Estuary 13: Old Saybrook & Old Lyme

Watershed Summary

WATERSHED DESCRIPTION AND MAPS

The Old Saybrook/Old Lyme Estuary (Estuary 13) covers an area of approximately 12,017 acres in southeastern Connecticut. These impaired segments are located in the eastern portion of Long Island Sound (LIS). The impaired segments in this summary are located in the municipalities of Old Lyme and Old Saybrook, CT.

The Old Saybrook/Old Lyme Estuary includes three segments impaired for commercial shellfish harvesting and nine 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 2012 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 EB Inner - Connecticut River (mouth) (CT-E1_024-SB) is part of the inner estuary from the outlet at Griswold Point, US to I-95 crossing, and includes North and South Coves, lower Lieutenant River and waters around Great Island up to RR crossings. Segment 2: LIS EB Inner - Black Hall River (upper) (CT-E1_026-SB) is part of the inner estuary from the Route 156 crossing to the saltwater limit at Mile Creek Road crossing. Segment 3: LIS EB Inner - Duck River (CT-E1_027-SB) is part of the inner estuary from RR crossing near Route 156 crossing, US to saltwater limit at Elm Street, Old Lyme.

These impaired segments of the Old Saybrook/Old Lyme Estuary have a water quality classification of SB. Designated uses include commercial shellfish

Impaired Segment Facts

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

Segment 1: LIS EB Inner - Connecticut River (mouth) (*CT-E1_024-SB*); SB; 3.28

Segment 2: LIS EB Inner - Black Hall River (upper) (*CT-E1_026-SB*); SB; 0.04

Segment 3: LIS EB Inner - Duck River (*CT-E1_027-SB*); SB; 0.01

Segment 4: LIS EB Inner - Fourmile River (mouth) (*CT-E1_023*); SA; 0.03

Segment 5: LIS EB Inner - Oyster River Area (*CT-E1_032*); SA; 0.10

Segment 6: LIS EB Shore - Rocky Neck (Fourmile Rvr) (*CT-E2_017*); SA; 0.53

Segment 7: LIS EB Shore - Soundview Beach (*CT-E2_018*); SA: 0.33

Segment 8: LIS EB Shore - Willard Bay (*CT-E2_020*); SA: 0.50

Segment 9: LIS EB Shore - Indiantown Harbor (*CT-E2_022*); SA: 0.39

Segment 10: LIS EB Midshore - Old Lyme, CT River (*CT-E3_008*); SA: 3.52

Segment 11: LIS EB Midshore - Old Saybrook (*CT-E3_010*); SA: 4.41

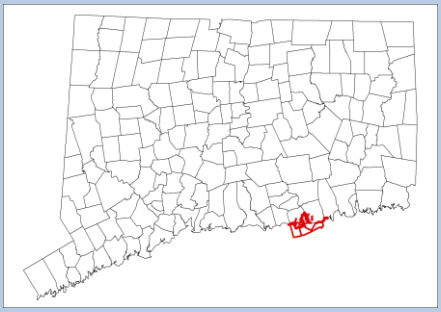
Segment 12: LIS EB Midshore - Old Saybrook, Indian Harbor (*CT-E3_011*); SA: 5.64

Municipalities: Old Saybrook and Old Lyme

Designated Use Impairments: Shellfish

MS4 Applicable? Yes

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



harvesting, recreation, habitat for marine fish and other aquatic life and wildlife, industrial water supply, and navigation. Segments 1-3 of the estuary are impaired due to elevated bacteria concentrations, affecting the designated use of commercial shellfishing.

Segment 4: LIS EB Inner - Fourmile River (mouth) (CT-E1_023) is part of the inner estuary from outlet at RR crossing, Western end of Rocky Neck State Park Beach, US to the saltwater limit at Route 156 crossing, Old Lyme. Segment 5: LIS EB Inner - Oyster River Area (CT-E1_032) is part of the inner estuary and includes the Oyster River, Plum Bank Creek, and Back River from mouths of Indian Harbor, US to the saltwater limits (Oyster River is to RR crossing above Route 1), Old Saybrook. Segment 6: LIS EB Shore - Rocky Neck (Fourmile Rvr) (CT-E2_017) extends from Hatchett Point to Seal Rock (Great Neck), including Rocky Neck State Park Beach, out approximately 1000 ft offshore. Segment 7: LIS EB Shore - Soundview Beach (CT-E2_018) extends from the SB/SA water quality boundary at Hawks Nest Beach area to Hatchett Point (including Soundview Beach), out approximately 1000 ft offshore. Segment 8: LIS EB Shore - Willard Bay (CT-E2_020) extends from Cornfield Point to the SB/SA water quality boundary at Lynde Point, out approximately 1000 ft offshore. Segment 9: LIS EB Shore - Indiantown Harbor (CT-E2_022) extends from Long Rock to Plum Bank Creek (includes the mouth of Oyster River and Back River, and Plum Bank Creek), out approximately 1000 ft offshore. Segment 10: LIS EB Midshore - Old Lyme, CT River (CT-E3_008) begins approximately 1,000 feet offshore beyond Segments 6 and 7 out to the 50-foot contour line (offshore of Connecticut River). Segment 11: LIS EB Midshore - Old Saybrook (CT-E3_010) begins approximately 1000 ft offshore Guardhouse Point, to SB/SA water quality boundary, Old Saybrook (Mouth of Connecticut River), out to 50 ft contour. Segment 12: LIS EB Midshore - Old Saybrook, Indian Harbor (CT-E3_011) begins approximately 1000 ft offshore Old Kelsey Point, to Guardhouse Point, Old Saybrook, (outer Indiantown Harbor and Plum Bank), out to 50 ft contour.

These impaired segments (Segments 4 – 12) of the Old Saybrook/Old Lyme 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 Old Saybrook/Old Lyme Estuary from the Connecticut 2012 Integrated Water Quality Report

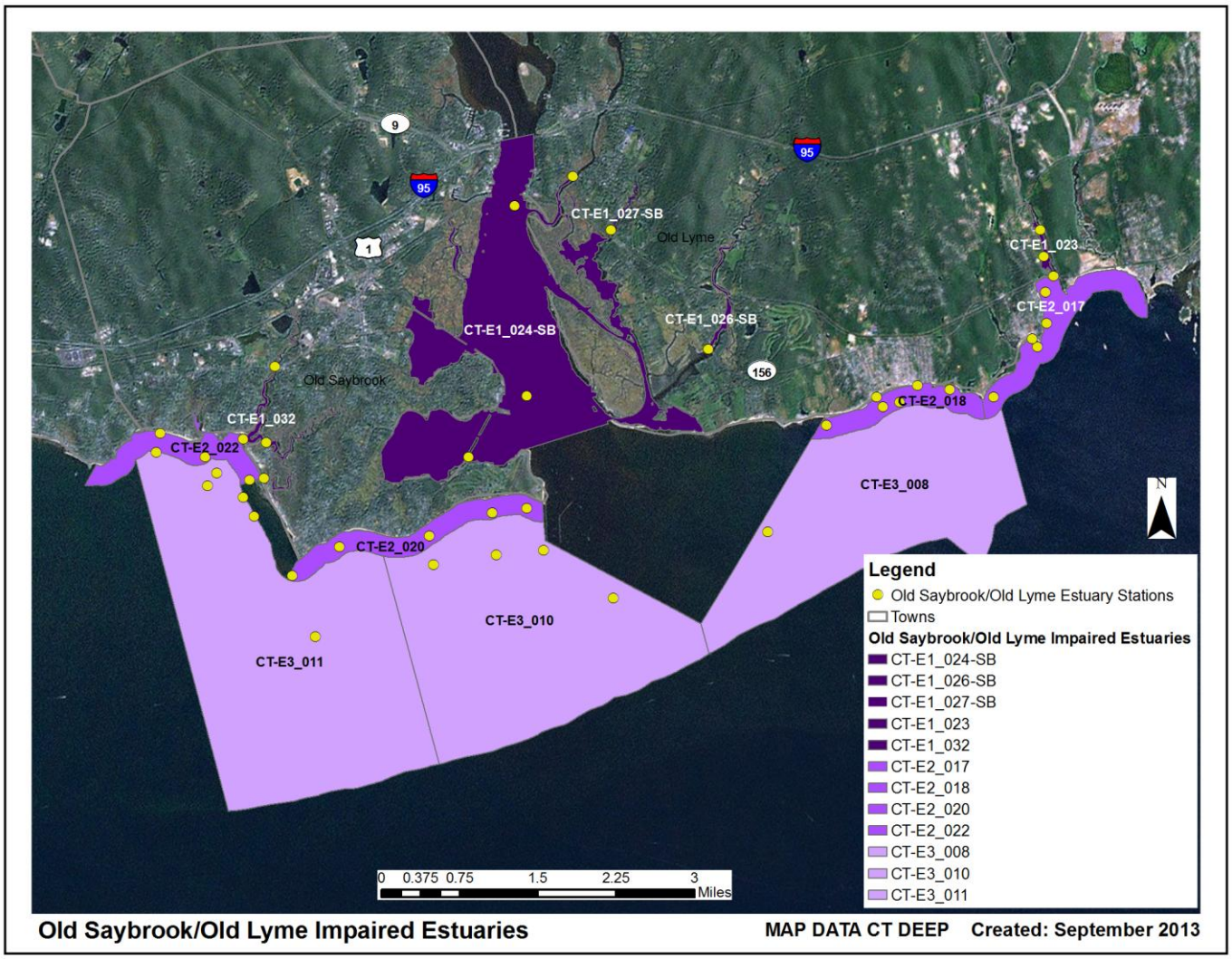
Waterbody ID	Waterbody Name	Location	Square Miles	Marine Aquatic Life	Recreation	Fish Consumption	Direct Shellfish	Commercial Shellfish
CT-E1_024-SB	LIS EB Inner - Connecticut River (mouth), Old Lyme	Eastern portion of LIS, Inner Estuary, Connecticut River from outlet at Griswold Point, US to I 95 crossing (Includes North and South Coves, lower Lieutenant River and waters around Great Island up to RR crossings), Old Lyme.	3.28	U	U	NOT	///	NOT

Waterbody ID	Waterbody Name	Location	Square Miles	Marine Aquatic Life	Recreation	Fish Consumption	Direct Shellfish	Commercial Shellfish
CT-E1_026-SB	LIS EB Inner - Black Hall River (upper), Old Lyme	Eastern portion of LIS, Inner Estuary, Black Hall River from Route 156 crossing, US to saltwater limit at Mile Creek Road crossing, Old Lyme.	0.04	U	U	FULL	///	NOT
CT-E1_027-SB	LIS EB Inner - Duck River, Old Lyme	Eastern portion of LIS, Inner Estuary, Duck River from RR crossing near Route 156 crossing, US to saltwater limit at Elm Street, Old Lyme.	0.01	U	NOT	FULL	///	NOT
CT-E1_023	LIS EB Inner - Fourmile River (mouth), Old Lyme	Eastern portion of LIS, Inner Estuary, Fourmile River from outlet at RR crossing, Western end of Rocky Neck State Park Beach, US to saltwater limit at Route 156 crossing, Old Lyme.	0.03	U	U	FULL	NOT	///
CT-E1_032	LIS EB Inner - Oyster River Area, Old Saybrook	Eastern portion of LIS, Inner Estuary, Oyster River, Plum Bank Creek, and Back River from mouths on Indian Harbor, US to saltwater limits (Oyster River is to RR crossing above Route 1), Old Saybrook.	0.10	U	U	FULL	NOT	///
CT-E2_017	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	Eastern portion of LIS from Hatchett Point to Seal Rock (Great Neck) Includes Rocky Neck State Park Beach, out approximately 1000 ft offshore.	0.53	U	FULL	FULL	NOT	///
CT-E2_018	LIS EB Shore - Soundview Beach, Old Lyme	Eastern portion of LIS from SB/SA water quality boundary at Hawks Nest Beach area to Hatchett Point (Includes Soundview Beach), out approximately 1000 ft offshore.	0.33	U	FULL	FULL	NOT	///
CT-E2_020	LIS EB Shore - Willard Bay, Old Saybrook	Eastern portion of LIS from Cornfield Point to SB/SA water quality boundary at Lynde Point, out approximately 1000 ft offshore. (SB water)	0.50	U	U	FULL	NOT	///

Waterbody ID	Waterbody Name	Location	Square Miles	Marine Aquatic Life	Recreation	Fish Consumption	Direct Shellfish	Commercial Shellfish
CT-E2_022	LIS EB Shore - Indiantown Harbor, Old Saybrook	Eastern portion of LIS from Long Rock to Plum Bank Creek (includes the mouth of Oyster River and Back River, and Plum Bank Creek), out approximately 1000 ft offshore.	0.39	U	FULL	FULL	NOT	///
CT-E3_008	LIS EB Midshore - Old Lyme, CT River	Eastern portion of LIS from SB/SA water quality boundary near CT River mouth to approximately 1000 ft offshore Hatchett Point, Old Lyme, out to 50 ft contour (offshore of Connecticut River).	3.52	FULL	U	FULL	NOT	///
CT-E3_010	LIS EB Midshore - Old Saybrook	Eastern portion of LIS from approximately 1000 ft offshore Guardhouse Point, to SB/SA water quality boundary, Old Saybrook (Mouth of Connecticut River), out to 50 ft contour.	4.41	FULL	U	FULL	NOT	///
CT-E3_011	LIS EB Midshore - Old Saybrook, Indian Harbor	Eastern portion of LIS from approximately 1000 ft offshore Old Kelsey Point, to Guardhouse Point, Old Saybrook, (outer Indiantown Harbor and Plum Bank), out to 50 ft contour.	5.64	FULL	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 Old Saybrook/Old Lyme 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 roe-on. 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). These classifications are goals for the waterbody segments and set the goals for water quality. These uses determine the water quality criteria that are the target for each segment. The impaired segments in the Old Saybrook/Old Lyme Estuary include both Class SA and SB waters.

Shellfish Bed Classifications and Closures in the Old Saybrook/Old Lyme Estuary

Shellfish classification areas in the Old Saybrook/Old Lyme 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.

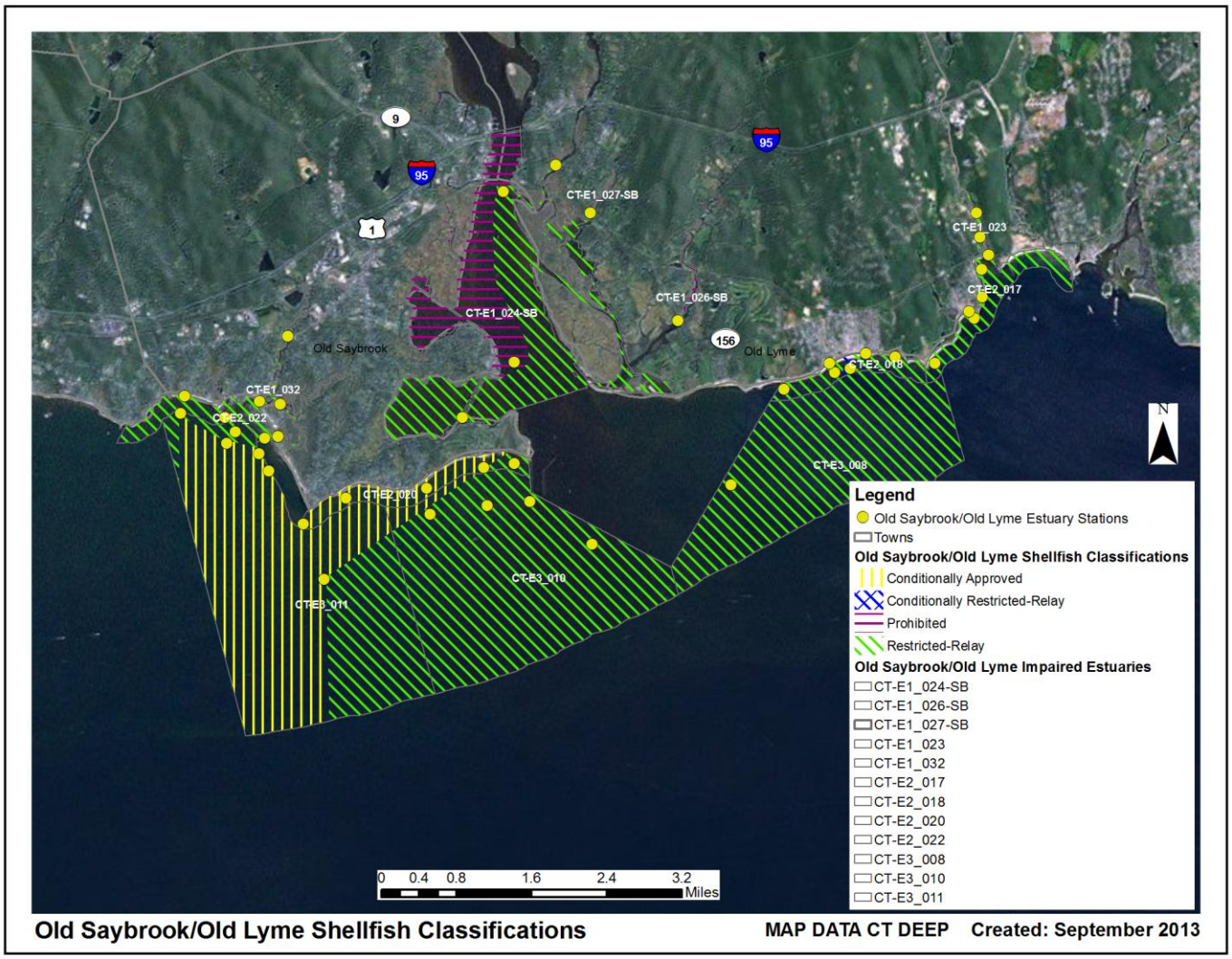
CONDITIONALLY RESTRICTED: Is a classification used to identify a growing area where a sanitary survey has found that the area meets the criteria for Restricted classification when the area is in the open status and meets the criteria for Prohibited classification when the area is in the closed status. 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 – 12 did not meet their designated use for shellfish harvesting for direct and commercial consumption due to bacteria (Table 1). Segments 1 (CT-E1_024-SB) and 3 (CT-E1_027-SB) are either Prohibited from commercial shellfish harvesting or permitted by Restricted-Relay/Depuration. Segment 2 (CT-E1_026-SB) is Prohibited from commercial shellfish harvesting. The majority of Segment 4 (CT-E1_023) is permitted by Restricted-Relay/Depuration, with small areas Conditionally permitted and the innermost portion of the segment Prohibited from direct shellfish harvesting. The inner portions of Segments 5 (CT-E1_032) and 9 (CT-E2_022) are Prohibited from direct shellfish harvesting with the remaining areas permitted by Restricted-Relay/Depuration. Segments 6 (CT-E2_017) and 7 (CT-E2_018) are permitted by Restricted-Relay/Depuration for direct shellfish harvesting, except for a small area of Segment 7 that is Conditionally permitted by Restricted-Relay/Depuration. The majority of Segment 8 (CT-E2_020) is permitted by Restricted-Relay/Depuration with a small area Conditionally Approved for direct shellfish harvesting. Segment 10 (CT-E3_008) is permitted by Restricted-Relay/Depuration. Segments 11 (CT-E3_010) and 12 (CT-E3_011) have areas that are permitted by Restricted-Relay/Depuration, with the remainder Conditionally Approved for direct shellfish harvesting.

