



# Trout Brook

## Watershed Summary

### WATERSHED DESCRIPTION AND MAPS

The Trout Brook watershed covers an area of approximately 11,357 acres in central Connecticut (Figure 1). There are multiple towns located at least partially in the watershed, including the municipalities of West Hartford, Farmington, and Avon, CT.

The Trout Brook watershed includes three segments impaired for recreation due to elevated bacteria levels. These segments were assessed by Connecticut Department of Energy and Environmental Protection (CT DEEP) and included in the CT 2010 303(d) list of impaired waterbodies. An excerpt of the Integrated Water Quality Report is included in Table 1 to show the status of waterbodies in the watershed (CT DEEP, 2010).

Trout Brook (Segment 3) (CT4403-00\_03) is 5.95 miles long and begins at the outlet to Woodbridge Lake in West Hartford, continues northeast to cross Route 4, turns south to cross Farmington Avenue, and ends at the Park Road crossing just downstream of the Boulevard Road crossing in West Hartford. Trout Brook (Segment 2) (CT4403-00\_02) is 0.88 miles long completely within a concrete channel and begins at the Park Road crossing in West Hartford, and ends at the upstream side of Interstate 84 near Exit 42. Trout Brook (Segment 1) (CT4403-00\_01) is 1.07 miles long and begins at the upstream side of Interstate 84 near Exit 42 and ends at the confluence with Piper Brook above South Branch Park River just downstream of the railroad crossing near New Britain Avenue in West Hartford. These segments have been altered by human activities, including rerouting and channelization prior to 1985, and current maps may not reflect the true routing of these urban streams.

The impaired segments of Trout Brook have a water quality classification of A. Designated uses include potential drinking water supply, habitat for fish and other aquatic life and wildlife, recreation, and industrial and agricultural water supply. These segments of the river are impaired due to elevated bacteria concentrations, affecting the designated use of recreation. As there are no designated beaches in these segments of Trout Brook, the specific recreation impairment is for non-designated swimming and other water contact related activities.

### Impaired Segment Facts

#### **Impaired Segments:**

1. Trout Brook (Segment 1) (CT4403-00\_01)
2. Trout Brook (Segment 2) (CT4403-00\_02)
3. Trout Brook (Segment 3) (CT4403-00\_03)

**Municipality:** West Hartford

#### **Impaired Segment Length (miles):**

4403-00\_01 (1.07); 4403-00\_02 (0.88); 4403-00\_03 (5.95)

#### **Water Quality Classification:**

Class A

#### **Designated Use Impairment:**

Recreation

#### **Sub-regional Basin Name and Code:**

Trout Brook, 4403

**Regional Basin:** Connecticut

**Major Basin:** Park

**Watershed Area (acres):** 11,357

**MS4 Applicable?** Yes

**Applicable Season:** Recreation

Season (May 1 to September 30)

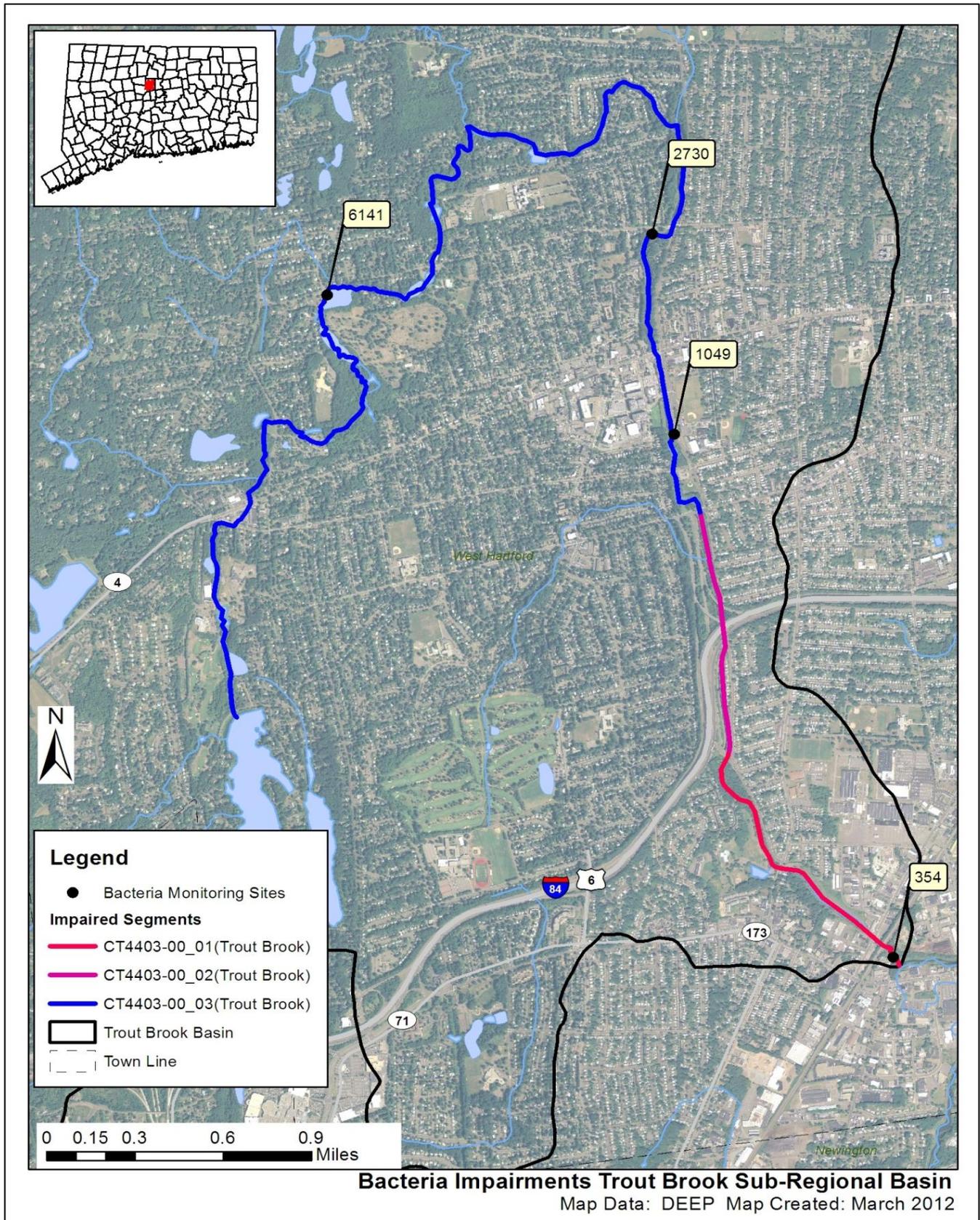
**Figure 1: Watershed location in Connecticut**



**Table 1: Impaired segments and nearby waterbodies from the Connecticut 2010 Integrated Water Quality Report**

<b>Waterbody ID</b>	<b>Waterbody Name</b>	<b>Location</b>	<b>Miles</b>	<b>Aquatic Life</b>	<b>Recreation</b>	<b>Fish Consumption</b>
CT4403-00_01	Trout Brook	From mouth at confluence with Piper Brook, above South Branch Park River (just downstream of railroad crossing, near New Britain Avenue), West Hartford, upstream under Route 84 exit 42 (Trout Brook Drive) ramp.	1.07	NOT	NOT	FULL
CT4403-00_02	Trout Brook	From upstream side of Route 84 Exit 42 (Trout Brook) ramp, West Hartford, upstream to Park Road crossing (entire segment flows through concrete channel).	0.88	NOT	NOT	FULL
CT4403-00_03	Trout Brook	From Park Road crossing (just downstream of Boulevard Road crossing), upstream to Woodbridge Lake outlet dam, West Hartford.	5.95	NOT	NOT	FULL
<p><b>Shaded cells indicate impaired segment addressed in this TMDL</b></p> <p><b>FULL = Designated Use Fully Supported</b></p> <p><b>NOT = Designated Use Not Supported</b></p> <p><b>U = Unassessed</b></p>						

Figure 2: GIS map featuring general information of the Trout Brook watershed at the sub-regional level



**Land Use**

Existing land use can affect the water quality of waterbodies within a watershed (USEPA, 2011c). Natural processes, such as soil infiltration of stormwater and plant uptake of water and nutrients, can occur in undeveloped portions of the watershed. As impervious surfaces (such as rooftops, roads, and sidewalks) increase within the watershed landscape from commercial, residential, and industrial development, the amount of stormwater runoff to waterbodies also increases. These waterbodies are negatively affected as increased pollutants from failing and insufficient septic systems, oil and grease from automobiles, and sediment from construction activities become entrained in this runoff. Agricultural land use activities, such as fertilizer application and manure from livestock, can also increase pollutants in nearby waterbodies (USEPA, 2011c).

As shown in Figures 3 and 4, the Trout Brook watershed consists of 63% urban area, 31% forest, 4% water, and 2% agriculture. Trout Brook (Segment 3) begins at Woodridge Lake surrounded by dense residential development and two golf courses (Buena Vista Recreational Complex and Rockledge Golf Club). Segment 3 cuts through some forested areas, including Spice Bush Swamp and Mooney’s Woods, and flows near commercial and recreational areas along Farmington Avenue (Route 4), including Fairview Cemetery, Fernridge Park, and American School for the Deaf. Segment 3 turns south following Trout Brook Drive where channelization is evident with exposed banking near residential development. Segment 3 flows into an underground conduit at the Farmington Avenue and Trout Brook Drive intersection, reappears at the Memorial Road crossing, and passes near Norfeldt Little League Field. Trout Brook (Segment 2) is located completely within a concrete channel beginning at the Park Road crossing, follows Trout Brook Drive south through dense residential development, and crosses under Interstate 84. Trout Brook (Segment 1) begins in a buffered wooded area near Interstate 84, flows south through residential development near Beechland Park with large recreational fields, and passes major commercial development along New Britain Avenue and New Park Avenue in West Hartford.

