Estuary 8: Branford/East Haven

Watershed Summary

WATERSHED DESCRIPTION AND MAPS

The Branford/East Haven Estuary (Estuary 8) covers an area of approximately 12,780 acres in southern Connecticut. These impaired segments are located in the central portion of Long Island Sound (LIS). All of the impaired segments in this summary are located in the municipality of Branford, with the exception of one segment located in East Haven, CT.

The Branford/East Haven Estuary includes one segment impaired for commercial shellfish harvesting and six segments impaired for direct shellfish harvesting 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. Some segments in the estuary are currently unassessed as of the writing of this document. This does not mean 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. An excerpt of the Integrated Water Quality Report is included in Table 1 (CT DEEP, 2012).

Impaired Segments

Segment 1: LIS CB Inner – Inner Branford Harbor (CT-C1_009-SB) is part of the inner estuary from Branford Point to SA/SB water quality line at railroad crossing above Route 146 crossing, Branford.

This impaired segment of the Branford/East Haven Estuary has a water quality classification of SB. Designated uses include commercial shellfish harvesting, recreation, habitat for marine fish and other aquatic life and wildlife, industrial water supply, and navigation. Segment 1 (CT-C1_009-SB) of the estuary is impaired due to elevated bacteria concentrations, affecting the designated use of commercial shellfishing.

Impaired Segment Facts

Impaired Segments, Classifications, and Areas (square miles):

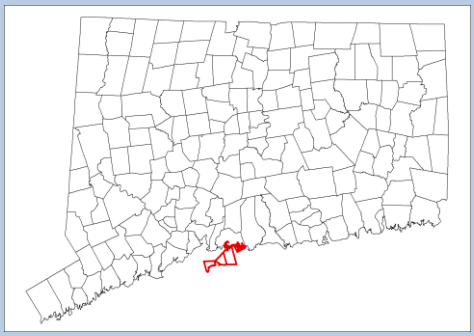
Segment 1: LIS CB Inner - Inner Branford Harbor (*CT-C1_009-SB*); SB; 0.31
Segment 2: LIS CB Shore - Stony Creek (East) (*CT-C2_011*); SA; 0.55
Segment 3: LIS CB Shore - Stony Creek (West) (*CT-C2_012*); SA; 0.38
Segment 4: LIS CB Shore - Indian Neck (*CT-C2_013*); SA; 0.57
Segment 5: LIS CB Midshore - Thimble Islands (*CT-C3_009-I*); SA; 1.46
Segment 6: LIS CB Midshore - Indian Neck (*CT-C3_010*); SA: 8.55
Segment 7: LIS CB Midshore - East Haven (*CT-C3_011*); SA: 8.15

Municipalities: Branford and East Haven

Designated Use Impairments: Shellfish, Marine Aquatic Life

MS4 Applicable? Yes

Applicable Season: Recreation Season (May 1 to September 30),Year Round for Shellfish Uses



Segment 2: LIS CB Shore - Stony Creek (East) (CT-C2_011) extends from the shoreline to approximately 1,000 feet offshore in Branford and Guilford, CT, from Flying Point to Clark Point area (includes Hoadley Neck, Narrows Island).

Segment 3: LIS CB Shore - Stony Creek (West) (CT-C2_012) extends from the shoreline to approximately 1,000 feet offshore in Branford, CT. Segment 3 is located from Brown Point to Flying Point area, including Stony Creek Beach, Saint Helena Island, Juniper Point, and Pleasant Point.

Segment 4: LIS CB Shore - Indian Neck (CT-C2_013) extends from the shoreline to approximately 1,000 feet offshore in Branford, CT, from Clam Island to Brown Point area including Haycock Point.

Segment 5: LIS CB Midshore - Thimble Islands (CT-C3_009-I) begins approximately 1,000 feet offshore beyond Segments 2 (CT-C2_011) and 3 (CT-C2_012) out to the 50-foot contour line.

Segment 6: LIS CB Midshore - Indian Neck (CT-C3_010) begins approximately 1000 ft offshore (Indian Neck, Little Point), out to 50 ft contour, Branford.

Segment 7: LIS CB Midshore - East Haven (CT-C3_011) SA water from SA/SB water boundary along outer New Haven and Branford Harbors out to 50 ft contour, East Haven.

These impaired segments (Segments 2 – 7) of the Branford/East Haven Estuary have a water quality classification of SA. Designated uses include shellfish harvesting for direct human consumption, recreation, habitat for marine fish and other aquatic life and wildlife, industrial water supply, and navigation. These segments of the estuary are impaired due to elevated bacteria concentrations, affecting the designated use of direct shellfishing.

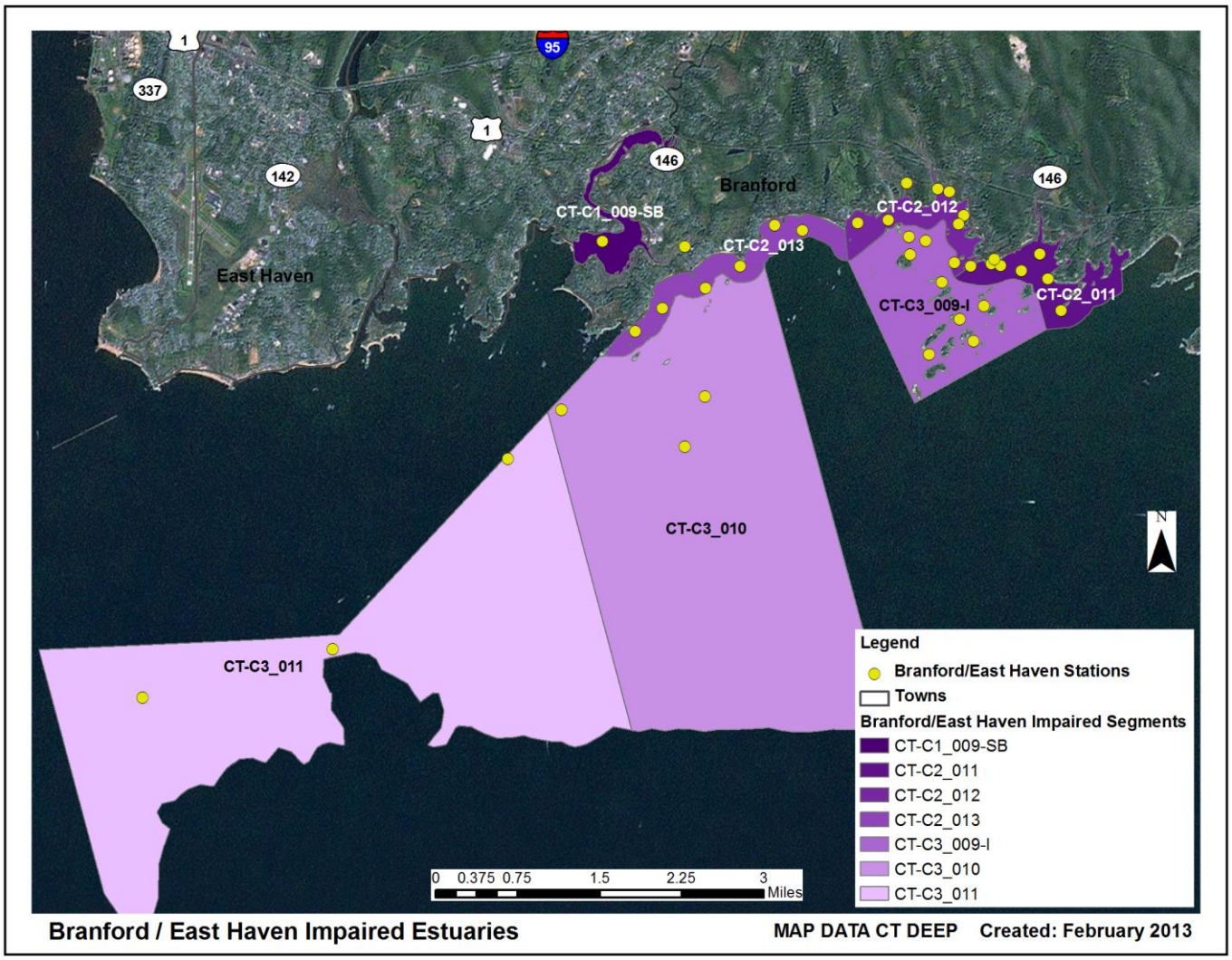
Table 1: Impaired segments in the Branford/East Haven Estuary from the Connecticut 2012 Integrated Water Quality Report

Waterbody ID	Waterbody Name	Location	Square Miles	Marine Aquatic Life	Recreation	Fish Consumption	Direct Shellfish	Commercial Shellfish
CT-C1_009-SB	LIS CB Inner - Inner Branford Harbor, Branford	Central portion of LIS, Inner Estuary, from Branford Point, US to SA/SB water quality line at RR crossing above Route 146 crossing, Branford.	0.31	U	U	FULL	///	NOT
CT-C2_011	LIS CB Shore - Stony Creek (East), Branford	Central portion of LIS from Flying Point to Clark Point area (includes Hoadley Neck, Narrows Island), out approximately 1000 ft offshore, Branford/Guilford.	0.55	U	U	FULL	NOT	///

Waterbody ID	Waterbody Name	Location	Square Miles	Marine Aquatic Life	Recreation	Fish Consumption	Direct Shellfish	Commercial Shellfish
CT-C2_012	LIS CB Shore - Stony Creek (West), Branford	Central portion of LIS from Brown Point to Flying Point area (includes Stony Creek Beach, Saint Helena Island, Juniper Point, Pleasant Point), out approximately 1000 ft offshore, Branford.	0.38	U	FULL	FULL	NOT	///
CT-C2_013	LIS CB Shore - Indian Neck, Branford	Central portion of LIS from Clam Island to Brown Point area (includes Haycock Point), out approximately 1000 ft offshore, Branford.	0.57	U	U	FULL	NOT	///
CT-C3_009-I	LIS CB Midshore - Thimble Islands, Branford	Central portion of LIS from approximately 1000 ft offshore (Thimble Islands), out to 50 ft contour, Branford.	1.46	FULL	U	FULL	NOT	///
CT-C3_010	LIS CB Midshore - Indian Neck, Branford	Central portion of LIS from approximately 1000 ft offshore (Indian Neck, Little Point), out to 50 ft contour, Branford.	8.55	FULL	U	FULL	NOT	///
CT-C3_011	LIS CB Midshore - East Haven	Central portion of LIS, SA water from SA/SB water boundary along outer New Haven and Branford Harbors out to 50 ft contour, East Haven.	8.15	NOT	U	FULL	NOT	///

Shaded cells indicate impaired segment addressed in this TMDL
FULL = Designated Use Fully Supported
NOT = Designated Use Not Supported
U = Unassessed
/// = Not Applicable to Segment

Figure 1: GIS map featuring general information for impaired segments in the Branford/East Haven Estuary



Shellfish Bed Classifications, Closures, and Lease Locations

The Connecticut Department of Agriculture/Bureau of Aquaculture (CT DA/BA) is responsible for regulating shellfish harvesting (http://www.ct.gov/doag/cwp/view.asp?a=1369&Q=259170). A shellfish growing area is defined by CT DA/BA as any area that supports or could support the growth and/or propagation of molluscan shellstock. Shellfish are defined by CT DA/BA as oysters, clams, mussels, and scallops, either shucked or in the shell, fresh or frozen, whole or in part. All shellfish growing areas are classified by CT DA/BA in accordance with the Interstate Shellfish Sanitation Conference (ISSC) National Shellfish Sanitation Program Model Ordinance (NSSP-MO) and CT General Statutes Chapter 491, §26-192e. These classifications, summarized below, are established to minimize health risks and may restrict the take and use of shellfish from some areas. They are based on fecal coliform bacteria standards as provided in the NSSP-MO (Interstate Shellfish Sanitation Conference, 2007). Any shellfish area, regardless of classification, may be temporarily closed to all activities when a potential public health emergency exists as a result of a storm event, flooding, sewage, chemical, or petroleum discharges, or a hazardous algal bloom.

Shellfish harvesting has been divided into two designated uses as specified in the Connecticut WQS: shellfish harvesting suitable for direct human consumption (Class SA waters), and shellfish harvesting suitable for commercial operations requiring depuration or relay (Class SB waters). The impaired segments in the Branford/East Haven Estuary include both Class SA and SB waters.

Shellfish Bed Classifications and Closures in the Branford/East Haven Estuary

Shellfish classification areas in the Branford/East Haven Estuary are shown in Figure 2. The following classifications for shellfish growing areas are defined by CT DA/BA:

APPROVED AREA: Is a classification used to identify a growing area that is safe for the direct marketing or consumption of shellfish. An area may be classified as Approved when a sanitary survey finds that there is no contamination from pathogenic organisms, poisonous or deleterious substances, marine biotoxins, or bacteria concentrations exceeding the bacteriological standards for a growing area in this classification as set forth in the NSSP MO. The water quality in the growing area shall also meet the bacteriological standards for an Approved classification.

CONDITIONALLY APPROVED AREA: Is a classification used to identify a growing area that is safe for the direct, marketing or consumption of shellfish when the area is in the open status. The area must meet the criteria for Approved classification when the area is in the open status, and meets the criteria for the restricted classification in the closed status. An area may be classified as Conditionally Approved when a sanitary survey finds that the area can remain in the open status for a reasonable period of time, the factors impacting the area are known and predictable and do not preclude a reasonable management approach, and the water quality correlates with the environmental conditions or other factors affecting the distribution of pollutants into the growing area. Each Conditionally Approved growing area must have a written management plan that is adhered to by all responsible parties.

RESTRICTED RELAY/DEPURATION: Is a classification used to identify a growing area where harvested shellstock is relayed to Approved or Conditionally Approved waters for natural cleansing or depuration*. An area may be classified as Restricted Relay when a sanitary survey finds a limited degree of pollution and levels of fecal pollution, human pathogens, or poisonous or deleterious substances so that shellstock can be made safe for human consumption by either relaying, depuration or low acid-canned food processing. Shellfish may only be harvested from Restricted areas by special license, and may not be directly harvested for market or consumption.

*Depuration means the process of reducing the pathogenic organisms that may be present in shellstock by using a controlled aquatic environment as the treatment process.

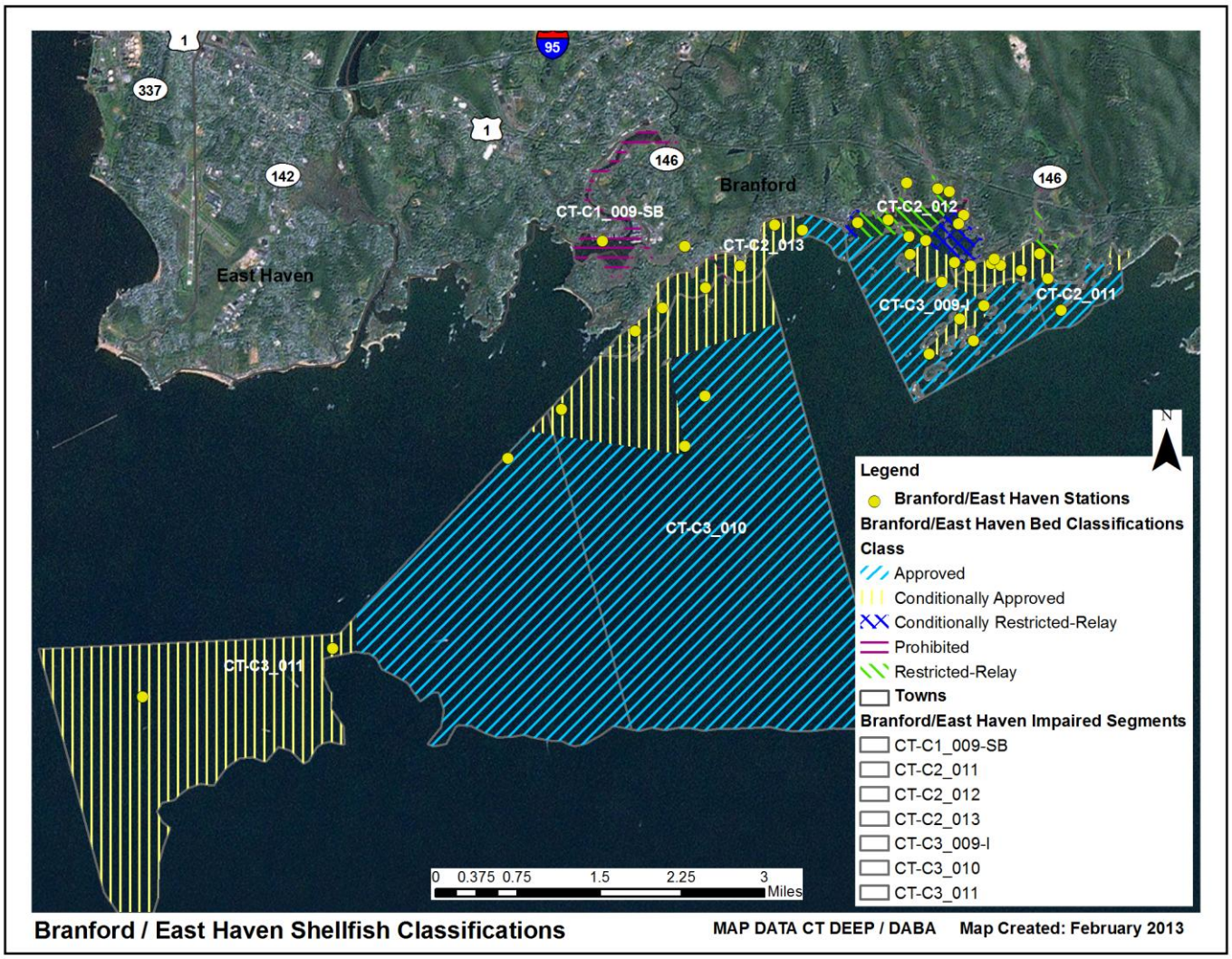
CONDITIONALLY RESTRICTED: Is a classification used to identify a growing area where a sanitary survey has found that the area meets the criteria for Restricted classification when the area is in the open status and meets the criteria for Prohibited classification when the area is in the closed status. Each Conditionally Restricted growing area must have a written management plan that designates whether harvested shellfish are relayed or depurated. Shellfish may only be harvested from Conditionally Restricted areas by special license, and may not be directly harvested for market or consumption.

PROHIBITED: Is a classification used to identify a growing area where there has been no current sanitary survey or where a sanitary survey has found that the area is adjacent to a sewage treatment plant or other point source outfall with public health significance; pollution sources may unpredictably contaminate the growing area; the growing area is contaminated with fecal waste so that the shellfish may

be vectors for disease microorganisms; and/or that the concentration of biotoxin is sufficient to cause a public health risk. Shellfish may not be harvested from Prohibited areas except for seed oystering or depletion of the areas.

As discussed above and shown in Table 1, Segments 1 – 7 did not meet their designated use for shellfish harvesting for direct and commercial consumption due to bacteria. Segment 1 (CT-C1_009-SB) is Prohibited from commercial shellfish harvesting. Segment 2 (CT-C2_011 is split between Approved, Conditionally Approved and Restricted-Relay, with a small Prohibited area in Stony Creek. Segment 3 (CT-C2_012) is Prohibited near Stony Creek Beach, with additional areas Restricted-Relay and Conditionally Restricted-Relay. Segment 4 (CT-C2_013) has shoreline areas split between Conditionally Approved and Approved waters, with a small section Prohibited. Segments 5 (CT-C3_009-I) is primarily Approved with an area that is Conditionally Approved. Segments 6 (CT-C3_010) and 7 (CT-C3_011) are also split between Approved and Conditionally Approved (Figure 2).

Figure 2: GIS map featuring Shellfish Bed Classifications and Closures for the impaired segments in the Branford/East Haven Estuary



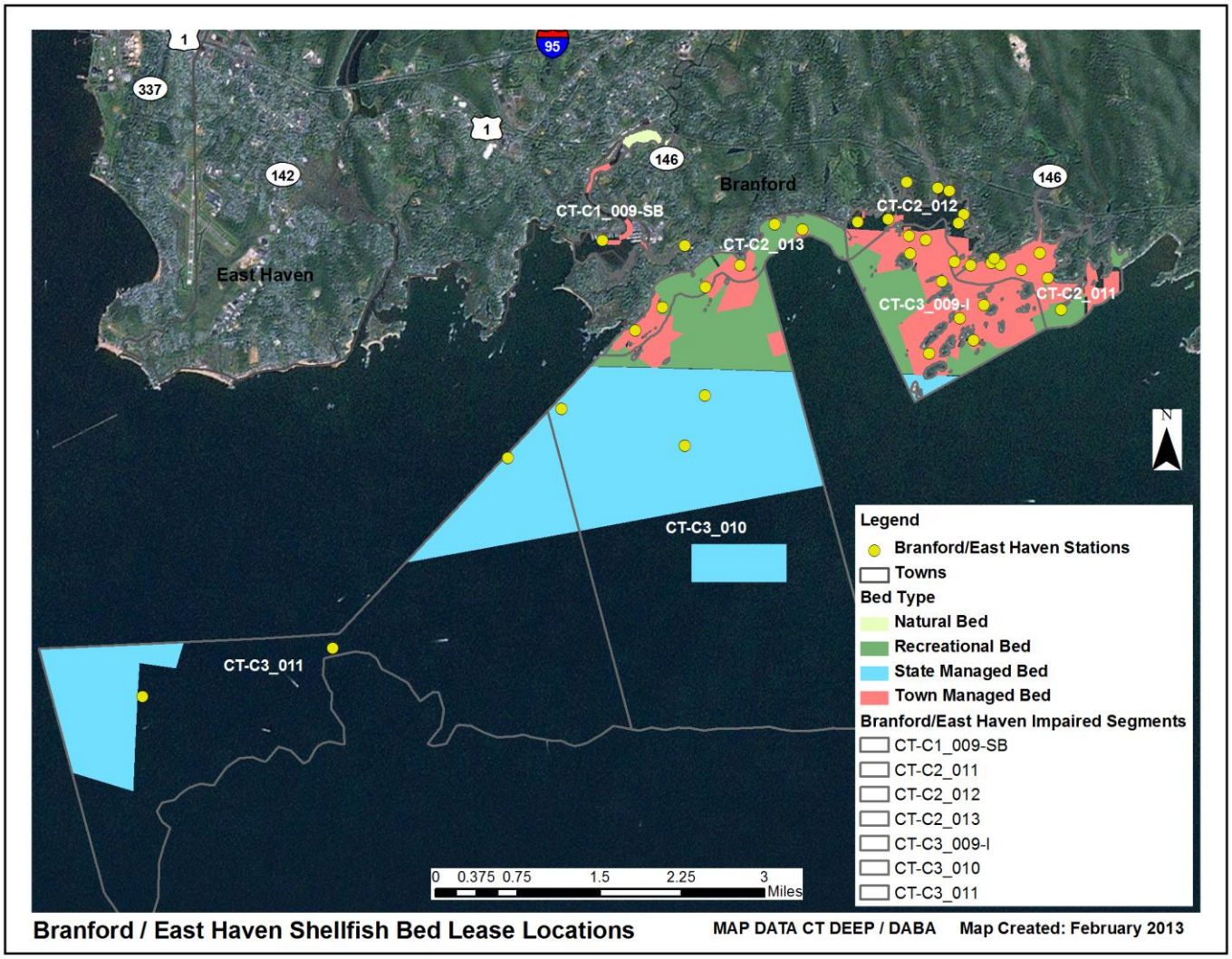
Shellfish Bed Lease Locations

Shellfish beds in the Branford/East Haven Estuary are also classified by their management (Figure 3). CT DA/BA defines these areas as follows:

> **State and Town Beds**: In 1881, a line, referred to as the Commissioner's Line, was established to divide the waters of the State into northern and southern sections. All beds south of this line are State beds and most beds north of this line are town beds. Town beds are leased, owned or managed through the local shellfish commission. However, CT DA/BA still controls all the licensing and regulations for both state and town beds. For example, DA/BA issues licenses and determines when an area will be closed to shellfishing due to a change in water quality. Towns may require additional permits to work in waters under local jurisdiction. Beds north of the line in Westport, Milford, West Haven, and New Haven are exceptions to this as they are fully under State control.
>
> **State and Town Natural Beds**: Natural beds get their name from the fact that shellfish, especially oyster, naturally inhabited the area. These areas tend to be closer to shore, usually at the mouth of a river. Natural beds have specific regulations concerning their use, including licensing and harvesting methods. They are predominately seed beds that cannot be mechanically harvested. Use of natural beds requires a Relay/Transplant License I or II and/or Seed Oyster Harvesting License from CT DA/BA. Any person assisting in the harvesting of seed oysters must have a Helper's License. These beds cannot be leased or subdivided; they are to remain open to any properly licensed harvester. State natural beds are natural beds south of the Commissioner's Line. Descriptions of these beds can be found in §3295 of the Connecticut General Statutes (CGS), revision of 1918. Not all beds listed in §3295 were mapped, and many natural beds in State waters off Greenwich are managed through leases. Town natural beds were defined by law under §2326 of the CGS of 1888. Each town had the opportunity to map areas to be considered natural beds. The documents, written descriptions, and maps were submitted to the Superior Court with jurisdiction for that town. Several towns did not avail themselves to this opportunity, and some, such as Westport, have changed the delineation of their natural beds in recent court decisions. There are also areas that may have been declared natural beds, but are now leased.

