



Tarkiln Brook

Watershed Description

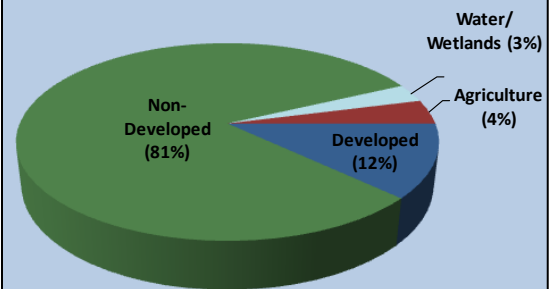
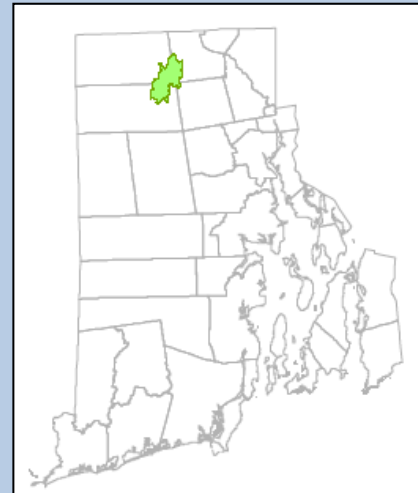
This **TMDL** applies to the Tarkiln Brook assessment unit (RI0001002R-13B), a 0.8-mile long impaired stream segment located in Burrillville and North Smithfield, RI (Figure 1), which are located in the northwestern corner of Rhode Island. The impaired segment of Tarkiln Brook is located along the western border of the Burrillville. The Tarkiln Brook watershed is presented in Figure 2 with land use types indicated.

The headwaters of Tarkiln Brook begin in a forested area between RI Route 44 (Putnam Pike) and Absalona Hill Road in Glocester, RI. The Brook travels north and is joined by a tributary in a wetland area south of Harmony Hill Road. The brook continues north and empties into a small unnamed pond north of Log Entry Road. At this pond, it is met by another tributary emptying a small pond between Evans Road and Eddy Road. Tarkiln Brook then crosses into Burrillville, RI and passes through a large forested area before it flows into a wetland near the Country View Golf Club. The brook turns east flowing through the golf course and under Colwell Road where it enters Nichols Pond. As Tarkiln Brook leaves the pond, it flows north under Nichols Road and enters Tarkiln Pond. The brook then flows into the Slatersville Reservoir between Pulaski Hill Road in Burrillville and the town line with North Smithfield.

The Tarkiln Brook watershed covers 9.6 square miles. As shown in the aerial image of Figure 3, non-developed lands occupy a large portion (81%) of the watershed. Developed uses (including residential and commercial uses) occupy approximately 12% of the land area. Impervious surfaces cover approximately 5%. Wetland and surface waters occupy 3%, and only a small portion of the watershed (4%) is used for agriculture.

Assessment Unit Facts *(RI0001002R-13B)*

- **Town:** Burrillville and North Smithfield
- **Impaired Segment Length:** 0.8 miles
- **Classification:** Class B
- **Direct Watershed:** 9.6 mi² (6,143 acres)
- **Impervious Cover:** 4.8%
- **Watershed Planning Area:** Branch - Blackstone (#8)