Figure 2: GIS map featuring Shellfish Bed Classifications and Closures for the impaired segments in the Old Saybrook/Old Lyme Estuary



Shellfish Bed Lease Locations

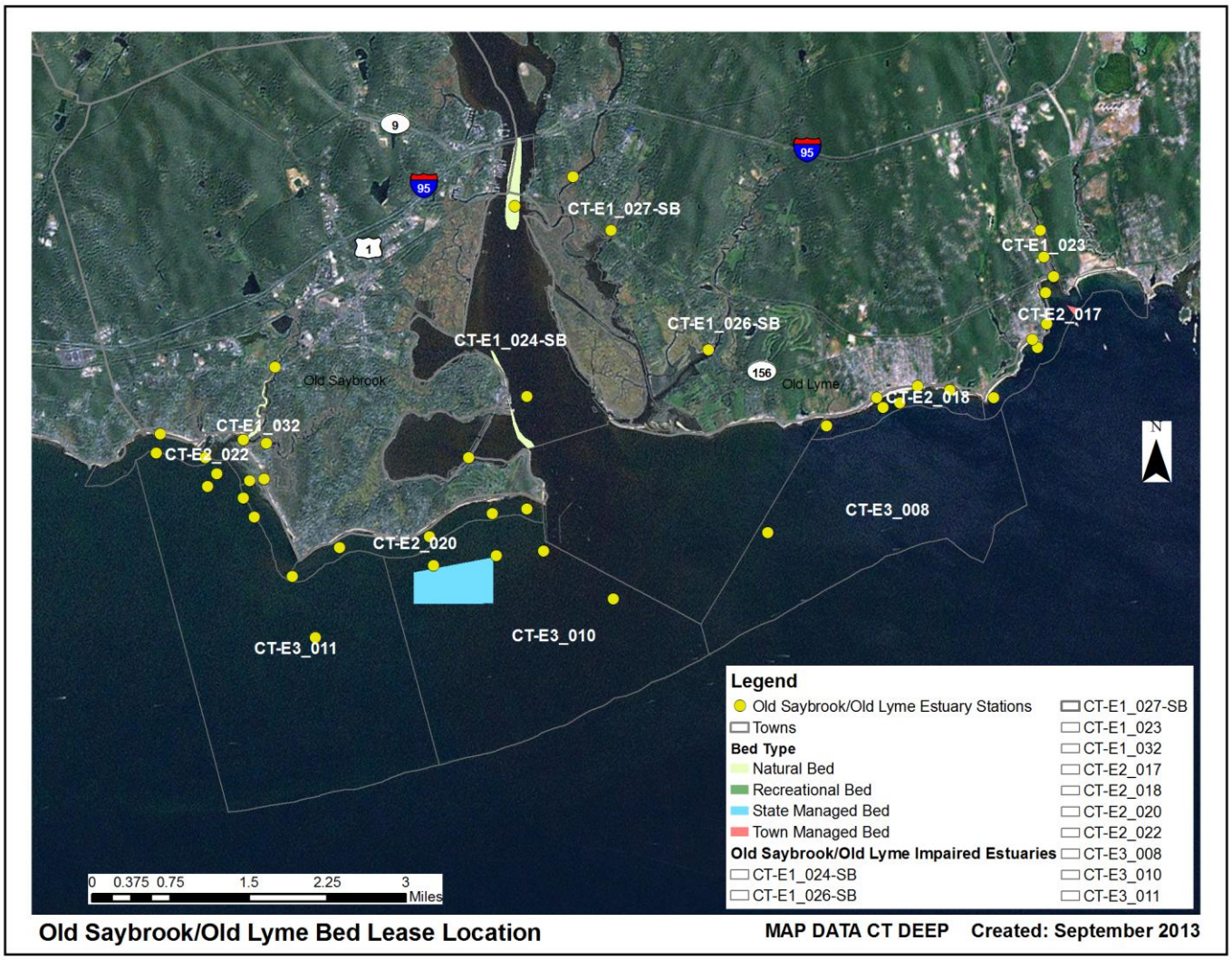
Shellfish beds in the Old Saybrook/Old Lyme Estuary are also classified by their management (Figure 3). CT DA/BA defines these areas as follows:

> **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 the shellfish beds in Segment 1 (CT-E1_024-SB) and a portion in Segment 5 (CT-E2_032) are natural beds. Portions of the shellfish beds in Segment 11 (CT-E3_010) are state-managed beds. No bed classification is shown for Segments 2, 3, 4, 6, 7, 8, 9, 10,and 12 (Figure 3).

Figure 3: GIS map featuring Shellfish Bed Lease Locations for the impaired segments in the Old Saybrook/Old Lyme 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, 2013). 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.

Segments 1 (CT-E1_024-SB), 2 (CT-E1_026-SB) and 3 (CT-E1_027-SB) are Class SB saltwater waterbodies. 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 four sampling locations on Segment 1, one sampling location on Segment 2 and one sampling location on Segment 3 (Table 2). The water quality criteria for fecal coliform, along with bacteria sampling results from 2000 – 2011, are presented in Tables 12-14. 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 Segments 1, 2 and 3, where possible (Tables 12-14).

Segment 1 (CT-E1_024-SB): As shown in Table 12, the 90% of samples value exceeded the WQS for fecal coliform only once at Station 105-01.3 during the sampling period. Geometric mean values also exceeded the WQS for fecal coliform at all the stations at least once 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 exceedance of WQS for fecal coliform during wet-weather at Station 106-11.2.

Segment 2 (CT-E1_026-SB): As shown in Table 13, geometric mean values exceeded the WQS for fecal coliform twice at Station 105-01.5 during the sampling period. The 90% of samples value did not exceed the WQS for fecal coliform for any sampling year 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, resulting in exceedance of WQS for fecal coliform during dry-weather at Station 105-01.5.

Segment 3 (CT-E1_027-SB): As shown in Table 14, the 90% of samples value exceeded the WQS for fecal coliform only once at Station 105-01.4 during the sampling period. Geometric mean values exceeded the WQS for fecal coliform four times at Station 105-01.4 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 exceedances of the WQS for fecal coliform during all conditions at Station 105-01.4.

Segments 4 - 12 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 three sampling locations on Segment 4 (CT-E1_023), four sampling locations on Segments 5 (CT-E1_032), five sampling locations from Segment 6 (CT-E2_017), six sampling locations on Segment 7 (CT-E2_018), five sampling locations on Segment 8 (CT-E2_020), three sampling locations on Segment 9 (CT-E2_022), one sampling location on Segment 10 (CT-E3_008), four sampling locations on Segment 11 (CT-E3_010) and six sampling locations on Segment 12 (CT-E3_011). The water quality criteria for fecal coliform, along with bacteria sampling results from 2000 – 2011, are presented in Tables 15 – 23. These segments of the estuary are impaired due to elevated bacteria concentrations, affecting the designated use of direct shellfishing.

Segment 4 (CT-E1_023): As shown in Table 15, the 90% of samples value exceeded the WQS for fecal coliform multiple years at all stations in Segment 4 during the sampling period. Geometric mean values also exceeded the WQS for fecal coliform at all three stations multiple years 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 exceedances of the WQS for fecal coliform for all conditions at all stations except dry-weather at Station 105-10.2.

Segment 5 (CT-E1_032): As shown in Table 16, the 90% of samples value exceeded the WQS for fecal coliform multiple years at all stations in Segment 5 during the sampling period. Geometric mean values also exceeded the WQS for fecal coliform at all three stations multiple years 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. Both wet and dry-weather geometric means exceeded the WQS for fecal coliform at all stations except Station 106-02.4.

Segment 6 (CT-E2_017): As shown in Table 17, the 90% of samples value exceeded the WQS for fecal coliform multiple times at most stations. The exception is Station 105-08.0 with only one exceedance in 2006 during the sampling period. Geometric mean values exceeded the WQS for fecal coliform multiple

times at most stations in the segment, but only once at Station 105-09.7 in 2004 and station 105-10.0 in 2003. Station 105-08.0 geometric mean values did not exceed the WQS 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, resulting in exceedances of the WQS for fecal coliform during wet-weather at Station 105-09.0 and exceedances in both wet and dry-weather at Station 105-09.1.

Segment 7 (CT-E2_018): As shown in Table 18, the 90% of samples value exceeded the WQS for fecal coliform multiple times at all stations in the segment, except only once at Station 105-05.0 in 2003 and only once at Station 105-07.0 in 2003 during the sampling period. Geometric mean values exceeded the WQS for fecal coliform multiple times at multiple stations, but only once at Station 105-06.0 in 2003 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 exceedances of the WQS for fecal coliform during wet-weather at Stations 105-05.1 and 105-06.1.

Segment 8 (CT-E2_020): As shown in Table 19, the 90% of samples value exceeded the WQS for fecal coliform only once at Station 106-09.0 in 2002 and Station 106-09.4 in 2000 during the sampling period. Geometric mean values exceeded the WQS for fecal coliform only once at Station 106-06.0 in 2008, 106-08.0 in 2008, and 106-09.0 in 2005 during the sampling period. Stations 106-07.0 and 106-09.4 geometric mean values did not exceed the WQS 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, resulting in no exceedance of the WQS for fecal coliform.

Segment 9 (CT-E2_022): As shown in Table 20, the 90% of samples value exceeded the WQS for fecal coliform three times at Station 106-01.1 during the sampling period, with no exceedances at Stations 106-01.2 and 106-03.0. Geometric mean values also exceeded the WQS for fecal coliform three times at Station 106-01.1 during the sampling period, with no exceedances at Stations 106-01.2 and 106-03.0. Geometric means for data collected during the sampling period were also calculated for each station using wet and dry-weather conditions, resulting in exceedances of the WQS for fecal coliform during wet-weather at Station 106-01.1.

Segment 10 (CT-E3_008): As shown in Table 21, the 90% of samples value exceeded the WQS for fecal coliform three times at Station 105-03.0 in 2000, 2002 and 2008 during the sampling period. Geometric mean values exceeded the WQS for fecal coliform five times at Station 105-03.0 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 exceedances of the WQS for fecal coliform during wet-weather.

Segment 11 (CT-E3_010): As shown in Table 22, the 90% of samples value exceeded the WQS for fecal coliform once at Station 106-09.2 and five times at Station 105-01.0 and Station 106-10.1 during the sampling period; Station 106-08.1 did not have any exceedances. Geometric mean values exceeded the WQS for fecal coliform three times at Station 105-01.0 and five times Station 106-10.1 during the sampling period. Stations 106-08.1 and 106-09.2 geometric mean values did not exceed the WQS 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, resulting in exceedances of the WQS for fecal coliform during wet-weather at Stations 106-08.1 and 106-09.2 and dry-weather at Station 106-10.1.

Segment 12 (CT-E3_011): As shown in Table 23, the 90% of samples value exceeded the WQS for fecal coliform twice at Station 106-01.0 and once at Stations 106-02.0 and 106-46.0 during the sampling period. Geometric mean values exceeded the WQS for fecal coliform once at Station 106-01.0 in 2001,

106-03.2 in 2008, and 106-46.0 in 2005 during the sampling period. Stations 106-02.0, 106-03.1 and 106-05.0 geometric mean values did not exceed the WQS 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, resulting in no exceedance of the WQS for fecal coliform.

Due to the elevated bacteria measurements presented in Tables 12-23, these twelve 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 Old Saybrook/Old Lyme Estuary

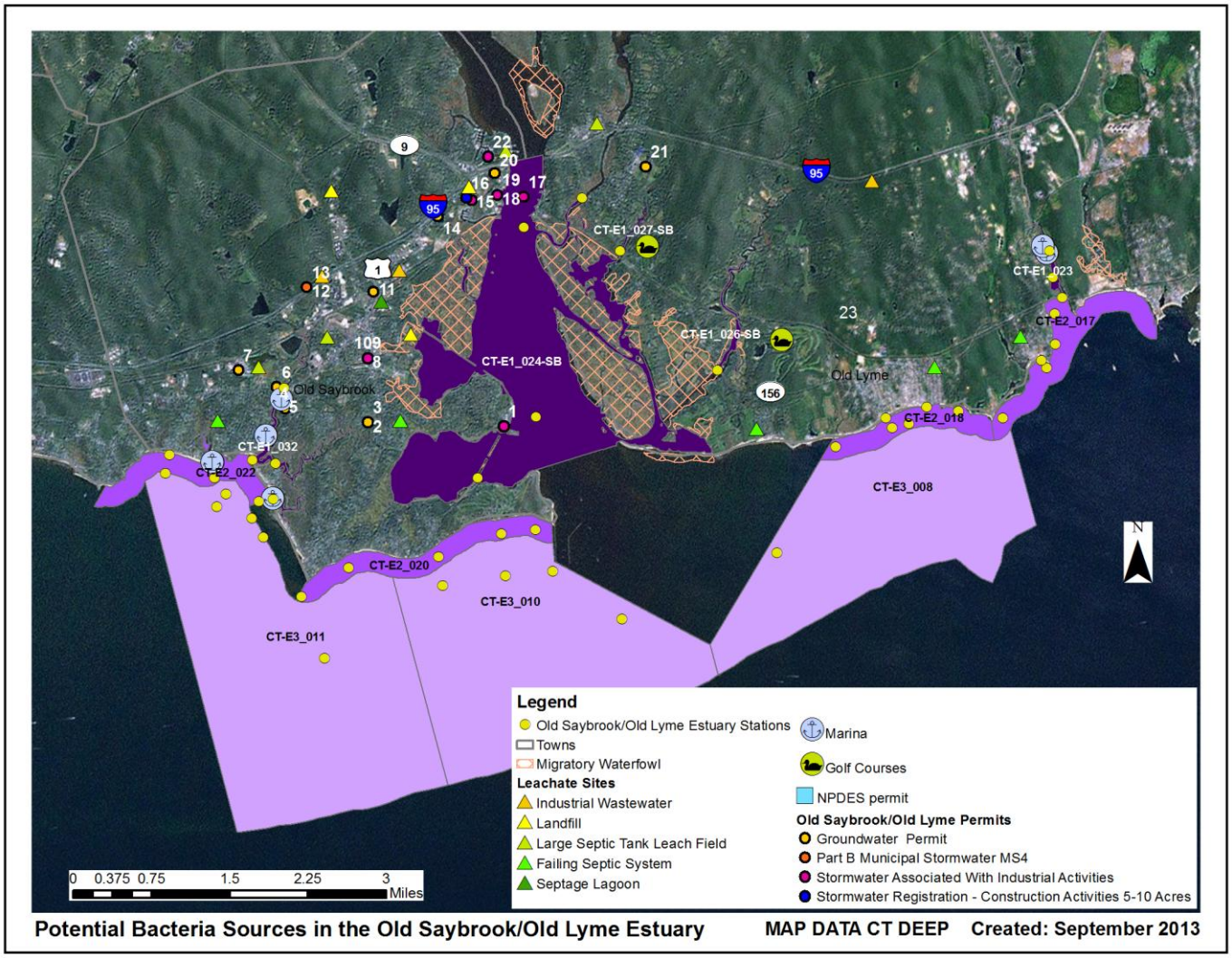
Waterbody ID	Station	Station Description	Municipality	Latitude	Longitude
Segment 1: CT-E1_024-SB	105-01.3	Lieutenant River at Rt. 156	Old Lyme	41.3138	-72.3371
	105-01.9	Connecticut River just south of the Amtrak Railroad bridge	Old Lyme	41.3098	-72.3479
	106-11.1	In and near South Cove on Conn River	Old Saybrook	41.2749	-72.3565
	106-11.2	In and near South Cove on Conn River	Old Saybrook	41.2834	-72.3458
Segment 2: CT-E1_026-SB	105-01.5	Black Hall River at Rt. 156	Old Lyme	41.2897	-72.3123
Segment 3: CT-E1_027-SB	105-01.4	Duck River at Rt. 156	Old Lyme	41.3063	-72.3301
Segment 4: CT-E1_023	105-10.1	mouth of Four Mile River	Old Lyme	41.2996	-72.2487
	105-10.2	Four Mile River btw Amtrak RR bridge and Rt. 156	Old Lyme	41.3023	-72.2504
	105-10.3	Four Mile River Marina	Old Lyme	41.3060	-72.2511
Segment 5: CT-E1_032	106-02.1	mouth of Oyster and Back rivers	Old Saybrook	41.2775	-72.3980
	106-02.2	Back River at 154 Overpass	Old Saybrook	41.2771	-72.3937
	106-02.3	Oyster River at Rt. 1	Old Saybrook	41.2876	-72.3921
	106-02.4	Plum Bank Creek	Old Saybrook	41.2721	-72.3941
Segment 6: CT-E2_017	105-08.0	Old Lyme coastline	Old Lyme	41.2829	-72.2598
	105-09.0	Old Lyme coastline	Old Lyme	41.2898	-72.2517
	105-09.1	Mouth of Three Mile River near foot bridge	Old Lyme	41.2909	-72.2527
	105-09.7		Old Lyme	41.2931	-72.2501
	105-10.0	Old Lyme coastline	Old Lyme	41.2974	-72.2501
Segment 7: CT-E2_018	105-04.0	Old Lyme coastline near Hawks Nest Beach	Old Lyme	41.2790	-72.2906
	105-05.0	Old Lyme coastline near Hawks Nest Beach	Old Lyme	41.2816	-72.2802