Portions of shellfish beds in Segment 1 (CT-C1_009-SB) are natural beds. Portions of shellfish beds in 6 segments are town-managed beds: Segments 1 (CT-C1_009-SB), 2 (CT-C2_011), 3 (CT-C2_012), 4 (CT-C2_013), 5 (CT-C3_009-I) and 6 (CT-C3_010). Portions of shellfish beds in Segments 5 (CT-C3_009-I), 6 (CT-C3_010) and 7 (CT-C3_011) are State-managed beds (Figure 3).

Figure 3: GIS map featuring Shellfish Bed Lease Locations for the impaired segments in the Branford/East Haven Estuary



WHY IS A TMDL NEEDED?

For saltwater segments, the indicator bacteria, fecal coliform, is used in the CT Water Quality Standards (WQS) to assess shellfish uses for Class SA and SB waters (CTDEEP, 2011). Enterococcus is the indicator bacteria used to assess recreational uses for Class SA and SB waters. All data are from CT DEEP, USGS, Bureau of Aquaculture, or volunteer monitoring efforts at stations located on the impaired segments.

Segment 1 (CT-C1_009-SB) is a Class SB saltwater waterbody. Applicable designated uses include commercial shellfish harvesting, recreation, habitat for marine fish and other aquatic life and wildlife, industrial water supply, and navigation. Water quality analyses were conducted using data from two sampling locations on Segment 1 (Table 2). The water quality criteria for fecal coliform, along with bacteria sampling results from 2000 – 2011, are presented in Table 13. These segments of the estuary are impaired due to elevated bacteria concentrations, affecting the designated use of commercial shellfishing. To aid in identifying possible bacteria sources, the geometric mean was also calculated for wet-weather and dry-weather sampling days for all stations in Segment 1, where possible (Table 13).

Segment 1 (CT-C1_009-SB): As shown in Table 13, 90% less than values exceeded the WQS for fecal coliform once at a station in Segment 1 during the sampling period. Geometric mean values also exceeded the WQS for fecal coliform once at Station 014-03.3 in 2010 during the sampling period and three times at Station 014-38.0 in 2004, 2005 and 2008. Geometric means for data collected during the entire sampling period were also calculated for each station using wet and dry-weather conditions, resulting in an exceedance of WQS for fecal coliform during wet-weather at Station 014-38.0.

Segments 2 - 7 are Class SA saltwater waterbodies. Their applicable designated uses include shellfish harvesting for direct human consumption, recreation, habitat for marine fish and other aquatic life and wildlife, industrial water supply, and navigation. Water quality analyses were conducted using data from eight sampling locations on Segments 2 (CT-C2_011), 3 (CT-C2_012) and 5 (CT-C3_009-I), seven sampling locations on Segment 4 (CT-C2_013) and three sampling locations on Segments 6 (CT-C3_010) and 7 (CT-C3_011). The water quality criteria for fecal coliform, along with bacteria sampling results from 2000 – 2011, are presented in Tables 14 – 19. These segments of the estuary are impaired due to elevated bacteria concentrations, affecting the designated use of direct shellfishing.

Segment 2 (CT-C2_011): As shown in Table 14, geometric mean values exceeded the WQS for fecal coliform three times at Station 014-15.9 and once at Station 014-22.0. 90% less than values exceeded the WQS for fecal coliform at seven of the eight Stations in Segment 2 during the sampling period. Geometric means for data collected during the sampling period were also calculated for each station using wet and dry-weather conditions, with wet-weather fecal coliform results exceeding WQS at Station 014-15.9.

Segment 3 (CT-C2_012): As shown in Table 15, 90% less than values exceeded the WQS for fecal coliform at six Stations multiple years during the sampling period. Geometric mean values exceeded the WQS for fecal coliform for five of the eight Stations during the sampling period. Geometric means for data collected during the sampling period were also calculated for each station using wet and dry-weather conditions, resulting in geomeans that exceeded the WQS for fecal coliform at Stations 014-16.1 and 014-16.3 for both dry and wet weather.

Segment 4 (CT-C2_013): As shown in Table 16, 90% less than values exceeded the WQS for fecal coliform at least once at four of the seven Stations during the sampling period. Geometric mean values also exceeded the WQS for fecal coliform for Station 014-04.9 in Segment 4 during the sampling period. Geometric means for data collected during the sampling period were also calculated for each station using wet and dry-weather conditions, resulting in no exceedance of the WQS for fecal coliform.

Segment 5 (CT-C3_009-I): As shown in Table 17, 90% less than values exceeded the WQS for fecal coliform at least once during the sampling period at Stations 014-13.2, 014-14.3, 014-11.4, and 014-11.2. Geometric mean values did not exceed the WQS for fecal coliform for any sampling year in Segment 5 during the sampling period. Geometric means for data collected during the sampling period were also calculated for each station using wet and dry-weather conditions; results did not exceed the WQS for fecal coliform at any station.

Segment 6 (CT-C3_010): As shown in Table 18, 90% less than values exceeded the WQS for fecal coliform once at Station 014-05.2 in 2009 and Station 014-09.6 in 2010 during the sampling period. Geometric mean values did not exceed the WQS in Station 6 for any sampling year. Geometric means for data collected during the sampling period were also calculated for each station using wet and dry-weather conditions; results did not exceed the WQS for fecal coliform at any station.

Segment 7 (CT-C3_011): As shown in Table 19, 90% less than values did not exceed the WQS for fecal coliform at any station during the sampling period. Also, geometric mean values did not exceed the WQS for fecal coliform at any station during the sampling period. Geometric means for data collected during the sampling period were also calculated for each station using wet and dry-weather conditions; results did not exceed the WQS for fecal coliform at any station.

With this most recent evaluation of data segment CT-C3_011 will be proposed for a delisting during the next IWQR (2014). The segment and associated text remain in this document due to the issuing of this TMDL falling between IWQR publications.

Due to the elevated bacteria measurements presented in Tables 13 – 19, these seven impaired segments 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.

Table 2: Sampling station location description for the impaired segments in the Branford/East Haven Estuary

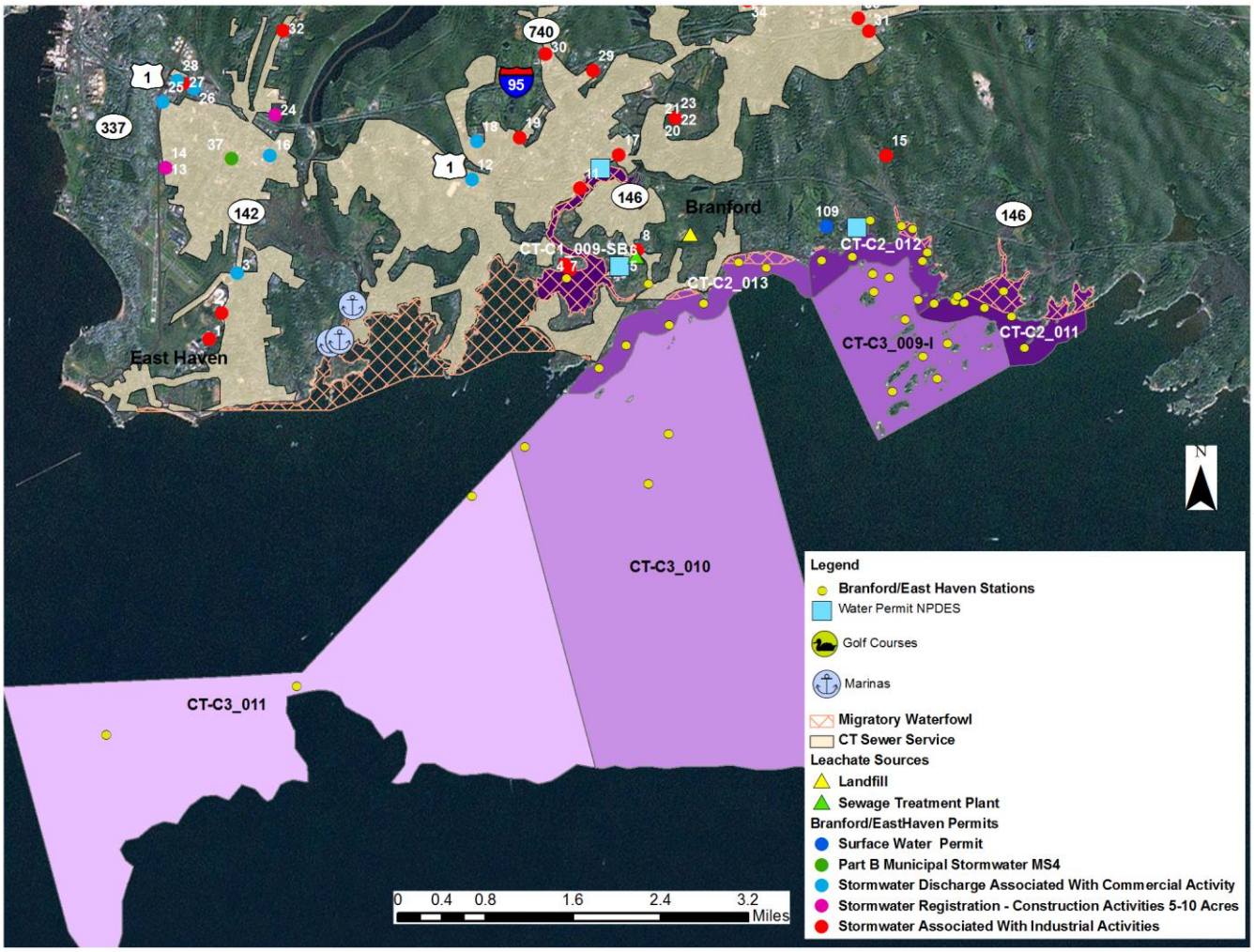
Waterbody ID	Station	Station Description	Municipality	Latitude	Longitude
Segment 1: CT-C1_009-SB	014-38.0	Limewood stream	Branford	41.2612	-72.8012
	014-03.3	Branford River	Branford	41.2619	-72.8157
Segment 2: CT-C2_011	014-15.5	Flying Pt.	Branford	41.2589	-72.7474
	014-15.0	South Of Narrows Is	Branford	41.2528	-72.7353
	014-15.4	Sw Of Leetes Is.	Branford	41.2569	-72.7375
	014-15.2	North Of Bear Is.	Branford	41.2580	-72.7423
	014-15.7	S. Of Flying Pt.	Branford	41.2586	-72.7511
	014-15.3	Flying Pt.	Branford	41.2587	-72.7459
	014-15.9	Flying Pt.	Branford	41.2595	-72.7470
	014-22.0	Ne Of Bear Is.	Branford	41.2602	-72.7389
Segment 3: CT-C2_012	014-16.1	Stony Creek	Branford	41.2653	-72.7523
	014-12.4	South Of Wheeler Is.	Branford	41.2591	-72.7539
	014-16.2	Se Of Pleasant Pt.	Branford	41.2642	-72.7532
	014-29.0	N Of St Helena Is.	Branford	41.2643	-72.7709
	014-28.0	North Of Andrews Is.	Branford	41.2647	-72.7655
	014-16.6	Stony Creek	Branford	41.2684	-72.7549
	014-16.3	Stony Creek	Branford	41.2689	-72.7568
	014-28.2	Tilcon	Branford	41.2696	-72.7624
Segment 4: CT-C2_013	014-04.9	Maltby Cove	Branford	41.2490	-72.8128
	014-06.0	Sedge Island	Branford	41.2500	-72.8099
	014-07.0	Bishop Rk	Branford	41.2530	-72.8051
	014-07.2	N Of Foot Rks	Branford	41.2557	-72.7976
	014-08.0	S Of Haycock Pt	Branford	41.2586	-72.7916
	014-09.0	Spring Rock Rd	Branford	41.2633	-72.7806

Waterbody ID	Station	Station Description	Municipality	Latitude	Longitude
	014-09.2	S Of Hotchkiss Grove	Branford	41.2640	-72.7854
Segment 5: CT-C3_009-I	014-13.2	South Of High I.	Branford	41.2470	-72.7584
	014-25.0	South Of Money Is.	Branford	41.2487	-72.7506
	014-24.0	Thimble Is Anchorage	Branford	41.2516	-72.7530
	014-14.3	Nw Of Davis Is.	Branford	41.2533	-72.7488
	014-26.0	North Of Gov. Is.	Branford	41.2565	-72.7562
	014-11.4	East Of Rogers Is.	Branford	41.2601	-72.7617
	014-11.3	North Of Rogers Is.	Branford	41.2620	-72.7590
	014-11.2	South Of Lewis Is.	Branford	41.2625	-72.7619
Segment 6: CT-C3_010	014-05.2	Se Of 5' Rk	Branford	41.2396	-72.8229
	014-09.6	Sw Of Gangway Rk	Branford	41.2347	-72.8012
	014-09.5	Nw Of Gangway Rk	Branford	41.2413	-72.7977
Segment 7: CT-C3_011	044-01.1	buoy "NH"	East Haven	41.2015	-72.8963
	044-01.0	Townshend Ledge R"10A"	East Haven	41.2079	-72.8629
	014-05.3	Se Of Cow And Calf	Branford	41.2331	-72.8322

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 Branford/East Haven Estuary are presented in Table 3 and Figure 4. 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 mean that there are no data or impairments in existence in the segment. There are data from permitted sources for some segments, 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.

Figure 4: Potential bacteria sources to the impaired segments in the Branford/East Haven Estuary



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).

Table 3: Potential bacteria sources to the impaired segments in the Branford/East Haven Estuary

Segment #	Impaired Segment	Permit Source	Illicit Discharge	CSO/SSO Issue	Failing Septic System	Marinas	Stormwater Runoff	Nuisance Wildlife/Pets	Other
1	LIS CB Inner - Inner Branford Harbor, Branford CT-C1_009-SB	x	x				x	x	x
2	LIS CB Shore - Stony Creek (East), Branford CT-C2_011	x	x		x		x	x	
3	LIS CB Shore - Stony Creek (West), Branford CT-C2_012	x	x		x		x	x	x
4	LIS CB Shore - Indian Neck, Branford CT-C2_013	x	x				x	x	x
5	LIS CB Midshore - Thimble Islands, Branford CT-C3_009-I	x	x		x		x	x	x
6	LIS CB Midshore - Indian Neck, Branford CT-C3_010	x	x			x	x	x	x
7	LIS CB Midshore - East Haven CT-C3_011		x			x	x	x	

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 municipalities that drain to the Branford/East Haven estuary is included in Table 5. Additional investigation and monitoring could reveal the presence of other discharges in the estuary.

Table 4: General categories list of permitted discharges

Permit Code	Permit Description Type	Number in Estuary
CT	Surface Water Discharges	2
GPL	Discharge of Swimming Pool Wastewater	0
GSC	Stormwater Discharge Associated with Commercial Activity	7
GSI	Stormwater Associated with Industrial Activity	23
GSM	Part B Municipal Stormwater MS4	2
GSN	Stormwater Registration – Construction	2
LF	Groundwater Permit (Landfill)	0
UI	Underground Injection	0

Permitted Sources

As shown in Table 5, there are multiple permitted discharges in Branford, East Haven and New Haven that could be contributing bacteria to the impaired segments. These facilities include the Town of

Branford Water Pollution Control Facility (WPCF), Branhaven Plaza, Stop & Shop, Branford Maintenance Facility, and multiple marinas throughout the watershed. According to the 2009 Branford Estuary Report, there are twelve commercial marinas, two private dock associations, one public anchorage area and five mooring areas in Branford waters. These include Branford Landing Marina, Goodsell Point Marina, Pine Creek Boat Yard, Bruce & Johnson's Marina and Pier 66 Marina. The high concentrations of commercial marinas in the Branford River, and to a lesser extent in Stony Creek, are also potential pollution sources to Branford shellfish growing waters. These areas remain closed to shellfishing while the marinas are in active use. As shown in Table 6, there are water quality data available for some of these discharges. Although this data cannot be compared to the WQS as there is no single sample shellfish standard for fecal coliform, several samples were high, exceeding 2,000 colonies/100 mL or had results "too numerous to count" (TNTC), including New Haven Terminal (GSI000870), Bruce & Johnson's Marina (GSI000647), Pier 66 Marina (GSI001080), Quality Carriers (GSI001362), Town of Branford (GSI000095) and Fuchs Lubricants NE Division (GSI001054) (Table 6).

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 in or near Branford and East Haven, CT that may be affecting the Branford/East Haven Estuary

Town	Client	Permit ID	Permit Type	Site Name	Address	Map #
East Haven	Square D Company	GSI002001	Stormwater Associated With Industrial Activities	Square D Services Connecticut District	182 Commerce St	1
East Haven	Fuchs Lubricants Co.	GSI001054	Stormwater Associated With Industrial Activities	Fuchs Lubricants - Northeast Division	281 Silver Sands Rd	2
East Haven	Town Fair Tire Centers, Inc.	GSC000351	Stormwater Discharge Associated With Commercial Activity	Town Fair Tire Centers, Inc.	460 Coe Ave	3
Branford	Brewer Bruce & Johnson's Marina	GSI002061	Stormwater Associated With Industrial Activities	Brewer Bruce & Johnson's West Marina	55 Goodsell Point Rd	4
Branford	Town Of Branford	GSI002238	Stormwater Associated With Industrial Activities	Branford WPCF	75 Block Island Rd	5
Branford	Town Of Branford	CT0100048	Surface Water Permit	Branford WPCF	75 Block Island Rd	6
Branford	Goodsell Point Marina	GSI001059	Stormwater Associated With Industrial Activities	Goodsell Point Marina	65 Goodsell Point Rd	7

Town	Client	Permit ID	Permit Type	Site Name	Address	Map #
Branford	Bruce & Johnson's Branford Marina, Inc.	GSI000647	Stormwater Associated With Industrial Activities	Bruce & Johnson's Branford Marina	145 S Montowese St	8
Branford	Tilcon Connecticut Inc.	GSI000575	Stormwater Associated With Industrial Activities	Tilcon Connecticut Inc.	190 Totoket Rd	9
Branford	Tilcon Connecticut Inc.	CT0000906	Surface Water Permit	Tilcon Connecticut Inc.	190 Totoket Rd	10
Branford	Branford Landing Inc	GSI001981	Stormwater Associated With Industrial Activities	Branford Landing Marina	50 Maple St	11
Branford	Kimco Realty Corporation /Mc Corp.	GSC000324	Stormwater Discharge Associated With Commercial Activity	Branhaven Plaza	1025-1091 West Main Street	12
New Haven	Tweed-New Haven Airport Authority	GSI001113	Stormwater Associated With Industrial Activities	Tweed-New Haven Regional Airport	155 Burr St	13
New Haven	Tweed New Haven Regional Airport Authority	GSN002132	Stormwater Registration - Construction Activities 5-10 Acres	Tweed-New Haven Regional Airport	155 Burr St	14
Branford	Pine Creek Boat Yard	GSI000851	Stormwater Associated With Industrial Activities	Pine Creek Boat Yard	231 Stony Creek Rd	15
East Haven	The Stop & Shop Supermarket Company Llc	GSC000131	Stormwater Discharge Associated With Commercial Activity	Stop & Shop Store #692	370 Hemingway Ave	16
Branford	Connecticut Army National Guard	GSI000287	Stormwater Associated With Industrial Activities	National Guard Armory	87 Montowese St	17
Branford	Wal-Mart Stores East, Lp	GSC000286	Stormwater Discharge Associated With Commercial Activity	Wal-Mart Store #2232	120 Commercial Pkwy	18
Branford	Town Of Branford	GSI002110	Stormwater Associated With Industrial Activities	Branford Department Of Public Works	43 N Main St	19
Branford	Town Of Branford	GSM000068	Part B Municipal Stormwater MS4	Branford, Town Of	MS4 Permit	21
Branford	Blakeslee Prestress, Inc.	GSI001150	Stormwater Associated With Industrial Activities	Vine Properties Ii, L.L.C.	Mcdermott Drive	22
Branford	Town Of Branford	GSI000095	Stormwater Associated With	Branford Landfill	Tabor Drive	23

Town	Client	Permit ID	Permit Type	Site Name	Address	Map #
			Industrial Activities			
New Haven	City Of New Haven	GSN001820	Stormwater Registration - Construction Activities 5-10 Acres	Comprehensive Modernization Eastview 4-34	Eastern Street / Eastern Circle	24
East Haven	David Mcdermott Auto Group	GSC000264	Stormwater Discharge Associated With Commercial Activity	David Mcdermott Auto Group	655 Main St	25
East Haven	Home Depot U. S. A., Inc.	GSC000328	Stormwater Discharge Associated With Commercial Activity	Home Depot, The #6223	75 Frontage Road	26
East Haven	New Haven Terminal, Incorporated	GSI000870	Stormwater Associated With Industrial Activities	East Haven Facility	119 Frontage Rd	27
East Haven	Carmax Auto Superstore Inc	GSC000303	Stormwater Discharge Associated With Commercial Activity	Carmax Auto Superstores, Inc.	121 Frontage Road	28
Branford	First Student, Inc	GSI002063	Stormwater Associated With Industrial Activities	First Student, Inc. #12417	189 N Main St	29
Branford	Harco Laboratories, Incorporated	GSI002180	Stormwater Associated With Industrial Activities	Harco Laboratories, Inc.	186 Cedar St	30
Branford	State Of Connecticut Department Of Transportation	GSI000007	Stormwater Associated With Industrial Activities	Branford Maintenance Facility	69 Leetes Island Rd	31
East Haven	State Of Connecticut Department Of Transportation	GSI000017	Stormwater Associated With Industrial Activities	East Haven Maintenance Facility	507 N High St	32
Branford	The Wilson Arms Company	GSI000216	Stormwater Associated With Industrial Activities	Wilson Arms Company	63 Leetes Island Rd	33
Branford	454 Life Sciences	GSI002158	Stormwater Associated With Industrial Activities	454 Life Sciences	1 Commercial St	34
Branford	454 Life Sciences	GSI002400	Stormwater Associated With Industrial Activities	454 Life Sciences	1 Commercial St	35
Branford	Howmet Corporation	GSI000207	Stormwater Associated With Industrial Activities	Howmet Turbine Components Coating	4 Commercial St	36

Town	Client	Permit ID	Permit Type	Site Name	Address	Map #
East Haven	City Of East Haven	GSM000068	Part B Municipal Stormwater MS4	East Haven, City Of	MS4 Permit	37

Table 6: Industrial permits affecting the Branford/East Haven Estuary and available fecal coliform data (colonies/100mL). The results cannot be compared to the water quality standard as there is no single sample shellfish standard for fecal coliform.

