Sucker Brook

Watershed Description

This **TMDL** applies to the Sucker Brook assessment unit (RI0007037R-01), a 0.9-mile long stream located in Tiverton, RI (Figure 1). The Town of Tiverton is located in eastern Rhode Island and Sucker Brook is situated in the northeast corner of the town. The Sucker Brook watershed is presented in Figure 2 with land use types indicated.

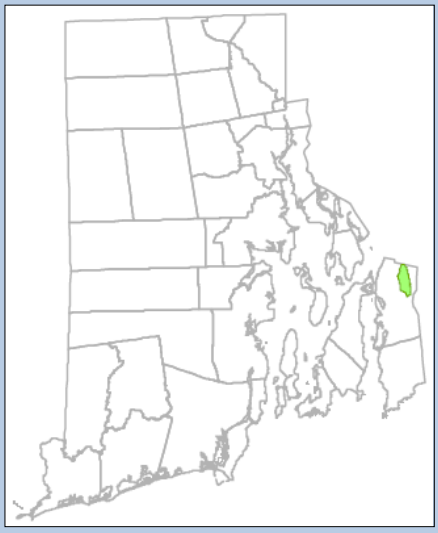
Stafford Pond makes up the majority of the Sucker Brook watershed. Stafford Pond is a 487-acre reservoir that serves as a drinking water supply for Tiverton and Portsmouth, RI (RIDEM, 1998). Sucker Brook flows from Stafford Pond at the northern outlet in the Village of Eagleville, and flows north across Eagleville Road. The brook then flows parallel to Route 24 in a wooded area, flows into Massachusetts, and crosses Route 81 near the intersection with Route 24. In Massachusetts, the brook is surrounded by high-density development and transportation land uses. Sucker Brook empties into South Watuppa Pond near the South Watuppa Boat Ramp.

The Sucker Brook watershed covers 2.5 square miles and is mostly undeveloped (54%), as shown in Figures 2 and 3. Developed uses (including residential, commercial, and transportation land uses) occupy 14%. Most development is medium to high-density residential on the eastern bank of Stafford Pond, along Route 81. Agricultural uses occupy 1% of the total watershed. Surface waters and wetlands, including Stafford Pond, occupy 31% of the watershed.

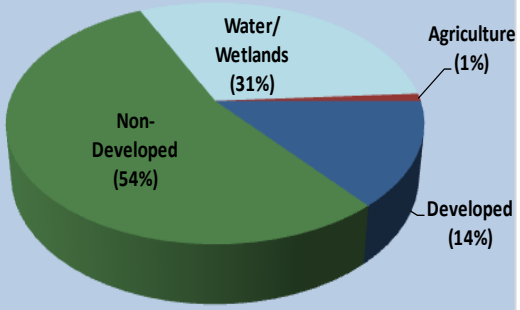
Sucker Brook is controlled by a dam operated by the City of Fall River, MA. The city uses Sucker Brook as an emergency water supply (URI, 2006). State law prohibits swimming in Stafford Pond, however, boating is allowed and the pond is stocked with trout throughout the year by RIDEM. The pond is also used as a landing site for recreational seaplanes.

Assessment Unit Facts (RI0007037R-01)

- **Town:** Tiverton
- **Impaired Segment Length:** 0.9 miles
- **Classification:** Class A
- **Direct Watershed:** 2.5 mi² (1,621 acres)
- **Impervious Cover:** 7.8%
- **Watershed Planning Area:** Stafford Pond (#20)



