



Branch River (Segment 1A)

Watershed Description

This **TMDL** applies to the Branch River assessment unit (RI0001002R-01A), a 6.7-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 Branch River is located in the central and western portions of town. The Branch River watershed is presented in Figures 2 and 3 with land use types indicated.

This impaired segment of the Branch River (Segment 1A) originates in Burrillville, RI, at the confluence of two other bacteria-impaired rivers (Chepachet and Clear Rivers) and ends at the Slatersville Reservoir. Another impaired segment of the Branch River (Segment 1B) begins at the Slatersville Reservoir.

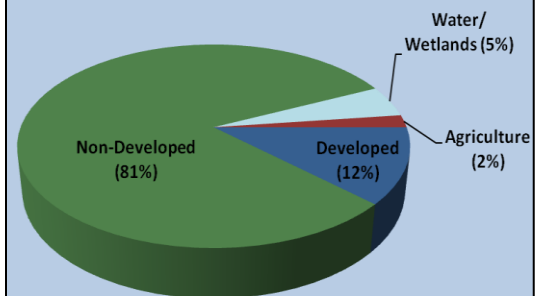
The Branch River Segment 1A flows northeast through a forested area, parallel to Victory Highway in the Village of Oakland. In the Village of Glendale, the river flows north and passes under Victory Highway and RI Route 102 (Broncos Highway) in the center of Glendale where it is joined by a small tributary.

This impaired segment of the Branch River then continues northeast through a wooded area and flows through the Village of Nasonville. The river flows back under Broncos Highway parallel to RI Route 7 (Douglas Turnpike) where development is located directly adjacent to the river (Figure 4). The river passes under the Douglas Turnpike and empties into the Upper Slatersville Reservoir in the Village of Nasonville.

This segment of the Branch River watershed covers 74 square miles. Forested lands occupy the majority (79%) of the watershed. Developed uses (including residential and commercial uses) cover approximately 12% of the land area. Impervious surfaces cover a total of 4.8%. Wetland and surface waters occupy 5%, and only 2% of the watershed is used for agriculture.

Assessment Unit Facts (RI0001002R-01A)

- **Town:** Burrillville
- **Impaired Segment Length:** 6.7 miles
- **Classification:** Class B
- **Direct Watershed:** 73.8 mi² (47,231 acres)
- **Impervious Cover:** 4.8%
- **Watershed Planning Area:** Branch - Blackstone (#8)



