

# FAIRFIELD COUNTY

## RIVER REPORT



Harbor Watch | 2018

## Fairfield County River Report: 2018

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This report includes data on:

Bruce Brook, Byram River, Comstock Brook, Deadman's Brook, Deep Brook, Farm Creek, Greenwich Creek, Goodwives River, Keelers Brook, Horseneck Brook, Mianus River, Mill River, Muddy Brook, Noroton River, Norwalk River, Pootatuck River, Rippowam River, Rooster River, Sasco Brook, and Saugatuck River

This report should be cited as:

S.C. Crosby, J.R. Cooper, P.J. Fraboni, D.E. Shulby, N.L. Spiller, and K.E. Tietz. 2018. Fairfield County River Report 2018. Harbor Watch, Earthplace, Inc. 1-68 p.

## About Harbor Watch

*The mission of Harbor Watch is to  
improve water quality and ecosystem health in Connecticut.*

Each day we strive to reach this goal through research in the lab and field, collaboration with our municipal partners, and education of students and the public. Harbor Watch addresses pollution threats to Long Island Sound and educates the next generation of scientists through hands-on research and experiential learning. As part of the larger organization of Earthplace, the work performed by Harbor Watch also supports the mission of Earthplace to build a passion in our community for nature and the environment through education, experience, and action.

Since its inception, Harbor Watch has trained over 1,000 high school students, college interns, and adult volunteers in the work of protecting and improving the biological integrity of Long Island Sound and has monitored over 250 sites for a variety of physical and biological parameters.

In 2018, Harbor Watch:

- Studied over 400 field sites in Fairfield County, CT
- Conducted biweekly, May-September monitoring of 20 rivers in 17 towns
- Trained 49 high school and college students
- Processed over 2500 water samples for bacteria concentration analysis in our laboratory

**Visit [www.harborwatch.org](http://www.harborwatch.org) for more information!**

## Acknowledgements

The authors would like to thank Leigh Ann Abbey, Diogo Antunes, Catalina Arenas, Lauren Brideau, Carolina De Menezes, Sonja Heineck, Emma Helman, Paul Lobdell, Bridget Mariner, Tony McDowell, Joe Racz, Sammy Riccio, Faith Taylor, Peter Wilson, and Bill Wright for their assistance with data collection and laboratory analysis. Funding for this research was generously provided by Atlantic Clam Farms, City of Norwalk, Coastwise Boatworks, Connecticut Department of Energy and Environmental Protection, Copps Island Oysters, Daphne Seybolt Culpeper Memorial Foundation, Elizabeth Raymond Ambler Trust, Environmental Professionals' Organization of Connecticut, General Reinsurance, Hillard Bloom Shellfish, Horizon Foundation, Insight Tutors, Jeniam Foundation, King Industries, Long Island Sound Futures Fund, New Canaan Community Foundation, Newman's Own Foundation, Norwalk Cove Marina, Norwalk River Watershed Association, NRG – Devon, Outdoor Sports Center of Wilton, Palmer's Market, Patagonia of Westport, Pramer Oyster Co., Resnick Advisors, Rex Marine Center, Rowayton Seafood, Town of Fairfield, Town of Ridgefield, Town of Westport, Town of Wilton, Trout Unlimited – Mianus Chapter and WASGP (this WASGP grant is funded in part by the Connecticut Department of Energy and Environmental Protection through a United States Environmental Protection Agency Clean Water Act Section 319 Nonpoint Source Grant, and administered by Rivers Alliance of Connecticut). Additional support was provided by the generosity of individual donors.

## Key Terms and Information

### Acronyms:

- CT DEEP: Connecticut Department of Energy and Environmental Protection
- CFU/100 mL: Colony forming units per 100 mL. This is a unit of measurement for bacteria concentrations. A colony is raised from a single bacterium to a visible colony for counting by providing the preferred heat range and media for 24 hours.

### Study Site Naming:

- Sites are numbered with the lowest number being closest to the mouth of the river where it meets a larger body of water or Long Island Sound. Sites with the highest numbers are located furthest upstream.
- Site names that include “SD” indicate that the sample location is a storm drain outfall rather than an instream location. These sites are not held to the same pass/fail assessment standards as instream sites and were not included in the pass or fail assessments.

### Terms/Symbols in Tables:

- “n/a” - Indicates that a sample was not taken at that time for reasons including broken or lost sample bag, stagnant water, inaccessibility due to construction, dry river bed, or other factors.
- “>” - More than 100 colonies were present on the filtered membrane, necessitating an estimated count per our methods. Values were obtained by using the formula  $(100 \text{ CFU} \times 100\text{mL})/\text{volume filtered (mL)}$ .
- “Est.” - Fewer than 20 colonies were present on the filtered membrane, so the colony count is estimated by using the formula  $(\text{CFU observed} \times 100\text{mL})/\text{volume filtered (mL)}$ .
- “Wet” - Rainfall is indicated as “Wet” if > 0.1 inches of rain fell within 2 days prior to sampling.
- “Dry” - Rainfall is indicated as “Dry” if < 0.1 inches of rain fell within 2 days prior to sampling.

## Introduction

Harbor Watch is a research and education program based out of Earthplace in Westport, CT. Our mission is to improve water quality and ecosystem health in Connecticut. In this report, we present a study of water quality in rivers throughout Fairfield County. The goal of this monitoring was to assess the health of each river and to identify areas where sources of sewage pollution may be present using *Escherichia coli* (*E. coli*) as an indicator.

Since 1986, Harbor Watch has been monitoring water quality throughout Fairfield County. The 2018 summer season represented our largest monitoring effort to date, including sampling 20 rivers in 17 towns along with dozens of stormwater systems flowing into those rivers and others. Partnering with local municipal leaders allowed us to identify multiple sources of sewage pollution to the Long Island Sound watershed in 2018. This report contains data summaries for the 20 rivers we monitored from May through September.

This report includes data on 4 water quality parameters: *E. coli*, dissolved oxygen, temperature, and conductivity. *E. coli* was selected for study because it is the indicator bacteria of choice for the Environmental Protection Agency (EPA) and Connecticut Department of Energy and Environmental Protection (CT DEEP) for sewage pollution in freshwater systems. Its presence in high concentrations suggests that there are likely also more harmful pathogens present. Dissolved oxygen is an important water quality indicator because many aquatic species rely on it for survival, similarly to how land animals rely on oxygen in the air. When dissolved oxygen is not available, species like fish and macroinvertebrates will relocate to higher quality waters, or die due to the lack of oxygen. Conductivity is a measure of how easily the water can carry an electrical current by measuring the ionic strength of the water. It can quantify the intrusion of salt water or other sources of salts and other compounds into a waterway. Temperature is also an important parameter for aquatic species, which can be excluded from a given location if the temperature is too high or too low.

## Methods

Each river was visited approximately twice per month from May through September for a total of 10 sampling days per river. Sites were selected based on access and representativeness of the river, with effort made to space sites evenly throughout the length of the river. Monitoring was carried out under a Quality Assurance Project Plan approved by the CT DEEP (RFA #17057).

Monitoring teams left Earthplace in Westport, CT in the morning to begin sampling and would return within 2-3 hours. Each team was comprised of fully-trained Harbor Watch employees, sometimes accompanied by volunteers. At each site, a water sample was collected and kept on ice. Water temperature, dissolved oxygen, and conductivity were measured at each site using a YSI Pro2030 meter.

Upon return to the Harbor Watch laboratory, the water samples were analyzed for fecal coliform and *E. coli* using membrane filtration methods set forth in Standard Methods (SM9222D and SM9222G). *E. coli* concentrations were evaluated using the criteria published in the CT DEEP Surface Water Quality Standards on 10/10/13 (Table 1). Because the rivers we tested do not contain designated swim areas, the “all other recreational uses” criteria will apply.

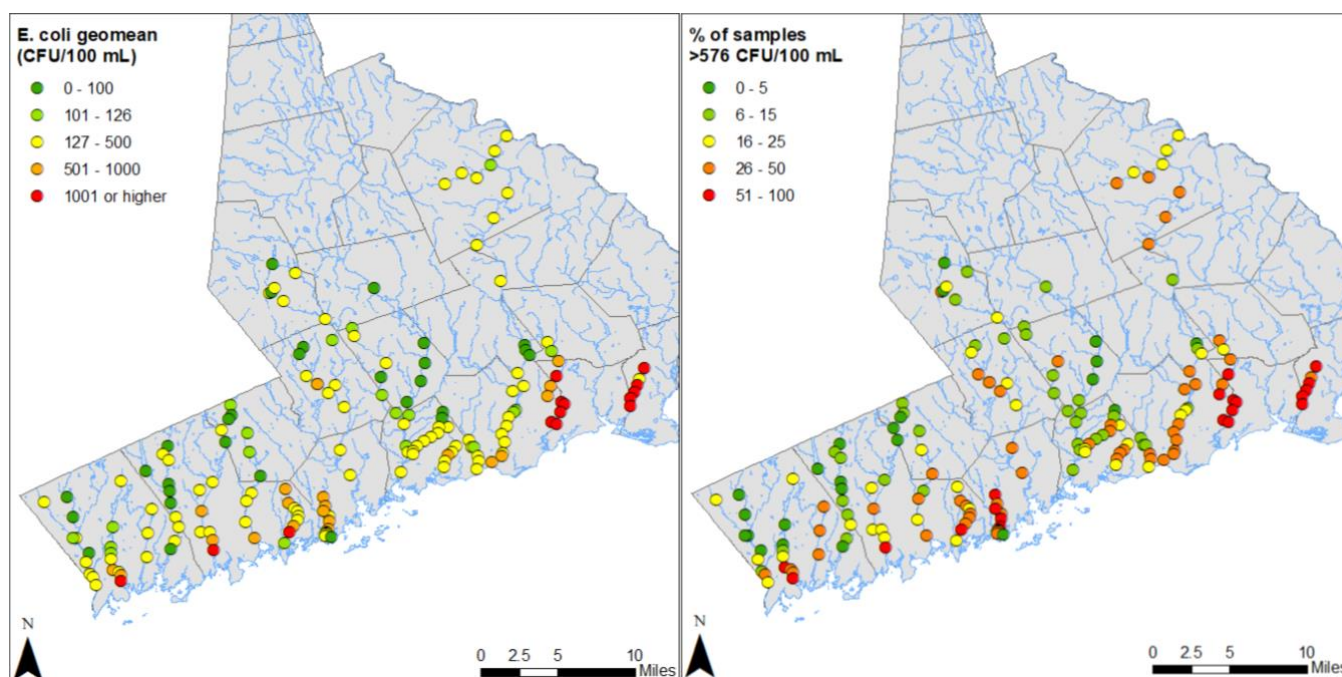
**Table 1.** CT DEEP criteria for *E. coli* levels as applied to recreational use, effective 10/10/13

Designated Use	Class	Indicator	Criteria
Designated Swimming	AA, A, B	<i>Escherichia coli</i>	Geomean less than 126 CFU/100 mL; Single Sample Maximum 235 CFU/100 mL
Non-designated Swimming	AA, A, B	<i>Escherichia coli</i>	Geomean less than 126 CFU/100 mL; Single Sample Maximum 410 CFU/100 mL
All Other Recreational Uses	AA, A, B	<i>Escherichia coli</i>	Geomean less than 126 CFU/100 mL; Single Sample Maximum 576 CFU/100 mL

## Results and Discussion

### Fairfield County Summary

From May through September 2018, 20 rivers were monitored by Harbor Watch across 17 towns in Fairfield County, CT. There were 169 unique sampling locations that were monitored 10 times each. Many of these rivers did not meet state criteria for bacteria concentrations (Figure 1) and are acting as a pathway for sewage pollution to enter Long Island Sound. 77% of sites exceeded either the CT DEEP geometric mean criterion of < 126 CFU/100 mL (Figure 1, left), the secondary single sample maximum criterion of < 15% of *E. coli* samples at each site > 576 CFU/100 mL (Figure 1, right), or both. The Saugatuck River had the fewest exceedances of the CT DEEP criteria. There was an 8-way tie for the most exceedances, with 100% of the sites studied on Bruce Brook, Deep Brook, Goodwives River, Greenwich Creek, Keelers Brook, Muddy Brook, Pootatuck River, and Rooster River failing either one or both of the CT DEEP criteria (Table 1).

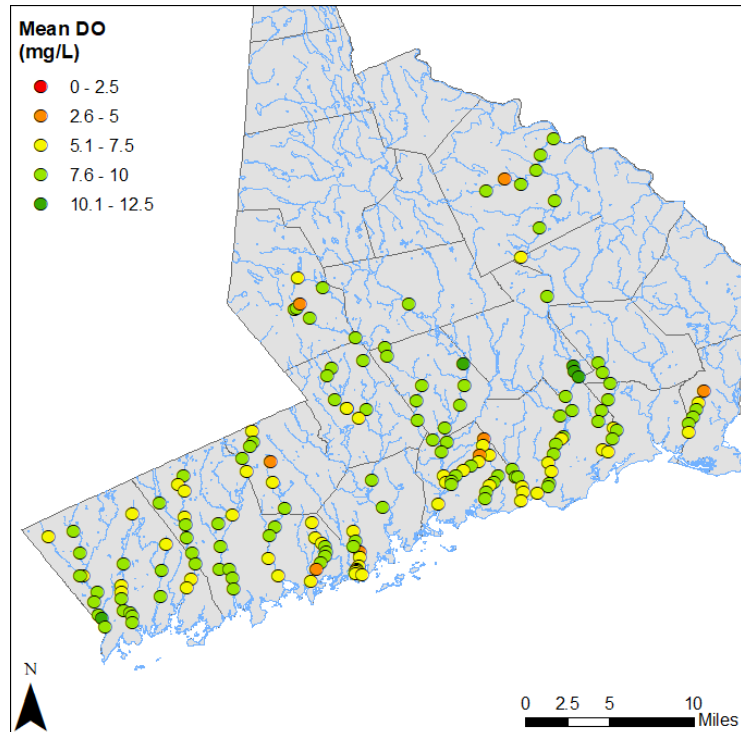


**Figure 1.** Map of 2018 sampling locations and *E. coli* concentrations. (Left) *E. coli* geomean for each site. The bacteria concentrations for each site were compared to the state criteria for recreational waters. Passing sites (light and dark green) have a geomean less than 126 CFU/100 mL. (Right) Percentage of *E. coli* samples failing the CT DEEP single sample maximum criterion for recreational waters at each site. Passing sites (light and dark green) have less than 15% of their samples exceeding 576 CFU/100 mL.



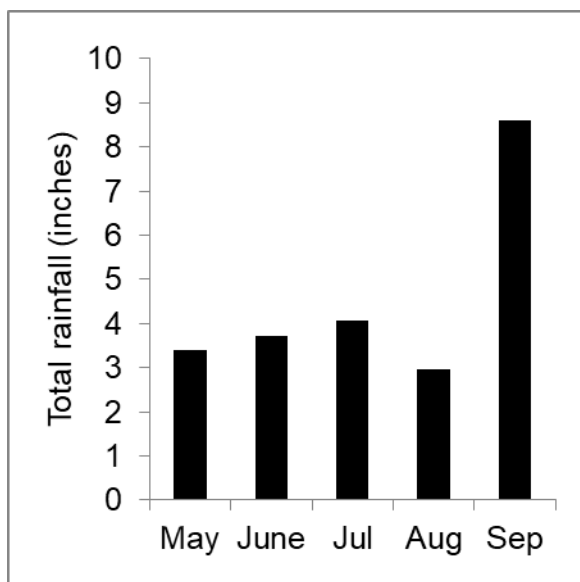
**Table 1. (Below, left)** Percentage of sites studied in each river that failed one or both of the state criteria for allowable levels of bacteria and the state criterion for dissolved oxygen (DO).

	Failing Bacteria	Failing DO
Bruce Brook	100.0%	16.7%
Byram River	66.7%	0.0%
Comstock Brook	80.0%	0.0%
Deadman Brook	77.8%	22.2%
Deep Brook	100.0%	25.0%
Farm Creek	87.5%	12.5%
Goodwives River	100.0%	0.0%
Greenwich Creek	100.0%	0.0%
Horseneck Brook	66.7%	0.0%
Keelers Brook	100.0%	0.0%
Mianus River	45.5%	0.0%
Mill River	80.0%	0.0%
Muddy Brook	100.0%	0.0%
Noroton River	85.7%	14.3%
Norwalk River	81.8%	9.1%
Pootatuck River	100.0%	0.0%
Rippowam River	66.7%	0.0%
Rooster River	100.0%	0.0%
Sasco Brook	71.4%	0.0%
Saugatuck River	31.3%	0.0%



**Figure 2. (Above)** Map of 2018 river sampling locations and mean dissolved oxygen values. The dissolved oxygen level for each sample was compared to the state criterion of a minimum of 5mg/L.

The state criterion for acceptable dissolved oxygen levels is set at a minimum of 5 mg/L. The majority of sampling sites had mean dissolved oxygen values which met this criterion, but a number of sites had mean values which fell below 5 mg/L (Figure 2). Prolonged events of low dissolved oxygen can be harmful to marine and aquatic organisms. Factors observed during the monitoring season such as low flow, decomposition of organic matter, and warm water temperatures have the potential to impact dissolved oxygen values. Only 4% off all study site means failed the dissolved oxygen criterion.



