Pawcatuck River Segment 18E

Watershed Description

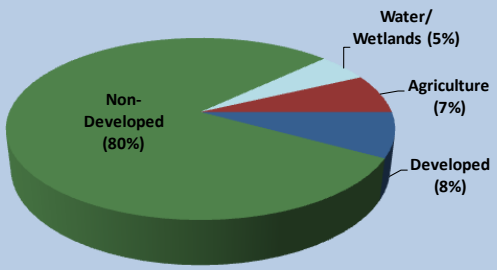
This **TMDL** applies to the segment of the Pawcatuck River from Route 3 to Main Street Bridge crossing in downtown Westerly (RI0008039R-18E), an 11.36-mile long stream segment located in Hopkinton and Westerly, RI (Figure 1). The Pawcatuck River watershed is presented in Figures 2 and 3 with land use types indicated.

The headwaters of the Pawcatuck River are located in Wordens Pond in South Kingstown. Just west of Route 2 and Great Swamp near the Village of Kenyon begins one of two impaired segments that were addressed in 2011 as part of the Statewide Bacteria TMDL. The first of these segments (RI00080439R-18B) ends just before Route 112, while the second (RI00080439R-18C) extends from just west of Route 112 near the border of Richmond and Charlestown in the Village of Carolina to the Village of Bradford, along the Hopkinton and Westerly border. The next downstream segment of the Pawcatuck River (RI00080439R-18D) travels from the Bradford Dying discharge point west to the Route 3 bridge crossing. This segment is also impaired for bacteria (RIDEM, 2011).

This TMDL covers the furthest downstream segment (RI00080439R-18E) of the freshwater Pawcatuck River from the Route 3 Bridge crossing to the Main Street Bridge in downtown Westerly. At Route 3, the river travels north towards Potter Hill where the river becomes the boundary between Rhode Island and Connecticut. From Potter Hill, the River travels southwest in a semi-circle towards downtown Westerly, RI and Pawcatuck, CT. This segment of the Pawcatuck River has less development and more agricultural land and forests upstream of its crossing with Route 78. As the River travels downstream of Route 78, the watershed becomes more urbanized and developed.

Assessment Unit Facts (RI0008039R-18E)

- **Towns:** Hopkinton, and Westerly
- **Impaired Segment Length:** 11.36 miles
- **Classification:** Class B
- **Direct Watershed:** 295 mi² (189,079 acres)
- **Impervious Cover:** 2.9%
- **Watershed Planning Area:** Pawcatuck – Pawcatuck (#23)



Watershed Land Uses

Major tributary streams entering this reach of the Pawcatuck River include the Ashaway River and the Shunock River. A bacteria TMDL for the Ashaway River was completed as part of the 2011 Statewide Bacteria TMDL. There are also several smaller tributary streams that will be discussed later in this waterbody summary. The Pawcatuck River eventually empties into Little Narragansett Bay.

This segment of the Pawcatuck River watershed covers 295 square miles. Non-developed areas occupy a large portion (80%) of the watershed. Developed uses cover approximately 9%. Agricultural land uses occupy 7% and wetlands and other surface waters account for 5%.