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
Branford	Atlantic CS&W	GSI000250	Branford River	001 N location inside pump house pit	07/26/01	>600
Branford	Atlantic CS&W	GSI000250	Branford River	002 S location inside pump house pit	07/26/01	100
Branford	Atlantic CS&W	GSI000250	Branford River	001 N location inside pump house pit	10/16/02	10
Branford	Atlantic CS&W	GSI000250	Branford River	002 S location inside pump house pit	10/16/02	1,140
Branford	Atlantic Wire Company	GSI000250	Branford River	001-N	06/06/00	200
Branford	Atlantic Wire Company	GSI000250	Branford River	002-S	06/06/00	100
Branford	Autac	GSI000182		SD	04/17/00	10
Branford	Autac	GSI000182		SD	11/15/01	10
Branford	Birbarie Marine Sales	GSI001047	Branford River	Branford Marine Railway	11/10/00	100
Branford	Birbarie Marine Sales	GSI001047	Branford River	Branford Marine Railway	05/22/01	100
Branford	Birbarie Marine Sales	GSI001047	Branford River	Branford Marine Railway	08/08/03	100
Branford	Blakeslee Prestress	GSI001150	stream to Wards Millpond	SW-1	05/10/00	28
Branford	Blakeslee Prestress	GSI001150	stream to Wards Millpond	SW-1	05/21/01	24
Branford	Blakeslee Prestress	GSI001150	Ward's Millpond	SW1	07/09/02	0
Branford	Bruce And Johnsons Marina Inc.	GSI000647	Branford River		09/13/00	600
Branford	Bruce And Johnsons Marina Inc.	GSI000647	Branford River		09/14/01	3,100

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
Branford	Bruce And Johnsons Marina Inc.	GSI000647	Branford River	SD near B dock	09/27/02	100
Branford	CT Army National Guard	GSI000287		001	11/14/00	100
Branford	CT Army National Guard	GSI000287		outfall #1	09/25/01	1,200
Branford	CT Army National Guard	GSI000287		outfall #1	10/16/02	200
Branford	Dana Engine Controls	GSI001102	Branford Harbor	002	07/26/00	0
Branford	Dana Engine Controls	GSI001102	Branford Harbor	SW2	07/01/01	8
Branford	Dana Engine Management	GSI001102	Branford Harbor	SW2	04/22/02	0
Branford	Goodsell Point Marina	GSI001059			01/10/00	300
Branford	Pier 66 Marina	GSI001080	Branford Harbor	CB#1(P66)	01/15/01	10
Branford	Pier 66 Marina	GSI001080	Branford Harbor	CB#1	07/26/01	2,700
Branford	Pier 66 Marina	GSI001080	Branford Harbor	CB#1	03/05/03	10
Branford	Quality Carriers	GSI001362	Branford	SW1	09/14/01	3,700
Branford	Tilcon Connecticut	GSI000575	LI Sound	branford POD	06/06/00	84
Branford	Tilcon Connecticut	GSI000575	LI Sound	branford POD 02	07/26/00	0
Branford	Tilcon Connecticut	GSI000575	LI Sound	pine orchard	11/10/00	275
Branford	Tilcon Connecticut	GSI000575	LI Sound	POD 02	08/29/02	6
Branford	Tilcon Connecticut	GSI000575	LI Sound	POD 02	05/01/03	12
Branford	Town of Branford	GSI000095	LIS	SP-1	11/14/00	>6000
Branford	Town of Branford	GSI000095	Sybil Creek/Branford River	SP-1	11/20/01	>6000
Branford	Town of Branford	GSI000095	Sybil Creek/Branford River	SP-1	09/26/02	>2,000
Branford	Turbine Components	GSI000207	Branford River	001	11/14/00	10
Branford	Turbine Components	GSI000207	Branford River	002	09/19/00	0
Branford	Turbine Components	GSI000207	Branford River	001	08/10/01	120
Branford	Turbine Components	GSI000207	Branford River	002	08/10/01	158

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
Branford	Turbine Components	GSI000207	Branford River	#1	08/20/02	320
Branford	Turbine Components	GSI000207	Branford River	#2	08/20/02	8
Branford	Turbine Components	GSI000207	Branford River	#1	07/16/03	6
Branford	Turbine Components	GSI000207	Branford River	#2	07/16/03	3
East Haven	Electric Services	GSI000373	Morris Cove	CB near loading dock	09/21/01	100
East Haven	Electric Services	GSI000373	Morris Cove	CB near loading dock	09/25/01	170
East Haven	Electric Services	GSI000373	Long Island Sound	OF-1	09/16/02	400
East Haven	Electric Services	GSI000373	Morris Creek/Long Island Sound	OF-1-CB	07/16/03	10
East Haven	Fuchs Lubricants NE Div.	GSI001054			09/23/00	1,800
East Haven	Fuchs Lubricants NE Div.	GSI001054			11/15/01	1,200
East Haven	Fuchs Lubricants NE Div.	GSI001054		001	09/26/02	600
East Haven	Fuchs Lubricants NE Div.	GSI001054		002	09/26/02	>10,000
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #1 (EH-4)	07/26/01	5,500
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #2 (EH-3)	07/26/01	100
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #3 (EH-2)	07/26/01	200
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #4 (EH-1)	07/26/01	100
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #5 (EH-5)	07/26/01	>600
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #6 (EH-6)	07/26/01	>600
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #7 (EH-7)	07/26/01	>600
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #1 (EH-1)	09/14/01	10
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #2 (EH-2)	09/14/01	100

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #3 (EH-3)	09/14/01	>600
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #4 (EH-4)	09/14/01	>600
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #5 (EH-5)	09/14/01	>600
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #6 (EH-6)	09/14/01	10
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #7 (EH-7)	09/14/01	>600
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #1 (EH-1)	08/29/02	160
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #2 (EH-2)	08/29/02	10
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #3 (EH-3)	08/29/02	120
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #4 (EH-4)	08/29/02	>600
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #5 (EH-5)	08/29/02	>600
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #6 (EH-6)	08/29/02	>600
East Haven	New Haven Terminal	GSI000870	Tuttle Brook	Outfall #7 (EH-7)	08/29/02	60

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 living in the UA portion of the municipality. 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 Branford/East Haven Estuary are located within the Town of Branford and the City of East Haven, CT. These municipalities have designated urban areas, as defined by the U.S. Census Bureau and are required to comply with the General Permit for the Discharge of Stormwater from Small Municipal Storm Sewer Systems (MS4 permit) issued by CT DEEP (Figure 5). 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 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/deep/stormwater).

There are potentially nineteen MS4 outfalls that have been sampled for *E. coli* bacteria in the watershed in Branford and East Haven, discharging directly to the shoreline of LIS or indirectly through the Branford River(Table 7). Although the results cannot be compared to the water quality standard as there is no single sample shellfish standard for *E. coli*, high counts were detected at five of the seven outfalls in Branford and twelve of the twelve outfalls in East Haven.

Figure 5: MS4 areas near the Branford/East Haven Estuary

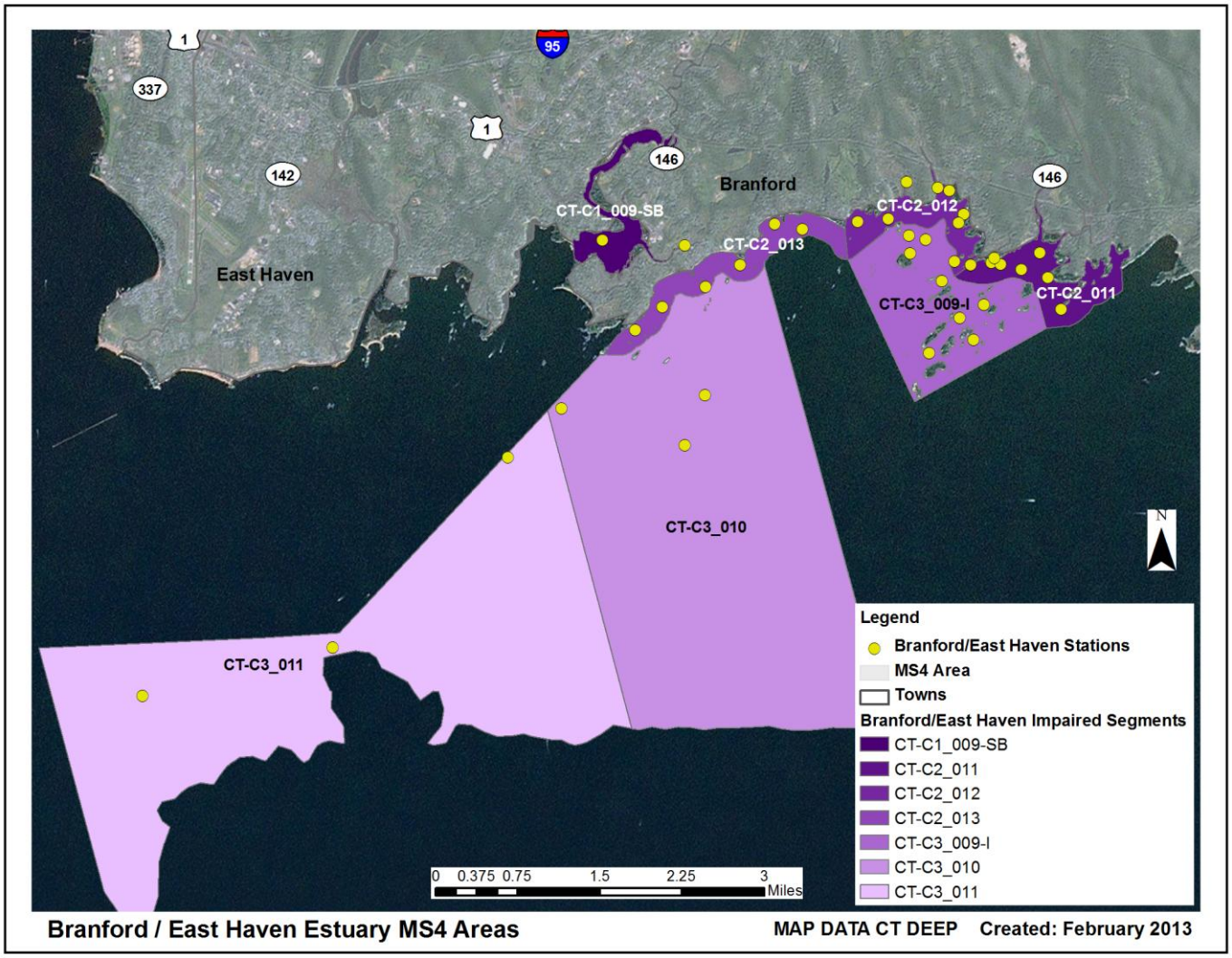


Table 7: List of MS4 sample locations and *E. coli* (colonies/100 mL) results in the Branford/East Haven Estuary. The results cannot be compared to the water quality standard as there is no single sample shellfish standard for *E. coli*.

Town	Location	MS4 Type	Receiving Waters	Sample Date	Result
Branford	Burban Dr	Residential	LIS	10/12/05	20
Branford	Burban Dr	Residential	LIS	09/14/06	8
Branford	Burban Dr	Residential	LIS	08/08/07	0
Branford	Burban Dr	Residential	LIS	9/6/2008	0
Branford	Burban Dr	Residential	LIS	9/26/2008	940
Branford	Burban Dr	Residential	LIS	3/13/2010	215
Branford	Commercial Pkwy	Commercial	LIS	10/12/05	0
Branford	Commercial Pkwy	Commercial	LIS	09/14/06	0
Branford	Commercial Pkwy	Commercial	LIS	08/08/07	0
Branford	Commercial Pkwy	Commercial	LIS	9/6/2008	0

Town	Location	MS4 Type	Receiving Waters	Sample Date	Result
Branford	Commercial Pkwy	Commercial	LIS	9/26/2008	0
Branford	Commercial Pkwy	Commercial	LIS	3/13/2010	25
Branford	North End Industrial Rd			09/14/06	55
Branford	North End Industrial Rd			08/08/07	0
Branford	North End Industrial Rd			9/6/2008	820
Branford	North End Industrial Rd			9/26/2008	60
Branford	North End Industrial Rd			10/12/05	0
Branford	Rte #1 & Cherry Hill	Commercial	LIS	10/12/05	1,050
Branford	Rte #1 & Cherry Hill	Commercial	LIS	09/14/06	6
Branford	Rte #1 & Cherry Hill	Commercial	LIS	08/08/07	0
Branford	Rte #1 & Cherry Hill	Commercial	LIS	9/6/2008	40
Branford	Rte #1 & Cherry Hill	Commercial	LIS	9/26/2008	380
Branford	Rte #1 & Cherry Hill	Commercial	LIS	3/13/2010	0
Branford	Rte 139 Bridge	Commercial	Branford River to LIS	3/13/2010	86
Branford	Sycamore Way	Commercial	LIS	10/12/05	40
Branford	Sycamore Way	Commercial	LIS	09/14/06	10
Branford	Sycamore Way	Commercial	LIS	08/08/07	0
Branford	Sycamore Way	Commercial	LIS	9/6/2008	84
Branford	Sycamore Way	Commercial	LIS	9/26/2008	0
Branford	Sycamore Way	Commercial	LIS	3/13/2010	321
Branford	Victoria Dr	Residential	LIS	10/12/05	480
Branford	Victoria Dr	Residential	LIS	09/14/06	6
Branford	Victoria Dr	Residential	LIS	08/08/07	0
Branford	Victoria Dr	Residential	LIS	9/6/2008	880
Branford	Victoria Dr	Residential	LIS	9/26/2008	0
Branford	Victoria Dr	Residential	LIS	3/13/2010	226
East Haven	C1	Commercial		12/29/05	2,152
East Haven	C1-Main St W @ Tuttle Brook	Commercial		07/18/07	17,329
East Haven	C1-Main St W @ Tuttle Brook	Commercial		07/23/07	39,726
East Haven	C2	Commercial		12/29/05	442
East Haven	C2-Hemmingway Ave Ext @ Farm River	Commercial		07/18/07	3,873
East Haven	C2-Hemmingway Ave Ext @ Farm River	Commercial		07/23/07	2,420
East Haven	I1	Industrial		12/29/05	40
East Haven	I1-near Panagross Circle	Industrial		07/18/07	19,863
East Haven	I1-near Panagross Circle	Industrial		07/23/07	48,392
East Haven	I2	Industrial		12/29/05	703
East Haven	I2-Commerce St @ Bear Circle	Industrial		07/18/07	4,352
East Haven	I2-Commerce St @ Bear Circle	Industrial		07/23/07	24,066

Town	Location	MS4 Type	Receiving Waters	Sample Date	Result
East Haven	R1	Residential		12/29/05	48,392
East Haven	R1-Englewood Dr outlet	Residential		07/18/07	24,196
East Haven	R1-Englewood Dr outlet	Residential		07/23/07	48,392
East Haven	R2	Residential		12/29/05	418
East Haven	R2-Russo Avenue outlet	Residential		07/18/07	24,196
East Haven	R2-Russo Avenue outlet	Residential		07/23/07	10,950

Publicly Owned Treatment Works

According to the 2009 Branford Estuary Report, there is only one water pollution control facility (WPCF), the Branford WPCF, which discharges to the Branford shellfish growing waters. The Branford WPCF underwent a major expansion that was completed in August 2002. The new WPCF is a secondary treatment plant with year-round disinfection using UV light (beginning in October 2001), designed average daily flow of 4.9 mgd (increase of 2.4 mgd) and a discharge to the Branford River across from the Branford Yacht Club, approximately 2,160 feet down river from the WPCF. A stone quarry operation (Tilcon Connecticut, Inc.) and a wire manufacturing operation (Atlantic Wire) are the only permitted industrial wastewater discharges that impact Branford shellfish growing waters. According to the 2001 East Haven Estuary Report, there are no WPCFs in East Haven.

Table 8: Wastewater treatment plant fecal coliform (colonies/100 mL) data discharging to the Branford/East Haven Estuary

Town	Permitee	Permit Number	Receiving Water	Date	30-Day Geometric Mean	7-Day Geometric Mean
Branford	Branford WPCF	CT0100048	Branford Estuary	01/31/2010	2	6
Branford	Branford WPCF	CT0100048	Branford Estuary	02/28/2010	3	4
Branford	Branford WPCF	CT0100048	Branford Estuary	03/31/2010	2	7
Branford	Branford WPCF	CT0100048	Branford Estuary	04/30/2010	3	5
Branford	Branford WPCF	CT0100048	Branford Estuary	05/31/2010	4	21
Branford	Branford WPCF	CT0100048	Branford Estuary	06/30/2010	4	11
Branford	Branford WPCF	CT0100048	Branford Estuary	07/31/2010	24	176
Branford	Branford WPCF	CT0100048	Branford Estuary	08/31/2010	15	327
Branford	Branford WPCF	CT0100048	Branford Estuary	09/30/2010	10	24
Branford	Branford WPCF	CT0100048	Branford Estuary	10/31/2010	9	37
Branford	Branford WPCF	CT0100048	Branford Estuary	11/30/2010	21	62
Branford	Branford WPCF	CT0100048	Branford Estuary	12/31/2010	11	25
Branford	Branford WPCF	CT0100048	Branford Estuary	01/31/2011	10	23
Branford	Branford WPCF	CT0100048	Branford Estuary	02/28/2011	4	7
Branford	Branford WPCF	CT0100048	Branford Estuary	03/31/2011	3	6
Branford	Branford WPCF	CT0100048	Branford Estuary	04/30/2011	3	6
Branford	Branford WPCF	CT0100048	Branford Estuary	05/31/2011	1	3
Branford	Branford WPCF	CT0100048	Branford Estuary	06/30/2011	4	7
Branford	Branford WPCF	CT0100048	Branford Estuary	07/31/2011	7	19

Town	Permitee	Permit Number	Receiving Water	Date	30-Day Geometric Mean	7-Day Geometric Mean
Branford	Branford WPCF	CT0100048	Branford Estuary	08/31/2011	8	14
Branford	Branford WPCF	CT0100048	Branford Estuary	09/30/2011	4	6
Branford	Branford WPCF	CT0100048	Branford Estuary	10/31/2011	3	6
Branford	Branford WPCF	CT0100048	Branford Estuary	11/30/2011	3	4
Branford	Branford WPCF	CT0100048	Branford Estuary	12/31/2011	1	3
Branford	Branford WPCF	CT0100048	Branford Estuary	01/31/2012	2	4
Branford	Branford WPCF	CT0100048	Branford Estuary	02/29/2012	3	6
Branford	Branford WPCF	CT0100048	Branford Estuary	03/31/2012	3	8
Branford	Branford WPCF	CT0100048	Branford Estuary	04/30/2012	3	5
Branford	Branford WPCF	CT0100048	Branford Estuary	05/31/2012	5	51
Branford	Branford WPCF	CT0100048	Branford Estuary	06/30/2012	6	9
Branford	Branford WPCF	CT0100048	Branford Estuary	07/31/2012	7	19
Branford	Branford WPCF	CT0100048	Branford Estuary	08/31/2012	11	36
Branford	Branford WPCF	CT0100048	Branford Estuary	09/30/2012	8	10
Branford	Branford WPCF	CT0100048	Branford Estuary	10/31/2012	7	32

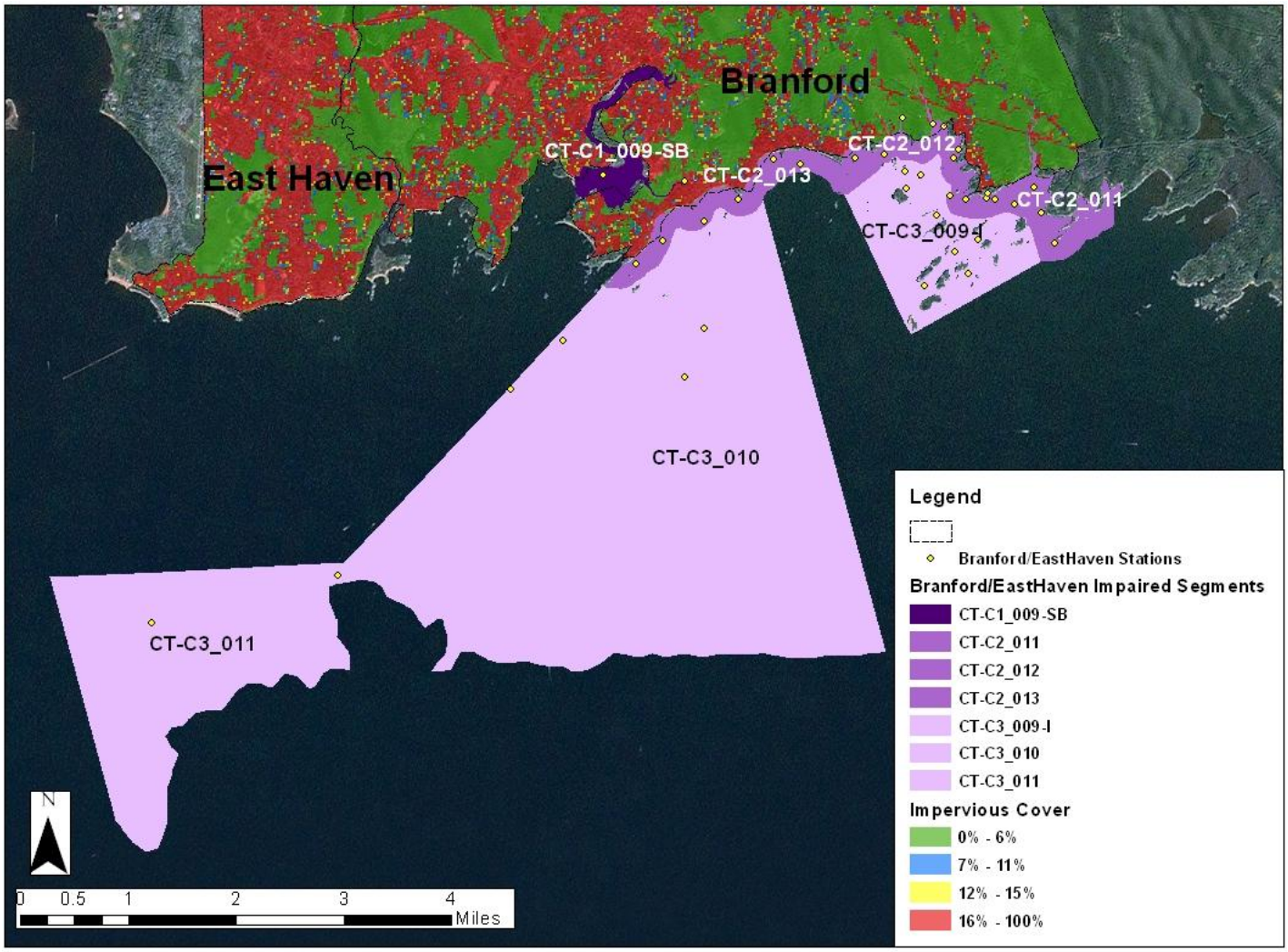
Non-point Sources

Non-point source (NPS) pollution comes from many diffuse sources and is more difficult to identify and control. NPS pollution is often associated with certain land-use practices. Examples of NPS that can contribute bacteria to surface waters include stormwater runoff, illicit discharges, insufficient septic systems, pet and wildlife waste, agriculture, and contact recreation (swimming or wading). With the waters of the Branford/East Haven Estuary being tidally influenced, many bacterial sources that appear to be downstream of the impaired segment may be affecting the water quality in upstream segments. Potential sources of NPS to the impaired segments in the Branford/East Haven Estuary are described below.