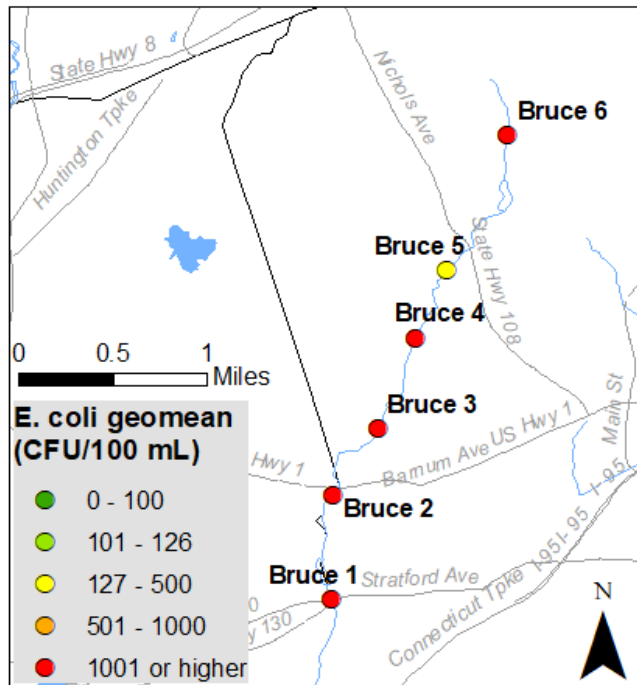
**Figure 3.** Monthly rainfall totals for 2018 (Weather Underground-KBDR).

Data were collected on these Fairfield County waterways for multiple reasons. Harbor Watch aims to better understand the ecological health of our watersheds by monitoring dissolved oxygen, conductivity, water temperature, and bacteria levels. A secondary objective is to use the data collected to inform where sewage pollution sources may be located so that we can perform further investigation. Once sources are identified, Harbor Watch works with municipal partners to fix the problem. During 2018, track-down surveys were conducted on projects in Bridgeport, Darien, Fairfield, Greenwich, Norwalk, Stamford, Stratford, Westport, and Wilton. Track-down surveys are ongoing and will continue year-round. Our process of repetitive bacteria testing has been successful in identifying point sources of pollution such as leaking sanitary sewer lines, broken sewer laterals, and pipes illegally hooked into the storm water system. By partnering with municipalities to fix these problems, we have been able to calculate as much as 98% reductions in bacteria concentrations entering our waterways from a single source location. While 14 sources of pollution have already been identified in 2018 and reported to local municipalities, the high incidence of failing bacteria concentrations observed over this monitoring season (Figure 1, Table 1) indicates that there is still considerably more work to be done to improve the overall water quality of the Long Island Sound watershed.

In the chapters to follow, we present a data summary of each of the 20 rivers monitored by Harbor Watch this summer. Additional data for each river can be found in an appendix at the end of this report.

# 1. Bruce Brook

The Bruce Brook watershed lies in both the Town of Stratford and the City of Bridgeport. It spans approximately 2,199 acres and discharges into Bridgeport Harbor. This land use is divided into 94% urban area, 5% forests, 1% water, and less than 1% agriculture (CT DEEP). The brook itself is channelized with cement through most of its length. Bruce Brook acts as a natural boundary between the two municipalities from the Route 1 corridor south to the coastline.



2017 marked the first year that Harbor Watch monitored Bruce Brook. The river was of interest because it is located in an area where Harbor Watch had not done any sampling previously. Monitoring continued in 2018 at the same sites. In 2017 and 2018 all sites exceeded both CT DEEP criteria for *E. coli*. Dissolved oxygen values met the CT DEEP minimum criterion at all sites except for Bruce 6. Track-down surveys in the watershed are actively ongoing in partnership with both the Town of Stratford and the City of Bridgeport. Two sites not shown, Bruce 7 and 8, were added towards the end of the 2018 season based on elevated counts observed at Bruce 6. See Appendix 1 for additional data.

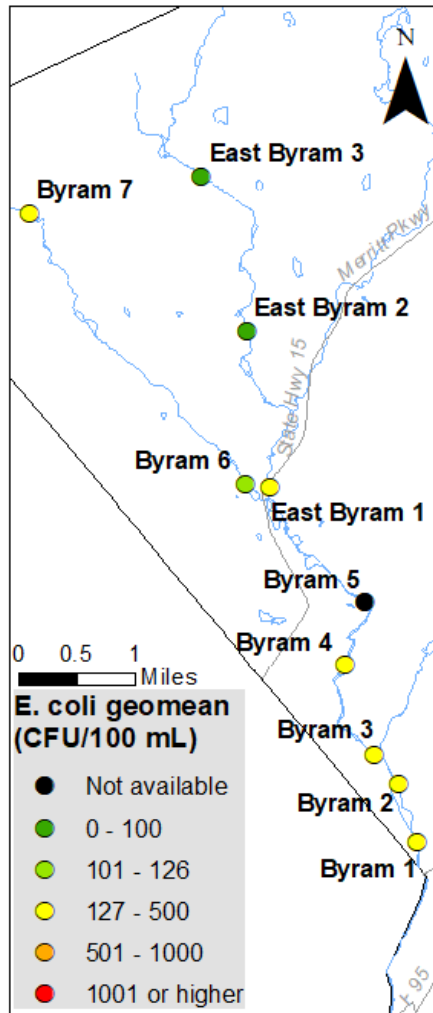
**Figure 1.1.** 2018 geometric mean of *E. coli* concentrations at each site studied on Bruce Brook.

Site	Bacteria Failed?	DO Failed?
Bruce 1	Yes	No
Bruce 2	Yes	No
Bruce 3	Yes	No
Bruce 4	Yes	No
Bruce 5	Yes	No
Bruce 6	Yes	Yes

Site	2017 Geomean	2018 Geomean	Change?
Bruce 1	41243	36264	Better
Bruce 2	3298	4004	Worse
Bruce 3	2573	2181	Better
Bruce 4	794	1333	Worse
Bruce 5	512	435	Better
Bruce 6	1241	1712	Worse

**Table 1.1.** (Left) Which sites failed either of the two state criteria for *E. coli* concentrations and the criterion for dissolved oxygen levels. **Table 1.2.** (Right) Comparison of geometric mean by site between 2017 and 2018.

## 2. Byram River



**Figure 2.1.** 2018 geometric mean of *E. coli* concentrations at each site.

Site	Bacteria Failed?	DO Failed?
Byram 1	Yes	No
Byram 2	Yes	No
Byram 3	Yes	No
Byram 4	Yes	No
Byram 6	No	No
Byram 7	Yes	No
East Byram 1	Yes	No
East Byram 2	No	No
East Byram 3	No	No

The Byram River watershed encompasses portions of 4 communities whose political boundaries fall within Connecticut and New York. The majority of the river is located in Greenwich, CT, but it also runs through New Castle, Purchase, and Port Chester, NY. The watershed is approximately 12,000 acres or 18.7 square miles and defined by two main drainage basins, the Byram River and the East Branch of the Byram River. The main stem of the Byram River is approximately 14 miles long. The river begins at the Byram River reservoir and flows south, ultimately discharging to Long Island Sound through Port Chester Harbor. The land use in the watershed is predominantly residential.

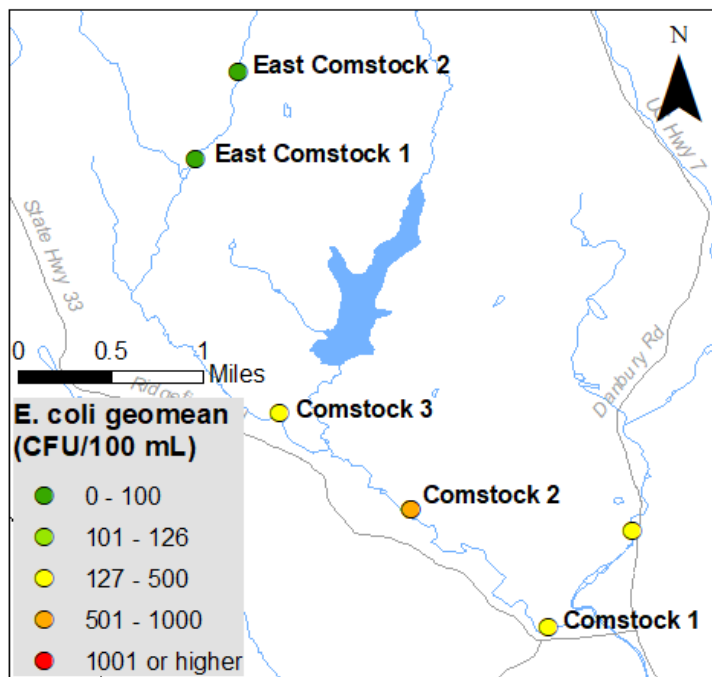
2018 marked the 3<sup>rd</sup> year that Harbor Watch collected data on the Byram River. We found that bacteria concentrations were slightly worse than in 2017, and more similar to the 2016 data; 6 of the sites exceeded the CT DEEP criteria. We are currently working with the Greenwich Public Works Department on track-down studies in the Byram River watershed to address the causes of these impairments. See Appendix 2 for additional data.

Site	2016 Geomean	2017 Geomean	2018 Geomean
Byram 1	339	152	299
Byram 2	528	266	455
Byram 3	114	88	150
Byram 4	171	159	141
Byram 5	76	53	N/A
Byram 6	126	51	124
Byram 7	232	105	202
East Byram 1	421	194	178
East Byram 2	162	86	72
East Byram 3	99	49	51

**Table 2.1.** (Left) Which sites failed either of the two state criteria for *E. coli* concentrations and the criterion for dissolved oxygen levels. **Table 2.2.** (Right) Comparison of *E. coli* geometric mean by site between 2016- 2018.

### 3. Comstock Brook

Comstock Brook is a tributary to the Norwalk River located in Wilton, CT. It meets the Norwalk River between our monitoring locations “Norwalk 9” and “Norwalk 6” (see Chapter 15 for Norwalk River). The watershed is primarily residential. This is the first year since 2012 during which Harbor Watch has tested water quality in Comstock Brook. Different study sites were chosen for monitoring in 2018. One stormwater outfall (“Wilton SD1”) located adjacent to site “Comstock 2” was also monitored due to a history of pollution at that site. Four of the 5 sites studied failed either one or both of the state criteria for allowable levels of bacteria, indicating that this brook is a potential conduit for sewage pollution to the Norwalk River and ultimately Long Island Sound. Track-down work to locate sources of this pollution will be initiated in partnership with the Town of Wilton. See Appendix 3 for additional data.



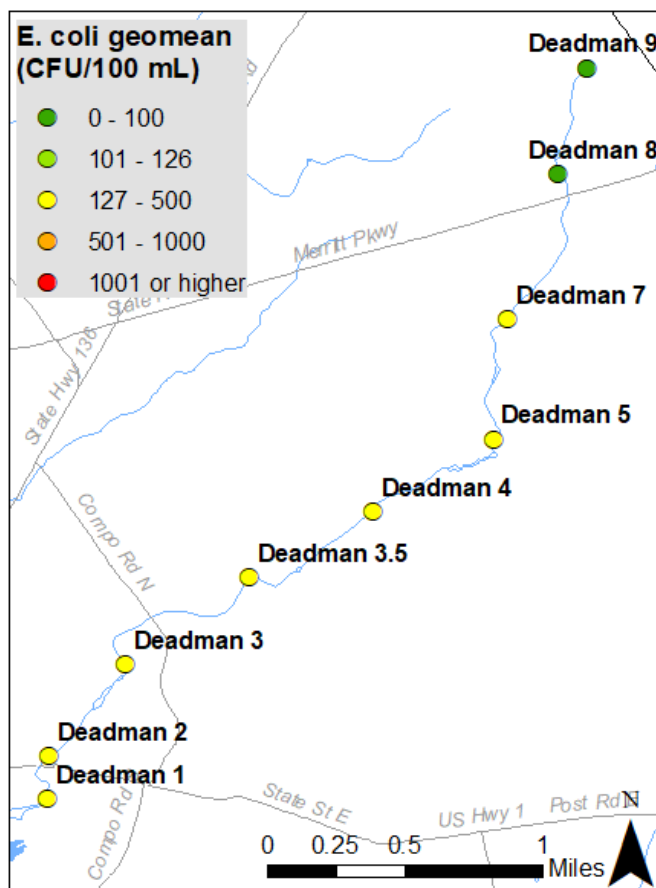
**Figure 3.1.** 2018 geometric mean of *E. coli* concentrations at each site. Wilton SD1 is in the same location as Comstock 2.

Site	Bacteria Failed?	DO Failed?
Comstock 1	Yes	No
Comstock 2	Yes	No
Comstock 3	Yes	No
East Comstock 1	Yes	No
East Comstock 2	No	No

**Table 3.1.** Which sites failed either of the two state criteria for *E. coli* and the criterion for dissolved oxygen levels.

## 4. Deadman's Brook

Deadman's Brook is a tributary to the Saugatuck River located in Westport, CT. It meets the Saugatuck River between our study sites "Saugatuck 0.5" and "Saugatuck 0.25" in downtown Westport. While Harbor Watch has done intermittent studies of Deadman's Brook over the past several years as part of our student education programs, 2018 was the first year in which a comprehensive study was conducted during the summer monitoring season. Unfortunately, all but the 2 northernmost sites failed either one or both of the state bacteria criteria in 2018, indicating that Deadman's Brook may be contributing to the elevated bacteria levels observed in the lower Saugatuck River. Track-down work to locate sources of this pollution will be initiated in partnership with the Town of Westport. See Appendix 4 for additional data.



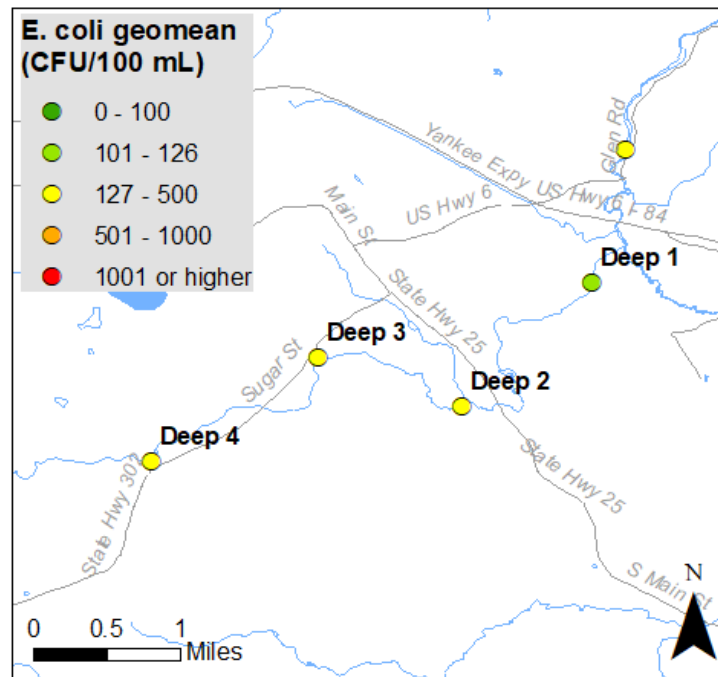
**Figure 4.1.** 2018 geometric mean of *E. coli* concentrations at each site.

Site	Bacteria Failed?	DO Failed?
Deadman 1	Yes	No
Deadman 2	Yes	No
Deadman 3	Yes	No
Deadman 3.5	Yes	No
Deadman 4	Yes	No
Deadman 5	Yes	No
Deadman 7	Yes	Yes
Deadman 8	No	No
Deadman 9	No	Yes

**Table 4.1.** Which sites failed either of the two state criteria for *E. coli* and the criterion for dissolved oxygen levels.

## 5. Deep Brook

The Deep Brook watershed is located entirely within the boundaries of Newtown, CT. Deep Brook starts on Castle Hill Road and flows northeast towards the center of Newtown. It is a tributary of the Pootatuck River (discussed in Chapter 16) and is mostly used for recreation, such as trout fishing (Town of Newtown). This was the 2<sup>nd</sup> year during which Harbor Watch monitored Deep Brook. Deep Brook was added to our monitoring regime at the request of the Town of Newtown due to its impaired status on the CT DEEP impaired waters list. All sites exceeded one or both of the CT DEEP criteria for bacteria but mean dissolved oxygen levels met the CT DEEP minimum criteria at all but one site. Track-down work to locate sources of this pollution will be initiated in partnership with the Town of Newtown. See Appendix 5 for additional data.