Watershed Land Uses

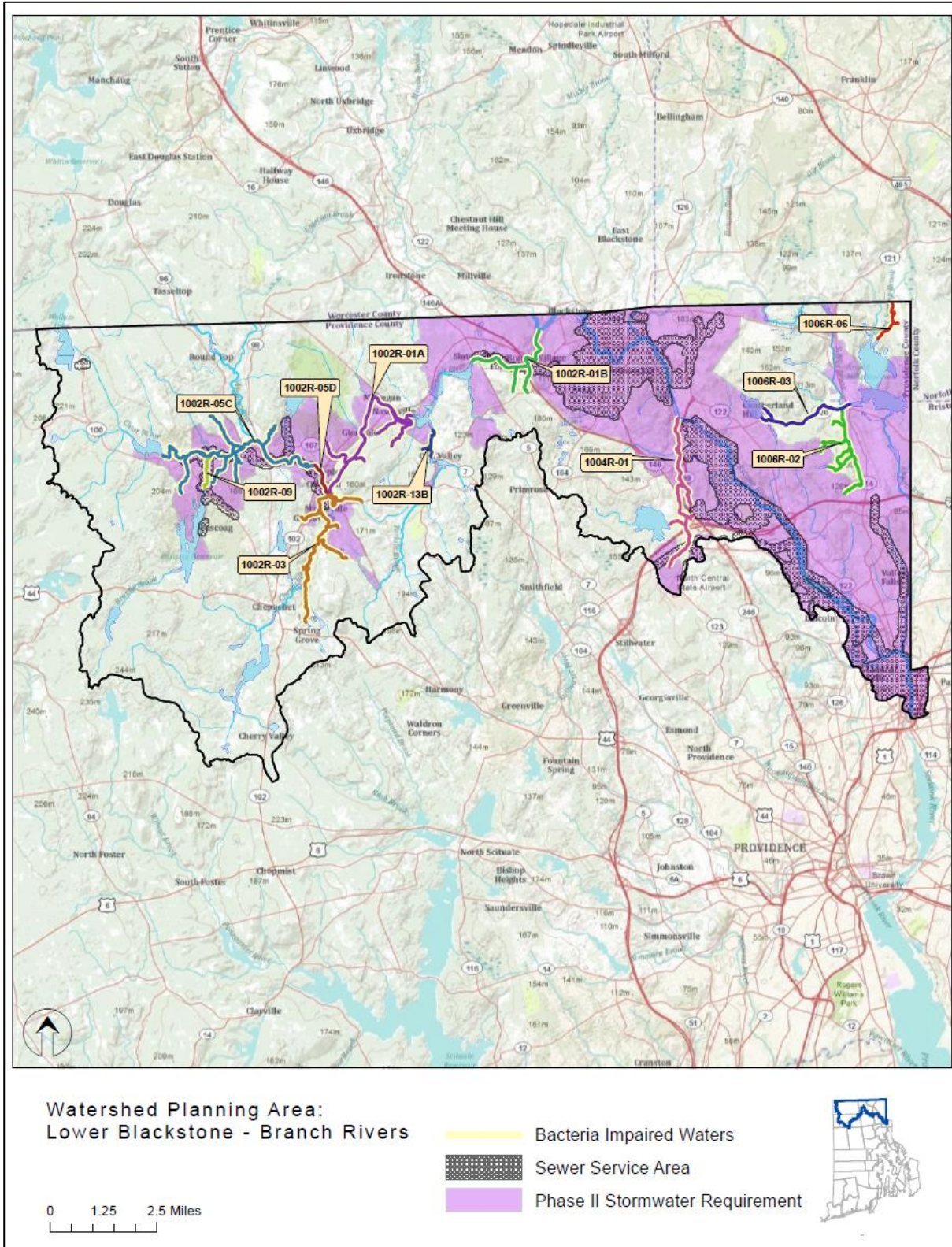


Figure 1: Map of the Branch and Blackstone Watershed Planning Area with impaired segments addressed by the Statewide Bacteria TMDL, sewered areas, and stormwater regulated zones.

