Estuary 10: Clinton

Watershed Summary

WATERSHED DESCRIPTION AND MAPS

The Clinton Estuary (Estuary 10) covers an area of approximately 4,389 acres in south central Connecticut. These impaired segments are located in the central portion of Long Island Sound (LIS). Most of the impaired segments in this summary are located in the municipality of Clinton, CT.

The Clinton Estuary includes one segment impaired for commercial shellfish harvesting and four 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 CB Inner-Hammonasset River (CT-C1_003-SB) is part of the inner estuary from the mouth of the Hammonasset River (SB water) at inner Clinton Harbor to SA/SB water quality line between Currycross Road and RR track, Clinton.

Segment 2: LIS CB Inner – Hayden Creek (CT-C1_004-SB) is part of the inner estuary, Hayden Creek SB water from the mouth at Hammonasset River (parallel with Pratt Road), US to saltwater limit near Maple Avenue (off Route 1), Clinton.

These two impaired segments of the Clinton Estuary has a water quality classification of SB. Designated uses include commercial shellfish harvesting, recreation, habitat for marine fish and other aquatic life and wildlife, industrial water supply, and navigation. Segments 1 (CT-C1_003-SB) and 2 (CT-C1_004-SB) of the estuary are

Impaired Segment Facts

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

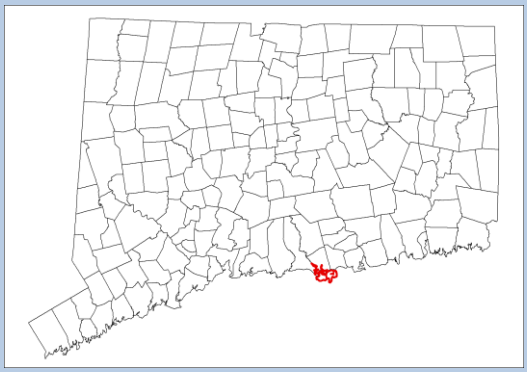
Segment 1: LIS CB Inner-Hammonasset River (*CT-C1_003-SB*); SB; 0.07
Segment 2: LIS CB Inner - Hayden Creek, Clinton (*CT-C1_004-SB*); SB; 0.01
Segment 3: LIS CB Inner - Clinton Harbor (*CT-C1_005*); SA; 0.14
Segment 4: LIS CB Shore - Clinton Beach, Clinton (*CT-C2_003*); SA; 0.52
Segment 5: LIS CB Shore - Outer Clinton Harbor (*CT-C2_004*); SA; 0.51
Segment 6: LIS CB Midshore - Duck Island area (*CT-C3_002*); SA; 3.62
Segment 7: LIS CB Midshore - Outer Clinton Harbor (*CT-C3_003*); SA; 2.52

Municipalities: Clinton

Designated Use Impairments: Shellfish

MS4 Applicable? Yes

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



impaired due to elevated bacteria concentrations, affecting the designated use of commercial shellfishing.

Segment 3: LIS CB Inner - Clinton Harbor (CT-C1_005) is a discontinuous segment that includes pieces from the upper Hammonasset River as well as the Indian and Hammock Rivers, Dudley Creek and other small tributaries, from SA/SB water quality line, US to saltwater limits.

Segment 4: LIS CB Shore - Outer Clinton Harbor (CT-C2_003) extends from the shoreline to approximately 1,000 feet offshore in Clinton and Westbrook, CT, from Kelsey Point to Grove Beach Point area (to Portside Drive, includes Patchogue River outlet).

Segment 5: LIS CB Shore - Outer Clinton Harbor (CT-C2_004) extends from the shoreline to approximately 1,000 feet offshore in Clinton, CT, from West Rock to Kelsey Point area, and includes Hammonasset, Indian, and Hammock River outlets.

Segments 6 and 7 in Central LIS begin approximately 1,000 feet offshore out to the 50-foot contour line. Segment 6: LIS CB Midshore - Duck Island area (CT-C3_002) is located in Clinton, along Clinton Beach, and includes Duck Island and Menunketesuck Island areas. Segment 7: LIS CB Midshore - Outer Clinton Harbor (CT-C3_003) is located in Clinton, along Clinton Harbor.

These impaired segments (Segments 3 – 7) of the Clinton 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.