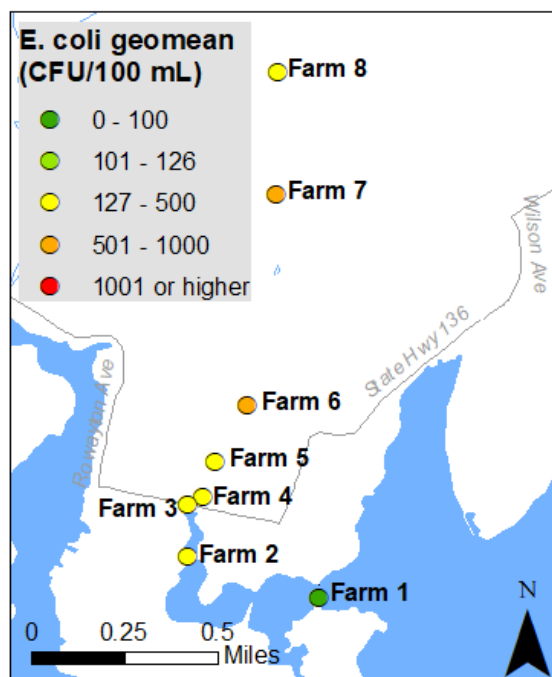
**Figure 5.1.** 2018 geometric mean of *E. coli* concentrations at each site.

Site	Bacteria Failed?	DO Failed?
Deep 1	Yes	No
Deep 2	Yes	No
Deep 3	Yes	Yes
Deep 4	Yes	No

Site	2017 Geomean	2018 Geomean	Change
Deep 1	94	125	Worse
Deep 2	232	297	Worse
Deep 3	182	283	Worse
Deep 4	369	353	Better

**Table 5.1.** (Left) Which sites failed either of the two state criteria for *E. coli* concentrations and the criterion for dissolved oxygen levels. **Table 5.2.** (Right) Comparison of geometric mean by site between 2017 and 2018.

## 6. Farm Creek



**Figure 6.1.** 2018 geometric mean of *E. coli* concentrations at each site.

Farm Creek is a small tributary to Long Island Sound located in Norwalk, CT. The creek begins north of Roton Middle School, flows south to where the creek opens up to an estuary surrounded by salt marsh, and ultimately discharges to Wilson Cove. Most of the watershed is residential with a few school campuses with large sports fields. Harbor Watch has monitored Farm Creek for 5 years, with the past 3 of those years being completed during our summer monitoring season. In 2018, all but one of the sites failed the CT DEEP criteria for *E. coli* and 1 site failed the criterion for dissolved oxygen. A pollution track-down project was initiated during the 2017 monitoring season and is ongoing, but has not yet yielded definitive source identification. Further investigation of Farm Creek is necessary to identify sources of pollution entering the watershed. See Appendix 6 for additional data.

Site	Bacteria Failed?	DO Failed?
Farm 1	No	No
Farm 2	Yes	No
Farm 3	Yes	No
Farm 4	Yes	No
Farm 5	Yes	No
Farm 6	Yes	No
Farm 7	Yes	No
Farm 8	Yes	Yes

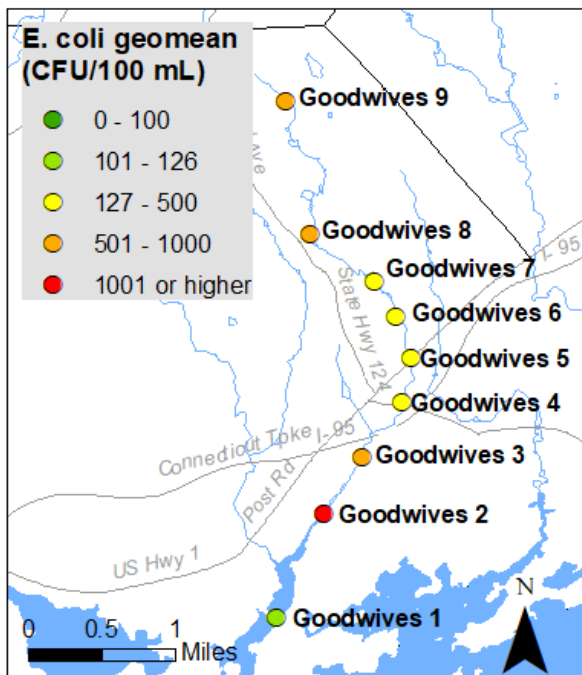
Site	2016 Geomean	2017 Geomean	2018 Geomean
Farm 8	-	-	460
Farm 7	631	354	727
Farm 6	2349	475	767
Farm 5	667	284	474
Farm 4	411	55	140
Farm 3	600	197	407
Farm 2	63	137	162
Farm 1	17	9	15

**Table 6.1.** (Left) Which sites failed either of the two state criteria for *E. coli* concentrations and the criterion for dissolved oxygen levels. **Table 6.2.** (Right) Comparison of geometric mean by site between 2017 and 2018.



## 7. Goodwives River

The Goodwives River is a tributary to Long Island Sound located in Darien, CT. It discharges into Gorham's Pond. This is the first year during which this river has been studied by Harbor Watch during our summer monitoring season, though we have previously conducted pollution detection work in this watershed. This river is significantly impaired for bacteria, with all sites failing one or both of the state criteria. Site "Goodwives 2" is adjacent to a stormwater outfall, upstream of which we identified a pollution source. The Town of Darien is working with the relevant homeowner to attempt to fix that pollution source, but our data indicate that the issue has not yet been resolved. Given the high concentration of bacteria observed upstream, it is clear that other sources are likely present in the watershed. The stormwater track-down work conducted by Harbor Watch in partnership with the town in 2016 and 2017 did not show any other outfalls of concern further upstream in the watershed. Other potential sources of pollution should be investigated as soon as possible. See Appendix 7 for additional data.



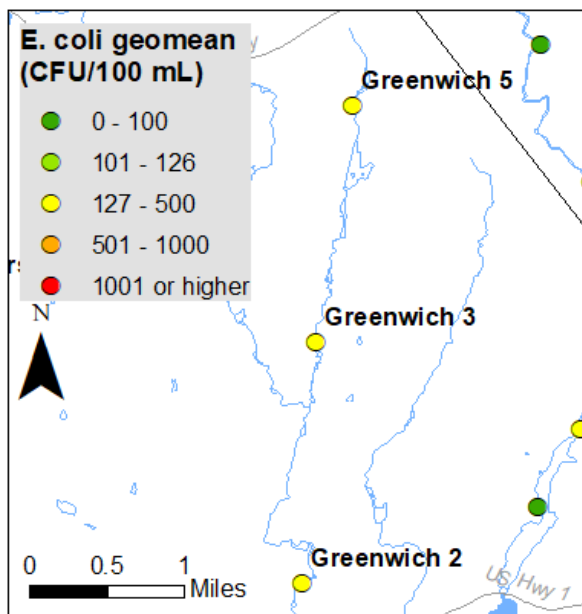
**Figure 7.1.** 2018 geometric mean of *E. coli* concentrations at each site.

Site	Bacteria Failed?	DO Failed?
Goodwives 1	Yes	No
Goodwives 2	Yes	No
Goodwives 3	Yes	No
Goodwives 4	Yes	No
Goodwives 5	Yes	No
Goodwives 6	Yes	No
Goodwives 7	Yes	No
Goodwives 8	Yes	No
Goodwives 9	Yes	No

**Table 7.1.** Which sites failed either of the two state criteria for *E. coli* and the criterion for dissolved oxygen levels.

## 8. Greenwich Creek

Greenwich Creek is located in Greenwich, CT. Its watershed is largely residential, with some schools and golf courses. Greenwich Creek discharges into Indian Harbor in Central Greenwich. 2018 marked the first year during which Harbor Watch monitored Greenwich Creek. In 2018, all 3 sites failed one or both of the CT DEEP criteria for bacteria, but all 3 sites met the dissolved oxygen criterion. Harbor Watch is engaged in an active pollution track-down project with the Town of Greenwich, and will look for potential sources in this watershed. See Appendix 8 for additional data.



**Figure 8.1.** 2018 geometric mean of *E. coli* concentrations at each site.

Site	Bacteria Failed?	DO Failed?
Greenwich 2	Yes	No
Greenwich 3	Yes	No
Greenwich 5	Yes	No

**Table 8.1.** Which sites failed either of the two state criteria for *E. coli* and the criterion for dissolved oxygen levels.

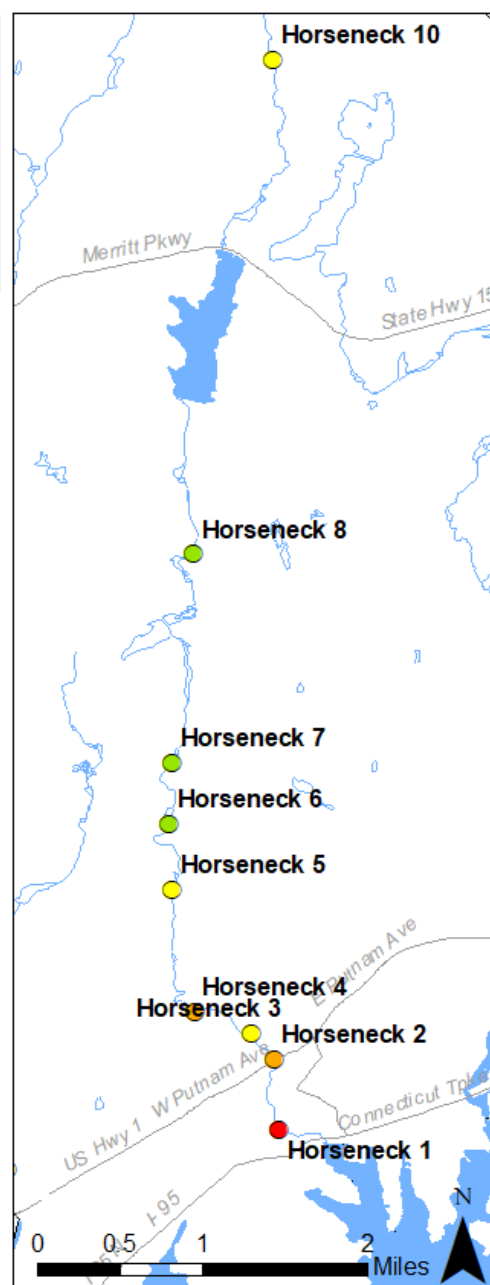
## 9. Horseneck Brook

Horseneck Brook is located in Greenwich, CT. The northern part of its watershed is largely residential, with some schools and golf courses. Closer to the harbor, the land use is dominated by higher density single and multi-family homes and businesses. Horseneck Brook discharges into Greenwich Harbor in Central Greenwich. 2018 marked the first year during which Harbor Watch monitored Horseneck Brook. In 2018, none of the sites failed the dissolved oxygen criterion, but many failed the bacteria criteria, especially in the more downstream sites. Harbor Watch is engaged in an active pollution track-down project with the Town of Greenwich, and will look for potential sources in this watershed. Sampling is underway in the vicinity of Horseneck 1, and one potential source has already been identified. See Appendix 9 for additional data.

Site	Bacteria Failed?	DO Failed?
Horseneck 1	Yes	No
Horseneck 2	Yes	No
Horseneck 3	Yes	No
Horseneck 4	Yes	No
Horseneck 5	Yes	No
Horseneck 6	No	No
Horseneck 7	No	No
Horseneck 8	No	No
Horseneck 10	Yes	No

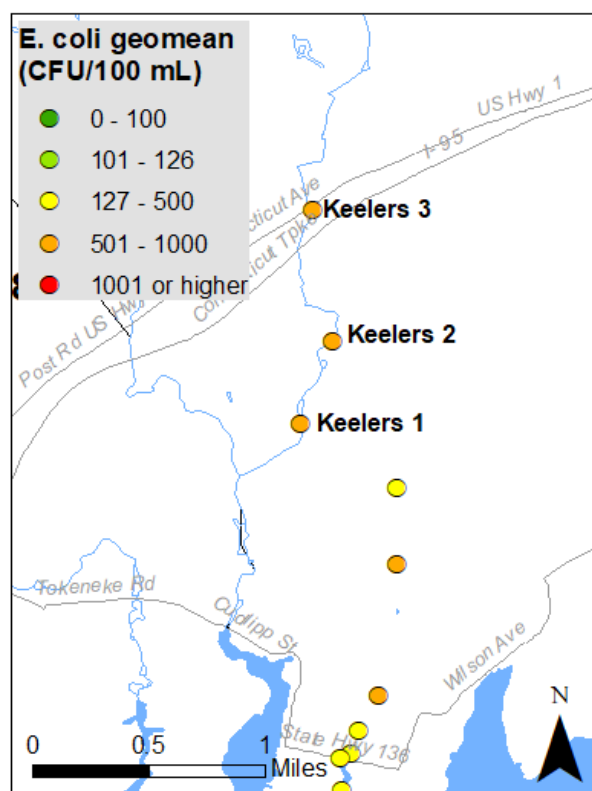
**E. coli geomean (CFU/100 mL)**

- 0 - 100
- 101 - 126
- 127 - 500
- 501 - 1000
- 1001 or higher



**Figure 9.1.** (Right) 2018 geometric mean of *E. coli* concentrations at each site. **Table 9.1.** (Above) Which sites failed either of the two state criteria for *E. coli* concentrations and the criterion for dissolved oxygen levels.

## 10. Keelers Brook



Keelers Brook is a small tributary to the Fivemile River. The confluence is located behind Rowayton Court in Norwalk. The Brook is located entirely in the City of Norwalk and is comprised of many small branches and a series of small ponds near its headwaters. Harbor Watch had previously monitored Keelers Brook in 2013, 2014, 2015, and 2017, with some additional intermittent data collection prior to those years. It was anticipated that the water quality would improve due to the removal of an outdated septic system and enforced hookup to the sewer system. All sites on Keelers Brook still exceeded the CT DEEP *E. coli* criteria, but met the minimum criterion for dissolved oxygen. Harbor Watch is working with the City of Norwalk to track down potential pollution sources in this system, which have so far remained elusive. See Appendix 10 for additional data.

Site	2013 Geomean	2014 Geomean	2015 Geomean	2017 Geomean	2018 Geomean
Keelers 3	1791	948	1569	539	942
Keelers 2	972	969	485	401	590
Keelers 1	-	-	-	620	803

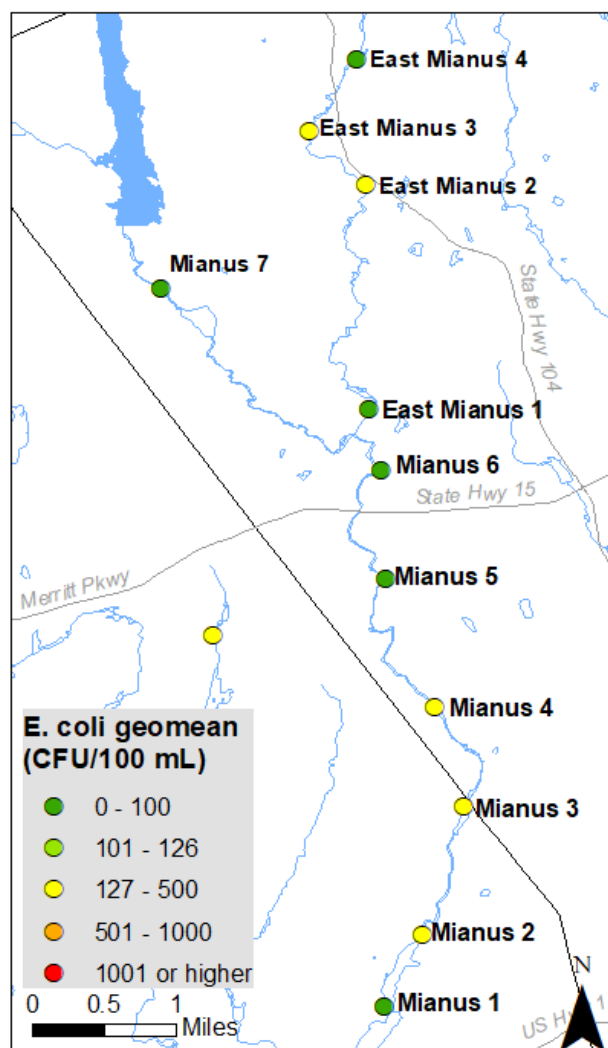
Site	Bacteria Failed?	DO Failed?
Keelers 1	Yes	No
Keelers 2	Yes	No
Keelers 3	Yes	No

**Figure 10.1.** (Top) 2018 geometric mean of *E. coli* concentrations at each site.

**Table 10.1.** (Middle) Geometric mean by site from 2013-2018.

**Table 10.2.** (Bottom) Which sites failed either of the two state

## 11. Mianus River



The Mianus River watershed encompasses portions of Stamford and Greenwich, CT and New Castle and Bedford, NY. The watershed is approximately 18,300 acres (28.7 mi<sup>2</sup>) and defined by 2 main drainage basins: the Mianus River and the East Branch of the Mianus River. The main stem of the Mianus River is approximately 20 miles long. The river begins in New Castle, NY and flows northeast into Bedford, NY where it begins to flow south into the Mianus Reservoir and Stamford, CT. The river discharges into Long Island Sound through Cos Cob Harbor in Greenwich, CT. The land use along the river is a mixture of preserves (Mianus River Gorge), state parks (Mianus River Park), and residential. Harbor Watch monitored the Mianus River in 2016 and 2018. In 2018, about half of the sites failed the CT DEEP bacteria criteria, while all of the sites met the dissolved oxygen criterion. See Appendix 11 for additional data.