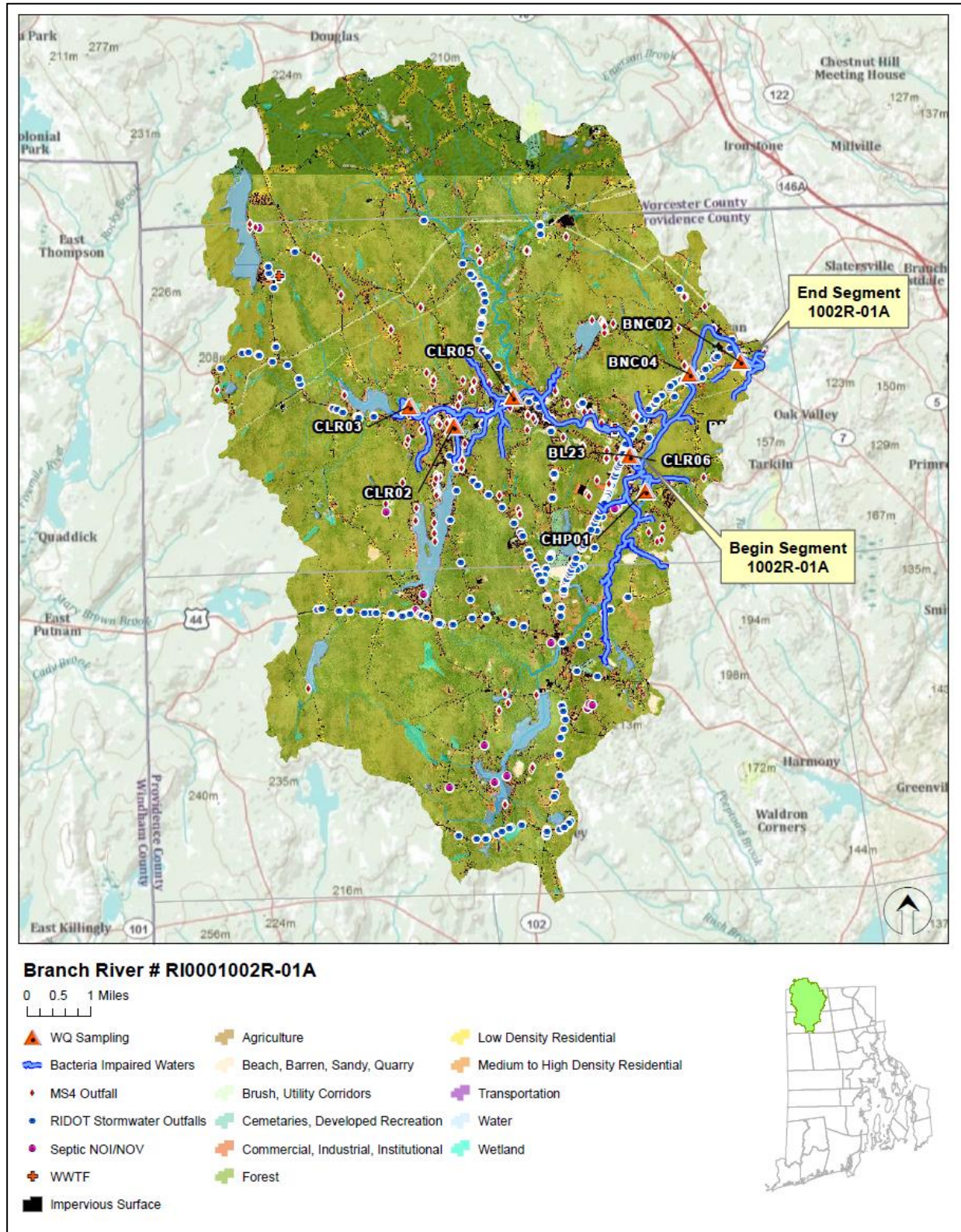


Figure 2: Map of Branch River (Segment 1A) watershed, with impaired segments, sampling locations, and land cover indicated.

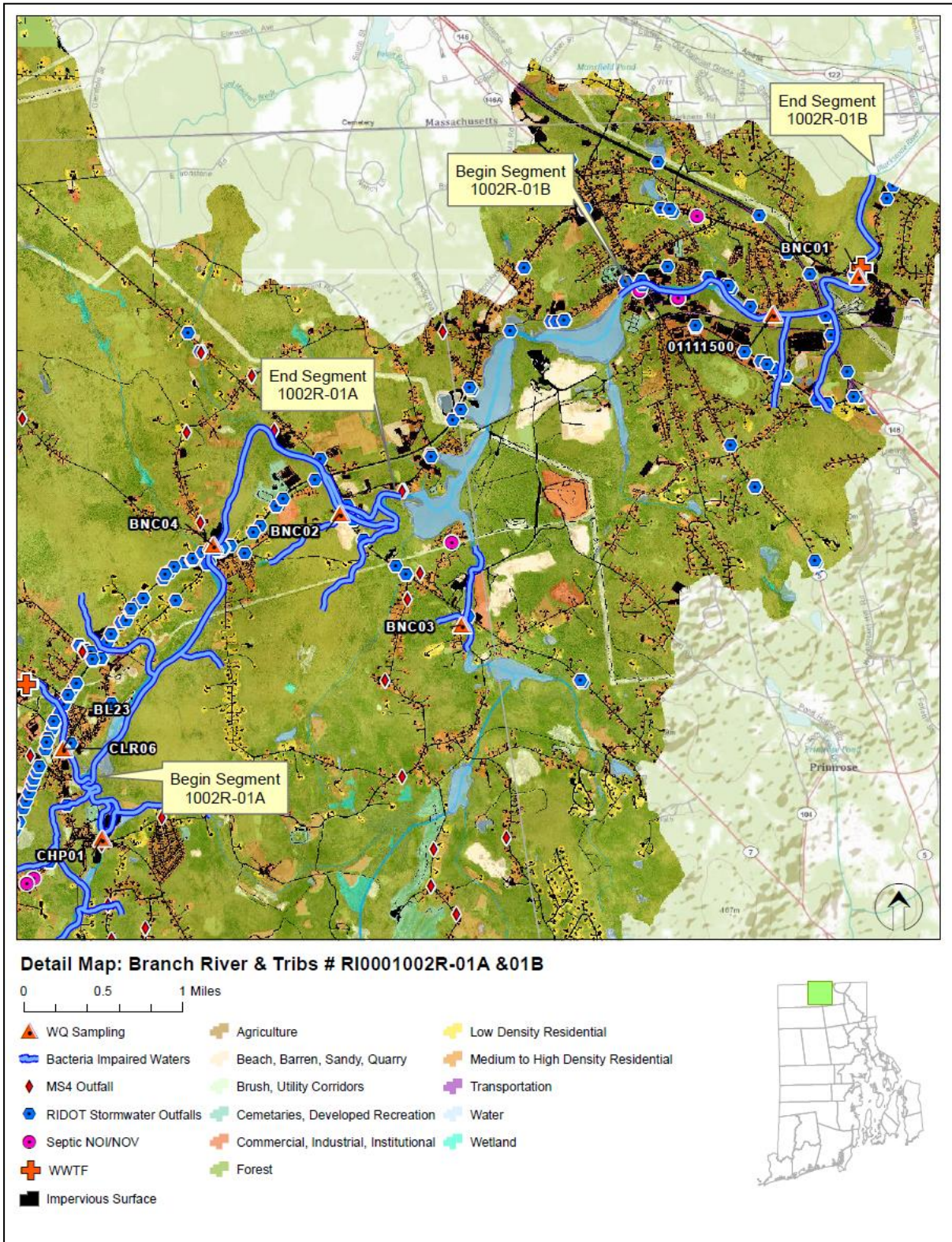


Figure 3: Zoomed map of the Branch River (Segment 1A) watershed, with impaired segments, sampling locations, and land cover indicated.