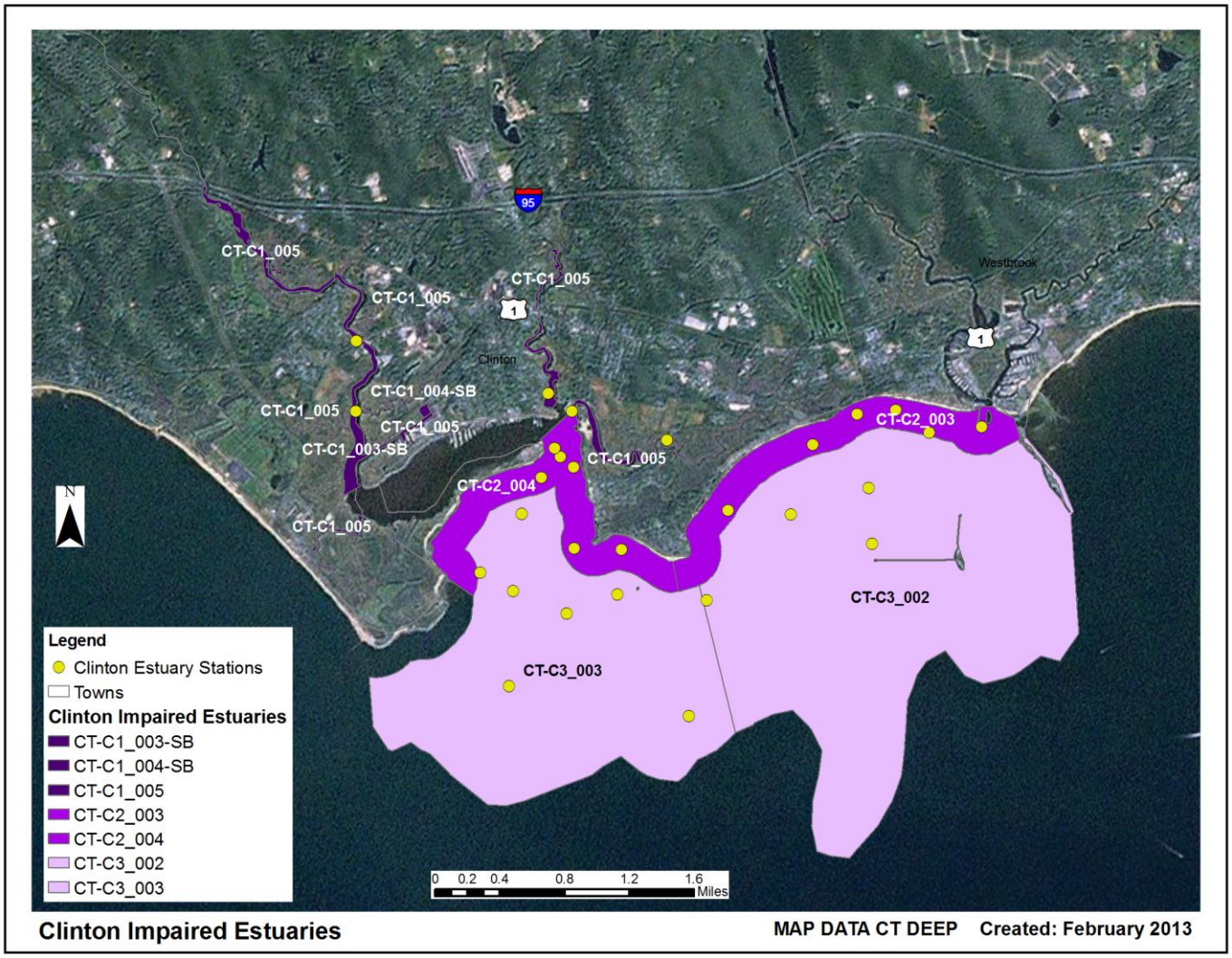
Table 1: Impaired segments in the Clinton Estuary from the Connecticut 2012 Integrated Water Quality Report