**Figure 3: Land use within the Trout Brook watershed**

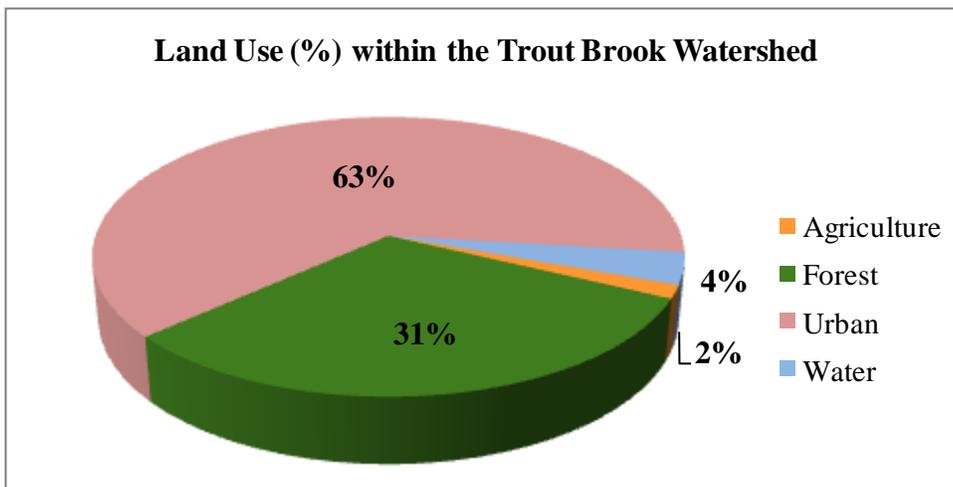
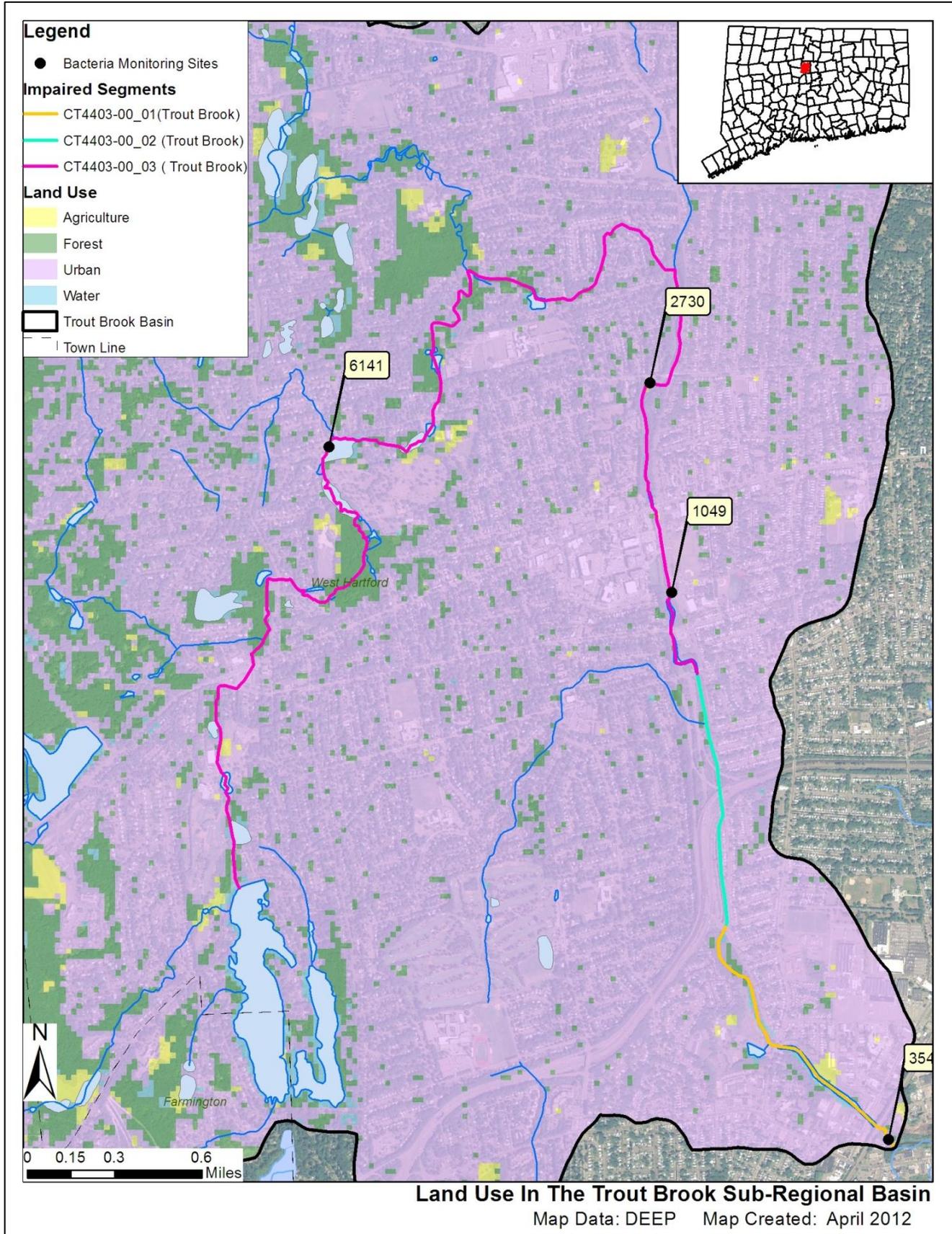


Figure 4: GIS map featuring land use for the Trout Brook watershed at the sub-regional level



### WHY IS A TMDL NEEDED?

*E. coli* is the indicator bacteria used for comparison with the CT State criteria in the CT Water Quality Standards (WQS) (CTDEEP, 2011). All data results are from CT DEEP, USGS, Bureau of Aquaculture, or volunteer monitoring efforts at stations located on the impaired segments.

**Table 2: Sampling station location description for the impaired segments in the Trout Brook watershed (stations organized downstream to upstream)**

Waterbody ID	Waterbody Name	Station	Station Description	Municipality	Latitude	Longitude
CT4403-00_01	Trout Brook	354	Upstream of New Britain Avenue	West Hartford	41.7313528889	-72.72306633
CT4403-00_03	Trout Brook	1049	Under Boulevard at Norfeldt Park	West Hartford	41.7586111111	-72.73750000
		2730	Downstream of Fern Street adjacent to Trout Brook Drive	West Hartford	41.7690600000	-72.73893000
		6141	Near Willow Brook Lane before Fern Street crossing	West Hartford	41.7658800000	-72.76033000

The impaired segments of Trout Brook are Class A freshwater rivers (Figure 5). Their applicable designated uses are potential drinking water supply, habitat for fish and other aquatic life and wildlife, recreation, and industrial and agricultural water supply. Water quality analyses were conducted using data from one sampling location (Station 354) from 2008-2010 on Trout Brook (Segment 1) (CT4403-00\_01), and from three sampling locations (Stations 1049, 2730, and 6141) from 2008-2010 on Trout Brook (Segment 3) (CT4403-00\_03) (Table 2). Percent reductions from the nearest station (Station 1049) upstream of Trout Brook (Segment 2) were applied since bacteria data is currently not available for this impaired segment. To aid in identifying possible bacteria sources, the geometric mean was also calculated for each station for wet-weather and dry-weather sampling days, where appropriate (Tables 10, 11 and 12).

Trout Brook (Segment 1) (CT4403-00\_01): As shown in Table 10, geometric mean values exceeded the WQS for *E. coli* at Station 354 for all sampling years. Single sample values also exceeded the WQS for *E. coli* multiple times at Station 354 for all sampling years. Geometric mean values were calculated for wet and dry-weather conditions, and Station 354 exceeded the WQS for *E. coli* during both wet and dry-weather. Wet-weather values were more than three times dry-weather values.

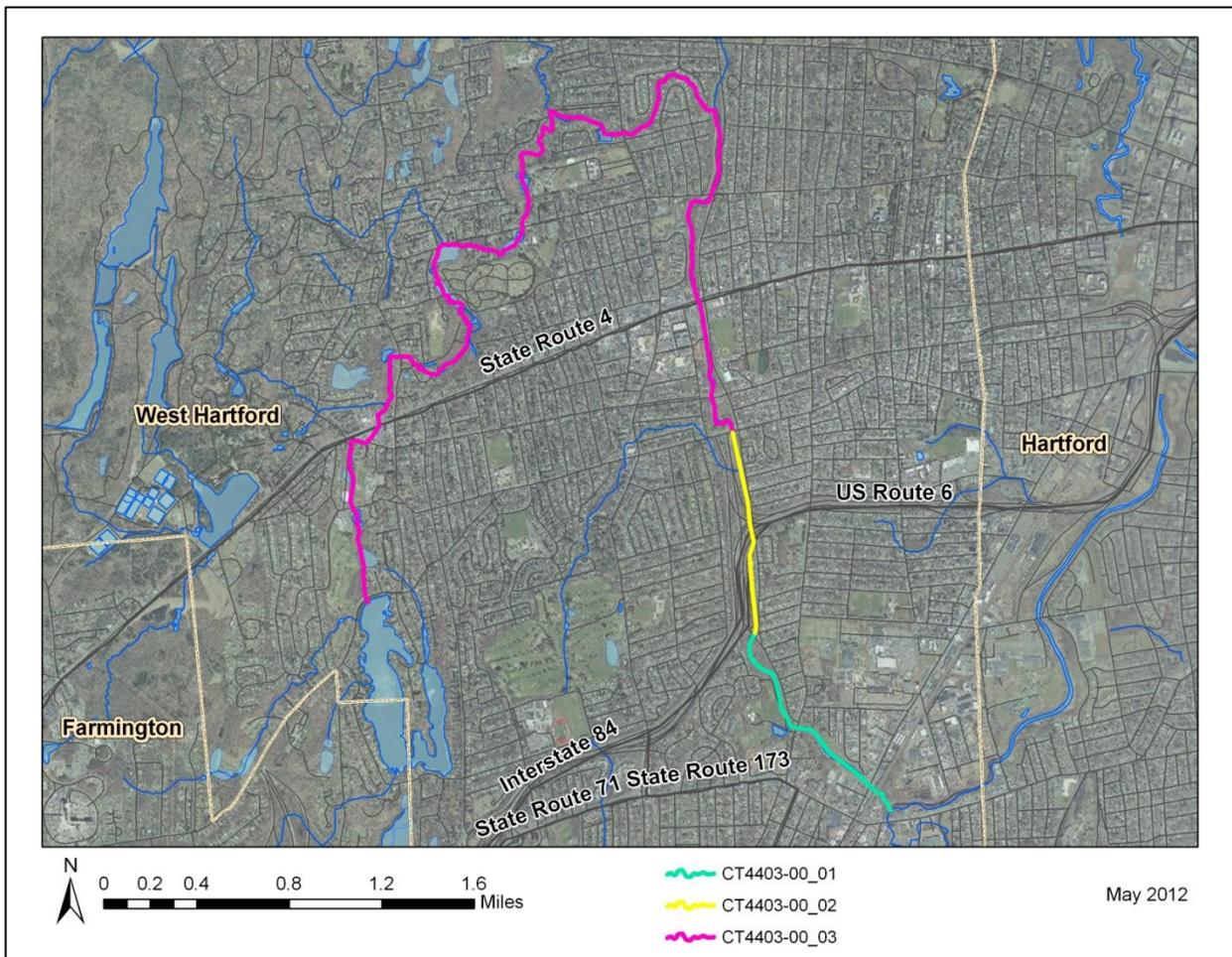
Trout Brook (Segment 2) (CT4403-00\_02): Percent reductions for this segment were based on the nearest upstream station (Station 1049) on Trout Brook (Segment 3). Station 1049 exceeded the WQS for *E. coli* for geometric mean and single sample values during all sampling years. Geometric mean values also exceeded the WQS for *E. coli* during both wet and dry-weather (Table 11).

