



Latham Brook

Watershed Description

This **TMDL** applies to the Latham Brook assessment unit (RI0002007R-05), a 4-mile long stream located in Smithfield, RI (Figure 1). The Town of Smithfield is located in the north central area of Rhode Island. Latham Brook is located in the northwestern corner of Smithfield. The Latham Brook watershed is presented in Figure 2 with land use types indicated.

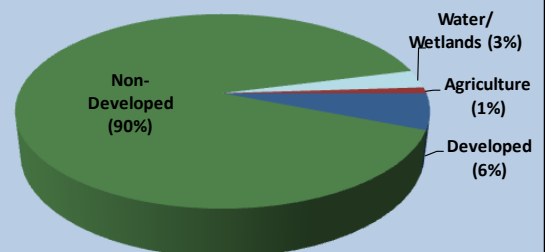
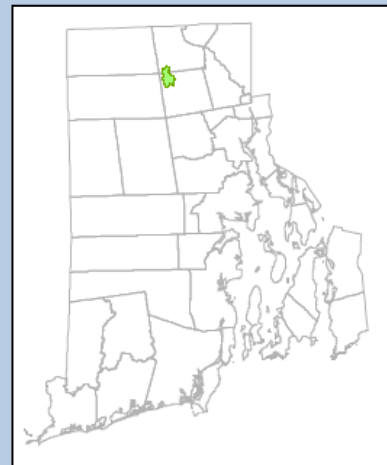
The Latham Brook watershed is located predominately in the Town of Smithfield, and drains southeast towards the Stillwater Reservoir. The headwaters of Latham Brook begin in a forested area east of Tarkiln Road. The brook travels north through an industrial and commercial development before it turns east and is met by a tributary as the brook passes east under Bayberry Road. Latham Brook continues east, passes under Log Road, and is met by another tributary that originates in the large forested area west of Latham Farm Road in Smithfield.

Latham Brook then flows south, passing back under Log Road. The brook continues south and shortly after it flows under Burlingame Road is met by another tributary, originating near the residential developments south of Latham Farm Road close to its intersection with Burlingame Road. Once these streams meet, Latham Brook flows south and empties into a small pond west of the Stillwater Reservoir.

The Latham Brook watershed covers 2 square miles. As shown in the aerial image of Figure 3, non-developed areas occupy a large portion (90%) of the watershed. Developed uses (including residential and commercial uses) account for 6% of the land area. Impervious surfaces cover only 3% of the land within the watershed. Wetland and surface waters occupy 3%, and agriculture only 1%.

Assessment Unit Facts (RI0002007R-05)

- **Town:** Smithfield
- **Impaired Segment Length:** 4 miles
- **Classification:** Class B
- **Direct Watershed:** 2 mi² (1,305 acres)
- **Impervious Cover:** 2.9%
- **Watershed Planning Area:** Woonasquatucket (#24)



