name	Station Location	Date	Result	Wet/Dry	Geometric Mean
CLR03	Clear River at Warner Lane (off of East Wallum Lake Road)(Bridgeton USGS 01111263)	8/20/2009	820	Dry	65
CLR03	Clear River at Warner Lane (off of East Wallum Lake Road)(Bridgeton USGS 01111263)	7/20/2009	411	Dry	
CLR03	Clear River at Warner Lane (off of East Wallum Lake Road)(Bridgeton USGS 01111263)	7/15/2009	7	Dry	
CLR03	Clear River at Warner Lane (off of East Wallum Lake Road)(Bridgeton USGS 01111263)	5/20/2009	3	Dry	
CLR03	Clear River at Warner Lane (off of East Wallum Lake Road)(Bridgeton USGS 01111263)	9/17/2008	148	Dry	

Single Sample Enterococci (colonies/100 mL) Results for the Clear River (Segment 5C) (2008-2009) with Geometric Mean Statistics (continued)

Station Name	Station Location	Date	Result	Wet/Dry	Geometric Mean
CLR05	Clear River at Callahan School Road Harrisville USGS 01111270	8/20/2009	1789	Dry	**122† (61%)***
CLR05	Clear River at Callahan School Road Harrisville USGS 01111270	7/20/2009	173	Dry	
CLR05	Clear River at Callahan School Road Harrisville USGS 01111270	7/15/2009	54	Dry	
CLR05	Clear River at Callahan School Road Harrisville USGS 01111270	5/20/2009	29	Dry	
CLR05	Clear River at Callahan School Road Harrisville USGS 01111270	9/18/2008	55	Dry	

Shaded cells indicate an exceedance of water quality criteria
*Includes 5% Margin of Safety
†Geometric mean used to calculate percent reduction

Wet and Dry Weather Geometric Mean Enterococci Values for all Stations

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
CLR03	Clear River at Warner Lane (off of East Wallum Lake Road) (Bridgeton USGS 01111263)	2008-2009	0	5	65	NA	65
CLR05	Clear River at Callahan School Road Harrisville USGS 01111270	2008-2009	0	5	122	NA	122

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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