West Branch Saugatuck River Watershed Summary

Cobbs Mill Brook

WATERSHED DESCRIPTION AND MAPS

The West Branch Saugatuck River watershed covers an area of approximately 7,630 acres in southwestern Connecticut (Figure 1). There are multiple municipalities located at least partially in the watershed, including Redding, Weston, Wilton, and Westport, CT.

The West Branch Saugatuck River watershed includes one segment, Cobbs Mill Brook (CT-7203-04_01), impaired for recreation due to elevated bacteria levels. This segment was assessed by Connecticut Department of Energy and Environmental Protection (CT DEEP) and included in the CT 2010 303(d) list of impaired waterbodies. Some segments in the watershed were currently unassessed as of the writing of this document. This does not mean there are no issues on those segments, but indicates a lack of current data to evaluate the segments as part of the assessment process. An excerpt of the Integrated Water Quality Report is included in Table 1 to show the status of other waterbodies in the watershed (CT DEEP, 2010).

Cobbs Mill Brook (CT7203-04_01) begins at the confluence with an unnamed tributary just west of Route 57 in Weston, flows through wooded and residential areas, and ends at the confluence with the West Branch Saugatuck River just east of Cobbs Mill Road. The impaired segment is 0.89 miles long and is located entirely within the Town of Weston.

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

Impaired Segment Facts

Impaired Segments:
Cobbs Mill Brook (CT7203-04_01)

Town: Weston and Wilton

Impaired Segments and Lengths (miles): CT7203-04_01 (0.89)

Water Quality Classifications:
Class A

Designated Use Impairments:
Recreation

Sub-regional Basin Name and Code: West Branch Saugatuck River, 7203

Regional Basin: Saugatuck

Major Basin: Southwest Coastal

Watershed Area (acres): 7,630

MS4 Applicable? No

Figure 1: Watershed location in Connecticut

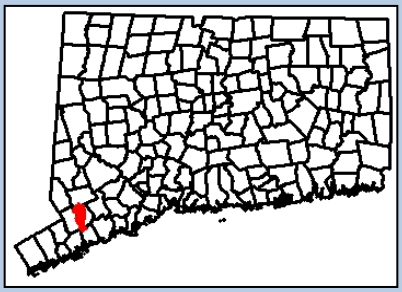


Table 1: Impaired segments and nearby waterbodies from the Connecticut 2010 Integrated Water Quality Report

Waterbody ID	Waterbody Name	Location	Miles	Aquatic Life	Recreation	Fish Consumption
CT7203-00_01	West Branch Saugatuck River-01	From mouth at confluence with Saugatuck River (DS of Pan Handle Lane crossing), Westport, US to Godfrey Road West crossing (just east of Old Orchard Drive intersection), Weston.	6.12	U	NOT*	FULL
CT7203-00_02	West Branch Saugatuck River-02	From Godfrey Road West crossing (just east of Old Orchard Drive intersection), Weston, US to headwaters at unnamed pond between Gilbert Hill on west and Goodsell Hill (encircled by Farview Farm Road) on east, Redding.	3.14	U	U	FULL
CT7203-04_01	Cobbs Mill Brook (Weston)-01	Mouth at confluence with West Branch Saugatuck River just DS of Cobb Mill Road crossing, US to confluence with unnamed tributary parallel to Route 57 (on west side behind houses) at Hillside Road intersection, Weston	0.89	U	NOT	FULL
CT7203-00-trib_01	Unnamed tributary, West Branch Saugatuck River (Weston)-01	From mouth at confluence with West Branch Saugatuck River (DS Route 53 (Newtown Turnpike) crossing), US to unnamed pond outlet (US Birch Hill Road crossing), Weston.	0.39	U	NOT**	FULL

Shaded cells indicate impaired segment addressed in this TMDL

***Current bacteria data shows attainment of water quality goals**

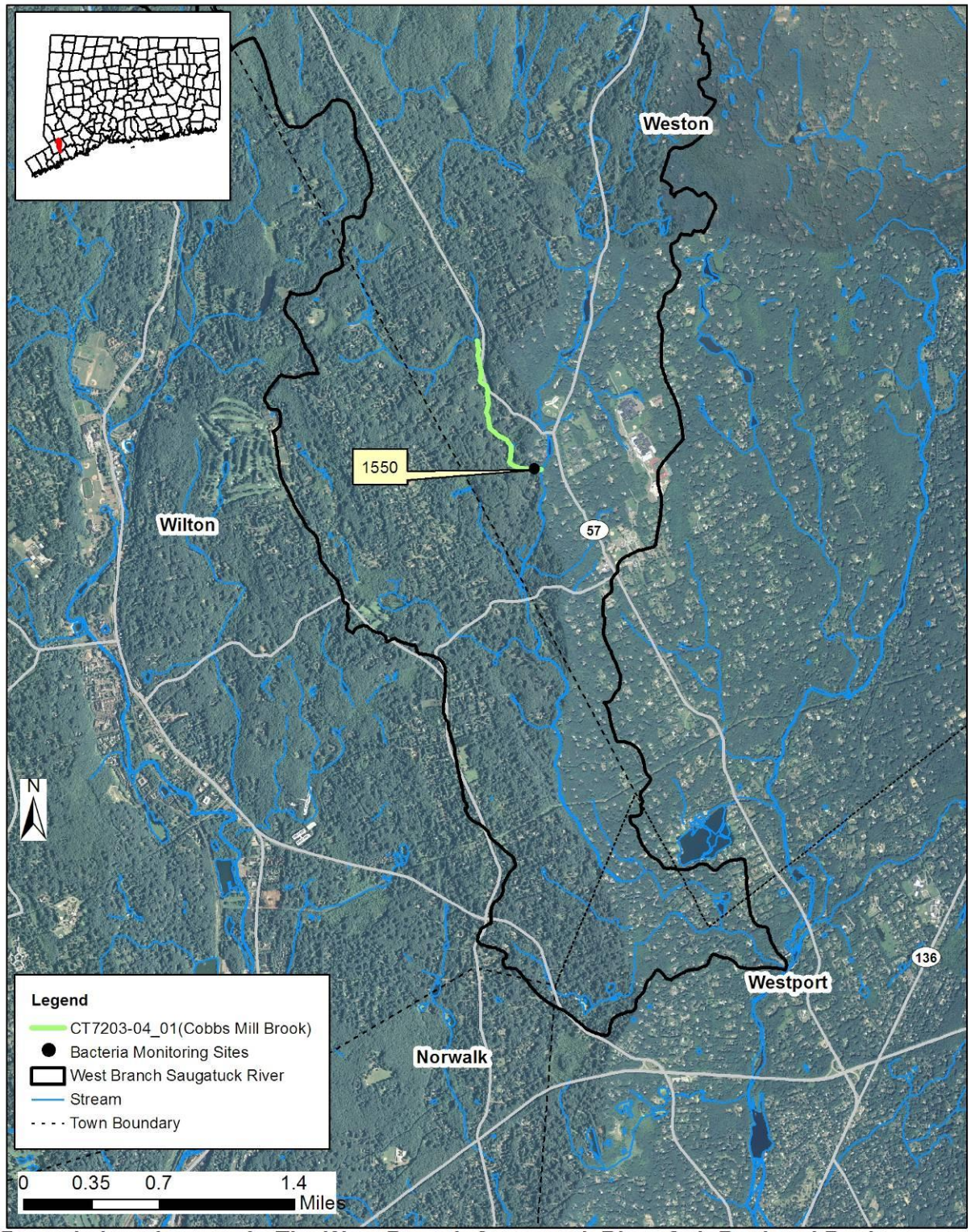
****This segment was incorrectly impaired due to mis-identified data collection location**