Watershed Land Uses

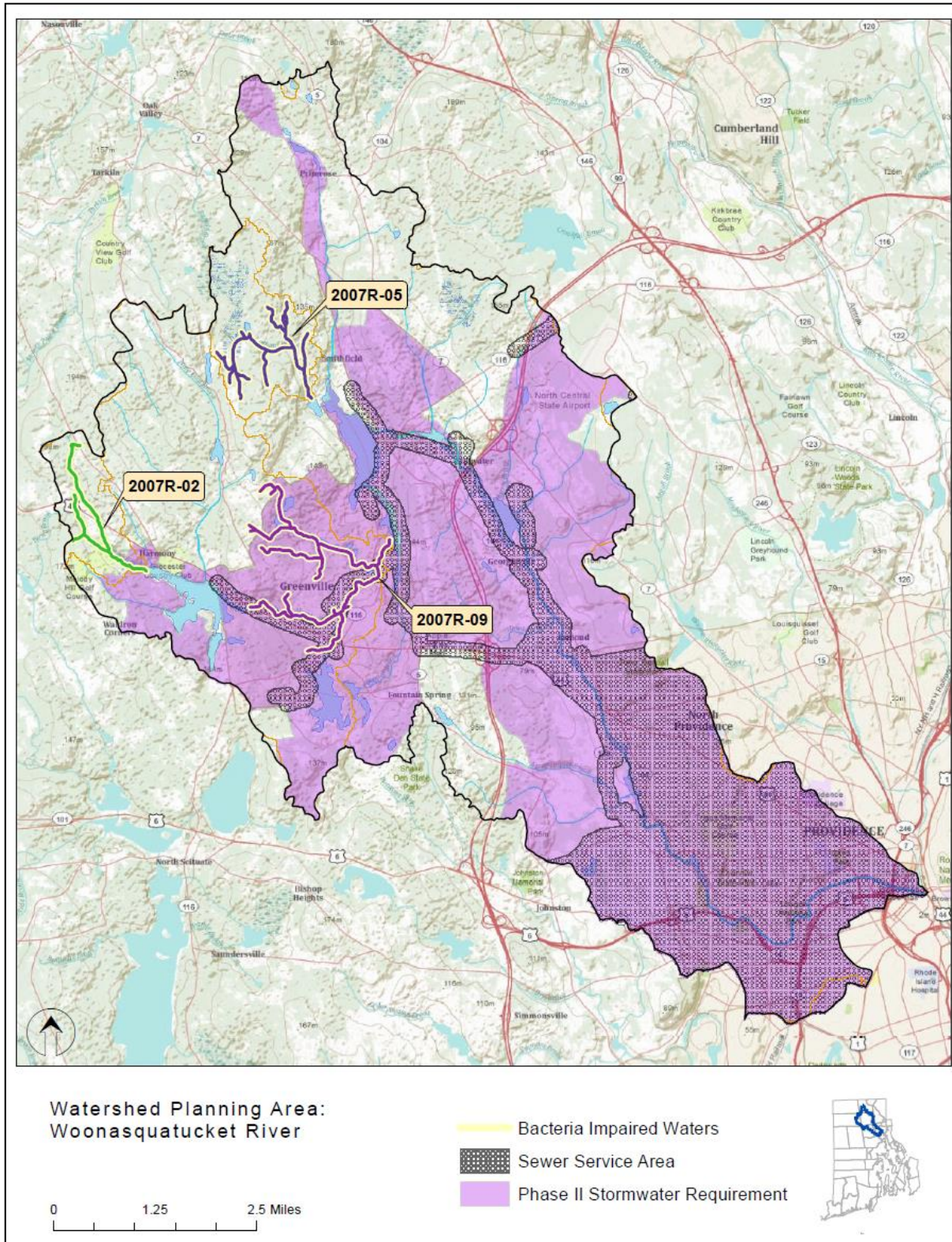


Figure 1: Map of the Woonasquatucket River Watershed Planning Area with impaired segments addressed by the Statewide Bacteria TMDL, sewered areas, and stormwater regulated zones.