Trout Brook (Segment 3) (CT4403-00\_03): As shown in Table 12, geometric mean and single sample values exceeded the WQS for *E. coli* at Stations 1049 and 6141 for all sampling years. Geometric mean values were also calculated for wet and dry-weather conditions, and Station 1049 exceeded the WQS for *E. coli* during both wet and dry-weather and Station 6141 exceeded the WQS for *E. coli* during dry-

weather only. Wet-weather values were more than three times greater than dry-weather values for Station 1049.

Due to the elevated bacteria measurements presented in Tables 10, 11 and 12, these segments of Trout Brook did not meet CT's bacteria WQS, were identified as impaired, and were placed on the CT List of Waterbodies Not Meeting Water Quality Standards, also known as the CT 303(d) Impaired Waters List. 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 WQS.

Figure 5: Aerial map of the impaired segments of Trout Brook



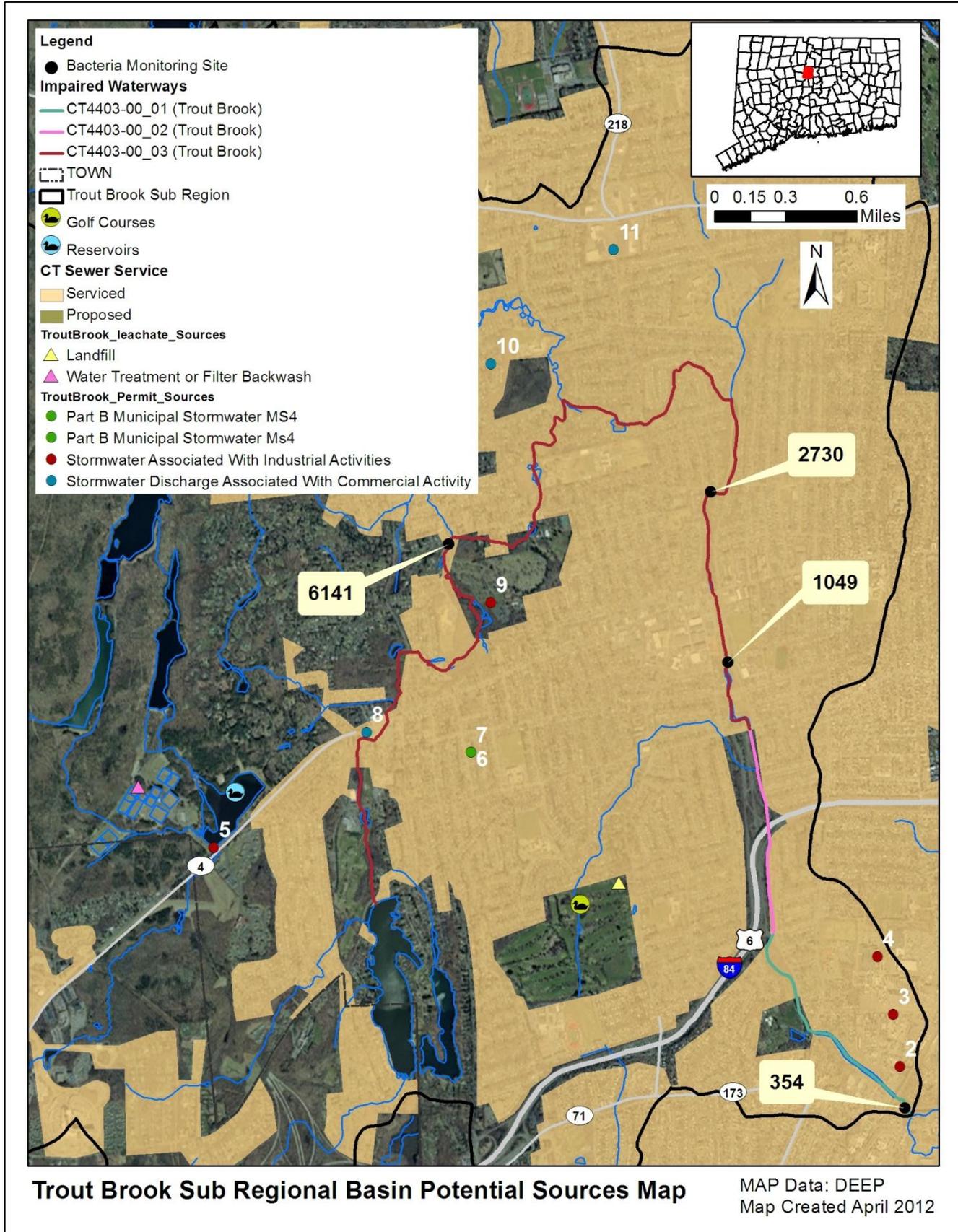
**POTENTIAL BACTERIA SOURCES**

Potential sources of indicator bacteria in a watershed include point and non-point sources, such as stormwater runoff, agriculture, sanitary sewer overflows (collection system failures), illicit discharges, and inappropriate discharges to the waterbody. Potential sources that have been tentatively identified in the Trout Brook watershed based on land use (Figures 3 and 4) and a collection of local information for the impaired waterbody are presented in Table 3 and Figure 6. However, the list of potential sources is general in nature and should not be considered comprehensive. There may be other sources not listed here that contribute to the observed water quality impairment in the study segment. Further monitoring and investigation will confirm listed sources and discover additional ones. For some segments, there are data from permitted sources, and CT DEEP recommends that any elevated concentrations found from those permitted sources be addressed through voluntary reduction measures. More detailed evaluation of potential sources is expected to become available as activities are conducted to implement these TMDLs.

**Table 3: Potential bacteria sources in the Trout Brook watershed**

<b>Impaired Segment</b>	<b>Permit Source</b>	<b>Illicit Discharge</b>	<b>CSO/SSO Issue</b>	<b>Failing Septic System</b>	<b>Agricultural Activity</b>	<b>Stormwater Runoff</b>	<b>Nuisance Wildlife/ Pets</b>	<b>Other</b>
Trout Brook CT4403-00_01	x	x		x		x	x	
Trout Brook CT4403-00_02		x		x		x	x	
Trout Brook CT4403-00_03	x	x		x		x	x	

Figure 6: Potential sources in the Trout Brook watershed at the sub-regional level



The potential sources map for the impaired basin was developed after thorough analysis of available data sets. If information is not displayed in the map, then no sources were discovered during the analysis. The following is the list of potential sources that were evaluated: problems with migratory waterfowl, golf course locations, reservoirs, proposed and existing sewer service, cattle farms, poultry farms, permitted sources of bacteria loading (surface water discharge, MS4 permit, industrial stormwater, commercial stormwater, groundwater permits, and construction related stormwater), and leachate and discharge sources (agricultural waste, CSOs, failing septic systems, landfills, large septic tank leach fields, septage lagoons, sewage treatment plants, and water treatment or filter backwash).

**Point Sources**

Permitted sources within the watershed that could potentially contribute to the bacteria loading are identified in Table 4. This table includes permit types that may or may not be present in the impaired watershed. A list of active permits in the watershed is included in Table 5. Additional investigation and monitoring could reveal the presence of additional discharges in the watershed. Available effluent data from each of these permitted categories found within the watershed are compared to the CT State WQS for the appropriate receiving waterbody use and type. When available, bacteria data results from these permitted sources are listed in Table 6.

**Table 4: General categories list of other permitted discharges**

Permit Code	Permit Description Type	Number in watershed
CT	Surface Water Discharges	0
GPL	Discharge of Swimming Pool Wastewater	0
GSC	Stormwater Discharge Associated with Commercial Activity	3
GSI	Stormwater Associated with Industrial Activity	6
GSM	Part B Municipal Stormwater MS4	1
GSN	Stormwater Registration – Construction	0
LF	Groundwater Permit (Landfill)	0
UI	Underground Injection	0

***Permitted Sources***

As shown in Table 5, there are multiple permitted discharges in the Trout Brook watershed. Bacteria data from 2001-2003 from several of these industrial permitted facilities are included in Table 6. Although Connecticut does not have a recreation WQS for fecal coliform bacteria, multiple samples were high, exceeding 2,000 colonies/100 mL, including Colt’s Manufacturing Company (GSI000546) and West Hartford Transfer Station (GSI000978). Permitted sources discharging directly to the impaired segments are a potential source of bacterial contamination to Trout Brook.

Since the MS4 permits are not targeted to a specific location, but the geographic area of the regulated municipality, there is no one accurate location on the map to display the location of these permits. One dot will be displayed at the geographic center of the municipality as a reference point. Sometimes this location falls outside of the targeted watershed and therefore the MS4 permit will not be displayed in the Potential Sources Map. Using the municipal border as a guideline will show which areas of an affected watershed are covered by an MS4 permit.