Waterbody ID	Waterbody Name	Location	Square Miles	Marine Aquatic Life	Recreation	Fish Consumption	Direct Shellfish	Commercial Shellfish
CT-C1_003-SB	LIS CB Inner-Hammonasset River, Clinton	Central portion of LIS, Inner Estuary, Hammonasset River SB water from mouth at inner Clinton Harbor, US to SA/SB water quality line between Currycross Road and RR track, Clinton.	0.07	U	U	FULL	///	NOT
CT-C1_004-SB	LIS CB Inner - Hayden Creek, Clinton	Central portion of LIS, Inner Estuary, Hayden Creek SB water from mouth at Hammonasset River (parallel with Pratt Road), US to saltwater limit near Maple Avenue (off Route 1), Clinton.	0.01	U	U	FULL	///	NOT

Waterbody ID	Waterbody Name	Location	Square Miles	Marine Aquatic Life	Recreation	Fish Consumption	Direct Shellfish	Commercial Shellfish
CT-C1_005	LIS CB Inner - Clinton Harbor (SA Inputs), Clinton	Central portion of LIS, Inner Estuary, (DISCONTINUOUS SEGMENT) SA water of upper Hammonasset, Indian, Hammock Rivers, Dudley Creek and other small tributaries, from SA/SB water quality line, US to saltwater limits, Clinton.	0.14	U	U	FULL	NOT	///
CT-C2_003	LIS CB Shore - Clinton Beach, Clinton	Central portion of LIS from Kelsey Point to Grove Beach Point area (to Portside Drive, includes Patchogue River outlet), out approximately 1000 ft offshore, Clinton/Westbrook.	0.52	U	U	FULL	NOT	///
CT-C2_004	LIS CB Shore - Outer Clinton Harbor, Clinton	Central portion of LIS from West Rock to Kelsey Point area (outer Clinton Harbor SA water includes Hammonasset, Indian, and Hammock River outlets, and Town Beach), out approximately 1000 ft offshore, Clinton.	0.51	U	FULL	FULL	NOT	///
CT-C3_002	LIS CB Midshore - Duck Island area, Clinton	Central portion of LIS from approximately 1000 ft offshore (Clinton Beach, includes Duck Island and Menunketesuck Island areas), out to 50 ft contour, Clinton.	3.62	FULL	U	FULL	NOT	///
CT-C3_003	LIS CB Midshore - Outer Clinton Harbor, Clinton	Central portion of LIS from approximately 1000 ft offshore (Clinton Harbor), out to 50 ft contour, Clinton.	2.52	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 Clinton Estuary



Shellfish Bed Classifications, Closures, and Lease Locations

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

Shellfish harvesting has been divided into two designated uses as specified in the Connecticut WQS: shellfish harvesting suitable for direct human consumption (Class SA waters), and shellfish harvesting

suitable for commercial operations requiring depuration or relay (Class SB waters). The impaired segments in the Clinton Estuary include both Class SA and SB waters.