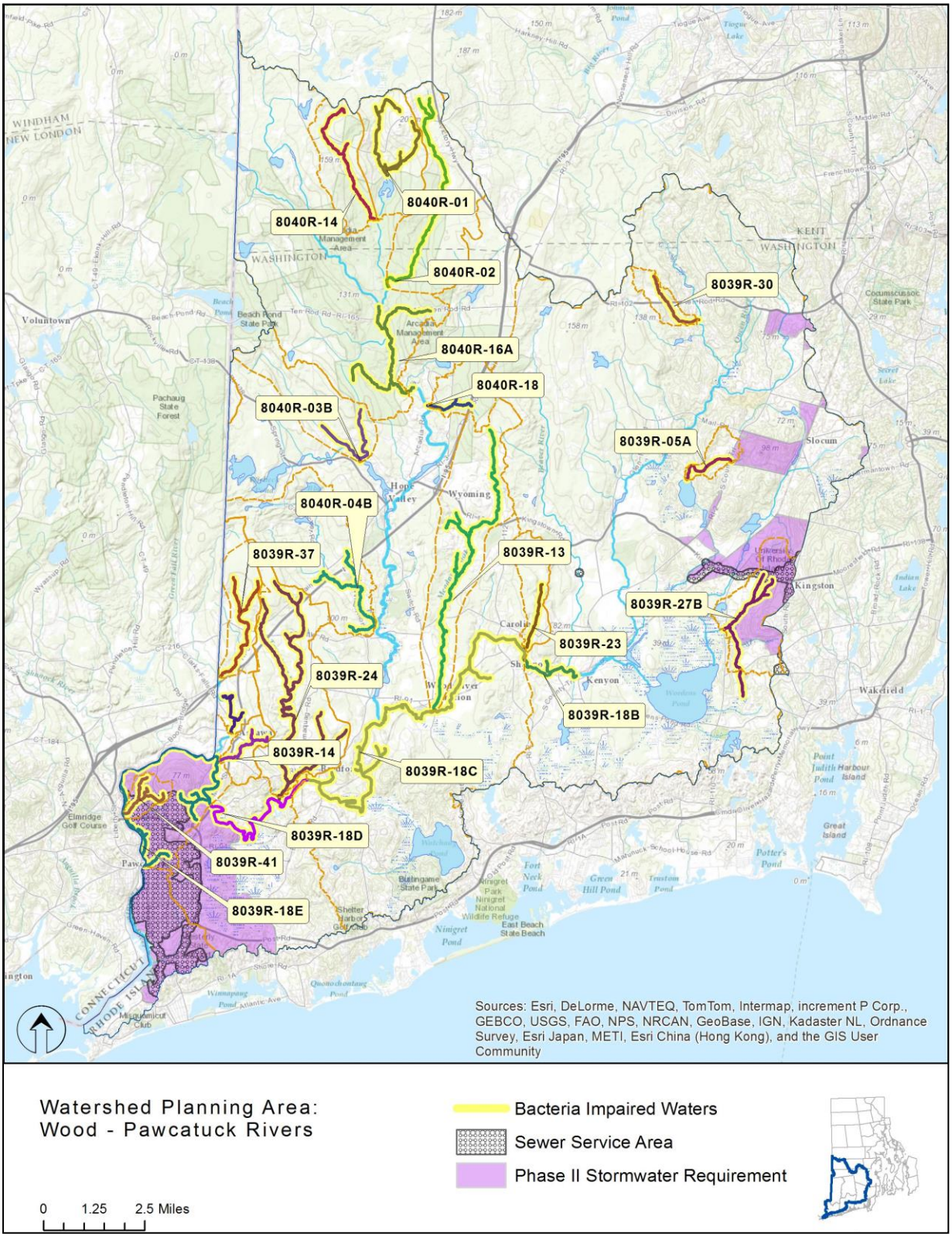


Figure 1: ***Map of the Wood-Pawcatuck Watershed Planning Area with impaired segments addressed by the Statewide Bacteria TMDL, sewered areas, and stormwater regulated zones.***