Watershed Land Use



Watershed Land Uses

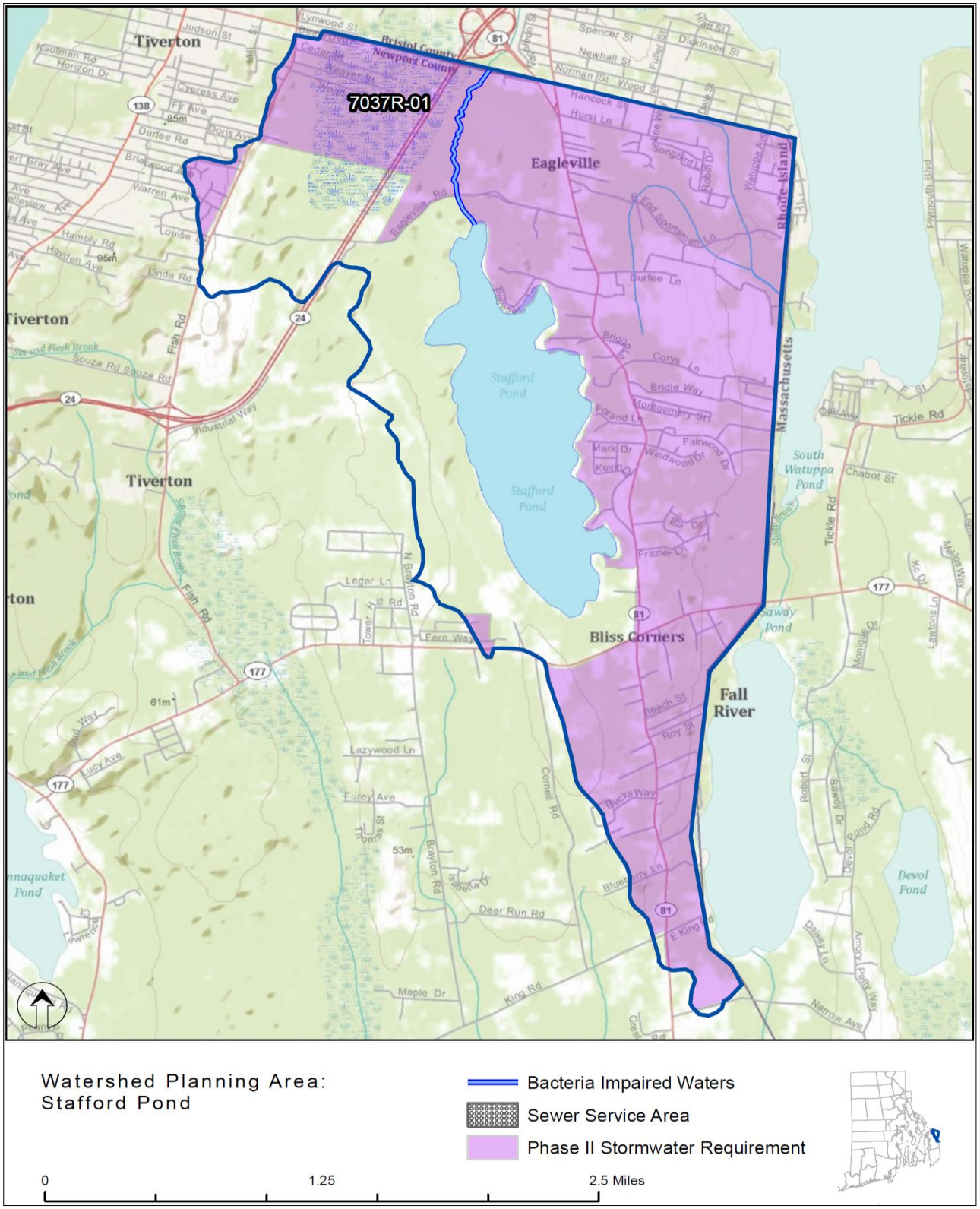


Figure 1: ***Map of Stafford Pond Watershed Planning Area with impaired segment addressed by the Statewide Bacteria TMDL, sewered areas, and stormwater regulated zone.***