FULL = Designated Use Fully Supported

NOT = Designated Use Not Supported

U = Unassessed

Figure 2: GIS map featuring general information of the West Branch Saugatuck River 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 West Branch Saugatuck River watershed consists of 64% forest, 30% urban area, 5% water, and 1% agriculture. The area surrounding the impaired segment of the Cobbs Mill Brook is dominated by forested areas with portions of urban development, particularly along Route 57.

Figure 3: Land use within the West Branch Saugatuck River watershed

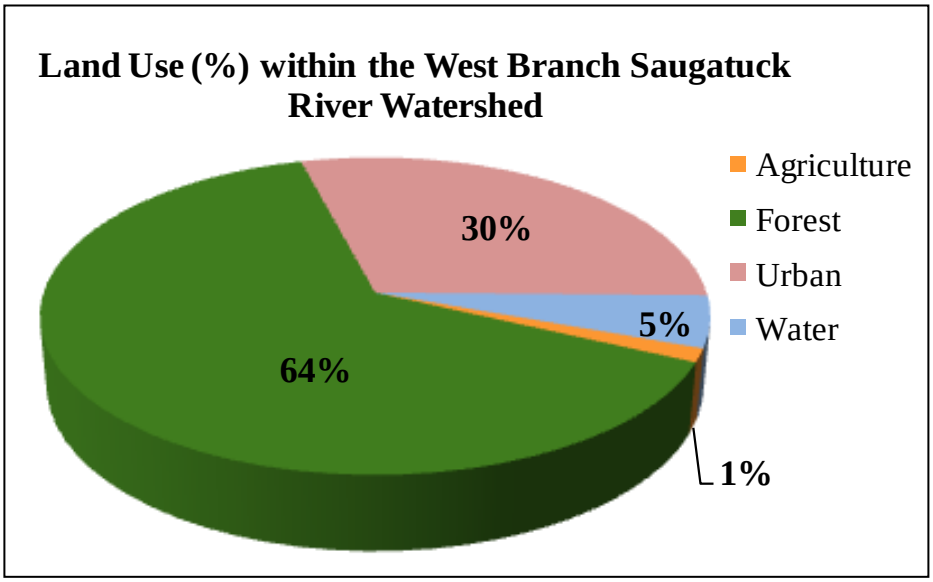
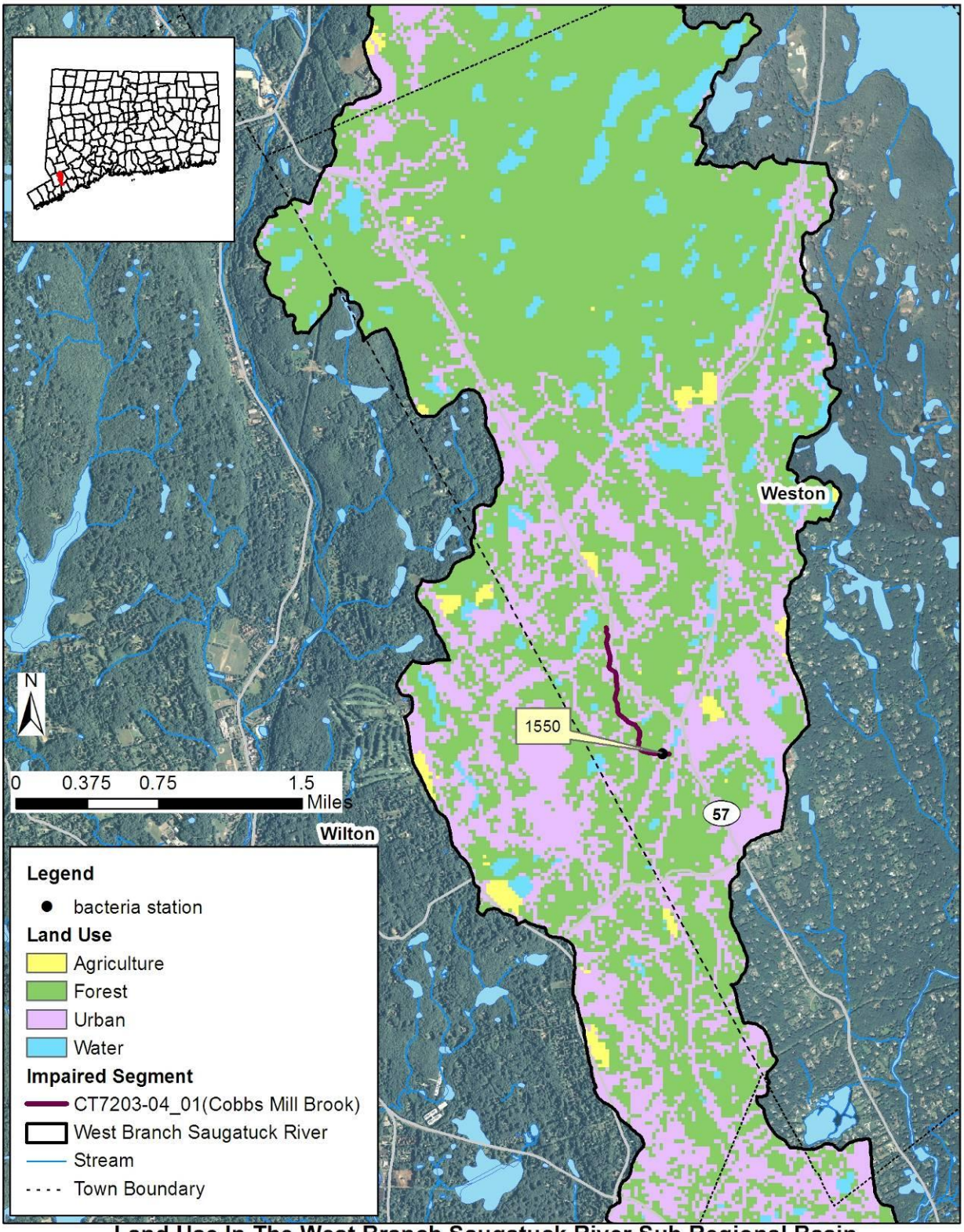