Shellfish Bed Classifications and Closures in the Clinton Estuary

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

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

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

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

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

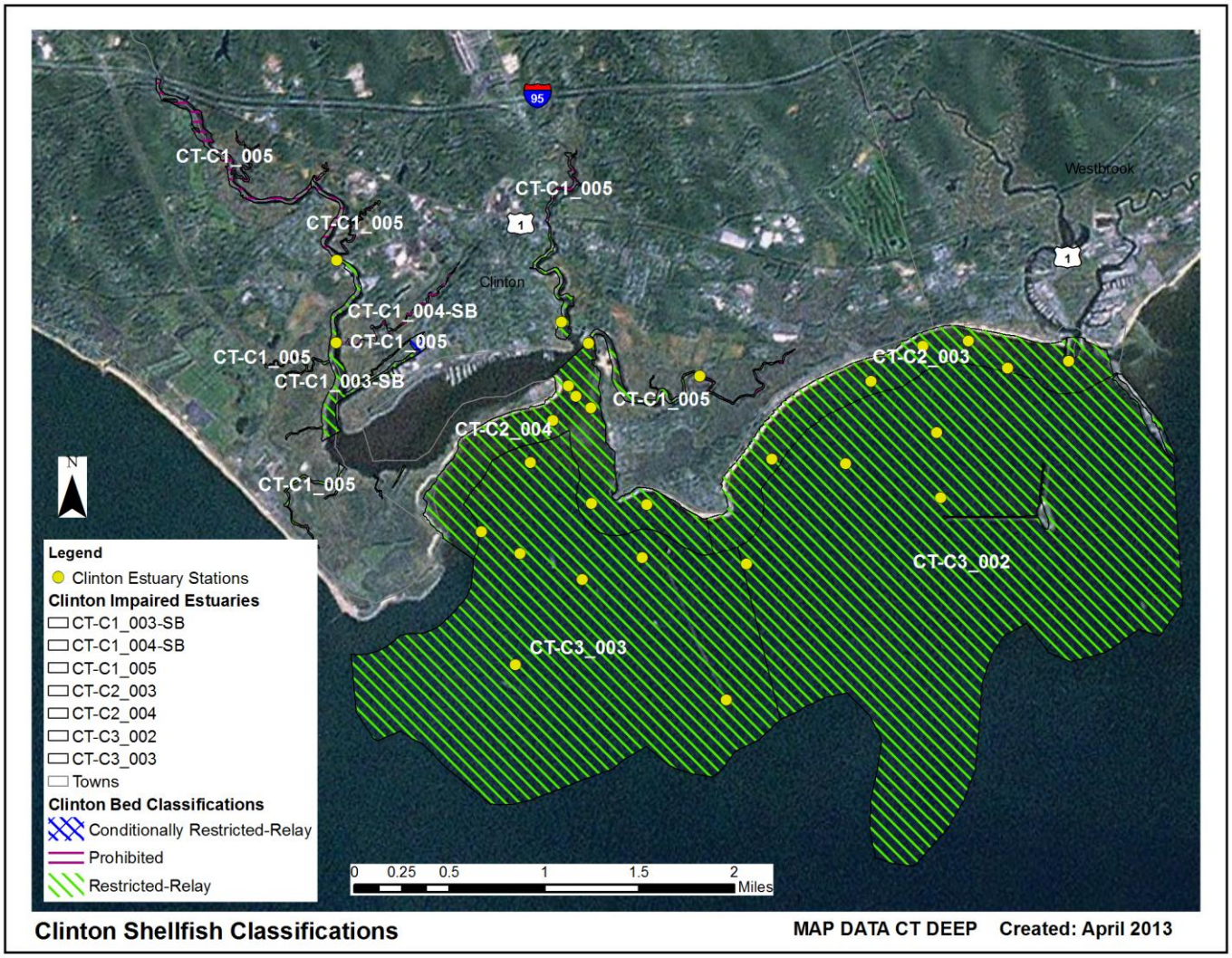
CONDITIONALLY RESTRICTED: Is a classification used to identify a growing area where a sanitary survey has found that the area meets the criteria for Restricted classification when the area is in the open status and meets the criteria for Prohibited classification when the area is in the closed status.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

PROHIBITED: Is a classification used to identify a growing area where there has been no current sanitary survey or where a sanitary survey has found that the area is adjacent to a sewage treatment plant or other point source outfall with public health significance; pollution sources may unpredictably contaminate the growing area; the growing area is contaminated with fecal waste so that the shellfish may be vectors for disease microorganisms; and/or that the concentration of biotoxin is sufficient to cause a

public health risk. Shellfish may not be harvested from Prohibited areas except for seed oystering or depletion of the areas.

As discussed above and shown in Table 1, Segments 1 – 7 did not meet their designated use for shellfish harvesting for direct and commercial consumption due to bacteria (Table 1). Segment 1 (CT-C1_003-SB) is Prohibited from commercial shellfish harvesting upstream and permitted by Restricted Relay/Depuration in the remainder of the segment. Segment 2 (CT-C1_004-SB) is Prohibited from commercial shellfish harvesting. Segment 3 (CT-C1_005) is Prohibited from direct shellfish harvesting upstream and permitted by Restricted Relay/Depuration in the remainder of the segment, with one small area permitted by Conditionally Restricted Relay. Segments 4 (CT-C2_003), 5 (CT-C2_004), 6 (CT-C3_002) and 7 (CT-C3_003) are permitted by Restricted Relay/Depuration.

