



# Nooseneck River

## Watershed Description

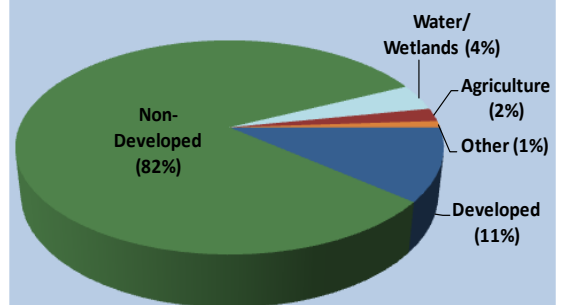
This **TMDL** applies to the Nooseneck River assessment unit (RI0006012R-05), a 9-mile long stream located in Coventry and West Greenwich, RI (Figure 1). The towns are located in the central portion of the state. The Nooseneck River watershed is presented in Figure 2 with land use types indicated.

The Nooseneck River begins as two streams in a forested area north of Sharp Street in Coventry. These two streams join in West Greenwich just before the Sharp Street crossing. The main stem of the Nooseneck River flows south across Sharp Street into Fry Pond in Cedar Swamp. A small tributary also enters Fry Pond from the northeast. The Nooseneck River then leaves Fry Pond, crosses Fry Pond Road, and flows through a forested area dotted with small cleared agricultural fields. A small tributary that originates in the medium-density