Watershed Land Uses

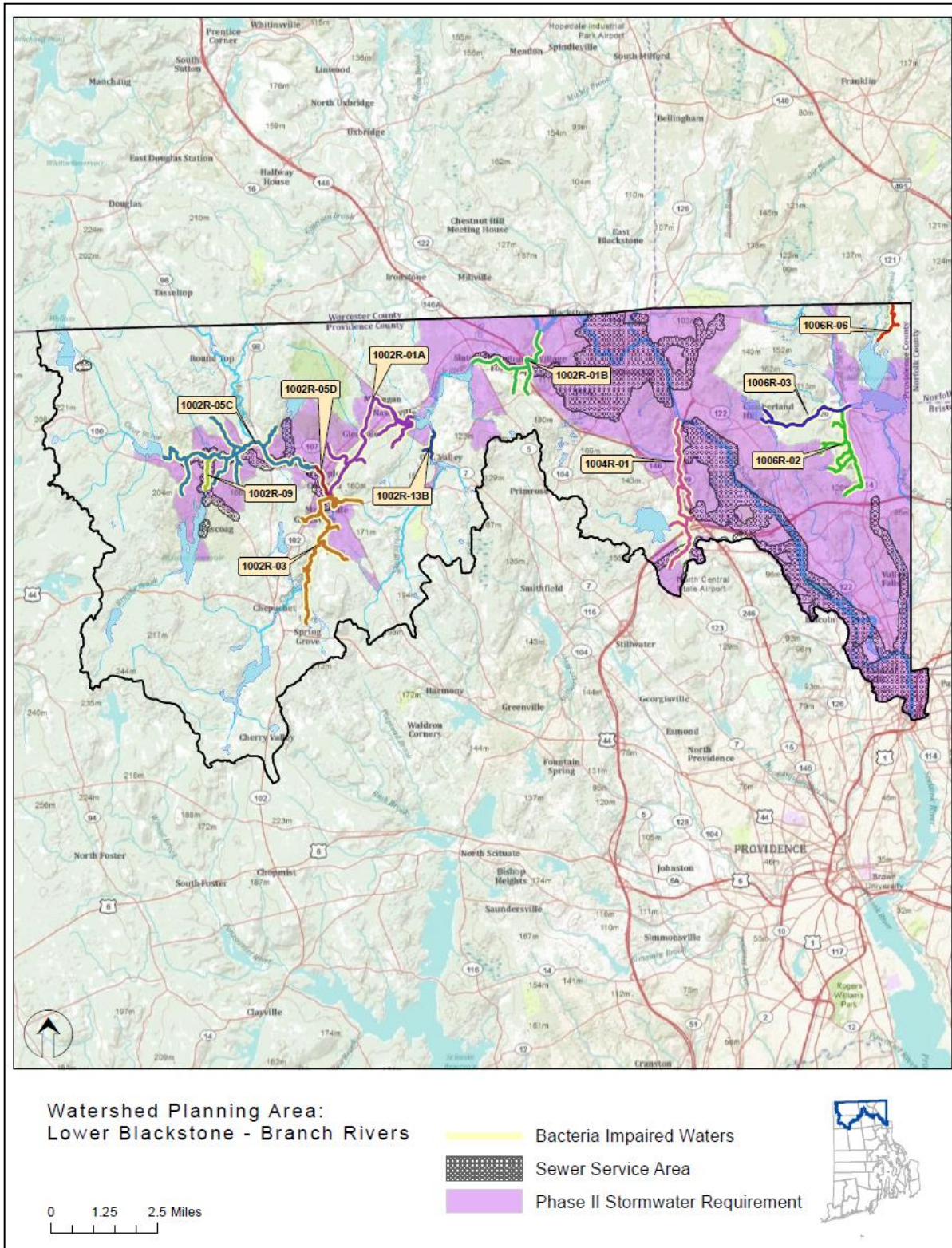


Figure 1: Map of the Branch-Blackstone Watershed Planning Area with impaired segments addressed by Statewide TMDL, sewer service areas, and stormwater regulated zones.