Table 5: Permitted facilities within the Trout Brook watershed

Town	Client	Permit ID	Permit Type	Site Name	Address	Map #
Farmington	CT DOT	GSI000022	Stormwater Associated With Industrial Activities	Farmington Maintenance Facility	139 South Road	1
West Hartford	The Stop & Shop Supermarket Company, LLC	GSC000101	Stormwater Discharge Associated With Commercial Activity	Stop & Shop Store #681	1245 Farmington Avenue	8
West Hartford	Edens & Avant Realty, Inc.	GSC000258	Stormwater Discharge Associated With Commercial Activity	Bishop's Corner Plaza	333 N Main Street	11
West Hartford	Edens & Avant Realty, Inc.	GSC000296	Stormwater Discharge Associated With Commercial Activity	Crossroads Plaza	714-774 North Main Street	10
West Hartford	Har-Conn Chrome Company, Inc.	GSI000356	Stormwater Associated With Industrial Activities	Har-Conn Chrome Company, Inc.	603 New Park Avenue	2
West Hartford	Goodrich Engine Control Systems	GSI000391	Stormwater Associated With Industrial Activities	Goodrich Pump & Engine Control Systems	1 Charter Oak Boulevard	4
West Hartford	Town Of West Hartford	GSI000978	Stormwater Associated With Industrial Activities	Transfer Station	17 Brixton Road	9
West Hartford	Aiudi Connecticut, LLC	GSI001227	Stormwater Associated With Industrial Activities	Aiudi Connecticut, LLC	69 Talcott Road	3
West Hartford	The Metropolitan District	GSI001693	Stormwater Associated With Industrial Activities	West Hartford WPCF	1420 Farmington Avenue	5
West Hartford	Town Of West Hartford	200902787	Part B Municipal Stormwater MS4	West Hartford, Town Of	MS4 Permit	6
West Hartford	Town Of West Hartford	GSM000001	Part B Municipal Stormwater MS4	West Hartford, Town Of	MS4 Permit	7

**Table 6: Industrial permits in the Trout Brook watershed and available fecal coliform data (colonies/100mL). The results cannot be compared to the water quality standard as there is no recreation standard for fecal coliform.**

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
West Hartford	Har-Conn Chrome Company, Inc.	GSI000356	Trout Brook	DSN 001	09/14/01	96
West Hartford	Har-Conn Chrome Company, Inc.	GSI000356	Trout Brook	DSN 001	06/05/02	0
West Hartford	Har-Conn Chrome Company, Inc.	GSI000356	Trout Brook	DSN 001	06/18/03	0
West Hartford	Har-Conn Chrome Company, Inc.	GSI000356	Trout Brook	DSN 002	09/14/01	64
West Hartford	Har-Conn Chrome Company, Inc.	GSI000356	Trout Brook	DSN 002	06/05/02	0
West Hartford	Har-Conn Chrome Company, Inc.	GSI000356	Trout Brook	DSN 002	06/18/03	3
West Hartford	Goodrich Pump & Engine Control Systems	GSI000391	Trout Brook	36" outfall	05/22/01	100
West Hartford	Goodrich Pump & Engine Control Systems	GSI000391	Trout Brook	36" outfall	06/05/02	700
West Hartford	Goodrich Pump & Engine Control Systems	GSI000391	Trout Brook	36" outfall	05/01/03	100
West Hartford	Colt's Manufacturing	GSI000546	Trout Brook	MH #23	09/20/01	100
West Hartford	Colt's Manufacturing	GSI000546	Trout Brook	MH #23	06/05/02	100
West Hartford	Colt's Manufacturing	GSI000546	Trout Brook	MH #23	05/01/03	100
West Hartford	Colt's Manufacturing	GSI000546	Trout Brook	MH #24	09/20/01	800
West Hartford	Colt's Manufacturing	GSI000546	Trout Brook	MH #24	06/05/02	1,300
West Hartford	Colt's Manufacturing	GSI000546	Trout Brook	MH #24	05/01/03	100
West Hartford	Colt's Manufacturing	GSI000546	Trout Brook	MH #28	09/20/01	10,600
West Hartford	Colt's Manufacturing	GSI000546	Trout Brook	MH #28	06/05/02	1,100
West Hartford	Colt's Manufacturing	GSI000546	Trout Brook	MH #28	05/01/03	100
West Hartford	Transfer Station	GSI000978	Trout Brook	Outfall 001	09/04/01	700
West Hartford	Transfer Station	GSI000978	Trout Brook	Outfall 001	09/26/02	2,250
West Hartford	Transfer Station	GSI000978	Trout Brook	Outfall 002	09/04/01	4,000
West Hartford	Transfer Station	GSI000978	Trout Brook	Outfall 002	09/26/02	2,500
West Hartford	Aiudi Connecticut, LLC	GSI001227	Trout Brook	S end retention basin	02/04/03	100

*Municipal Stormwater Permitted Sources*

Per the EPA Phase II Stormwater rule all municipal storm sewer systems (MS4s) operators located within US Census Bureau Urbanized Areas (UAs) must be covered under MS4 permits regulated by the appropriate State agency. There is an EPA waiver process that municipalities can apply for to not participate in the MS4 program. In Connecticut, EPA has granted such waivers to 19 municipalities. All participating municipalities within UAs in Connecticut are currently regulated under MS4 permits by CT DEEP staff in the MS4 program.

The US Census Bureau defines a UA as a densely settled area that has a census population of at least 50,000. A UA generally consists of a geographic core of block groups or blocks that exceeds the 50,000 people threshold and has a population density of at least 1,000 people per square mile. The UA will also include adjacent block groups and blocks with at least 500 people per square mile. A UA consists of all or part of one or more incorporated places and/or census designated places, and may include additional territory outside of any place. (67 FR 11663)

For the 2000 Census a new geographic entity was created to supplement the UA blocks of land. This created a block known as an Urban Cluster (UC) and is slightly different than the UA. The definition of a UC is a densely settled area that has a census population of 2,500 to 49,999. A UC generally consists of a geographic core of block groups or blocks that have a population density of at least 1,000 people per square mile, and adjacent block groups and blocks with at least 500 people per square mile. A UC consists of all or part of one or more incorporated places and/or census designated places; such a place(s) together with adjacent territory; or territory outside of any place. The major difference is the total population cap of 49,999 people for a UC compared to >50,000 people for a UA. (67 FR 11663)

While it is possible that CT DEEP will be expanding the reach of the MS4 program to include UC municipalities in the near future they are not currently under the permit. However, the GIS layers used to create the MS4 maps in this Statewide TMDL did include both UA and UC blocks. This factor creates some municipalities that appear to be within an MS4 program that are not currently regulated through an MS4 permit. This oversight can explain a municipality that is at least partially shaded grey in the maps and there are no active MS4 reporting materials or information included in the appropriate appendix. While these areas are not technically in the MS4 permit program, they are still considered urban by the cluster definition above and are likely to contribute similar stormwater discharges to affected waterbodies covered in this TMDL.

As previously noted, EPA can grant a waiver to a municipality to preclude their inclusion in the MS4 permit program. One reason a waiver could be granted is a municipality with a total population less than 1000 people, even if the municipality was located in a UA. There are 19 municipalities in Connecticut that have received waivers, this list is: Andover, Bozrah, Canterbury, Coventry, East Hampton, Franklin, Haddam, Killingworth, Litchfield, Lyme, New Hartford, Plainfield, Preston, Salem, Sherman, Sprague, Stafford, Washington, and Woodstock. There will be no MS4 reporting documents from these towns even if they are displayed in an MS4 area in the maps of this document.

The list of US Census UCs is defined by geographic regions and is named for those regions, not necessarily by following municipal borders. In Connecticut the list of UCs includes blocks in the following Census Bureau regions: Colchester, Danielson, Lake Pocotopaug, Plainfield, Stafford, Storrs, Torrington, Willimantic, Winsted, and the border area with Westerly, RI (67 FR 11663). Any MS4 maps showing these municipalities may show grey areas that are not currently regulated by the CT DEEP MS4 permit program.