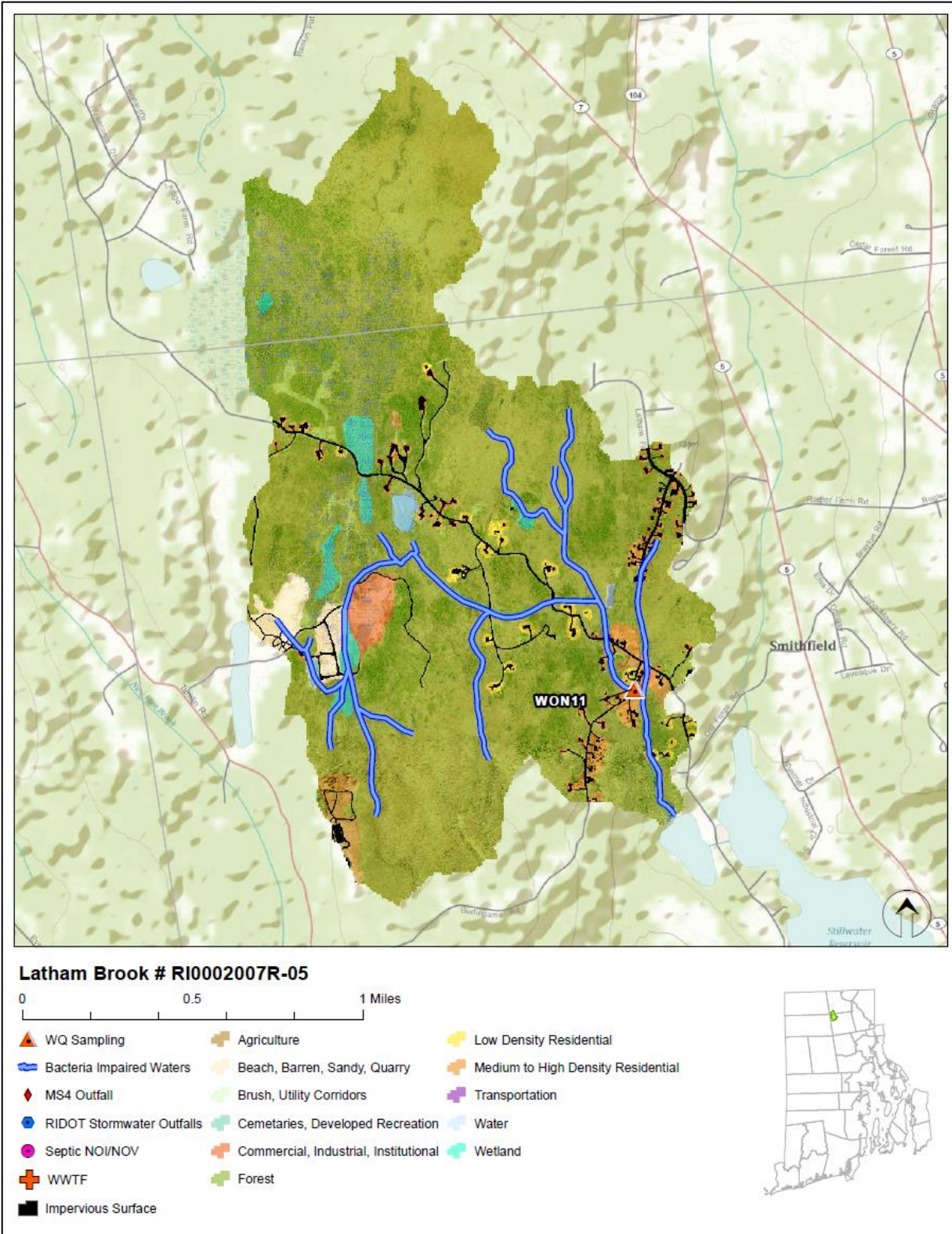


Figure 2: Map of the Latham Brook watershed with impaired segment, sampling location, and land cover indicated.

Why is a TMDL Needed?

Latham Brook is a Class B freshwater stream with designated uses of primary and secondary contact recreation and fish and wildlife habitat (RIDEM, 2009). From 2008-2009, water samples were collected from a sampling location (WON11) along Latham Brook 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 WON11 and exceeded the water quality criteria for enterococci. All samples were collected in dry-weather conditions.



Figure 3: Partial aerial view of the Latham Brook watershed (Source: Google Maps)

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

Latham Brook is also impaired for Chronic Aquatic Toxicity and Lead, though no TMDLs have been completed for these impairments (RIDEM, 2008). The former Davis Liquid Waste Site is located within the Latham Brook watershed, was on the Superfund Program's National Priority List, and could be a source of contamination to the Brook (BETA, 2003). Working under a 1987 Record of Decision, remedial action has been underway at the Davis Liquid Waste Site since 1997. Groundwater will continue under a 2010 Amendment to the Record of Decision.

Potential Bacteria Sources

There are several potential sources of bacteria in the Latham 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

All residents within the Latham Brook watershed rely on onsite wastewater treatment systems (OWTS) such as septic systems and cesspools. Failing OWTS can be significant sources of bacteria by allowing improperly treated waste to reach surface waters (RI HEALTH, 2003). If OWTS are improperly sized, malfunctioning, or in soils poorly suited for septic waste disposal, microorganisms such as bacteria, can easily enter surface water (USEPA, 2002). The majority of Smithfield (62%) has well drained soils suitable for OWTS. However, 24% of the soils in Smithfield have very poor to moderate draining capabilities. Because these soils have a lower hydraulic conductivity, their chance of conveying septic waste seepage into surface water is higher than that of well-drained soils (Town of Smithfield, 2006). The majority of the Latham Brook watershed is underlain with soils that can pose problems for septic waste disposal (BETA, 2003).