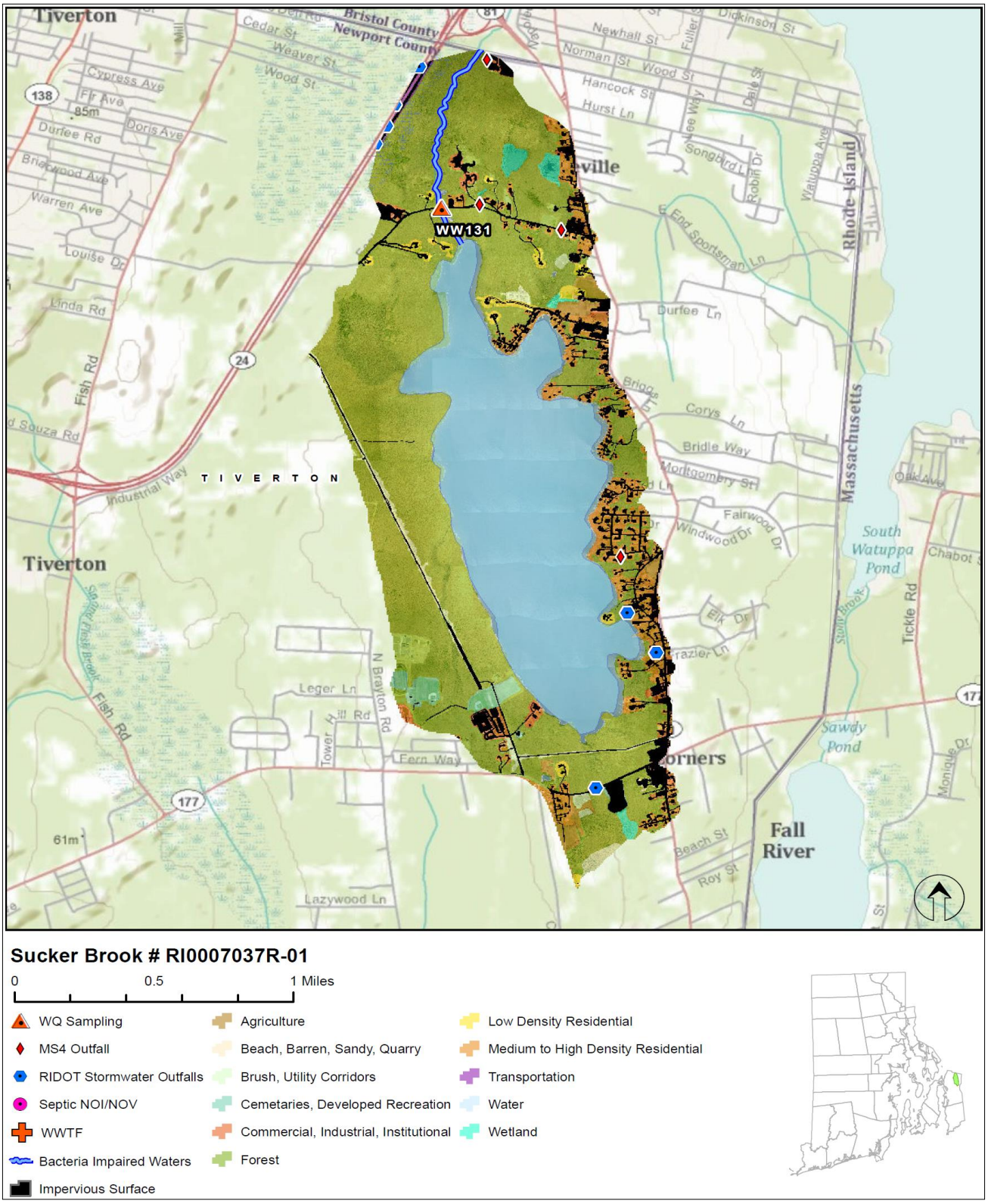


Figure 2: ***Map of Sucker Brook watershed with impaired segment, sampling location, and land cover indicated.***

Why is a TMDL Needed?