Waterbody ID	Station	Station Description	Municipality	Latitude	Longitude
	105-05.1	Swan Brook at Hawks Nest Beach	Old Lyme	41.2830	-72.2813
	105-06.0	Old Lyme coastline near Sound View	Old Lyme	41.2822	-72.2771
	105-06.1	tidal creek at end of Seaspray Road at Old Colony Beach	Old Lyme	41.2845	-72.2739
	105-07.0	Old Lyme coastline	Old Lyme	41.2839	-72.2679
Segment 8: CT-E2_020	106-06.0	Old Saybrook coastline near Cornfield Pt	Old Saybrook	41.2586	-72.3891
	106-07.0	Old Saybrook coastline near Knollwood	Old Saybrook	41.2625	-72.3803
	106-08.0	Old Saybrook coastline near Guardhouse Pt	Old Saybrook	41.2640	-72.3638
	106-09.0	Old Saybrook coastline off Fenwick	Old Saybrook	41.2672	-72.3522
	106-09.4	mouth of Conn River off of Fenwick	Old Saybrook	41.2677	-72.3459
Segment 9: CT-E2_022	106-01.1	Old Saybrook coastline at entrance to Indian Town Harbor	Old Saybrook	41.2751	-72.4050
	106-01.2	Chapman Beach	Old Saybrook	41.2784	-72.4133
	106-03.0	mouth of Plum Bank Creek	Old Saybrook	41.2718	-72.3969
Segment 10: CT-E3_008	105-03.0	mouth of Conn River	Old Lyme	41.2643	-72.3016
Segment 11: CT-E3_010	105-01.0	mouth of Conn River	Old Saybrook	41.2552	-72.3301
	106-08.1	Old Saybrook coastline	Old Saybrook	41.2600	-72.3631
	106-09.2	Old Saybrook coastline off Fenwick	Old Saybrook	41.2613	-72.3515
	106-10.0	Old Saybrook coastline at mouth of Conn River	Old Saybrook	41.2619	-72.3428
Segment 12: CT-E3_011	106-01.0	Old Saybrook coastline near Chapman Beach	Old Saybrook	41.2758	-72.4140
	106-02.0	mouth of Oyster and Back rivers	Old Saybrook	41.2729	-72.4029
	106-03.1	Old Saybrook coastline near mouth of Plum Bank Creek	Old Saybrook	41.2694	-72.3981
	106-03.2	Old Saybrook coastline near mouth of Plum Bank Creek	Old Saybrook	41.2711	-72.4046
	106-05.0	Old Saybrook coastline near Plum Bank Beach	Old Saybrook	41.2668	-72.3961
	106-46.0	Old Saybrook coastline	Old Saybrook	41.2500	-72.3848

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 Old Saybrook/Old Lyme 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. A 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 Old Saybrook/Old Lyme Estuary



Potential Bacteria Sources in the Old Saybrook/Old Lyme Estuary **MAP DATA CT DEEP** **Created: September 2013**

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 Old Saybrook/Old Lyme Estuary

Segment #	Impaired Segment	Permit Source	Illicit Discharge	CSO/SSO Issue	Failing Septic System	Marinas	Stormwater Runoff	Nuisance Wildlife/Pets	Other
1	CT-E1_024-SB	X			X		X	X	
2	CT-E1_026-SB				X		X	X	
3	CT-E1_027-SB	X						X	
4	CT-E1_023					X		X	
5	CT-E1_032				X	X	X		
6	CT-E2_017				X	X	X	X	
7	CT-E2_018				X		X		
8	CT-E2_020	X					X		
9	CT-E2_022	X			X	X	X		
10	CT-E3_008						X		
11	CT-E3_010	X					X		
12	CT-E3_011	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 Old Saybrook/Old Lyme estuary is included in Table 5, and are geographically presented in Figure 4. 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	0
GPL	Discharge of Swimming Pool Wastewater	0
GSC	Stormwater Discharge Associated with Commercial Activity	0
GSI	Stormwater Associated with Industrial Activity	8
GSM	Part B Municipal Stormwater MS4	2
GSN	Stormwater Registration – Construction	1
LF	Groundwater Permit (Landfill)	0
UI	Underground Injection	9

Permitted Sources

As shown in Table 5, there are multiple permitted discharges in Old Saybrook and Old Lyme that could be contributing bacteria to the impaired segments. These facilities include a number of large subsurface disposal systems, industrial stormwater activities, and multiple marinas throughout the watershed. According to the DA/BA 2003 Old Saybrook Estuary Report and the 2002 Old Lyme Estuary Report, there are nine large subsurface sewage disposal systems in Old Saybrook and three large septic system facilities in Old Lyme located near tributaries to shellfish growing waters. Three of these systems in Old Saybrook, Between the Bridges Marina sewage treatment system and septic systems at Dock and Dine Restaurant and the Saybrook Inn and Marina, are permitted and inspected by DEEP. Also in the 2003 Old Saybrook Estuary Report, the 2001 DA/BA shoreline survey identified nine commercial marinas, four town docks and/or mooring areas and six private association marinas or docks in Old Saybrook. Between the Bridges Marina (formerly the River Landing Marina) treatment system is located in the Prohibited area of the Connecticut River in Old Saybrook just north of the Amtrak Railroad bridge and has a limited impact on Old Saybrook shellfish growing waters in the Connecticut River. According to the 2002 Old Lyme Estuary Report, there are seven small marinas located south of 1-95 in Old Lyme in the Connecticut, Black Hall, Three Mile and Four Mile Rivers. 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, including Hull Harbor Inc. (GSI002312) in October 2011 (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 potential sources 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 Old Saybrook and Old Lyme, CT that may be affecting the Old Saybrook/Old Lyme Estuary (Map # refers to the potential sources map in this document)

Town	Client	Permit ID	Permit Type	Site Name	Address	Map #
Old Saybrook	Banbury Crossing Association, Inc.	UI0000013	Groundwater Permit	Banbury Crossing	367 Main St	3
Old Saybrook	Oyster River Landing Condo. Assoc.	UI0000021	Groundwater Permit	Oyster River Condominiums	25 Sunset Rd	4
Old Saybrook	Town Of Old Saybrook	UI0000430	Groundwater Permit	Old Saybrook High School	1111 Boston Post Rd	6
Old Saybrook	WS Old Saybrook Realty, LLC	UI0000146	Groundwater Permit	R. R. Donnelley & Sons Company	50 School House Rd	7
Old Saybrook	Muros South Limited Partnership	UI0000009	Groundwater Permit	Saybrook Junction Marketplace	455 Boston Post Rd	11
Old Saybrook	Gladeview Health Care Center, Inc.	UI0000081	Groundwater Permit	Gladeview Health Care Center	60 Boston Post Rd	14
Old Saybrook	Between The Bridges, LLC	UI0000373	Groundwater Permit	Between The Bridges, LLC.	142 Ferry Rd	18
Old Saybrook	Eden Harbour Condominium Association, Inc.	UI0000328	Groundwater Permit	Eden Harbor	175 Ferry Rd	20
Old Saybrook	Regional School District #18	UI0000393	Groundwater Permit	Regional School District No. 18 - Lyme/Old Lyme Schools	Lyme St	21
Old Saybrook	Town Of Old Saybrook	GSM000078	Part B Municipal Stormwater MS4	Old Saybrook, Town Of	MS4 Permit	13
Old Lyme	Town Of Old Lyme	GSM000032	Part B Municipal Stormwater MS4	Old Lyme, Town Of	MS4 Permit	23
Old Saybrook	Hull Harbor, Inc.	GSI002312	Stormwater Associated With Industrial Activities	Harbor One Marina	26 Bridge St	1
Old Saybrook	Fortune Plastics, Incorporated	GSI000473	Stormwater Associated With Industrial Activities	Fortune Plastics Inc	1 Williams Ln	8
Old Saybrook	Town Of Old Saybrook	GSI001349	Stormwater Associated With Industrial Activities	Old Saybrook Transfer Station	Middlesex Turnpike (Route 154)	9
Old Saybrook	Tilcon Connecticut Inc.	GSI000572	Stormwater Associated With Industrial Activities	Tilcon Connecticut Inc	1 Boston Point Road Place	10

Town	Client	Permit ID	Permit Type	Site Name	Address	Map #
Old Saybrook	Ragged Rock Marina	GSI001270	Stormwater Associated With Industrial Activities	Ragged Rock Marina	54 Ferry Rd	15
Old Saybrook	Between The Bridges, LLC	GSI001381	Stormwater Associated With Industrial Activities	Between The Bridges Marina-S. Yard	2 Clark St	17
Old Saybrook	Between The Bridges, LLC	GSI001382	Stormwater Associated With Industrial Activities	Between The Bridges, LLC.	142 Ferry Rd	19
Old Lyme	BFPM Inc.	GSI000271	Stormwater Associated With Industrial Activities	Brewer Ferry Point Marina	29 Essex Rd	22
Old Saybrook	State Of Connecticut Department Of Transportation	GSN001841	Stormwater Registration - Construction Activities 5-10 Acres	Remediation-Former Old Saybrook Maint. Facility	45 Ferry Rd	16

Table 6: Industrial permits affecting the Old Saybrook/Old Lyme 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
Old Lyme	Old Lyme Development Corp	GSI001195	Three Mile River	pond	04/26/00	100
Old Lyme	Old Lyme Development Corp	GSI001195	Three Mile River	upgradient stream overflow	04/26/00	100
Old Lyme	Old Lyme Development Corp	GSI001195	Three Mile River	upgradient stream overflow	09/15/00	11,100
Old Lyme	Old Lyme Development Corp	GSI001195	Three Mile River	pond outfall	09/15/00	2,400
Old Lyme	Old Lyme Development Corp	GSI001195	Three Mile River	pond outfall	09/25/01	100
Old Lyme	Old Lyme Development Corp	GSI001195	Three Mile River	upgradient stream overflow	09/25/01	600
Old Saybrook	Tilcon	GSI000572	Rock Creek	001	02/14/00	0
Old Saybrook	Tilcon Connecticut	GSI000572	Rock Creek	Old Saybrook 001	06/06/00	0
Old Saybrook	Tilcon Connecticut	GSI000572	Rock Creek	Old Saybrook 001	07/26/00	712
Old Saybrook	R.R.Donnelly & Sons	GSI000144		CB, SE corner	09/19/00	1,500

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
Old Saybrook	Tilcon Connecticut	GSI000572	Rock Creek	Old Saybrook	11/10/00	10
Old Saybrook	R.R.Donnelly & Sons	GSI000144		CB, SE corner	09/25/01	5,600
Old Saybrook	Between the Bridges Marina	GSI001381	Connecticut River	001	08/23/01	30
Old Saybrook	Between the Bridges Marina	GSI001382	Connecticut River	002	08/23/01	60
Old Saybrook	Between the Bridges Marina	GSI001382	Connecticut River	003	08/23/01	10
Old Saybrook	Ragged Rock Marina	GSI001270		C-1	11/26/01	40
Old Saybrook	Ragged Rock Marina	GSI001270		C-2	11/26/01	40
Old Saybrook	Ragged Rock Marina	GSI001270		C-3	11/26/01	340
Old Saybrook	Town of Old Saybrook PW & Trf Sta	GSI001349	trib to Ingham Pond	open vegetated swale #001	02/10/02	70
Old Saybrook	Tilcon Connecticut	GSI000572	Rock Creek	Old Saybrook 001	06/05/02	38
Old Saybrook	Between the Bridges Marina	GSI001382	Connecticut River	002	08/29/02	1,020
Old Saybrook	Between the Bridges Marina	GSI001382	Connecticut River	003	08/29/02	220
Old Saybrook	Between the Bridges Marina	GSI001381	Connecticut River	001	08/29/02	>2000
Old Saybrook	Tilcon Connecticut	GSI000572	Rock Creek	Old Saybrook 001	05/08/03	2
Old Saybrook	Hull Harbor, Inc. DBA Harbor One Marina	GSI002312	LIS EB CT River	Outfall 001	10/19/11	>12,000
Old Saybrook	Hull Harbor, Inc. DBA Harbor One Marina	GSI002312	LIS EB CT River	Outfall 001	10/19/2012	20
Old Saybrook	Hull Harbor, Inc. DBA Harbor One Marina	GSI002312	LIS EB CT River	Outfall 001	11/01/2013	50

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 a waiver process by which municipalities, with a population of less than 1,000 in the UA, can be granted an exemption from the MS4 program. In Connecticut, DEEP has granted such waivers to 19 municipalities under the current MS4 permit term. One hundred and thirteen (113) small MS4s, as defined by EPA, in Connecticut are currently regulated by DEEP's General Permit for the Discharge of Stormwater from Small Municipal Storm Sewer Systems, reissued on January 1, 2013 (MS4 general permit) . Stormwater discharges from CT's only medium MS4, as defined by EPA, are regulated by an individual permit.

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 MS4 program to include additional municipalities (with or without UCs) in the near future, they are not currently regulated by the MS4 general 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 a MS4 permit program that are not currently regulated by a 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, DEEP can grant a waiver to a municipality to exempt it from the requirements of the MS4 general permit. There are 19 municipalities in Connecticut that have received waivers: 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 general permit program.

The impaired segments of the Old Saybrook / Old Lyme Estuary are located within the Towns of Old Saybrook and Old Lyme, CT. These municipalities have designated urban areas and are required to comply with the MS4 general permit (Figure 5). This general permit is only applicable to municipalities that are identified in Appendix A of the MS4 general 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 general permit is discussed further in the "TMDL Implementation Guidance" section of the core TMDL document. Additional information regarding

stormwater management and the MS4 general permit can be obtained on CTDEEP's website (http://www.ct.gov/deep/stormwater).

There are twelve MS4 outfalls that have been sampled for *E. coli* bacteria in the watershed in Old Saybrook and Old Lyme, discharging directly to the shoreline of LIS and Old Saybrook Harbor or indirectly through the Four Mile River, Swan Brook, Mill Brook, Black Hall River, Oyster River, or Hagar Creek (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 all six outfalls in Old Saybrook and five of the six outfalls in Old Lyme.

Figure 5: MS4 areas near the Old Saybrook/Old Lyme Estuary

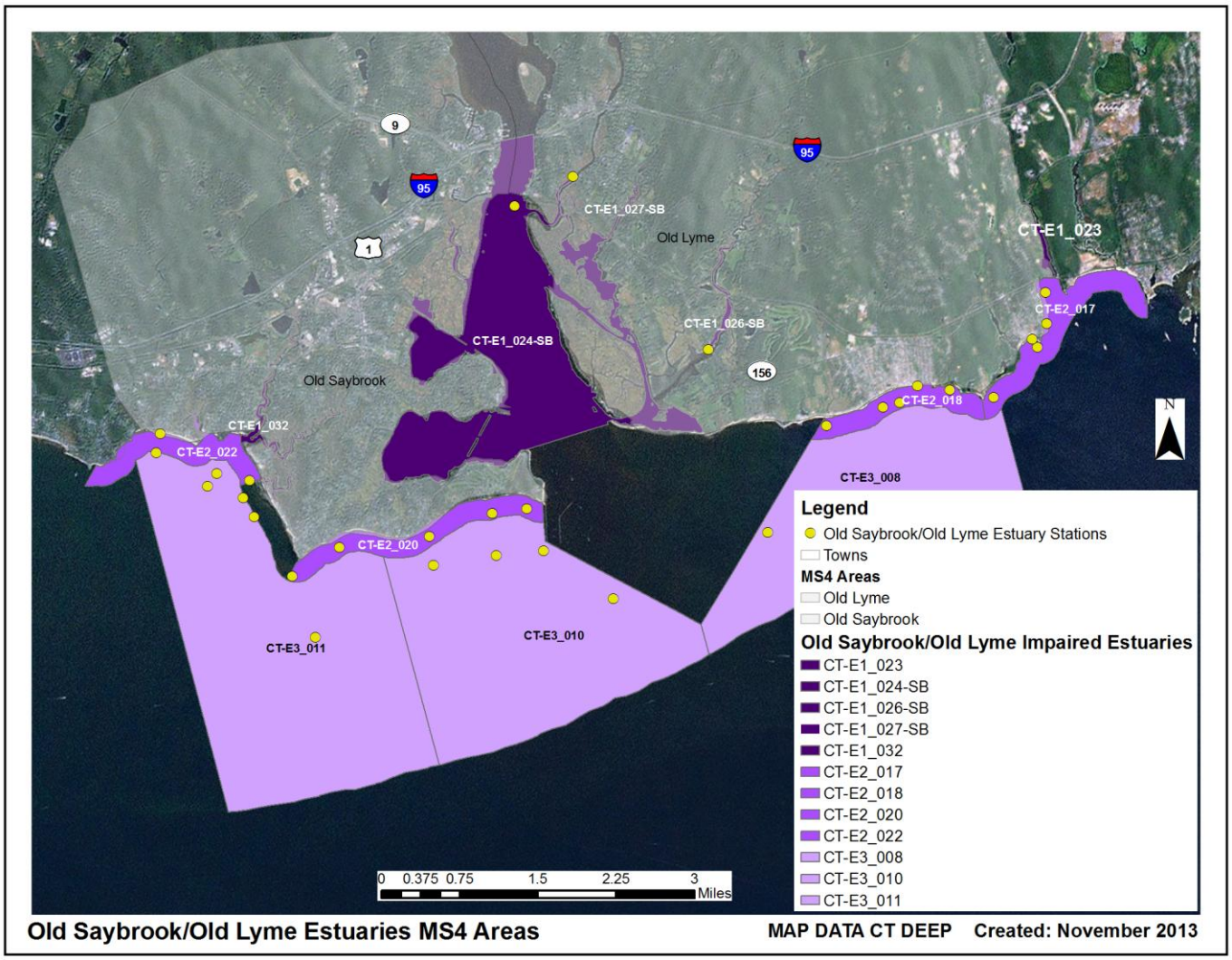


Table 7: List of MS4 sample locations and *E. coli* (colonies/100 mL) results in the Old Saybrook/ Old Lyme Estuary. The results cannot be compared to the water quality standard as there is no single sample shellfish standard for *E. coli*.