Stormwater Runoff from Developed Areas

The City of East Haven and the Town of Branford are primarily residential. Branford has a developed residential coastline with mostly year-round dwellings, with industrial development limited to the Branford River and Juniper Point. Development in East Haven is primarily private residences, many of which are only occupied seasonally. Impervious surfaces, or surface areas such as roofs and roads that force water to run off land surfaces rather than infiltrate soil, often characterize developed areas. Studies have shown a link between the amount of impervious area in a watershed and water quality conditions (CWP, 2003). In one study, researchers correlated the amount of fecal coliform to the percentage of land with impervious cover in a watershed (Mallin *et al.,* 2000). Coastal land bordering the Branford and East Haven estuary has concentrated areas that exceed the 16% impervious cover percentage shown in red (Figure 6). Also, stations on Segments (CT-C1_009-SB), (CT-C2_012), and (CT-C2_011) exceeded the WQS for fecal coliform during wet-weather, which indicates that stormwater runoff is likely contributing bacteria to the estuary.

Figure 6: Impervious cover (%) for Branford and East Haven



Impervious Cover In The Branford/East Haven Estuary Map Data CT DEEP Created April 2013

Illicit Discharges and Insufficient Septic Systems

As shown in Figure 4, large portions of Branford and East Haven rely on a municipal sanitary sewer system. More specifically, the 2009 Branford Estuary Report claims that the entire Branford coastline is served by public sewers except for Riverview Road, Killiams Point, Goodsell Point and a few short streets in the Branford Harbor area and all areas east of Juniper Point, as of 12/31/09. There are several areas in Branford where septic system failures are more likely to occur: Riverview Avenue area of the Farm River and the Town beach area and creek off Prospect Hill Road in Stony Creek. The DA/BA has requested the East Shore District Health Department to follow up on the locations cited in the shoreline survey report. Sporadic septic system failures from homes in the Stony Creek area continue to be potential indirect pollution sources to shellfish growing areas, but are investigated and abated as discovered by the health department. Some small tidal creeks in the center of Stony Creek may still be sources of fecal coliform bacteria to adjacent shellfish growing waters and are monitored by DA/BA water sampling stations.

Properly managed septic systems and leach fields have the ability to effectively remove bacteria from waste. If systems are not maintained, waste will not be adequately treated and may result in bacteria reaching nearby surface and ground water.

Wildlife and Domestic Animal Waste

Wildlife, including waterfowl, and domestic animals within the municipalities of Branford and East Haven, including those present in the estuary, represent another potential source of bacteria to the impaired waterbodies. Elevated bacteria levels due solely to a natural population of wildlife are not subject to the WQS. However, any exacerbation of wildlife population sizes or residency times influenced by human activities is subject to the CT WQS and TMDL provisions. Multiple locations of concentrated migratory waterfowl have been identified throughout the Branford/East Haven Estuary, including the entirety of Segment 1 (CT-C1_009-SB), and along the shoreline near Segments 2 (CT-C2_011), 3 (CT-C2_012), and 4 (CT-C2_013) (Figure 4). With the construction of roads and drainage systems, wastes from these waterfowl may no longer be retained on the landscape, but instead may be conveyed via stormwater to the nearest surface waterbody. As such, physical land alterations can exacerbate the impact of these natural sources on water quality (USEPA, 2001).

The 2009 Branford Estuary Report noted that the Farm and Branford Rivers support a moderate waterfowl population of ducks and swans. Swans also congregate in Stony Creek. The extensive saltwater marshes on the Farm River, Branford River, Sybil Creek, Pine Creek, Jauris (Gigamoche) Creek and Hoadley Creek also support a significant wildlife population that may impact water quality in adjacent shellfish growing waters.

As indicated previously, portions of Branford and East Haven near the estuary are heavily developed with residential properties. As such, waste from domestic animals, such as dogs, may also be contributing to bacteria concentrations in these impaired segments in the Branford/East Haven Estuary.

Marinas

Since its inception, the federal Clean Water Act has prohibited the discharge of untreated sewage from vessels in all of Long Island Sound. Now, eliminating the release of all sewage from boats, both treated and untreated, will result in further reductions of human fecal waste discharge and, therefore, reductions in nutrient loading and potential human exposure to bacterial and viral pathogens in swimming areas, shellfish beds and other environmentally sensitive aquatic habitats. Connecticut has designated No Discharge Areas (NDAs) in all of Connecticut's coastal waters from the Rhode Island state boundary in the Pawcatuck River to the New York State Boundary in the Byram River and extending from shore out to the New York state boundary. In these waters the discharge of any sewage from any vessel is prohibited.

As noted previously, multiple marinas are located within the Branford/East Haven Estuary, particularly in Branford Harbor (Figure 4 and Table 5). Marinas are located at the water's edge, and if no measures are taken to reduce pollutants, including buffering, pollutants can be transported via runoff from parking lots and hull maintenance areas directly into the marina basin. Common pollutants from marinas include bacteria and nutrients from stormwater runoff, solid and liquid materials used in boat maintenance and cleaning, fuel and oil, sewage from public restrooms and boat pump-outs, fish waste, and turbidity from boating activities. The CT DEEP has information on regional pump-out boats and facilities at its website, http://www.ct.gov/dep/cwp/view.asp?a=2705&q=323708&depNav_GID=1711. There are several pump-out facilities in the Branford area, including a pump-out boat operated by the Branford River Project. Most services are free and eliminate the possibility of vessels dumping raw wastes into Long Island

Sound, which is prohibited by CT Water Quality Standards Number 24, "the discharge of sewage from any vessel to any water is prohibited."

Recreation

People coming in direct contact with surface water presents another potential source of bacterial contamination. Microbial source tracking (MST) surveys conducted in New Hampshire have shown humans to be a source of bacterial contamination at beaches (Jones, 2008). Since there are several swimming areas along the shoreline it is probable that some bacterial contamination can be attributed to human activities in the Branford/East Haven Estuary.

Additional Sources

The 2009 Branford Estuary Report noted that there are no active sanitary landfills, refuse transfer stations or septage disposal lagoons in Branford that would impact shellfish growing waters.

There may be other sources not listed here or identified in Figure 4 that contribute to the observed water quality impairments in the Branford/East Haven Estuary. 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.

CURRENT MANAGEMENT ACTIVITIES

The Town of Branford and the City of East Haven have developed and implemented programs to protect water quality from bacterial contamination. In addition, the National Shellfish Sanitation Program (NSSP) has multiple requirements for the protection and evaluation of shellfish growing areas. More information about this program is provided below and available online: http://www.fda.gov/Food/FoodSafety/Product-SpecificInformation/Seafood/FederalStatePrograms/NationalShellfishSanitationProgram/ucm053724.htm.

The NSSP requires the completion of a sanitary survey to determine acceptable and unacceptable growing areas, and to accurately classify a growing area as Approved, Conditionally Approved, Restricted, Conditionally Restricted, or Prohibited. A sanitary survey is an in-depth evaluation of all environmental factors impacting water quality in a shellfish growing area. Environmental factors include both actual and potential pollutant sources, whether natural or man-made, along with meteorological and hydrographic characteristics of the growing area. The principal components of a sanitary survey are: (1) identification and evaluation of pollutant sources, (2) evaluation of meteorological factors, (3) evaluation of hydrographic factors affecting the distribution of pollutants, and (4) assessment of water quality.

The sanitary survey includes data and results from the following:

1. Shoreline survey;
2. Survey of the bacteriological quality of the water;
3. Evaluation of meteorological, hydrodynamic, and geographic characteristics of the growing area;
4. Analysis of shoreline survey, bacteriological water quality, and meteorological, hydrodynamic, and geographic characteristics; and
5. Determination of the appropriate growing area classification

Maintaining updated sanitary survey records consists primarily of routinely evaluating major pollutant sources, collecting water quality data from sampling stations under the selected NSSP water quality monitoring strategy, and analyzing the data to ensure that the classification continues to represent current sanitary conditions in the growing area. The entire sanitary survey process must be repeated every 12 years. In the interim, the sanitary quality of each growing area must be reviewed as often as necessary to ensure appropriate classification. Certain sanitary survey components are required by the Model Ordinance to be updated annually and triennially.

The growing area classification and supporting data from the sanitary survey shall be reviewed at least every three years. As required by the NSSP, this triennial re-evaluation shall include:

1. A review of water quality sampling results;
2. Documentation of any new pollutant sources and evaluation of their impact on the growing area;
3. Re-evaluation of all pollutant sources, including sources previously identified in the sanitary survey, as necessary to fully evaluate any changes in the sanitary conditions of the growing area. Re-evaluation may or may not include a site visit;
4. A comprehensive report analyzing the sanitary survey data and determining whether the existing growing area classification is accurate or requires revision; and
5. Reclassification of the growing area if re-evaluation determines that conditions for classification have changed based on data collected during the triennial review

NSSP also requires that the sanitary survey be updated annually to reflect changes in conditions in the growing area. The annual re-evaluation shall include:

1. Field observation of pollutant sources during drive-through surveys, sample collections, or other information sources;
2. Addition and review of current year's water quality sampling results to a database collected in accordance with the bacteriological standards and sample collection required;
3. Review of available inspection reports and effluent samples collected from pollutant sources;
4. Review of available performance standards for various types of discharges impacting the growing area; and
5. A brief report documenting annual re-evaluation findings.

The most recent triennial re-evaluation for the Shellfish Growing Waters in the Town of Branford was published in 2009 (Branford, 2009). Based upon the findings of this report, all Branford shellfish growing area classifications, last amended on 6/2/06 conform to the applicable criteria set forth in the NSSP Model Ordinance and are properly classified. No classification change is required at this time. All routine stations met their current water quality classification requirements.

Other efforts have been taken by Branford to reduce bacteria to its surface waters. As indicated previously, Branford 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) that reduces the discharge of stormwater pollutants to improve water quality. The plan must address the following six 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 also required to submit an annual update outlining steps taken to meet the six minimum measures. The most recent updates that address bacterial contamination in the watershed is summarized in Table 9.

Table 9: Summary of MS4 requirement updates related to the reduction of bacterial contamination from Branford, CT (Permit # GSM000068)

Minimum Measure	Branford Annual Report (January 2012)
Public Outreach and Education	1) Booth with educational materials maintained at Branford Festival in June 2) Continue to label storm drains 3) Created and publicized stormwater notification number for citizen reports
Public Involvement and Participation	1) Town website updated to include specific stormwater information. 2) Continuing to enlist volunteer groups for water quality monitoring and watershed clean-ups.
Illicit Discharge Detection and Elimination	1) Regularly updating GIS system including highway storm drainage, outfall locations and facilities. 2) Continuing to develop an ordinance regulating illicit discharges.
Construction Site Stormwater Runoff Control	1) Conducted random inspections for construction operator compliance.

Minimum Measure	Branford Annual Report (January 2012)
Post Construction Stormwater Management	1) Revised and adopted regulations regarding impervious surface and parking reductions. 2) Continuing to develop a list of BMPs strategies.
Pollution Prevention and Good Housekeeping	1) Developed a training program for municipal employees; training has occurred and is ongoing. 2) Finalize maintanence plan and schedule for all BMPs. Streets are swept annually and catch basins cleaned regularly. 3) Ongoing drainage improvements, including replacement of failing infrastructure and addition of sumps to catchbasins.

Table 10: Summary of MS4 requirement updates related to the reduction of bacterial contamination from East Haven, CT (Permit # GSM000068)

Minimum Measure	East Haven Annual Report (July 2007)
Public Outreach and Education	1) Maintain educational materials at Library and Planning Department 2) Developed educational materials targeted to industries and commerical operations.
Public Involvement and Participation	1) Continuing to enlist volunteer groups to coordinate curb markers, perform stenciling, and promote clean-ups. 2) Continue to encourage public participation in Stormwater Management Plan
Illicit Discharge Detection and Elimination	1) Continue inventory and mapping of storm drainage outfalls 2) Sampled 25% of outfalls where dry weather discharge was identified. 3) Adopted changes to Town ordinances to prohibit non-stormwater discharges to the storm drainage system.
Construction Site Stormwater Runoff Control	1) Revise Application forms to notify contractors of Stormwater permits
Post Construction Stormwater Management	1) Revise town design and construction standards for BMPs
Pollution Prevention and Good Housekeeping	1) Annual employee training on safe handling of hazardous materials 2) All roads swept once during April & June 2006 3) Continued catch basin cleaning in priority areas and inspected 1/3 of all catch basins in town

RECOMMENDED NEXT STEPS

Branford and East Haven have developed and implemented programs to protect water quality from bacterial contamination. Future mitigative activities are necessary to ensure the long-term protection of Segments 1 – 7 in the Branford/East Haven Estuary and have been prioritized below.

1) Continue monitoring of permitted sources.

There are at least 36 permitted sources in the Branford/East Haven Estuary, some of which have shown historically high bacteria concentrations. 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 is required, and any voluntary measures to identify and reduce sources of bacterial contamination at the facility are also recommended. 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.

Tables 11 and 12 detail 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 Branford/East Haven Estuary.

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 11: Bacteria (Enterococci) TMDLs, WLAs, and LAs for Recreational Uses.

		Instantaneous Enterococcus (#/100mL)				Geometric Mean Enterococcus (#/100mL)	
Class	**Bacteria Source**	**WLA[6]**		**LA[6]**		**WLA[6]**	**LA[6]**
	Recreational Use	**1**	**2**	**1**	**3**	**All**	**All**
SA[5]	Illicit sewer connection	0	0			0	
	Leaking sewer lines	0	0			0	
	Stormwater (MS4s)	104[7]	500[7]			35[7]	
	Stormwater (non-MS4)			104[7]	500[7]		35[7]
	Wildlife direct discharge			104[7]	500[7]		35[7]
	Human or domestic animal direct discharge[3]			104	500		35

		Instantaneous Enterococcus (#/100mL)				Geometric Mean Enterococcus (#/100mL)	
Class	**Bacteria Source**	**WLA[6]**		**LA[6]**		**WLA[6]**	**LA[6]**
	Recreational Use	**1**	**2**	**1**	**3**	**All**	**All**
SB[5]	Non-Stormwater NPDES	104	500			35	
	CSOs	104	500			35	
	SSOs	0	0			0	
	OBDs[4]	0	0			0	
	Illicit sewer connection	0	0			0	
	Leaking sewer lines	0	0			0	
	Stormwater (MS4s)	104[7]	500[7]			35[7]	
	Stormwater (non-MS4)			104[7]	500[7]		35[7]
	Wildlife direct discharge			104[7]	500[7]		35[7]
	Human or domestic animal direct discharge[3]			104	500		35

(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.

Table 12: Bacteria (Fecal Coliform) TMDLs, WLAs, and LAs for Shellfish Harvesting Areas.

		Geometric Mean Fecal coliform (#/100mL)[4]		90% less than Fecal Coliform (#/100mL)[4]	
Class	**Bacteria Source[1]**	**WLA[5]**	**LA[5]**	**WLA[5]**	**LA[5]**
SA Direct Consumption	CSOs	14		31	
	SSOs	0		0	
	OBDs[3]	0		0	
	Illicit sewer connection	0		0	
	Leaking sewer lines	0		0	
	Stormwater (MS4s)	14[6]		31[6]	
	Stormwater (non-MS4)		14[6]		31[6]
	Wildlife direct discharge		14[6]		31[6]
	Human or domestic animal direct discharge[2]		14		31
SB Indirect Consumption	Non-Stormwater NPDES	88		260	
	CSOs	88		260	
	SSOs	0		0	
	OBDs[3]	0		0	
	Illicit sewer connection	0		0	
	Leaking sewer lines	0		0	
	Stormwater (MS4s)	88[6]		260[6]	
	Stormwater (non-MS4)		88[6]		260[6]
	Wildlife direct discharge		88[6]		260[6]
	Human or domestic animal direct discharge[2]		88		260

(1) Criteria are based on utilizing the mTec method as specified in the U.S. Food and Drug Administration National Shellfish Sanitation Program-Model Ordinance (NSSP-MO) document *Guide for the Control of Molluscan Shellfish 2007.*

(2) Human direct discharge = swimmers

(3) All coastal and inland waters in Connecticut are designated as No Discharge Areas for Overboard Discharges (OBDs) from marine vessels with Marine Sanitation Devices.

(4) Adverse Condition Allocations apply to areas affected by Point Sources. Adverse Condition or Random Sampling Allocations apply to areas affected by Nonpoint Sources. Adverse condition is defined as "... a State or situation caused by meteorological, hydrological or seasonal events or point source discharges that has historically resulted in elevated [bacteria] levels in the particular growing area." USFDA 2005

(5) Unless otherwise required by statute or regulation, compliance with this TMDL will be based on ambient concentrations and not end-of-pipe bacteria concentrations

(6) 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.

2) Identify areas in Branford and East Haven to implement Best Management Practices (BMPs) to control stormwater runoff.

As noted previously, most of East Haven inland of the Estuary have impervious cover greater than 16% and is an urban area regulated under the MS4 program. Branford features a slightly lower percentage of impervious cover above 16%, particularly in the eastern reaches of the Town. There are still significant

areas along the coastline above 16% impervious cover. As such, stormwater runoff from both municipalities is likely contributing bacteria to the Branford/East Haven Estuary. To identify areas that are contributing bacteria to the impaired segments, municipalities should conduct wet-weather sampling at stormwater outfalls that discharge directly to the impaired segments in Branford/East Haven Estuary. To treat stormwater runoff, the towns should identify areas along the developed sections of the impaired segments to install BMPs designed to encourage stormwater to infiltrate the ground before entering the waterbodies. These BMPs would disconnect impervious areas and reduce pollutant loads to the estuary. More detailed information and BMP recommendations can be found in the core TMDL document established in September 2012 and available at http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/ct_bacteria_coredoc_tmdl.pdf.

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

Portions of both Branford and East Haven near the estuary rely on a municipal sewer system (Figure 4). If not already in place, it is important for Branford and East Haven to develop a program to evaluate its sanitary sewer system and reduce leaks and overflows. This program should include periodic inspections of the sewer line.

4) Develop a system to monitor septic systems.

A number of residents near the Branford/East Haven Estuary rely on septic systems. If not already in place, Branford and East Haven 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. Municipalities can also 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.

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 by allowing tall, coarse vegetation to grow in riparian areas of impaired segments 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 Branford/East Haven Estuary 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.

6) Improve education and outreach programs regarding boats and marinas.

Marinas must comply with permit requirements that limit bacteria contribution to the Branford/East Haven Estuary. Other programs, such as Connecticut's Clean Marina Program, may also be adopted by all marinas in the estuary to reduce bacteria contribution from non-point source pollution from marinas (http://www.ct.gov/dep/cwp/view.asp?a=2705&q=323530&depNav_GID=1635). The Clean Marina Program is a voluntary program that encourages inland and coastal marina operators to minimize pollution, and recognizes Connecticut marinas, boatyards, and yacht clubs that go above and beyond

regulatory compliance as "Certified Clean Marinas." All certified marinas receive a weatherproof Clean Marina Flag to fly at their facility and authorization to use the Clean Marina Program logo on company publications. CT DEEP recognizes certified Clean Marinas through press releases, on its web page, and at public events. As a companion to the Clean Marina Program, the Clean Boater Program encourages boaters to use clean boating techniques when operating and maintaining their boats.

BACTERIA DATA AND PERCENT REDUCTIONS TO MEET THE TMDL

Table 13: Segment 1: LIS CB Inner – Inner Branford Harbor Bacteria Data

Waterbody ID: CT-C1_009-SB
Characteristics: Saltwater, Class SB, Commercial Shellfishing Harvesting, Recreation, Habitat for Marine Fish and other Aquatic Life and Wildlife, Industrial Water Supply, and Navigation
Impairment: Shellfishing
Water Quality Criteria for fecal coliform:

Geometric Mean: 88 colonies/100 ml
90% samples less than: 260 colonies/100 ml

Percent reduction to meet TMDL:

Geometric Mean: 41%
90% samples less than: 90%

Data: 2000 – 2011 from CT DEEP target sampling efforts, 2012 TMDL cycle

Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment: LIS CB Inner – Inner Branford Harbor, Branford (CT-C1_009-SB) with annual geometric means and reduction goals for samples.

Station Name	Station Location	Date	Result	Wet/Dry	Geomean	90% Reduction
014-03.3	LIS CB Inner - Inner Branford Harbor, Branford	4/29/2003	10	Dry	72.9	n/a
014-03.3	LIS CB Inner - Inner Branford Harbor, Branford	6/24/2003	224	Dry		
014-03.3	LIS CB Inner - Inner Branford Harbor, Branford	8/19/2003	173	Dry		
014-03.3	LIS CB Inner - Inner Branford Harbor, Branford	9/23/2004	36	Dry	36	n/a
014-03.3	LIS CB Inner - Inner Branford Harbor, Branford	4/6/2005	1	Dry	1	n/a
014-03.3	LIS CB Inner - Inner Branford Harbor, Branford	10/16/2006	1	Dry	1	n/a
014-03.3	LIS CB Inner - Inner Branford Harbor, Branford	3/3/2008	1	Dry	3.6	n/a
014-03.3	LIS CB Inner - Inner Branford Harbor, Branford	5/14/2008	8	Dry		
014-03.3	LIS CB Inner - Inner Branford Harbor, Branford	12/16/2008	6	Wet		
014-03.3	LIS CB Inner - Inner Branford Harbor, Branford	3/31/2009	8	Dry	2.8	n/a
014-03.3	LIS CB Inner - Inner Branford Harbor, Branford	4/13/2009	1	Dry		
014-03.3	LIS CB Inner - Inner Branford Harbor, Branford	12/14/2010	124	Wet	124	n/a

Station Name	Station Location	Date	Result	Wet/Dry	Geomean	90% Reduction
014-03.3	LIS CB Inner - Inner Branford Harbor, Branford	3/15/2011	2	Dry	2	n/a
014-38.0	LIS CB Inner - Inner Branford Harbor, Branford	4/16/2003	36	Dry	36	n/a
014-38.0	LIS CB Inner - Inner Branford Harbor, Branford	8/23/2004	311	Dry	311	90
014-38.0	LIS CB Inner - Inner Branford Harbor, Branford	2/15/2005	171	Wet	149.1	n/a
014-38.0	LIS CB Inner - Inner Branford Harbor, Branford	9/1/2005	130	Dry		
014-38.0	LIS CB Inner - Inner Branford Harbor, Branford	2/9/2006	1	Dry	1	n/a
014-38.0	LIS CB Inner - Inner Branford Harbor, Branford	5/13/2008	112	Dry	112	n/a

Shaded cells indicate an exceedance of water quality criteria

90% Reduction calculated by determining how many sample values (n) were in a given dataset and dividing that value into 100%. This gave the (P)% of each data value. Then this (P)% was multiplied by the total number of values that did not exceed criteria (E). The final (PE) was then subtracted from 90 and the difference was included as the 90% reduction goal (RG) needed for the dataset.