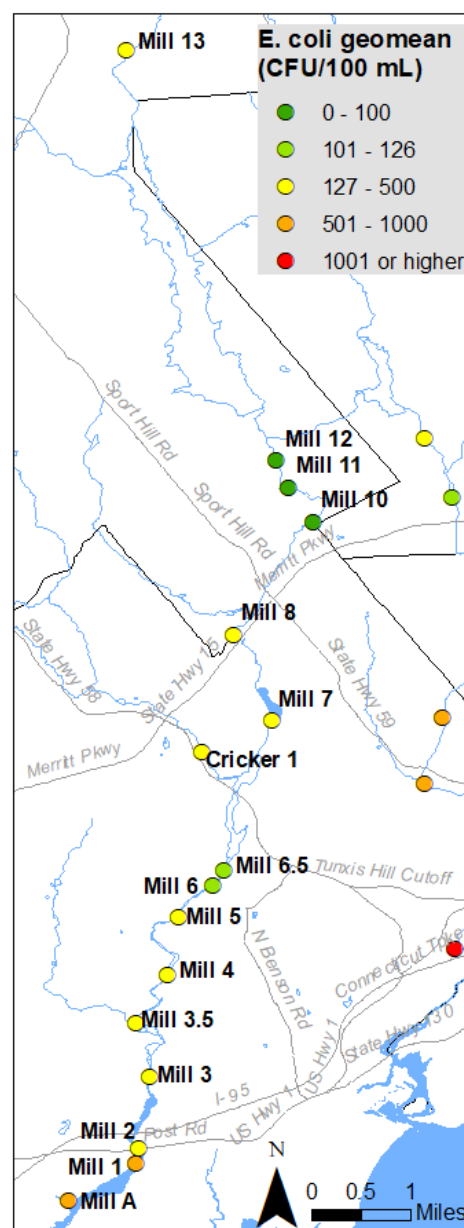
Site	Bacteria Failed?	DO Failed?	2016 Geomean	2018 Geomean
Mianus 1	No	No	31	29
Mianus 2	Yes	No	62	160
Mianus 3	Yes	No	137	198
Mianus 4	Yes	No	114	141
Mianus 5	No	No	78	100
Mianus 6	No	No	67	76
Mianus 7	No	No	49	45
East Mianus 1	No	No	33	73
East Mianus 2	Yes	No	152	184
East Mianus 3	Yes	No	84	172
East Mianus 4	No	No	58	66

**Figure 11.1.** (Above) 2018 geometric mean of *E. coli* concentrations at each site. **Table 11.1.** (Left) Which sites failed either of the two state criteria for *E. coli* concentrations and the criterion for dissolved oxygen levels, and geometric mean by site from 2016 and 2018.

## 12. Mill River

The Mill River watershed encompasses portions of 6 communities in Fairfield County, CT: Redding, Easton, Monroe, Trumbull, Fairfield, and Bridgeport. The watershed is approximately 16,000 acres (25.8 square miles). There are 2 large dams on the river that create reservoirs (Easton Reservoir and Samp Mortar Reservoir) for drinking water and downriver flow control. The Mill River begins in the northeast corner of Easton and travels south into Southport Harbor in Fairfield. This was the 3<sup>rd</sup> year during which Harbor Watch monitored the Mill River. 80% of the sites did not meet at least one of the CT DEEP criteria for *E. coli*. Mean dissolved oxygen values met the CT DEEP criterion at all sites. Site Mill A and Cricker 1 are at the confluences of tributaries to the Mill River. We are currently working with the Town of Fairfield to identify sources of pollution, especially in the lower half of the watershed. See Appendix 12 for additional data.

Site	Bacteria Failed 2018?	DO Failed 2018?	2016 Geomean	2017 Geomean	2018 Geomean
Mill A	Yes	No	-	277	669
Mill 1	Yes	No	406	298	502
Mill 2	Yes	No	293	382	469
Mill 3	Yes	No	78	68	138
Mill 3.5	Yes	No	228	183	397
Mill 4	Yes	No	258	147	352
Mill 5	Yes	No	80	122	166
Mill 6	Yes	No	101	120	106
Mill 6.5	No	No	49	33	107
Cricker 1	Yes	No	-	-	294
Mill 7	Yes	No	56	28	196
Mill 8	Yes	No	172	121	245
Mill 10	Yes	No	83	66	86
Mill 11	No	No	67	66	73
Mill 12	No	No	24	27	38
Mill 13	Yes	No	57	63	128



**Figure 12.1.** (Above) 2018 geometric mean of *E. coli* concentrations at each site. **Table 12.1.** (Left) Which sites failed either of the two state criteria for *E. coli* concentrations and the criterion for dissolved oxygen levels, and geometric mean by site from 2016-2018.

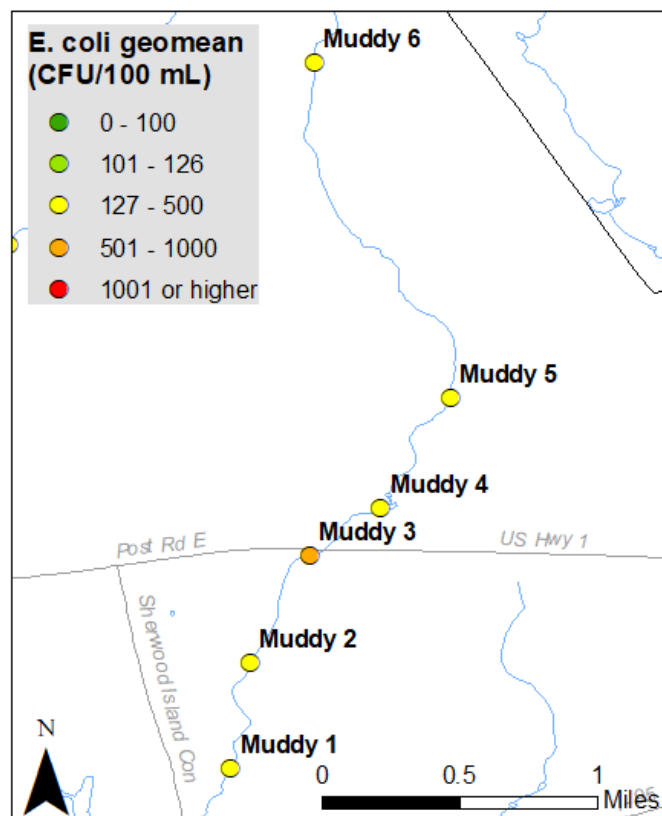
### 13. Muddy Brook

Muddy Brook is part of the CT DEEP designated “Southwest Shoreline sub-regional basin” which is 2.8 square miles and discharges into Sherwood Island Mill Pond. Muddy Brook is located entirely in Westport, CT. The land use for the Southwest Shoreline sub-regional basin consists of 45% developed areas, 27% turf and grasses, 24% forests, and 4% agriculture, wetlands, utility right of ways (CT DEEP).

Harbor Watch has monitored Muddy Brook in the past, but often sampling occurred from September through April when colder temperatures and reduced bacteria concentrations were observed. 2017 marked the first year that Harbor Watch conducted a study of Muddy Brook during the May through September monitoring season. The brook is of interest to the Town of Westport because its discharge point is the Sherwood Island Mill Pond, a historic area known for its swimming and shellfishing activities in prior decades. All sites exceeded at least one of the CT DEEP *E. coli* criteria. Continued monitoring is suggested in order to identify potential sources of pollution. See Appendix 13 for additional data.

Site	2017 Geomean	2018 Geomean	Change
Muddy 1	273	357	Worse
Muddy 2	525	480	Better
Muddy 3	515	583	Worse
Muddy 4	277	494	Worse
Muddy 5	160	227	Worse
Muddy 6	299	251	Better

Site	Bacteria Failed?	DO Failed?
Muddy 1	Yes	No
Muddy 2	Yes	No
Muddy 3	Yes	No
Muddy 4	Yes	No
Muddy 5	Yes	No
Muddy 6	Yes	No



**Figure 13.1.** (Right) 2018 geometric mean of *E. coli* concentrations at each site. **Table 13.1.** (Above, top) Geometric mean by site from 2017-2018. **Table 13.2.** (Above, bottom) Which sites failed either of the two state criteria for *E. coli* concentrations and the criterion for dissolved oxygen levels.

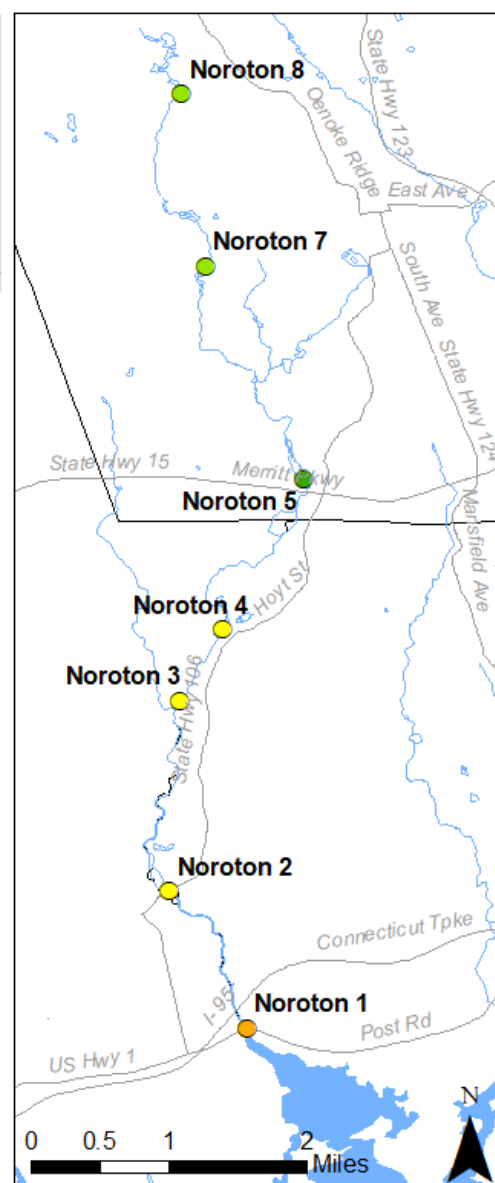
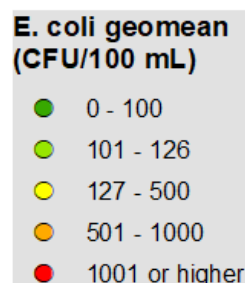
## 14. Noroton River

The Noroton River watershed encompasses portions of Stamford, Darien, and New Canaan, in Fairfield County, CT. The watershed is approximately 7,000 acres (11 mi<sup>2</sup>). The river begins in New Canaan and flows south along the border of Stamford and Darien. The river discharges into Long Island Sound through Holly Pond. The land use along the river is a mixture of residential and light commercial.

This is the 3<sup>rd</sup> year during which Harbor Watch has monitored the Noroton River. Bacteria concentrations except for the northernmost site in the upper watershed failed one or both of the CT DEEP criteria. The majority of sites met the CT DEEP criterion for dissolved oxygen. Work is beginning with Harbor Watch leading a joint effort between the Town of Darien and the City of Stamford to locate pollution sources to this river. See Appendix 14 for additional data.

Site	Bacteria Failed?	DO Failed?
Noroton 1	Yes	No
Noroton 2	Yes	No
Noroton 3	Yes	No
Noroton 4	Yes	No
Noroton 5	Yes	No
Noroton 7	Yes	No
Noroton 8	No	Yes

Site	2016 Geomean	2017 Geomean	2018 Geomean
Noroton 1	1477	253	601
Noroton 2	504	153	336
Noroton 3	971	304	451
Noroton 4	304	99	172
Noroton 5	64	23	66
Noroton 7	149	70	114
Noroton 8	135	67	123

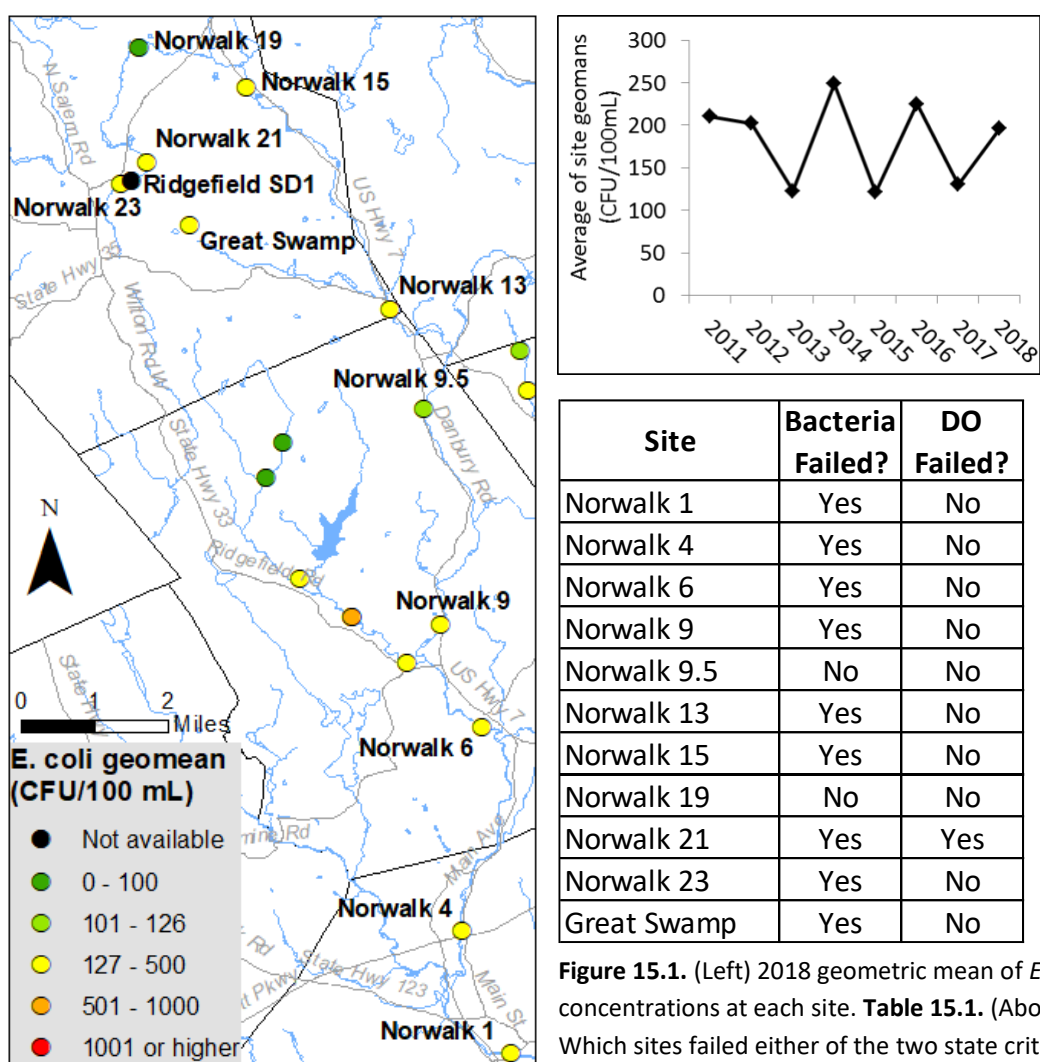


**Figure 14.1.** (Right) 2018 geometric mean of *E. coli* concentrations at each site. **Table 14.1.** (Above, top) Which sites failed either of the two state criteria for *E. coli* concentrations and the criterion for dissolved oxygen levels, and **Table 14.2.** (Above, bottom) Geometric mean by site from 2016-2018.



## 15. Norwalk River

The Norwalk River watershed includes New Canaan, Norwalk, Redding, Ridgefield, Weston and Wilton, CT, as well as Lewisboro, NY. The watershed is roughly 40,000 acres (64.1 mi<sup>2</sup>), 64% of which is developed by commercial/light industry uses and residential neighborhoods (NRWI, 1998). The main stem of the Norwalk River is approximately 20 miles in length, beginning in the Great Swamp in Ridgefield, ultimately discharging in Norwalk Harbor where the last three miles are a tidal estuary (NRWI, 1998). Harbor Watch has monitored the Norwalk River year-round for over 20 years. In 2018, all but 2 of the sites exceeded one or both of the CT DEEP criteria for *E. coli*, but the majority of sites met the CT DEEP dissolved oxygen criterion. In addition to instream monitoring, we conducted multiple pollution track down projects and successfully identified several sources of pollution entering the river and estuary downstream of Norwalk 4. We continue an active partnership with the City of Norwalk to address these issues. See Appendix 15 for additional data.