Town	Location	MS4 Type	Receiving Waters	Sample Date	Result
Old Lyme	Four Mile River Rd @ Colton Road	Industrial	pond at outlet on Four Mile River	12/06/04	12

Town	Location	MS4 Type	Receiving Waters	Sample Date	Result
Old Lyme	Four Mile River Rd @ Colton Road	Industrial	pond at outlet on Four Mile River	11/17/05	60
Old Lyme	Four Mile River Rd @ Colton Road	Industrial	pond at outlet on Four Mile River	11/16/06	10
Old Lyme	Four Mile River Rd @ Colton Road	Industrial	pond at outlet on Four Mile River	01/11/08	20
Old Lyme	Four Mile River Rd @ Colton Road	Residential	pond at outlet on Four Mile River	03/19/08	20
Old Lyme	Four Mile River Rd @ Colton Road	Residential	pond at outlet on Four Mile River	6/9/2009	930
Old Lyme	Four Mile River Rd @ Colton Road	Residential	pond at outlet on Four Mile River	9/23/2011	590
Old Lyme	Maple Ave and Groton Ave	Residential	Old Lyme Shores	12/06/04	1
Old Lyme	Maple Ave and Groton Ave	Residential	Old Lyme Shores coastal area adj to LIS	11/17/05	10
Old Lyme	Maple Ave and Groton Ave	Residential	Old Lyme Shores coastal area adj to LIS	11/16/06	10
Old Lyme	Maple Ave and Groton Ave	Residential	Old Lyme Shores coastal area adj to LIS	01/11/08	80
Old Lyme	Maple Ave and Groton Ave	Residential	Old Lyme Shores coastal area adj to LIS	03/19/08	10
Old Lyme	Maple Ave and Groton Ave	Residential	Old Lyme Shores coastal area adj to LIS	6/9/2009	180
Old Lyme	Maple Ave and Groton Ave	Residential	Old Lyme Shores coastal area adj to LIS	9/23/2011	30
Old Lyme	Martino Ave & Portland Ave	Residential	Swan Brook	12/06/04	8
Old Lyme	Martino Ave & Portland Ave	Residential	Swan Brook @ mouth of LIS	11/17/05	130
Old Lyme	Martino Ave & Portland Ave	Residential	Swan Brook @ mouth of LIS	11/16/06	>2000
Old Lyme	Martino Ave & Portland Ave	Commercial	Swan Brook @ mouth of LIS	01/11/08	20
Old Lyme	Martino Ave & Portland Ave	Residential	Swan Brook @ mouth of LIS	03/19/08	10
Old Lyme	Martino Ave & Portland Ave	Residential	Swan Brook @ mouth of LIS	6/9/2009	15530
Old Lyme	Martino Ave & Portland Ave	Residential	Swan Brook @ mouth of LIS	9/23/2011	60
Old Lyme	Post Office near the intersection of RT 1 & Davis Rd East	Commercial	Mill Brook	12/06/04	>60

Town	Location	MS4 Type	Receiving Waters	Sample Date	Result
Old Lyme	Post Office near the intersection of RT 1 & Davis Rd East	Commercial	Mill Brook @ mouth above Lieutenant River	11/17/05	210
Old Lyme	Post Office near the intersection of RT 1 & Davis Rd East	Commercial	Mill Brook @ mouth above Lieutenant River	11/16/06	20
Old Lyme	Post Office near the intersection of RT 1 & Davis Rd East	Commercial	Mill Brook @ mouth above Lieutenant River	01/11/08	200
Old Lyme	Post Office near the intersection of RT 1 & Davis Rd East	Commercial	Mill Brook @ mouth above Lieutenant River	03/19/08	90
Old Lyme	Post Office near the intersection of RT 1 & Davis Rd East	Commercial	Mill Brook @ mouth above Lieutenant River	6/9/2009	180
Old Lyme	Post Office near the intersection of RT 1 & Davis Rd East	Commercial	Mill Brook @ mouth above Lieutenant River	9/23/2011	>24200
Old Lyme	Rogers Lake Dam	Residential	Rogers Lake at outlet on Mill Brook	12/06/04	10
Old Lyme	Rogers Lake Dam	Commercial	Rogers Lake at outlet on Mill Brook	11/17/05	10
Old Lyme	Rogers Lake Dam	Residential	Rogers Lake at outlet on Mill Brook	11/16/06	>1000
Old Lyme	Rogers Lake Dam	Residential	Rogers Lake at outlet on Mill Brook	01/11/08	20
Old Lyme	Rogers Lake Dam	Residential	Rogers Lake at outlet on Mill Brook	03/19/08	10
Old Lyme	Rogers Lake Dam	Residential	Rogers Lake at outlet on Mill Brook	6/9/2009	770
Old Lyme	Rogers Lake Dam	Residential	Rogers Lake at outlet on Mill Brook	9/23/2011	180
Old Lyme	Whipoorwill Road @ Bucky Brook	Commercial	Black Hall River	12/06/04	12
Old Lyme	Whipoorwill Road @ Bucky Brook	Residential	Black Hall River	11/17/05	50
Old Lyme	Whipoorwill Road @ Bucky Brook	Commercial	Black Hall River	11/16/06	50
Old Lyme	Whipoorwill Road @ Bucky Brook	Residential	Black Hall River above un-named brook	01/11/08	120
Old Lyme	Whipoorwill Road @ Bucky Brook	Residential	Black Hall River above un-named brook	03/19/08	30
Old Lyme	Whipoorwill Road @ Bucky Brook	Residential	Black Hall River above un-named brook	6/9/2009	10
Old Lyme	Whipoorwill Road @ Bucky Brook	Residential	Black Hall River above un-named brook	9/23/2011	270
Old Saybrook	41.2694/72.3664 (R2)	Residential	trib to South Cove	06/28/05	70,000
Old Saybrook	41.2915/72.3882 (C1)	Commercial	Oyster River	06/28/05	460

Town	Location	MS4 Type	Receiving Waters	Sample Date	Result
Old Saybrook	41.2918/72.4037 (I1)	Industrial	Hagar Creek	06/28/05	16,000
Old Saybrook	41.2922/72.4157 (C2)	Commercial	trib to LIS	06/28/05	1,300
Old Saybrook	41.2993/72.4165 (R1)	Residential	Crystal Lake	06/28/05	55,000
Old Saybrook	41.3022/72.3842 (I2)	Industrial	Oyster River	06/28/05	67,000

Publicly Owned Treatment Works

According to the 2003 Old Saybrook Estuary Report and the 2002 Old Lyme Estuary Report, there are no public sewers or public WPCFs in Old Saybrook or in the adjacent towns of Westbrook and Old Lyme; all properties are serviced by on-site sewage disposal systems.

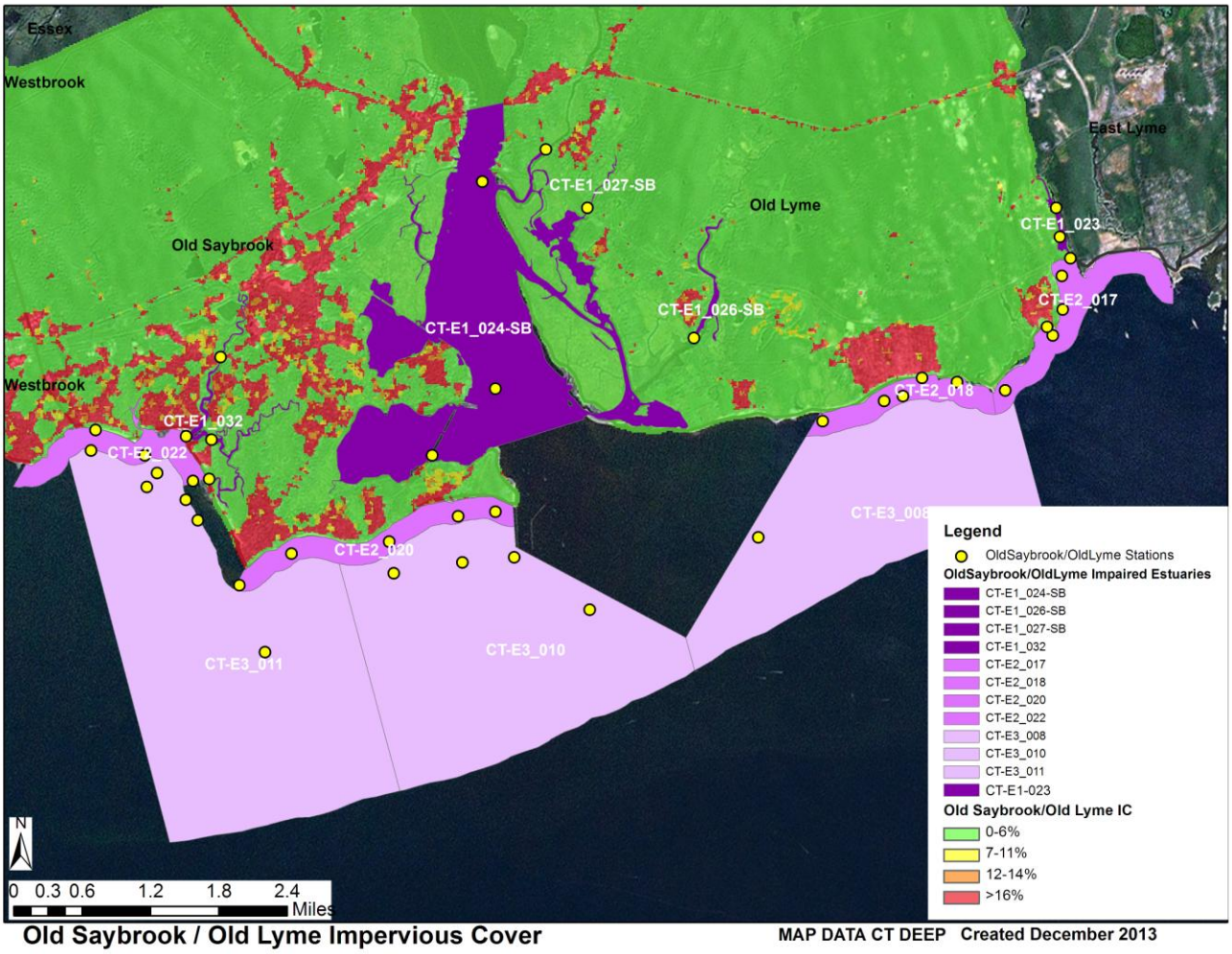
Non-point Sources

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 Old Saybrook / Old Lyme 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 Old Saybrook / Old Lyme Estuary are described below.

Stormwater Runoff from Developed Areas

The Towns of Old Saybrook and Old Lyme feature small areas of heavy development, but are predominantly in the 0-6% range for impervious cover. 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). Inland and coastal land bordering the estuary in Old Saybrook and Old Lyme exceeds 16% impervious surfaces (Figure 6). Also, stations on every segment in this estuary except for Segments 2 (CT-E1_026-SB), 8 (CT-E2_020) and 12 (CT-E3_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 Old Saybrook and Old Lyme, CT



Illicit Discharges and Insufficient Septic Systems

As shown in Figure 4, there are no public sewers or public WPCFs in Old Saybrook or Old Lyme. All properties are served by on-site subsurface sewage disposal systems. That being said, Old Lyme is moving towards providing sanitary sewer for much of the area on the shoreline of the municipality. 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. In Connecticut, local health directors or health districts are responsible for keeping track of any reported insufficient or failing septic systems in a specific municipality. Both Old Saybrook and Old Lyme have groundwater and surface water monitoring programs to identify problem areas.

Wildlife and Domestic Animal Waste

Wildlife, including waterfowl, and domestic animals within the municipalities of Old Saybrook and Old Lyme, 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. Large flocks of geese and swans are found in the Connecticut River mostly in North Cove and South Cove of Old Saybrook and the Four Mile River in Old Lyme. Other waterfowl in smaller numbers can be found in the tidal marshes of all the rivers and creeks in Old Saybrook (Old Saybrook, 2003). There are several large tidal marshes in all seven major rivers and creeks in Old Lyme. These marshes support significant animal and waterfowl populations including deer, geese, swans and ducks. These animal and waterfowl populations represent non-point pollution sources to shellfish growing areas in, and adjacent to, these river systems. Geese and other waterfowl are known to congregate in open areas, including recreational fields, agricultural crop fields, and golf courses. In addition to creating a nuisance, large numbers of geese can create unsanitary conditions on the grassed areas and cause water quality problems due to bacterial contamination associated with their droppings. Large populations of geese can also lead to habitat destruction as a result of overgrazing on wetland and riparian plants.

There are no agricultural activities located on shellfish growing waters in Old Saybrook. A small farm located at 84 Ingham Hill Road on the Oyster River north of Route 1 and south of the RR bridge may be impacting the Prohibited and Restricted-Relay shellfish growing areas of the Oyster River.

As indicated previously, portions of Old Saybrook and Old Lyme near the estuary are heavily developed with commercial and residential properties. As such, waste from domestic animals, such as dogs, may also be contributing to bacteria concentrations in these impaired segments in the Old Saybrook/Old Lyme 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. 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. Elimination of release of sewage from boats, both treated and untreated, will result in further reductions of human fecal waste discharged in the waterbody. This will also result in reductions in nutrient loading and potential human exposure to bacterial and viral pathogens in swimming areas, shellfish beds and other environmentally sensitive aquatic habitats.

As noted previously, multiple marinas are located within the Old Saybrook/Old Lyme Estuary (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, Connecticut Statewide Pumpout Facilities List. There is a free pumpout facility at the DEEP Marine Headquarters.

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, 2006). Since there are several

swimming areas along the shoreline, it is probable that some bacterial contamination can be attributed to human activities in the Old Saybrook/Old Lyme Estuary.

Additional Sources

The Connecticut River continues to be the major non-point pollution source that impacts Old Saybrook and Old Lyme shellfish growing waters. The Connecticut River has a drainage basin of 11,263 square miles, which extends through Vermont, Massachusetts and Connecticut. Spring floods, which have been measured as high as 256,000 cubic feet per second (cfs) at the Massachusetts-Connecticut border in March, have a significant impact on water quality in the Connecticut River. Lowest flows occur in July and August with flows ranging from 970-104,000 cfs. The 16 permitted sewage treatment plants and eight to ten industrial wastewater discharges to the Connecticut River from cities and towns north of Old Saybrook makes the Connecticut River a major non-point pollution source to the Old Lyme and Old Saybrook shellfish growing waters (Old Saybrook, 2003).

There are no active sanitary landfills or refuse transfer stations in Old Lyme (Old Lyme, 2002). There are no active sanitary landfills in Old Saybrook and the Old Saybrook refuse transfer station and recycling center is sited such that current activities at this site would not impact shellfish growing waters (Old Saybrook, 2003).

There may be other sources not listed here or identified in Figure 4 that contribute to the observed water quality impairments in the Old Saybrook / Old Lyme 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 Towns of Old Saybrook and Old Lyme 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/GuidanceRegulation/FederalStateFoodPrograms/ucm2006754.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 available annual re-evaluation for the Shellfish Growing Waters in the Town of Old Saybrook was conducted in 2003 (Old Saybrook, 2005). According to this report, all Old Saybrook shellfish growing waters are properly classified in conformance with the NSSP Model Ordinance. No classification changes are recommended or required at this time.

The most recent available annual re-evaluation for the Shellfish Growing Waters in the Town of Old Lyme was conducted in 2002 (Old Lyme, 2003). According to this report, all Old Saybrook shellfish growing waters are properly classified in conformance with the NSSP Model Ordinance. No classification changes are recommended or required at this time.

Other efforts have been taken by Old Saybrook and Old Lyme to reduce bacteria to its surface waters. As indicated previously, Old Saybrook and Old Lyme are regulated under the MS4 general permit program. The MS4 general permit requires regulated towns to prepare and implement 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.
6. Pollution prevention/good housekeeping.

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 are summarized in Tables 8 and 9.

Table 8: Summary of MS4 requirement updates related to the reduction of bacterial contamination from Old Saybrook, CT (Permit # GSM000078)

Minimum Measure	2003 Old Saybrook Annual Report Update
Public Outreach and Education	1) Continued to make a number of publications regarding stormwater pollution and resources available at Town Hall. 2) Continued to maintain and update the Town of Old Saybrook website main page with publications and resources.
Public Involvement and Participation	1) Continue to involve Town residents in the Household Hazardous Waste, Electronics Collection, Recycling Program and the Bulky Waste Programs. 2) Continue to involve Town Residents in the Leaf Collection Program.

Minimum Measure	2003 Old Saybrook Annual Report Update
	3) Sponsored a new nature club for Old Saybrook Grades K-9 children entitled Outdoor Education Kids which encourages children to connect with nature and the fun of being outside.
Illicit Discharge Detection and Elimination	1) Purchased a portable GPS unit to locate MS4 outfalls; anticipate that all of the MS4 outfalls in town will be located during the 2012 calendar year. 2) Anticipate that the IDDE Ordinance will be reviewed by the Board of Selectmen, forwarded to the Town Legal Counsel and enacted in the 2012 calendar year. 3) Continued to enforce the Animal Waste Ordinance and maintain the WPCA five year septic tank pumpout program.
Construction Site Stormwater Runoff Control	1) Continued with the Qualifying Local Program with respect to Construction Site Runoff Control as contained in the land use regulations.
Post Construction Stormwater Management	1) Continued to make design engineers and developers aware of stormwater quality management by referencing the CTDEEP publication *2004 Connecticut Stormwater Quality Manual* as well as other low impact development best management practices.
Pollution Prevention and Good Housekeeping	1) Conducted road sweeping for all roads town wide in 2011. Roads prone to sediment or debris accumulations were swept at least twice in 2011. 2) Cleaned approximately 90 percent of catch basins and storm manholes town wide in 2011.

Table 9: Summary of MS4 requirement updates related to the reduction of bacterial contamination from Old Lyme, CT (Permit # GSM000037)

Minimum Measure	2002 Old Lyme Annual Report Update
Public Outreach and Education	1) Coordinated with Connecticut River Estuary Regional Planning Authority-Gateway Commission to unify sources of information. 2) Formed Pesticide Awareness Committee. The group will bring to the public recommendations cease or limit the application or distribution of pesticides on public property.
Public Involvement and Participation	1) Establish town website. 2) Work with volunteer groups to stencil storm drains.
Illicit Discharge Detection and Elimination	1) Complete mapping catch basins & outfalls greater than 15' within the urbanized area. 2) Continue identifying and monitoring all illicit discharge sites.
Construction Site Stormwater Runoff Control	1) Review and recommend regulatory statutes to the Board of Selectmen.
Post Construction Stormwater Management	1) Continued to review regulations in effect at this time.
Pollution Prevention and Good Housekeeping	1) Continue to develop a collection of training materials that will be used to educate staff about pollution prevention and good housekeeping.

RECOMMENDED NEXT STEPS

Old Saybrook and Old Lyme 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 – 12 in the Old Saybrook/Old Lyme Estuary and have been prioritized below.

1) Continue monitoring of permitted sources.

Regular monitoring should be established for all permitted sources to ensure compliance with permit requirements and to determine if current management measures are adequate or if additional measures are necessary for water quality protection. There are at least 20 permittees in the Old Saybrook/Old Lyme 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 industrial facility monitoring indicates elevated bacteria, the General Permit for the Discharge of Stormwater Associated with Industrial Activity, effective October 1, 2011 (Industrial general permit) outlines an iterative approach of implementing additional control measures (in addition to required measures) to identify and reduce sources of bacterial contamination from the facility.

Section 6(k) of the MS4 general permit requires a municipality to modify its Stormwater Management Plan (SMP) to implement a 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. . The allocation is expressed as a daily target concentration to direct the permittee to implement best management practices towards improving water quality. The TMDL target goal is not expected to be a discharge permit limit because achieving the WQS will be determined through surface water sampling not discharge monitoring (for additional information see Section 5 of the Statewide Bacteria TMDL Core Document). For discharges to impaired waterbodies, the municipality must assess and modify the six minimum measures of its SMP, 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. Once the MS4 modifies the SMP in response to a TMDL, it must notify DEEP of the modification(s).