Figure 4: GIS map featuring land use for the West Branch Saugatuck River watershed at the sub-regional level



Land Use In The West Branch Saugatuck River Sub Regional Basin

Map Data: CT DEP Map Created: July 2011

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 impaired segments in the West Branch Saugatuck River watershed

Waterbody ID	Waterbody Name	Station	Station Description	Municipality	Latitude	Longitude
CT7203-04_01	Cobbs Mill Brook	1550	Upstream of Cobbs Mill Road	Weston	41.231305	-72.383361

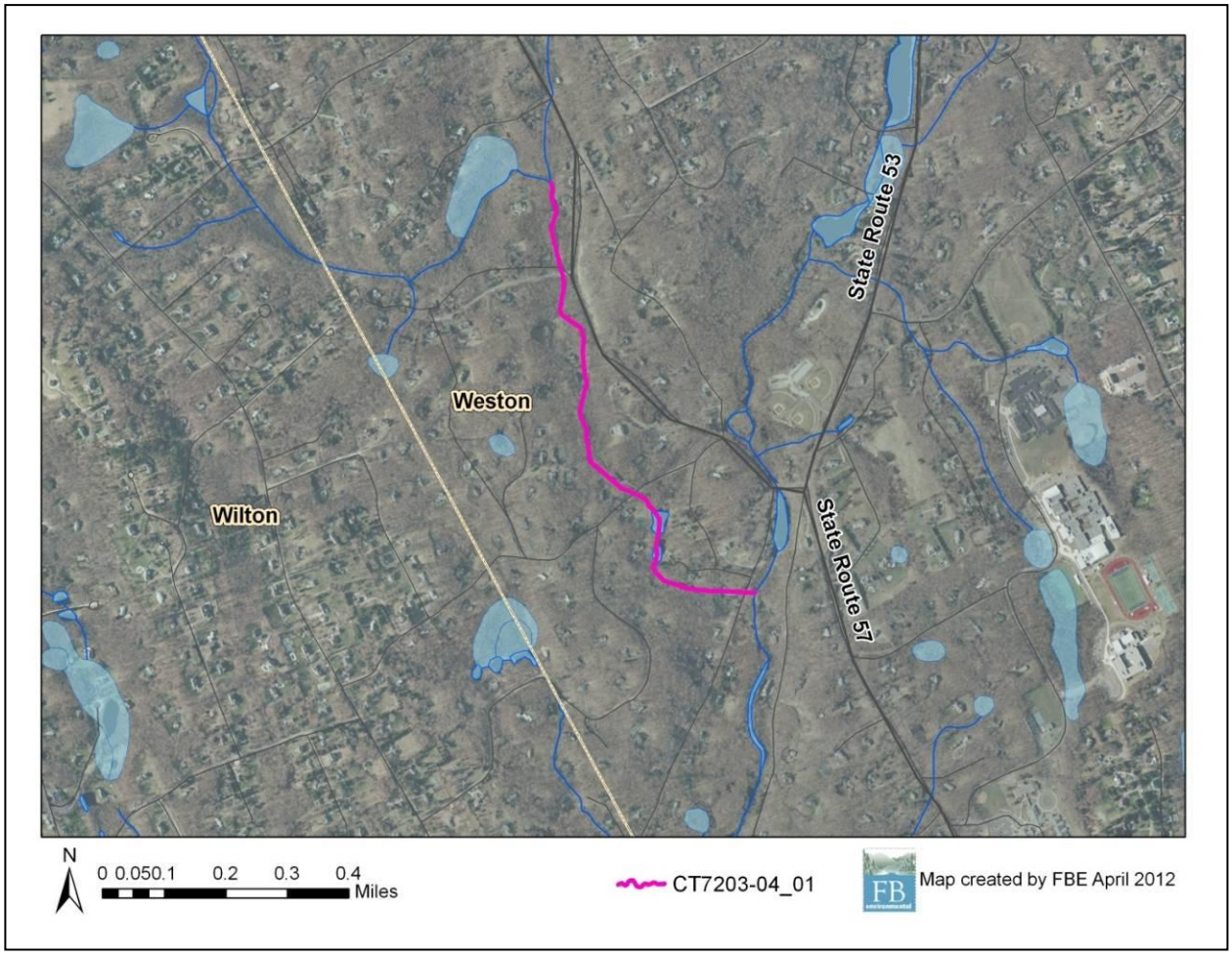
Cobbs Mill Brook (CT7203-04_01) is a Class A freshwater stream (Figure 5). Its applicable designated uses are potential drinking water supplies, habitat for fish and other aquatic life and wildlife, recreation, navigation, and industrial and agricultural water supply. Water quality analyses were conducted using data from one sampling location on Cobbs Mill Brook (Station 1550) (Table 2).

Water quality criteria for *E. coli*, along with bacteria sampling results from 2005-2008, for Cobbs Mill Brook are presented in Table 7. Single sample values at Station 1550 exceeded the WQS for *E. coli* once in 2006 and once in 2007. The annual geometric mean was calculated for Station 1550 and exceeded the WQS for *E. coli* in 2007.

To aid in identifying possible bacteria sources, the geometric mean was also calculated for Station 1550 for wet-weather and dry-weather sampling days (Table 7). The geometric mean exceeded the WQS for *E. coli* during wet-weather, and the wet-weather value was more than four times greater than the dry-weather value.

Due to the elevated bacteria measurements presented in Table 7, the impaired segment did not meet CT's bacteria WQS, was identified as impaired, and was 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 water bodies to comply with state WQS.