Why is a TMDL Needed?

The Branch River Segment 1A is a Class B freshwater river with applicable designated uses of primary and secondary contact recreation and fish and wildlife habitat (RIDEM, 2009). During 2008-2009, water samples were collected from two sampling locations (BNC02 and BNC04) and analyzed for the indicator bacteria, enterococci. The water quality criteria for enterococci, along with bacteria sampling results from the 2008-2009 studies and associated statistics are presented in Table 1. The geometric mean statistical metric was calculated for stations BNC02 and BNC04 and exceeded the water quality criteria value. All samples were taken in dry-weather conditions.

Due to the elevated bacteria measurements presented in Table 1, the Branch River Segment 1A 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 the impairments and identifies the measures needed to restore water quality. The goal is for all water bodies to comply with state water quality standards.

The Branch River Segment 1A is also impaired for non-native aquatic plants (RIDEM, 2008). Since the cause of this impairment is not a pollutant, no TMDL is required to address non-native aquatic plants. These impairments are not caused by a pollutant and are identified by RIDEM for tracking purposes only. RIDEM has developed a guide to assist lake associations and others with addressing nuisance aquatic weeds. The *Guide to Understanding Freshwater Aquatic Plants* is available on the RIDEM website.



Figure 4: *Partial aerial view of the Branch River watershed, as it passes through the Village of Nasonville (Source: Google Maps).*

Potential Bacteria Sources

There are several potential sources of bacteria in the Branch River watershed 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 Branch River watershed is undeveloped and does not have access to Burrillville's municipal sewer system (Figure 1). The main areas of the watershed serviced by the municipal sewer are small portions of the watershed around the rivers draining to the Branch River, in the Villages of Pascoag, Harrisville and Mapleville. A small section of Branch River, located near the beginning of this impaired segment in the Village of Mapleville, is serviced by the municipal sewer system. The majority of the Branch River, particularly in the lower reaches of the river, is surrounded by residents relying on onsite wastewater treatment systems (OWTS), such as septic systems and cesspools. However, the soils in much of the Branch River watershed are not suited for OWTS due to wetness, flooding potential, slow percolation, and soil type (Town of Burrillville, 2005). Soil conditions are especially poor in the Villages of Glendale and Nasonville, directly on the banks of this reach of the river (WFP, 2001).

Failing septic systems 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 Figures 2 and 3, multiple OWTS Notices of Violation/Notices of Intent to Violate (NOV/NOIs) have been issued by the RIDEM Office of Compliance and Inspection in the Branch River watershed.

Sewer Leaks

Another potential source of bacterial contamination to the Branch River is leaks in the municipal sewer system. If there were leaks within this sewer system, particularly in the system servicing the upstream reaches of the Branch River, waste from the sewer, containing high levels of bacteria, could enter the river. Spills and leaks from municipal sewer systems can cause human health issues from high bacteria levels, and can cause significant ecological damage (Mallin *et. al.*, 2007).

Wildlife and Domestic Animal Waste

Domestic animals within the Branch River watershed represent another potential source of bacteria. Residential developments are located adjacent to the river in several areas in the Villages of Glendale and Nasonville. Several of these neighborhoods have storm drain pipes that drain to outfalls 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 Branch River watershed consist of large tracts of contiguous forest land, including the Black Hut Wildlife Management Area, which provides sanctuary to a variety of wildlife including squirrel, deer, and waterfowl (Town of Burrillville, 2005). Most of these forested areas surround the unimpaired tributaries of the river, concentrating wildlife around the small streams that drain into the 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 Branch River watershed has an impervious cover of approximately 4.2%. 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 these portions of the watershed may be contributing bacteria to the Branch 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) and the Town of Burrillville have identified and mapped all or almost all of their stormwater outfalls in the Branch River watershed. This impaired segment of the Branch River was shown to receive discharges from multiple stormwater outfalls (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 Branch River 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

The majority of residents within the Branch River watershed rely on OWTS. Currently, the Town of Burrillville does not have an Onsite Wastewater Management Plan (RIDEM, 2008b). As part of the onsite wastewater management planning process, Burrillville 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-standards systems. Policies that govern the eventual replacement of sub-standard OWTS within a reasonable timeframe 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).