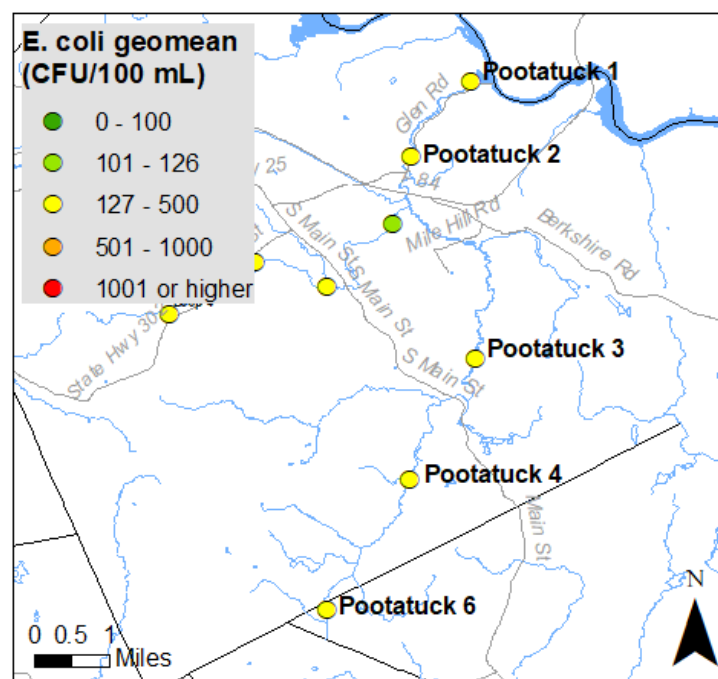
**Figure 15.1.** (Left) 2018 geometric mean of *E. coli* concentrations at each site. **Table 15.1.** (Above, bottom) Which sites failed either of the two state criteria for *E. coli* concentrations and the criterion for dissolved oxygen levels, and **Figure 15.2.** (Above, top) Mean of site geometric means from 2011-2018.

## 16. Pootatuck River

The Pootatuck River begins in Easton and flows east into Monroe before it discharges into the Housatonic River in Newtown, CT. Deep Brook is one of the larger tributaries which drains to the Pootatuck River (discussed in Chapter 5 of this report). The watershed spans a total of 26.1 square miles (Carlson et al.). Much of the watershed land use is defined by residential plots and Rocky Glen State Park.

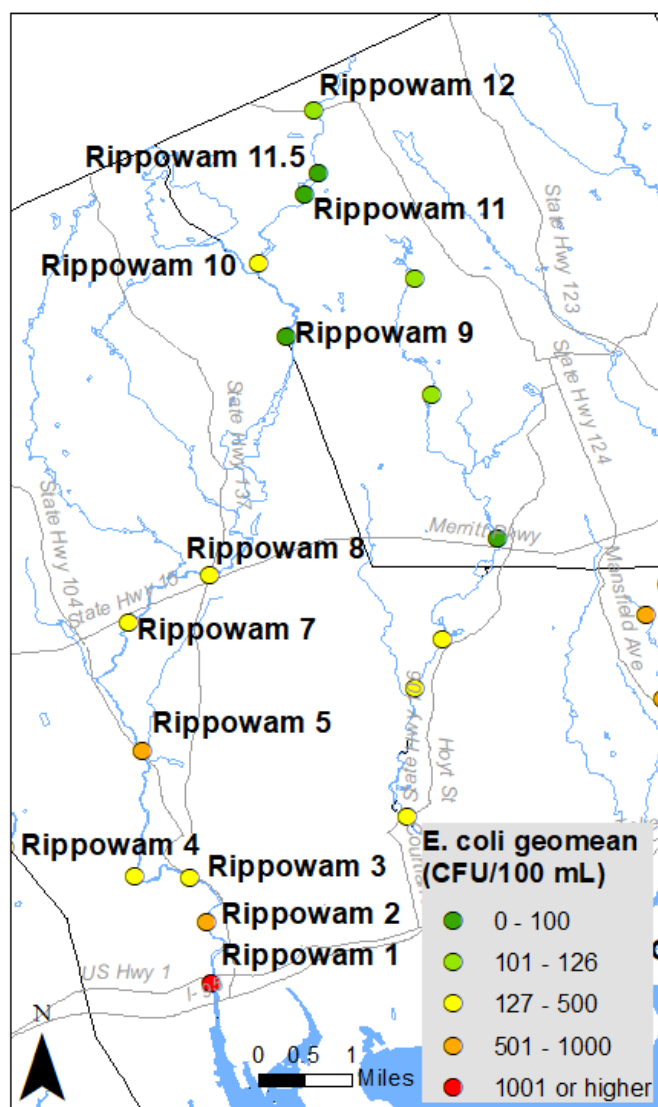
This was the 2<sup>nd</sup> year during which Harbor Watch monitored the Pootatuck River. Sites were picked with consultation from the Town of Newtown and the Pootatuck Watershed Association to supplement their own data collection. All sites exceeded the CT DEEP *E. coli* criteria during the 2018 monitoring season, however all of the sites met the CT DEEP minimum criterion for dissolved oxygen. See Appendix 16 for additional data.

Site	Bacteria Failed?	DO Failed?	2017 Geomean	2018 Geomean	Change
Pootatuck 1	Yes	No	62	195	Worse
Pootatuck 2	Yes	No	126	179	Worse
Pootatuck 3	Yes	No	129	219	Worse
Pootatuck 4	Yes	No	191	320	Worse
Pootatuck 6	Yes	No	197	290	Worse



**Figure 16.1.** (Left) 2018 geometric mean of *E. coli* concentrations at each site. **Table 16.1.** (Above) Which sites failed either of the two state criteria for *E. coli* concentrations and the criterion for dissolved oxygen levels, and site *E. coli* geomean values for 2017 and 2018.

## 17. Rippowam River



The Rippowam River, sometimes referred to as the Mill River, watershed covers 37.5 square miles from the NY State border, through parts of New Canaan, Ridgefield, and Stamford, where it discharges into Stamford Harbor. The southern portion of the basin is commercial, industrial and residential and the northern portion is largely residential, forested and agricultural (CT DEEP). 2017 was the first year during which Harbor Watch monitored the Rippowam River. The water quality in the river did not meet CT DEEP criteria for bacteria at the majority of sites in 2018. All sites met the CT DEEP minimum criterion for dissolved oxygen. We are working with the Public Works Department in the City of Stamford to identify and remediate any pollution sources. See Appendix 17 for additional data.

Site	Bacteria Failed?	DO Failed?
Rippowam 1	Yes	No
Rippowam 2	Yes	No
Rippowam 3	Yes	No
Rippowam 4	Yes	No
Rippowam 5	Yes	No
Rippowam 7	Yes	No
Rippowam 8	Yes	No
Rippowam 9	No	No
Rippowam 10	Yes	No
Rippowam 11	No	No
Rippowam 11.5	No	No
Rippowam 12	No	No

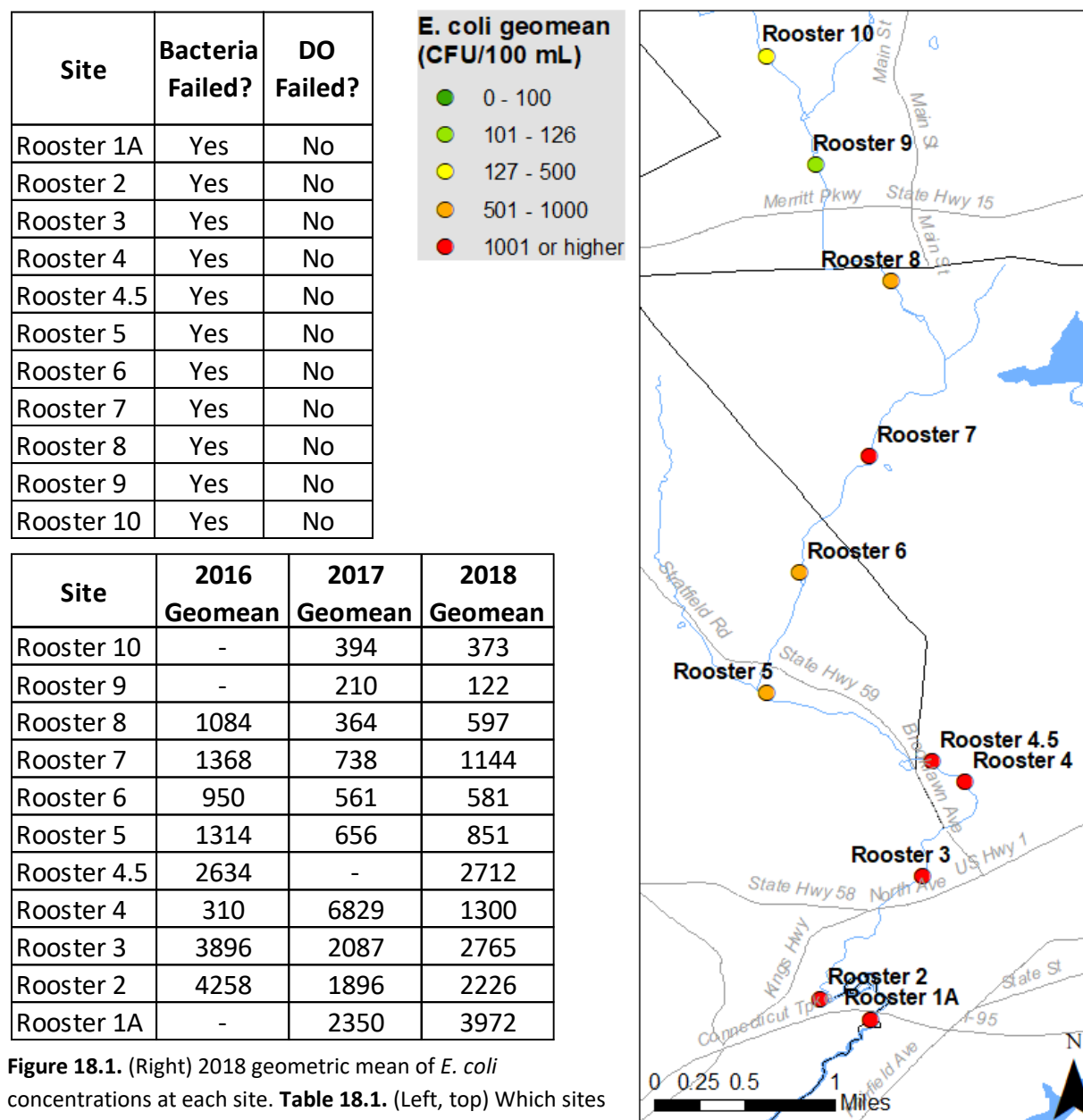
Site	2017 Geomean	2018 Geomean	Change
Rippowam 1/1A	1939	2023	Worse
Rippowam 2	341	569	Worse
Rippowam 3	338	323	Better
Rippowam 4	457	373	Better
Rippowam 5	580	767	Worse
Rippowam 7	331	317	Better
Rippowam 8	209	177	Better

**Figure 17.1.** (Top, left) 2018 geometric mean of *E. coli* concentrations at each site.

**Table 17.1.** (Left) Geometric mean by site in 2017-2018, and **Table 17.2.** (Above) Which sites failed either of the two state criteria for *E. coli* concentrations and the criterion for dissolved oxygen levels.

## 18. Rooster River

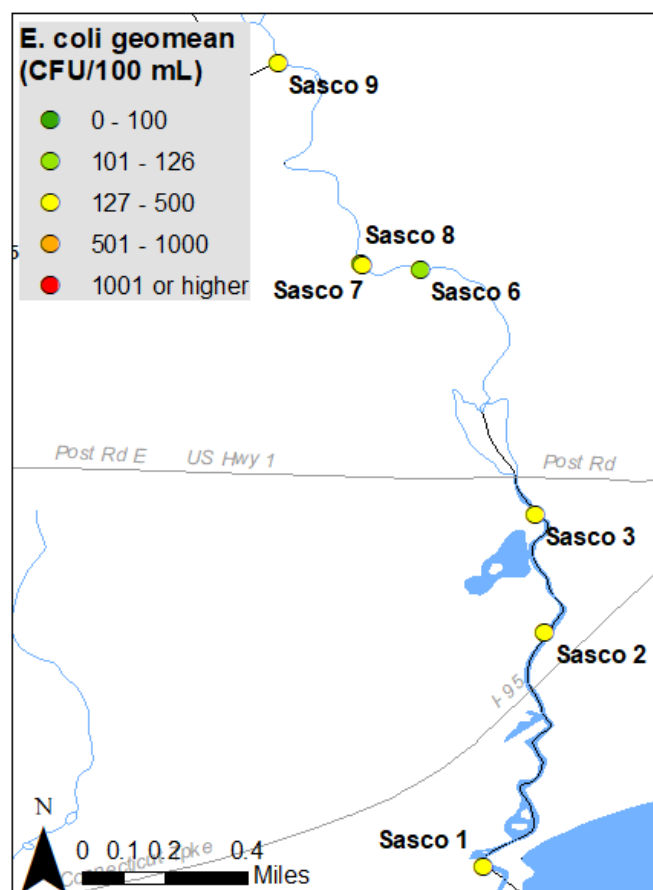
The Rooster River watershed encompasses portions of Fairfield, Bridgeport, Trumbull, and Easton, CT. The watershed is approximately 9,800 acres or 15.3 square miles. The Rooster River, also known as Ash Creek and Horse Tavern Brook, begins on the west side of Trumbull and travels south, traversing the Bridgeport and Fairfield border before discharging to Ash Creek. 2018 was the 3<sup>rd</sup> year during which Harbor Watch monitored the Rooster River. All sites failed the CT DEEP criteria for bacteria, though they all met the dissolved oxygen criterion. See Appendix 18 for additional data.



**Figure 18.1.** (Right) 2018 geometric mean of *E. coli* concentrations at each site. **Table 18.1.** (Left, top) Which sites failed either of the two state criteria for *E. coli* concentrations and the criterion for dissolved oxygen levels, and **Table 18.2.** (Left, bottom) Geometric mean by site in 2016-2018.

## 19. Sasco Brook

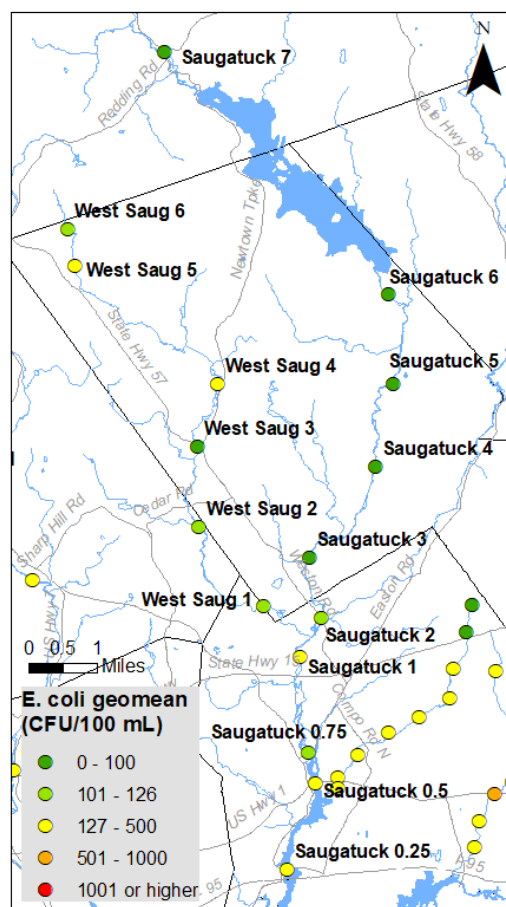
The Sasco Brook watershed falls within Westport, Fairfield, and Easton, CT. The watershed is approximately 6,600 acres. The land use consists of residential housing on 2+ acres of land, private farms (horses, sheep, llamas), a golf course (Patterson Country Club), wildlife preserves (Brentwood Park, Audubon Society), and the Fairfield County Hunt Club. Residential housing at the southern end of the watershed near the Route 1 corridor is on smaller properties consisting of 0.5 acres, and is on the municipal sewer system. Most of the housing in the Sasco Brook watershed, however, is on septic systems. Sasco Brook discharges into Long Island Sound at Southport Beach. Harbor Watch monitored Sasco Brook most recently from 2011-2016. In 2018, all but 2 of the sites failed the CT DEEP criteria for bacteria, but all sites met the criterion for dissolved oxygen. See Appendix 19 for additional data.



Site	Bacteria Failed?	DO Failed?	2016 Geomean	2018 Geomean
Sasco 1	Yes	No	32	165
Sasco 2	Yes	No	144	292
Sasco 3	Yes	No	566	394
Sasco 6	No	No	71	102
Sasco 7	Yes	No	165	150
Sasco 8	No	No	159	117
Sasco 9	Yes	No	147	142

**Figure 19.1.** (Above) 2018 geometric mean of *E. coli* concentrations at each site. **Table 19.1.** (Left) Which sites failed either of the two state criteria for *E. coli* concentrations and the criterion for dissolved oxygen levels, and site *E. coli* geomean values for 2016 and 2018.