Figure 5: Aerial map of Cobbs Mill Brook in the West Branch Saugatuck River watershed



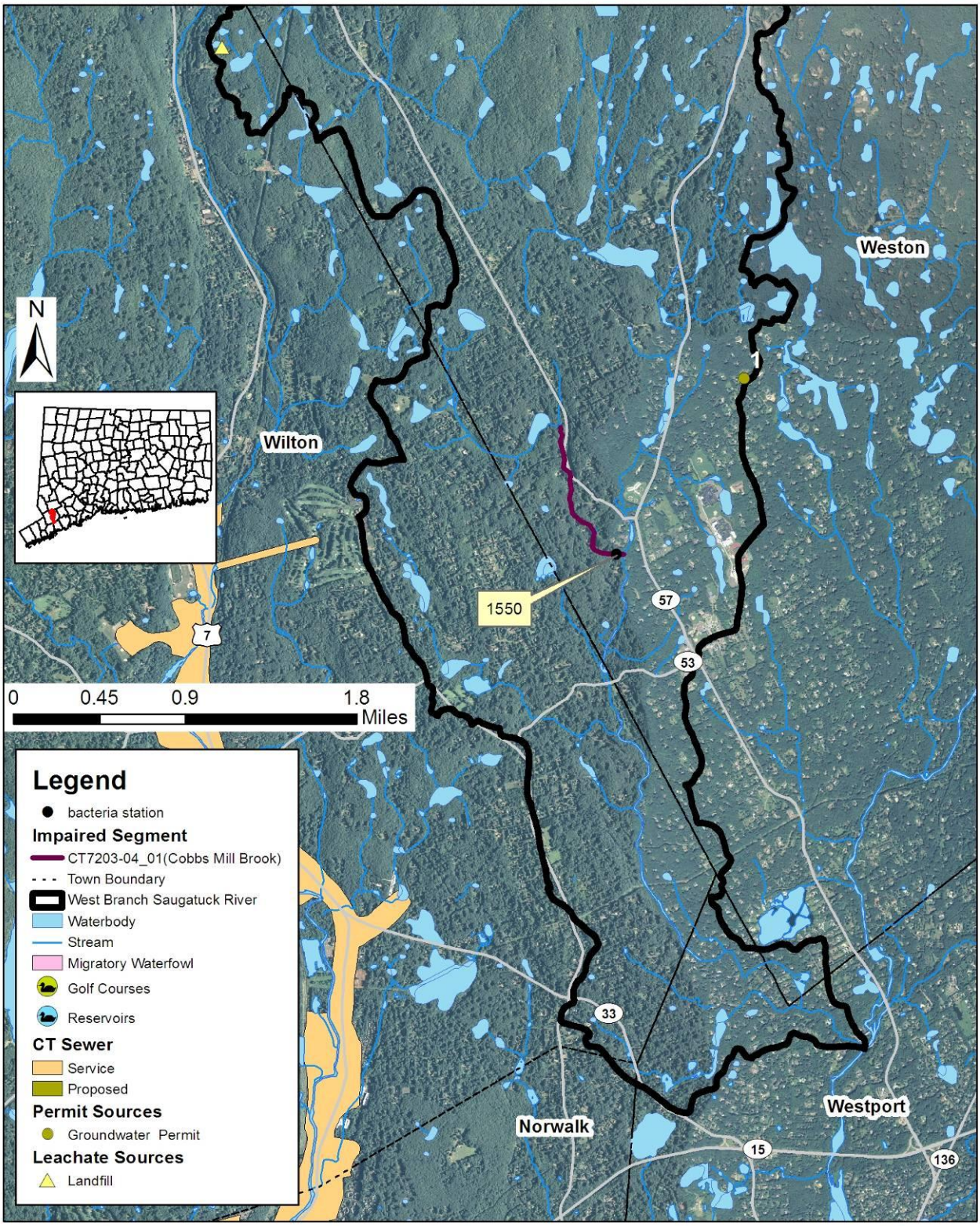
Potential Bacteria Sources

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 West Branch Saugatuck River watershed based on land use (Figures 3 and 4) and a collection of local information for each of the waterbodies is 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 segments. Further monitoring and investigation will confirm listed sources and discover additional ones. Some segments in this watershed are currently listed as unassessed by CT DEEP procedures. This does not suggest that there are no potential issues on these segments, but indicates a lack of current data to evaluate the segments as part of the assessment process. 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 West Branch Saugatuck River watershed

Impaired Segment	Permit Source	Illicit Discharge	CSO/SSO Issue	Failing Septic System	Agricultural Activity	Stormwater Runoff	Nuisance Wildlife/ Pets	Other
Cobbs Mill Brook CT7203-04_01	**x**			**x**		**x**	**x**	

Figure 6: Potential sources in the West Branch Saugatuck River watershed at the sub-regional level



Potential Bacteria Sources In The West Branch Saugatuck River Sub Regional Basin

Map Data: CT DEP Map Created: July 2011

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 it is because no examples of that specific source were discovered to be present during the analysis of the basin. The following is the list of potential sources that were evaluated during analysis of the impaired basin: 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.

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	0
GSI	Stormwater Associated with Industrial Activity	0
GSM	Part B Municipal Stormwater MS4	4
GSN	Stormwater Registration – Construction	0
LF	Groundwater Permit (Landfill)	0
UI	Underground Injection	1

Permitted Sources

As shown in Table 5, there are two permits issued that discharge into the West Branch of the Saugatuck River watershed. The groundwater permit requires monitoring for fecal coliform. This data cannot be compared to a water quality standard as Connecticut does not have a water quality standard to evaluate recreation use for fecal coliform bacteria. However, monitoring results reported here in 2009 and 2010 have shown very low fecal coliform numbers. The monitoring results are not included here because this facility does not discharge into Cobbs Mill 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. There were no stormwater discharges into Cobbs Mill Brook collected under the MS4 permit.

Table 5: Permitted facilities within the West Branch Saugatuck River watershed

Town	Client	Permit ID	Permit Type	Site Name/Address	Map #
Weston	Town Of Weston	UI0000392	Groundwater Permit	Town Of Weston	1
Weston	Town of Weston	GSM000106	MS4	Town of Weston	N/A
Redding	Town of Redding	GSM000085	MS4	Town of Redding	N/A
Wilton	Town of Wilton	GSM000040	MS4	Town of Wilton	N/A
Westport	Town of Westport	GSM000026	MS4	Town of Westport	N/A

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)