100/n = P%
(P%) *E = PE
90 – PE = (RG)

Where: n = # of samples
E = # of samples that did not exceed criteria

Wet and dry weather geometric mean values for all monitoring stations on segment: LIS CB Inner – Inner Branford Harbor, Branford (CT-C1_009-SB)

Station #	Station ID	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
014-03.3	LIS CB Inner - Inner Branford Harbor, Branford	2000-2011	2	11	9	27	7
014-38.0	LIS CB Inner - Inner Branford Harbor, Branford	2000-2011	1	5	55	171	44

Shaded cells indicate an exceedance of water quality criteria

Table 14: Segment 2: LIS CB Shore – Stony Creek (East), Branford Bacteria Data

Waterbody ID: CT-C2_011
Characteristics: Saltwater, Class SA
Impairment: Shellfishing
Water Quality Criteria for Fecal coliform:
Geometric Mean: 14 colonies/100 ml
90% of samples less than: 31 colonies/100 ml
Percent reduction to meet:
Geometric Mean: 73%
90% of samples less than: 15%
Data: 2000 – 2011 from CT DEEP target sampling efforts, 2012 TMDL cycle

Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment: LIS CB Shore – Stony Creek (East), Branford (CT-C2_011) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-15.0	LIS CB Shore - Stony Creek (East), Branford	4/3/2003	1.6	Dry	1.8	n/a
014-15.0	LIS CB Shore - Stony Creek (East), Branford	4/14/2003	0.7	Dry		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	4/29/2003	1.7	Dry		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	6/3/2003	1.6	Dry		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	6/24/2003	8.1	Dry		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	8/19/2003	1.6	Dry		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	10/2/2003	1.7	Dry		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	8/17/2004	8.1	Wet	8.1	n/a
014-15.0	LIS CB Shore - Stony Creek (East), Branford	9/23/2004	8.1	Dry		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	2/8/2005	0.9	Dry	0.9	n/a
014-15.0	LIS CB Shore - Stony Creek (East), Branford	4/6/2005	1	Dry		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	6/19/2006	1	Dry	3.1	n/a
014-15.0	LIS CB Shore - Stony Creek (East), Branford	7/19/2006	30	Wet		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	8/31/2006	3	Wet		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	10/16/2006	1	Dry		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	1/11/2007	7	Dry	2.7	4
014-15.0	LIS CB Shore - Stony Creek (East), Branford	5/1/2007	1	Dry		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	6/5/2007	41	Wet		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	6/7/2007	1	Dry		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	8/23/2007	1	Dry		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	9/13/2007	1	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-15.0	LIS CB Shore - Stony Creek (East), Branford	10/22/2007	4	Dry		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	3/3/2008	1	Dry	1.6	n/a
014-15.0	LIS CB Shore - Stony Creek (East), Branford	3/12/2008	1	Dry		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	5/1/2008	1	Wet		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	12/16/2008	6	Wet		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	3/31/2009	1	Dry	2.2	n/a
014-15.0	LIS CB Shore - Stony Creek (East), Branford	4/13/2009	1	Dry		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	4/22/2009	3	Wet		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	6/22/2009	14	Wet		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	7/23/2009	2	Wet		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	7/27/2009	1	Dry		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	10/29/2009	7	Wet		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	11/18/2009	1	Dry		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	3/17/2010	1	Dry	2.5	n/a
014-15.0	LIS CB Shore - Stony Creek (East), Branford	3/25/2010	1	Wet		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	5/19/2010	9	Wet		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	8/25/2010	1	Wet		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	12/2/2010	7	Wet		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	12/14/2010	4	Wet		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	3/15/2011	1	Dry	2.9	n/a
014-15.0	LIS CB Shore - Stony Creek (East), Branford	4/18/2011	24	Wet		
014-15.0	LIS CB Shore - Stony Creek (East), Branford	4/25/2011	1	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	4/3/2003	1.6	Dry	2.3	n/a
014-15.2	LIS CB Shore - Stony Creek (East), Branford	4/14/2003	1.6	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	4/29/2003	1.6	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	6/3/2003	1.6	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	6/24/2003	3.6	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	8/19/2003	1.7	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	10/2/2003	8.1	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	8/17/2004	3.6	Wet	3.2	n/a
014-15.2	LIS CB Shore - Stony Creek (East), Branford	9/23/2004	5.8	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-15.2	LIS CB Shore - Stony Creek (East), Branford	11/30/2004	1.6	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	2/8/2005	1	Dry	1.4	n/a
014-15.2	LIS CB Shore - Stony Creek (East), Branford	4/6/2005	1	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	11/14/2005	3	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	6/19/2006	3	Dry	1.8	n/a
014-15.2	LIS CB Shore - Stony Creek (East), Branford	10/16/2006	2	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	11/20/2006	1	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	1/11/2007	7	Dry	2.3	n/a
014-15.2	LIS CB Shore - Stony Creek (East), Branford	8/23/2007	2	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	9/13/2007	2	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	10/22/2007	1	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	3/3/2008	1	Dry	1.3	n/a
014-15.2	LIS CB Shore - Stony Creek (East), Branford	3/12/2008	1	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	5/14/2008	1	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	12/16/2008	3	Wet		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	3/31/2009	1	Dry	2.2	n/a
014-15.2	LIS CB Shore - Stony Creek (East), Branford	4/13/2009	1	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	4/22/2009	3	Wet		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	6/22/2009	13	Wet		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	7/23/2009	2	Wet		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	7/27/2009	1	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	10/29/2009	6	Wet		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	11/18/2009	1	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	5/19/2010	72	Wet	8.7	15
014-15.2	LIS CB Shore - Stony Creek (East), Branford	8/25/2010	10	Wet		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	12/2/2010	4	Wet		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	12/14/2010	2	Wet		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	3/15/2011	1	Dry	1.6	n/a
014-15.2	LIS CB Shore - Stony Creek (East), Branford	4/18/2011	3	Wet		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	4/25/2011	1	Dry		
014-15.2	LIS CB Shore - Stony Creek (East), Branford	6/21/2011	1	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-15.2	LIS CB Shore - Stony Creek (East), Branford	6/28/2011	3	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	4/3/2003	1.6	Dry	2.1	n/a
014-15.3	LIS CB Shore - Stony Creek (East), Branford	4/14/2003	1.7	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	4/29/2003	1.6	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	6/3/2003	1.7	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	6/24/2003	3.6	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	8/19/2003	1.7	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	10/2/2003	3.6	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	8/17/2004	22	Wet	6.6	n/a
014-15.3	LIS CB Shore - Stony Creek (East), Branford	9/23/2004	8.1	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	11/30/2004	1.6	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	2/8/2005	1	Dry	3.6	10
014-15.3	LIS CB Shore - Stony Creek (East), Branford	2/15/2005	48	Wet		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	2/17/2005	4	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	4/6/2005	1	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	11/14/2005	3	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	6/19/2006	2	Dry	1.6	n/a
014-15.3	LIS CB Shore - Stony Creek (East), Branford	10/16/2006	1	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	11/20/2006	2	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	1/11/2007	14	Dry	4.1	n/a
014-15.3	LIS CB Shore - Stony Creek (East), Branford	9/13/2007	5	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	10/22/2007	1	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	3/3/2008	1	Dry	1.6	n/a
014-15.3	LIS CB Shore - Stony Creek (East), Branford	3/12/2008	1	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	5/14/2008	2	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	12/16/2008	3	Wet		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	3/31/2009	1	Dry	3.7	n/a
014-15.3	LIS CB Shore - Stony Creek (East), Branford	4/13/2009	1	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	4/22/2009	4	Wet		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	6/22/2009	16	Wet		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	7/23/2009	11	Wet		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-15.3	LIS CB Shore - Stony Creek (East), Branford	7/27/2009	6	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	10/29/2009	8	Wet		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	11/18/2009	1	Dry		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	5/19/2010	34	Wet	11.7	15
014-15.3	LIS CB Shore - Stony Creek (East), Branford	8/25/2010	5	Wet		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	12/2/2010	14	Wet		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	12/14/2010	8	Wet		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	3/15/2011	1	Dry	1.9	n/a
014-15.3	LIS CB Shore - Stony Creek (East), Branford	4/18/2011	7	Wet		
014-15.3	LIS CB Shore - Stony Creek (East), Branford	4/25/2011	1	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	4/3/2003	1.6	Dry	3.3	n/a
014-15.4	LIS CB Shore - Stony Creek (East), Branford	4/14/2003	1.6	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	4/29/2003	1.7	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	6/3/2003	1.6	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	6/24/2003	3.6	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	8/19/2003	11	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	10/2/2003	14	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	8/17/2004	8.1	Wet	8.1	n/a
014-15.4	LIS CB Shore - Stony Creek (East), Branford	9/23/2004	8.1	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	2/8/2005	1	Dry	1	n/a
014-15.4	LIS CB Shore - Stony Creek (East), Branford	4/6/2005	1	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	6/19/2006	4	Dry	3.4	n/a
014-15.4	LIS CB Shore - Stony Creek (East), Branford	8/31/2006	10	Wet		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	10/16/2006	1	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	1/11/2007	7	Dry	4.5	4
014-15.4	LIS CB Shore - Stony Creek (East), Branford	5/1/2007	1	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	6/5/2007	32	Wet		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	6/7/2007	2	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	8/23/2007	2	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	9/13/2007	5	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-15.4	LIS CB Shore - Stony Creek (East), Branford	10/22/2007	9	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	3/3/2008	1	Dry	3.4	n/a
014-15.4	LIS CB Shore - Stony Creek (East), Branford	3/12/2008	2	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	5/1/2008	6	Wet		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	12/16/2008	11	Wet		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	3/31/2009	1	Dry	2.4	n/a
014-15.4	LIS CB Shore - Stony Creek (East), Branford	4/13/2009	1	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	4/22/2009	5	Wet		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	6/22/2009	14	Wet		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	7/23/2009	3	Wet		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	7/27/2009	1	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	10/29/2009	5	Wet		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	11/18/2009	1	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	3/17/2010	1	Dry	5.2	7
014-15.4	LIS CB Shore - Stony Creek (East), Branford	3/25/2010	1	Wet		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	5/19/2010	35	Wet		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	8/25/2010	3	Wet		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	12/2/2010	9	Wet		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	12/14/2010	22	Wet		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	3/15/2011	1	Dry	2.2	10
014-15.4	LIS CB Shore - Stony Creek (East), Branford	4/18/2011	51	Wet		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	4/25/2011	1	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	6/21/2011	1	Dry		
014-15.4	LIS CB Shore - Stony Creek (East), Branford	6/28/2011	1	Dry		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	4/3/2003	1.6	Dry	2.8	n/a
014-15.5	LIS CB Shore - Stony Creek (East), Branford	4/14/2003	1.7	Dry		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	4/29/2003	3.6	Dry		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	6/3/2003	1.6	Dry		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	10/2/2003	11	Dry		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	8/17/2004	14	Wet	4.3	n/a
014-15.5	LIS CB Shore - Stony Creek (East), Branford	9/23/2004	3.6	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-15.5	LIS CB Shore - Stony Creek (East), Branford	11/30/2004	1.6	Dry		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	2/8/2005	64	Dry	6.4	10
014-15.5	LIS CB Shore - Stony Creek (East), Branford	2/15/2005	9	Wet		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	2/17/2005	6	Dry		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	4/6/2005	1	Dry		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	11/14/2005	3	Dry		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	6/19/2006	5	Dry	2.5	n/a
014-15.5	LIS CB Shore - Stony Creek (East), Branford	10/16/2006	1	Dry		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	11/20/2006	3	Dry		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	1/11/2007	45	Dry	6.7	40
014-15.5	LIS CB Shore - Stony Creek (East), Branford	10/22/2007	1	Dry		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	3/3/2008	1	Dry	2.1	n/a
014-15.5	LIS CB Shore - Stony Creek (East), Branford	3/12/2008	3	Dry		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	5/14/2008	1	Dry		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	12/16/2008	7	Wet		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	3/31/2009	1	Dry	1.9	n/a
014-15.5	LIS CB Shore - Stony Creek (East), Branford	4/13/2009	1	Dry		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	4/22/2009	4	Wet		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	10/29/2009	6	Wet		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	11/18/2009	1	Dry		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	12/2/2010	8	Wet	8.9	n/a
014-15.5	LIS CB Shore - Stony Creek (East), Branford	12/14/2010	10	Wet		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	3/15/2011	2	Dry	2.1	n/a
014-15.5	LIS CB Shore - Stony Creek (East), Branford	4/18/2011	5	Wet		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	6/21/2011	2	Dry		
014-15.5	LIS CB Shore - Stony Creek (East), Branford	6/28/2011	1	Dry		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	4/3/2003	1.6	Dry	2.1	n/a
014-15.7	LIS CB Shore - Stony Creek (East), Branford	4/14/2003	1.6	Dry		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	4/29/2003	1.7	Dry		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	6/3/2003	1.6	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-15.7	LIS CB Shore - Stony Creek (East), Branford	10/2/2003	5.8	Dry		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	8/17/2004	22	Wet	5.9	n/a
014-15.7	LIS CB Shore - Stony Creek (East), Branford	9/23/2004	5.8	Dry		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	11/30/2004	1.6	Dry		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	2/8/2005	20	Dry	9.1	n/a
014-15.7	LIS CB Shore - Stony Creek (East), Branford	2/15/2005	171	Wet		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	4/6/2005	1	Dry		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	11/14/2005	2	Dry		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	6/19/2006	2	Dry	1.3	n/a
014-15.7	LIS CB Shore - Stony Creek (East), Branford	10/16/2006	1	Dry		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	11/20/2006	1	Dry		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	1/11/2007	27	Dry	5.2	n/a
014-15.7	LIS CB Shore - Stony Creek (East), Branford	10/22/2007	1	Dry		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	3/3/2008	1	Dry	1.7	n/a
014-15.7	LIS CB Shore - Stony Creek (East), Branford	3/12/2008	1	Dry		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	5/14/2008	1	Dry		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	12/16/2008	8	Wet		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	3/31/2009	2	Dry	2.8	n/a
014-15.7	LIS CB Shore - Stony Creek (East), Branford	4/13/2009	1	Dry		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	4/22/2009	4	Wet		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	10/29/2009	10	Wet		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	11/18/2009	2	Dry		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	12/2/2010	5	Wet	5	n/a
014-15.7	LIS CB Shore - Stony Creek (East), Branford	12/14/2010	5	Wet		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	3/15/2011	4	Dry	2.5	n/a
014-15.7	LIS CB Shore - Stony Creek (East), Branford	4/18/2011	5	Wet		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	6/21/2011	1	Dry		
014-15.7	LIS CB Shore - Stony Creek (East), Branford	6/28/2011	2	Dry		
014-15.9	LIS CB Shore - Stony Creek (East), Branford	4/16/2003	23	Dry	23	n/a
014-15.9	LIS CB Shore - Stony Creek (East), Branford	8/18/2004	88	Dry	88	90

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-15.9	LIS CB Shore - Stony Creek (East), Branford	2/15/2005	91	Wet	52.2	40
014-15.9	LIS CB Shore - Stony Creek (East), Branford	2/17/2005	30	Dry		
014-15.9	LIS CB Shore - Stony Creek (East), Branford	2/9/2006	1	Dry	1	n/a
014-15.9	LIS CB Shore - Stony Creek (East), Branford	11/1/2007	48	Dry	30.9	33
014-15.9	LIS CB Shore - Stony Creek (East), Branford	11/29/2007	11	Dry		
014-15.9	LIS CB Shore - Stony Creek (East), Branford	12/6/2007	12	Dry		
014-15.9	LIS CB Shore - Stony Creek (East), Branford	12/11/2007	20	Dry		
014-15.9	LIS CB Shore - Stony Creek (East), Branford	12/11/2007	150	Dry		
014-15.9	LIS CB Shore - Stony Creek (East), Branford	12/11/2007	70	Dry		
014-15.9	LIS CB Shore - Stony Creek (East), Branford	12/11/2007	20	Dry		
014-15.9	LIS CB Shore - Stony Creek (East), Branford	5/13/2008	82	Dry	38.4	40
014-15.9	LIS CB Shore - Stony Creek (East), Branford	12/15/2008	18	Wet		
014-15.9	LIS CB Shore - Stony Creek (East), Branford	12/15/2010	171	Wet	171	90
014-22.0	LIS CB Shore - Stony Creek (East), Branford	4/3/2003	1.6	Dry	4.2	n/a
014-22.0	LIS CB Shore - Stony Creek (East), Branford	4/14/2003	1.6	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	4/29/2003	3.6	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	6/3/2003	1.7	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	6/24/2003	28	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	8/19/2003	3.6	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	10/2/2003	14	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	8/17/2004	5.8	Wet	4.2	n/a
014-22.0	LIS CB Shore - Stony Creek (East), Branford	9/23/2004	8.1	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	11/30/2004	1.6	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	2/8/2005	0.9	Dry	1	n/a
014-22.0	LIS CB Shore - Stony Creek (East), Branford	4/6/2005	1	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	11/14/2005	1	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	10/16/2006	1	Dry	1.4	n/a
014-22.0	LIS CB Shore - Stony Creek (East), Branford	11/20/2006	2	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	1/11/2007	14	Dry	6.2	n/a
014-22.0	LIS CB Shore - Stony Creek (East), Branford	8/23/2007	1	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-22.0	LIS CB Shore - Stony Creek (East), Branford	9/13/2007	9	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	10/22/2007	12	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	3/3/2008	1	Dry	2	n/a
014-22.0	LIS CB Shore - Stony Creek (East), Branford	3/12/2008	1	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	5/1/2008	8	Wet		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	5/14/2008	1	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	12/16/2008	4	Wet		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	3/31/2009	1	Dry	2.3	n/a
014-22.0	LIS CB Shore - Stony Creek (East), Branford	4/13/2009	1	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	4/22/2009	1	Wet		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	6/22/2009	9	Wet		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	7/23/2009	1	Wet		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	7/27/2009	8	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	10/29/2009	10	Wet		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	11/18/2009	1	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	5/19/2010	90	Wet	16.9	40
014-22.0	LIS CB Shore - Stony Creek (East), Branford	8/25/2010	4	Wet		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	12/2/2010	7	Wet		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	12/14/2010	32	Wet		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	3/15/2011	2	Dry	5.1	10
014-22.0	LIS CB Shore - Stony Creek (East), Branford	4/18/2011	34	Wet		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	4/25/2011	1	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	6/21/2011	7	Dry		
014-22.0	LIS CB Shore - Stony Creek (East), Branford	6/28/2011	7	Dry		
Shaded cells indicate an exceedance of water quality criteria						

Wet and dry weather geometric mean values for all monitoring stations on segment: LIS CB Shore – Stony Creek (East), Branford (CT-C2_011)

Station #	Station ID	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
014-15.0	LIS CB Shore - Stony Creek (East), Branford	2000-2011	16	27	2	5	1
014-15.2	LIS CB Shore - Stony Creek (East), Branford	2000-2011	11	30	2	5	2

Station #	Station ID	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
014-15.3	LIS CB Shore - Stony Creek (East), Branford	2000-2011	12	28	3	11	2
014-15.4	LIS CB Shore - Stony Creek (East), Branford	2000-2011	15	29	3	9	2
014-15.5	LIS CB Shore - Stony Creek (East), Branford	2000-2011	8	25	3	7	3
014-15.7	LIS CB Shore - Stony Creek (East), Branford	2000-2011	8	24	3	11	2
014-15.9	LIS CB Shore - Stony Creek (East), Branford	2000-2011	3	12	32	65	27
014-22.0	LIS CB Shore - Stony Creek (East), Branford	2000-2011	12	29	4	8	3
Shaded cells indicate an exceedance of water quality criteria							

Table 15: Segment 3: LIS CB Shore – Stony Creek (West), Branford

Waterbody ID: CT-C2_012
Characteristics: Saltwater, Class SA
Impairment: Shellfishing
Water Quality Criteria for Fecal coliform:
Geometric Mean: 14 colonies/100 ml
90% samples less than: 31 colonies/100 ml
Percent reduction to meet:
Geometric Mean: 96%
90% samples less than: 90%
Data: 2000 – 2011 from CT DEEP target sampling efforts, 2012 TMDL cycle

Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment: LIS CB Shore – Stony Creek (West), Branford (CT-C2_012) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-12.4	LIS CB Shore - Stony Creek (West), Branford	4/3/2003	1.6	Dry	4.1	n/a
014-12.4	LIS CB Shore - Stony Creek (West), Branford	4/14/2003	1.6	Dry		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	4/29/2003	1.6	Dry		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	6/3/2003	5.8	Dry		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	10/2/2003	50	Dry		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	11/30/2004	3.6	Dry	3.6	n/a
014-12.4	LIS CB Shore - Stony Creek (West), Branford	2/8/2005	0.9	Dry	1	n/a
014-12.4	LIS CB Shore - Stony Creek (West), Branford	4/6/2005	1	Dry		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	11/14/2005	1	Dry		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	6/19/2006	4	Dry	2	n/a
014-12.4	LIS CB Shore - Stony Creek (West), Branford	10/16/2006	1	Dry		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	11/20/2006	2	Dry		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	1/11/2007	3	Dry	2.4	n/a
014-12.4	LIS CB Shore - Stony Creek (West), Branford	10/22/2007	2	Dry		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	3/3/2008	1	Dry	1.6	n/a
014-12.4	LIS CB Shore - Stony Creek (West), Branford	3/12/2008	3	Dry		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	5/1/2008	1	Wet		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	5/14/2008	3	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-12.4	LIS CB Shore - Stony Creek (West), Branford	12/16/2008	1	Wet		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	3/31/2009	1	Dry	2.4	n/a
014-12.4	LIS CB Shore - Stony Creek (West), Branford	4/13/2009	1	Dry		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	4/22/2009	6	Wet		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	10/29/2009	13	Wet		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	11/18/2009	1	Dry		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	12/2/2010	12	Wet	4.9	n/a
014-12.4	LIS CB Shore - Stony Creek (West), Branford	12/14/2010	2	Wet		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	3/15/2011	2	Dry	2.1	n/a
014-12.4	LIS CB Shore - Stony Creek (West), Branford	4/18/2011	3	Wet		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	6/21/2011	1	Dry		
014-12.4	LIS CB Shore - Stony Creek (West), Branford	6/28/2011	3	Dry		
014-16.1	LIS CB Shore - Stony Creek (West), Branford	2/9/2006	1	Dry	1	n/a
014-16.1	LIS CB Shore - Stony Creek (West), Branford	11/1/2007	72	Dry	30.6	40
014-16.1	LIS CB Shore - Stony Creek (West), Branford	11/29/2007	13	Dry		
014-16.1	LIS CB Shore - Stony Creek (West), Branford	5/13/2008	156	Dry	163.3	90
014-16.1	LIS CB Shore - Stony Creek (West), Branford	12/15/2008	171	Wet		
014-16.1	LIS CB Shore - Stony Creek (West), Branford	12/15/2010	171	Wet	171	90
014-16.2	LIS CB Shore - Stony Creek (West), Branford	4/3/2003	8.6	Dry	5.2	n/a
014-16.2	LIS CB Shore - Stony Creek (West), Branford	4/14/2003	1.6	Dry		
014-16.2	LIS CB Shore - Stony Creek (West), Branford	4/29/2003	10	Dry		
014-16.2	LIS CB Shore - Stony Creek (West), Branford	11/30/2004	10	Dry	10	n/a
014-16.2	LIS CB Shore - Stony Creek (West), Branford	2/8/2005	1	Dry	5.3	15
014-16.2	LIS CB Shore - Stony Creek (West), Branford	2/15/2005	64	Wet		
014-16.2	LIS CB Shore - Stony Creek (West), Branford	2/17/2005	12	Dry		
014-16.2	LIS CB Shore - Stony Creek (West), Branford	11/14/2005	1	Dry		
014-16.2	LIS CB Shore - Stony Creek (West), Branford	2/9/2006	2	Dry	4	n/a