Figure 2: GIS map featuring Shellfish Bed Classifications and Closures for the impaired segments in the Clinton Estuary



Shellfish Bed Lease Locations

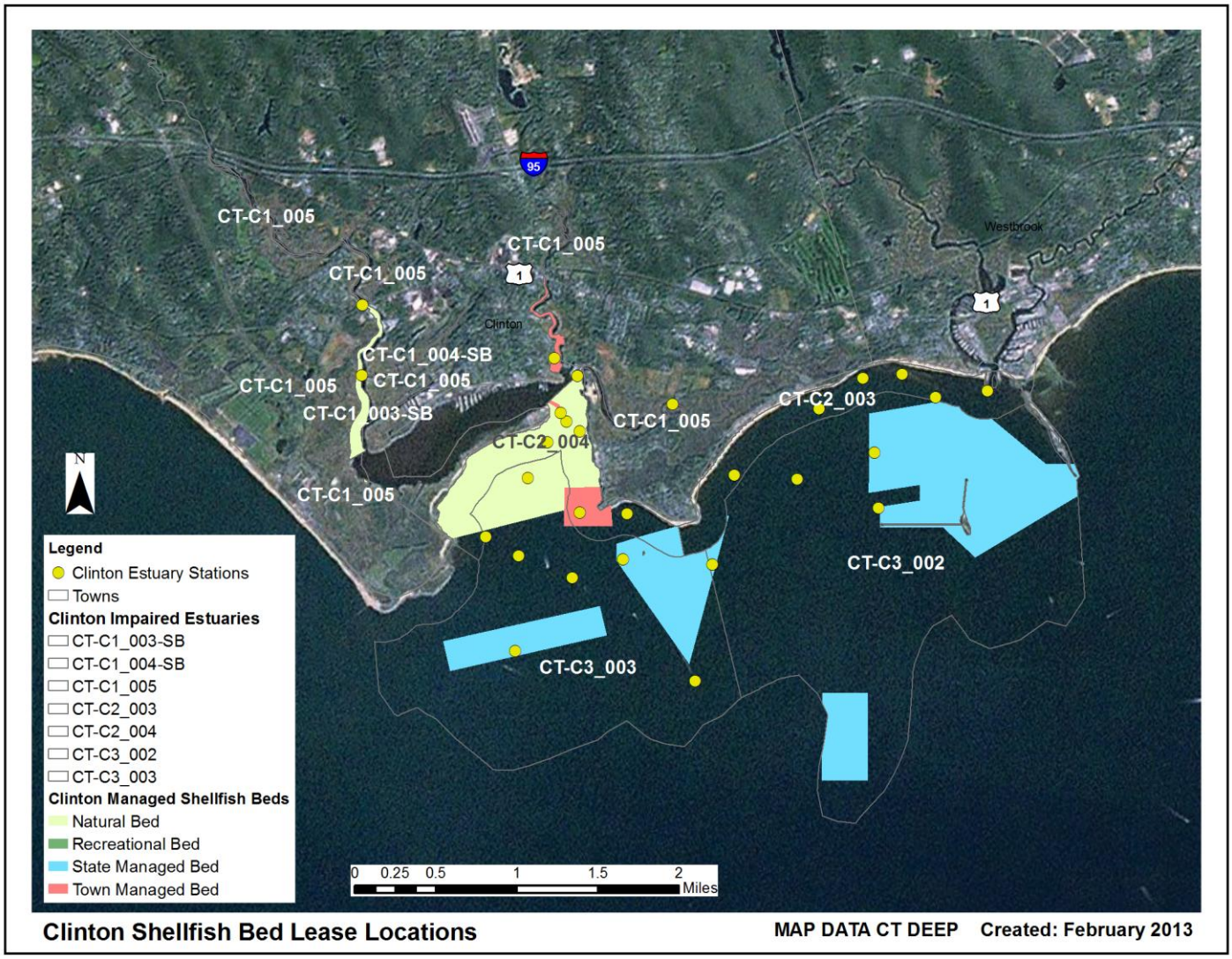
Shellfish beds in the Clinton Estuary are also classified by their management (Figure 3). CT DA/BA defines these areas as follows:

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-C1_003-SB), Segment 3 (CT-C1_005), Segment 5 (CT-C2_004) and Segment 6 (CT-C3_002) are natural beds. Segments 3 (CT-C1_005), 5 (CT-C2_004) and 6 (CT-C3_002) also contain portions that are Town Managed beds. Portions of shellfish beds in Segment 6 (CT-C3_002) and Segment 7 (CT-C3_003) are State-managed beds (Figure 3).