Sucker Brook is a Class A fresh water stream and its applicable designated uses are primary and secondary contact recreation and fish and wildlife habitat (RIDEM, 2009). From 2006-2008, water samples were collected from one sampling location (WW131) located near the outlet of Stafford Pond, and analyzed for the indicator bacteria, enterococci. The water quality criteria for enterococci, along with bacteria sampling results from 2006-2008 and associated statistics are presented in Table 1. The geometric mean was calculated for Station WW131 and exceeded the water quality criteria for enterococci.

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

To aid in identifying possible bacteria sources, the geometric mean was also calculated for wet and dry-weather sample days, where appropriate. The dry-weather geometric mean value exceeded the water quality criteria for enterococci. As only one sample was collected in wet-weather conditions, the geometric mean could not be calculated. However, this individual sample was extremely high (> 24,000 colonies/100mL).

Due to the elevated bacteria measurements presented in Table 1, the Sucker Brook assessment unit does not meet Rhode Island's 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 Total Maximum Daily Load (TMDL) assessment that describes the impairments and identifies the measures needed to res tore water quality. The goal is for all waterbodies to comply with state water quality standards.

Sucker Brook and Stafford Pond have previously been assessed by RIDEM as impaired for total phosphorus. A TMDL was developed in December 1998 for the Stafford Pond phosphorus impairment. No TMDL has been developed for the phosphorus impairment in Sucker Brook.

Potential Bacteria Sources

Previous investigations have concluded that there are several potential sources of bacteria in the Sucker Brook watershed including stormwater runoff from developed areas, failing onsite wastewater treatment systems, wildlife and domestic pet waste, and agricultural runoff. Each type of potential bacteria sources is described briefly below.

Agricultural Activities

Agricultural operations are an important economic activity and landscape feature in many areas of the state. Agricultural land use occupies only 1% of the watershed area in the Sucker Brook watershed. However, the primary agricultural operation in the watershed is a 55-acre dairy farm near the northeast corner of Stafford Pond. Agricultural runoff from this farm may contain multiple pollutants, including bacteria, and may be contributing to the high concentrations of bacteria in Sucker Brook. The farm has been identified in previous studies as a source of bacteria and nutrients to Stafford Pond (RIDEM, 1998).

Onsite Wastewater Treatment Systems

Residents in the Sucker Brook watershed rely entirely on onsite wastewater treatment systems (OWTS), such as septic systems and cesspools. There are an estimated 565 cesspool properties in the Town of Tiverton (URI, 2006). Failing OWTS can be significant sources of bacteria by allowing improperly treated waste to reach surface waters. Though no OWTS Notices of Violation/Notices of Intent to Violate have been issued by the RIDEM Office of Compliance and Inspection in the Sucker Brook watershed, soils in the area range from well-drained to poorly drained and some require special OWTS design and installation considerations (RIDEM, 1998). Failing or inadequate OWTS, including cesspools, are possibly contributing to ambient bacteria concentrations in Sucker Brook.

Wildlife and Domestic Animal Waste

Non-developed land accounts for 54% of the watershed area. Land uses directly adjacent to Sucker Brook are mostly forested and the western edge of Stafford Pond is entirely forested. Forests and open water areas are home to multiple species of wildlife and waterfowl. Continued development and encroachment into wildlife areas can cause animal densities to increase and animal waste to be more prevalent closer to the 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.

Domestic animals are another potential source of bacteria to Sucker Brook. Medium to high density residential developments are found in the headwaters area of the watershed. If residents are not properly disposing of pet waste, the bacteria from that waste could enter and contaminate the brook either directly or through stormwater.

Developed Area Stormwater Runoff

The Sucker Brook watershed has an impervious cover of approximately 7.8%. 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 these portions of the watershed may be contributing bacteria to Sucker 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.

In accordance with Phase II requirements, Tiverton has identified and mapped all known outfalls to surface water bodies. The Rhode Island Department of Transportation (RIDOT) has also mapped stormwater outfalls within the Sucker Brook watershed, including those on Route 24. As shown in Figure 2, seven stormwater outfalls are located in the watershed, with four outfalls located near Sucker Brook.