residential along Donald Potter Drive then enters the main stem of the Nooseneck River. The river continues southeast, joins a small tributary from Yard Pond, flows under Interstate 95 (I-95), and enters the Big River State Management Area. The river then flows through a small forested area and crosses Route 3, an area characterized by low-density commercial development. Nooseneck River then flows through a forested and wetland area and empties into the Big River.

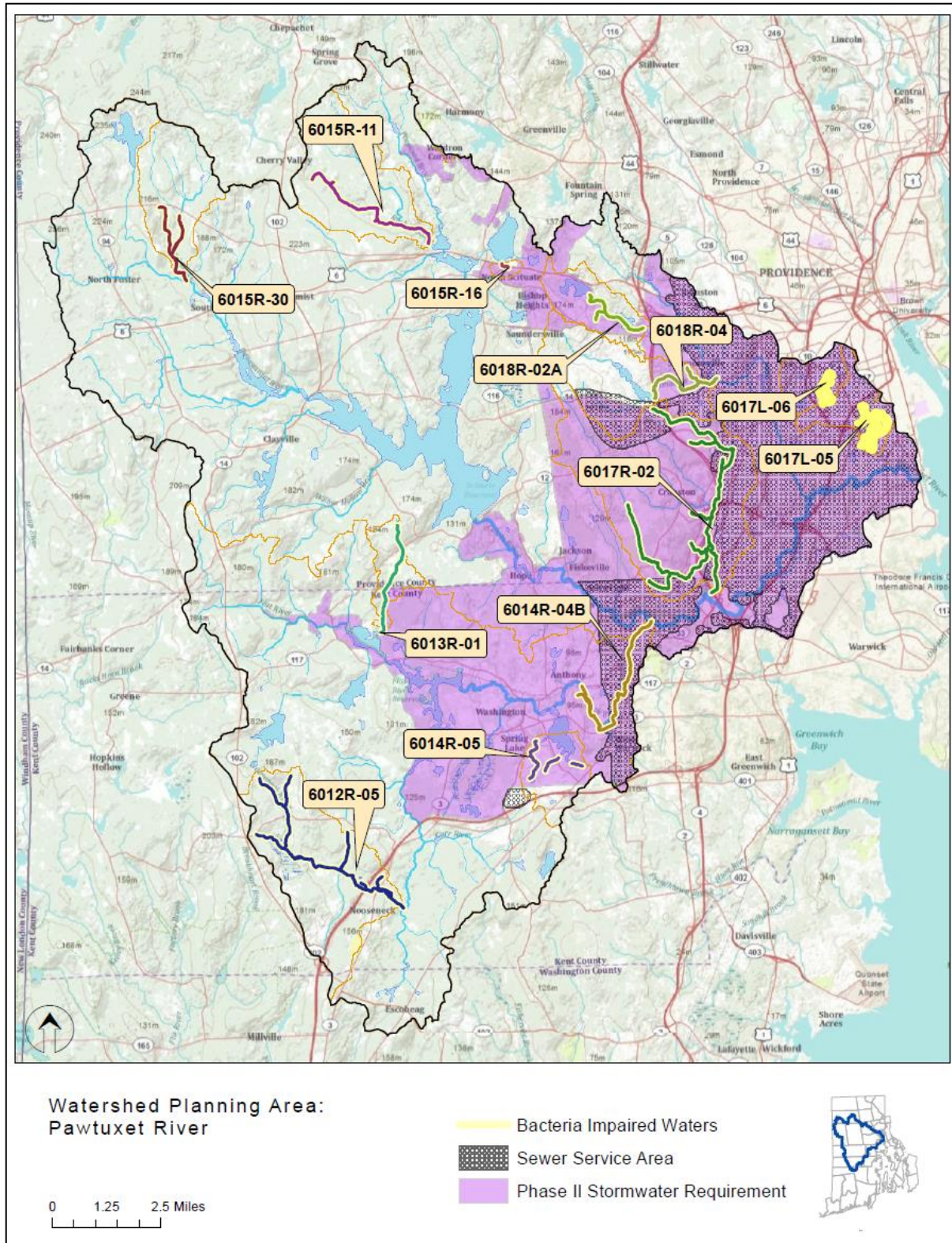
The Nooseneck River watershed covers 8.9 square miles. Non-developed uses, including the Big River State Management Area covers 82% of watershed area. Developed uses (including residential, transportation, and commercial uses) occupy approximately 11% of the land area. Impervious surfaces cover a total of 3.7%. Wetland and surface waters occupy 4%, and agricultural use accounts for a small portion of the watershed (2%).