## 20. Saugatuck River



The Saugatuck River watershed is located in Danbury, Ridgefield, Bethel, Redding, Wilton, Weston, Easton, Westport, and Norwalk, CT. The watershed is approximately 38,704 acres (60.5 mi<sup>2</sup>) and is defined by 2 main drainage basins and a tributary: the Saugatuck River, the West Branch of the Saugatuck River, and Poplar Plains Brook. The land use is a combination of protected preserve around the Saugatuck Reservoir, residential, and light commercial. The Saugatuck River discharges into Long Island Sound at Saugatuck Harbor. Harbor Watch has monitored the Saugatuck River for over 10 years. Bacteria concentrations from 2017 were slightly improved over 2016. In 2018, 5 sites failed the CT DEEP bacteria criteria, and none of the sites failed the dissolved oxygen criterion. Of the 20 rivers studied by Harbor Watch in 2018, this river had the lowest percentage of sites failing the bacteria criteria. Three new sites added in 2018 revealed higher bacteria levels near the mouth of the river than were observed in the more upstream sites. High levels of bacteria in Deadman's Brook (see Chapter 4) may be a contributing factor and Harbor Watch is working with

Site	Bacteria Failed?	DO Failed?	2016 Geomean	2017 Geomean	2018 Geomean
Saugatuck 0.25	Yes	No	-	-	225
Saugatuck 0.5	Yes	No	-	-	237
Saugatuck 0.75	No	No	-	-	112
Saugatuck 1	Yes	No	211	171	152
Saugatuck 2	No	No	145	109	101
Saugatuck 3	No	No	90	56	82
Saugatuck 4	No	No	114	58	71
Saugatuck 5	No	No	103	62	56
Saugatuck 6	No	No	10	6	6
Saugatuck 7	No	No	71	84	92
West Saug 1	No	No	97	114	106
West Saug 2	No	No	92	91	110
West Saug 3	No	No	49	27	55
West Saug 4	Yes	No	60	53	202
West Saug 5	Yes	No	177	157	128
West Saug 6	No	No	269	86	119

the Town of Westport on the location of potential pollution sources. See Appendix 20 for additional data.

**Figure 20.1.** (Above) 2018 geometric mean of *E. coli* concentrations at each site. **Table 20.1.** (Left) Which sites failed either of the two state criteria for *E. coli* concentrations and the criterion for dissolved oxygen levels, and site *E. coli* geomean values for 2016-2018.

## Appendix 1: Bruce Brook

**Table A1.1.** GPS coordinates and site locations for Bruce Brook

Site Name	Latitude	Longitude	Site location notes	Town
Bruce 8	41.22280	-73.14172	Bunnell Ave	Stratford
Bruce 7	41.22115	-73.14089	Connors Lane	Stratford
Bruce 6	41.21949	-73.14091	Old Spring Road	Stratford
Bruce 5	41.20915	-73.14565	Albright Avenue	Stratford
Bruce 4	41.20397	-73.14803	2340 Broadbridge Avenue	Stratford
Bruce 3	41.19699	-73.15085	380 Canaan Road	Stratford
Bruce 2	41.19188	-73.15427	102 Bowe Avenue	Stratford
Bruce 1	41.18386	-73.15447	Connecticut Avenue	Bridgeport

**Table A1.2.** Bruce Brook *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: Weather Underground – Sikorsky Memorial, October 22, 2018).

	5/10	5/22	6/7	6/25	7/16	7/31	8/9	8/29	9/13	9/18	Geomean	SSM
Bruce 8									900	6800		100%
Bruce 7									800	17400		100%
Bruce 6	1750	400	960	3300	1550	700	3700	1100	1400	15800	1712	90%
Bruce 5	est. 20	168	100	1320	280	est. 90	1440	300	2500	> 20000	435	40%
Bruce 4	est. 180	460	290	2550	1450	520	4800	1200	2900	23000	1333	60%
Bruce 3	480	350	950	4600	3600	1200	> 20000	3000	3200	4000	2181	80%
Bruce 2	1800	9000	5600	5400	2100	7000	35000	800	3500	1500	4004	100%
Bruce 1	> 100000	29000	1200	69000	39000	> 100000	> 100000	> 100000	4200	> 100000	36264	100%
Weather	Wet	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Wet	Wet		

**Table A1.3.** Bruce Brook average water temperature, dissolved oxygen, and conductivity for each site

	<b>Water Temp (°C)</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>Conductivity (µS)</b>
Bruce 8	21.0	7.1	401
Bruce 7	20.9	5.8	363
Bruce 6	18.1	4.7	455
Bruce 5	18.9	6.9	337
Bruce 4	19.4	9.0	373
Bruce 3	19.9	9.2	363
Bruce 2	19.5	8.3	371
Bruce 1	19.8	5.7	483



## Appendix 2: Byram River

**Table A2.1.** GPS coordinates and site locations for Byram River

Site Name	Latitude	Longitude	Site location notes	Town
East Byram 3	41.09915	-73.68308	88 John Street	Greenwich
East Byram 2	41.07998	-73.67743	105 Porchuck Road	Greenwich
East Byram 1	41.06051	-73.67454	329 Riversville Road	Greenwich
Byram 7	41.09460	-73.70437	111 Bedford Road	Greenwich
Byram 6	41.06092	-73.67760	Sherwood Avenue	Greenwich
Byram 5	41.04627	-73.66265	7 Bailywick Road	Greenwich
Byram 4	41.03858	-73.66530	Glenville Street	Greenwich
Byram 3	41.02740	-73.66169	Comly Avenue and Pemberwick Road	Greenwich
Byram 2	41.02383	-73.65859	2 Upland Street East	Greenwich
Byram 1	41.01649	-73.65623	Den Lane	Greenwich

**Table A2.2.** Byram River *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: M. Long, personal communication, October 11, 2018)

	5/10	5/29	6/11	6/25	7/10	7/24	8/13	8/22	9/12	9/24	Geomean	SSM
East Byram 3	est. 20	32	20	100	40	86	164	54	78	39	51	0%
East Byram 2	est. 28	37	35	144	40	116	144	256	est. 160	28	72	0%
East Byram 1	34	37	> 400	170	480	est. 170	360	540	250	92	178	0%
Byram 7	42	140	156	500	est. 68	230	270	770	920	84	202	20%
Byram 6	est. 34	62	74	336	est. 38	132	440	380	450	est. 44	124	0%
Byram 5	est. 28	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0%
Byram 4	est. 18	118	136	140	104	160	660	128	620	88	141	20%
Byram 3	est. 28	76	> 400	68	74	88	430	700	500	est. 100	150	10%
Byram 2	430	160	480	> 2000	430	160	740	940	700	est. 170	455	40%
Byram 1	228	180	330	230	est. 48	220	> 2000	660	520	250	299	20%
Weather	Wet	Wet	Dry	Wet	Dry	Wet	Wet	Wet	Wet	Dry		

**Table A2.3.** Byram River average water temperature, dissolved oxygen, and conductivity for each site

	<b>Water Temp (°C)</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>Conductivity (µS)</b>
East Byram 3	19.9	8.0	276
East Byram 2	19.2	8.4	302
East Byram 1	20.3	7.5	329
Byram 7	19.6	6.5	744
Byram 6	19.8	9.3	612
Byram 5	18.3	10.0	498
Byram 4	20.8	8.0	504
Byram 3	21.1	9.2	1523
Byram 2	21.3	10.9	495
Byram 1	21.0	7.6	494

## Appendix 3: Comstock Brook

**Table A3.1.** GPS coordinates and site locations for Comstock Brook

Site Name	Latitude	Longitude	Site location notes	Town
East Comstock 2	41.23927	-73.46164	Whipstick Road	Wilton
East Comstock 1	41.23247	-73.46502	Millstone Road	Wilton
Comstock 3	41.21262	-73.45841	Nod Hill Road	Wilton
Wilton SD1	41.20519	-73.44824	Middlebrook Farm Road	Wilton
Comstock 2	41.20518	-73.44822	Middlebrook Farm Road	Wilton
Comstock 1	41.19597	-73.43747	Lovers Lane	Wilton

**Table A3.2.** Comstock Brook *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: P. DiPietro, Personal communication, October 22, 2018)

	5/16	5/31	6/13	6/21	7/18	7/30	8/6	8/21	9/4	9/25	Geomean	SSM
East Comstock 2	84	est. 22	13	200	840	n/a	108	82	est. 8	> 400	79	11%
East Comstock 1	80	est. 4	3	82	830	52	132	96	90	> 1000	72	20%
Comstock 3	200	est. 64	46	760	1100	est. 140	110	170	136	> 2000	226	30%
Wilton SD1	164	66	8	280	940	230	est. 50	116	10	> 2000	-	-
Comstock 2	> 1000	est. 70	172	1300	1300	est. 250	est. 160	1200	190	> 10000	533	50%
Comstock 1	250	80	92	est. 1200	2400	330	est. 160	204	84	> 2000	315	30%
Weather	Wet	Dry	Dry	Dry	Wet	Dry	Wet	Dry	Dry	Wet		

**Table A3.3.** Comstock Brook average water temperature, dissolved oxygen, and conductivity for each site

	Water Temp (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS)
East Comstock 2	18.4	7.7	265
East Comstock 1	18.7	8.2	277
Comstock 3	18.0	8.8	285
Wilton SD1	17.9	8.2	420
Comstock 2	17.7	7.1	319
Comstock 1	18.5	7.3	304

## Appendix 4: Deadman's Brook

**Table A4.1.** GPS coordinates and site locations for Deadman's Brook

Site Name	Latitude	Longitude	Site location notes	Town
Deadman 9	41.17826	-73.33006	Tupelo Road	Westport
Deadman 8	41.17267	-73.33152	Highland Road	Westport
Deadman 7	41.16502	-73.33419	Silent Grove North	Westport
Deadman 5	41.15869	-73.33498	North Avenue	Westport
Deadman 4	41.15487	-73.34130	Leslie Lane	Westport
Deadman 3.5	41.15141	-73.34782	Deerwood Lane	Westport
Deadman 3	41.14682	-73.35434	Evergreen Ave	Westport
Deadman 2	41.14199	-73.35834	Myrtle Ave	Westport
Deadman 1	41.13975	-73.35843	Jesup Road	Westport

**Table A4.2.** Deadman's Brook *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: P. DiPietro, Personal communication, October 22, 2018)

	5/7	5/30	6/14	6/18	7/9	7/25	8/7	8/30	9/10	9/24	Geomean	SSM
Deadman 9	est. 4	24	44	5	4	52	19	28	est. 80	52	20	0%
Deadman 8	30	17	80	54	82	660	80	40	530	68	82	10%
Deadman 7	52	140	400	1300	540	1250	500	160	5800	370	462	30%
Deadman 5	220	144	88	560	780	950	950	220	800	240	369	40%
Deadman 4	112	90	340	184	204	960	300	104	560	290	240	10%
Deadman 3.5	108	76	36	98	260	290	est. 160	300	1220	220	176	10%
Deadman 3	108	92	270	280	480	2900	240	1200	1500	132	378	30%
Deadman 2	est. 170	370	440	490	est. 170	760	200	175	1360	240	339	20%
Deadman 1	220	280	380	430	310	3600	440	110	2300	160	427	20%
Weather	Dry	Dry	Dry	Dry	Dry	Wet	Dry	Dry	Wet	Dry		

**Table A4.3.** Deadman's Brook average water temperature, dissolved oxygen, and conductivity for each site

	<b>Water Temp (°C)</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>Conductivity (µS)</b>
Deadman 9	20.1	3.1	240
Deadman 8	18.9	5.2	237
Deadman 7	18.4	4.8	416
Deadman 5	18.6	7.5	349
Deadman 4	18.4	8.3	395
Deadman 3.5	18.6	7.2	344
Deadman 3	18.3	8.7	362
Deadman 2	18.5	8.1	691
Deadman 1	20.2	8.1	12240

## Appendix 5: Deep Brook

**Table A5.1.** GPS coordinates and site locations for Deep Brook

Site Name	Latitude	Longitude	Site location notes	Town
Deep 4	41.39217	-73.32881	Head of Meadow Road	Newtown
Deep 3	41.40242	-73.31227	Boggs Hill Road	Newtown
Deep 2	41.39755	-73.29807	Elm Drive	Newtown
Deep 1	41.40980	-73.28536	Old Farm Road	Newtown

**Table A5.2.** Deep Brook *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: Weather Underground – Waterbury/Oxford)

	5/9	5/23	6/13	6/19	7/12	7/31	8/8	8/23	9/11	9/20	Geomean	SSM
Deep 4	42	470	500	> 2000	1400	est. 180	380	68	1020	230	353	30%
Deep 3	28	490	380	> 2000	160	168	310	116	1920	170	283	20%
Deep 2	60	1000	400	1480	est. 360	est. 100	160	100	> 2000	est. 130	297	30%
Deep 1	est. 30	> 1000	est. 40	510	68	92	140	44	> 1000	est. 40	125	20%
Weather	Dry	Wet	Dry	Dry	Dry	Dry	Wet	Wet	Wet	Wet		

**Table A5.3.** Deep Brook average water temperature, dissolved oxygen, and conductivity for each site

	Water Temp (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS)
Deep 4	17.5	9.3	296
Deep 3	18.9	4.9	239
Deep 2	18.1	8.8	233
Deep 1	18.0	9.5	351

## Appendix 6: Farm Creek

**Table A6.1.** GPS coordinates and site locations for Farm Creek

Site Name	Latitude	Longitude	Site location notes	Town
Farm 8	41.08163	-73.43704	Bridge between Rowayton Woods Drive and Watson Court	Norwalk
Farm 7	41.07687	-73.43706	55 Crooked Trail	Norwalk
Farm 6	41.06866	-73.43820	3 Indian Spring Road	Norwalk
Farm 5	41.06646	-73.43946	8 Roton Ave	Norwalk
Farm 4	41.06506	-73.43994	29 McKinley Street	Norwalk
Farm 3	41.06478	-73.44056	25 McKinley Street	Norwalk
Farm 2	41.06279	-73.44051	7 Sammis Street	Norwalk
Farm 1	41.06118	-73.43543	86 Bluff Avenue	Norwalk

**Table A6.2.** Farm Creek *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: P. DiPietro, Personal communication, October 22, 2018)

	5/15	5/23	6/6	6/27	7/11	7/26	8/14	8/23	9/6	9/17	Geomean	SSM
Farm 8	78	240	420	1600	380	2800	750	240	450	390	460	30%
Farm 7	960	420	1100	1900	640	480	380	n/a	290	2000	727	56%
Farm 6	236	205	350	860	3800	2400	900	1500	1350	290	767	60%
Farm 5	148	200	300	2000	300	3200	600	240	620	380	474	40%
Farm 4	232	170	250	2000	est. 20	> 2000	1100	n/a	est. 0	24	140	33%
Farm 3	800	104	204	860	440	> 10000	1150	est. 120	700	20	407	50%
Farm 2	19	800	est. 180	est. 100	88	> 2000	650	est. 80	est. 28	180	162	30%
Farm 1	7	32	n/a	est. 0	11	60	510	est. 8	5	15	15	0%
Weather	Dry	Wet	Wet	Dry	Dry	Wet	Wet	Wet	Dry	Dry		

**Table A6.3.** Farm Creek average water temperature, dissolved oxygen, and conductivity for each site

	<b>Water Temp (°C)</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>Conductivity (µS)</b>
Farm 8	19.5	4.0	307
Farm 7	21.7	5.6	381
Farm 6	19.0	6.6	409
Farm 5	18.9	7.1	450
Farm 4	21.7	6.1	397
Farm 3	21.3	5.7	12890
Farm 2	22.0	6.1	28811
Farm 1	20.9	6.9	37710



## Appendix 7: Goodwives River

**Table A7.1.** GPS coordinates and site locations for Goodwives River

Site Name	Latitude	Longitude	Site location notes	Town
Goodwives 9	41.10690	-73.47823	Pembroke Road	Darien
Goodwives 8	41.09380	-73.47568	Buttonwood Lane	Darien
Goodwives 7	41.08918	-73.46935	Overbrook Lane	Darien
Goodwives 6	41.08560	-73.46724	Granaston Lane	Darien
Goodwives 5	41.08164	-73.46571	Post Road	Darien
Goodwives 4	41.07722	-73.46662	Tokeneke Road	Darien
Goodwives 3	41.07182	-73.47066	Andrews Drive	Darien
Goodwives 2	41.06617	-73.47432	Goodwives River Road	Darien
Goodwives 1	41.05594	-73.47909	Rings End Road	Darien

**Table A7.2.** Goodwives River *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: P. DiPietro, Personal communication, October 22, 2018)

	5/8	5/23	6/12	6/26	7/11	7/31	8/15	8/22	9/6	9/26	Geomean	SSM
Goodwives 9	280	192	560	n/a	164	440	390	1560	n/a	3700	514	25%
Goodwives 8	610	est. 60	690	1100	n/a	260	130	500	n/a	9400	508	50%
Goodwives 7	88	230	est. 64	610	36	26	172	> 1000	est. 8	9900	159	30%
Goodwives 6	est. 150	420	400	1400	est. 60	140	150	470	180	7800	352	20%
Goodwives 5	48	410	310	1360	680	160	135	540	> 1000	7700	468	40%
Goodwives 4	est. 30	480	380	2650	620	380	180	680	280	7100	492	40%
Goodwives 3	44	440	340	> 2000	440	> 5000	250	4100	550	6600	800	40%
Goodwives 2	220	1900	370	est. 1500	740	540	600	> 5000	680	8500	1049	70%
Goodwives 1	est. 2	720	est. 20	390	68	70	480	est. 28	est. 20	> 10000	104	20%
Weather	Dry	Wet	Dry	Wet	Dry	Dry	Wet	Wet	Dry	Wet		

**Table A7.3.** Goodwives River average water temperature, dissolved oxygen, and conductivity for each site

	Water Temp (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS)
Goodwives 9	17.6	7.3	271
Goodwives 8	20.6	7.2	320
Goodwives 7	19.6	6.7	329
Goodwives 6	19.8	8.4	318
Goodwives 5	19.6	8.3	346
Goodwives 4	19.7	8.0	512
Goodwives 3	19.7	8.5	685
Goodwives 2	21.7	5.0	9661
Goodwives 1	22.9	6.9	22648