Existing Local Management and Recommended Next Steps

Tiverton has developed and implemented programs to protect its surface waters from bacterial contamination. Future mitigative activities are necessary to ensure the long-term protection of Sucker Brook. Additional bacteria data collection would be beneficial to support identification of sources of potentially harmful bacteria in the Sucker 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 may also be beneficial.

Tiverton has a Comprehensive Plan that provides technical resources for protection of the Sucker Brook watershed. A brief description of existing local programs and recommended next steps from this plan, as well as Tiverton's Onsite Wastewater Management Plan, Phase II Stormwater Management Plan, Wastewater Facilities Plan, Source Water Assessment, as well as other sources are provided below. Stakeholders should review these documents directly for more detailed information.

Agricultural Activities

If not already in place, the U.S. Department of Agriculture Natural Resources Conservation Service and the RIDEM Division of Agriculture should to work with local agricultural operations, particularly the Joseph D. Arruda Dairy Farm near the northeastern shore of Stafford Pond, to develop conservation plans for farming activities within the watershed. NRCS and the RIDEM Division of Agriculture should ensure that all agricultural operations within the watershed have sufficient stream buffers, have fencing to restrict access of livestock and horses to streams and wetlands, and have animal waste handling, disposal, and other appropriate BMPs in place. A plan should be developed to evaluate the contributions of this farm and other sites to the bacterial contamination in Sucker Brook.

Onsite Wastewater Management

All residents in the Sucker Brook watershed rely on OWTS (Figure 1). It is expected that the Sucker Brook watershed will see a 50% increase in the number of OWTS in the next 30 years in response to increased development (RI HEALTH, 2003). Tiverton has an Onsite Wastewater Management Plan that provides a framework for managing the OWTS and has adopted a septic system ordinance requiring all OWTS to be inspected and pumped routinely. 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 Tiverton is eligible for Rhode Island's Community Septic System Loan Program (CSSLP) and has obtained $600,000 in CSSLP money since 2006. The CSSLP program provides low-interest loans to residents to help with maintenance and replacement of OWTS.

Wildlife and Domestic Animal Waste

Tiverton's education and outreach programs should highlight the importance of picking up after dogs and other pets and not feeding waterfowl. Animal wastes should be disposed of away from any waterway or stormwater system. Tiverton should work with volunteers to map locations where animal waste is a significant and chronic problem. 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 take several measures to minimize waterfowl-related impacts. They can allow tall, coarse vegetation to grow in areas along the shores of Sucker Brook and Stafford Pond that 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 Sucker Brook and can harm human health and the environment.

Stormwater Management

Tiverton (RIPDES permit RIR040039) and RIDOT (RIPDES permit RIR040036) are municipal separate storm sewer (MS4) operators in the Sucker Brook watershed and have prepared the required Phase II Stormwater Management Plans (SWMPP). The western portion of the watershed, including a small section of Sucker Brook and the western shore of Stafford Pond are outside of the regulate area. Route 24, located in the western portion of the watershed is regulated under the Phase II program because it is a divided highway.

Tiverton's SWMPP outlines goals for the reduction of stormwater runoff to Sucker 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).

The Town of Tiverton has adopted an IDDE ordinance (RIDEM, 2010). This type of ordinance prohibits illicit discharges to the MS4 and provides an enforcement mechanism. Stormwater outfalls discharging in the near vicinity of these sampling locations should be monitored to check for illicit discharges. Illicit discharges can be identified through 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. It should be noted that RIDOT has chosen to enact the General Permit statewide, beyond the General Permit's requirements regarding stormwater from urbanized and densely populated areas, as well as from divided highways outside of the urbanized and densely populated areas. 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. SWMPPs 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.