## Assessment Unit Facts (RI0006012R-05)

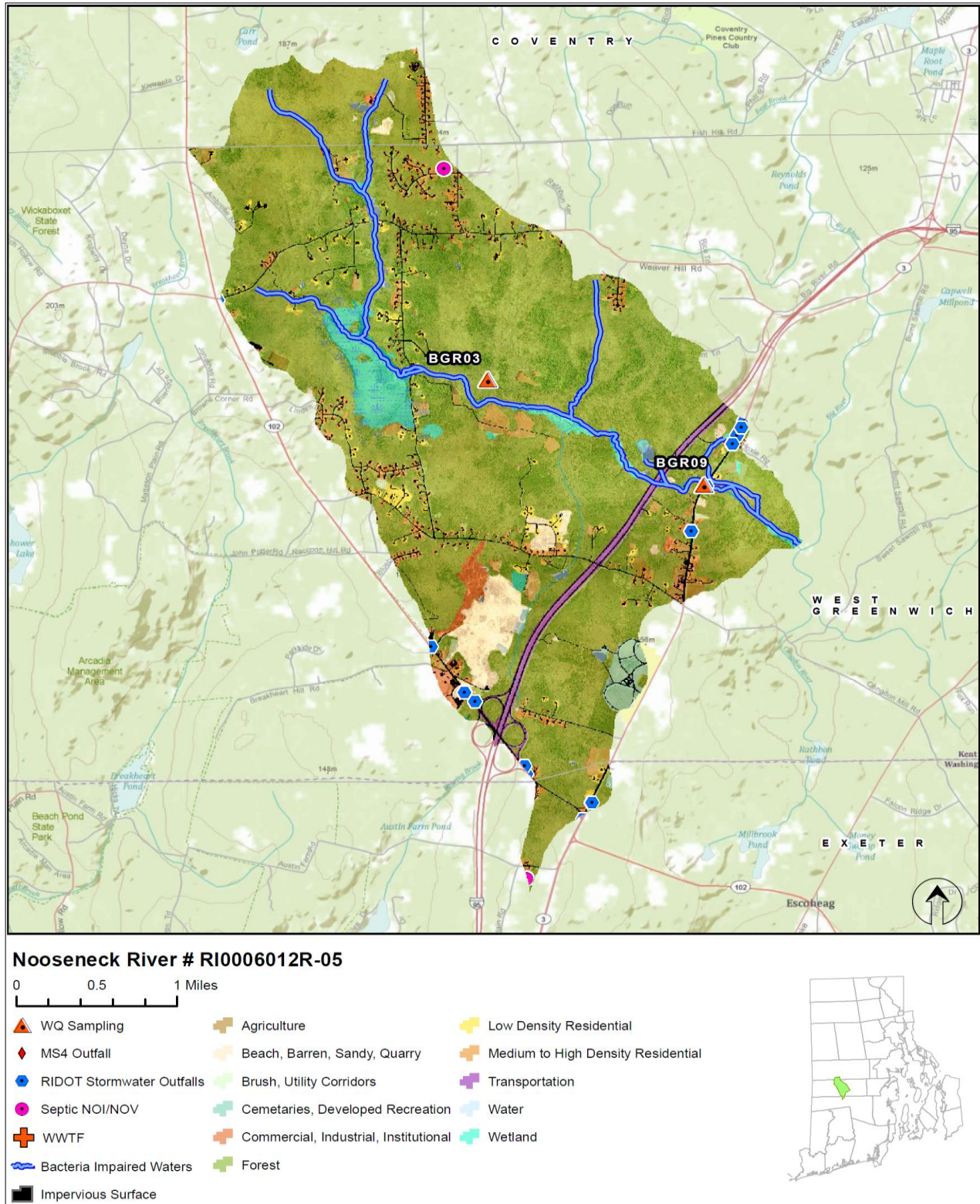
- **Town:** Coventry and West Greenwich
- **Impaired Segment Length:** 9 miles
- **Classification:** Class A
- **Direct Watershed:** 8.9 mi<sup>2</sup> (5,726 acres)
- **Impervious Cover:** 3.7%
- **Watershed Planning Area:** Pawtuxet (#12)



**Watershed Land Uses**



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



**Figure 2: Map of the Nooseneck River watershed with impaired segments, sampling locations, and land cover indicated.**



### Potential Bacteria Sources

There are several potential sources of bacteria in the Nooseneck River watershed including malfunctioning onsite wastewater treatment systems, agricultural activities, wildlife and domestic animal waste, and stormwater runoff from developed areas.

#### Onsite Wastewater Treatment Systems

The residents within the Nooseneck River watershed rely entirely on onsite wastewater treatment systems (OWTS). Failing OWTS can be significant sources of bacteria by allowing improperly treated waste to reach surface waters (RI HEALTH, 2003). OWTS that are improperly sized, are malfunctioning, or are in soils poorly suited for septic waste disposal can be sources of bacteria to surface water (USEPA, 2002). The soils in much of the Nooseneck River watershed are not well suited for OWTS due to wetness, flooding potential, slow percolation, and slopes. Over 50 percent of the towns' total land area has soils with constraints on development (Town of West Greenwich, 1995). As shown in Figure 2, two Notices of Violation/Notices of Intent to Violate (NOV/NOIs) have been issued by the RIDEM Office of Compliance and Inspection in the Nooseneck River watershed.

#### Agricultural Activities

Agricultural operations are an important economic activity and landscape feature in the state's rural areas. Agricultural land use occupies 2% of the Nooseneck River watershed. However, a large agricultural area is located directly adjacent to Nooseneck River, off of Fry Pond Road, near Station BGR03 (Figure 2). Bacteria samples collected at this station exceeded the water quality standards for enterococci. Other agricultural operations are located along the southern bank of Fry Pond. Agricultural runoff, may contain pollutants, including bacteria, and may be contributing to the high concentrations of bacteria in Nooseneck River.