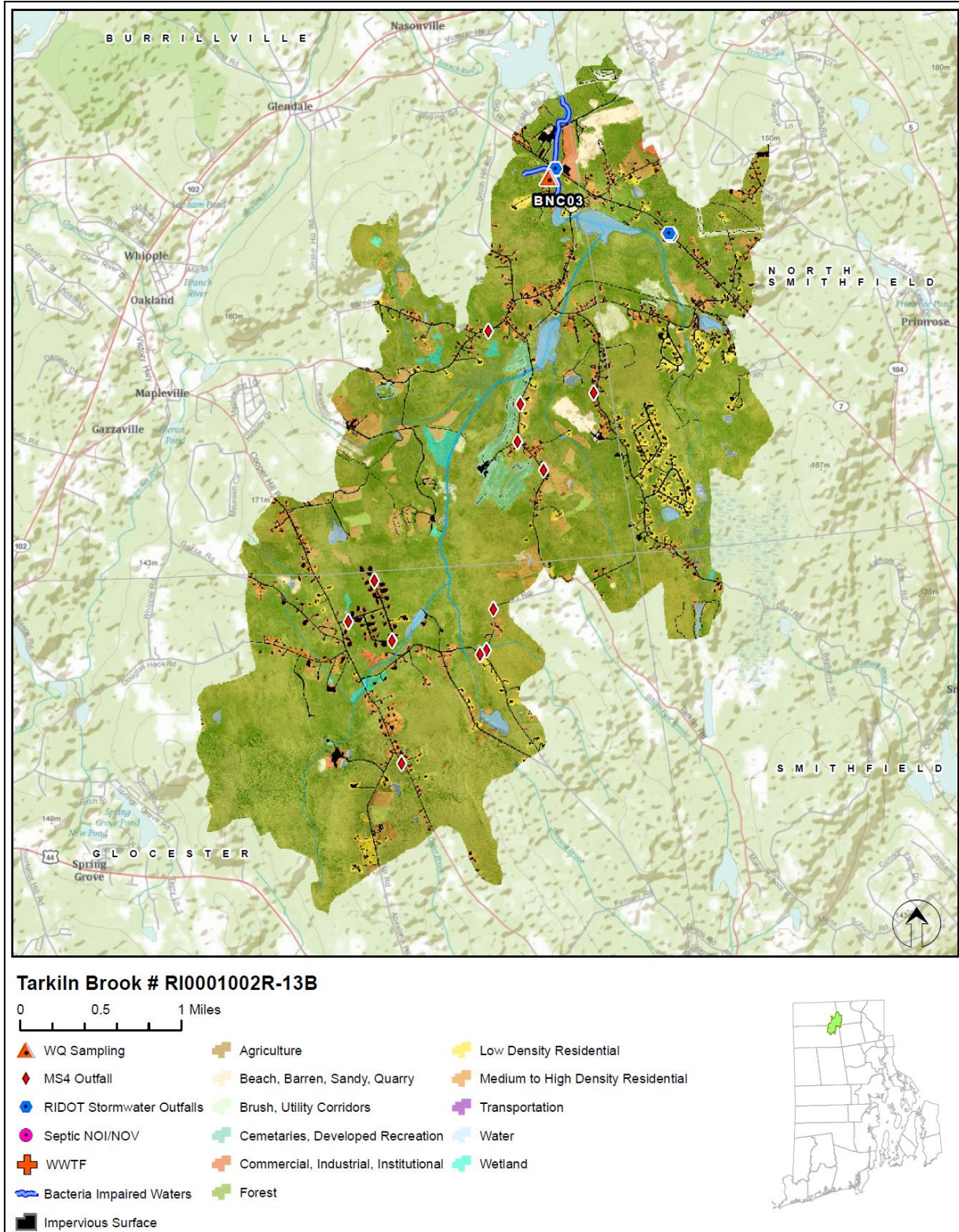


Figure 2: Map of the Tarkiln Brook watershed with impaired segment, sampling location, and land cover indicated.

Why is a TMDL Needed?

Tarkiln Brook is a Class B fresh water stream 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 (BNC03) 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 BNC03 and exceeded the water quality criteria for enterococci. All samples were taken in dry-weather conditions.