Though the Town of Burrillville is not currently eligible for Rhode Island's Community Septic System Loan Program (CSSLP), it is recommended that the town develop a program to assist citizens with the replacement of older and failing systems. CSSLP provides low-interest loans to residents to help with maintenance and replacement of OWTS.

Wildlife and Domestic Animal Waste

The Town of 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 small streams draining to the Branch River Segment 1A. 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 municipality's 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 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 Branch River and can harm human health and the environment.

Stormwater Management

The Town of Burrillville (RIPDES permit RIR040001) and RIDOT (RIPDES permit RIR040036) are municipal separate storm sewer (MS4) operators in the Branch River watershed and have prepared Phase II Stormwater Management Plans (SWMPP). Most of the watershed is regulated under the Phase II program. Burrillville's SWMPP outlines goals for the reduction of stormwater runoff to the Branch 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 control ordinances, and conducting public education activities (RIDEM, 2010a).

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. Burrillville should focus on the commercial and residential development around this impaired segment of the Branch River, particularly in the Villages of Glendale and Nasonville, where it is reported that some homes have known discharges of improperly treated waste to the Branch River (WFP, 2002). These discharges may be a significant source of bacterial contamination and Burrillville should have more thorough measures in place for detection. Illicit discharges can be identified through continued dry weather outfall sampling and microbial source tracking.

RIDOT has also completed a SWMPP for state-owned roads in the watershed. 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 Branch River based on the watershed's imperviousness, the Town of 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.

The Town of Burrillville should continue to implement the goals of its Phase II Stormwater Management Plan (2004) including dry weather sampling, extensive street and catch basin cleaning programs, and public education activities. RIDOT should also continue to implement the goals of its Phase II Stormwater Management Plan.

Land Use Protection

There are large sections of protected forest within the Branch River watershed, including a portion of the Black Hut Wildlife Management Area. Within Burrillville's Comprehensive Plan, specific policies were proposed to preserve natural areas. Over 7,000 acres are zoned for conservation and open space, indicating the town's commitment to preserving natural areas (Burrillville, 2004). Burrillville is encouraged to continue pursuing these policies, as the link between land use, land conservation, and water quality is well known (Town of Burrillville, 2005).

Preserving these natural areas is important because woodland and wetland areas within the Branch 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 86% of the land use in the 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 Branch River Segment 1A.

Table 1: Branch River (Segment 1A) Bacteria Data

Waterbody ID: RI0001002R-01A

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: 22% (Includes 5% Margin of Safety)

Data: 2008-2009 from RIDEM

Single Sample Enterococci (colonies/100 mL) Results for the Branch River (Segment 1A) (2008-2009) with Geometric Mean Statistics

Station Name	Station Location	Date	Result	Wet/Dry	Geometric Mean
BNC02	Branch River at Rte7/Douglas Turnpike btw Glendale and Nasonville	8/26/2009	121	Wet	65 [†] (22%)*
BNC02	Branch River at Rte7/Douglas Turnpike btw Glendale and Nasonville	7/20/2009	46	Dry	
BNC02	Branch River at Rte7/Douglas Turnpike btw Glendale and Nasonville	7/15/2009	16	Dry	
BNC02	Branch River at Rte7/Douglas Turnpike btw Glendale and Nasonville	5/20/2009	66	Wet	
BNC02	Branch River at Rte7/Douglas Turnpike btw Glendale and Nasonville	9/17/2008	201	Wet	
BNC04	Branch River at Victory Hwy, USGS 1111420 Glendale	8/20/2009	552	Dry	62
BNC04	Branch River at Victory Hwy, USGS 1111420 Glendale	7/20/2009	101	Dry	
BNC04	Branch River at Victory Hwy, USGS 1111420 Glendale	7/15/2009	10	Dry	
BNC04	Branch River at Victory Hwy, USGS 1111420 Glendale	5/20/2009	45	Dry	
BNC04	Branch River at Victory Hwy, USGS 1111420 Glendale	9/17/2008	37	Dry	

Shaded cells indicate an exceedance of water quality criteria

* Includes a 5% Margin of Safety

[†] Geometric Mean used to calculate percent reduction

Wet and Dry Weather Geometric Mean Enterococci Values for each Station

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
BNC02	Branch River at Rte7/Douglas Turnpike btw Glendale and Nasonville	2008-2009	0	5	65	NA	65
BNC04	Branch River at Victory Hwy, USGS 1111420 Glendale	2008-2009	0	5	62	NA	62

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

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