Tables 10 and 11 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 Old Saybrook/Old Lyme Estuary.

For any municipality subject to a MS4 general 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 an increased street sweeping frequency above basic permit requirements. Any non-MS4 municipalities can implement these same types of initiatives in an effort to reduce bacteria source loading to impaired waterways.

Any industrial facilities that discharge regulated stormwater to impaired waters must update its 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 stormwater measures that increase infiltration of stormwater to the ground to reduce overall stormwater discharge to impaired surface waters. Similarly, facilities that are regulated under the General Permit for the Discharge of Stormwater from Commercial

Activity, reissued May 1, 2014 (Commercial general permit) and discharge stormwater to impaired waters should update its Stormwater Management Plan and implement additional BMPs, as listed above for industrial activities, to reduce bacteria from its stormwater discharges.

Table 10. 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**	**2**	**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**	**2**	**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) **All Other Recreational Uses.**

(3) Human direct discharge = swimmers

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

(5) WLA and LA refer to Enterococcus of human and domestic animal origin

(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 11. Bacteria (Fecal Coliform) TMDLs, WLAs, and LAs for Shellfish Harvesting Areas.

		Geometric Mean Fecal coliform (#/100mL)[4]		90% samples 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 have 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 Old Saybrook and Old Lyme to implement Best Management Practices (BMPs) to control stormwater runoff.

As noted previously, areas of Old Saybrook and Old Lyme near the Old Saybrook/Old Lyme Estuary have impervious cover greater than 12% and are urban areas regulated under the MS4 program. As such, stormwater runoff is likely contributing bacteria to the Old Saybrook/Old Lyme 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 Old Saybrook/Old Lyme 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.

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

Neither Old Saybrook nor Old Lyme relies on a municipal sewer system. The Town of Old Lyme is currently proceeding toward providing sanitary sewer service for a number of its shoreline neighborhoods. Construction is expected to begin by 2016, and last 3 to 5 years. The town should implement an asset management program to ensure that, once these sewers are operational, adequate funding is generated to properly maintain the sewer system and keep the sewers operational without bypasses of untreated wastewater to the environment.

4) Continue and expand a system to monitor septic systems.

All residents of Old Saybrook and Old Lyme currently rely on septic systems. Both towns already have programs in place to ensure that existing septic systems are properly operated and maintained by owners. The Town of Old Saybrook has embarked on an extensive decentralized wastewater management program. As of this writing, approximately 350 of the 1,900 systems in the program have been upgraded to meet the rigorous requirements of the town's Upgrade Program Standards. Further work is scheduled in each of the next four years to meet the court-ordered completion deadline of 2018. These upgrades have thus far included only conventional repairs, but may, in the future, include advanced treatment technologies or community treatment approaches for more densely developed shoreline areas. The town is also required to implement a management system to ensure the effective operation of those systems in perpetuity.

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 Old Saybrook/Old Lyme 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 Old Saybrook/Old Lyme 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 (www.ct.gov/deep/cleanmarina).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 12: Segment 1: LIS EB Inner - Connecticut River (mouth) Bacteria Data

Waterbody ID: CT-E1_024-SB
Characteristics: Saltwater, Class SB
Impairment: Shellfishing
Water Quality Criteria for Fecal coliform:
Geometric Mean: 88 colonies/100 ml
90% of Samples Less Than: 260 colonies/100 ml
Percent reduction to meet:
Geometric Mean: 58%
90% of Samples Less Than: 57%

Data: 2000 – 2011 from CT DEEP and DABA target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS EB Inner – Connecticut River (mouth), Old Lyme (CT-E1_024-SB) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
105-01.3	LIS EB Inner – Connecticut River (mouth), Old Lyme	2/15/2000	41	Wet	102.8	n/a
105-01.3	LIS EB Inner – Connecticut River (mouth), Old Lyme	6/12/2000	258	Wet		
105-01.3	LIS EB Inner – Connecticut River (mouth), Old Lyme	6/6/2002	18	Wet	31.2	n/a
105-01.3	LIS EB Inner – Connecticut River (mouth), Old Lyme	10/28/2002	54	Dry		
105-01.3	LIS EB Inner – Connecticut River (mouth), Old Lyme	4/23/2003	11	Wet	11	n/a
105-01.3	LIS EB Inner – Connecticut River (mouth), Old Lyme	4/28/2004	88	Wet	**208.5***	**57***
105-01.3	LIS EB Inner – Connecticut River (mouth), Old Lyme	11/29/2004	321	Wet		
105-01.3	LIS EB Inner – Connecticut River (mouth), Old Lyme	12/27/2004	321	Wet		
105-01.3	LIS EB Inner – Connecticut River (mouth), Old Lyme	7/11/2005	140	Dry	17.2	n/a
105-01.3	LIS EB Inner – Connecticut River (mouth), Old Lyme	8/30/2005	171	Wet		
105-01.3	LIS EB Inner – Connecticut River (mouth), Old Lyme	9/26/2005	81	Wet		
105-01.3	LIS EB Inner – Connecticut River (mouth), Old Lyme	9/28/2005	81	Dry		
105-01.3	LIS EB Inner – Connecticut River (mouth), Old Lyme	2/7/2006	42	Dry	42	n/a
105-01.3	LIS EB Inner – Connecticut River (mouth), Old Lyme	5/2/2007	8	Wet	8	n/a
105-01.9	LIS EB Inner – Connecticut River (mouth),	2/15/2000	29	Wet	107.4	n/a

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
	Old Lyme					
105-01.9	LIS EB Inner – Connecticut River (mouth), Old Lyme	6/7/2000	70	Wet		
105-01.9	LIS EB Inner – Connecticut River (mouth), Old Lyme	6/8/2000	258	Wet		
105-01.9	LIS EB Inner – Connecticut River (mouth), Old Lyme	6/13/2000	110	Wet		
105-01.9	LIS EB Inner – Connecticut River (mouth), Old Lyme	9/14/2000	248	Wet		
105-01.9	LIS EB Inner – Connecticut River (mouth), Old Lyme	6/4/2001	70	Dry	47.5	n/a
105-01.9	LIS EB Inner – Connecticut River (mouth), Old Lyme	7/30/2001	29	Dry		
105-01.9	LIS EB Inner – Connecticut River (mouth), Old Lyme	8/13/2001	139	Wet		
105-01.9	LIS EB Inner – Connecticut River (mouth), Old Lyme	8/16/2001	18	Dry		
105-01.9	LIS EB Inner – Connecticut River (mouth), Old Lyme	6/6/2002	8.6	Wet	18.7	n/a
105-01.9	LIS EB Inner – Connecticut River (mouth), Old Lyme	6/10/2002	88	Dry		
105-01.9	LIS EB Inner – Connecticut River (mouth), Old Lyme	9/30/2002	8.7	Dry		
105-01.9	LIS EB Inner – Connecticut River (mouth), Old Lyme	7/14/2004	23	Wet	23	n/a
105-01.9	LIS EB Inner – Connecticut River (mouth), Old Lyme	8/23/2006	18	Dry	26.5	n/a
105-01.9	LIS EB Inner – Connecticut River (mouth), Old Lyme	10/2/2006	39	Dry		
105-01.9	LIS EB Inner – Connecticut River (mouth), Old Lyme	7/28/2008	171	Wet	171	n/a
105-01.9	LIS EB Inner – Connecticut River (mouth), Old Lyme	8/12/2008	171	Wet		
106-11.1	LIS EB Inner – Connecticut River (mouth), Old Lyme	2/15/2000	54	Wet	31.2	n/a
106-11.1	LIS EB Inner – Connecticut River (mouth), Old Lyme	9/19/2000	18	Wet		
106-11.1	LIS EB Inner – Connecticut River (mouth), Old Lyme	2/20/2001	41	Dry	18.9	n/a
106-11.1	LIS EB Inner – Connecticut River (mouth), Old Lyme	3/19/2001	8.7	Dry		
106-11.1	LIS EB Inner – Connecticut River (mouth), Old Lyme	5/6/2002	29	Dry	34.5	n/a
106-11.1	LIS EB Inner – Connecticut River (mouth), Old Lyme	10/28/2002	41	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-11.1	LIS EB Inner – Connecticut River (mouth), Old Lyme	10/28/2003	224	Wet	N/A	n/a
106-11.1	LIS EB Inner – Connecticut River (mouth), Old Lyme	5/5/2004	11	Dry	11	n/a
106-11.1	LIS EB Inner – Connecticut River (mouth), Old Lyme	5/22/2006	81	Dry	81	n/a
106-11.1	LIS EB Inner – Connecticut River (mouth), Old Lyme	11/7/2007	40	Wet	50.6	n/a
106-11.1	LIS EB Inner – Connecticut River (mouth), Old Lyme	12/11/2007	64	Dry		
106-11.1	LIS EB Inner – Connecticut River (mouth), Old Lyme	6/11/2008	171	Dry	N/A	n/a
106-11.1	LIS EB Inner – Connecticut River (mouth), Old Lyme	4/23/2009	171	Dry	N/A	n/a
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	6/7/2000	70	Wet	89	n/a
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	6/8/2000	258	Wet		
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	6/14/2000	140	Wet		
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	9/14/2000	54	Wet		
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	9/19/2000	41	Wet		
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	2/20/2001	8.7	Dry	55.9	n/a
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	6/4/2001	110	Dry		
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	8/13/2001	179	Wet		
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	8/16/2001	29	Dry		
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	8/21/2001	110	Wet		
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	6/10/2002	54	Dry	44.9	n/a
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	6/17/2002	41	Dry		
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	6/18/2002	41	Dry		
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	6/3/2003	88	Dry	56.3	n/a
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	8/20/2003	36	Dry		
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	7/12/2005	82	Dry	80	n/a

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	7/13/2005	78	Dry		
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	4/25/2006	81	Dry	40.4	n/a
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	9/6/2006	48	Dry		
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	9/18/2006	17	Dry		
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	7/29/2008	171	Dry	84.7	n/a
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	7/30/2008	42	Dry		

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS EB Inner – Connecticut River (mouth), Old Lyme (CT-E1_024_SB)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
105-01.3	LIS EB Inner – Connecticut River (mouth), Old Lyme	2000-2011	10	4	69	68	71
105-01.9	LIS EB Inner – Connecticut River (mouth), Old Lyme	2000-2011	10	7	53	81	30
106-11.1	LIS EB Inner – Connecticut River (mouth), Old Lyme	2000-2011	4	9	47	60	45
106-11.2	LIS EB Inner – Connecticut River (mouth), Old Lyme	2000-2011	7	15	62	101	49

Table 13: Segment 2: LIS EB Inner – Black Hall River (upper) Bacteria Data

Waterbody ID: CT-E1_026-SB
Characteristics: Saltwater, Class SB
Impairment: Shellfishing
Water Quality Criteria for Fecal coliform:
Geometric Mean: 88 colonies/100 ml
90% of Samples Less Than: 260 colonies/100 ml
Percent reduction to meet:
Geometric Mean: 25%
90% of Samples Less Than: NA

Data : 2000 – 2011 from CT DEEP and DABA target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS EB Inner – Black Hall River (upper), Old Lyme (CT-E1_026-SB) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
105-01.5	LIS EB Inner – Black Hall River (upper), Old Lyme	2/15/2000	18	Wet	68.1	n/a
105-01.5	LIS EB Inner – Black Hall River (upper), Old Lyme	6/12/2000	258	Wet		
105-01.5	LIS EB Inner – Black Hall River (upper), Old Lyme	6/6/2002	88	Wet	98.4	n/a
105-01.5	LIS EB Inner – Black Hall River (upper), Old Lyme	10/28/2002	110	Dry		
105-01.5	LIS EB Inner – Black Hall River (upper), Old Lyme	4/23/2003	51	Wet	51	n/a
105-01.5	LIS EB Inner – Black Hall River (upper), Old Lyme	4/28/2004	67	Wet	**117.8***	n/a
105-01.5	LIS EB Inner - Black Hall River (upper), Old Lyme	11/29/2004	224	Wet		
105-01.5	LIS EB Inner - Black Hall River (upper), Old Lyme	12/27/2004	109	Wet		
105-01.5	LIS EB Inner - Black Hall River (upper), Old Lyme	7/11/2005	32	Dry	24	n/a
105-01.5	LIS EB Inner - Black Hall River (upper), Old Lyme	8/30/2005	38	Wet		
105-01.5	LIS EB Inner - Black Hall River (upper), Old Lyme	9/26/2005	17	Wet		
105-01.5	LIS EB Inner - Black Hall River (upper), Old Lyme	9/28/2005	16	Dry		
105-01.5	LIS EB Inner - Black Hall River (upper), Old Lyme	2/7/2006	30	Dry	30	n/a
105-01.5	LIS EB Inner - Black Hall River (upper), Old Lyme	5/2/2007	32	Wet	32	n/a

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS EB Inner – Black Hall River (upper), Old Lyme (CT-E1_026-SB)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
105-01.5	LIS EB Inner - Black Hall River (upper), Old Lyme	2000-2011	10	4	52	61	36

Table 14: Segment 3: LIS EB Inner - Duck River Bacteria Data

Waterbody ID: CT-E1_027-SB
Characteristics: Saltwater, Class SB
Impairment: Shellfishing
Water Quality Criteria for Fecal coliform:
Geometric Mean: 88 colonies/100 ml
90% of Samples Less Than: 260 colonies/100 ml
Percent reduction to meet:
Geometric Mean: 66%
90% of Samples Less Than: 57%

Data : 2000 – 2011 from CT DEEP and DABA target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS EB Inner – Duck River, Old Lyme (CT-E1_027-SB) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
105-01.4	LIS EB Inner - Duck River, Old Lyme	2/15/2000	18	Wet	68.1	n/a
105-01.4	LIS EB Inner - Duck River, Old Lyme	6/12/2000	258	Wet		
105-01.4	LIS EB Inner - Duck River, Old Lyme	6/6/2002	248	Wet	**253***	n/a
105-01.4	LIS EB Inner - Duck River, Old Lyme	10/28/2002	258	Dry		
105-01.4	LIS EB Inner - Duck River, Old Lyme	4/23/2003	88	Wet	88	n/a
105-01.4	LIS EB Inner - Duck River, Old Lyme	4/28/2004	23	Wet	133.3	**57**
105-01.4	LIS EB Inner - Duck River, Old Lyme	11/29/2004	321	Wet		
105-01.4	LIS EB Inner - Duck River, Old Lyme	12/27/2004	321	Wet		
105-01.4	LIS EB Inner - Duck River, Old Lyme	7/11/2005	30	Dry	76.2	n/a
105-01.4	LIS EB Inner - Duck River, Old Lyme	8/30/2005	171	Wet		
105-01.4	LIS EB Inner - Duck River, Old Lyme	9/26/2005	81	Wet		
105-01.4	LIS EB Inner - Duck River, Old Lyme	9/28/2005	81	Dry		
105-01.4	LIS EB Inner - Duck River, Old Lyme	2/7/2006	18	Dry	18	n/a
105-01.4	LIS EB Inner - Duck River, Old Lyme	5/2/2007	94	Wet	94	n/a

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS EB Inner – Duck River, Old Lyme (CT-E1_027-SB)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
105-01.4	LIS EB Inner - Duck River, Old Lyme	2000-2011	10	4	93	112	58

Table 15: Segment 4: LIS EB Inner - Fourmile River (mouth) Bacteria Data

Waterbody ID: CT-E1_023
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: 89%
90% of Samples Less Than: 57%

Data : 2000 – 2011 from CT DEEP and DABA target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS EB Inner – Fourmile River (mouth), Old Lyme (CT-E1_023) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
105-10.1	LIS EB Inner - Fourmile River (mouth), Old Lyme	6/13/2000	50	Wet	8.9	40
105-10.1	LIS EB Inner - Fourmile River (mouth), Old Lyme	9/14/2000	1.6	Wet		
105-10.1	LIS EB Inner - Fourmile River (mouth), Old Lyme	6/4/2001	50	Dry	13.6	23
105-10.1	LIS EB Inner - Fourmile River (mouth), Old Lyme	7/30/2001	8.6	Dry		
105-10.1	LIS EB Inner - Fourmile River (mouth), Old Lyme	8/16/2001	5.8	Dry		
105-10.1	LIS EB Inner - Fourmile River (mouth), Old Lyme	5/20/2002	8.6	Dry	25.6	23
105-10.1	LIS EB Inner - Fourmile River (mouth), Old Lyme	6/10/2002	28	Dry		
105-10.1	LIS EB Inner - Fourmile River (mouth), Old Lyme	9/17/2002	70	Wet		
105-10.1	LIS EB Inner - Fourmile River (mouth), Old Lyme	9/24/2003	36	Dry	N/A	90
105-10.1	LIS EB Inner - Fourmile River (mouth), Old Lyme	7/14/2004	23	Wet	N/A	90
105-10.1	LIS EB Inner - Fourmile River (mouth), Old Lyme	6/6/2006	38	Dry	13.8	40
105-10.1	LIS EB Inner - Fourmile River (mouth), Old Lyme	8/23/2006	5	Dry		
105-10.1	LIS EB Inner - Fourmile River (mouth), Old Lyme	7/28/2008	12	Wet	18.3	n/a
105-10.1	LIS EB Inner - Fourmile River (mouth), Old Lyme	8/12/2008	28	Wet		
105-10.2	LIS EB Inner - Fourmile River (mouth), Old Lyme	6/12/2000	258	Wet	N/A	90
105-10.2	LIS EB Inner - Fourmile River (mouth), Old Lyme	6/6/2002	179	Wet	39.2	40
105-10.2	LIS EB Inner - Fourmile River (mouth), Old Lyme	10/28/2002	8.6	Dry		
105-10.2	LIS EB Inner - Fourmile River (mouth), Old Lyme	4/23/2003	36	Wet	N/A	90
105-10.2	LIS EB Inner - Fourmile River (mouth), Old Lyme	4/28/2004	23	Wet	29.3	23