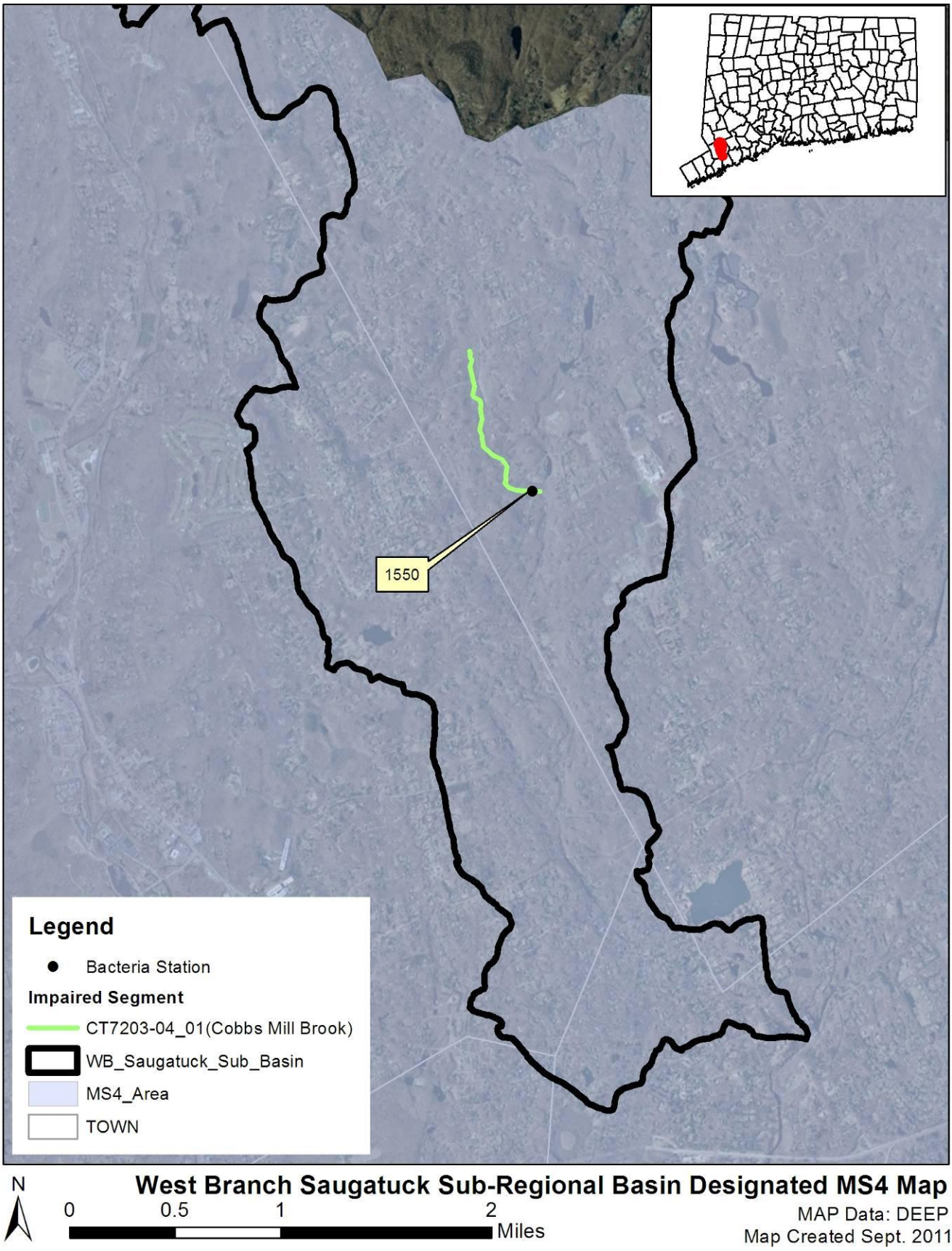
While it is possible that CT DEEP will be expanding the reach of the MS4 program to include UC municipalities in the near future they are not currently under the permit. However, the GIS layers used to create the MS4 maps in this Statewide TMDL did include both UA and UC blocks. This factor creates some 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 segment of Cobbs Mill Brook is located in the Town of Weston. Weston 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 10). 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 requires 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 (www.ct.gov/dep/stormwater).

Figure 7: MS4 areas of the West Branch Saugatuck River 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 West Branch Saugatuck River watershed are described below.

Stormwater Runoff from Developed Areas

Approximately 30% of the land use in the watershed is considered urban, some of which is concentrated around the impaired segment in the Town of Weston (Figure 4). 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 50% of the West Branch Saugatuck River watershed is characterized by 0- 6% impervious cover, 45% is characterized by 7-11% impervious cover, particularly around the impaired segment, and 5% is characterized by 12-15% impervious cover (Figures 8 and 9). There are several areas with impervious surfaces close to Cobbs Mill Brook, including residential and commercial businesses along Route 57 that have the potential to convey runoff during storm events. Water quality data taken at Station 1550 on Cobbs Mill Brook were consistently high, especially during wet-weather, which suggests that stormwater runoff may be a source of bacteria to the West Branch Saugatuck River watershed (Table 6). In particular, geometric means during wet-weather were four times greater than dry-weather values.

Figure 8: Range of impervious cover (%) in the West Branch Saugatuck River watershed