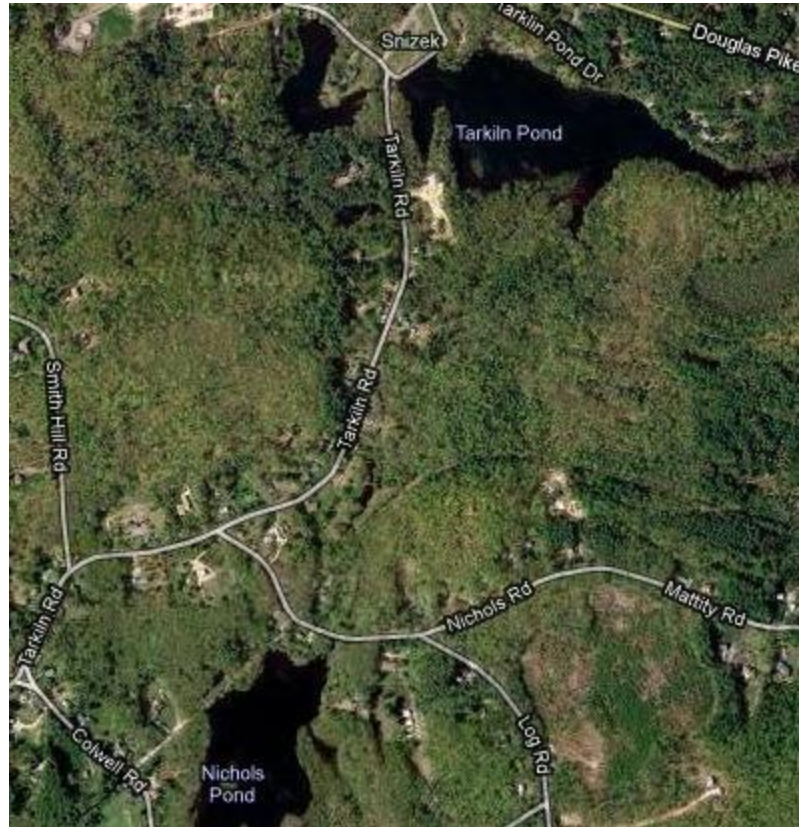


Figure 3: *Partial aerial view of the Tarkiln Brook watershed. (Source: Google Maps)*

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

Potential Bacteria Sources

There are several potential sources of bacteria in the Tarkiln Brook 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 Tarkiln Brook watershed is undeveloped and does not have access to Burrillville's municipal wastewater system (Figure 1). Most residents rely on onsite wastewater treatment systems (OWTS) such as septic systems and cesspools. 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 are in soils poorly suited for septic waste disposal, bacteria can easily be transported to adjacent surface waters (USEPA, 2002). As shown in Figure 4, the soils in much of the Tarkiln Brook watershed are not well suited for OWTS due to shallow groundwater aquifers, flooding potential, slow percolation, and relatively steep slopes (Town of Burrillville, 2005).

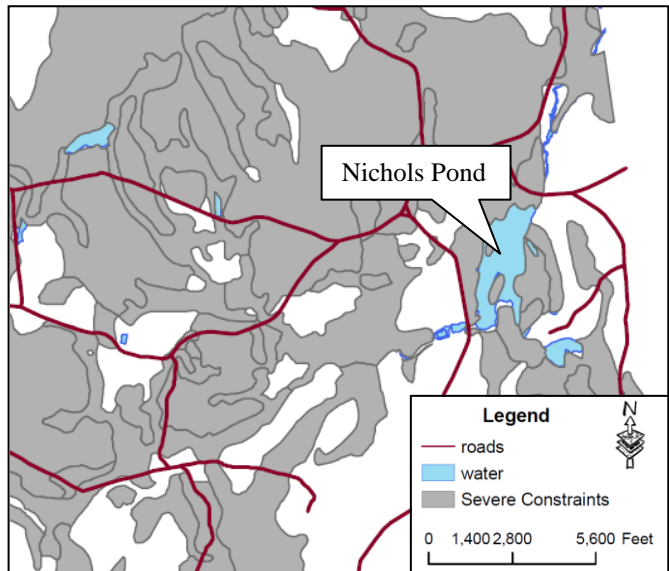


Figure 4: Map of soils with severe constraints within a portion of the Tarkiln Brook watershed. (Source: Town of Burrillville, 2005)

Wildlife and Domestic Animal Waste

Domestic animals within the Tarkiln Brook watershed represent another potential source of bacteria. 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 can enter and contaminate the stream.