#### Wildlife and Domestic Animal Waste

Domestic animals within the Nooseneck River watershed represent another potential source of bacteria. Residential development is located directly adjacent to the river and Fry Pond in several areas. If residents are not properly disposing of pet waste, the bacteria associated with that waste could enter and contaminate the river.

Forty percent of the Town of West Greenwich is public open space preserved in land trusts (Berger, 2003). Open space in the Nooseneck River watershed provides sanctuary to a variety of wildlife including squirrel, deer, and waterfowl. Many of these areas surround the river (Figure 2) and concentrate wildlife around the Nooseneck 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 Nooseneck River watershed has an impervious cover of approximately 3.7%. 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 these portions of the watershed may be contributing bacteria to the Nooseneck 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 Coventry and West Greenwich, including those for I-95. Twelve RIDOT stormwater outfalls were identified within the Nooseneck River watershed. These outfalls are located along major roads in the southern portion of the watershed in West Greenwich.

#### 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 Nooseneck 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

All residents in the Nooseneck River watershed rely on OWTS (Figure 1). While Coventry has an Onsite Wastewater Management Plan that provides a framework for managing the OWTS, West Greenwich has yet to develop an onsite plan. Neither town has adopted an OWTS ordinance requiring all OWTS to be inspected and pumped routinely. No sewer expansion is planned for this area (Weston and Sampson, 2003, Town of West Greenwich, 1995). As part of the onsite wastewater management planning process, Coventry and West Greenwich 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 Coventry is eligible for Rhode Island's Community Septic System Loan Program (CSSLP) and has obtained \$300,000 in CSSLP money since 2008. The CSSLP program provides low-interest loans to residents to help with maintenance and replacement of OWTS. The Town of West Greenwich is not currently eligible for CSSLP. It is recommended that West Greenwich develop a program to assist citizens with the replacement of older and failing systems.

### Agricultural Activities

If not already in place, the U.S. Department of Agriculture Natural Resources Conservation Service and the RIDEM Division of Agriculture should work with local agricultural operations, particularly the operations off of Fry Pond Road, to develop conservation plans for farming activities. These plans should ensure that there are sufficient stream buffers, that fencing exists to restrict access of livestock and horses to streams and wetlands, and that animal waste handling, disposal, and other appropriate BMPs in place. A plan should be developed to evaluate the contributions of these farms and other sites to the bacterial contamination in Nooseneck River.

### Wildlife and Domestic Animal Waste

Education and outreach programs in West Greenwich and Coventry should highlight the importance of picking up after dogs and other pets and not feeding waterfowl, particularly around Fry Pond. Animal wastes should be disposed of away from any waterway or stormwater systems. West Greenwich and Coventry should work with volunteers from the towns 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 Fry and Yard Ponds. 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 Nooseneck

River and can harm human health and the environment. Both towns should ensure that mention of this regulation is included in their SWMPPs.

### Stormwater Management

The Rhode Island Department of Transportation (RIDOT) is a municipal separate storm sewer (MS4) operator (RIPDES permit RIR040036) that has prepared the required Phase II Stormwater Management Plan (SWMPP) for state-owned divided highways within the watershed. Though the Towns of Coventry (RIPDES permit RIR040006) and West Greenwich (RIPDES permit RIR040029) are regulated under the Phase II program, the Nooseneck River watershed is outside of the regulated area.

In 2009, both towns adopted an illicit discharge detection and elimination (IDDE) ordinance (RIDEM, 2010). This type of ordinance prohibits illicit discharges to the MS4 and provides 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.

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.

As it is assumed that stormwater runoff is not the major contributor of bacteria to the Nooseneck River based on the watershed's imperviousness, RIDOT, Coventry, and West Greenwich 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

The Nooseneck River watershed has a large amount of land consisting of important woodland and wetland areas including the Big River State Management Area. These areas absorb and filter pollutants from stormwater runoff, and help protect both water quality in the stream and stream channel stability. As non-developed areas represent approximately 82% of the land use in the Nooseneck River watershed,



it is important to continue preserving these undeveloped areas, and to institute controls on development in the watershed.