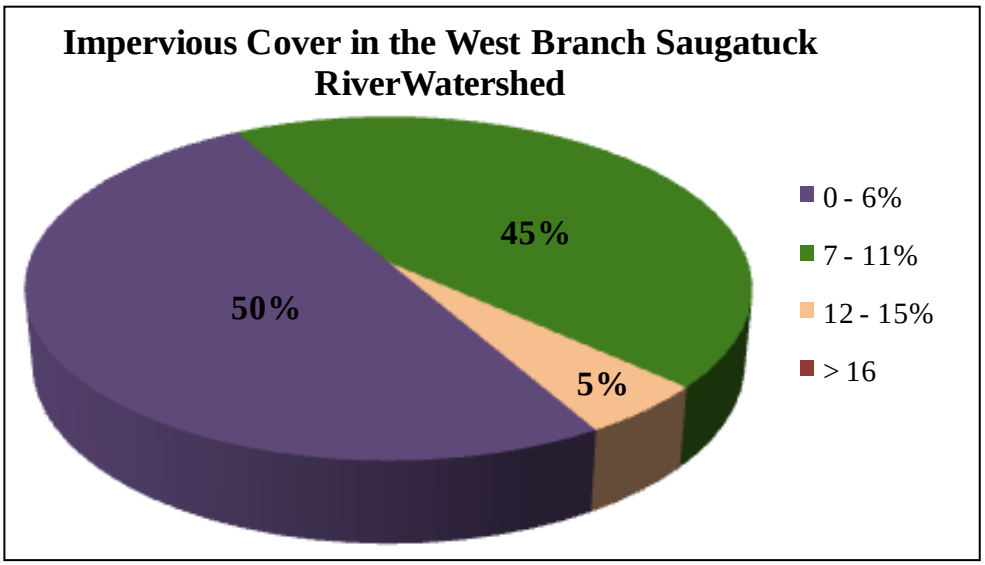
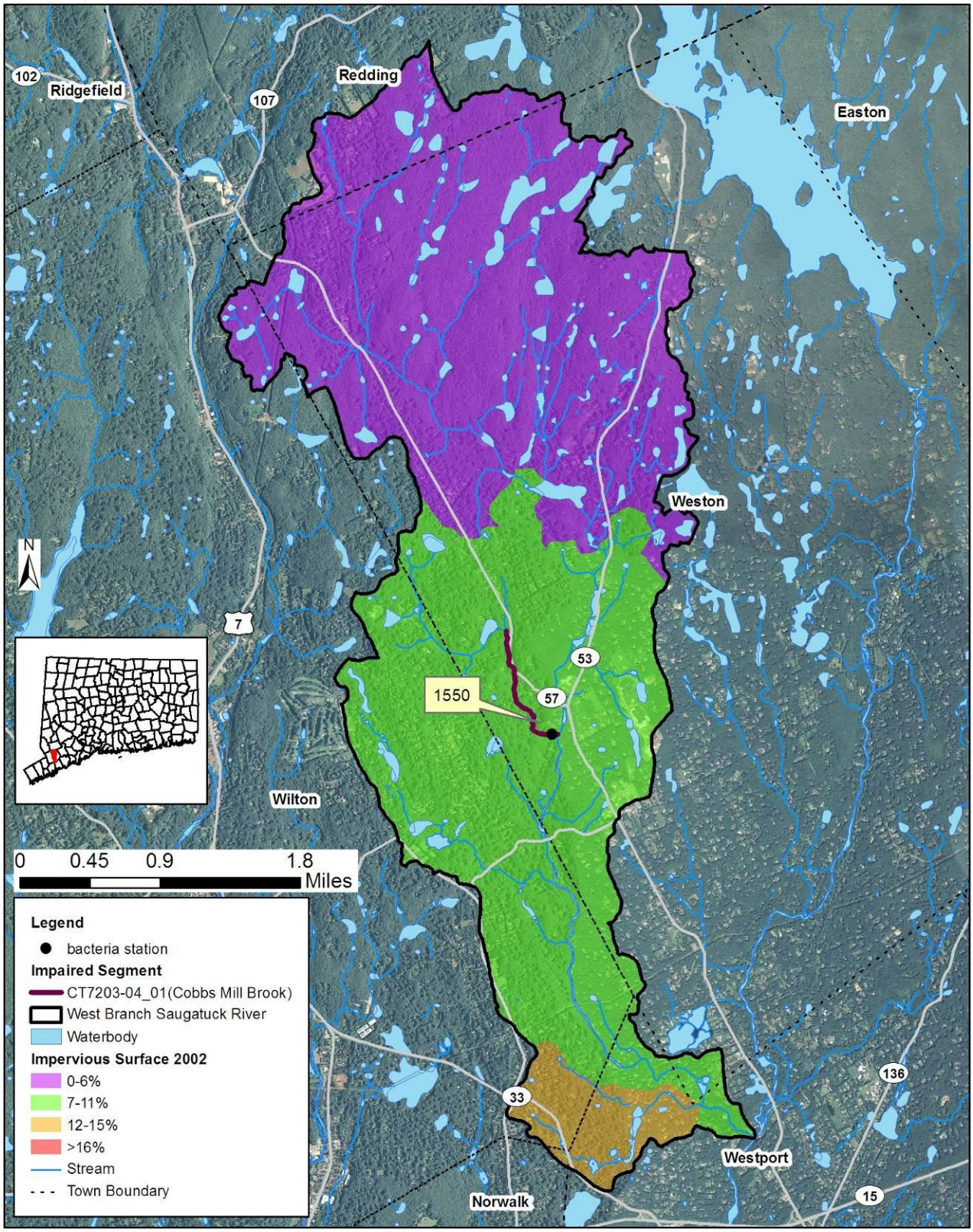


Figure 9: Impervious cover (%) for the West Branch Saugatuck River sub-regional watershed



Impervious Surfaces In The West Branch Saugatuck River Sub Regional Basin

Map Data: CT DEP Map Created: July 2011

Insufficient Septic Systems

As shown in Figure 6, the entire watershed relies 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 Weston is part of the Weston-Westport Health District (www.wwhd.org/).

Wildlife and Domestic Animal Waste

Wildlife and domestic animals within the West Branch Saugatuck River watershed represent a potential source of bacteria. 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, golf courses, and agricultural crop fields. 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 also lead to habitat destruction as a result of overgrazing on wetland and riparian plants.

As potential hotspots for dog and horse owners, residential development surrounds much of Cobbs Mill Brook (Figure 4). When not properly disposed, waste from domestic animals such as dogs and horses can enter surface waters directly or through stormwater infrastructure.

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 1% of the West Branch Saugatuck River watershed (Figure 4). There were no active agricultural operations identified near Cobbs Mill Brook. Therefore, due to small numbers of acres used by farms, agricultural activities are not a likely source of bacteria.

Additional Sources

There may be other sources not listed here or identified in Figure 6 that contribute to the observed water quality impairment in Cobbs Mill 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