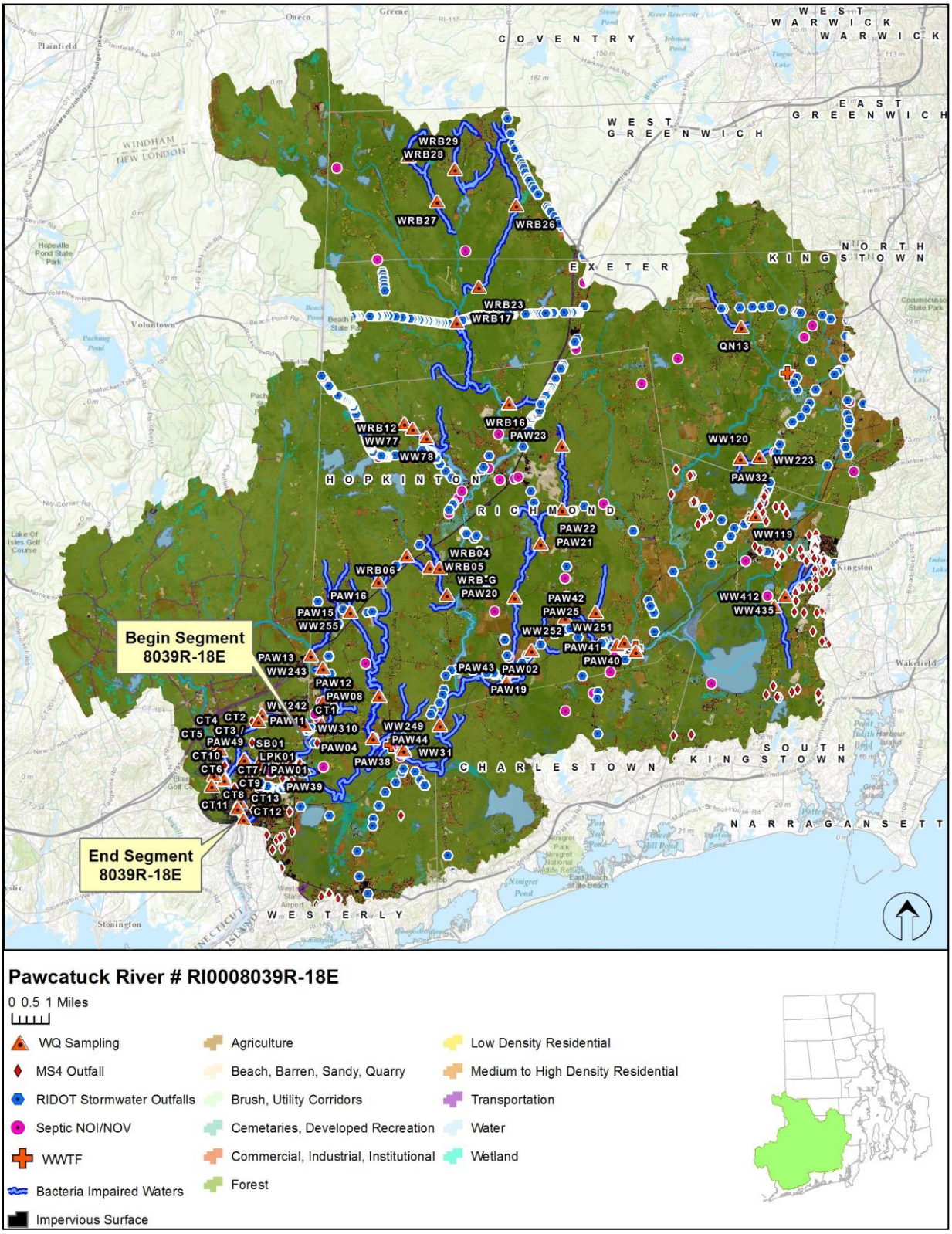


Figure 2: ***Map of the Pawcatuck River (Segment 18E) watershed with impaired segments, sampling locations, and land cover indicated.***

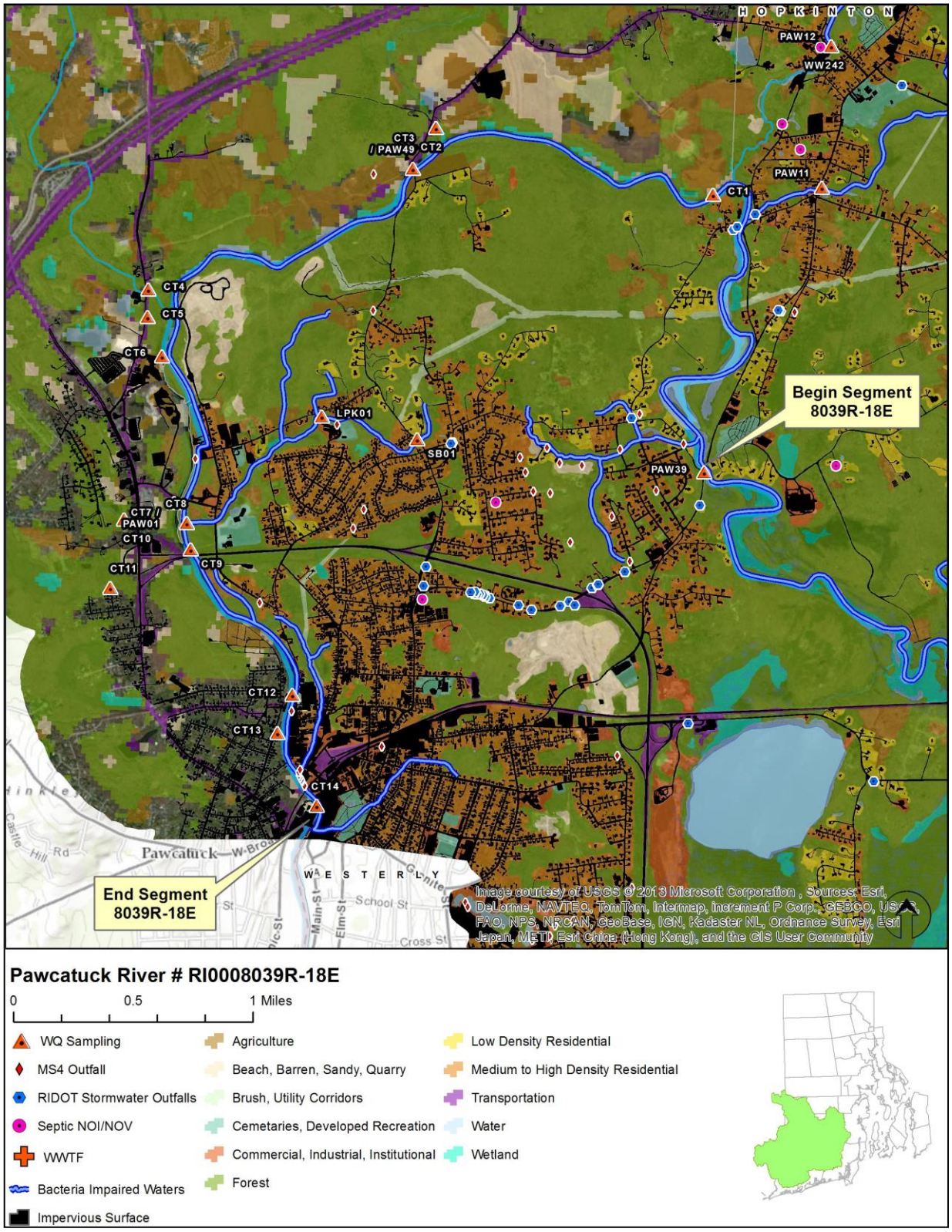


Figure 3: ***Zoomed map of the Pawcatuck River (Segment 18E) watershed with impaired segments, sampling locations, and land cover indicated.***

Why is a TMDL Needed?