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-16.2	LIS CB Shore - Stony Creek (West), Branford	11/20/2006	8	Dry		
014-16.2	LIS CB Shore - Stony Creek (West), Branford	10/22/2007	4	Dry	5	n/a
014-16.2	LIS CB Shore - Stony Creek (West), Branford	11/1/2007	10	Dry		
014-16.2	LIS CB Shore - Stony Creek (West), Branford	11/29/2007	4	Dry		
014-16.2	LIS CB Shore - Stony Creek (West), Branford	12/6/2007	4	Dry		
014-16.2	LIS CB Shore - Stony Creek (West), Branford	5/1/2008	1	Wet	3.6	n/a
014-16.2	LIS CB Shore - Stony Creek (West), Branford	5/13/2008	4	Dry		
014-16.2	LIS CB Shore - Stony Creek (West), Branford	12/15/2008	12	Wet		
014-16.2	LIS CB Shore - Stony Creek (West), Branford	3/31/2009	2	Dry	4.3	n/a
014-16.2	LIS CB Shore - Stony Creek (West), Branford	4/13/2009	1	Dry		
014-16.2	LIS CB Shore - Stony Creek (West), Branford	6/22/2009	12	Wet		
014-16.2	LIS CB Shore - Stony Creek (West), Branford	10/29/2009	14	Wet		
014-16.2	LIS CB Shore - Stony Creek (West), Branford	12/2/2010	32	Wet	17.2	23
014-16.2	LIS CB Shore - Stony Creek (West), Branford	12/14/2010	10	Wet		
014-16.2	LIS CB Shore - Stony Creek (West), Branford	12/15/2010	16	Wet		
014-16.2	LIS CB Shore - Stony Creek (West), Branford	3/15/2011	2	Dry	2	n/a
014-16.3	LIS CB Shore - Stony Creek (West), Branford	4/16/2003	10	Dry	10	n/a
014-16.3	LIS CB Shore - Stony Creek (West), Branford	8/18/2004	224	Dry	224	90
014-16.3	LIS CB Shore - Stony Creek (West), Branford	2/15/2005	100	Wet	44.7	40
014-16.3	LIS CB Shore - Stony Creek (West), Branford	2/17/2005	20	Dry		
014-16.3	LIS CB Shore - Stony Creek (West), Branford	2/9/2006	2	Dry	2	n/a
014-16.3	LIS CB Shore - Stony Creek (West), Branford	11/1/2007	32	Dry	32	90
014-16.3	LIS CB Shore - Stony Creek (West), Branford	5/13/2008	18	Dry	19.9	n/a
014-16.3	LIS CB Shore - Stony Creek (West), Branford	12/15/2008	22	Wet		
014-16.3	LIS CB Shore - Stony Creek (West), Branford	12/15/2010	28	Wet	28	n/a
014-16.6	LIS CB Shore - Stony Creek (West), Branford	4/16/2003	10	Dry	10	n/a
014-16.6	LIS CB Shore - Stony Creek (West), Branford	8/18/2004	321	Dry	321	90

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-16.6	LIS CB Shore - Stony Creek (West), Branford	8/23/2004	321	Dry		
014-16.6	LIS CB Shore - Stony Creek (West), Branford	2/15/2005	60	Wet	11	40
014-16.6	LIS CB Shore - Stony Creek (West), Branford	2/17/2005	2	Dry		
014-16.6	LIS CB Shore - Stony Creek (West), Branford	2/9/2006	2	Dry	2	n/a
014-16.6	LIS CB Shore - Stony Creek (West), Branford	11/1/2007	4	Dry	4	n/a
014-16.6	LIS CB Shore - Stony Creek (West), Branford	5/13/2008	4	Dry	9.4	n/a
014-16.6	LIS CB Shore - Stony Creek (West), Branford	12/15/2008	22	Wet		
014-16.6	LIS CB Shore - Stony Creek (West), Branford	12/15/2010	2	Wet	2	n/a
014-28.0	LIS CB Shore - Stony Creek (West), Branford	4/29/2003	1.6	Dry	5.8	n/a
014-28.0	LIS CB Shore - Stony Creek (West), Branford	6/24/2003	11	Dry		
014-28.0	LIS CB Shore - Stony Creek (West), Branford	8/19/2003	11	Dry		
014-28.0	LIS CB Shore - Stony Creek (West), Branford	9/23/2004	3.6	Dry	3.6	n/a
014-28.0	LIS CB Shore - Stony Creek (West), Branford	2/8/2005	3	Dry	3.1	n/a
014-28.0	LIS CB Shore - Stony Creek (West), Branford	2/15/2005	2	Wet		
014-28.0	LIS CB Shore - Stony Creek (West), Branford	4/6/2005	5	Dry		
014-28.0	LIS CB Shore - Stony Creek (West), Branford	10/16/2006	1	Dry	1.4	n/a
014-28.0	LIS CB Shore - Stony Creek (West), Branford	11/20/2006	2	Dry		
014-28.0	LIS CB Shore - Stony Creek (West), Branford	10/22/2007	2	Dry	2	n/a
014-28.0	LIS CB Shore - Stony Creek (West), Branford	3/3/2008	1	Dry	1	n/a
014-28.0	LIS CB Shore - Stony Creek (West), Branford	5/1/2008	1	Wet		
014-28.0	LIS CB Shore - Stony Creek (West), Branford	12/16/2008	1	Wet		
014-28.0	LIS CB Shore - Stony Creek (West), Branford	3/31/2009	1	Dry	3.5	n/a
014-28.0	LIS CB Shore - Stony Creek (West), Branford	4/13/2009	1	Dry		
014-28.0	LIS CB Shore - Stony Creek (West), Branford	6/22/2009	12	Wet		
014-28.0	LIS CB Shore - Stony Creek (West), Branford	7/23/2009	12	Wet		
014-28.0	LIS CB Shore - Stony Creek (West), Branford	7/27/2009	4	Dry		
014-28.0	LIS CB Shore - Stony Creek (West), Branford	10/29/2009	3	Wet		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-28.0	LIS CB Shore - Stony Creek (West), Branford	5/19/2010	22	Wet	9.5	15
014-28.0	LIS CB Shore - Stony Creek (West), Branford	8/25/2010	46	Wet		
014-28.0	LIS CB Shore - Stony Creek (West), Branford	12/2/2010	4	Wet		
014-28.0	LIS CB Shore - Stony Creek (West), Branford	12/14/2010	2	Wet		
014-28.0	LIS CB Shore - Stony Creek (West), Branford	3/15/2011	2	Dry	2	n/a
014-28.2	LIS CB Shore - Stony Creek (West), Branford	4/16/2003	50	Dry	50	90
014-28.2	LIS CB Shore - Stony Creek (West), Branford	2/9/2006	1	Dry	1	n/a
014-29.0	LIS CB Shore - Stony Creek (West), Branford	4/3/2003	8.6	Dry	2.9	n/a
014-29.0	LIS CB Shore - Stony Creek (West), Branford	4/14/2003	1.6	Dry		
014-29.0	LIS CB Shore - Stony Creek (West), Branford	4/29/2003	1.7	Dry		
014-29.0	LIS CB Shore - Stony Creek (West), Branford	9/23/2004	3.6	Dry	6	n/a
014-29.0	LIS CB Shore - Stony Creek (West), Branford	11/30/2004	10	Dry		
014-29.0	LIS CB Shore - Stony Creek (West), Branford	2/8/2005	0.9	Dry	2.2	n/a
014-29.0	LIS CB Shore - Stony Creek (West), Branford	2/15/2005	4	Wet		
014-29.0	LIS CB Shore - Stony Creek (West), Branford	2/17/2005	8	Dry		
014-29.0	LIS CB Shore - Stony Creek (West), Branford	4/6/2005	1	Dry		
014-29.0	LIS CB Shore - Stony Creek (West), Branford	11/14/2005	2	Dry		
014-29.0	LIS CB Shore - Stony Creek (West), Branford	2/9/2006	8	Dry	2.5	n/a
014-29.0	LIS CB Shore - Stony Creek (West), Branford	10/16/2006	1	Dry		
014-29.0	LIS CB Shore - Stony Creek (West), Branford	11/20/2006	2	Dry		
014-29.0	LIS CB Shore - Stony Creek (West), Branford	10/22/2007	1	Dry	1	n/a
014-29.0	LIS CB Shore - Stony Creek (West), Branford	5/1/2008	1	Wet	1	n/a
014-29.0	LIS CB Shore - Stony Creek (West), Branford	12/15/2008	1	Wet		
014-29.0	LIS CB Shore - Stony Creek (West), Branford	3/31/2009	1	Dry	4.5	n/a
014-29.0	LIS CB Shore - Stony Creek (West), Branford	4/13/2009	1	Dry		
014-29.0	LIS CB Shore - Stony Creek (West), Branford	6/22/2009	4	Wet		
014-29.0	LIS CB Shore - Stony Creek (West), Branford	7/23/2009	18	Wet		
014-29.0	LIS CB Shore - Stony Creek (West), Branford	7/27/2009	10	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-29.0	LIS CB Shore - Stony Creek (West), Branford	10/29/2009	11	Wet		
014-29.0	LIS CB Shore - Stony Creek (West), Branford	12/2/2010	10	Wet	8.9	n/a
014-29.0	LIS CB Shore - Stony Creek (West), Branford	12/14/2010	8	Wet		
014-29.0	LIS CB Shore - Stony Creek (West), Branford	3/15/2011	2	Dry	2	n/a

Shaded cells indicate an exceedance of water quality criteria
†Average of two duplicate samples
***Indicates geometric mean and 90% less than values used to calculate the percent reduction**

Wet and dry weather geometric mean values for all monitoring stations on segment: LIS CB Shore – Stony Creek (West), Branford (CT-C2_012)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
014-12.4	LIS CB Shore - Stony Creek (West), Branford	2000-2011	7	23	2	3	2
014-16.1	LIS CB Shore - Stony Creek (West), Branford	2000-2011	2	4	40	171	20
014-16.2	LIS CB Shore - Stony Creek (West), Branford	2000-2011	8	17	5	13	4
014-16.3	LIS CB Shore - Stony Creek (West), Branford	2000-2011	3	16	24	39	19
014-16.6	LIS CB Shore - Stony Creek (West), Branford	2000-2011	3	7	13	14	13
014-28.0	LIS CB Shore - Stony Creek (West), Branford	2000-2011	10	14	3	5	2
014-28.2	LIS CB Shore - Stony Creek (West), Branford	2000-2011	0	2	7	0	7
014-29.0	LIS CB Shore - Stony Creek (West), Branford	2000-2011	8	17	3	5	2

Shaded cells indicate an exceedance of water quality criteria

Table 16: Segment 4: LIS CB Shore – Indian Neck Bacteria Data

Waterbody ID: CT-C2_013
Characteristics: Saltwater, Class SA
Impairment: Shellfishing
Water Quality Criteria for Fecal coliform:

Geometric Mean: 14 colonies/100 ml
90% samples less than: 31 colonies/100 ml

Percent reduction to meet:

Geometric Mean: 19%
90% samples less than: 15%

Data: 2000 – 2011 from CT DEEP target sampling efforts, 2012 TMDL cycle

Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment: LIS CB Shore – Indian Neck, Branford (CT-C2_013) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-04.9	LIS CB Shore - Indian Neck, Branford	10/20/2004	3.6	Wet	3	n/a
014-04.9	LIS CB Shore - Indian Neck, Branford	11/30/2004	1.6	Dry		
014-04.9	LIS CB Shore - Indian Neck, Branford	12/5/2004	1.7	Dry		
014-04.9	LIS CB Shore - Indian Neck, Branford	12/8/2004	8.1	Wet		
014-04.9	LIS CB Shore - Indian Neck, Branford	2/15/2005	25	Wet	17.3	n/a
014-04.9	LIS CB Shore - Indian Neck, Branford	9/1/2005	12	Dry		
014-04.9	LIS CB Shore - Indian Neck, Branford	1/27/2010	4	Dry	2.9	n/a
014-04.9	LIS CB Shore - Indian Neck, Branford	6/14/2010	12	Dry		
014-04.9	LIS CB Shore - Indian Neck, Branford	7/15/2010	4	Wet		
014-04.9	LIS CB Shore - Indian Neck, Branford	8/25/2010	1	Wet		
014-04.9	LIS CB Shore - Indian Neck, Branford	12/5/2010	1	Dry		
014-04.9	LIS CB Shore - Indian Neck, Branford	4/14/2011	2	Wet	2	n/a
014-06.0	LIS CB Shore - Indian Neck, Branford	4/3/2003	1.7	Dry	3.4	n/a
014-06.0	LIS CB Shore - Indian Neck, Branford	4/14/2003	1.6	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	4/29/2003	1.6	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	6/3/2003	5.8	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	6/24/2003	3.6	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	8/19/2003	11	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	10/2/2003	5.8	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	7/15/2004	11	Dry	3.3	n/a
014-06.0	LIS CB Shore - Indian Neck, Branford	8/17/2004	8.1	Wet		
014-06.0	LIS CB Shore - Indian Neck, Branford	9/13/2004	1.6	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	9/23/2004	1.7	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-06.0	LIS CB Shore - Indian Neck, Branford	11/30/2004	1.6	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	2/8/2005	1	Dry	2.5	10
014-06.0	LIS CB Shore - Indian Neck, Branford	2/15/2005	45	Wet		
014-06.0	LIS CB Shore - Indian Neck, Branford	2/17/2005	2	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	4/6/2005	1	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	11/14/2005	1	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	6/19/2006	1	Dry	1.3	n/a
014-06.0	LIS CB Shore - Indian Neck, Branford	10/16/2006	1	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	11/20/2006	2	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	1/11/2007	6	Dry	4	15
014-06.0	LIS CB Shore - Indian Neck, Branford	8/23/2007	41	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	9/13/2007	1	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	10/22/2007	1	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	2/21/2008	3	Dry	1.8	n/a
014-06.0	LIS CB Shore - Indian Neck, Branford	3/3/2008	1	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	3/12/2008	1	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	5/14/2008	1	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	12/16/2008	7	Wet		
014-06.0	LIS CB Shore - Indian Neck, Branford	3/31/2009	1	Dry	1.6	n/a
014-06.0	LIS CB Shore - Indian Neck, Branford	4/13/2009	1	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	4/22/2009	1	Wet		
014-06.0	LIS CB Shore - Indian Neck, Branford	6/22/2009	2	Wet		
014-06.0	LIS CB Shore - Indian Neck, Branford	7/23/2009	1	Wet		
014-06.0	LIS CB Shore - Indian Neck, Branford	7/27/2009	1	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	10/29/2009	5	Wet		
014-06.0	LIS CB Shore - Indian Neck, Branford	11/18/2009	4	Dry		
014-06.0	LIS CB Shore - Indian Neck, Branford	5/19/2010	28	Wet	2.3	n/a
014-06.0	LIS CB Shore - Indian Neck, Branford	8/25/2010	1	Wet		
014-06.0	LIS CB Shore - Indian Neck, Branford	12/2/2010	1	Wet		
014-06.0	LIS CB Shore - Indian Neck, Branford	12/14/2010	1	Wet		
014-06.0	LIS CB Shore - Indian Neck, Branford	3/15/2011	1	Dry	1.7	n/a
014-06.0	LIS CB Shore - Indian Neck, Branford	4/18/2011	8	Wet		
014-06.0	LIS CB Shore - Indian Neck, Branford	6/21/2011	1	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-06.0	LIS CB Shore - Indian Neck, Branford	6/28/2011	1	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	4/3/2003	3.6	Dry	2.1	n/a
014-07.0	LIS CB Shore - Indian Neck, Branford	4/14/2003	1.6	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	4/29/2003	1.6	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	6/3/2003	3.6	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	6/24/2003	1.7	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	8/19/2003	1.7	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	10/2/2003	1.7	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	7/15/2004	1.6	Dry	5.1	n/a
014-07.0	LIS CB Shore - Indian Neck, Branford	8/17/2004	18	Wet		
014-07.0	LIS CB Shore - Indian Neck, Branford	9/13/2004	3.6	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	9/23/2004	5.8	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	11/30/2004	5.8	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	2/8/2005	3	Dry	3.7	10
014-07.0	LIS CB Shore - Indian Neck, Branford	2/15/2005	59	Wet		
014-07.0	LIS CB Shore - Indian Neck, Branford	2/17/2005	4	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	4/6/2005	1	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	11/14/2005	1	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	6/19/2006	1	Dry	1.3	n/a
014-07.0	LIS CB Shore - Indian Neck, Branford	10/16/2006	1	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	11/20/2006	2	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	1/11/2007	4	Dry	1.4	n/a
014-07.0	LIS CB Shore - Indian Neck, Branford	8/23/2007	1	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	9/13/2007	1	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	10/22/2007	1	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	2/21/2008	3	Dry	2	n/a
014-07.0	LIS CB Shore - Indian Neck, Branford	3/3/2008	1	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	3/12/2008	5	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	5/14/2008	1	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	12/16/2008	2	Wet		
014-07.0	LIS CB Shore - Indian Neck, Branford	3/31/2009	1	Dry	1.6	n/a
014-07.0	LIS CB Shore - Indian Neck, Branford	4/13/2009	1	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	4/22/2009	1	Wet		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-07.0	LIS CB Shore - Indian Neck, Branford	6/22/2009	7	Wet		
014-07.0	LIS CB Shore - Indian Neck, Branford	7/23/2009	3	Wet		
014-07.0	LIS CB Shore - Indian Neck, Branford	7/27/2009	1	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	10/29/2009	2	Wet		
014-07.0	LIS CB Shore - Indian Neck, Branford	11/18/2009	1	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	5/19/2010	10	Wet	3	n/a
014-07.0	LIS CB Shore - Indian Neck, Branford	8/25/2010	2	Wet		
014-07.0	LIS CB Shore - Indian Neck, Branford	12/2/2010	2	Wet		
014-07.0	LIS CB Shore - Indian Neck, Branford	12/14/2010	2	Wet		
014-07.0	LIS CB Shore - Indian Neck, Branford	3/15/2011	1	Dry	1.3	n/a
014-07.0	LIS CB Shore - Indian Neck, Branford	4/18/2011	3	Wet		
014-07.0	LIS CB Shore - Indian Neck, Branford	6/21/2011	1	Dry		
014-07.0	LIS CB Shore - Indian Neck, Branford	6/28/2011	1	Dry		
014-07.2	LIS CB Shore - Indian Neck, Branford	4/3/2003	8.1	Dry	4.8	n/a
014-07.2	LIS CB Shore - Indian Neck, Branford	4/14/2003	1.7	Dry		
014-07.2	LIS CB Shore - Indian Neck, Branford	4/29/2003	1.6	Dry		
014-07.2	LIS CB Shore - Indian Neck, Branford	6/3/2003	51	Dry		
014-07.2	LIS CB Shore - Indian Neck, Branford	6/5/2003	14	Wet		
014-07.2	LIS CB Shore - Indian Neck, Branford	6/24/2003	1.7	Dry		
014-07.2	LIS CB Shore - Indian Neck, Branford	8/19/2003	1.7	Dry		
014-07.2	LIS CB Shore - Indian Neck, Branford	10/2/2003	5.8	Dry		
014-07.2	LIS CB Shore - Indian Neck, Branford	10/16/2006	1	Dry	1	n/a
014-07.2	LIS CB Shore - Indian Neck, Branford	8/23/2007	1	Dry	1	n/a
014-07.2	LIS CB Shore - Indian Neck, Branford	10/22/2007	1	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	4/3/2003	1.7	Dry	3.6	n/a
014-08.0	LIS CB Shore - Indian Neck, Branford	4/14/2003	1.6	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	4/29/2003	1.6	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	6/3/2003	51	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	6/5/2003	5.8	Wet		
014-08.0	LIS CB Shore - Indian Neck, Branford	6/24/2003	3.6	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	8/19/2003	1.6	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	10/2/2003	3.6	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	7/15/2004	8.1	Dry	4	n/a

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-08.0	LIS CB Shore - Indian Neck, Branford	8/17/2004	1.7	Wet		
014-08.0	LIS CB Shore - Indian Neck, Branford	9/13/2004	3.6	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	9/23/2004	5.8	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	11/30/2004	3.6	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	2/8/2005	1	Dry	3.2	10
014-08.0	LIS CB Shore - Indian Neck, Branford	2/15/2005	65	Wet		
014-08.0	LIS CB Shore - Indian Neck, Branford	2/17/2005	5	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	4/6/2005	1	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	11/14/2005	1	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	6/19/2006	1	Dry	1.6	n/a
014-08.0	LIS CB Shore - Indian Neck, Branford	10/16/2006	1	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	11/20/2006	4	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	1/11/2007	37	Dry	2.5	15
014-08.0	LIS CB Shore - Indian Neck, Branford	8/23/2007	1	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	9/13/2007	1	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	10/22/2007	1	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	2/21/2008	1	Dry	1.1	n/a
014-08.0	LIS CB Shore - Indian Neck, Branford	3/3/2008	1	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	3/12/2008	1	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	5/1/2008	1	Wet		
014-08.0	LIS CB Shore - Indian Neck, Branford	5/14/2008	1	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	12/16/2008	2	Wet		
014-08.0	LIS CB Shore - Indian Neck, Branford	3/31/2009	1	Dry	1.5	n/a
014-08.0	LIS CB Shore - Indian Neck, Branford	4/13/2009	1	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	4/22/2009	1	Wet		
014-08.0	LIS CB Shore - Indian Neck, Branford	6/22/2009	3	Wet		
014-08.0	LIS CB Shore - Indian Neck, Branford	7/23/2009	3	Wet		
014-08.0	LIS CB Shore - Indian Neck, Branford	7/27/2009	1	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	10/29/2009	3	Wet		
014-08.0	LIS CB Shore - Indian Neck, Branford	11/18/2009	1	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	5/19/2010	6	Wet	3.1	n/a
014-08.0	LIS CB Shore - Indian Neck, Branford	8/25/2010	1	Wet		
014-08.0	LIS CB Shore - Indian Neck, Branford	12/2/2010	4	Wet		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-08.0	LIS CB Shore - Indian Neck, Branford	12/14/2010	4	Wet		
014-08.0	LIS CB Shore - Indian Neck, Branford	3/15/2011	1	Dry	1.2	n/a
014-08.0	LIS CB Shore - Indian Neck, Branford	4/18/2011	1	Wet		
014-08.0	LIS CB Shore - Indian Neck, Branford	6/21/2011	1	Dry		
014-08.0	LIS CB Shore - Indian Neck, Branford	6/28/2011	2	Dry		
014-09.0	LIS CB Shore - Indian Neck, Branford	8/31/2006	1	Wet	1	n/a
014-09.0	LIS CB Shore - Indian Neck, Branford	10/16/2006	1	Dry		
014-09.0	LIS CB Shore - Indian Neck, Branford	1/11/2007	5	Dry	2.2	n/a
014-09.0	LIS CB Shore - Indian Neck, Branford	10/22/2007	1	Dry		
014-09.0	LIS CB Shore - Indian Neck, Branford	5/1/2008	1	Wet	1	n/a
014-09.2	LIS CB Shore - Indian Neck, Branford	4/3/2003	3.6	Dry	5	3
014-09.2	LIS CB Shore - Indian Neck, Branford	4/14/2003	1.6	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	4/29/2003	1.6	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	6/3/2003	51	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	6/5/2003	18	Wet		
014-09.2	LIS CB Shore - Indian Neck, Branford	6/24/2003	1.6	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	8/19/2003	3.6	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	10/2/2003	8.1	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	8/17/2004	3.6	Wet	2.1	n/a
014-09.2	LIS CB Shore - Indian Neck, Branford	9/23/2004	1.7	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	11/30/2004	1.6	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	2/8/2005	0.9	Dry	0.9	n/a
014-09.2	LIS CB Shore - Indian Neck, Branford	4/6/2005	1	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	6/19/2006	8	Dry	2	n/a
014-09.2	LIS CB Shore - Indian Neck, Branford	8/31/2006	2	Wet		
014-09.2	LIS CB Shore - Indian Neck, Branford	10/16/2006	1	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	11/20/2006	1	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	1/11/2007	9	Dry	1.7	n/a
014-09.2	LIS CB Shore - Indian Neck, Branford	8/23/2007	1	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	9/13/2007	1	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	10/22/2007	1	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	2/21/2008	3	Dry	1.2	n/a
014-09.2	LIS CB Shore - Indian Neck, Branford	3/3/2008	1	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-09.2	LIS CB Shore - Indian Neck, Branford	3/12/2008	1	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	5/1/2008	1	Wet		
014-09.2	LIS CB Shore - Indian Neck, Branford	5/14/2008	1	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	12/16/2008	1	Wet		
014-09.2	LIS CB Shore - Indian Neck, Branford	3/31/2009	1	Dry	1.9	n/a
014-09.2	LIS CB Shore - Indian Neck, Branford	4/13/2009	1	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	4/22/2009	2	Wet		
014-09.2	LIS CB Shore - Indian Neck, Branford	6/22/2009	2	Wet		
014-09.2	LIS CB Shore - Indian Neck, Branford	7/23/2009	11	Wet		
014-09.2	LIS CB Shore - Indian Neck, Branford	7/27/2009	1	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	10/29/2009	4	Wet		
014-09.2	LIS CB Shore - Indian Neck, Branford	11/18/2009	1	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	5/19/2010	4	Wet	2.6	n/a
014-09.2	LIS CB Shore - Indian Neck, Branford	8/25/2010	2	Wet		
014-09.2	LIS CB Shore - Indian Neck, Branford	12/2/2010	6	Wet		
014-09.2	LIS CB Shore - Indian Neck, Branford	12/14/2010	1	Wet		
014-09.2	LIS CB Shore - Indian Neck, Branford	3/15/2011	1	Dry	1	n/a
014-09.2	LIS CB Shore - Indian Neck, Branford	4/18/2011	1	Wet		
014-09.2	LIS CB Shore - Indian Neck, Branford	6/21/2011	1	Dry		
014-09.2	LIS CB Shore - Indian Neck, Branford	6/28/2011	1	Dry		