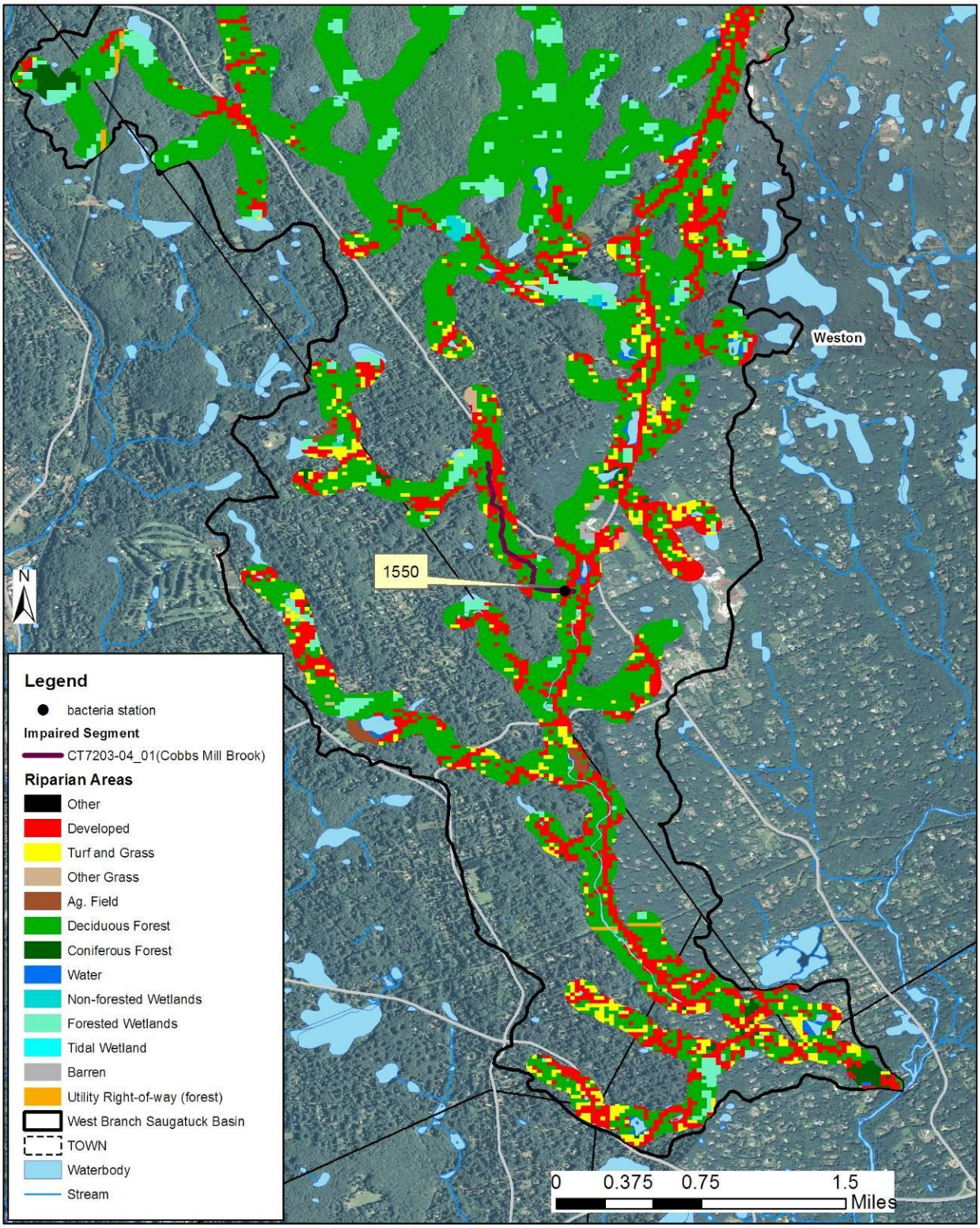
The riparian buffer zone is the area of land located immediately adjacent to streams, lakes, or other surface waters. The boundary of the riparian zone and the adjoining uplands is gradual and not always well-defined. However, riparian zones differ from uplands because of high levels of soil moisture, frequent flooding, and the unique assemblage of plant and animal communities found there. Through the interaction of their 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. The land use directly adjacent to a waterbody can have direct impacts on water quality from surface runoff sources.

The riparian zone for Cobbs Mill Brook is dominated by developed and forested 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 West Branch Saugatuck River watershed



Riparian Areas In The West Branch Saugatuck River Sub Regional Basin

UCONN CLEAR: http://clear.uconn.edu/

Map Data: DEEP Map Created: October 2011

CURRENT MANAGEMENT ACTIVITIES

The watershed community has developed and implemented programs to protect water quality from bacterial contamination. In 2006, the Saugatuck River Watershed Partnership was formed and a conservation action plan was drafted (http://www.ct.gov/dep/lib/dep/water/watershed_management/wm_plans/saugatuckrwpactionplan.pdf). This document presents mitigation strategies for the health of the Saugatuck River, including the West Branch Saugatuck River (Harold, 2006). In 2011, the Saugatuck River DRAFT Watershed Based Plan, Phase I was developed (http://www.swrpa.org/Uploads/Saug_P1_reduced.pdf?phpMyAdmin=727f2ac42cbed584386014c03e889f71). This document outlines existing conditions in the watershed, presents goals and strategies, and identifies potential projects and management actions within the watershed (AKRF, 2011).

As indicated previously, Weston and Wilton are 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 new development and redevelopment.
6. Pollution prevention/good housekeeping for municipal operations.

Each town is also required to submit an annual update outlining the steps they are taking to meet the six minimum measures. The most recent updates that address bacterial contamination in the watershed are summarized in Tables 6 and 7.

Table 6: Summary of MS4 requirement updates related to the reduction of bacterial contamination from Weston, CT (Permit # GSM000106)

Minimum Measure	Town of Weston SWMP Annual Report (2010)
Public Outreach and Education	1) Continuing to update website to include annual report. 2) Developed flyer focusing on water quality aspect of residential stormwater.
Public Involvement and Participation	1) Established and evaluated effectiveness of hotline/e-mail system.
Illicit Discharge Detection and Elimination	1) Developed and anticipate adoption of Stormwater Ordinance re: Town storm sewers. 2) Continually updating stormwater discharge mapping.
Construction Site Stormwater Runoff Control	1) Enforced new Zoning ordinance.
Post Construction Stormwater Management	1) Continuing inspections and prioritizing cleaning & maintenance.

Table 6: Summary of MS4 requirement updates related to the reduction of bacterial contamination from Weston, CT (Permit # GSM000106) (continued)

Minimum Measure	Town of Weston SWMP Annual Report (2010)
Pollution Prevention and Good Housekeeping	1) Developed and continuing (as budget dictates) staff training. 2) Annual inspections of catch basins continue as well as street sweeping.

Table 7: Summary of MS4 requirement updates related to the reduction of bacterial contamination from Wilton, CT (Permit # GSM000040)

Minimum Measure	Town of Wilton Annual Report (2008)
Public Outreach and Education	1) Published newsletter with information on stormwater management. 2) Completed catch basin stenciling. 3) Installed signage marking the stormwater management detention pond across Route 7 from the Allen's Meadow site. 4) Provided funding to Norwalk River Watershed Association for water quality monitoring.
Public Involvement and Participation	1) Sponsored Household Hazardous Waste Collection Day on October 25, 2008.
Illicit Discharge Detection and Elimination	1) All town field staff trained to look for discharges as part of standard procedure when cleaning or maintaining catch basins. 2) Mapping storm sewer system. 3) Required connections to storm sewer system be approved by the Department of Public Works.
Construction Site Stormwater Runoff Control	1) Developing concepts for stormwater management in land use applications.
Post Construction Stormwater Management	1) Requires stormwater BMPs to be evaluated and included on a project-specific basis. In some cases, pollutant removal calculations are required. 2) Requires post-construction stormwater monitoring to evaluate the effectiveness of installed BMPs.
Pollution Prevention and Good Housekeeping	1) Swept all town road and specific parking lots. 2) Prioritized and maintained catch basins.