The Pawcatuck River Segment 18E is a Class B freshwater stream, and its applicable designated uses are primary and secondary contact recreation and fish and wildlife habitat (RIDEM, 2010c). This segment of the Pawcatuck River has been designated by RIDEM as a Special Resource Protection Water (SRPW), which provides the River with special protections under RIDEM's Antidegradation Provisions. SRPWs are high quality surface waters that include public water supplies and waterbodies having significant ecological or recreational uses. The Pawcatuck River Segment 18E is designated an SRPW for conservation, critical habitat (rare and endangered species), and as a wild and scenic waterbody.

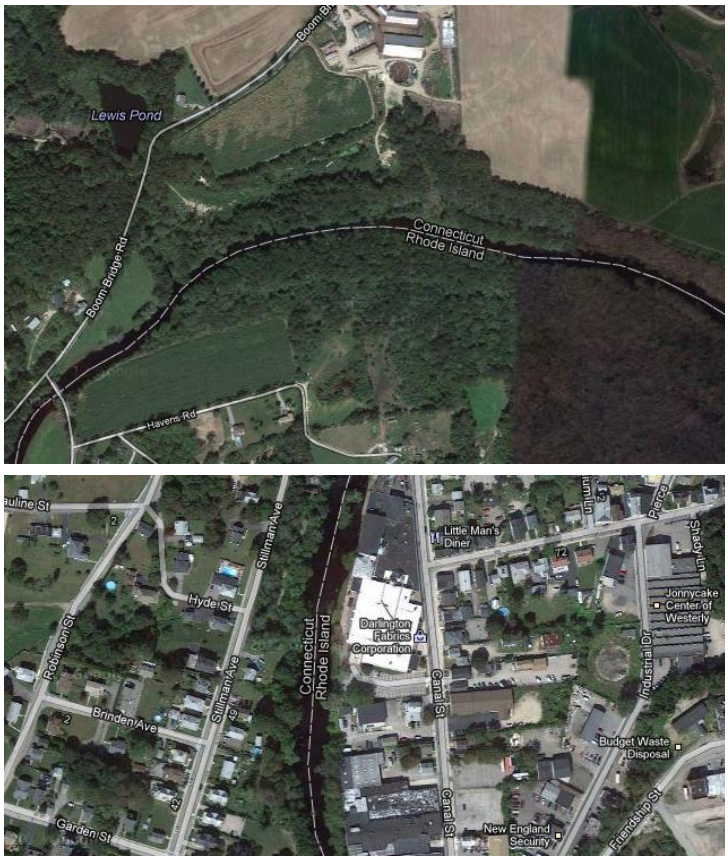


Figure 4: ***Partial aerial views of the Pawcatuck River watershed. (Source: Google Maps)***

In 2011, the Connecticut Department of Energy and Environmental Protection (CT DEEP) collected two sets of bacteria water quality samples in this area. RIDEM provided CT DEEP with bottles to be analyzed by the RI HEALTH Lab for enterococci, the Rhode Island indicator bacteria, while CT DEEP had their samples analyzed for e-*coli*, the Connecticut indicator bacteria. Water samples were collected from eight sampling locations (Figures 2 and 3) along the Pawcatuck River, eight sampling locations along tributaries to this segment of the Pawcatuck River, and one station in the canal adjacent to the Pawcatuck River near White Rock. One of the tributaries, Spring Brook, is located in Rhode Island and was sampled by RIDEM personal for enterococci only, while the rest of the tributaries are located in Connecticut and were sampled by CT DEEP personal. Also in 2011, the RIDEM/OWR Ambient River Monitoring Program (ARM) sampled the Wood River and Pawcatuck River watershed basins, which includes this study area.

The enterococci water quality data collected in 2011 are described in the Data Report for this study (2013) and summarized in Table 1. Under dry weather conditions, enterococci concentrations were much higher in several of the tributary streams than in this reach of the Pawcatuck River. In general, main stem Pawcatuck River enterococci concentrations were consistent throughout this reach of the

River during dry weather. However when all data (wet and dry weather samples) are combined enterococci concentrations increase in the downstream direction from White Rock Road to Stillmanville Road. Several tributaries including Spring Brook enter the Pawcatuck River in this area. While all tributaries generally have greater bacteria concentrations than the main stem of the Pawcatuck River, Spring Brook, Lassel's Brook, and Hyde Brook have the highest bacteria concentrations of the stations sampled. Analyzing the wet weather data is difficult because there were only two samples collected at most of the stations and many of the concentrations were reported as greater than the detection limit. It can be said that wet weather concentrations are much higher than dry weather concentrations. Similar to dry weather conditions, wet weather enterococci concentrations were higher in several of the tributary streams than in this reach of the Pawcatuck River. The stations with the highest bacteria concentrations were located in Lewis Brook, Spring Brook, Lassel's Brook, and Hyde Brook.