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
105-10.2	LIS EB Inner - Fourmile River (mouth), Old Lyme	11/29/2004	109	Wet		
105-10.2	LIS EB Inner - Fourmile River (mouth), Old Lyme	12/27/2004	10	Wet		
105-10.2	LIS EB Inner - Fourmile River (mouth), Old Lyme	7/11/2005	2	Dry	9	n/a
105-10.2	LIS EB Inner - Fourmile River (mouth), Old Lyme	9/26/2005	12	Wet		
105-10.2	LIS EB Inner - Fourmile River (mouth), Old Lyme	12/20/2005	30	Wet		
105-10.2	LIS EB Inner - Fourmile River (mouth), Old Lyme	2/7/2006	4	Dry	4	n/a
105-10.2	LIS EB Inner - Fourmile River (mouth), Old Lyme	5/2/2007	18	Wet	18	n/a
105-10.3	LIS EB Inner - Fourmile River (mouth), Old Lyme	2/15/2000	18	Wet	68.1	40
105-10.3	LIS EB Inner - Fourmile River (mouth), Old Lyme	6/12/2000	258	Wet		
105-10.3	LIS EB Inner - Fourmile River (mouth), Old Lyme	6/6/2002	248	Wet	**131.8***	90
105-10.3	LIS EB Inner - Fourmile River (mouth), Old Lyme	10/28/2002	70	Dry		
105-10.3	LIS EB Inner - Fourmile River (mouth), Old Lyme	4/23/2003	173	Wet	N/A	90
105-10.3	LIS EB Inner - Fourmile River (mouth), Old Lyme	4/28/2004	10	Wet	17.2	**57**
105-10.3	LIS EB Inner - Fourmile River (mouth), Old Lyme	11/29/2004	51	Wet		
105-10.3	LIS EB Inner - Fourmile River (mouth), Old Lyme	12/27/2004	10	Wet		
105-10.3	LIS EB Inner - Fourmile River (mouth), Old Lyme	7/11/2005	74	Dry	27.9	**57**
105-10.3	LIS EB Inner - Fourmile River (mouth), Old Lyme	9/26/2005	7	Wet		
105-10.3	LIS EB Inner - Fourmile River (mouth), Old Lyme	12/20/2005	42	Wet		
105-10.3	LIS EB Inner - Fourmile River (mouth), Old Lyme	2/7/2006	4	Dry	4	n/a
105-10.3	LIS EB Inner - Fourmile River (mouth), Old Lyme	5/2/2007	10	Wet	10	n/a

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS EB Inner – Fourmile River (mouth), Old Lyme (CT-E1_023)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
105-10.1	LIS EB Inner - Fourmile River (mouth), Old Lyme	2000-2011	6	8	17	19	16
105-10.2	LIS EB Inner - Fourmile River (mouth), Old Lyme	2000-2011	9	3	23	40	4
105-10.3	LIS EB Inner - Fourmile River (mouth), Old Lyme	2000-2011	10	3	33	35	27

Table 16: Segment 5: LIS EB Inner - Oyster River Area Bacteria Data

Waterbody ID: CT-E1_032
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: 88%
90% of Samples Less Than: 90%

Data : 2000 – 2011 from CT DEEP and DABA target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS EB Inner – Oyster River Area, Old Saybrook (CT-E1_032) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-02.1	LIS EB Inner – Oyster River Area, Old Saybrook	2/15/2000	70	Wet	47.6	57
106-02.1	LIS EB Inner – Oyster River Area, Old Saybrook	9/19/2000	8.6	Wet		
106-02.1	LIS EB Inner – Oyster River Area, Old Saybrook	12/19/2000	179	Wet		
106-02.1	LIS EB Inner – Oyster River Area, Old Saybrook	2/20/2001	8.6	Dry	5.6	n/a
106-02.1	LIS EB Inner – Oyster River Area, Old Saybrook	3/19/2001	3.6	Dry		
106-02.1	LIS EB Inner – Oyster River Area, Old Saybrook	5/6/2002	29	Dry	38.5	40
106-02.1	LIS EB Inner – Oyster River Area, Old Saybrook	10/28/2002	51	Dry		
106-02.1	LIS EB Inner – Oyster River Area, Old Saybrook	10/28/2003	11	Wet	38.8	40
106-02.1	LIS EB Inner – Oyster River Area, Old Saybrook	11/4/2003	137	Dry		
106-02.1	LIS EB Inner – Oyster River Area, Old Saybrook	5/5/2004	36	Dry	N/A	90
106-02.1	LIS EB Inner – Oyster River Area, Old Saybrook	5/22/2006	81	Dry	31.2	90
106-02.1	LIS EB Inner – Oyster River Area, Old Saybrook	12/4/2006	12	Dry		
106-02.1	LIS EB Inner – Oyster River Area, Old Saybrook	11/7/2007	32	Wet	5.7	40
106-02.1	LIS EB Inner – Oyster River Area, Old Saybrook	12/11/2007	1	Dry		
106-02.1	LIS EB Inner – Oyster River Area, Old Saybrook	6/11/2008	171	Dry	N/A	90
106-02.1	LIS EB Inner – Oyster River Area, Old Saybrook	4/23/2009	2	Dry	2	n/a
106-02.2	LIS EB Inner – Oyster River Area, Old Saybrook	5/6/2002	8.7	Dry	8.7	n/a
106-02.2	LIS EB Inner – Oyster River Area, Old Saybrook	10/28/2003	36	Wet	N/A	90
106-02.2	LIS EB Inner – Oyster River Area, Old Saybrook	5/22/2006	81	Dry	N/A	90

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-02.2	LIS EB Inner – Oyster River Area, Old Saybrook	11/7/2007	68	Wet	N/A	90
106-02.2	LIS EB Inner – Oyster River Area, Old Saybrook	6/11/2008	116	Dry	N/A	90
106-02.2	LIS EB Inner – Oyster River Area, Old Saybrook	4/23/2009	4	Dry	4	n/a
106-02.3	LIS EB Inner – Oyster River Area, Old Saybrook	2/15/2000	29	Wet	47.2	40
106-02.3	LIS EB Inner – Oyster River Area, Old Saybrook	9/19/2000	8.7	Wet		
106-02.3	LIS EB Inner – Oyster River Area, Old Saybrook	11/27/2000	110	Wet		
106-02.3	LIS EB Inner – Oyster River Area, Old Saybrook	12/19/2000	179	Wet		
106-02.3	LIS EB Inner – Oyster River Area, Old Saybrook	2/20/2001	8.6	Dry	34.2	23
106-02.3	LIS EB Inner – Oyster River Area, Old Saybrook	3/19/2001	18	Dry		
106-02.3	LIS EB Inner – Oyster River Area, Old Saybrook	8/13/2001	258	Wet		
106-02.3	LIS EB Inner – Oyster River Area, Old Saybrook	5/6/2002	54	Dry	**115.7***	90
106-02.3	LIS EB Inner - Oyster River Area, Old Saybrook	10/28/2002	248	Dry		
106-02.3	LIS EB Inner - Oyster River Area, Old Saybrook	10/28/2003	321	Wet	N/A	90
106-02.3	LIS EB Inner - Oyster River Area, Old Saybrook	5/5/2004	173	Dry	N/A	90
106-02.3	LIS EB Inner - Oyster River Area, Old Saybrook	5/22/2006	81	Dry	N/A	90
106-02.3	LIS EB Inner - Oyster River Area, Old Saybrook	11/7/2007	171	Wet	48.9	40
106-02.3	LIS EB Inner - Oyster River Area, Old Saybrook	12/11/2007	14	Dry		
106-02.3	LIS EB Inner - Oyster River Area, Old Saybrook	6/11/2008	171	Dry	N/A	90
106-02.3	LIS EB Inner - Oyster River Area, Old Saybrook	4/23/2009	171	Dry	N/A	90
106-02.4	LIS EB Inner - Oyster River Area, Old Saybrook	2/15/2000	8.7	Wet	11	n/a
106-02.4	LIS EB Inner - Oyster River Area, Old Saybrook	9/19/2000	8.6	Wet		
106-02.4	LIS EB Inner - Oyster River Area, Old Saybrook	12/19/2000	18	Wet		
106-02.4	LIS EB Inner - Oyster River Area, Old Saybrook	2/20/2001	8.6	Dry	3.7	n/a
106-02.4	LIS EB Inner - Oyster River Area, Old Saybrook	3/19/2001	1.6	Dry		
106-02.4	LIS EB Inner - Oyster River Area, Old Saybrook	5/6/2002	8.7	Dry	11	n/a
106-02.4	LIS EB Inner - Oyster River Area, Old Saybrook	10/28/2002	14	Dry		
106-02.4	LIS EB Inner - Oyster River Area, Old Saybrook	10/28/2003	8.1	Wet	8.1	n/a
106-02.4	LIS EB Inner - Oyster River Area, Old Saybrook	5/5/2004	109	Dry	N/A	90

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-02.4	LIS EB Inner - Oyster River Area, Old Saybrook	5/22/2006	10	Dry	10	n/a
106-02.4	LIS EB Inner - Oyster River Area, Old Saybrook	11/7/2007	12	Wet	4.9	n/a
106-02.4	LIS EB Inner - Oyster River Area, Old Saybrook	12/11/2007	2	Dry		
106-02.4	LIS EB Inner - Oyster River Area, Old Saybrook	6/11/2008	68	Dry	N/A	90
106-02.4	LIS EB Inner - Oyster River Area, Old Saybrook	4/23/2009	6	Dry	6	n/a

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS EB Inner – Oyster River Area, Old Saybrook (CT-E1_032)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
106-02.1	LIS EB Inner - Oyster River Area, Old Saybrook	2000-2011	5	11	22	33	18
106-02.2	LIS EB Inner - Oyster River Area, Old Saybrook	2000-2011	2	4	30	49	24
106-02.3	LIS EB Inner - Oyster River Area, Old Saybrook	2000-2011	7	9	74	95	61
106-02.4	LIS EB Inner - Oyster River Area, Old Saybrook	2000-2011	5	9	10	11	10

Table 17: Segment 6: LIS EB Shore - Rocky Neck (Fourmile River) Bacteria Data

Waterbody ID: CT-E2_017
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: 89%
90% of Samples Less Than: 57%

Data : 2000 – 2011 from CT DEEP and DABA target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS EB Shore – Rocky Neck (Fourmile River), Old Lyme (CT-E2_017) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
105-08.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	6/8/2000	1.7	Wet	3.9	n/a
105-08.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	6/13/2000	22	Wet		
105-08.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	9/14/2000	1.6	Wet		
105-08.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	6/4/2001	3.6	Dry	2.7	n/a
105-08.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	7/30/2001	1.6	Dry		
105-08.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	8/16/2001	3.6	Dry		
105-08.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	5/20/2002	1.7	Dry	2.8	n/a
105-08.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	6/10/2002	3.6	Dry		
105-08.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	9/17/2002	3.6	Wet		
105-08.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	9/24/2003	22	Dry	22	n/a
105-08.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	7/14/2004	8.1	Wet	8.1	n/a
105-08.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	6/6/2006	39	Dry	6.2	90
105-08.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	8/23/2006	1	Dry		
105-08.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	7/28/2008	5	Wet	2.2	n/a
105-08.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	8/12/2008	1	Wet		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
105-09.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	6/8/2000	28	Wet	8.6	n/a
105-09.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	6/13/2000	14	Wet		
105-09.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	9/14/2000	1.6	Wet		
105-09.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	6/4/2001	14	Dry	8.7	n/a
105-09.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	7/30/2001	1.7	Dry		
105-09.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	8/16/2001	28	Dry		
105-09.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	5/20/2002	1.7	Dry	9.5	n/a
105-09.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	6/10/2002	28	Dry		
105-09.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	9/17/2002	18	Wet		
105-09.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	9/24/2003	5.8	Dry	5.8	n/a
105-09.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	7/14/2004	8.1	Wet	8.1	n/a
105-09.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	6/6/2006	38	Dry	6.2	40
105-09.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	8/23/2006	1	Dry		
105-09.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	7/28/2008	32	Wet	41.6	90
105-09.0	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	8/12/2008	54	Wet		
105-09.1	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	6/8/2000	88	Wet	57.4	57
105-09.1	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	6/13/2000	250	Wet		
105-09.1	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	9/14/2000	8.6	Wet		
105-09.1	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	6/4/2001	70	Dry	40.8	57
105-09.1	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	7/30/2001	18	Dry		
105-09.1	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	8/16/2001	54	Dry		
105-09.1	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	5/20/2002	8.7	Dry	43.8	57
105-09.1	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	6/10/2002	110	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
105-09.1	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	9/17/2002	88	Wet		
105-09.1	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	9/24/2003	36	Dry	N/A	90
105-09.1	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	7/14/2004	51	Wet	N/A	90
105-09.1	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	6/6/2006	46	Dry	6.8	40
105-09.1	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	8/23/2006	1	Dry		
105-09.1	LIS EB Shore – Rocky Neck (Fourmile Rvr), Old Lyme	7/28/2008	144	Wet	**123.5***	90
105-09.1	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	8/12/2008	106	Wet		
105-09.7	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	9/24/2003	14	Dry	14	n/a
105-09.7	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	7/14/2004	36	Wet	36	90
105-09.7	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	6/6/2006	31	Dry	5.6	40
105-09.7	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	8/23/2006	1	Dry		
105-09.7	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	7/28/2008	4	Wet	5.7	n/a
105-09.7	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	8/12/2008	8	Wet		
105-10.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	6/8/2000	41	Wet	15	47
105-10.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	6/13/2000	51	Wet		
105-10.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	9/14/2000	1.6	Wet		
105-10.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	6/4/2001	5.8	Dry	3.2	n/a
105-10.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	7/30/2001	1.6	Dry		
105-10.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	8/16/2001	3.6	Dry		
105-10.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	5/20/2002	1.6	Dry	12.1	23
105-10.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	6/10/2002	50	Dry		
105-10.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	9/17/2002	22	Wet		
105-10.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	9/24/2003	22	Dry	N/A	n/a

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
105-10.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	7/14/2004	8.1	Wet	8.1	n/a
105-10.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	6/6/2006	37	Dry	6.1	40
105-10.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	8/23/2006	1	Dry		
105-10.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	7/28/2008	6	Wet	12.5	n/a
105-10.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	8/12/2008	26	Wet		

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS EB Shore – Rocky Neck (Fourmile River), Old Lyme (CT-E2_017)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
105-08.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	2000-2011	7	8	4	4	4
105-09.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	2000-2011	7	8	10	15	7
105-09.1	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	2000-2011	7	8	41	75	24
105-09.7	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	2000-2011	3	3	9	10	8
105-10.0	LIS EB Shore - Rocky Neck (Fourmile Rvr), Old Lyme	2000-2011	7	8	9	14	6

Table 18: Segment 7: LIS EB Shore - Soundview Beach Bacteria Data

Waterbody ID: CT-E2_018
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: 94%
90% of Samples Less Than: 90%

Data : 2000 – 2011 from CT DEEP and DABA target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS EB Shore – Soundview Beach, Old Lyme (CT-E2_018) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
105-04.0	LIS EB Shore - Soundview Beach, Old Lyme	6/8/2000	51	Wet	8.9	23
105-04.0	LIS EB Shore - Soundview Beach, Old Lyme	6/13/2000	8.6	Wet		
105-04.0	LIS EB Shore - Soundview Beach, Old Lyme	9/14/2000	1.6	Wet		
105-04.0	LIS EB Shore - Soundview Beach, Old Lyme	6/4/2001	18	Dry	3.7	n/a
105-04.0	LIS EB Shore - Soundview Beach, Old Lyme	7/30/2001	1.6	Dry		
105-04.0	LIS EB Shore - Soundview Beach, Old Lyme	8/16/2001	1.7	Dry		
105-04.0	LIS EB Shore - Soundview Beach, Old Lyme	5/20/2002	29	Dry	13.5	23
105-04.0	LIS EB Shore - Soundview Beach, Old Lyme	6/10/2002	50	Dry		
105-04.0	LIS EB Shore - Soundview Beach, Old Lyme	9/17/2002	1.7	Wet		
105-04.0	LIS EB Shore - Soundview Beach, Old Lyme	9/24/2003	28	Dry	N/A	n/a
105-04.0	LIS EB Shore - Soundview Beach, Old Lyme	7/14/2004	5.8	Wet	5.8	n/a
105-04.0	LIS EB Shore - Soundview Beach, Old Lyme	6/6/2006	15	Dry	3.9	n/a
105-04.0	LIS EB Shore - Soundview Beach, Old Lyme	8/23/2006	1	Dry		
105-04.0	LIS EB Shore - Soundview Beach, Old Lyme	7/28/2008	49	Wet	30.5	40
105-04.0	LIS EB Shore - Soundview Beach, Old Lyme	8/12/2008	19	Wet		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
105-05.0	LIS EB Shore - Soundview Beach, Old Lyme	6/8/2000	28	Wet	7.9	n/a
105-05.0	LIS EB Shore - Soundview Beach, Old Lyme	6/13/2000	11	Wet		
105-05.0	LIS EB Shore - Soundview Beach, Old Lyme	9/14/2000	1.6	Wet		
105-05.0	LIS EB Shore - Soundview Beach, Old Lyme	6/4/2001	8.1	Dry	3.6	n/a
105-05.0	LIS EB Shore - Soundview Beach, Old Lyme	7/30/2001	1.6	Dry		
105-05.0	LIS EB Shore - Soundview Beach, Old Lyme	8/16/2001	3.6	Dry		
105-05.0	LIS EB Shore - Soundview Beach, Old Lyme	5/20/2002	36	Dry	5.9	n/a
105-05.0	LIS EB Shore - Soundview Beach, Old Lyme	6/10/2002	1.6	Dry		
105-05.0	LIS EB Shore - Soundview Beach, Old Lyme	9/17/2002	3.6	Wet		
105-05.0	LIS EB Shore - Soundview Beach, Old Lyme	9/24/2003	51	Dry	N/A	90
105-05.0	LIS EB Shore - Soundview Beach, Old Lyme	7/14/2004	22	Wet	N/A	n/a
105-05.0	LIS EB Shore - Soundview Beach, Old Lyme	6/6/2006	17	Dry	4.1	n/a
105-05.0	LIS EB Shore - Soundview Beach, Old Lyme	8/23/2006	1	Dry		
105-05.0	LIS EB Shore - Soundview Beach, Old Lyme	7/28/2008	26	Wet	12.5	n/a
105-05.0	LIS EB Shore - Soundview Beach, Old Lyme	8/12/2008	6	Wet		
105-05.1	LIS EB Shore - Soundview Beach, Old Lyme	2/15/2000	70	Wet	134.4	90
105-05.1	LIS EB Shore - Soundview Beach, Old Lyme	6/12/2000	258	Wet		
105-05.1	LIS EB Shore - Soundview Beach, Old Lyme	6/6/2002	258	Wet	N/A	90
105-05.1	LIS EB Shore - Soundview Beach, Old Lyme	4/23/2003	11	Wet	11	n/a
105-05.1	LIS EB Shore - Soundview Beach, Old Lyme	7/11/2005	810	Dry	174.5	90
105-05.1	LIS EB Shore - Soundview Beach, Old Lyme	9/26/2005	81	Wet		
105-05.1	LIS EB Shore - Soundview Beach, Old Lyme	9/28/2005	81	Wet		
105-05.1	LIS EB Shore - Soundview Beach, Old Lyme	2/7/2006	2	Dry	2	n/a