RECOMMENDED NEXT STEPS

The watershed communities have developed and implemented programs to protect water quality from bacterial contamination. Future mitigative activities are necessary to ensure the long-term protection of the West Branch Saugatuck River watershed, and have been prioritized below.

1) Identify areas in the developed portions of the West Branch Saugatuck River to implement Best Management Practices (BMPs) to control stormwater runoff.

As noted previously, 30% of the West Branch Saugatuck River watershed is considered urban. As such, stormwater runoff is likely contributing bacteria to Cobbs Mill Brook. Within the Saugatuck River DRAFT Watershed Based Plan (2011), the West Branch Saugatuck River and Cobbs Mill Brook were given a "poor" score for impervious cover due to the amount and proximity of impervious surfaces to the waterbodies. The plan recommended installing BMPs, including stormwater detention pond retrofits and bioretention areas (AKRF, 2011). To identify other areas that are contributing bacteria to the impaired segment, Weston should begin conducting wet-weather sampling at stormwater outfalls that discharge directly to Cobbs Mill Brook. To treat stormwater runoff, the towns should identify areas along the more developed sections of the impaired segment to install BMPs that encourage stormwater to infiltrate the ground before entering the waterbodies. 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) Develop a system to monitor septic systems.

All residents within Weston near Cobbs Mill Brook rely on septic systems. If not already in place, the towns 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 the sub-standard systems within a reasonable timeframe could be adopted. Towns can also develop programs to assist citizens with the replacement and repair of older and failing systems.

3) Evaluate municipal education and outreach programs regarding animal waste.

As upstream portions of Cobbs Mill Brook are undeveloped, any education and outreach program should highlight the importance of not feeding waterfowl and wildlife, managing horse and livestock waste, and picking up after 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 the West Branch Saugatuck River and its tributaries 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 the West Branch Saugatuck River watershed 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.

4) Continue monitoring permitted sources.

As shown in Figure 6 and Table 5, there are five permitted discharges in the West Branch Saugatuck River watershed. 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. Table 6 details the appropriate waste load allocations established by this TMDL for use as water quality targets for permittees as permits are renewed and updated, within the West Branch Saugatuck 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 6. Bacteria (e.coli) TMDLs, WLAs, and LAs for Recreation

		Instantaneous *E. coli* (#/100mL)						Geometric Mean *E. coli* (#/100mL)	
Class	**Bacteria Source**	**WLA[6]**			**LA[6]**			**WLA[6]**	**LA[6]**
	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[7]	410[7]	576[7]				126[7]	
	Stormwater (non-MS4)				235[7]	410[7]	576[7]		126[7]
	Wildlife direct discharge				235[7]	410[7]	576[7]		126[7]
	Human or domestic animal direct discharge[5]				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) These values can be "as naturally occurs" if the only pollutant source is 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.

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.

BACTERIA DATA AND PERCENT REDUCTIONS TO MEET THE TMDL

Table 7: Cobbs Mill Brook Bacteria Data

Waterbody ID: CT7203-04_01

Characteristics: Freshwater, Class A, Potential Drinking Water Source, 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: **7%**

Single Sample: **46%**

Data: 2005-2008 from CT DEEP targeted sampling efforts, 2012 TMDL Cycle

Single sample *E. coli* (colonies/100 mL) data from Station 1550 on Cobbs Mill Brook with annual geometric means calculated

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1550	Upstream of Cobbs Mill Road	5/5/2005	20	dry**	73
1550	Upstream of Cobbs Mill Road	5/19/2005	42	dry	
1550	Upstream of Cobbs Mill Road	6/2/2005	59	dry	
1550	Upstream of Cobbs Mill Road	7/7/2005	220	wet	
1550	Upstream of Cobbs Mill Road	7/21/2005	190	Wet	

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1550	Upstream of Cobbs Mill Road	5/4/2006	22	dry	58
1550	Upstream of Cobbs Mill Road	5/18/2006	80	dry	
1550	Upstream of Cobbs Mill Road	6/8/2006	**760* (46%)**	wet	
1550	Upstream of Cobbs Mill Road	6/22/2006	52	dry	
1550	Upstream of Cobbs Mill Road	7/6/2006	370	wet	
1550	Upstream of Cobbs Mill Road	7/20/2006	100	dry	
1550	Upstream of Cobbs Mill Road	8/10/2006	4	dry**	
1550	Upstream of Cobbs Mill Road	8/24/2006	172	dry	
1550	Upstream of Cobbs Mill Road	9/7/2006	32	dry	
1550	Upstream of Cobbs Mill Road	9/21/2006	8	dry	

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1550	Upstream of Cobbs Mill Road	5/10/2007	64	dry	**136* (7%)**
1550	Upstream of Cobbs Mill Road	5/31/2007	44	wet	
1550	Upstream of Cobbs Mill Road	6/14/2007	68	dry	
1550	Upstream of Cobbs Mill Road	6/28/2007	400	dry	
1550	Upstream of Cobbs Mill Road	7/12/2007	220	wet	
1550	Upstream of Cobbs Mill Road	7/26/2007	28	dry	
1550	Upstream of Cobbs Mill Road	8/9/2007	580	wet	
1550	Upstream of Cobbs Mill Road	8/23/2007	224	dry**	
1550	Upstream of Cobbs Mill Road	9/13/2007	400	dry	
1550	Upstream of Cobbs Mill Road	9/27/2007	88	dry**	
1550	Upstream of Cobbs Mill Road	5/8/2008	88	dry	30
1550	Upstream of Cobbs Mill Road	5/22/2008	42	wet	
1550	Upstream of Cobbs Mill Road	6/12/2008	108	wet	
1550	Upstream of Cobbs Mill Road	6/26/2008	32	dry	
1550	Upstream of Cobbs Mill Road	7/10/2008	42	dry	
1550	Upstream of Cobbs Mill Road	7/31/2008	128	wet	
1550	Upstream of Cobbs Mill Road	8/14/2008	1	dry**	
1550	Upstream of Cobbs Mill Road	8/28/2008	16	dry**	
1550	Upstream of Cobbs Mill Road	9/11/2008	48	dry	
1550	Upstream of Cobbs Mill Road	9/25/2008	12	dry	

Shaded cells indicate an exceedance of water quality criteria

†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 geometric mean values for Station 1550 on Cobbs Mill Brook

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
1550	Upstream of Cobbs Mill Road	2005-2008	10	25	64	181	42

Shaded cells indicate an exceedance of water quality criteria

Weather condition determined from rain gages in Danbury, CT and at Hartford Bradley International Airport

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