In 2014, CT DEEP drafted a TMDL plan for its impaired waters in the Pawcatuck River watershed (CT DEEP, 2014) using the e-*coli* data that they collected in 2011. The e-*coli* data from the tributaries were consistent with the enterococci data. The CT DEEP data showed that the tributaries with the highest dry weather e-*coli* concentrations were Lewis Brook, Lassel's Brook, and Hyde Brook. These three tributaries also had the highest wet weather concentrations. The CT DEEP TMDL mentions that large agricultural operations are located near Lewis Brook. CT DEEP sampled several stations in Lassell's Brook, whose watershed is identified as being residential. The results indicate that there is a potential bacteria source between Fairview Drive and Somerset Drive. In Hyde Brook, whose watershed is high density residential and commercial, the results indicate that there is a potential source between West Arch Street and Smith Street.

The water quality criteria for enterococci, along with enterococci bacteria sampling results from 2011 from the stations within the Pawcatuck River and associated statistics are presented in Table 1. Information about Spring Brook can be found in its waterbody summary. CT DEEP will complete its TMDL for this area in 2014.

Due to the elevated bacteria measurements presented in Table 1, the Pawcatuck River Segment 18E does not meet Rhode Island's bacteria water quality standards, is identified as impaired, and was placed on the 303(d) list (RIDEM, 2012). 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 waterbodies to comply with state water quality standards.

Potential Bacteria Sources

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

Onsite Wastewater Treatment Systems

All residents in the town of Hopkinton rely on onsite wastewater treatment systems (OWTS), such as septic systems and cesspools. In general, in the town of Westerly, OWTS are located upstream of the White Rock area. White Rock is located near Route 78, which is also known as the Westerly by-pass. As mentioned previously, the watershed becomes more developed as you move downstream of this area. This portion of the watershed is served by a sewage collection system. Failing OWTS 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/NOI) have been issued by the RIDEM Office of Compliance and Inspection in the Pawcatuck River watershed, and many of the NOV/NOIs have been issued to residents near this impaired segment of the Pawcatuck River.

Illicit Discharges

Illicit discharges, or any discharge to a municipal separate storm sewer system (MS4) that is not composed entirely of stormwater, may also be contributing bacteria to Pawcatuck River. As shown in Figure 2, multiple MS4 outfalls discharge into this segment of the river.

Agricultural Activities

The Pawcatuck River watershed has multiple agricultural operations. Comprising 7% of the land cover in this sub-watershed, agricultural operations are an important economic activity and landscape feature in the state's rural areas. However, agricultural runoff may contain multiple pollutants, including bacteria. Agricultural practices such as allowing livestock to graze near streams, crossing livestock through waterbodies, spreading manure as fertilizer, and improper disposal of manure can contribute to bacterial contamination. This impaired segment of the Pawcatuck River has multiple farms located near the banks of the river. CT DEEP identified two large agricultural areas in the vicinity of the Pawcatuck River and Lewis Brook. One area is off Anthony Road and Boom Bridge Road, while the other is off of Ella Wheeler Road and Pendleton Hill Road. Both areas are located in North Stonington. Water quality data from Lewis Brook, located near one of these agricultural operations, exceeded the water quality criteria for enterococci, suggesting that activities and/or runoff from the farms may be contributing bacteria to the Pawcatuck River.

Wildlife and Waterfowl Waste

Approximately 80% of the Pawcatuck River watershed is undeveloped. 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 infrastructure to the nearest surface water. As such these physical land alterations can exacerbate the impact of these natural sources on water quality. The impaired segment of the Pawcatuck River flows through woodland and wetland areas. Waste from wildlife and waterfowl that frequent these areas may be contributing bacteria to the Pawcatuck River Segment 18E.

Developed Area Stormwater Runoff

Approximately 9.1% of the Pawcatuck River watershed is developed and most of the development is concentrated along major roads in the watershed, particularly in downtown Westerly, RI and Pawcatuck, CT near the end of this impaired segment. The Pawcatuck River watershed has an impervious cover of approximately 2.8%. 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 can provide a useful metric for the potential for adverse stormwater impacts. In this case, given the size of the Pawcatuck River watershed a careful review of the distribution of impervious cover across the watershed is also warranted. The 2.8% impervious cover value was calculated for the entire Pawcatuck River watershed upstream of this segment. When the less developed upper reaches of the watershed were removed, the percent impervious cover increased to 7.5%. A further review of the watershed map shown in Figure 3, reveals that most of the impervious cover appears to be situated along this segment of the Pawcatuck 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. However, as discussed in greater detail below, available data from the 2010 Pawcatuck River and Little Narragansett Bay Bacteria TMDL suggests that urban stormwater is likely contributing to elevated bacteria levels observed in this reach.

Both the Town of Westerly and the Rhode Island Department of Transportation (RIDOT) have identified and mapped stormwater outfalls in the Pawcatuck River watershed. As shown in Figures 2 and 3, multiple RIDOT and Westerly owned outfalls are found in the watershed, particularly along major highways.