Sections of the Tarkiln Brook watershed consist of large tracts of contiguous forest land, which can provide sanctuary to a variety of wildlife including squirrel, deer, and waterfowl (Town of Burrillville, 2005). Most of these forested areas surround the stream concentrating wildlife around Tarkiln Brook. 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 Tarkiln Brook watershed has an impervious cover of 4.8%. 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 Tarkiln 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.

As of March 2010, nearly all of the stormwater outfalls within Burrillville were mapped as part of their Phase II requirements (MS4). Tarkiln Brook was shown to receive discharges from several 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 Tarkiln Brook 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 the Tarkiln Brook watershed relies on OWTS. Currently, the Town of Burrillville does not have an Onsite Wastewater Management Plan, while the Town of North Smithfield has a draft Onsite Wastewater Management Plan. Neither town has OWTS ordinances requiring all OWTS to be inspected and pumped routinely. As part of the onsite wastewater planning process, the towns 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).

Though Burrillville and North Smithfield are currently not 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 loans to towns to use helping citizens to replace their failing or malfunctioning OWTS.

Wildlife and Domestic Animal Waste

Burrillville and North Smithfield'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. The towns 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, 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 Nichols Pond and Tarkiln Pond, 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 Tarkiln Brook and can harm human health and the environment. Burrillville and North Smithfield should ensure that mention of this regulation is included in their SWMPPs.

Stormwater Management

The Town of Burrillville (RIDPES permit RIR040001), North Smithfield (RIDPES Permit RIR040013), and RIDOT (RIDPES permit RIR040036) are municipal separate storm sewer system (MS4) operators in the Tarkiln Brook watershed and have prepared Phase II Stormwater Management Plans (SWMPP). The Tarkiln Brook watershed located in North Smithfield is not regulated under the Phase II Program, while only a small portion of the watershed area in Burrillville is regulated.

Burrillville's SWMPP outlines goals for the reduction of stormwater runoff to Tarkiln Brook 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 types of ordinances prohibit illicit discharges to the MS4 and provide an enforcement mechanism. 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. It is recommended that North Smithfield develop similar IDDE ordinances to help protect Tarkiln Brook.

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 Tarkiln Brook based on the watershed's imperviousness, Burrillville, North Smithfield, 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 Tarkiln Brook.

Land Use Protection

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. There are 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 Tarkiln Brook 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 84% of the land use in the Tarkiln Brook 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 Tarkiln Brook.

Table 1: Tarkiln Brook Bacteria Data

Waterbody ID: RI0001002R-13B

Watershed Planning Area: 8 – Branch - Blackstone

Characteristics: Freshwater, Class B, Primary and Secondary Contact Recreation, Fish and Wildlife Ha

Impairment: Enterococci (colonies/100mL)

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

Percent Reduction to meet TMDL: 50% (Includes 5% Margin of Safety)

Data: 2008-2009 from RIDEM

Single Sample Enterococci (colonies/100 mL) Results for Tarkiln Brook (2008-2009) with Geometric Mean Statistics

Station Name	Station Location	Date	Result	Wet/Dry	Geometric Mean
BNC03	Tarkiln Brook at Rte 7 near Tarkiln Rd at USGS 1111470	8/20/2009	816	Dry	98 (50%)*
BNC03	Tarkiln Brook at Rte 7 near Tarkiln Rd at USGS 1111470	7/20/2009	641	Dry	
BNC03	Tarkiln Brook at Rte 7 near Tarkiln Rd at USGS 1111470	7/15/2009	13	Dry	
BNC03	Tarkiln Brook at Rte 7 near Tarkiln Rd at USGS 1111470	5/20/2009	16	Dry	
BNC03	Tarkiln Brook at Rte 7 near Tarkiln Rd at USGS 1111470	9/17/2008	80	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 BNC03

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
BNC03	Tarkiln Brook at Rte 7 near Tarkiln Rd at USGS 1111470	2008-2009	0	5	98	NA	98

Shaded cells indicate an exceedance of water quality criteria

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

References

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