Shaded cells indicate an exceedance of water quality criteria

†Average of two duplicate samples

***Indicates geometric mean and 90% less than values used to calculate the percent reduction**

Wet and dry weather geometric mean values for all monitoring stations on segment: LIS CB Shore – Indian Neck, Branford (CT-C2_013)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
014-04.9	LIS CB Shore - Indian Neck, Branford	2000-2011	6	6	4	4	3
014-06.0	LIS CB Shore - Indian Neck, Branford	2000-2011	12	33	2	4	2
014-07.0	LIS CB Shore - Indian Neck, Branford	2000-2011	12	33	2	4	2
014-07.2	LIS CB Shore - Indian Neck, Branford	2000-2011	1	10	3	14	3
014-08.0	LIS CB Shore - Indian Neck, Branford	2000-2011	14	33	2	3	2
014-09.0	LIS CB Shore - Indian Neck, Branford	2000-2011	2	3	1	1	2
014-09.2	LIS CB Shore - Indian Neck, Branford	2000-2011	14	29	2	3	2

Shaded cells indicate an exceedance of water quality criteria

Table 17: Segment 5: LIS CB Midshore – Thimble Island Bacteria Data
Waterbody ID: CT-C3_009-I
Characteristics: Saltwater, Class SA
Impairment: Shellfishing
Water Quality Criteria for Fecal coliform:
Geometric Mean: 14 colonies/100 ml
90% samples less than: 31 colonies/100 ml
Percent reduction to meet:
Geometric Mean: NA
90% samples less than: 15%
Data: 2000 – 2011 from CT DEEP target sampling efforts, 2012 TMDL cycle

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Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment: LIS CB Midshore – Thimble Island, Branford (CT-C3_009) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-11.2	LIS CB Midshore - Thimble Islands, Branford	4/14/2003	1.6	Dry	2.5	n/a
014-11.2	LIS CB Midshore - Thimble Islands, Branford	4/29/2003	1.6	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	6/3/2003	1.7	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	6/24/2003	5.8	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	8/19/2003	5.8	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	10/2/2003	1.7	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	8/17/2004	3.6	Wet	1.9	n/a
014-11.2	LIS CB Midshore - Thimble Islands, Branford	9/23/2004	8.1	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	11/30/2004	3.6	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	2/8/2005	0.9	Dry	0.9	n/a
014-11.2	LIS CB Midshore - Thimble Islands, Branford	4/6/2005	1	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	6/19/2006	1	Dry	1.4	n/a
014-11.2	LIS CB Midshore - Thimble Islands, Branford	8/31/2006	3	Wet		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	10/16/2006	1	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	1/11/2007	11	Dry	2.7	4
014-11.2	LIS CB Midshore - Thimble Islands, Branford	5/1/2007	1	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	6/5/2007	32	Wet		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	6/7/2007	1	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	8/23/2007	1	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	9/13/2007	3	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	10/22/2007	1	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	3/3/2008	1	Dry	1.4	n/a

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-11.2	LIS CB Midshore - Thimble Islands, Branford	3/12/2008	1	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	5/1/2008	1	Wet		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	12/16/2008	4	Wet		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	3/31/2009	1	Dry	4.4	n/a
014-11.2	LIS CB Midshore - Thimble Islands, Branford	4/13/2009	1	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	4/22/2009	5	Wet		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	6/22/2009	13	Wet		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	7/23/2009	15	Wet		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	7/27/2009	22	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	10/29/2009	7	Wet		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	11/18/2009	1	Dry		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	3/17/2010	3	Dry	3	n/a
014-11.2	LIS CB Midshore - Thimble Islands, Branford	3/25/2010	1	Wet		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	5/19/2010	25	Wet		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	8/25/2010	3	Wet		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	12/2/2010	3	Wet		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	12/14/2010	1	Wet		
014-11.2	LIS CB Midshore - Thimble Islands, Branford	3/15/2011	1	Dry	1	n/a
014-11.2	LIS CB Midshore - Thimble Islands, Branford	4/18/2011	1	Wet		
014-11.3	LIS CB Midshore - Thimble Islands, Branford	3/15/2011	1	Dry	1	n/a
014-11.3	LIS CB Midshore - Thimble Islands, Branford	4/18/2011	1	Wet		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	4/3/2003	1.6	Dry	2	n/a
014-11.4	LIS CB Midshore - Thimble Islands, Branford	4/14/2003	1.6	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	4/29/2003	1.6	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	6/3/2003	3.6	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	6/24/2003	1.7	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	8/19/2003	1.6	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	10/2/2003	3.6	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	8/17/2004	5.8	Wet	4.2	n/a
014-11.4	LIS CB Midshore - Thimble Islands, Branford	9/23/2004	8.1	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	11/30/2004	1.6	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	2/8/2005	1	Dry	1	n/a
014-11.4	LIS CB Midshore - Thimble Islands, Branford	4/6/2005	1	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-11.4	LIS CB Midshore - Thimble Islands, Branford	11/14/2005	1	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	6/19/2006	4	Dry	4.9	n/a
014-11.4	LIS CB Midshore - Thimble Islands, Branford	10/16/2006	1	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	11/20/2006	30	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	1/11/2007	2	Dry	2.6	n/a
014-11.4	LIS CB Midshore - Thimble Islands, Branford	8/23/2007	3	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	9/13/2007	8	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	10/22/2007	1	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	3/3/2008	1	Dry	2	n/a
014-11.4	LIS CB Midshore - Thimble Islands, Branford	3/12/2008	1	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	5/14/2008	4	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	12/16/2008	4	Wet		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	3/31/2009	1	Dry	2.7	n/a
014-11.4	LIS CB Midshore - Thimble Islands, Branford	4/13/2009	1	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	4/22/2009	1	Wet		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	6/22/2009	11	Wet		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	7/23/2009	4	Wet		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	7/27/2009	4	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	10/29/2009	8	Wet		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	11/18/2009	2	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	5/19/2010	36	Wet	4.6	15
014-11.4	LIS CB Midshore - Thimble Islands, Branford	8/25/2010	1	Wet		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	12/2/2010	4	Wet		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	12/14/2010	3	Wet		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	3/15/2011	2	Dry	1.2	n/a
014-11.4	LIS CB Midshore - Thimble Islands, Branford	4/18/2011	1	Wet		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	6/21/2011	1	Dry		
014-11.4	LIS CB Midshore - Thimble Islands, Branford	6/28/2011	1	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	4/3/2003	1.7	Dry	2.4	n/a
014-13.2	LIS CB Midshore - Thimble Islands, Branford	4/14/2003	1.6	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	4/29/2003	1.6	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	6/3/2003	1.7	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	6/24/2003	5.8	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-13.2	LIS CB Midshore - Thimble Islands, Branford	8/19/2003	1.7	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	10/2/2003	5.8	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	8/17/2004	3.7	Wet	2.4	n/a
014-13.2	LIS CB Midshore - Thimble Islands, Branford	9/23/2004	1.6	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	2/8/2005	5	Dry	2.2	n/a
014-13.2	LIS CB Midshore - Thimble Islands, Branford	4/6/2005	1	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	6/19/2006	1	Dry	2	n/a
014-13.2	LIS CB Midshore - Thimble Islands, Branford	7/19/2006	8	Wet		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	8/31/2006	2	Wet		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	10/16/2006	1	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	1/11/2007	36	Dry	2	4
014-13.2	LIS CB Midshore - Thimble Islands, Branford	5/1/2007	1	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	6/5/2007	2	Wet		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	6/7/2007	1	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	8/23/2007	1	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	9/13/2007	2	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	10/22/2007	1	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	3/3/2008	1	Dry	1.6	n/a
014-13.2	LIS CB Midshore - Thimble Islands, Branford	3/12/2008	2	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	5/1/2008	1	Wet		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	12/16/2008	3	Wet		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	3/31/2009	3	Dry	2	n/a
014-13.2	LIS CB Midshore - Thimble Islands, Branford	4/13/2009	1	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	4/22/2009	1	Wet		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	6/22/2009	8	Wet		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	7/23/2009	10	Wet		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	7/27/2009	1	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	10/29/2009	1	Wet		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	11/18/2009	1	Dry		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	3/17/2010	1	Dry	2	n/a
014-13.2	LIS CB Midshore - Thimble Islands, Branford	3/25/2010	1	Wet		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	5/19/2010	5	Wet		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	8/25/2010	1	Wet		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-13.2	LIS CB Midshore - Thimble Islands, Branford	12/2/2010	1	Wet		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	12/14/2010	14	Wet		
014-13.2	LIS CB Midshore - Thimble Islands, Branford	3/15/2011	1	Dry	1	n/a
014-13.2	LIS CB Midshore - Thimble Islands, Branford	4/18/2011	1	Wet		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	4/3/2003	1.7	Dry	2.9	n/a
014-14.3	LIS CB Midshore - Thimble Islands, Branford	4/14/2003	1.6	Dry		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	4/29/2003	1.7	Dry		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	6/3/2003	1.7	Dry		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	6/24/2003	3.6	Dry		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	8/19/2003	3.6	Dry		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	10/2/2003	18	Dry		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	8/17/2004	3.6	Wet	8	n/a
014-14.3	LIS CB Midshore - Thimble Islands, Branford	9/23/2004	18	Dry		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	2/8/2005	6	Dry	2.4	n/a
014-14.3	LIS CB Midshore - Thimble Islands, Branford	4/6/2005	1	Dry		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	6/19/2006	2	Dry	2.5	n/a
014-14.3	LIS CB Midshore - Thimble Islands, Branford	8/31/2006	8	Wet		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	10/16/2006	1	Dry		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	1/11/2007	7	Dry	4.6	6
014-14.3	LIS CB Midshore - Thimble Islands, Branford	6/5/2007	33	Wet		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	6/7/2007	5	Dry		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	8/23/2007	1	Dry		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	9/13/2007	2	Dry		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	10/22/2007	4	Dry		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	3/3/2008	2	Dry	1.8	n/a
014-14.3	LIS CB Midshore - Thimble Islands, Branford	5/1/2008	1	Wet		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	12/16/2008	3	Wet		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	3/31/2009	1	Dry	1.8	n/a
014-14.3	LIS CB Midshore - Thimble Islands, Branford	4/13/2009	1	Dry		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	4/22/2009	2	Wet		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	6/22/2009	3	Wet		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	7/23/2009	2	Wet		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	7/27/2009	2	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-14.3	LIS CB Midshore - Thimble Islands, Branford	10/29/2009	4	Wet		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	11/18/2009	1	Dry		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	3/17/2010	1	Dry	1.3	n/a
014-14.3	LIS CB Midshore - Thimble Islands, Branford	3/25/2010	1	Wet		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	5/19/2010	3	Wet		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	8/25/2010	1	Wet		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	12/2/2010	2	Wet		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	12/14/2010	1	Wet		
014-14.3	LIS CB Midshore - Thimble Islands, Branford	3/15/2011	1	Dry	1	n/a
014-14.3	LIS CB Midshore - Thimble Islands, Branford	4/18/2011	1	Wet		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	4/3/2003	1.6	Dry	1.6	n/a
014-24.0	LIS CB Midshore - Thimble Islands, Branford	4/14/2003	1.6	Dry		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	4/29/2003	1.6	Dry		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	10/2/2003	1.7	Dry		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	9/23/2004	1.7	Dry	1.6	n/a
014-24.0	LIS CB Midshore - Thimble Islands, Branford	11/30/2004	1.6	Dry		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	2/8/2005	0.9	Dry	1	n/a
014-24.0	LIS CB Midshore - Thimble Islands, Branford	4/6/2005	1	Dry		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	11/14/2005	1	Dry		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	6/19/2006	1	Dry	1.3	n/a
014-24.0	LIS CB Midshore - Thimble Islands, Branford	8/31/2006	1	Wet		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	10/16/2006	1	Dry		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	11/20/2006	3	Dry		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	1/11/2007	4	Dry	2	n/a
014-24.0	LIS CB Midshore - Thimble Islands, Branford	10/22/2007	1	Dry		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	3/3/2008	1	Dry	1	n/a
014-24.0	LIS CB Midshore - Thimble Islands, Branford	3/12/2008	1	Dry		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	5/1/2008	1	Wet		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	5/14/2008	1	Dry		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	12/16/2008	1	Wet		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	3/31/2009	1	Dry	1.2	n/a
014-24.0	LIS CB Midshore - Thimble Islands, Branford	4/13/2009	1	Dry		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	4/22/2009	1	Wet		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-24.0	LIS CB Midshore - Thimble Islands, Branford	10/29/2009	3	Wet		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	11/18/2009	1	Dry		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	12/2/2010	1	Wet	2.4	n/a
014-24.0	LIS CB Midshore - Thimble Islands, Branford	12/14/2010	6	Wet		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	3/15/2011	1	Dry	1	n/a
014-24.0	LIS CB Midshore - Thimble Islands, Branford	4/18/2011	1	Wet		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	6/28/2011	1	Dry		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	4/3/2003	1.6	Dry	1.6	n/a
014-25.0	LIS CB Midshore - Thimble Islands, Branford	4/14/2003	1.6	Dry		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	4/29/2003	1.6	Dry		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	6/3/2003	1.6	Dry		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	6/24/2003	3.6	Dry		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	8/19/2003	0.6	Dry		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	10/2/2003	1.6	Dry		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	8/17/2004	1.7	Wet	3.1	n/a
014-25.0	LIS CB Midshore - Thimble Islands, Branford	9/23/2004	5.8	Dry		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	2/8/2005	0.9	Dry	0.9	n/a
014-25.0	LIS CB Midshore - Thimble Islands, Branford	4/6/2005	1	Dry		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	6/19/2006	1	Dry	1.6	n/a
014-25.0	LIS CB Midshore - Thimble Islands, Branford	8/31/2006	4	Wet		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	10/16/2006	1	Dry		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	1/11/2007	1	Dry	1.9	n/a
014-25.0	LIS CB Midshore - Thimble Islands, Branford	5/1/2007	1	Dry		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	6/5/2007	11	Wet		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	6/7/2007	1	Dry		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	9/13/2007	4	Dry		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	10/22/2007	1	Dry		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	3/3/2008	1	Dry	1.3	n/a
014-25.0	LIS CB Midshore - Thimble Islands, Branford	3/12/2008	1	Dry		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	5/1/2008	1	Wet		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	12/16/2008	3	Wet		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	3/31/2009	1	Dry	1.2	n/a
014-25.0	LIS CB Midshore - Thimble Islands, Branford	4/13/2009	1	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-25.0	LIS CB Midshore - Thimble Islands, Branford	4/22/2009	1	Wet		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	6/22/2009	5	Wet		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	7/23/2009	1	Wet		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	7/27/2009	1	Dry		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	10/29/2009	1	Wet		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	11/18/2009	1	Dry		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	3/17/2010	1	Dry	1.6	n/a
014-25.0	LIS CB Midshore - Thimble Islands, Branford	3/25/2010	1	Wet		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	5/19/2010	1	Wet		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	8/25/2010	1	Wet		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	12/2/2010	2	Wet		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	12/14/2010	7	Wet		
014-25.0	LIS CB Midshore - Thimble Islands, Branford	3/15/2011	6	Dry	2.4	n/a
014-25.0	LIS CB Midshore - Thimble Islands, Branford	4/18/2011	1	Wet		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	4/3/2003	1.6	Dry	2.5	n/a
014-26.0	LIS CB Midshore - Thimble Islands, Branford	4/14/2003	1.6	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	4/29/2003	1.6	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	6/3/2003	1.6	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	6/24/2003	1.6	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	8/19/2003	8.1	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	10/2/2003	8.1	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	8/17/2004	1.6	Wet	2.7	n/a
014-26.0	LIS CB Midshore - Thimble Islands, Branford	9/23/2004	8.1	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	11/30/2004	1.6	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	2/8/2005	0.9	Dry	0.9	n/a
014-26.0	LIS CB Midshore - Thimble Islands, Branford	4/6/2005	1	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	6/19/2006	1	Dry	1	n/a
014-26.0	LIS CB Midshore - Thimble Islands, Branford	8/31/2006	1	Wet		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	10/16/2006	1	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	1/11/2007	4	Dry	2.4	n/a
014-26.0	LIS CB Midshore - Thimble Islands, Branford	5/1/2007	1	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	6/5/2007	17	Wet		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	6/7/2007	6	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-26.0	LIS CB Midshore - Thimble Islands, Branford	8/23/2007	1	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	9/13/2007	1	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	10/22/2007	1	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	3/3/2008	1	Dry	1.3	n/a
014-26.0	LIS CB Midshore - Thimble Islands, Branford	3/12/2008	1	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	5/1/2008	1	Wet		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	12/16/2008	3	Wet		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	3/31/2009	1	Dry	2.2	n/a
014-26.0	LIS CB Midshore - Thimble Islands, Branford	4/13/2009	1	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	4/22/2009	1	Wet		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	6/22/2009	7	Wet		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	7/23/2009	5	Wet		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	7/27/2009	1	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	10/29/2009	18	Wet		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	11/18/2009	1	Dry		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	3/17/2010	2	Dry	1.1	n/a
014-26.0	LIS CB Midshore - Thimble Islands, Branford	3/25/2010	1	Wet		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	5/19/2010	1	Wet		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	8/25/2010	1	Wet		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	12/2/2010	1	Wet		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	12/14/2010	1	Wet		
014-26.0	LIS CB Midshore - Thimble Islands, Branford	3/15/2011	1	Dry	1	n/a
014-26.0	LIS CB Midshore - Thimble Islands, Branford	4/18/2011	1	Wet		
Shaded cells indicate an exceedance of water quality criteria						

Wet and dry weather geometric mean values for all monitoring stations on segment: LIS CB Midshore – Thimble Islands, Branford (CT-C3_009)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
014-11.2	LIS CB Midshore - Thimble Islands, Branford	2000-2011	15	26	3	4	2
014-11.3	LIS CB Midshore - Thimble Islands, Branford	2000-2011	1	1	1	1	1
014-11.4	LIS CB Midshore - Thimble Islands, Branford	2000-2011	11	29	2	4	2
014-13.2	LIS CB Midshore - Thimble Islands, Branford	2000-2011	16	26	2	2	2
0.14-14.3	LIS CB Midshore - Thimble Islands, Branford	2000-2011	15	24	2	2	2

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
014-24.0	LIS CB Midshore - Thimble Islands, Branford	2000-2011	8	22	1	1	1
014-25.0	LIS CB Midshore - Thimble Islands, Branford	2000-2011	15	25	2	2	1
014-26.0	LIS CB Midshore - Thimble Islands, Branford	2000-2011	15	27	2	2	2
Shaded cells indicate an exceedance of water quality criteria							

Table 18: Segment 6: LIS CB Midshore – Indian Neck Bacteria Data

Waterbody ID: CT-C3_010
Characteristics: Saltwater, Class SA
Impairment: Shellfishing
Water Quality Criteria for Fecal coliform:
Geometric Mean: 14 colonies/100 ml
90% samples less than: 31 colonies/100 ml
Percent reduction to meet:
Geometric Mean: NA
90% samples less than: 7%
Data: 2000 – 2011 from CT DEEP target sampling efforts, 2012 TMDL cycle

Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment: LIS CB Midshore – Indian Neck, Branford (CT-C3_010) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-05.2	LIS CB Midshore - Indian Neck, Branford	4/3/2003	1.6	Dry	3.5	n/a
014-05.2	LIS CB Midshore - Indian Neck, Branford	4/14/2003	1.7	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	4/29/2003	1.6	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	6/3/2003	8.1	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	6/24/2003	5.8	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	8/19/2003	3.6	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	10/2/2003	8.1	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	7/15/2004	1.6	Dry	2	n/a
014-05.2	LIS CB Midshore - Indian Neck, Branford	8/17/2004	1.7	Wet		
014-05.2	LIS CB Midshore - Indian Neck, Branford	9/13/2004	1.6	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	11/30/2004	3.6	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	2/8/2005	0.9	Dry	1	n/a
014-05.2	LIS CB Midshore - Indian Neck, Branford	4/6/2005	1	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	11/14/2005	1	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	6/19/2006	1	Dry	1.3	n/a
014-05.2	LIS CB Midshore - Indian Neck, Branford	10/16/2006	1	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	11/20/2006	2	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	1/11/2007	3	Dry	2.1	n/a
014-05.2	LIS CB Midshore - Indian Neck, Branford	8/23/2007	1	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	9/13/2007	3	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	10/22/2007	2	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	2/21/2008	7	Dry	1.7	n/a