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 Pawcatuck River watershed. These activities could potentially 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

All residents in the town of Hopkinton rely on onsite wastewater treatment systems (OWTS), such as septic systems and cesspools. While some residents the town of Westerly rely on a municipal sanitary sewer system, the area surrounding the upper section of this impaired segment of the Pawcatuck River does not have available sewers. These residents must rely on OWTS. Westerly and Hopkinton have approved Onsite Wastewater Management Plans. These plans provide a framework for managing the OWTS. RIDEM recommends that all communities create an inventory of onsite systems through mandatory inspections. Inspections help 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, 2010c).

Rhode Island's Community Septic System Loan Program (CSSLP) allows towns to assist citizens with the replacement of older and failing systems through low-interest loans. Portions of the Town of Westerly have been approved for CSSLP, while the entire Town of Hopkinton is not currently eligible for CSSLP. In general, the parts of the Pawcatuck River in Westerly that are upstream of White Rock area are eligible for CSSLP, while the Apache Drive and Spring Brook Avenue areas are not (RIDEM, 2011a). It is recommended that the town develop a program to assist citizens with the replacement of older and failing systems.

Agricultural Activities

If not already in place, agricultural producers should work with the RIDEM Division of Agriculture and the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) to develop conservation plans for their 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. As mentioned previously, there are several large agricultural areas located in the Town of North Stonington, Connecticut near Lewis Brook and the Pawcatuck River. It is recommended that these operations also follow best management practices as appropriate to minimize water quality impacts.

Wildlife and Waterfowl Waste

The towns should develop education and outreach programs to highlight the importance of picking up after dogs and other pets and not feeding waterfowl. Animal waste should be disposed of away from any waterway or stormwater system. The towns should work with volunteers to map locations where animal waste is a significant and a chronic problem. The town should also evaluate 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 take several measures to minimize the impacts of wildlife and waterfowl to the Pawcatuck River. They can allow tall, coarse vegetation to grow in areas along the shores of the Pawcatuck River that are frequented by waterfowl and wildlife. 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, contributes to water quality impairments in the Pawcatuck River and can harm human health and the environment.

Stormwater Management

RIDOT (RIPDES permit RIR040036) is a municipal separate storm sewer (MS4) operator in the Pawcatuck River watershed has prepared a Phase II Stormwater Management Plan (SWMPP) for state-owned roads in Rhode Island. Parts of the Town of Westerly (RIPDES permit RIR044014) are regulated by the Phase II program. The regulated area includes most of the watershed that drains to this section of the Pawcatuck River. The Town of Hopkinton is not currently regulated under the Phase II Program.

The Town of Westerly adopted an illicit discharge detection and elimination ordinance in 2008. The Town of Hopkinton does not currently have ordinances to address illicit discharges. This type of ordinance prohibits illicit discharges to the storm drain system and provides an enforcement mechanism. It is recommended that any stormwater outfalls discharging in the vicinity of the sampling locations 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 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. 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 discussed previously in the Bacteria Source section, while the percent impervious cover for the watershed as a whole suggests that urban stormwater runoff is not the major contributor of bacteria to the Pawcatuck River, watershed maps show that the impervious cover is concentrated adjacent to this segment of the Pawcatuck River. Furthermore, in 2010 RIDEM completed a TMDL Analysis for Bacteria Impairments to the Pawcatuck River and Little Narragansett Bay for waters directly downstream of this waterbody segment. Data collected in support of the 2010 TMDL found that the freshwater Pawcatuck River is a significant bacteria source to the estuarine Pawcatuck River in wet weather. The 2010 TMDL details steps that RIDOT and Westerly must take to address stormwater. These steps include revisions to the Phase II minimum measures and construction of structural BMPs at identified priority locations.

Given these findings, RIDEM is requiring that Westerly and RIDOT revise their post-construction stormwater ordinances to ensure that development and re-development projects include stormwater controls effective at reducing bacteria levels, as further described in Section 6.3 of the Core TMDL Document. RIDEM is also requiring these MS4 operators to evaluate the sufficiency of their six minimum measures in achieving water quality goals for this reach of the Pawcatuck River as well as downstream waters. Changes to the SWMPPs should be documented in a TMDL Implementation Plan (TMDL IP) and should comply with relevant provisions Part IV.D of the RIPDES Stormwater General Permit (RIDEM, 2010b), which are summarized in Section 6.2 (Numbers 1 through 5) of the Core TMDL Document.

Land Use Protection

Woodland and wetland areas within the Pawcatuck River watershed absorb and filter pollutants from stormwater runoff, and help protect both water quality in the stream and stream channel stability. As these areas represent the majority of the land use in the Pawcatuck River watershed, it is important to preserve these undeveloped areas, and institute controls on development in the watershed. The Hopkinton Land Trust was established in 2004 and has since protected 875 acres of land through property acquisition and conservation easements (Town of Hopkinton, 2011). The Town of Hopkinton should continue to work with the Land Trust to protect more of the undeveloped land in the town, with a focus on lands around the Pawcatuck River. Since 1987, the Westerly Land Trust has acquired 29

significant parcels totaling about 1500 acres of property in the town of Westerly. Many of the properties are locations directly along the Pawcatuck River (Westerly Land Trust, 2013).