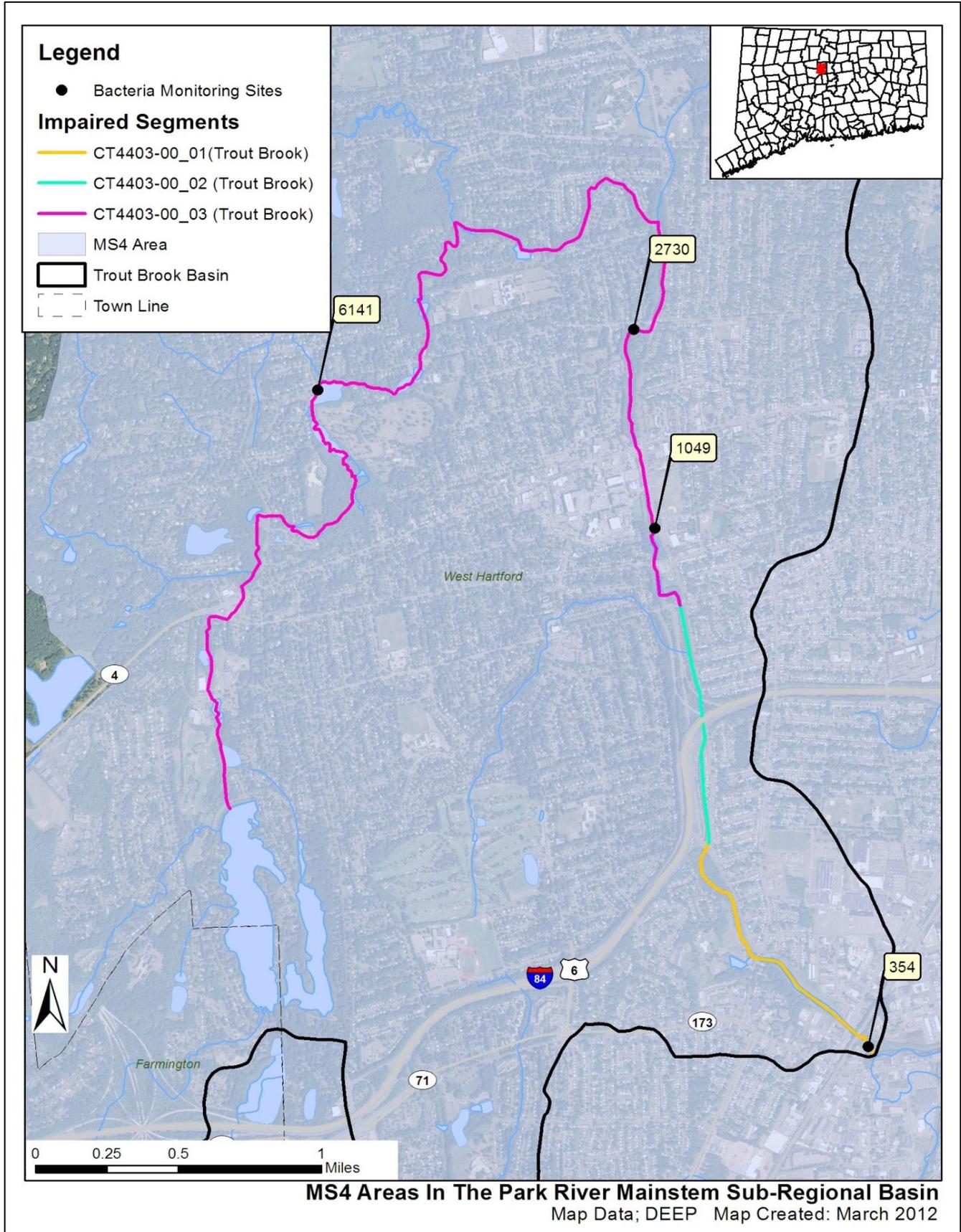
The impaired segments of the Trout Brook watershed are located within the Town of West Hartford. This town has designated urban areas, as defined by the U.S. Census Bureau, and is required to comply with the General Permit for the Discharge of Stormwater from Small Municipal Storm Sewer Systems (MS4 permit) issued by the Connecticut Department of Energy and Environmental Protection (DEEP) (Figure 7). This general permit is only applicable to municipalities that are identified in Appendix A of the MS4 permit that contain designated urban areas and discharge stormwater via a separate storm sewer system to surface waters of the State. The permit required municipalities to develop a Stormwater Management Plan (SMP) to reduce the discharge of pollutants as well as to protect water quality. The MS4 permit is discussed further in the “TMDL Implementation Guidance” section of the core TMDL document. Additional information regarding stormwater management and the MS4 permit can be obtained on CTDEEP’s website ([http://www.ct.gov/dep/cwp/view.asp?a=2721&q=325702&depNav\\_GID=1654](http://www.ct.gov/dep/cwp/view.asp?a=2721&q=325702&depNav_GID=1654)).

Multiple MS4 outfalls have been sampled for *E. coli* bacteria in the watershed (Table 7). In West Hartford, six MS4 outfalls were sampled from 2005 – 2009. Of these outfalls, all exceeded the single sample water quality standard of 410 colonies/100 mL on at least one sample date.

**Table 7: List of MS4 sample locations and *E. coli* (colonies/100 mL) results in the Trout Brook**

Town	Location	MS4 Type	Receiving Waters	Sample Date	Result
West Hartford	Outfall #1 Oakwood Avenue	Industrial	Trout Brook	10/22/05	500
West Hartford	Outfall #1 Oakwood Avenue	Industrial	Trout Brook	09/14/06	>2,000
West Hartford	Outfall #1 Oakwood Avenue	Industrial	Trout Brook	10/24/07	2,000
West Hartford	Outfall #1 Oakwood Avenue	Industrial	Trout Brook	07/21/09	310
West Hartford	Outfall #2 New Britain Avenue at South Street	Industrial	Trout Brook	10/22/05	2,050
West Hartford	Outfall #2 New Britain Avenue at South Street	Industrial	Trout Brook	09/14/06	>2,000
West Hartford	Outfall #2 New Britain Avenue at South Street	Industrial	Trout Brook	10/24/07	2,000
West Hartford	Outfall #2 New Britain Avenue at South Street	Industrial	Trout Brook	09/12/08	1,000
West Hartford	Outfall #2 New Britain Avenue at South Street	Industrial	Trout Brook	07/21/09	170
West Hartford	Outfall #3 Ballard Drive	Residential	Trout Brook	10/22/05	3,200
West Hartford	Outfall #3 Ballard Drive	Residential	Trout Brook	09/14/06	>2,000
West Hartford	Outfall #3 Ballard Drive	Residential	Trout Brook	10/24/07	2,000
West Hartford	Outfall #3 Ballard Drive	Residential	Trout Brook	09/12/08	1,000
West Hartford	Outfall #3 Ballard Drive	Residential	Trout Brook	07/21/09	350
West Hartford	Outfall #4 Fern Street	Residential	Trout Brook	10/22/05	100
West Hartford	Outfall #4 Fern Street	Residential	Trout Brook	09/14/06	>2,000
West Hartford	Outfall #4 Fern Street	Residential	Trout Brook	10/24/07	280
West Hartford	Outfall #4 Fern Street	Residential	Trout Brook	09/12/08	260
West Hartford	Outfall #4 Fern Street	Residential	Trout Brook	07/21/09	140
West Hartford	Outfall #5 Red Top Drive at Rockledge Brook	Commercial	Trout Brook	07/21/09	1,150
West Hartford	Outfall #6 Park Road Kennedy Brook	Commercial	Trout Brook	10/22/05	900
<b>Shaded cells indicate an exceedance of single-sample based water quality criteria (410 colonies/100 mL)</b>					

Figure 7: MS4 areas of the Trout Brook watershed



**Non-point Sources**

Non-point source pollution (NPS) comes from many diffuse sources and is more difficult to identify and control. NPS pollution is often associated with land-use practices. Examples of NPS that can contribute bacteria to surface waters include insufficient septic systems, pet and wildlife waste, agriculture, and contact recreation (swimming or wading). Potential sources of NPS within the Trout Brook watershed are described below.

***Stormwater Runoff from Developed Areas***

The majority of the Trout Brook watershed is developed with approximately 63% considered urban. Much of that area is concentrated around the impaired segments in the Town of West Hartford (Figures 4 and 9). Urban areas are often characterized by impervious cover, or surface areas such as roofs and roads that force water to run off land surfaces rather than infiltrate the soil. Studies have shown a link between increasing impervious cover and degrading water quality conditions in a watershed (CWP, 2003). In one study, researchers correlated the amount of fecal coliform to the percent of impervious cover in a watershed (Mallin *et al.*, 2000).

Approximately 74% of the Trout Brook watershed is characterized by greater than 16% impervious cover as the impaired segments flow through dense commercial and residential areas (Figures 8 and 9). Water quality data taken at Station 354 along Trout Brook (Segment 1) and Station 1049 along Trout Brook (Segment 3) were consistently high, especially during wet weather, which suggests that stormwater runoff may be a source of bacteria to Trout Brook (Tables 10-12).

**Figure 8: Range of impervious cover (%) in the Trout Brook watershed**

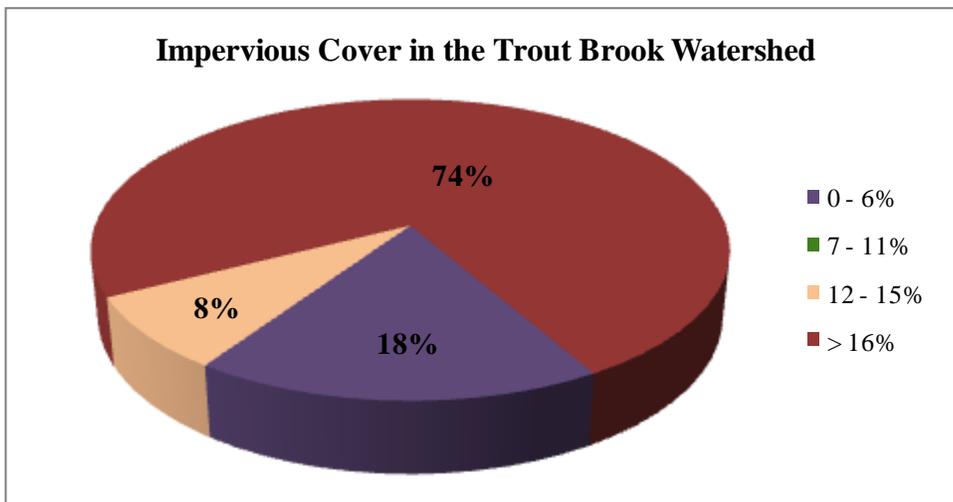
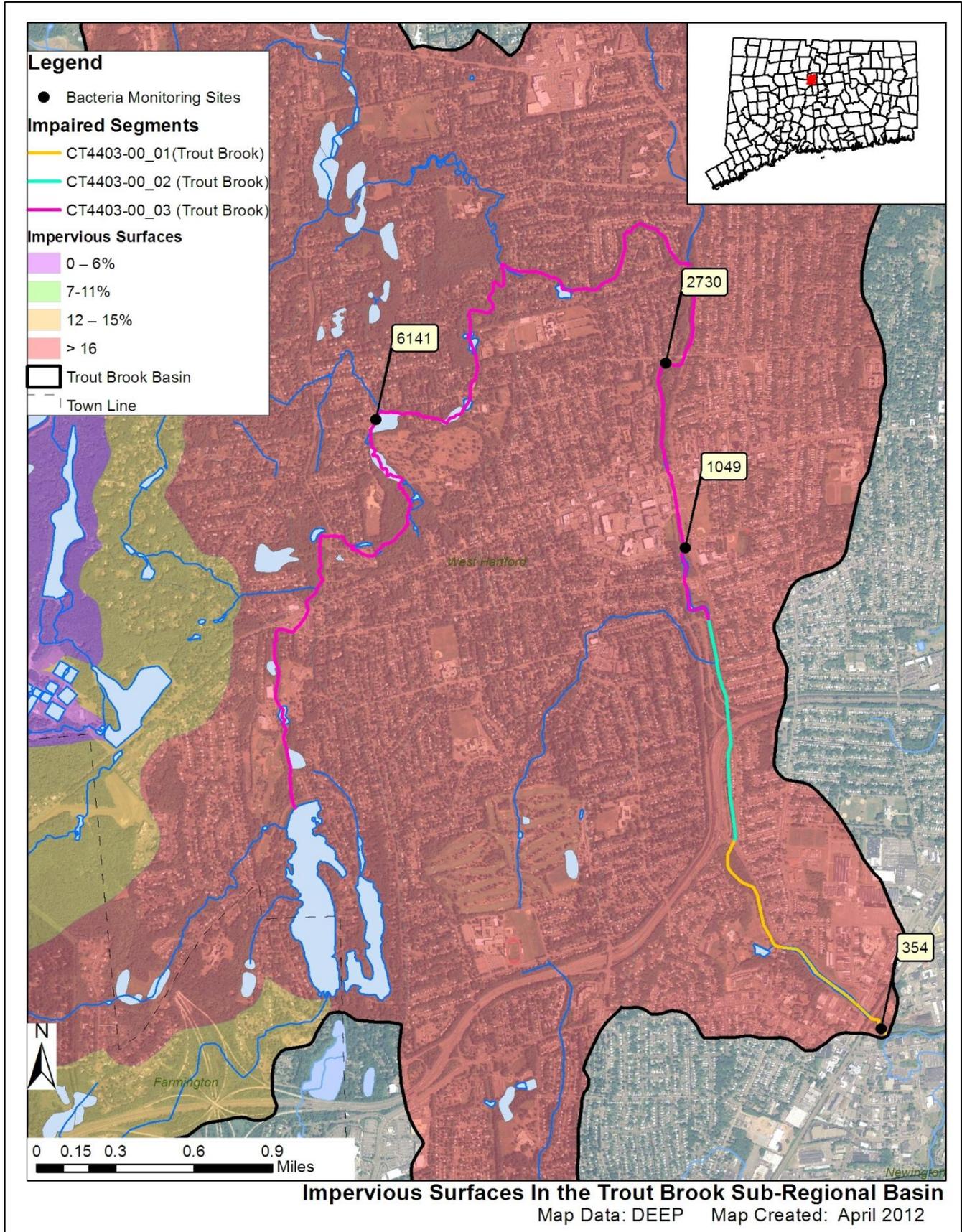