## Appendix 8: Greenwich Creek

**Table A8.1.** GPS coordinates and site locations for Greenwich Creek

Site Name	Latitude	Longitude	Site location notes	Town
Greenwich 5	41.08792	-73.60348	17 Barnstable Lane	Greenwich
Greenwich 3	41.06570	-73.60694	Hill Road	Greenwich
Greenwich 2	41.04320	-73.60823	Brookridge Drive	Greenwich

**Table A8.2.** Greenwich Creek *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: M. Long, personal communication, October 11, 2018)

	5/8	5/24	6/4	6/27	7/10	7/23	8/7	8/27	9/11	9/20	Geomean	SSM
Greenwich 5	32	112	1080	280	est. 24	780	168	36	> 2000	600	207	40%
Greenwich 3	est. 28	108	1180	> 1000	450	420	136	970	1900	340	377	40%
Greenwich 2	56	380	1500	116	est. 32	350	132	160	> 2000	780	259	30%
Weather	Dry	Wet	Wet	Dry	Dry	Wet	Dry	Dry	Wet	Wet		

**Table A8.3.** Greenwich Creek average water temperature, dissolved oxygen, and conductivity for each site

	Water Temp (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS)
Greenwich 2	20.4	8.3	448
Greenwich 3	19.6	8.3	456
Greenwich 5	22.3	5.2	437

## Appendix 9: Horseneck Brook

**Table A9.1.** GPS coordinates and site locations for Horseneck Brook

Site Name	Latitude	Longitude	Site location notes	Town
Horseneck 10	41.11419	-73.63283	Lower Cross Road	Greenwich
Horseneck 8	41.07068	-73.63984	Lake Avenue	Greenwich
Horseneck 7	41.05232	-73.64170	Round Hill Road	Greenwich
Horseneck 6	41.04696	-73.64195	Winding Lane	Greenwich
Horseneck 5	41.04121	-73.64171	Zaccheus Mead Lane	Greenwich
Horseneck 4	41.03046	-73.63974	Valley Drive	Greenwich
Horseneck 3	41.02853	-73.63472	Brookside Park	Greenwich
Horseneck 2	41.02629	-73.63274	West Putnam Avenue (Route 1)	Greenwich
Horseneck 1	41.02008	-73.63227	Horseneck Lane	Greenwich

**Table A9.2.** Horseneck Brook *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: M. Long, personal communication, October 11, 2018)

	5/7	5/24	6/4	6/27	7/10	7/23	8/7	8/27	9/11	9/20	Geomean	SSM
Horseneck 10	est. 26	356	4500	350	175	530	920	est. 80	450	est. 130	300	20%
Horseneck 8	est. 6	32	> 400	116	> 400	250	300	est. 110	240	est.	123	0%
Horseneck 7	86	50	220	102	92	108	140	88	210	92	109	0%
Horseneck 6	est. 32	232	1560	est. 32	38	212	78	28	470	190	119	10%
Horseneck 5	44	80	> 1000	176	est. 24	380	120	56	670	210	149	20%
Horseneck 4	76	520	est. 1400	860	860	640	est. 140	900	1700	1180	605	70%
Horseneck 3	76	232	1480	750	370	1020	160	150	2200	500	426	40%
Horseneck 2	260	304	> 2000	530	380	1300	320	220	2200	620	575	40%
Horseneck 1	2500	600	6400	est. 1500	1820	1200	470	2000	2900	620	1488	90%
Weather	Dry	Wet	Wet	Dry	Dry	Wet	Dry	Dry	Wet	Wet		

**Table A9.3.** Horseneck Brook average water temperature, dissolved oxygen, and conductivity for each site

	<b>Water Temp (°C)</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>Conductivity (µS)</b>
Horseneck 10	18.6	6.2	400
Horseneck 8	19.6	8.0	456
Horseneck 7	20.9	6.5	378
Horseneck 6	20.2	6.6	396
Horseneck 5	19.9	7.9	418
Horseneck 4	19.4	8.2	448
Horseneck 3	19.3	9.2	445
Horseneck 2	19.4	8.7	489
Horseneck 1	19.5	9.5	511

## Appendix 10: Keelers Brook

**Table A10.1.** GPS coordinates and site locations for Keelers Brook

Site Name	Latitude	Longitude	Site location notes	Town
Keelers 3	41.09895	-73.44235	Route 1	Norwalk
Keelers 2	41.09081	-73.44105	Primrose Court	Norwalk
Keelers 1	41.08562	-73.44305	Rowayton Avenue	Norwalk

**Table A10.2.** Keelers Brook *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: P. DiPietro, Personal communication, October 22, 2018)

	5/15	5/23	6/6	6/27	7/11	7/26	8/14	8/23	9/6	9/17	Geomean	SSM
Keelers 3	640	540	450	1900	1020	3100	1100	400	3950	340	942	60%
Keelers 2	224	440	350	620	1300	2300	650	520	290	820	590	50%
Keelers 1	710	410	780	1750	1000	4900	1050	240	420	540	803	60%
Weather	Dry	Wet	Wet	Dry	Dry	Wet	Wet	Wet	Dry	Dry		

**Table A10.3.** Keelers Brook average water temperature, dissolved oxygen, and conductivity for each site

	Water Temp (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS)
Keelers 3	20.2	7.3	373
Keelers 2	20.0	8.1	553
Keelers 1	20.1	8.0	467

## Appendix 11: Mianus River

**Table A11.1.** GPS coordinates and site locations for Mianus River

Site Name	Latitude	Longitude	Site location notes	Town
East Mianus 4	41.14636	-73.58899	137 Old Long Ridge Road	Stamford
East Mianus 3	41.13906	-73.59377	1501 Riverbank Road	Stamford
East Mianus 2	41.13368	-73.58800	180 Wildwood Road	Stamford
East Mianus 1	41.11091	-73.58770	365 Riverbank Road	Stamford
Mianus 7	41.12319	-73.60880	215 Farms Road	Stamford
Mianus 6	41.10473	-73.58652	2 June Road	Stamford
Mianus 5	41.09368	-73.58594	121 Old Mill Lane	Stamford
Mianus 4	41.08076	-73.58111	277 Merriebrook Lane	Stamford
Mianus 3	41.07069	-73.57806	499 Valley Road	Greenwich
Mianus 2	41.05760	-73.58222	Palmer Hill Road and Valley Road	Greenwich
Mianus 1	41.05034	-73.58622	179 Valley Road	Greenwich

**Table A11.2.** Mianus River *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: M. Long, personal communication, October 11, 2018)

	5/16	5/21	6/5	6/19	7/12	7/26	8/15	8/30	9/10	9/19	Geomean	SSM
East Mianus 4	52	14	82	38	30	160	46	144	180	est. 130	66	0%
East Mianus 3	190	208	1180	68	52	180	72	56	430	430	172	10%
East Mianus 2	152	224	180	136	116	760	72	144	n/a	310	184	11%
East Mianus 1	134	72	34	16	est. 36	> 400	105	est. 30	47	372	73	0%
Mianus 7	est. 28	6	68	60	35	156	est. 16	35	152	104	45	0%
Mianus 6	158	84	66	92	25	312	70	est. 24	41	144	76	0%
Mianus 5	140	70	200	98	36	630	80	31	66	144	100	10%
Mianus 4	114	42	176	188	64	740	98	est. 30	264	530	141	10%
Mianus 3	n/a	46	320	360	80	720	100	74	700	300	198	22%
Mianus 2	350	100	220	54	34	> 400	88	52	284	1540	160	10%
Mianus 1	est. 38	140	est. 32	est. 6	4	38	30	19	15	304	29	0%
Weather	Wet	Wet	Wet	Dry	Dry	Wet	Wet	Dry	Wet	Wet		

**Table A11.3.** Mianus River average water temperature, dissolved oxygen, and conductivity for each site

	<b>Water Temp (°C)</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>Conductivity (µS)</b>
East Mianus 4	20.3	7.9	252
East Mianus 3	20.1	7.5	324
East Mianus 2	19.5	7.2	342
East Mianus 1	20.7	6.8	361
Mianus 7	15.9	7.8	345
Mianus 6	20.3	8.4	333
Mianus 5	20.1	8.5	334
Mianus 4	19.9	8.7	329
Mianus 3	20.2	7.7	338
Mianus 2	20.4	7.5	346
Mianus 1	23.2	7.4	343



## Appendix 12: Mill River

**Table A12.1.** GPS coordinates and site locations for Mill River

Site Name	Latitude	Longitude	Site location notes	Town
Mill 13	41.30149	-73.27613	Judd Road and Velvet Street	Monroe
Mill 12	41.24108	-73.25393	S Park Avenue between Buck Hill Road and Marich Drive	Easton
Mill 11	41.23707	-73.25217	S Park Avenue near Riverside Drive open space area	Easton
Mill 10	41.23198	-73.24856	Southern most South Park Avenue crossing	Easton
Mill 8	41.21545	-73.26020	427 Congress Street	Fairfield
Mill 7	41.20273	-73.25471	Morehouse Highway (near Canterbury Lane)	Fairfield
Cricker 1	41.19822	-73.26489	Nonopoge Road	Fairfield
Mill 6.5	41.18079	-73.26161	Samp Mortar Drive and Brookside Drive	Fairfield
Mill 6	41.17847	-73.26341	61 Mountain Laurel Road	Fairfield
Mill 5	41.17380	-73.26840	Bridge on Mill Plain Road	Fairfield
Mill 4	41.16541	-73.27005	165 Duck Farm Road	Fairfield
Mill 3.5	41.15821	-73.27467	Twin Brooks Lane	Fairfield
Mill 3	41.15040	-73.27260	Sturges Road	Fairfield
Mill 2	41.13977	-73.27418	Route 1	Fairfield
Mill 1	41.13758	-73.27460	70 Harbor Road	Fairfield
Mill A	41.13210	-73.28465	Harbor Road	Fairfield

**Table A12.2.** Mill River *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: Weather Underground – Fairfield Town Hall)

	5/17	5/21	6/4	6/25	7/19	8/1	8/13	8/28	9/5	9/26	Geomean	SSM
Mill 13	50	est. 16	168	520	240	est. 140	74	40	76	2200	128	10%
Mill 12	68	4	96	est. 28	88	112	46	38	0	450	38	0%
Mill 11	> 2000	est. 10	460	est. 20	est. 100	est. 48	58	est. 20	12	370	73	10%
Mill 10	300	est. 10	800	est. 50	est. 110	est. 48	> 1000	est. 20	est. 4	440	86	20%
Mill 8	710	est. 30	1600	850	160	125	180	32	80	2900	245	40%
Mill 7	140	est. 60	600	1000	600	est. 60	30	148	est. 14	7300	196	40%
Cricker 1	960	220	3800	1200	est. 50	232	56	124	68	900	294	40%
Mill 6.5	360	est. 36	560	170	est. 80	est. 4	19	324	est. 12	6700	107	10%
Mill 6	280	est. 28	700	est. 200	est. 20	est. 44	32	24	38	6200	106	20%
Mill 5	360	est. 30	2400	est. 250	est. 160	est. 45	40	38	35	6500	166	20%
Mill 4	est. 800	est. 70	3100	est. 400	est. 120	204	116	152	148	6600	352	30%
Mill 3.5	750	est. 50	3700	2000	est. 500	152	152	52	76	7700	397	40%
Mill 3	1000	est. 40	410	1280	est. 80	est. 32	48	11	12	7500	138	30%
Mill 2	1500	est. 130	1200	1200	est. 350	est. 120	340	96	140	9500	469	40%
Mill 1	est. 1000	est. 140	2300	1400	est. 250	est. 120	300	216	136	8500	502	40%
Mill A	3300	est. 300	9000	est. 300	1100	est. 150	140	640	est. 60	7600	669	50%
Weather	Wet	Dry	Wet	Wet	Dry	Wet	Wet	Dry	Dry	Wet		

**Table A12.3.** Mill River average water temperature, dissolved oxygen, and conductivity for each site

	Water Temp (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS)
Mill 13	18.3	8.3	204
Mill 12	14.1	10.3	185
Mill 11	14.3	10.4	189
Mill 10	14.5	10.3	187
Mill 8	15.6	10.0	215
Mill 7	18.8	9.1	210
Cricker 1	17.9	8.7	240
Mill 6.5	21.3	8.0	212
Mill 6	20.6	6.8	209
Mill 5	20.9	8.2	215
Mill 4	20.4	7.6	217
Mill 3.5	20.0	7.3	220
Mill 3	21.1	6.8	221
Mill 2	21.9	7.6	3538
Mill 1	21.6	7.7	4995
Mill A	20.2	5.4	10451

## Appendix 13: Muddy Brook

**Table A13.1.** GPS coordinates and site locations for Muddy Brook

Site Name	Latitude	Longitude	Site location notes	Town
Muddy 6	41.16444	-73.32521	Bayberry Lane	Westport
Muddy 5	41.14686	-73.31809	Long Lots Road	Westport
Muddy 4	41.14107	-73.32172	Turkey Hill Road N	Westport
Muddy 3	41.13857	-73.32546	Morningside Drive S	Westport
Muddy 2	41.13293	-73.32859	Center Street	Westport
Muddy 1	41.12735	-73.32958	Greens Farms Road	Westport

**Table A13.2.** Muddy Brook *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: P. DiPietro, Personal communication, October 22, 2018)

	5/7	5/30	6/14	6/18	7/9	7/25	8/7	8/30	9/10	9/24	Geomean	SSM
Muddy 6	46	104	108	> 400	360	1900	est. 90	152	1160	440	251	20%
Muddy 5	est. 22	364	330	350	250	2600	220	135	680	est. 30	227	20%
Muddy 4	210	192	> 2000	640	300	3300	860	170	900	128	494	50%
Muddy 3	320	172	420	480	310	3700	500	140	7500	680	583	30%
Muddy 2	220	470	560	640	290	1400	290	280	2050	260	480	30%
Muddy 1	290	270	420	340	320	780	270	145	1560	200	357	20%
Weather	Dry	Dry	Dry	Dry	Dry	Wet	Dry	Dry	Wet	Dry		

**Table A13.3.** Muddy Brook average water temperature, dissolved oxygen, and conductivity for each site

	Water Temp (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS)
Muddy 1	18.8	8.8	560
Muddy 2	18.8	8.2	571
Muddy 3	17.7	7.4	465
Muddy 4	18.3	9.2	415
Muddy 5	18.4	9.3	373
Muddy 6	17.1	7.3	362

## Appendix 14: Noroton River

**Table A14.1.** GPS coordinates and site locations for Noroton River

Site Name	Latitude	Longitude	Site location notes	Town
Noroton 8	41.15925	-73.51421	West Road and Greenley Road	New Canaan
Noroton 7	41.14108	-73.51167	209 Frogtown Road	New Canaan
Noroton 5	41.11868	-73.50130	47 Jellif Mill Road	New Canaan
Noroton 4	41.10290	-73.50982	137 Woodway Road	Stamford
Noroton 3	41.09540	-73.51430	Camp Avenue	Stamford
Noroton 2	41.07530	-73.51550	668 Connecticut 106	Stamford
Noroton 1	41.06093	-73.50735	Route 1	Stamford

**Table A14.2.** Noroton River *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: M. Long, personal communication, October 11, 2018)

	5/14	5/30	6/13	7/2	7/10	7/24	8/9	8/28	9/12	9/27	Geomean	SSM
Noroton 8	78	44	190	32	32	62	n/a	400	192	2000	123	11%
Noroton 7	54	58	22	58	25	165	1500	80	124	1500	114	20%
Noroton 5	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	180	1600	66	33%
Noroton 4	64	94	155	280	210	70	244	228	60	1800	172	10%
Noroton 3	192	260	430	560	660	220	650	370	320	2600	451	30%
Noroton 2	280	250	150	160	440	210	1000	140	250	3400	336	20%
Noroton 1	290	470	265	250	1040	480	5000	290	390	2400	601	30%
Weather	Wet	Dry	Dry	Dry	Dry	Wet	Wet	Dry	Wet	Wet		

**Table A14.3.** Noroton River average water temperature, dissolved oxygen, and conductivity for each site

	<b>Water Temp (°C)</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>Conductivity (µS)</b>
Noroton 8	21.9	4.5	325
Noroton 7	19.8	7.4	278
Noroton 5	20.7	9.1	299
Noroton 4	21.9	8.3	320
Noroton 3	21.1	7.7	333
Noroton 2	21.2	6.5	466
Noroton 1	21.8	6.8	7216

## Appendix 15: Norwalk River

**Table A15.1.** GPS coordinates and site locations for Norwalk River

Site Name	Latitude	Longitude	Site location notes	Town
Great Swamp	41.28209	-73.48018	Ivy Hill Road	Ridgefield
Norwalk 23	41.29005	-73.49349	22 South Street	Ridgefield
Ridgefield SD1	41.29077	-73.49155	Ligi's Way	Ridgefield
Norwalk 21	41.29444	-73.48843	68 Farmingville Road	Ridgefield
Norwalk 19	41.31672	-73.49001	Limestone Road	Ridgefield
Norwalk 15	41.30909	-73.46909	30 Stonehenge Road	Ridgefield
Norwalk 13	41.26550	-73.44079	787 Branchville Road	Ridgefield
Norwalk 9.5	41.24590	-73.43409	Old Mill Road	Wilton
Norwalk 9	41.20354	-73.43094	School Road	Wilton
Norwalk 6	41.18341	-73.42276	187 Danbury Road	Wilton
Norwalk 4	41.14349	-73.42669	10 Glover Avenue	Norwalk
Norwalk 1	41.11947	-73.41701	40 Cross Street	Norwalk