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

Table 1: Pawcatuck River Bacteria Data

***Waterbody ID*:** RI0008039R-18E

Watershed Planning Area: 23 – Wood-Pawcatuck

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

Impairment: Enterococci (colonies/100mL)

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

Percent Reduction to meet TMDL: **83.2% (Includes 5% Margin of Safety)**

Data: 2011

Single Sample Enterococci (colonies/100 mL) Results for the Pawcatuck River Segment 18E (2011) with Geometric Mean Statistics

Station Name	Station Location	Date	Result	Wet/Dry	Geometric Mean
PAW39	Downstream, Route 3 (Main St / Ashaway Rd)	05/10/11	7.4	DRY	67.9
PAW39	Downstream, Route 3 (Main St / Ashaway Rd)	06/27/11	71.2	DRY	
PAW39	Downstream, Route 3 (Main St / Ashaway Rd)	07/07/11	17.2	DRY	
PAW39	Downstream, Route 3 (Main St / Ashaway Rd)	07/20/11	23.1	DRY	
PAW39	Downstream, Route 3 (Main St / Ashaway Rd)	08/03/11	56.6	DRY	
PAW39	Downstream, Route 3 (Main St / Ashaway Rd)	08/15/11	1203.3	WET	
PAW39	Downstream, Route 3 (Main St / Ashaway Rd)	08/17/11	517.2	WET	
PAW39	Downstream, Route 3 (Main St / Ashaway Rd)	07/20/11	64	DRY	
PAW39	Downstream, Route 3 (Main St / Ashaway Rd)	09/13/11	122.3	DRY	
PAW39	Downstream, Route 3 (Main St / Ashaway Rd)	09/27/11	38.9	DRY	
PAW39	Downstream, Route 3 (Main St / Ashaway Rd)	09/28/11	63.1	DRY	
CT1	Pawcatuck River at Stateline, Post Office Lane	06/22/11	79.8	DRY	140.1
CT1	Pawcatuck River at Stateline, Post Office Lane	07/07/11	33.2	DRY	
CT1	Pawcatuck River at Stateline, Post Office Lane	08/03/11	49.6	DRY	
CT1	Pawcatuck River at Stateline, Post Office Lane	08/15/11	2500	WET	
CT1	Pawcatuck River at Stateline, Post Office Lane	08/17/11	613.1	WET	
CT1	Pawcatuck River at Stateline, Post Office Lane	09/13/11	93.3	DRY	
CT1	Pawcatuck River at Stateline, Post Office Lane	09/28/11	56.5	DRY	

Single Sample Enterococci (colonies/100 mL) Results for the Pawcatuck River Segment 18E (2011) with Geometric Mean Statistics (continued)

Station Name	Station Location	Date	Result	Wet/Dry	Geometric Mean
CT3/PAW49	Pawcatuck River at Boon Bridge Road	05/12/11	77.1	DRY	90.6
CT3/PAW49	Pawcatuck River at Boon Bridge Road	06/22/11	65	DRY	
CT3/PAW49	Pawcatuck River at Boon Bridge Road	06/28/11	38.2	DRY	
CT3/PAW49	Pawcatuck River at Boon Bridge Road	07/07/11	26.5	DRY	
CT3/PAW49	Pawcatuck River at Boon Bridge Road	07/21/11	46.4	DRY	
CT3/PAW49	Pawcatuck River at Boon Bridge Road	08/03/11	31.3	DRY	
CT3/PAW49	Pawcatuck River at Boon Bridge Road	08/15/11	2500	WET	
CT3/PAW49	Pawcatuck River at Boon Bridge Road	08/17/11	648.8	WET	
CT3/PAW49	Pawcatuck River at Boon Bridge Road	08/24/11	33.2	DRY	
CT3/PAW49	Pawcatuck River at Boon Bridge Road	09/13/11	92.35	DRY	
CT3/PAW49	Pawcatuck River at Boon Bridge Road	09/28/11	91.75*	DRY	
CT6	Pawcatuck River at Alice Court	06/22/11	116.9	DRY	144.6
CT6	Pawcatuck River at Alice Court	07/07/11	30.1	DRY	
CT6	Pawcatuck River at Alice Court	08/03/11	38.4	DRY	
CT6	Pawcatuck River at Alice Court	08/15/11	2500	WET	
CT6	Pawcatuck River at Alice Court	08/17/11	816.4	WET	
CT6	Pawcatuck River at Alice Court	09/13/11	86.7	DRY	
CT7/PAW01	Pawcatuck River at White Rock Bridge	05/10/11	6.3	DRY	81.0
CT7/PAW01	Pawcatuck River at White Rock Bridge	06/22/11	83.9	DRY	
CT7/PAW01	Pawcatuck River at White Rock Bridge	06/27/11	66.3	DRY	
CT7/PAW01	Pawcatuck River at White Rock Bridge	07/07/11	58.1	DRY	
CT7/PAW01	Pawcatuck River at White Rock Bridge	07/20/11	21.1	DRY	
CT7/PAW01	Pawcatuck River at White Rock Bridge	08/03/11	34.2	DRY	
CT7/PAW01	Pawcatuck River at White Rock Bridge	08/15/11	2500	WET	
CT7/PAW01	Pawcatuck River at White Rock Bridge	08/17/11	770.1	WET	
CT7/PAW01	Pawcatuck River at White Rock Bridge	08/18/11	108.1	WET	
CT7/PAW01	Pawcatuck River at White Rock Bridge	09/13/11	72.3	DRY	
CT7/PAW01	Pawcatuck River at White Rock Bridge	09/27/11	52	DRY	
CT7/PAW01	Pawcatuck River at White Rock Bridge	09/28/11	69.7	DRY	