As shown in Figure 2, no OWTS Notices of Violation/Notices of Intent to Violate have been issued by the RIDEM Office of Compliance and Inspection in the watershed. However, an OWTS failure rate of approximately seven percent was estimated in an Onsite Wastewater Plan written for the Town of Smithfield (BETA, 2003).

Waterfowl, Wildlife, and Domestic Animal Waste

Domestic animals within the Latham 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 could enter and contaminate the stream.

There are several small impoundments along Latham Brook, providing ideal habitat for waterfowl (Woonasquatucket, 2011). 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 Latham Brook watershed has an impervious cover of 2.9%. 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 Latham 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 part of Phase II requirements for Smithfield's Municipal Separate Storm Sewer System (MS4), the town has mapped all known outfalls to surface water bodies within its regulated area (Town of Smithfield, 2006). The Rhode Island Department of Transportation (RIDOT) has also mapped stormwater outfalls.

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 Latham 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

All of the residents within the Latham Brook watershed rely on OWTS. Currently, the Town of Smithfield has a draft Onsite Wastewater Management Plan. As part of the onsite wastewater planning process, Smithfield 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 Smithfield is currently not eligible for Rhode Island's Community Septic System Loan Program (CSSLP). CSSLP is a program that assists citizens with the replacement of older and failing

systems through low-interest loans. It is recommended that the town develop a program to assist citizens with the replacement of older and failing systems.

Wildlife and Domestic Animal Waste

Smithfield's education and outreach programs currently highlight the importance of picking up after dogs and other pets (Town of Smithfield, 2006). The town should also incorporate educational materials focused on not feeding waterfowl, particularly around the small impoundments within the watershed, as part of their Phase II plan. Animal wastes should be disposed of away from any waterway or stormwater drainage system. Smithfield 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 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 the many small impoundments along the streams course, 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 Latham Brook and can harm human health and the environment.

Stormwater Management

The Rhode Island Department of Transportation (RIDOT) is a municipal separate storm sewer system (MS4) operator (RIPDES permit RIR040036) that has prepared a Phase II Stormwater Management Plan (SWMPP). Though the Town of Smithfield (RIPDES permit RIR040034) is also regulated under the Phase II program, the watershed area within Smithfield is outside of the regulated area.

The Town of Smithfield adopted an illicit discharge detection and elimination (IDDE) ordinance on January 4th, 2011. These types of ordinances prohibit illicit discharges to the MS4 and provide an enforcement mechanism. The town also has procedures in place to detect illicit discharges. Detecting these discharges is a central component of the IDDE program. Illicit discharges can be a significant source of bacterial contamination and Smithfield should continue to have thorough measures in place for their detection (Town of Smithfield, 2006).

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 Latham Brook based on the watershed's imperviousness, 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.

Land Use Protection

Smithfield's Comprehensive Community Plan proposes to have a minimum of 15% of the land within town held in conservation (Smithfield, 2007). Preserving these natural areas is important because woodland and wetland areas within the Latham Brook watershed absorb and filter pollutants from stormwater and help protect water quality in the stream and stream channel stability. As these areas represent approximately 91% of the land use in the Latham Brook 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 Latham Brook watershed.

Table 1: Latham Brook Bacteria Data

Waterbody ID: RI0002007R-05

Watershed Planning Area: 24 – Woonasquatucket

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: 63% (Includes 5% Margin of Safety)

Data: 2008-2009 from RIDEM

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

Station Name	Station Location	Date	Result	Wet/Dry	Geometric Mean
WON11	Latham Brook at Burlingame Road #2 (off of Log Road)	8/25/2009	228	Dry	130 (63%)*
WON11	Latham Brook at Burlingame Road #2 (off of Log Road)	8/4/2009	214	Dry	
WON11	Latham Brook at Burlingame Road #2 (off of Log Road)	6/17/2009	71	Dry	
WON11	Latham Brook at Burlingame Road #2 (off of Log Road)	6/1/2009	387	Dry	
WON11	Latham Brook at Burlingame Road #2 (off of Log Road)	9/17/2008	28	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 WON11

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
WON11	Latham Brook at Burlingame Road #2 (off of Log Road)	2008-2009	0	5	130	NA	130
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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- 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.
- Woonasquatucket (2011). Woonasquatucket River Watershed Council, Wildlife in the Watershed. Online: www.woonasquatucket.org/wildlife.php.