Figure 9: Impervious cover (%) for the Trout Brook sub-regional watershed



### ***Illicit Discharges and Insufficient Septic Systems***

As shown in Figure 6, most of the watershed is serviced by sanitary sewers. Sewer system leaks and other illicit discharges may be contributing bacteria to the impaired segments of Trout Brook. Portions of Trout Brook rely on onsite wastewater treatment systems, such as septic systems. Insufficient or failing septic systems can be significant sources of bacteria by allowing raw waste to reach surface waters. In Connecticut, local health directors or health districts are responsible for keeping track of any reported insufficient or failing septic systems in a specific municipality. The Town of West Hartford is part of the West Hartford-Bloomfield Health District (<http://www.westhartford.org/whcares/TownDepartments/HealthDistrict/Health1.htm>).

As shown in Tables 10-12, geometric mean values during dry-weather exceeded the WQS for *E. coli* at Station 354 along Trout Brook (Segment 1) and Stations 1049 and 6141 along Trout Brook (Segment 3). The area surrounding these stations is serviced by the sanitary sewer system, which may indicate that bacteria from leaky pipes are a source of bacterial contamination to the impaired segments of Trout Brook.

### ***Wildlife and Domestic Animal Waste***

Wildlife and domestic animals within the Trout Brook watershed represent another potential source of bacteria to surface waters. With the construction of roads and drainage systems, these wastes may no longer be retained on the landscape, but instead may be conveyed via stormwater to the nearest surface water. These physical land alterations can exacerbate the impact of natural sources on water quality (USEPA, 2001).

Geese and other waterfowl are known to congregate in open areas including recreational fields, agricultural crop fields, and golf courses. There are several open spaces near the impaired segments, including the Bueno Vista Recreational Complex, the Rockledge Golf Club, Fernridge Park, American School for the Deaf, Norfeldt Little League Field, and Beechland Park. In addition to creating a nuisance, large numbers of geese can also create unsanitary conditions on the grassed areas and cause water quality problems due to bacterial contamination associated with their droppings. Large populations of geese can lead to habitat destruction as a result of overgrazing on wetland and riparian plants

Also, dense residential development surrounds much of the impaired segments of Trout Brook (Figure 4). When not disposed properly, waste from domestic animals such as dogs can enter surface waters either directly or indirectly through stormwater infrastructure. Therefore, pet waste may also be contributing to bacteria concentrations in Trout Brook.

### ***Agricultural Activities***

Agricultural operations are an important economic activity and landscape feature in many areas of the State. Runoff from agricultural fields may contain pollutants such as bacteria and nutrients (USEPA, 2011a). This runoff can include pollutants from farm practices such as storing manure, allowing livestock to wade in nearby waterbodies, applying fertilizer, and reducing the width of vegetated buffer along the shoreline. Agricultural land use makes up only 2% of the Trout Brook watershed. No major agricultural areas were identified as potential sources of bacterial contamination to the impaired segments of Trout Brook.

### **Additional Sources**

As shown in Figure 6, a landfill was identified along the far upstream reaches of a tributary to the impaired segments of Trout Brook. There may be other sources not listed here or identified in Figure 6 that contribute to the observed water quality impairment in Trout Brook. Further monitoring and investigation will confirm the listed sources and discover additional ones. More detailed evaluation of potential sources is expected to become available as activities are conducted to implement this TMDL.

### **Land Use/Landscape**

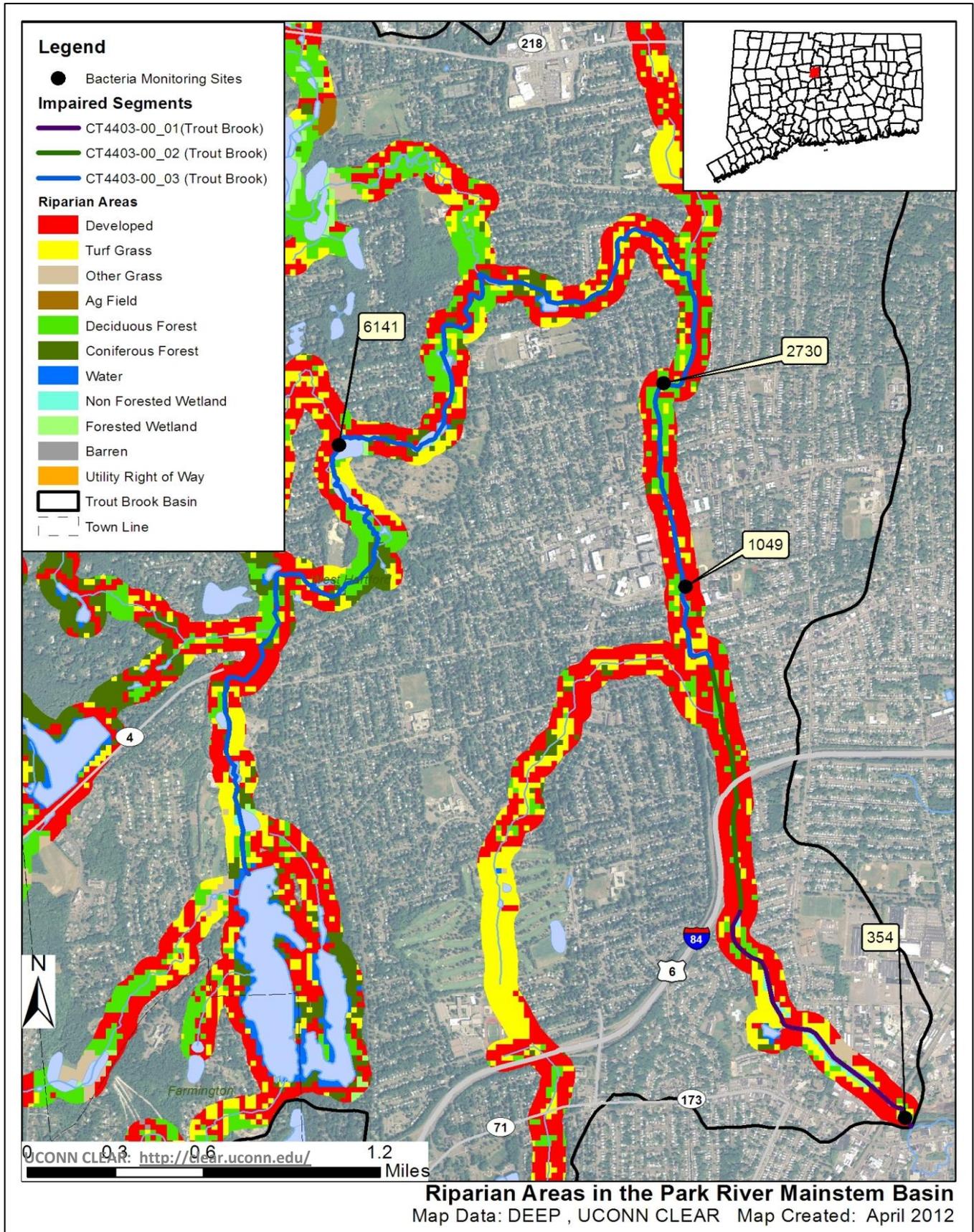
#### ***Riparian Buffer Zones***

The riparian buffer zone is the area of land located immediately adjacent to streams, lakes, or other surface waters. The boundary of the riparian zone and adjoining uplands is gradual and not always well-defined. However, riparian zones differ from uplands because of high levels of soil moisture, frequent flooding, and the unique assemblage of plant and animal communities found there. Through the interaction of their unique soils, hydrology, and vegetation, natural riparian areas influence water quality as contaminants are taken up into plant tissues, adsorbed onto soil particles, or modified by soil organisms. Any change to the natural riparian buffer zone can reduce the effectiveness of the natural buffer and has the potential to contribute to water quality impairment (USEPA, 2011b).