Single Sample Enterococci (colonies/100 mL) Results for the Pawcatuck River Segment 18E (2011) with Geometric Mean Statistics (continued)

Station Name	Station Location	Date	Result	Wet/Dry	Geometric Mean
CT8	Pawcatuck River Canal at Canal Access Road	06/22/11	110.6	DRY	126.6
CT8	Pawcatuck River Canal at Canal Access Road	07/07/11	9.7	DRY	
CT8	Pawcatuck River Canal at Canal Access Road	08/03/11	101.2	DRY	
CT8	Pawcatuck River Canal at Canal Access Road	08/15/11	2500	WET	
CT8	Pawcatuck River Canal at Canal Access Road	08/17/11	816.4	WET	
CT8	Pawcatuck River Canal at Canal Access Road	09/13/11	47.4	DRY	
CT9	Pawcatuck River Below Canal	06/22/11	195.6	DRY	186.8
CT9	Pawcatuck River Below Canal	07/07/11	37.9	DRY	
CT9	Pawcatuck River Below Canal	08/03/11	67.6	DRY	
CT9	Pawcatuck River Below Canal	08/15/11	2500	WET	
CT9	Pawcatuck River Below Canal	08/17/11	579.4	WET	
CT9	Pawcatuck River Below Canal	09/13/11	137.6	DRY	
CT12	Pawcatuck River at Stillmanville Road	06/22/11	967	DRY	248.1†
CT12	Pawcatuck River at Stillmanville Road	07/07/11	47.95	DRY	
CT12	Pawcatuck River at Stillmanville Road	08/03/11	52	DRY	
CT12	Pawcatuck River at Stillmanville Road	08/15/11	2500	WET	
CT12	Pawcatuck River at Stillmanville Road	08/17/11	816.4	WET	
CT12	Pawcatuck River at Stillmanville Road	09/13/11	105	DRY	
CT14	Pawcatuck River at Coggswell Street	06/22/11	175	DRY	198.1
CT14	Pawcatuck River at Coggswell Street	07/07/11	20	DRY	
CT14	Pawcatuck River at Coggswell Street	08/03/11	121	DRY	
CT14	Pawcatuck River at Coggswell Street	08/15/11	2500	WET	
CT14	Pawcatuck River at Coggswell Street	08/17/11	579.4	WET	
CT14	Pawcatuck River at Coggswell Street	09/13/11	104.3	DRY	

Shaded cells indicate an exceedance of water quality criteria. Values in red were reported as greater than the detection limit. For the purpose of mathematical calculations, the values were increased one significant number (NSSP, 2007). Values in blue are the average of duplicate samples.
*Sampled twice in one day. Value calculated by averaging two sample concentrations (104.6 and 78.9).
† Indicated geometric mean used to calculate the percent reduction

Wet and Dry Weather Geometric Mean Enterococci Values for all Stations

Station Name	Station Location	Year Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
PAW39	Downstream, Route 3 (Main St / Ashaway Rd)	2011	3	8	67.9	341.5	37.1
CT1	Pawcatuck River at Stateline, Post Office Lane	2011	2	5	140.1	NA	58.6
CT3/PAW49	Pawcatuck River at Boon Bridge Road	2011	2	9	90.6	NA	50.3
CT6	Pawcatuck River at Alice Court	2011	2	5	144.6	NA	57.9
CT7/PAW01	Pawcatuck River at White Rock Bridge	2011	3	9	81.0	592.6	41.7
CT8	Pawcatuck River Canal at Canal Access Road	2011	2	5	126.6	NA	48.0
CT9	Pawcatuck River Below Canal	2011	2	5	186.8	NA	88.6
CT12	Pawcatuck River at Stillmanville Road	2011	2	5	248.1	NA	123.2
CT14	Pawcatuck River at Coggswell Street	2011	2	5	198.1	NA	96.3

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

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