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-05.2	LIS CB Midshore - Indian Neck, Branford	3/3/2008	1	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	3/12/2008	1	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	5/1/2008	1	Wet		
014-05.2	LIS CB Midshore - Indian Neck, Branford	5/14/2008	1	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	12/16/2008	3	Wet		
014-05.2	LIS CB Midshore - Indian Neck, Branford	3/31/2009	1	Dry	2.7	3
014-05.2	LIS CB Midshore - Indian Neck, Branford	4/13/2009	1	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	4/22/2009	1	Wet		
014-05.2	LIS CB Midshore - Indian Neck, Branford	6/22/2009	4	Wet		
014-05.2	LIS CB Midshore - Indian Neck, Branford	7/23/2009	10	Wet		
014-05.2	LIS CB Midshore - Indian Neck, Branford	7/27/2009	76	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	10/29/2009	1	Wet		
014-05.2	LIS CB Midshore - Indian Neck, Branford	11/18/2009	1	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	5/19/2010	1	Wet	2	n/a
014-05.2	LIS CB Midshore - Indian Neck, Branford	8/25/2010	1	Wet		
014-05.2	LIS CB Midshore - Indian Neck, Branford	12/2/2010	1	Wet		
014-05.2	LIS CB Midshore - Indian Neck, Branford	12/14/2010	17	Wet		
014-05.2	LIS CB Midshore - Indian Neck, Branford	3/15/2011	1	Dry	1	n/a
014-05.2	LIS CB Midshore - Indian Neck, Branford	4/18/2011	1	Wet		
014-05.2	LIS CB Midshore - Indian Neck, Branford	6/21/2011	1	Dry		
014-05.2	LIS CB Midshore - Indian Neck, Branford	6/28/2011	1	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	4/3/2003	1.6	Dry	2.2	n/a
014-09.5	LIS CB Midshore - Indian Neck, Branford	4/14/2003	1.6	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	4/29/2003	1.6	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	6/3/2003	1.7	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	6/24/2003	1.6	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	8/19/2003	5.8	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	10/2/2003	3.6	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	8/17/2004	3.6	Wet	2.5	n/a
014-09.5	LIS CB Midshore - Indian Neck, Branford	9/23/2004	1.7	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	2/8/2005	2	Dry	1.4	n/a
014-09.5	LIS CB Midshore - Indian Neck, Branford	4/6/2005	1	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	6/19/2006	1	Dry	2.7	n/a

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-09.5	LIS CB Midshore - Indian Neck, Branford	7/19/2006	10	Wet		
014-09.5	LIS CB Midshore - Indian Neck, Branford	8/31/2006	5	Wet		
014-09.5	LIS CB Midshore - Indian Neck, Branford	10/16/2006	1	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	1/11/2007	4	Dry	2.1	n/a
014-09.5	LIS CB Midshore - Indian Neck, Branford	5/1/2007	1	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	6/5/2007	19	Wet		
014-09.5	LIS CB Midshore - Indian Neck, Branford	6/7/2007	1	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	9/13/2007	1	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	10/22/2007	1	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	2/21/2008	1	Dry	1	n/a
014-09.5	LIS CB Midshore - Indian Neck, Branford	3/3/2008	1	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	3/12/2008	1	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	12/16/2008	1	Wet		
014-09.5	LIS CB Midshore - Indian Neck, Branford	3/31/2009	1	Dry	1.1	n/a
014-09.5	LIS CB Midshore - Indian Neck, Branford	4/13/2009	1	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	4/22/2009	1	Wet		
014-09.5	LIS CB Midshore - Indian Neck, Branford	6/22/2009	1	Wet		
014-09.5	LIS CB Midshore - Indian Neck, Branford	7/23/2009	2	Wet		
014-09.5	LIS CB Midshore - Indian Neck, Branford	7/27/2009	1	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	10/29/2009	1	Wet		
014-09.5	LIS CB Midshore - Indian Neck, Branford	11/18/2009	1	Dry		
014-09.5	LIS CB Midshore - Indian Neck, Branford	3/17/2010	1	Dry	1.8	n/a
014-09.5	LIS CB Midshore - Indian Neck, Branford	3/25/2010	1	Wet		
014-09.5	LIS CB Midshore - Indian Neck, Branford	5/19/2010	3	Wet		
014-09.5	LIS CB Midshore - Indian Neck, Branford	8/25/2010	1	Wet		
014-09.5	LIS CB Midshore - Indian Neck, Branford	12/2/2010	1	Wet		
014-09.5	LIS CB Midshore - Indian Neck, Branford	12/14/2010	11	Wet		
014-09.5	LIS CB Midshore - Indian Neck, Branford	3/15/2011	2	Dry	2.4	n/a
014-09.5	LIS CB Midshore - Indian Neck, Branford	4/18/2011	3	Wet		
014-09.6	LIS CB Midshore - Indian Neck, Branford	4/3/2003	1.6	Dry	2	n/a
014-09.6	LIS CB Midshore - Indian Neck, Branford	4/14/2003	1.6	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	4/29/2003	1.6	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	6/3/2003	3.6	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-09.6	LIS CB Midshore - Indian Neck, Branford	6/24/2003	1.6	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	8/19/2003	1.6	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	10/2/2003	3.6	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	8/17/2004	1.6	Wet	1.6	n/a
014-09.6	LIS CB Midshore - Indian Neck, Branford	9/23/2004	1.7	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	2/8/2005	1	Dry	1	n/a
014-09.6	LIS CB Midshore - Indian Neck, Branford	4/6/2005	1	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	6/19/2006	1	Dry	1.4	n/a
014-09.6	LIS CB Midshore - Indian Neck, Branford	7/19/2006	4	Wet		
014-09.6	LIS CB Midshore - Indian Neck, Branford	8/31/2006	1	Wet		
014-09.6	LIS CB Midshore - Indian Neck, Branford	10/16/2006	1	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	1/11/2007	3	Dry	1.8	n/a
014-09.6	LIS CB Midshore - Indian Neck, Branford	5/1/2007	1	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	6/5/2007	12	Wet		
014-09.6	LIS CB Midshore - Indian Neck, Branford	6/7/2007	1	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	8/23/2007	1	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	9/13/2007	1	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	10/22/2007	2	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	2/21/2008	4	Dry	1.3	n/a
014-09.6	LIS CB Midshore - Indian Neck, Branford	3/3/2008	1	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	3/12/2008	1	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	5/1/2008	1	Wet		
014-09.6	LIS CB Midshore - Indian Neck, Branford	12/16/2008	1	Wet		
014-09.6	LIS CB Midshore - Indian Neck, Branford	3/31/2009	1	Dry	1.3	n/a
014-09.6	LIS CB Midshore - Indian Neck, Branford	4/13/2009	1	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	4/22/2009	1	Wet		
014-09.6	LIS CB Midshore - Indian Neck, Branford	6/22/2009	2	Wet		
014-09.6	LIS CB Midshore - Indian Neck, Branford	7/23/2009	5	Wet		
014-09.6	LIS CB Midshore - Indian Neck, Branford	7/27/2009	1	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	10/29/2009	1	Wet		
014-09.6	LIS CB Midshore - Indian Neck, Branford	11/18/2009	1	Dry		
014-09.6	LIS CB Midshore - Indian Neck, Branford	3/17/2010	1	Dry	2	7
014-09.6	LIS CB Midshore - Indian Neck, Branford	3/25/2010	1	Wet		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-09.6	LIS CB Midshore - Indian Neck, Branford	5/19/2010	1	Wet		
014-09.6	LIS CB Midshore - Indian Neck, Branford	8/25/2010	1	Wet		
014-09.6	LIS CB Midshore - Indian Neck, Branford	12/2/2010	2	Wet		
014-09.6	LIS CB Midshore - Indian Neck, Branford	12/14/2010	32	Wet		
014-09.6	LIS CB Midshore - Indian Neck, Branford	3/15/2011	1	Dry	2.8	n/a
014-09.6	LIS CB Midshore - Indian Neck, Branford	4/18/2011	8	Wet		
Shaded cells indicate an exceedance of water quality criteria						

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS CB Midshore – Indian Neck, Branford (CT-C3_010)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
014-05.2	LIS CB Midshore - Indian Neck, Branford	2003-2011	12	31	2	2	2
014-09.5	LIS CB Midshore - Indian Neck, Branford	2003-2011	15	26	2	2	1
014-09.6	LIS CB Midshore - Indian Neck, Branford	2003-2011	16	27	2	2	1
Shaded cells indicate an exceedance of water quality criteria							

Table 19: Segment 7: LIS CB Midshore – East Haven Bacteria Data

Waterbody ID: CT-C3_011
Characteristics: Saltwater, Class SA
Impairment: Shellfishing
Water Quality Criteria for Fecal coliform:
Geometric Mean: 14 colonies/100 ml
90% samples less than: 31 colonies/100 ml
Percent reduction to meet:
Geometric Mean: NA*
90% samples less than: NA*
Data: 2000 – 2011 from CT DEEP target sampling efforts, 2012 TMDL cycle

Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment: LIS CB Midshore – East Haven (CT-C3_011) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-05.3	LIS CB Midshore - East Haven	4/3/2003	1.6	Dry	4	n/a
014-05.3	LIS CB Midshore - East Haven	4/14/2003	1.6	Dry		
014-05.3	LIS CB Midshore - East Haven	4/29/2003	1.7	Dry		
014-05.3	LIS CB Midshore - East Haven	6/3/2003	8.1	Dry		
014-05.3	LIS CB Midshore - East Haven	6/24/2003	1.6	Dry		
014-05.3	LIS CB Midshore - East Haven	8/19/2003	11	Dry		
014-05.3	LIS CB Midshore - East Haven	10/2/2003	28	Dry		
014-05.3	LIS CB Midshore - East Haven	8/17/2004	1.6	Wet	1.6	n/a
014-05.3	LIS CB Midshore - East Haven	9/23/2004	1.7	Dry		
014-05.3	LIS CB Midshore - East Haven	11/30/2004	1.6	Dry		
014-05.3	LIS CB Midshore - East Haven	2/8/2005	1	Dry	1	n/a
014-05.3	LIS CB Midshore - East Haven	4/6/2005	1	Dry		
014-05.3	LIS CB Midshore - East Haven	6/19/2006	1	Dry	3.4	n/a
014-05.3	LIS CB Midshore - East Haven	7/19/2006	21	Wet		
014-05.3	LIS CB Midshore - East Haven	8/31/2006	6	Wet		
014-05.3	LIS CB Midshore - East Haven	10/16/2006	1	Dry		
014-05.3	LIS CB Midshore - East Haven	1/11/2007	2	Dry	2.2	n/a
014-05.3	LIS CB Midshore - East Haven	5/1/2007	1	Dry		
014-05.3	LIS CB Midshore - East Haven	6/5/2007	12	Wet		
014-05.3	LIS CB Midshore - East Haven	6/7/2007	1	Dry		
014-05.3	LIS CB Midshore - East Haven	8/23/2007	1	Dry		
014-05.3	LIS CB Midshore - East Haven	9/13/2007	2	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
014-05.3	LIS CB Midshore - East Haven	10/22/2007	5	Dry		
014-05.3	LIS CB Midshore - East Haven	2/21/2008	5	Dry	1.7	n/a
014-05.3	LIS CB Midshore - East Haven	3/3/2008	1	Dry		
014-05.3	LIS CB Midshore - East Haven	3/12/2008	1	Dry		
014-05.3	LIS CB Midshore - East Haven	5/1/2008	1	Wet		
014-05.3	LIS CB Midshore - East Haven	12/16/2008	3	Wet		
014-05.3	LIS CB Midshore - East Haven	3/31/2009	1	Dry	1.7	n/a
014-05.3	LIS CB Midshore - East Haven	4/13/2009	1	Dry		
014-05.3	LIS CB Midshore - East Haven	4/22/2009	1	Wet		
014-05.3	LIS CB Midshore - East Haven	6/22/2009	4	Wet		
014-05.3	LIS CB Midshore - East Haven	7/23/2009	20	Wet		
014-05.3	LIS CB Midshore - East Haven	7/27/2009	1	Dry		
014-05.3	LIS CB Midshore - East Haven	10/29/2009	1	Wet		
014-05.3	LIS CB Midshore - East Haven	11/18/2009	1	Dry		
014-05.3	LIS CB Midshore - East Haven	3/17/2010	1	Dry	1.5	n/a
014-05.3	LIS CB Midshore - East Haven	3/25/2010	1	Wet		
014-05.3	LIS CB Midshore - East Haven	5/19/2010	1	Wet		
014-05.3	LIS CB Midshore - East Haven	8/25/2010	1	Wet		
014-05.3	LIS CB Midshore - East Haven	12/2/2010	1	Wet		
014-05.3	LIS CB Midshore - East Haven	12/14/2010	12	Wet		
014-05.3	LIS CB Midshore - East Haven	3/15/2011	1	Dry	3.3	n/a
014-05.3	LIS CB Midshore - East Haven	4/18/2011	11	Wet		
044-01.0	LIS CB Midshore –East Haven	1/11/07	7	Dry	1.41	N/A
044-01.0	LIS CB Midshore –East Haven	2/28/07	1	Dry		
044-01.0	LIS CB Midshore –East Haven	3/12/07	2	Wet		
044-01.0	LIS CB Midshore –East Haven	3/13/07	1	Dry		
044-01.0	LIS CB Midshore –East Haven	3/26/07	1	Dry		
044-01.0	LIS CB Midshore –East Haven	4/11/07	1	Dry		
044-01.0	LIS CB Midshore –East Haven	4/23/07	1	Dry		
044-01.0	LIS CB Midshore –East Haven	4/25/07	1	Wet		
044-01.0	LIS CB Midshore –East Haven	5/14/07	1	Dry		
044-01.0	LIS CB Midshore –East Haven	5/29/07	1	Dry		
044-01.0	LIS CB Midshore –East Haven	6/7/07	1	Dry		
044-01.0	LIS CB Midshore –East	6/12/07	1	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
	Haven					
044-01.0	LIS CB Midshore –East Haven	7/10/07	1	Dry		
044-01.0	LIS CB Midshore –East Haven	8/7/07	1	Dry		
044-01.0	LIS CB Midshore –East Haven	8/23/07	1	Dry		
044-01.0	LIS CB Midshore –East Haven	9/12/07	1	Wet		
044-01.0	LIS CB Midshore –East Haven	9/17/07	1	Dry		
044-01.0	LIS CB Midshore –East Haven	10/16/07	1	Dry		
044-01.0	LIS CB Midshore –East Haven	10/22/07	1	Dry		
044-01.0	LIS CB Midshore –East Haven	11/8/07	1	Dry		
044-01.0	LIS CB Midshore –East Haven	11/29/07	1	Dry		
044-01.0	LIS CB Midshore –East Haven	1/15/08	1	Dry		
044-01.0	LIS CB Midshore –East Haven	2/21/08	1	Dry		
044-01.0	LIS CB Midshore –East Haven	3/4/08	1	Wet		
044-01.0	LIS CB Midshore –East Haven	3/12/08	1	Dry		
044-01.0	LIS CB Midshore –East Haven	4/9/08	1	Dry		
044-01.0	LIS CB Midshore –East Haven	5/6/08	1	Dry		
044-01.0	LIS CB Midshore –East Haven	5/14/08	1	Dry		
044-01.0	LIS CB Midshore –East Haven	5/22/08	1	Dry		
044-01.0	LIS CB Midshore –East Haven	6/5/08	1	Wet		
044-01.0	LIS CB Midshore –East Haven	7/10/08	1	Dry		
044-01.0	LIS CB Midshore –East Haven	7/28/08	1	Wet	1.26	N/A
044-01.0	LIS CB Midshore –East Haven	8/13/08	1	Dry		
044-01.0	LIS CB Midshore –East Haven	8/26/08	1	Dry		
044-01.0	LIS CB Midshore –East Haven	9/11/08	1	Dry		
044-01.0	LIS CB Midshore –East Haven	10/1/08	1	Wet		
044-01.0	LIS CB Midshore –East Haven	10/8/08	1	Dry		
044-01.0	LIS CB Midshore –East Haven	10/21/08	1	Dry		
044-01.0	LIS CB Midshore –East Haven	12/3/08	1	Dry		
044-01.0	LIS CB Midshore –East Haven	12/16/08	17	Wet		
044-01.0	LIS CB Midshore –East Haven	12/18/08	4	Dry		
044-01.0	LIS CB Midshore –East Haven	12/23/08	2	Dry		
044-01.0	LIS CB Midshore –East Haven	1/5/09	2	Dry		
044-01.0	LIS CB Midshore –East Haven	2/2/09	1	Dry	1.62	NONE
044-01.0	LIS CB Midshore –East Haven	4/1/09	1	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
044-01.0	LIS CB Midshore –East Haven	4/16/09	1	Dry		
044-01.0	LIS CB Midshore –East Haven	5/12/09	1	Dry		
044-01.0	LIS CB Midshore –East Haven	5/19/09	1	Dry		
044-01.0	LIS CB Midshore –East Haven	6/1/09	1	Dry		
044-01.0	LIS CB Midshore –East Haven	6/10/09	8	Wet		
044-01.0	LIS CB Midshore –East Haven	6/12/09	46	Wet		
044-01.0	LIS CB Midshore –East Haven	6/15/09	1	Wet		
044-01.0	LIS CB Midshore –East Haven	6/29/09	1	Dry		
044-01.0	LIS CB Midshore –East Haven	7/14/09	1	Dry		
044-01.0	LIS CB Midshore –East Haven	7/23/09	11	Wet		
044-01.0	LIS CB Midshore –East Haven	7/27/09	1	Dry		
044-01.0	LIS CB Midshore –East Haven	9/1/09	1	Dry		
044-01.0	LIS CB Midshore –East Haven	9/30/09	1	Dry		
044-01.0	LIS CB Midshore –East Haven	10/13/09	1	Dry		
044-01.0	LIS CB Midshore –East Haven	10/29/09	1	Wet		
044-01.0	LIS CB Midshore –East Haven	11/9/09	1	Dry		
044-01.0	LIS CB Midshore –East Haven	12/14/09	2	Wet		
044-01.0	LIS CB Midshore –East Haven	12/22/09	1	Dry		
044-01.1	LIS CB Midshore –East Haven	2/28/07	1	Dry		
044-01.1	LIS CB Midshore –East Haven	3/13/07	1	Dry		
044-01.1	LIS CB Midshore –East Haven	3/26/07	1	Wet		
044-01.1	LIS CB Midshore –East Haven	4/11/07	1	Dry		
044-01.1	LIS CB Midshore –East Haven	4/23/07	1	Dry		
044-01.1	LIS CB Midshore –East Haven	4/25/07	1	Dry		
044-01.1	LIS CB Midshore –East Haven	5/14/07	1	Dry		
044-01.1	LIS CB Midshore –East Haven	5/29/07	1	Wet		
044-01.1	LIS CB Midshore –East Haven	6/7/07	1	Dry		
044-01.1	LIS CB Midshore –East Haven	6/12/07	1	Dry		
044-01.1	LIS CB Midshore –East Haven	7/10/07	1	Dry		
044-01.1	LIS CB Midshore –East Haven	8/7/07	1	Dry		
044-01.1	LIS CB Midshore –East Haven	8/23/07	1	Dry	1.00	N/A
044-01.1	LIS CB Midshore –East Haven	9/12/07	1	Dry		
044-01.1	LIS CB Midshore –East Haven	9/17/07	1	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
044-01.1	LIS CB Midshore –East Haven	10/16/07	1	Wet		
044-01.1	LIS CB Midshore –East Haven	10/22/07	1	Dry		
044-01.1	LIS CB Midshore –East Haven	10/30/07	1	Dry		
044-01.1	LIS CB Midshore –East Haven	11/8/07	1	Dry		
044-01.1	LIS CB Midshore –East Haven	11/29/07	1	Dry		
044-01.1	LIS CB Midshore –East Haven	1/15/08	1	Dry	1.33	N/A
044-01.1	LIS CB Midshore –East Haven	2/21/08	2	Dry		
044-01.1	LIS CB Midshore –East Haven	3/4/08	1	Dry		
044-01.1	LIS CB Midshore –East Haven	3/12/08	2	Wet		
044-01.1	LIS CB Midshore –East Haven	4/9/08	1	Dry		
044-01.1	LIS CB Midshore –East Haven	5/6/08	1	Dry		
044-01.1	LIS CB Midshore –East Haven	5/14/08	1	Dry		
044-01.1	LIS CB Midshore –East Haven	5/22/08	1	Dry		
044-01.1	LIS CB Midshore –East Haven	6/5/08	1	Dry		
044-01.1	LIS CB Midshore –East Haven	7/10/08	1	Wet		
044-01.1	LIS CB Midshore –East Haven	7/28/08	1	Dry		
044-01.1	LIS CB Midshore –East Haven	8/13/08	1	Wet		
044-01.1	LIS CB Midshore –East Haven	8/26/08	1	Dry		
044-01.1	LIS CB Midshore –East Haven	9/11/08	1	Dry		
044-01.1	LIS CB Midshore –East Haven	10/1/08	1	Dry		
044-01.1	LIS CB Midshore –East Haven	10/8/08	1	Wet		
044-01.1	LIS CB Midshore –East Haven	10/21/08	1	Dry		
044-01.1	LIS CB Midshore –East Haven	12/3/08	1	Dry		
044-01.1	LIS CB Midshore –East Haven	12/16/08	17	Dry		
044-01.1	LIS CB Midshore –East Haven	12/18/08	2	Wet		
044-01.1	LIS CB Midshore –East Haven	12/23/08	3	Dry		
044-01.1	LIS CB Midshore –East Haven	1/5/09	1	Dry	1.50	NONE
044-01.1	LIS CB Midshore –East Haven	2/2/09	1	Dry		
044-01.1	LIS CB Midshore –East Haven	4/1/09	1	Dry		
044-01.1	LIS CB Midshore –East Haven	4/16/09	1	Dry		
044-01.1	LIS CB Midshore –East Haven	5/12/09	1	Dry		
044-01.1	LIS CB Midshore –East Haven	5/19/09	1	Dry		
044-01.1	LIS CB Midshore –East Haven	6/1/09	1	Dry		
044-01.1	LIS CB Midshore –East	6/10/09	1	Dry		

Station #	Station Name	Date	Result	Wet/Dry	Geomean	90% Reduction
	Haven					
044-01.1	LIS CB Midshore –East Haven	6/12/09	81	Wet		
044-01.1	LIS CB Midshore –East Haven	6/15/09	1	Wet		
044-01.1	LIS CB Midshore –East Haven	6/29/09	1	Wet		
044-01.1	LIS CB Midshore –East Haven	7/14/09	1	Dry		
044-01.1	LIS CB Midshore –East Haven	7/23/09	21	Dry		
044-01.1	LIS CB Midshore –East Haven	7/27/09	3	Wet		
044-01.1	LIS CB Midshore –East Haven	9/1/09	1	Dry		
044-01.1	LIS CB Midshore –East Haven	9/30/09	1	Dry		
044-01.1	LIS CB Midshore –East Haven	10/13/09	1	Dry		
044-01.1	LIS CB Midshore –East Haven	10/29/09	1	Dry		
044-01.1	LIS CB Midshore –East Haven	11/9/09	1	Wet		
044-01.1	LIS CB Midshore –East Haven	12/14/09	1	Dry		
044-01.1	LIS CB Midshore –East Haven	12/22/09	1	Wet		
Shaded cells indicate an exceedance of water quality criteria						

Wet and dry weather geometric mean values for all monitoring stations on segment: LIS CB Midshore – East Haven (CT-C3_011)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
014-05.3	LIS CB Midshore - East Haven	2000-2011	16	28	2	3	2
044-01.0	LIS CB Midshore –East Haven	2007-2009	14	49	1	2	1
044-01.1	LIS CB Midshore –East Haven	2007-2009	14	49	1	2	1
Shaded cells indicate an exceedance of water quality criteria							

***** With this most recent evaluation of data segment CT-C3_011 will be proposed for a delisting during the next IWQR (2014). The segment and associated text remain in this document due to the issuing of this TMDL falling between IWQR publications.

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