RIDOT and Tiverton will have no changes to their Phase II permit requirements and no TMDL Implementation Plan (TMDL IP) will be required at this time. As part of the larger Stafford Pond

Restoration Project, Tiverton has redesigned and upgraded stormwater outfalls to capture pollutants in the watershed. The town and RIDEM received a Successful Project Merit Award from the North American Lake Management Society (NALMS) in 2000 (RIDEM, 2000).

Land Use Protection

Woodland and wetland areas within the Sucker Brook watershed absorb and filter pollutants from stormwater runoff, and help protect both water quality in the stream and stream channel stability. As these areas currently represent approximately 54% of the land use in the Sucker Brook watershed, it is important to preserve these undeveloped areas. Much of the land area has soils that do not support development and controls on development in the Sucker Brook watershed should be instituted (RI HEALTH, 2003).

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

Table 1: Sucker Brook Bacteria Data

***Waterbody ID*:** RI0007037R-01

Watershed Planning Area: 20 – Stafford Pond

Characteristics: Freshwater, Class A, Primary and Secondary Contact Recreation, Fish and Wildlife Habitat

Impairment: Enterococci (colonies/100mL)

Water Quality Criteria for E. coli: Geometric Mean: 54 colonies/100 mL

Percent Reduction to meet TMDL: **70% (Includes 5% Margin of Safety)**

Data: 2006-2008 from RIDEM

Single Sample Enterococci (colonies/100 mL) Data for Sucker Brook (2006-2008) with Geometric Mean Statistic

Station Name	Station Location	Date	Result	Wet/Dry	Geometric Mean
WW131	Stafford Pond Inlet-Downstream/Sucker Brook	10/25/2008	36	Dry	**153 (70%)***
WW131	Stafford Pond Inlet-Downstream/Sucker Brook	9/20/2008	214	Dry	
WW131	Stafford Pond Inlet-Downstream/Sucker Brook	8/16/2008	20	Dry	
WW131	Stafford Pond Inlet-Downstream/Sucker Brook	6/7/2008	16	Dry	
WW131	Stafford Pond Inlet-Downstream/Sucker Brook	10/20/2007	24196	Wet	
WW131	Stafford Pond Inlet-Downstream/Sucker Brook	7/21/2007	613	Dry	
WW131	Stafford Pond Inlet-Downstream/Sucker Brook	5/12/2007	28	Dry	
WW131	Stafford Pond Inlet-Downstream/Sucker Brook	7/29/2006	1203	Dry	
WW131	Stafford Pond Inlet-Downstream/Sucker Brook	6/17/2006	36	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 WW131

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
WW131	Stafford Pond Inlet-Downstream/Sucker Brook	2006-2008	1	8	153	NA	81

Shaded cells indicate an exceedance of water quality criteria
Weather condition determined from rain gage at Newport County Airport in Middletown, RI

References

ESS Group (2003). Phase II Stormwater Management Plan: Town of Tiverton, Rhode Island. Submitted by ESS Group, Inc, East Providence, RI. Revised August 2005.

Berger (2000). Wastewater Facilities Plan: Town of Tiverton, Rhode Island. Submitted by Louis Berger Group, Inc, Providence, RI. Updated January 2000.

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RIDEM (2008). State of Rhode Island and Providence Plantations 2008 303(d) List – List of Impaired Water Bodies. Rhode Island Department of Environmental Management.

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RIHEALTH (2003). The Tiverton and Little Compton Drinking Water Assessment. University of Rhode Island Cooperative Extension in cooperation with Rhode Island Department of Health Source Water Assessment Program, Office of Drinking Water Quality.

Town of Tiverton (2006). The Comprehensive Community Plan, Tiverton, Rhode Island. Five Year Update. Prepared by the Tiverton Planning Board and the Tiverton Town Council. Updated November 2009.

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USEPA (2002). Onsite Wastewater Treatment Systems Manual – Office of Water, Office of Research and Development – EPA/625/R-00/008. Online: www.epa.gov/owm/septic/pubs/septic_2002_osdm_all.pdf.