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
105-06.0	LIS EB Shore - Soundview Beach, Old Lyme	6/8/2000	22	Wet	10.8	23
105-06.0	LIS EB Shore - Soundview Beach, Old Lyme	6/13/2000	36	Wet		
105-06.0	LIS EB Shore - Soundview Beach, Old Lyme	9/14/2000	1.6	Wet		
105-06.0	LIS EB Shore - Soundview Beach, Old Lyme	6/4/2001	5.8	Dry	2.5	n/a
105-06.0	LIS EB Shore - Soundview Beach, Old Lyme	7/30/2001	1.6	Dry		
105-06.0	LIS EB Shore - Soundview Beach, Old Lyme	8/16/2001	1.7	Dry		
105-06.0	LIS EB Shore - Soundview Beach, Old Lyme	5/20/2002	22	Dry	3.8	n/a
105-06.0	LIS EB Shore - Soundview Beach, Old Lyme	6/10/2002	1.6	Dry		
105-06.0	LIS EB Shore - Soundview Beach, Old Lyme	9/17/2002	1.6	Wet		
105-06.0	LIS EB Shore - Soundview Beach, Old Lyme	9/24/2003	50	Dry	N/A	90
105-06.0	LIS EB Shore - Soundview Beach, Old Lyme	7/14/2004	5.8	Wet	5.8	n/a
105-06.0	LIS EB Shore - Soundview Beach, Old Lyme	6/6/2006	24	Dry	4.9	n/a
105-06.0	LIS EB Shore - Soundview Beach, Old Lyme	8/23/2006	1	Dry		
105-06.0	LIS EB Shore - Soundview Beach, Old Lyme	7/28/2008	12	Wet	9.2	n/a
105-06.0	LIS EB Shore - Soundview Beach, Old Lyme	8/12/2008	7	Wet		
105-06.1	LIS EB Shore - Soundview Beach, Old Lyme	2/15/2000	70	Wet	134.4	90
105-06.1	LIS EB Shore - Soundview Beach, Old Lyme	6/12/2000	258	Wet		
105-06.1	LIS EB Shore - Soundview Beach, Old Lyme	6/6/2002	258	Wet	N/A	90
105-06.1	LIS EB Shore - Soundview Beach, Old Lyme	4/23/2003	67	Wet	N/A	90
105-06.1	LIS EB Shore - Soundview Beach, Old Lyme	7/11/2005	690	Dry	**236.4***	**90**
105-06.1	LIS EB Shore - Soundview Beach, Old Lyme	9/26/2005	81	Wet		
105-06.1	LIS EB Shore - Soundview Beach, Old Lyme	2/7/2006	4	Dry	4	n/a
105-07.0	LIS EB Shore - Soundview Beach, Old Lyme	6/8/2000	28	Wet	13.4	23

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
105-07.0	LIS EB Shore - Soundview Beach, Old Lyme	6/13/2000	51	Wet		
105-07.0	LIS EB Shore - Soundview Beach, Old Lyme	9/14/2000	1.7	Wet		
105-07.0	LIS EB Shore - Soundview Beach, Old Lyme	6/4/2001	5.8	Dry	3.9	n/a
105-07.0	LIS EB Shore - Soundview Beach, Old Lyme	7/30/2001	1.7	Dry		
105-07.0	LIS EB Shore - Soundview Beach, Old Lyme	8/16/2001	5.8	Dry		
105-07.0	LIS EB Shore - Soundview Beach, Old Lyme	5/20/2002	14	Dry	4.4	n/a
105-07.0	LIS EB Shore - Soundview Beach, Old Lyme	6/10/2002	1.7	Dry		
105-07.0	LIS EB Shore - Soundview Beach, Old Lyme	9/17/2002	3.6	Wet		
105-07.0	LIS EB Shore - Soundview Beach, Old Lyme	9/24/2003	50	Dry	N/A	90
105-07.0	LIS EB Shore - Soundview Beach, Old Lyme	7/14/2004	22	Wet	N/A	n/a
105-07.0	LIS EB Shore - Soundview Beach, Old Lyme	6/6/2006	28	Dry	5.3	n/a
105-07.0	LIS EB Shore - Soundview Beach, Old Lyme	8/23/2006	1	Dry		
105-07.0	LIS EB Shore - Soundview Beach, Old Lyme	7/28/2008	12	Wet	4.9	n/a
105-07.0	LIS EB Shore - Soundview Beach, Old Lyme	8/12/2008	2	Wet		

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS EB Shore – Soundview Beach, Old Lyme (CT-E2_018)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
105-04.0	LIS EB Shore - Soundview Beach, Old Lyme	2000-2011	7	8	9	9	9
105-05.0	LIS EB Shore - Soundview Beach, Old Lyme	2000-2011	7	8	8	9	6
105-05.1	LIS EB Shore - Soundview Beach, Old Lyme	2000-2011	6	2	70	83	40
105-06.0	LIS EB Shore - Soundview Beach, Old Lyme	2000-2011	7	8	6	7	5
105-06.1	LIS EB Shore - Soundview Beach, Old Lyme	2000-2011	5	2	95	120	52
105-07.0	LIS EB Shore - Soundview Beach, Old Lyme	2000-2011	7	8	7	9	9

Table 19: Segment 8: LIS EB Shore - Willard Bay Bacteria Data

Waterbody ID: CT-E2_020
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: 29%
90% of Samples Less Than: 90%

Data : 2000 – 2011 from CT DEEP and DABA target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS EB Shore – Willard Bay, Old Saybrook (CT-E2_020) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	6/7/2000	5.8	Wet	2.5	n/a
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	9/14/2000	1.7	Wet		
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	9/19/2000	1.6	Wet		
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	8/13/2001	1.7	Wet	3.9	n/a
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	8/16/2001	5.8	Dry		
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	8/21/2001	5.8	Wet		
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	6/10/2002	8.1	Dry	3.6	n/a
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	6/17/2002	3.6	Dry		
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	9/19/2002	1.6	Dry		
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	8/20/2003	3.6	Dry	3.6	n/a
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	7/12/2005	3	Dry	2.4	n/a
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	7/13/2005	2	Dry		
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	4/25/2006	2	Dry	1.3	n/a
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	9/6/2006	1	Dry		
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	9/18/2006	1	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	7/29/2008	26	Dry	**19.7***	90
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	7/30/2008	15	Dry		
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	6/7/2000	5.8	Wet	2.5	n/a
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	9/14/2000	1.7	Wet		
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	9/19/2000	1.6	Wet		
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	8/13/2001	11	Wet	4.1	n/a
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	8/16/2001	3.6	Dry		
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	8/21/2001	1.7	Wet		
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	6/10/2002	1.7	Dry	3.1	n/a
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	6/17/2002	11	Dry		
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	9/19/2002	1.6	Dry		
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	8/20/2003	1.6	Dry	1.6	n/a
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	7/12/2005	1	Dry	1	n/a
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	7/13/2005	1	Dry		
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	4/25/2006	3	Dry	1.8	n/a
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	9/6/2006	2	Dry		
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	9/18/2006	1	Dry		
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	7/29/2008	7	Dry	6.5	n/a
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	7/30/2008	6	Dry		
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	6/7/2000	1.7	Wet	3.8	n/a
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	6/14/2000	22	Wet		
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	9/14/2000	3.6	Wet		
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	9/19/2000	1.6	Wet		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	8/13/2001	5.8	Wet	2.5	n/a
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	8/16/2001	1.7	Dry		
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	8/21/2001	1.6	Wet		
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	6/10/2002	5.8	Dry	4.2	n/a
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	6/17/2002	8.1	Dry		
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	9/19/2002	1.6	Dry		
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	8/20/2003	1.6	Dry	1.6	n/a
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	7/12/2005	1	Dry	1.7	n/a
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	7/13/2005	3	Dry		
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	4/25/2006	4	Dry	2	n/a
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	9/6/2006	2	Dry		
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	9/18/2006	1	Dry		
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	7/29/2008	9	Dry	14.4	40
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	7/30/2008	23	Dry		
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	6/7/2000	3.6	Wet	3.3	n/a
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	6/14/2000	5.8	Wet		
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	9/14/2000	1.6	Wet		
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	9/19/2000	3.6	Wet		
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	8/13/2001	8.1	Wet	3.6	n/a
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	8/16/2001	3.6	Dry		
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	8/21/2001	1.6	Wet		
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	6/10/2002	36	Dry	5.7	15
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	6/17/2002	11	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	9/19/2002	1.6	Dry		
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	9/30/2002	1.7	Dry		
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	8/20/2003	1.6	Dry	1.6	n/a
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	7/12/2005	9	Dry	15.6	40
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	7/13/2005	27	Dry		
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	4/25/2006	4	Dry	1.6	n/a
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	9/6/2006	1	Dry		
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	9/18/2006	1	Dry		
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	7/29/2008	11	Dry	13.7	n/a
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	7/30/2008	17	Dry		
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	6/7/2000	88	Wet	11	15
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	6/14/2000	5.8	Wet		
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	9/14/2000	1.6	Wet		
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	9/19/2000	18	Wet		
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	8/13/2001	11	Wet	4	n/a
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	8/16/2001	3.6	Dry		
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	8/21/2001	1.6	Wet		
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	6/10/2002	8.1	Dry	6.6	n/a
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	6/17/2002	22	Dry		
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	9/30/2002	1.6	Dry		
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	8/20/2003	1.6	Dry	1.6	n/a
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	7/12/2005	13	Dry	5.1	n/a
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	7/13/2005	2	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	4/25/2006	1	Dry	1.4	n/a
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	9/18/2006	2	Dry		
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	7/29/2008	11	Dry	7.4	n/a
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	7/30/2008	5	Dry		

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS EB Midshore - Willard Bay, Old Saybrook (CT-E2_020)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
106-06.0	LIS EB Shore – Willard Bay, Old Saybrook	2000-2011	5	12	3	3	4
106-07.0	LIS EB Shore – Willard Bay, Old Saybrook	2000-2011	5	12	3	3	2
106-08.0	LIS EB Shore – Willard Bay, Old Saybrook	2000-2011	6	12	3	4	3
106-09.0	LIS EB Shore – Willard Bay, Old Saybrook	2000-2011	6	13	4	3	5
106-09.4	LIS EB Shore – Willard Bay, Old Saybrook	2000-2011	6	11	5	8	4

Table 20: Segment 9: LIS EB Shore – Indiantown Harbor Bacteria Data

Waterbody ID: CT-E2_022
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: 56%
90% of Samples Less Than: 23%

Data : 2000 – 2011 from CT DEEP and DABA target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS EB Shore – Indiantown Harbor, Old Saybrook (CT-E2_022) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-01.1	LIS EB Shore – Indiantown Harbor, Old Saybrook	6/7/2000	258	Wet	26.7	23
106-01.1	LIS EB Shore – Indiantown Harbor, Old Saybrook	9/14/2000	8.6	Wet		
106-01.1	LIS EB Shore – Indiantown Harbor, Old Saybrook	9/19/2000	8.6	Wet		
106-01.1	LIS EB Shore – Indiantown Harbor, Old Saybrook	8/13/2001	258	Wet	26.9	23
106-01.1	LIS EB Shore – Indiantown Harbor, Old Saybrook	8/16/2001	8.7	Dry		
106-01.1	LIS EB Shore – Indiantown Harbor, Old Saybrook	8/21/2001	8.7	Wet		
106-01.1	LIS EB Shore – Indiantown Harbor, Old Saybrook	6/10/2002	14	Dry	**31.7***	15
106-01.1	LIS EB Shore - Indiantown Harbor, Old Saybrook	6/17/2002	139	Dry		
106-01.1	LIS EB Shore - Indiantown Harbor, Old Saybrook	6/18/2002	18	Dry		
106-01.1	LIS EB Shore - Indiantown Harbor, Old Saybrook	9/30/2002	29	Dry		
106-01.1	LIS EB Shore - Indiantown Harbor, Old Saybrook	8/20/2003	10	Dry	10	n/a
106-01.1	LIS EB Shore - Indiantown Harbor, Old Saybrook	7/12/2005	9	Dry	6	n/a
106-01.1	LIS EB Shore - Indiantown Harbor, Old Saybrook	7/13/2005	4	Dry		
106-01.1	LIS EB Shore - Indiantown Harbor, Old Saybrook	4/25/2006	1	Dry	3.3	n/a
106-01.1	LIS EB Shore - Indiantown Harbor, Old Saybrook	9/6/2006	6	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-01.1	LIS EB Shore - Indiantown Harbor, Old Saybrook	9/18/2006	6	Dry		
106-01.1	LIS EB Shore - Indiantown Harbor, Old Saybrook	7/29/2008	18	Dry	4.2	n/a
106-01.1	LIS EB Shore - Indiantown Harbor, Old Saybrook	7/30/2008	1	Dry		
106-01.2	LIS EB Shore - Indiantown Harbor, Old Saybrook	2/20/2001	1.7	Dry	1.6	n/a
106-01.2	LIS EB Shore - Indiantown Harbor, Old Saybrook	3/19/2001	1.6	Dry		
106-03.0	LIS EB Shore - Indiantown Harbor, Old Saybrook	9/19/2000	3.6	Wet	5.6	n/a
106-03.0	LIS EB Shore - Indiantown Harbor, Old Saybrook	12/19/2000	8.6	Wet		
106-03.0	LIS EB Shore - Indiantown Harbor, Old Saybrook	2/20/2001	1.6	Dry	1.6	n/a
106-03.0	LIS EB Shore - Indiantown Harbor, Old Saybrook	3/19/2001	1.6	Dry		
106-03.0	LIS EB Shore - Indiantown Harbor, Old Saybrook	5/6/2002	8.7	Dry	7.1	n/a
106-03.0	LIS EB Shore - Indiantown Harbor, Old Saybrook	10/28/2002	5.8	Dry		
106-03.0	LIS EB Shore - Indiantown Harbor, Old Saybrook	10/28/2003	11	Wet	11	n/a

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS EB Shore – Indiantown Harbor, Old Saybrook (CT-E2_022)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
106-01.1	LIS EB Shore - Indiantown Harbor, Old Saybrook	2000-2011	5	13	13	34	9
106-01.2	LIS EB Shore - Indiantown Harbor, Old Saybrook	2000-2011	0	2	2	0	2
106-03.0	LIS EB Shore - Indiantown Harbor, Old Saybrook	2000-2011	3	4	5	7	3

Table 21: Segment 10: LIS EB Midshore - Old Lyme, CT River Bacteria Data

Waterbody ID: CT-E3_008
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: 79%
90% of Samples Less Than: 90%

Data : 2000 – 2011 from CT DEEP and DABA target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS EB Midshore – Old Lyme, CT River (CT-E3_008) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
105-03.0	LIS EB Midshore – Old Lyme, CT River	6/8/2000	258	Wet	15.3	23
105-03.0	LIS EB Midshore – Old Lyme, CT River	6/13/2000	8.7	Wet		
105-03.0	LIS EB Midshore – Old Lyme, CT River	9/14/2000	1.6	Wet		
105-03.0	LIS EB Midshore – Old Lyme, CT River	6/4/2001	50	Dry	5.8	15
105-03.0	LIS EB Midshore – Old Lyme, CT River	7/30/2001	1.6	Dry		
105-03.0	LIS EB Midshore – Old Lyme, CT River	8/14/2001	8.6	Wet		
105-03.0	LIS EB Midshore – Old Lyme, CT River	8/16/2001	1.7	Dry		
105-03.0	LIS EB Midshore – Old Lyme, CT River	5/20/2002	54	Dry	28.6	57
105-03.0	LIS EB Midshore – Old Lyme, CT River	6/10/2002	50	Dry		
105-03.0	LIS EB Midshore – Old Lyme, CT River	9/17/2002	8.7	Wet		
105-03.0	LIS EB Midshore – Old Lyme, CT River	6/3/2003	11	Dry	6.3	n/a
105-03.0	LIS EB Midshore – Old Lyme, CT River	9/24/2003	3.6	Dry		
105-03.0	LIS EB Midshore – Old Lyme, CT River	7/14/2004	1.6	Wet	1.6	n/a
105-03.0	LIS EB Midshore – Old Lyme, CT River	6/6/2006	60	Dry	7.7	40
105-03.0	LIS EB Midshore – Old Lyme, CT River	8/23/2006	1	Dry		
105-03.0	LIS EB Midshore – Old Lyme, CT River	7/28/2008	74	Wet	**66.1***	**90**
105-03.0	LIS EB Midshore – Old Lyme, CT River	8/12/2008	59	Wet		

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS EB Midshore - Old Lyme, CT River (CT-E3_008)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
105-03.0	LIS EB Midshore – Old Lyme, CT River	2000-2011	8	9	12	14.4	10

Table 22: Segment 11: LIS EB Midshore – Old Saybrook Bacteria Data

Waterbody ID: CT-E3_010
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: 82%
90% of Samples Less Than: 90%