The Town of West Greenwich encourages the use of the State of Rhode Island's Farm, Forest, and Open Space Act which allows land owners with 10 or more open acres to apply for local tax assessment relief (Berger, 2003). More than 165 residents have successfully pursued this tax break in the town, preserving land in its natural state. Areas within the watershed should also be conserved from future development to benefit the Nooseneck River. The Town of West Greenwich's Comprehensive Plan provides goals to further preserve the unique natural areas and limit development.

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

**Table 1: Nooseneck River Bacteria Data**

**Waterbody ID:** RI0006012R-05

**Watershed Planning Area:** 12-Pawtuxet River

**Characteristics:** Freshwater, Class A, 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:** 81% (Includes 5% Margin of Safety)

**Data:** 2006-2007 from RIDEM

**Single Sample Enterococci (colonies/100 mL) Results for the Nooseneck River (2006-2007) with Geometric Mean Statistics**

Station Name	Station Location	Date	Result	Wet/Dry	Geometric Mean
BGR03	Dirt road off of Fry Pond Road along river	8/9/2007	1200	Dry	224 <sup>†</sup> (81%)*
BGR03	Dirt road off of Fry Pond Road along river	7/9/2007	1100	Dry	
BGR03	Dirt road off of Fry Pond Road along river	6/26/2007	580	Dry	
BGR03	Dirt road off of Fry Pond Road along river	6/12/2007	730	Wet	
BGR03	Dirt road off of Fry Pond Road along river	10/9/2006	1	Dry	
BGR09	On Rte 3 (near Yard Pond Road)	8/9/2007	980	Dry	39
BGR09	On Rte 3 (near Yard Pond Road)	7/9/2007	50	Dry	
BGR09	On Rte 3 (near Yard Pond Road)	6/26/2007	46	Dry	
BGR09	On Rte 3 (near Yard Pond Road)	6/12/2007	39	Wet	
BGR09	On Rte 3 (near Yard Pond Road)	10/9/2006	1	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 all Stations**

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
BGR03	Dirt road off of Fry Pond Road along river	2006-2007	1	4	224	NA	166
BGR09	On Rte 3 (near Yard Pond Road)	2006-2007	1	4	39	NA	39

Shaded cells indicate an exceedance of water quality criteria  
 Weather condition determined from rain gage at T.F. Green Airport in Warwick, RI

### References

- Fuss & O'Neill (2004). Phase II Stormwater Management Plan: Town of Coventry, Rhode Island. Submitted by Fuss & O'Neill, Inc, Providence, RI.
- RIDEM (2008). State of Rhode Island and Providence Plantations 2008 303(d) List – List of Impaired Water Bodies. Rhode Island Department of Environmental Management.
- RIDEM (2009). State of Rhode Island and Providence Plantations Water Quality Regulations. Amended December, 2009. Rhode Island Department of Environmental Management.
- RIDEM (2010). MS4 Compliance Status Report for RI Statewide Bacteria TMDL. Rhode Island Department of Environmental Management.
- RI HEALTH (2003). Cumberland, Lincoln, and Pawtucket Drinking Water Assessment Results, Source Water Protection Assessment conducted by the University of Rhode Island for the Rhode Island Department of Health, Office of Drinking Water Quality.
- Town of West Greenwich (1995). Town of West Greenwich Comprehensive Plan. West Greenwich Planning Department, West Greenwich, Rhode Island. Amended Mar 19, 2008.
- 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](http://www.epa.gov/owm/septic/pubs/septic_2002_osdm_all.pdf).
- Weston & Sampson (1995). Wastewater Facilities Plan: Town of Coventry, Rhode Island. Submitted by Weston & Sampson Engineers, Inc, Warwick, RI. June 1995.
- Weston & Sampson (2003). Onsite Wastewater Management Plan: Town of Coventry, Rhode Island. Submitted by Weston & Sampson Engineers, Inc, Warwick, RI. October 2003.