The CLEAR program at UCONN has created streamside buffer layers for the entire State of Connecticut (<http://clear.uconn.edu/>) which have been used in this TMDL. Analyzing this information can reveal potential sources and implementation opportunities at a localized level. Land use directly adjacent to a waterbody can have direct impacts on water quality from surface runoff sources.

The majority of the riparian zone for the impaired segments of Trout Brook is characterized by developed land use with some forested and turf/grass areas (Figure 10). Developed areas within the riparian zone likely contribute pollutants such as bacteria to the waterbody since the natural riparian buffer cannot treat stormwater runoff from impervious surfaces.

Figure 10: Riparian buffer zone information for the Trout Brook watershed



## CURRENT MANAGEMENT ACTIVITIES

As indicated previously, the Town of West Hartford is regulated under the MS4 program. The MS4 General Permit is required for any municipality with urbanized areas that initiates, creates, originates or maintains any discharge of stormwater from a storm sewer system to waters of the State. The MS4 permit requires towns to design a Stormwater Management Plan (SMP) to reduce the discharge of pollutants in stormwater to improve water quality. The plan must address the following 6 minimum measures:

1. Public Education and Outreach.
2. Public Involvement/Participation.
3. Illicit discharge detection and elimination.
4. Construction site stormwater runoff control.
5. Post-construction stormwater management in the new development and redevelopment.
6. Pollution prevention/good housekeeping for municipal operations.

Each municipality is required to submit an annual update outlining the steps they are taking to meet the six minimum measures. All updates that address bacterial contamination in the watershed are summarized in Table 8.

**Table 8: Summary of MS4 requirement updates related to the reduction of bacterial contamination from West Hartford, CT (Permit #GSM000001)**

Minimum Measure	West Hartford 2007 Annual Report
Public Outreach and Education	1) Provided online links to CT DEEP's MS4 outreach materials.
	2) Public awareness bulletins of new large constructions projects delivered with tax bills.
Public Involvement and Participation	1) Held public meetings for new development projects, which included storm water reviews.
Illicit Discharge Detection and Elimination	1) Conducted stormwater outfall sampling at six locations.
Construction Site Stormwater Runoff Control	1) Conducted strict review of new Blue Back Square (West Hartford Center) and housing condo construction projects.
Post Construction Stormwater Management	1) Conducted annual water samplings at the Public Works Department site.
Pollution Prevention and Good Housekeeping	1) Labeled catch basins that drain to watercourses.
	2) Cleaned 2,833 catch basins.
	3) Swept all town roads.

### RECOMMENDED NEXT STEPS

As shown above, the Town of West Hartford has developed and implemented programs to protect water quality from bacterial contamination. Future mitigative activities are necessary to ensure the long-term protection of the impaired segments in Trout Brook and have been prioritized below.

#### **1) Identify areas along Trout Brook to implement Best Management Practices (BMPs) to control stormwater runoff.**

As noted previously, the Town of West Hartford is an MS4 community regulated by the MS4 program. Since 63% of the watershed is considered urban and the area surrounding the impaired segments has an impervious cover greater than 16%, stormwater runoff is likely contributing bacteria to the waterbodies. To identify specific areas that are contributing bacteria to the impaired segments, the town should continue to conduct wet-weather sampling at stormwater outfalls that discharge directly to Trout Brook. To treat stormwater runoff, the town should also identify areas along the more developed sections of Trout Brook, particularly along the impaired segments, to install BMPs that encourage stormwater to infiltrate the ground before entering Trout Brook. These BMPs would disconnect impervious areas and reduce pollutant loads to the river. More detailed information and BMP recommendations can be found in the core TMDL document.

#### **2) Continue monitoring of permitted sources.**

Previous sampling of industrial discharges and MS4 outfalls has shown elevated levels of bacteria, an indicator of bacterial pollution (Tables 6 and 7). Further monitoring will provide information essential to better locate, understand, and reduce pollution sources. If any current monitoring is not done with appropriate bacterial indicator based on the receiving water, then a recommended change during the next permit reissuance is to include the appropriate indicator species. If facility monitoring indicates elevated bacteria, then implementation of permit required, and voluntary measures to identify and reduce sources of bacterial contamination at the facility are an additional recommendation. Regular monitoring should be established for all permitted sources to ensure compliance with permit requirements and to determine if current requirements are adequate or if additional measures are necessary for water quality protection.

Section 6(k) of the MS4 General Permit requires a municipality to modify their Stormwater Management Plan to implement the TMDL within four months of TMDL approval by EPA if stormwater within the municipality contributes pollutant(s) in excess of the allocation established by the TMDL. For discharges to impaired waterbodies, the municipality must assess and modify the six minimum measures of its plan, if necessary, to meet TMDL standards. Particular focus should be placed on the following plan components: public education, illicit discharge detection and elimination, stormwater structures cleaning, and the repair, upgrade, or retrofit of storm sewer structures. The goal of these modifications is to establish a program that improves water quality consistent with TMDL requirements. Modifications to the Stormwater Management Plan in response to TMDL development should be submitted to the Stormwater Program of DEEP for review and approval.

Table 9 details the appropriate bacteria criteria for use as waste load allocations established by this TMDL for use as water quality targets by permittees as permits are renewed and updated, within the Trout Brook Watershed.

For any municipality subject to an MS4 permit and affected by a TMDL, the permit requires a modification of the SMP to include BMPs that address the included impairment. In the case of bacteria related impairments municipal BMPs could include: implementation or improvement to existing nuisance

wildlife programs, septic system monitoring programs, any additional measures that can be added to the required illicit discharge detection and elimination (IDDE) programs, and increased street sweeping above basic permit requirements. Any non-MS4 municipalities can implement these same types of initiatives in effort to reduce bacteria source loading to impaired waterways.

Any facilities that discharge non-MS4 regulated stormwater should update their Pollution Prevention Plan to reflect BMPs that can reduce bacteria loading to the receiving waterway. These BMPs could include nuisance wildlife control programs and any installations that increase surface infiltration to reduce overall stormwater volumes. Facilities that are regulated under the Commercial Activities Stormwater Permit should report any updates to their SMP in their summary documentation submitted to DEEP.

**Table 9. Bacteria (e.coli) TMDLs, WLAs, and LAs for Recreational Use**

Class	Bacteria Source	Instantaneous <i>E. coli</i> (#/100mL)						Geometric Mean <i>E. coli</i> (#/100mL)	
		WLA <sup>6</sup>			LA <sup>6</sup>			WLA <sup>6</sup>	LA <sup>6</sup>
	Recreational Use	1	2	3	1	2	3	All	All
A	Non-Stormwater NPDES	0	0	0				0	
	CSOs	0	0	0				0	
	SSOs	0	0	0				0	
	Illicit sewer connection	0	0	0				0	
	Leaking sewer lines	0	0	0				0	
	Stormwater (MS4s)	235 <sup>7</sup>	410 <sup>7</sup>	576 <sup>7</sup>				126 <sup>7</sup>	
	Stormwater (non-MS4)				235 <sup>7</sup>	410 <sup>7</sup>	576 <sup>7</sup>		126 <sup>7</sup>
	Wildlife direct discharge				235 <sup>7</sup>	410 <sup>7</sup>	576 <sup>7</sup>		126 <sup>7</sup>
	Human or domestic animal direct discharge <sup>5</sup>				235	410	576		126

- (1) **Designated Swimming.** Procedures for monitoring and closure of bathing areas by State and Local Health Authorities are specified in: Guidelines for Monitoring Bathing Waters and Closure Protocol, adopted jointly by the Department of Environmental Protections and the Department of Public Health. May 1989. Revised April 2003 and updated December 2008.
- (2) **Non-Designated Swimming.** Includes areas otherwise suitable for swimming but which have not been designated by State or Local authorities as bathing areas, waters which support tubing, water skiing, or other recreational activities where full body contact is likely.
- (3) **All Other Recreational Uses.**
- (4) Criteria for the protection of recreational uses in Class B waters do not apply when disinfection of sewage treatment plant effluents is not required consistent with Standard 23. (Class B surface waters located north of Interstate Highway I-95 and downstream of a sewage treatment plant providing seasonal disinfection May 1 through October 1, as authorized by the Commissioner.)
- (5) Human direct discharge = swimmers
- (6) Unless otherwise required by statute or regulation, compliance with this TMDL will be based on ambient concentrations and not end-of-pipe bacteria concentrations
- (7) Replace numeric value with "natural levels" if only source is naturally occurring wildlife. Natural is defined as the biological, chemical and physical conditions and communities that occur within the environment which are unaffected or minimally affected by human influences (CT DEEP 2011a). Sections 2.2.2 and 6.2.7 of this Core Document deal with BMPs and delineating type of wildlife inputs.

**3) Implement a program to evaluate the sanitary sewer system.**

Most of the Trout Brook watershed surrounding the impaired segments relies on a municipal sewer system (Figure 6). West Hartford should develop a program that evaluates the sanitary sewer system and reduces leaks and overflows. This program should include periodic inspections of the sewer line.

**4) Develop a system to monitor septic systems.**

Portions of the impaired segments rely on septic systems (Figure 6). If not already in place, West Hartford should establish a program to ensure that existing septic systems are properly operated and maintained. For instance, communities can create an inventory of existing septic 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 systems within a reasonable timeframe could also be adopted. Towns can develop programs to assist citizens with the replacement and repair of older and failing systems.

**5) Evaluate municipal education and outreach programs regarding animal waste.**

As most of the Trout Brook watershed is developed, any education and outreach program should highlight the importance of not feeding waterfowl and wildlife and managing waste from horses, dogs, and other pets. Municipalities and residents can take measures to minimize waterfowl-related impacts such as allowing tall, coarse vegetation to grow in the riparian areas of Trout Brook that are frequented by waterfowl. Waterfowl, especially grazers like geese, prefer easy access to water. Maintaining an uncut vegetated buffer along the shore will make the habitat less desirable to geese and encourage migration. In addition, any educational program should emphasize that feeding waterfowl, such as ducks, geese, and swans, may contribute to water quality impairments in Trout Brook and can harm human health and the environment. Animal wastes should be disposed of away from any waterbody or storm drain system. BMPs effective at reducing the impact of animal waste on water quality include installing signage, providing pet waste receptacles in high-use areas, enacting ordinances requiring the clean-up of pet waste, and targeting educational and outreach programs in problem areas.