Data : 2000 – 2011 from CT DEEP and DABA target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS EB Midshore – Old Saybrook (CT-E3_010) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
105-01.0	LIS EB Midshore – Old Saybrook	6/7/2000	8.6	Wet	31.9	40
105-01.0	LIS EB Midshore – Old Saybrook	6/8/2000	258	Wet		
105-01.0	LIS EB Midshore – Old Saybrook	6/13/2000	54	Wet		
105-01.0	LIS EB Midshore – Old Saybrook	9/14/2000	8.6	Wet		
105-01.0	LIS EB Midshore – Old Saybrook	6/4/2001	1.7	Dry	2.9	n/a
105-01.0	LIS EB Midshore – Old Saybrook	7/30/2001	8.6	Dry		
105-01.0	LIS EB Midshore – Old Saybrook	8/16/2001	1.6	Dry		
105-01.0	LIS EB Midshore – Old Saybrook	6/10/2002	50	Dry	9.2	40
105-01.0	LIS EB Midshore – Old Saybrook	9/17/2002	1.7	Wet		
105-01.0	LIS EB Midshore – Old Saybrook	6/3/2003	10	Dry	22.6	40
105-01.0	LIS EB Midshore – Old Saybrook	9/24/2003	51	Dry		
105-01.0	LIS EB Midshore – Old Saybrook	7/14/2004	10	Wet	10	n/a
105-01.0	LIS EB Midshore – Old Saybrook	6/6/2006	67	Dry	11.6	40
105-01.0	LIS EB Midshore – Old Saybrook	8/23/2006	2	Dry		
105-01.0	LIS EB Midshore – Old Saybrook	7/28/2008	80	Wet	**78.5***	**90**
105-01.0	LIS EB Midshore – Old Saybrook	8/12/2008	77	Wet		
106-08.1	LIS EB Midshore – Old Saybrook	6/7/2000	8.1	Wet	5.1	n/a
106-08.1	LIS EB Midshore – Old Saybrook	6/14/2000	14	Wet		
106-08.1	LIS EB Midshore – Old Saybrook	9/14/2000	1.6	Wet		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-08.1	LIS EB Midshore – Old Saybrook	9/19/2000	3.6	Wet		
106-08.1	LIS EB Midshore – Old Saybrook	8/13/2001	3.6	Wet	2.7	n/a
106-08.1	LIS EB Midshore – Old Saybrook	8/16/2001	1.6	Dry		
106-08.1	LIS EB Midshore – Old Saybrook	8/21/2001	3.6	Wet		
106-08.1	LIS EB Midshore – Old Saybrook	6/10/2002	1.6	Dry	2.6	n/a
106-08.1	LIS EB Midshore – Old Saybrook	6/17/2002	11	Dry		
106-08.1	LIS EB Midshore – Old Saybrook	9/19/2002	1.7	Dry		
106-08.1	LIS EB Midshore – Old Saybrook	9/30/2002	1.6	Dry		
106-08.1	LIS EB Midshore – Old Saybrook	8/20/2003	3.6	Dry	3.6	n/a
106-08.1	LIS EB Midshore – Old Saybrook	7/12/2005	4	Dry	2	n/a
106-08.1	LIS EB Midshore – Old Saybrook	7/13/2005	1	Dry		
106-08.1	LIS EB Midshore – Old Saybrook	4/25/2006	1	Dry	1.3	n/a
106-08.1	LIS EB Midshore – Old Saybrook	9/6/2006	2	Dry		
106-08.1	LIS EB Midshore – Old Saybrook	9/18/2006	1	Dry		
106-08.1	LIS EB Midshore – Old Saybrook	7/29/2008	16	Dry	12	n/a
106-08.1	LIS EB Midshore – Old Saybrook	7/30/2008	9	Dry		
106-09.2	LIS EB Midshore – Old Saybrook	6/7/2000	8.6	Wet	6	n/a
106-09.2	LIS EB Midshore – Old Saybrook	6/14/2000	11	Wet		
106-09.2	LIS EB Midshore – Old Saybrook	9/14/2000	1.7	Wet		
106-09.2	LIS EB Midshore – Old Saybrook	9/19/2000	8.1	Wet		
106-09.2	LIS EB Midshore – Old Saybrook	8/13/2001	1.7	Wet	1.6	n/a
106-09.2	LIS EB Midshore – Old Saybrook	8/16/2001	1.6	Dry		
106-09.2	LIS EB Midshore – Old Saybrook	8/21/2001	1.6	Wet		
106-09.2	LIS EB Midshore – Old Saybrook	6/10/2002	54	Dry	6.7	15
106-09.2	LIS EB Midshore – Old Saybrook	6/17/2002	14	Dry		
106-09.2	LIS EB Midshore – Old Saybrook	9/30/2002	1.7	Dry		
106-09.2	LIS EB Midshore – Old Saybrook	10/15/2002	1.6	Dry		
106-09.2	LIS EB Midshore – Old Saybrook	8/20/2003	1.6	Dry	1.6	n/a

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-09.2	LIS EB Midshore – Old Saybrook	7/12/2005	9	Dry	3	n/a
106-09.2	LIS EB Midshore – Old Saybrook	7/13/2005	1	Dry		
106-09.2	LIS EB Midshore – Old Saybrook	4/25/2006	7	Dry	3.5	n/a
106-09.2	LIS EB Midshore – Old Saybrook	9/6/2006	2	Dry		
106-09.2	LIS EB Midshore – Old Saybrook	9/18/2006	3	Dry		
106-09.2	LIS EB Midshore – Old Saybrook	7/29/2008	17	Dry	5.8	n/a
106-09.2	LIS EB Midshore – Old Saybrook	7/30/2008	2	Dry		
106-10.0	LIS EB Midshore – Old Saybrook	6/7/2000	110	Wet	22.6	30
106-10.0	LIS EB Midshore – Old Saybrook	6/8/2000	258	Wet		
106-10.0	LIS EB Midshore – Old Saybrook	6/14/2000	8.7	Wet		
106-10.0	LIS EB Midshore – Old Saybrook	9/14/2000	1.7	Wet		
106-10.0	LIS EB Midshore – Old Saybrook	9/19/2000	14	Wet		
106-10.0	LIS EB Midshore – Old Saybrook	8/13/2001	51	Wet	5.3	23
106-10.0	LIS EB Midshore – Old Saybrook	8/16/2001	1.7	Dry		
106-10.0	LIS EB Midshore – Old Saybrook	8/21/2001	1.7	Wet		
106-10.0	LIS EB Midshore – Old Saybrook	6/10/2002	41	Dry	19.4	23
106-10.0	LIS EB Midshore – Old Saybrook	6/17/2002	70	Dry		
106-10.0	LIS EB Midshore – Old Saybrook	6/18/2002	29	Dry		
106-10.0	LIS EB Midshore – Old Saybrook	9/17/2002	8.6	Wet		
106-10.0	LIS EB Midshore – Old Saybrook	9/30/2002	8.6	Dry		
106-10.0	LIS EB Midshore – Old Saybrook	10/15/2002	8.6	Dry		
106-10.0	LIS EB Midshore – Old Saybrook	6/3/2003	10	Dry	10	n/a
106-10.0	LIS EB Midshore – Old Saybrook	8/20/2003	10	Dry		
106-10.0	LIS EB Midshore – Old Saybrook	7/12/2005	56	Dry	41	40
106-10.0	LIS EB Midshore – Old Saybrook	7/13/2005	30	Dry		
106-10.0	LIS EB Midshore – Old Saybrook	4/25/2006	11	Dry	3.5	n/a
106-10.0	LIS EB Midshore – Old Saybrook	9/6/2006	2	Dry		
106-10.0	LIS EB Midshore – Old Saybrook	9/18/2006	2	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-10.0	LIS EB Midshore – Old Saybrook	7/29/2008	171	Dry	55.5	40
106-10.0	LIS EB Midshore – Old Saybrook	7/30/2008	18	Dry		

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS EB Midshore - Old Saybrook (CT-E3_010)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
105-01.0	LIS EB Midshore – Old Saybrook	2000-2011	8	8	15	24	10
106-08.1	LIS EB Midshore – Old Saybrook	2000-2011	6	13	3	5	3
106-09.2	LIS EB Midshore – Old Saybrook	2000-2011	6	13	4	4	4
106-10.0	LIS EB Midshore – Old Saybrook	2000-2011	8	15	15	16	14

Table 23: Segment 12: LIS EB Midshore – Old Saybrook, Indian Harbor Bacteria Data

Waterbody ID: CT-E3_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: 64%
90% of Samples Less Than: 40%

Data : 2000 – 2011 from CT DEEP and DABA target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS EB Midshore – Old Saybrook, Indian Harbor (CT-E3_011) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-01.0	LIS EB Midshore – Old Saybrook, Indian Harbor	6/7/2000	51	Wet	10.2	23
106-01.0	LIS EB Midshore – Old Saybrook, Indian Harbor	9/14/2000	3.6	Wet		
106-01.0	LIS EB Midshore – Old Saybrook, Indian Harbor	9/19/2000	5.8	Wet		
106-01.0	LIS EB Midshore – Old Saybrook, Indian Harbor	8/13/2001	51	Wet	15.3	23
106-01.0	LIS EB Midshore – Old Saybrook, Indian Harbor	8/16/2001	8.1	Dry		
106-01.0	LIS EB Midshore – Old Saybrook, Indian Harbor	8/21/2001	8.6	Wet		
106-01.0	LIS EB Midshore – Old Saybrook, Indian Harbor	6/10/2002	3.6	Dry	7.6	n/a
106-01.0	LIS EB Midshore – Old Saybrook, Indian Harbor	6/17/2002	14	Dry		
106-01.0	LIS EB Midshore – Old Saybrook, Indian Harbor	9/19/2002	8.6	Dry		
106-01.0	LIS EB Midshore – Old Saybrook, Indian Harbor	8/20/2003	5.8	Dry	5.8	n/a
106-01.0	LIS EB Midshore – Old Saybrook, Indian Harbor	7/12/2005	1	Dry	3.5	n/a
106-01.0	LIS EB Midshore – Old Saybrook, Indian Harbor	7/13/2005	12	Dry		
106-01.0	LIS EB Midshore – Old Saybrook, Indian Harbor	4/25/2006	2	Dry	2.2	n/a
106-01.0	LIS EB Midshore – Old Saybrook, Indian Harbor	9/6/2006	1	Dry		
106-01.0	LIS EB Midshore – Old Saybrook, Indian Harbor	9/18/2006	5	Dry		
106-01.0	LIS EB Midshore – Old Saybrook, Indian Harbor	7/29/2008	12	Dry	7.7	n/a
106-01.0	LIS EB Midshore – Old Saybrook, Indian Harbor	7/30/2008	5	Dry		
106-03.2	LIS EB Midshore – Old Saybrook, Indian Harbor	8/13/2001	14	Wet	5.2	n/a
106-03.2	LIS EB Midshore – Old Saybrook, Indian Harbor	8/16/2001	1.7	Dry		
106-03.2	LIS EB Midshore – Old Saybrook, Indian Harbor	8/21/2001	5.8	Wet		
106-03.2	LIS EB Midshore – Old Saybrook, Indian Harbor	6/10/2002	1.6	Dry	4.5	n/a

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-03.2	LIS EB Midshore – Old Saybrook, Indian Harbor	6/17/2002	28	Dry		
106-03.2	LIS EB Midshore – Old Saybrook, Indian Harbor	9/19/2002	1.6	Dry		
106-03.2	LIS EB Midshore – Old Saybrook, Indian Harbor	9/30/2002	5.8	Dry		
106-03.2	LIS EB Midshore – Old Saybrook, Indian Harbor	8/20/2003	5.8	Dry	5.8	n/a
106-03.2	LIS EB Midshore – Old Saybrook, Indian Harbor	7/12/2005	3	Dry	1.7	n/a
106-03.2	LIS EB Midshore – Old Saybrook, Indian Harbor	7/13/2005	1	Dry		
106-03.2	LIS EB Midshore – Old Saybrook, Indian Harbor	4/25/2006	3	Dry	1.4	n/a
106-03.2	LIS EB Midshore – Old Saybrook, Indian Harbor	9/6/2006	1	Dry		
106-03.2	LIS EB Midshore – Old Saybrook, Indian Harbor	9/18/2006	1	Dry		
106-03.2	LIS EB Midshore – Old Saybrook, Indian Harbor	7/29/2008	21	Dry	14.5	40
106-03.2	LIS EB Midshore – Old Saybrook, Indian Harbor	7/30/2008	10	Dry		
106-03.1	LIS EB Midshore – Old Saybrook, Indian Harbor	8/13/2001	18	Wet	5.6	n/a
106-03.1	LIS EB Midshore – Old Saybrook, Indian Harbor	8/16/2001	5.8	Dry		
106-03.1	LIS EB Midshore – Old Saybrook, Indian Harbor	8/21/2001	1.7	Wet		
106-03.1	LIS EB Midshore – Old Saybrook, Indian Harbor	6/10/2002	5.8	Dry	4.1	n/a
106-03.1	LIS EB Midshore – Old Saybrook, Indian Harbor	6/17/2002	8.1	Dry		
106-03.1	LIS EB Midshore – Old Saybrook, Indian Harbor	9/19/2002	1.7	Dry		
106-03.1	LIS EB Midshore – Old Saybrook, Indian Harbor	9/30/2002	3.6	Dry		
106-03.1	LIS EB Midshore – Old Saybrook, Indian Harbor	8/20/2003	3.6	Dry	3.6	n/a
106-03.1	LIS EB Midshore – Old Saybrook, Indian Harbor	7/12/2005	1	Dry	3	n/a
106-03.1	LIS EB Midshore – Old Saybrook, Indian Harbor	7/13/2005	9	Dry		
106-03.1	LIS EB Midshore – Old Saybrook, Indian Harbor	4/25/2006	1	Dry	1.4	n/a
106-03.1	LIS EB Midshore – Old Saybrook, Indian Harbor	9/6/2006	3	Dry		
106-03.1	LIS EB Midshore – Old Saybrook, Indian Harbor	9/18/2006	1	Dry		
106-03.1	LIS EB Midshore – Old Saybrook, Indian Harbor	7/29/2008	8	Dry	8.5	n/a
106-03.1	LIS EB Midshore – Old Saybrook, Indian Harbor	7/30/2008	9	Dry		
106-05.0	LIS EB Midshore – Old Saybrook, Indian Harbor	6/7/2000	22	Wet	6	n/a
106-05.0	LIS EB Midshore – Old Saybrook, Indian Harbor	9/14/2000	5.8	Wet		
106-05.0	LIS EB Midshore – Old Saybrook, Indian Harbor	9/19/2000	1.7	Wet		
106-05.0	LIS EB Midshore – Old Saybrook, Indian Harbor	8/13/2001	14	Wet	5.2	n/a
106-05.0	LIS EB Midshore – Old Saybrook, Indian Harbor	8/16/2001	1.7	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-05.0	LIS EB Midshore – Old Saybrook, Indian Harbor	8/21/2001	5.8	Wet		
106-05.0	LIS EB Midshore – Old Saybrook, Indian Harbor	6/10/2002	5.8	Dry	6.4	n/a
106-05.0	LIS EB Midshore – Old Saybrook, Indian Harbor	6/17/2002	28	Dry		
106-05.0	LIS EB Midshore – Old Saybrook, Indian Harbor	9/19/2002	1.6	Dry		
106-05.0	LIS EB Midshore – Old Saybrook, Indian Harbor	8/20/2003	1.7	Dry	1.7	n/a
106-05.0	LIS EB Midshore – Old Saybrook, Indian Harbor	7/12/2005	1	Dry	1	n/a
106-05.0	LIS EB Midshore – Old Saybrook, Indian Harbor	7/13/2005	1	Dry		
106-05.0	LIS EB Midshore – Old Saybrook, Indian Harbor	4/25/2006	2	Dry	3.4	n/a
106-05.0	LIS EB Midshore – Old Saybrook, Indian Harbor	9/6/2006	5	Dry		
106-05.0	LIS EB Midshore – Old Saybrook, Indian Harbor	9/18/2006	4	Dry		
106-05.0	LIS EB Midshore – Old Saybrook, Indian Harbor	7/29/2008	27	Dry	12.7	n/a
106-05.0	LIS EB Midshore – Old Saybrook, Indian Harbor	7/30/2008	6	Dry		
106-46.0	LIS EB Midshore – Old Saybrook, Indian Harbor	6/7/2000	28	Wet	6.5	n/a
106-46.0	LIS EB Midshore – Old Saybrook, Indian Harbor	9/14/2000	1.7	Wet		
106-46.0	LIS EB Midshore – Old Saybrook, Indian Harbor	9/19/2000	5.8	Wet		
106-46.0	LIS EB Midshore – Old Saybrook, Indian Harbor	8/13/2001	3.6	Wet	2.8	n/a
106-46.0	LIS EB Midshore – Old Saybrook, Indian Harbor	8/16/2001	3.6	Dry		
106-46.0	LIS EB Midshore – Old Saybrook, Indian Harbor	8/21/2001	1.7	Wet		
106-46.0	LIS EB Midshore – Old Saybrook, Indian Harbor	6/10/2002	3.6	Dry	4.5	n/a
106-46.0	LIS EB Midshore – Old Saybrook, Indian Harbor	6/17/2002	22	Dry		
106-46.0	LIS EB Midshore – Old Saybrook, Indian Harbor	6/18/2002	22	Dry		
106-46.0	LIS EB Midshore – Old Saybrook, Indian Harbor	9/17/2002	1.7	Wet		
106-46.0	LIS EB Midshore – Old Saybrook, Indian Harbor	9/19/2002	1.6	Dry		
106-46.0	LIS EB Midshore – Old Saybrook, Indian Harbor	9/30/2002	1.7	Dry		
106-46.0	LIS EB Midshore – Old Saybrook, Indian Harbor	8/20/2003	11	Dry	11	n/a
106-46.0	LIS EB Midshore – Old Saybrook, Indian Harbor	7/12/2005	81	Dry	**39.2***	40
106-46.0	LIS EB Midshore - Old Saybrook, Indian Harbor	7/13/2005	19	Dry		
106-46.0	LIS EB Midshore - Old Saybrook, Indian Harbor	4/25/2006	1	Dry	1.3	n/a
106-46.0	LIS EB Midshore - Old Saybrook, Indian Harbor	9/6/2006	2	Dry		
106-46.0	LIS EB Midshore - Old Saybrook, Indian Harbor	9/18/2006	1	Dry		
106-46.0	LIS EB Midshore - Old Saybrook, Indian Harbor	7/29/2008	17	Dry	4.1	n/a

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
106-46.0	LIS EB Midshore - Old Saybrook, Indian Harbor	7/30/2008	1	Dry		
106-02.0	LIS EB Midshore - Old Saybrook, Indian Harbor	6/7/2000	51	Wet	6.6	23
106-02.0	LIS EB Midshore - Old Saybrook, Indian Harbor	9/14/2000	1.6	Wet		
106-02.0	LIS EB Midshore - Old Saybrook, Indian Harbor	9/19/2000	3.6	Wet		
106-02.0	LIS EB Midshore - Old Saybrook, Indian Harbor	7/29/2008	11	Dry	9.9	n/a
106-02.0	LIS EB Midshore - Old Saybrook, Indian Harbor	7/30/2008	9	Dry		

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS EB Midshore - Old Saybrook Indian Harbor (CT-E3_011)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
106-01.0	LIS EB Midshore - Old Saybrook, Indian Harbor	2000-2011	5	12	7	13.6	5
106-02.0	LIS EB Midshore - Old Saybrook, Indian Harbor	2000-2011	3	2	8	7	10
106-03.1	LIS EB Midshore - Old Saybrook, Indian Harbor	2000-2011	2	13	4	6	4
106-03.2	LIS EB Midshore - Old Saybrook, Indian Harbor	2000-2011	2	13	4	9	3
106-05.0	LIS EB Midshore - Old Saybrook, Indian Harbor	2000-2011	5	12	4	7	4
106-46.0	LIS EB Midshore - Old Saybrook, Indian Harbor	2000-2011	6	14	5	4	5

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