**Table A15.2.** Norwalk River *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: P. DiPietro, Personal communication, October 22, 2018)

	5/16	5/31	6/12	6/21	7/18	7/30	8/6	8/21	9/4	9/25	Geomean	SSM
Great Swamp	11	64	112	370	920	n/a	460	80	n/a	n/a	139	14%
Norwalk 23	102	76	140	580	1700	100	100	190	180	10000	286	30%
Ridgefield SD1	0	0	100	0	1	0	1	0	0	6	-	-
Norwalk 21	60	148	360	620	420	60	164	58	100	2000	199	20%
Norwalk 19	172	28	44	54	156	56	84	60	332	150	87	0%
Norwalk 15	98	180	76	104	520	104	72	38	38	1820	130	10%
Norwalk 13	66	192	156	540	640	30	74	44	38	900	137	20%
Norwalk 9.5	68	40	51	260	360	40	86	100	62	810	108	10%
Norwalk 9	86	104	380	420	1700	180	210	105	176	1320	272	20%
Norwalk 6	156	148	156	550	2600	360	250	145	120	1700	326	20%
Norwalk 4	132	140	156	680	2000	140	280	85	48	2000	257	30%
Norwalk 1	570	260	128	680	2300	100	175	130	208	2000	351	30%
Weather	Wet	Dry	Dry	Dry	Wet	Dry	Wet	Dry	Dry	Wet		



**Table A15.3.** Norwalk River average water temperature, dissolved oxygen, and conductivity for each site

	Water Temp (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS)
Great Swamp	16.6	7.7	485
Norwalk 23	18.4	8.8	1012
Ridgefield SD1	19.5	9.5	753
Norwalk 21	19.1	3.2	740
Norwalk 19	20.9	6.9	705
Norwalk 15	20.2	8.2	674
Norwalk 13	20.7	8.4	479
Norwalk 9.5	20.8	8.3	466
Norwalk 9	19.5	8.7	428
Norwalk 6	19.7	9.1	430
Norwalk 4	20.1	9.7	449
Norwalk 1	21.3	9.3	410

## Appendix 16: Pootatuck River

**Table A16.1.** GPS coordinates and site locations for Pootatuck River

Site Name	Latitude	Longitude	Site location notes	Town
Pootatuck 6	41.33469	-73.29826	Mountainside Drive	Monroe
Pootatuck 4	41.36009	-73.28211	Meadow Brook Road	Newtown
Pootatuck 3	41.38355	-73.26919	Turkey Hill Road	Newtown
Pootatuck 2	41.42292	-73.28190	Rocky Glen State Park	Newtown
Pootatuck 1	41.43745	-73.27017	Walnut Tree Hill	Newtown

**Table A16.2.** Pootatuck River *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: Weather Underground – Waterbury/Oxford)

	5/9	5/23	6/13	6/19	7/12	7/31	8/8	8/23	9/11	9/20	Geomean	SSM
Pootatuck 6	74	> 1000	250	> 2000	500	est. 140	170	88	900	est. 120	290	30%
Pootatuck 4	46	> 1000	460	> 2000	580	est. 200	208	108	720	est. 140	320	40%
Pootatuck 3	118	> 1000	est. 70	620	400	est. 100	140	est. 56	> 2000	est. 80	219	30%
Pootatuck 2	52	> 1000	350	500	est. 85	112	115	85	> 2000	est. 20	179	20%
Pootatuck 1	72	> 1000	n/a	235	n/a	n/a	175	n/a	n/a	96	195	20%
Weather	Dry	Wet	Dry	Dry	Dry	Dry	Wet	Wet	Wet	Wet		

**Table A16.3.** Pootatuck River average water temperature, dissolved oxygen, and conductivity for each site

	Water Temp (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS)
Pootatuck 6	18.2	7.2	163
Pootatuck 4	18.6	8.1	187
Pootatuck 3	18.4	8.7	224
Pootatuck 2	17.9	9.5	316
Pootatuck 1	18.2	9.5	305

## Appendix 17: Rippowam River

**Table A17.1.** GPS coordinates and site locations for Rippowam

Site Name	Latitude	Longitude	Site location notes	Town
Rippowam 12	41.18524	-73.52999	Oenoke Ridge	New Canaan
Rippowam 11.5	41.17561	-73.52919	West Road	New Canaan
Rippowam 11	41.17234	-73.53126	Dans Highway	New Canaan
Rippowam 10	41.16153	-73.53843	Ponus Ridge Road	New Canaan
Rippowam 9	41.15023	-73.53412	Cascade Road	New Canaan
Rippowam 8	41.11302	-73.54619	High Ridge Road	Stamford
Rippowam 7	41.10559	-73.55860	Cedar Heights Road	Stamford
Rippowam 5	41.08559	-73.55664	Long Ridge Road	Stamford
Rippowam 4	41.06617	-73.55763	Cold Spring Road	Stamford
Rippowam 3	41.06593	-73.54912	Bridge Street	Stamford
Rippowam 2	41.05904	-73.54664	W North Street	Stamford
Rippowam 1	41.04940	-73.54588	Division Street	Stamford

**Table A17.2.** Rippowam River *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: M. Long, personal communication, October 11, 2018)\*

	5/22	6/5	7/2	7/5	7/11	7/25	8/15	8/20	9/12	9/17	Geomean	SSM
Rippowam 12	34	104	58	144	94	820	80	106	66	92	102	10%
Rippowam 11.5	est. 22	68	n/a	82	est. 120	1600	102	28	116	30	85	11%
Rippowam 11	60	22	36	40	56	n/a	252	60	est. 100	14	51	0%
Rippowam 10	88	270	140	108	104	160	136	190	est. 190	48	130	0%
Rippowam 9	est. 16	190	116	280	125	290	est. 60	60	est. 68	36	89	0%
Rippowam 8	190	220	115	30	170	> 2000	320	est. 40	108	450	177	10%
Rippowam 7	144	n/a	144	168	200	1360	124	148	340	5500	317	22%
Rippowam 5	168	est. 1300	est. 500	> 1000	740	11000	420	390	440	1100	767	50%
Rippowam 4	240	390	440	380	300	1400	260	280	600	180	373	20%
Rippowam 3	250	420	400	40	340	2000	240	310	820	180	323	20%
Rippowam 2	380	3600	290	420	230	> 5600	480	260	440	300	569	20%
Rippowam 1/1A	2500	1200	1300	840	8100	16000	n/a	n/a	2000	330	2023	88%
Weather	Wet	Wet	Dry	Dry	Dry	Wet	Wet	Wet	Wet	Dry		

\*Power outages during incubation on sampling dates in May and June resulted in the addition of extra “make-up” sampling dates during July to meet our goal of 10 monitoring days per site.

**Table A17.3.** Rippowam River average water temperature, dissolved oxygen, and conductivity for each site

	<b>Water Temp (°C)</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>Conductivity (µS)</b>
Rippowam 12	21.5	6.7	223
Rippowam 11.5	21.1	8.6	221
Rippowam 11	22.6	8.1	224
Rippowam 10	22.4	8.4	232
Rippowam 9	21.1	6.6	259
Rippowam 8	21.8	7.4	359
Rippowam 7	22.2	8.6	404
Rippowam 5	21.3	9.1	503
Rippowam 4	21.2	8.4	508
Rippowam 3	21.2	8.7	502
Rippowam 2	21.3	9.1	518
Rippowam 1/1A	21.9	7.8	1666

## Appendix 18: Rooster River

**Table A18.1.** GPS coordinates and site locations for Rooster River

Site Name	Latitude	Longitude	Site location notes	Town
Rooster 10	41.24438	-73.23205	26 Revere Lane	Trumbull
Rooster 9	41.23572	-73.22811	184 Chestnut Hill Road	Trumbull
Rooster 8	41.22641	-73.22206	2825 Old Town Road	Bridgeport
Rooster 7	41.21243	-73.22382	Vinvellette Street	Bridgeport
Rooster 6	41.20316	-73.22940	263 Wilson Street	Fairfield
Rooster 5	41.19351	-73.23204	131 Westwood Road	Fairfield
Rooster 4.5	41.18807	-73.21872	1675 Capitol Avenue	Bridgeport
Rooster 4	41.18642	-73.21613	41 Astoria Avenue	Bridgeport
Rooster 3	41.17889	-73.21954	Cartright Street	Bridgeport
Rooster 2	41.16910	-73.22773	Fairchild Avenue	Fairfield
Rooster 1A	41.16745	-73.22369	2170 State Street Extention	Fairfield

**Table A18.2.** Rooster River *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: Weather Underground – Sikorsky Memorial, October 22, 2018)

	5/15	5/23	6/14	6/18	7/12	8/2	8/14	8/20	9/4	9/18	Geomean	SSM
Rooster 10	50	1000	260	232	70	1460	500	420	80	10000	373	30%
Rooster 9	56	350	58	228	100	800	750	0	168	290	122	20%
Rooster 8	160	180	340	490	400	1280	900	360	720	10000	597	40%
Rooster 7	340	3900	780	1040	820	2450	1650	200	2000	2700	1144	80%
Rooster 6	310	220	800	580	280	2600	1000	350	340	1600	581	50%
Rooster 5	180	360	1300	760	410	2350	1150	700	500	8000	851	60%
Rooster 4.5	5400	1700	1600	1260	1600	2200	11400	1400	2300	9000	2712	100%
Rooster 4	1300	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1300	100%
Rooster 3	500	3600	20000	1400	n/a	3300	4000	1300	1300	8400	2765	89%
Rooster 2	840	1300	1850	1060	5700	4900	2500	1600	1450	8600	2226	100%
Rooster 1A	560	560	10000	2100	3500	6400	6600	5400	12400	15000	3972	80%
Weather	Dry	Wet	Dry	Dry	Dry	Wet	Wet	Wet	Dry	Wet		

**Table A18.3.** Rooster River average water temperature, dissolved oxygen, and conductivity for each site

	<b>Water Temp (°C)</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>Conductivity (µS)</b>
Rooster 10	18.0	9.4	358
Rooster 9	19.3	9.0	309
Rooster 8	19.1	8.9	450
Rooster 7	19.1	8.5	500
Rooster 6	19.1	8.8	497
Rooster 5	19.2	9.2	451
Rooster 4.5	19.9	6.4	803
Rooster 4	14.4	8.7	554
Rooster 3	18.8	8.2	466
Rooster 2	19.5	6.9	473
Rooster 1A	20.1	5.3	3681

## Appendix 19: Sasco Brook

**Table A19.1.** GPS coordinates and site locations for Sasco Brook

Site Name	Latitude	Longitude	Site location notes	Town
Sasco 9	41.15280	-73.30605	210 Hulls Farm Road	Fairfield
Sasco 8	41.14579	-73.30318	8 Ulbrick Lane	Westport
Sasco 7	41.14573	-73.30314	8 Ulbrick Lane	Westport
Sasco 6	41.14556	-73.30111	Old Road and Wakeman Lane	Westport
Sasco 3	41.13702	-73.29708	408 Greens Farm Road	Westport
Sasco 2	41.13293	-73.29675	32 Westway Road	Westport
Sasco 1	41.12478	-73.29888	1505 Pequot Avenue	Westport

**Table A19.2.** Sasco Brook *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: Weather Underground – Fairfield Town Hall)

	5/14	5/30	6/7	6/20	7/16	7/30	8/16	8/27	9/5	9/27	Geomean	SSM
Sasco 9	56	74	112	104	116	94	92	104	340	2000	142	10%
Sasco 8	62	152	108	124	60	92	96	36	104	1900	117	10%
Sasco 7	64	128	136	270	128	290	140	36	74	1400	150	10%
Sasco 6	78	124	164	84	90	66	88	est. 20	54	1600	102	10%
Sasco 3	184	400	640	2200	1160	est. 180	124	88	290	1300	394	40%
Sasco 2	172	260	> 2000	600	580	110	110	40	120	2500	292	40%
Sasco 1	36	> 400	640	est. 180	180	88	184	64	est. 18	2700	165	20%
Weather	Wet	Dry	Dry	Wet	Wet	Dry	Dry	Dry	Dry	Wet		



**Table A19.3.** Sasco Brook average water temperature, dissolved oxygen, and conductivity for each site

	<b>Water Temp (°C)</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>Conductivity (µS)</b>
Sasco 9	19.5	7.9	209
Sasco 8	19.0	8.8	232
Sasco 7	19.0	8.5	241
Sasco 6	19.2	8.8	228
Sasco 3	19.9	7.0	593
Sasco 2	21.8	6.4	15450
Sasco 1	21.7	6.7	21981

## Appendix 20: Saugatuck River

**Table A20.1.** GPS coordinates and site locations for Saugatuck River

Site Name	Latitude	Longitude	Site location notes	Town
West Saug 6	41.25730	-73.41533	86 Old Farm Road	Weston
West Saug 5	41.24954	-73.41377	20 Indian Valley Road	Weston
West Saug 4	41.22465	-73.38366	3 Michaels Way	Weston
West Saug 3	41.21162	-73.38800	Georgetown Road and Old Mill Road	Weston
West Saug 2	41.19480	-73.38763	23 Stonebridge Road	Wilton
West Saug 1	41.17809	-73.37404	21 Cavalry Road	Weston
Saugatuck 7	41.29439	-73.39480	Route 53 and Route 107 intersection	Redding
Saugatuck 6	41.24343	-73.34785	153 Valley Forge Road	Weston
Saugatuck 5	41.22469	-73.34670	18 Davis Hill Road	Weston
Saugatuck 4	41.20722	-73.35043	1 Cartbridge Road	Weston
Saugatuck 3	41.18830	-73.36441	27 River Road	Weston
Saugatuck 2	41.17553	-73.36193	Weston Road	Westport
Saugatuck 1	41.16748	-73.36647	Clinton Avenue	Westport
Saugatuck 0.75	41.14719	-73.36469	Kings Highway North	Westport
Saugatuck 0.5	41.14098	-73.36312	State Street East	Westport
Saugatuck 0.25	41.12274	-73.36912	Bridge Street	Westport

**Table A20.2.** Saugatuck River *E. coli* concentrations and relation to CT DEEP water quality criteria (Rainfall data: P. DiPietro, Personal communication, October 22, 2018)

	5/9	5/31	6/6	6/20	7/19	8/1	8/8	8/21	9/13	9/25	Geomean	SSM
West Saug 6	68	8	44	216	560	72	100	72	368	> 1000	119	10%
West Saug 5	18	35	72	268	210	340	66	66	320	> 1000	128	10%
West Saug 4	48	n/a	n/a	n/a	260	98	82	172	960	840	202	29%
West Saug 3	11	23	22	26	72	172	est. 28	19	264	> 1000	55	10%
West Saug 2	55	62	60	132	130	124	60	45	216	> 1000	110	10%
West Saug 1	30	80	60	90	270	108	72	28	240	> 1000	106	10%
Saugatuck 7	33	44	74	160	96	62	50	55	152	> 1000	92	10%
Saugatuck 6	2	0	1	2	8	11	22	2	7	264	6	0%
Saugatuck 5	12	27	39	56	168	28	90	5	> 400	480	56	0%
Saugatuck 4	19	29	38	78	210	100	86	10	> 400	290	71	0%
Saugatuck 3	13	60	62	68	120	76	64	25	> 400	700	82	10%
Saugatuck 2	32	80	126	76	230	68	60	36	740	est. 180	101	10%
Saugatuck 1	31	188	98	176	440	70	92	36	1160	550	152	10%
Saugatuck 0.75	29	74	108	232	200	90	82	44	1460	est. 60	112	10%
Saugatuck 0.5	88	48	> 400	> 400	220	150	est. 260	250	1500	260	237	10%
Saugatuck 0.25	49	n/a	196	128	220	160	232	est. 280	1520	340	225	11%
Weather	Dry	Dry	Wet	Wet	Wet	Wet	Dry	Dry	Wet	Wet		

**Table A20.3.** Saugatuck River average water temperature, dissolved oxygen, and conductivity for each site

	Water Temp (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS)
West Saug 6	17.5	9.1	330
West Saug 5	17.6	9.1	198
West Saug 4	20.3	8.2	397
West Saug 3	20.3	7.6	183
West Saug 2	19.7	8.5	221
West Saug 1	19.3	8.8	222
Saugatuck 7	19.5	8.5	278
Saugatuck 6	13.2	11.0	222
Saugatuck 5	16.2	9.0	207
Saugatuck 4	17.0	8.8	208
Saugatuck 3	18.2	9.1	212
Saugatuck 2	18.2	8.7	205
Saugatuck 1	19.0	7.7	418
Saugatuck 0.75	20.9	6.5	8867
Saugatuck 0.5	21.3	5.4	20552
Saugatuck 0.25	21.2	6.5	24577

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