## BACTERIA DATA AND PERCENT REDUCTIONS TO MEET THE TMDL

Table 10: Trout Brook (Segment 1) Bacteria Data

*Waterbody ID:* CT4403-00\_01*Characteristics:* Freshwater, Class A, Potential Public Drinking Water Supply, Habitat for Fish and other Aquatic Life and Wildlife, Recreation, and Industrial and Agricultural Water Supply*Impairment:* Recreation (*E. coli* bacteria)*Water Quality Criteria for E. coli:*

Geometric Mean: 126 colonies/100 mL

Single Sample: 410 colonies/100 mL

*Percent Reduction to meet TMDL:*Geometric Mean: **86%**Single Sample: **98%***Data:* 2008-2010 from CT DEEP targeted sampling efforts, 2012 TMDL Cycle**Single sample *E. coli* (colonies/100 mL) data from Station 354 on Trout Brook (Segment 1) with annual geometric means calculated**

Station Name	Station Location	Date	Result	Wet/Dry	Geomean
354	Upstream of New Britain Avenue	6/16/2008	540	wet	740
354	Upstream of New Britain Avenue	7/1/2008	520	wet	
354	Upstream of New Britain Avenue	7/10/2008	790	dry	
354	Upstream of New Britain Avenue	7/17/2008	350	dry	
354	Upstream of New Britain Avenue	7/23/2008	2800	wet	
354	Upstream of New Britain Avenue	8/7/2008	4600	wet	
354	Upstream of New Britain Avenue	8/12/2008	1300	wet	
354	Upstream of New Britain Avenue	8/21/2008	300	dry	
354	Upstream of New Britain Avenue	8/28/2008	360	dry	
354	Upstream of New Britain Avenue	9/2/2008	690	dry	
354	Upstream of New Britain Avenue	9/12/2008	440	wet	
354	Upstream of New Britain Avenue	9/15/2008	630	wet	

Single sample *E. coli* (colonies/100 mL) data from Station 354 on Trout Brook (Segment 1) with annual geometric means calculated (continued)

Station Name	Station Location	Date	Result	Wet/Dry	Geomean
354	Upstream of New Britain Avenue	6/29/2009	700	dry	634
354	Upstream of New Britain Avenue	7/10/2009	550	dry	
354	Upstream of New Britain Avenue	7/15/2009	350	dry	
354	Upstream of New Britain Avenue	7/24/2009	5800	wet	
354	Upstream of New Britain Avenue	8/5/2009	480	dry	
354	Upstream of New Britain Avenue	8/14/2009	1100	dry	
354	Upstream of New Britain Avenue	8/28/2009	500	wet	
354	Upstream of New Britain Avenue	9/4/2009	620	dry	
354	Upstream of New Britain Avenue	9/8/2009	610	dry	
354	Upstream of New Britain Avenue	9/15/2009	370	dry	
354	Upstream of New Britain Avenue	9/25/2009	230	dry	
354	Upstream of New Britain Avenue	5/7/2010	270	dry	926* (86%)
354	Upstream of New Britain Avenue	5/12/2010	1800	wet	
354	Upstream of New Britain Avenue	5/20/2010	420	dry	
354	Upstream of New Britain Avenue	5/25/2010	300	dry	
354	Upstream of New Britain Avenue	5/27/2010	24000* (98%)	wet	
354	Upstream of New Britain Avenue	6/8/2010	430	dry	
<b>Shaded cells indicate an exceedance of water quality criteria</b>					
† Average of two duplicate samples					
** Weather conditions for selected data taken from Hartford because local station had missing data					
*Indicates single sample and geometric mean values used to calculate the percent reduction					

Wet and dry weather *E. coli* (colonies/100 mL) geometric mean values for Station 354 on Trout Brook (Segment 1)

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
354	Upstream of New Britain Avenue	2008-2010	11	18	731	1589	455
<b>Shaded cells indicate an exceedance of water quality criteria</b>							
<b>Weather condition determined from rain gage at Hartford Bradley International Airport.</b>							

**Table 11: Trout Brook (Segment 2) Bacteria Data**

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**Waterbody ID:** CT4403-00\_02

**Characteristics:** Freshwater, Class A, Potential Public Drinking Water Supply, Habitat for Fish and other Aquatic Life and Wildlife, Recreation, and Industrial and Agricultural Water Supply

**Impairment:** Recreation (*E. coli* bacteria)

**Water Quality Criteria for *E. coli*:**

Geometric Mean: 126 colonies/100 mL

Single Sample: 410 colonies/100 mL

**Percent Reduction to meet TMDL:**

Geometric Mean: **78%**

Single Sample: **98%**

**Data:** N/A

There is no actual data collected on this segment due to accessibility issues for the brook. Load reduction goals calculated for the upstream segment (Segment 3) were substituted due to little expected change in water quality for the channelized segment.

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**Table 12: Trout Brook (Segment 3) Bacteria Data****Waterbody ID:** CT4403-00\_03**Characteristics:** Freshwater, Class A, Potential Public Drinking Water Supply, Habitat for Fish and other Aquatic Life and Wildlife, Recreation, and Industrial and Agricultural Water Supply**Impairment:** Recreation (*E. coli* bacteria)**Water Quality Criteria for *E. coli*:**

Geometric Mean: 126 colonies/100 mL

Single Sample: 410 colonies/100 mL

**Percent Reduction to meet TMDL:**Geometric Mean: **78%**Single Sample: **98%****Data:** 2008-2010 from CT DEEP targeted sampling efforts, 2012 TMDL Cycle**Single sample *E. coli* (colonies/100 mL) data from all monitoring stations on Trout Brook (Segment 3) with annual geometric means calculated**

Station Name	Station Location	Date	Result	Wet/Dry	Geomean
1049	Under Boulevard at Northfeldt Park	6/16/2008	720	wet	<b>563*</b> <b>(78%)</b>
1049	Under Boulevard at Northfeldt Park	7/1/2008	410	wet	
1049	Under Boulevard at Northfeldt Park	7/10/2008	800	dry	
1049	Under Boulevard at Northfeldt Park	7/17/2008	300	dry	
1049	Under Boulevard at Northfeldt Park	7/23/2008	11000	wet	
1049	Under Boulevard at Northfeldt Park	8/7/2008	2100	wet	
1049	Under Boulevard at Northfeldt Park	8/12/2008	1300	wet	
1049	Under Boulevard at Northfeldt Park	8/21/2008	200	dry	
1049	Under Boulevard at Northfeldt Park	8/28/2008	190	dry	
1049	Under Boulevard at Northfeldt Park	9/2/2008	120	dry	
1049	Under Boulevard at Northfeldt Park	9/12/2008	390	wet	
1049	Under Boulevard at Northfeldt Park	9/15/2008	270	wet	

Single sample *E. coli* (colonies/100 mL) data from all monitoring stations on Trout Brook (Segment 3) with annual geometric means calculated (continued)

Station Name	Station Location	Date	Result	Wet/Dry	Geomean
1049	Under Boulevard at Northfeldt Park	6/29/2009	480	dry	524
1049	Under Boulevard at Northfeldt Park	7/10/2009	330	dry	
1049	Under Boulevard at Northfeldt Park	7/15/2009	860	dry	
1049	Under Boulevard at Northfeldt Park	7/24/2009	3400	wet	
1049	Under Boulevard at Northfeldt Park	8/5/2009	280	dry	
1049	Under Boulevard at Northfeldt Park	8/14/2009	1850 <sup>†</sup>	dry	
1049	Under Boulevard at Northfeldt Park	8/28/2009	400	wet	
1049	Under Boulevard at Northfeldt Park	9/4/2009	230 <sup>†</sup>	dry	
1049	Under Boulevard at Northfeldt Park	9/8/2009	420	dry	
1049	Under Boulevard at Northfeldt Park	9/15/2009	585 <sup>†</sup>	dry	
1049	Under Boulevard at Northfeldt Park	9/25/2009	150	dry	
1049	Under Boulevard at Northfeldt Park	5/7/2010	63	dry	473
1049	Under Boulevard at Northfeldt Park	5/12/2010	1100	wet	
1049	Under Boulevard at Northfeldt Park	5/20/2010	240	dry	
1049	Under Boulevard at Northfeldt Park	5/25/2010	86	dry	
1049	Under Boulevard at Northfeldt Park	5/27/2010	20000* (98%)	wet	
1049	Under Boulevard at Northfeldt Park	6/8/2010	390	dry	
2730	Downstream of Fern Street adjacent to Trout Brook Drive	5/7/2010	220	dry	NA
6141	Near Willow Brook Lane before Fern Street crossing	5/20/2010	220	dry	439
6141	Near Willow Brook Lane before Fern Street crossing	5/25/2010	220	dry	
6141	Near Willow Brook Lane before Fern Street crossing	5/27/2010	1300 <sup>†</sup>	wet	
6141	Near Willow Brook Lane before Fern Street crossing	6/8/2010	590	dry	
<b>Shaded cells indicate an exceedance of water quality criteria</b>					
<b><sup>†</sup> Average of two duplicate samples</b>					
<b>** Weather conditions for selected data taken from Hartford because local station had missing data</b>					
<b>*Indicates single sample and geometric mean values used to calculate the percent reduction</b>					

**Wet and dry weather *E. coli* (colonies/100 mL) geometric mean values for all monitoring stations on Trout Brook (Segment 3)**

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
1049	Under Boulevard at Northfeldt Park	2008-2010	11	18	528	1354	297
2730	Downstream of Fern Street adjacent to Trout Brook Drive	2010	0	1	220	NA	NA
6141	Near Willow Brook Lane before Fern Street crossing	2010	1	3	439	NA	306
<p><b>Shaded cells indicate an exceedance of water quality criteria</b></p> <p><b>Weather condition determined from rain gage at Hartford Bradley International Airport.</b></p>							

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