Figure 3: GIS map featuring Shellfish Bed Lease Locations for the impaired segments in the Clinton Estuary



WHY IS A TMDL NEEDED?

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

Segments 1 (CT-C1_003-SB) and 2 (CT-C1_004-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 one sampling location on Segment 1 and one sampling location on Segment 2 (Table 2). The water quality criteria for fecal coliform, along with bacteria sampling results from 2000 – 2011, are presented in Table 12. 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 and 2, where possible (Tables 12 and 13).

Segment 1 (CT-C1_003-SB): As shown in Table 12, 90% less than values did not exceed the WQS for fecal coliform in Segment 1 during the sampling period. Geometric mean values also exceeded the WQS for fecal coliform three years at Station 027-13.2 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 exceedances of WQS for fecal coliform during both wet-weather and dry-weather at both stations.

Segment 2 (CT-C1_004-SB): As shown in Table 13, 90% less than values exceeded the WQS for fecal coliform at least once at the station in Segment 1 during the sampling period. Geometric mean values also exceeded the WQS for fecal coliform four years at Station 027-13.1 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 WQS for fecal coliform during both wet-weather and dry-weather at both stations.

Segments 3 - 7 are Class SA saltwater waterbodies. Their applicable designated uses include shellfish harvesting for direct human consumption, recreation, habitat for marine fish and other aquatic life and wildlife, industrial water supply, and navigation. Water quality analyses were conducted using data from three sampling locations on Segment 3 (CT-C1_005), six sampling locations on Segment 4 (CT-C2_003), eight sampling locations on Segment 5 (CT-C2_004), four sampling locations on Segment 6 (CT-C3_002) and seven sampling locations on Segment 7 (CT-C3_003). The water quality criteria for fecal coliform, along with bacteria sampling results from 2000 – 2010, are presented in Tables 14 – 18. These segments of the estuary are impaired due to elevated bacteria concentrations, affecting the designated use of direct shellfishing.

Segment 3 (CT-C1_005): As shown in Table 14, geometric mean values exceeded the WQS for fecal coliform seven out of eight years for all three Stations during the sampling period. 90% less than values also exceeded the WQS for fecal coliform at least six years at all three Stations during the sampling period. Geometric means for data collected during the sampling period were also calculated for each station using wet and dry-weather conditions, resulting in exceedances of WQS for fecal coliform during wet-weather and dry-weather at all stations.

Segment 4 (CT-C2_003): As shown in Table 15, 90% less than values exceeded the WQS for fecal coliform at two of the sampling stations on the same date in 2008. The 90% less than value was also exceeded at a third station 3 times during the 2005-2008 sampling period. Geometric mean values never exceeded the WQS 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 WQS for fecal coliform at none of the stations under none of the conditions.

Segment 5 (CT-C2_004): As shown in Table 16, 90% less than values exceeded the WQS for fecal coliform multiple years at three of the eight Stations in Segment 3 during the sampling period. Geometric mean values exceeded the WQS multiple times for fecal coliform at two of the eight Stations in Segment 3 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 WQS for fecal coliform during wet-weather at three stations and during dry-weather at one station.

Segment 6 (CT-C3_002): As shown in Table 17, 90% less than values did not exceed the WQS for fecal coliform at any of the stations during the sampling period. Geometric mean values did exceed the WQS for fecal coliform at Station 027-10.1 in 2008 and at Station 027-11.0 in 2000 during the sampling period. Geometric means for data collected during the sampling period were also calculated for each station using wet and dry-weather conditions, resulting in no exceedance of the WQS for fecal coliform.

Segment 7 (CT-C3_003): As shown in Table 18, 90% less than values exceeded the WQS for fecal coliform multiple times at three of the seven stations in Segment 5 during the sampling period. Geometric mean values exceeded the WQS for fecal coliform once at Station 027-02.0 in 2000 and multiple times at Station 027-02.5 in 2001, 2002, and 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. Although there were geomean exceedances in individual years, geometric means for wet and dry-weather did not exceed the WQS for fecal coliform at any station.

Due to the elevated bacteria measurements presented in Tables 12 – 18, these five 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 Clinton Estuary

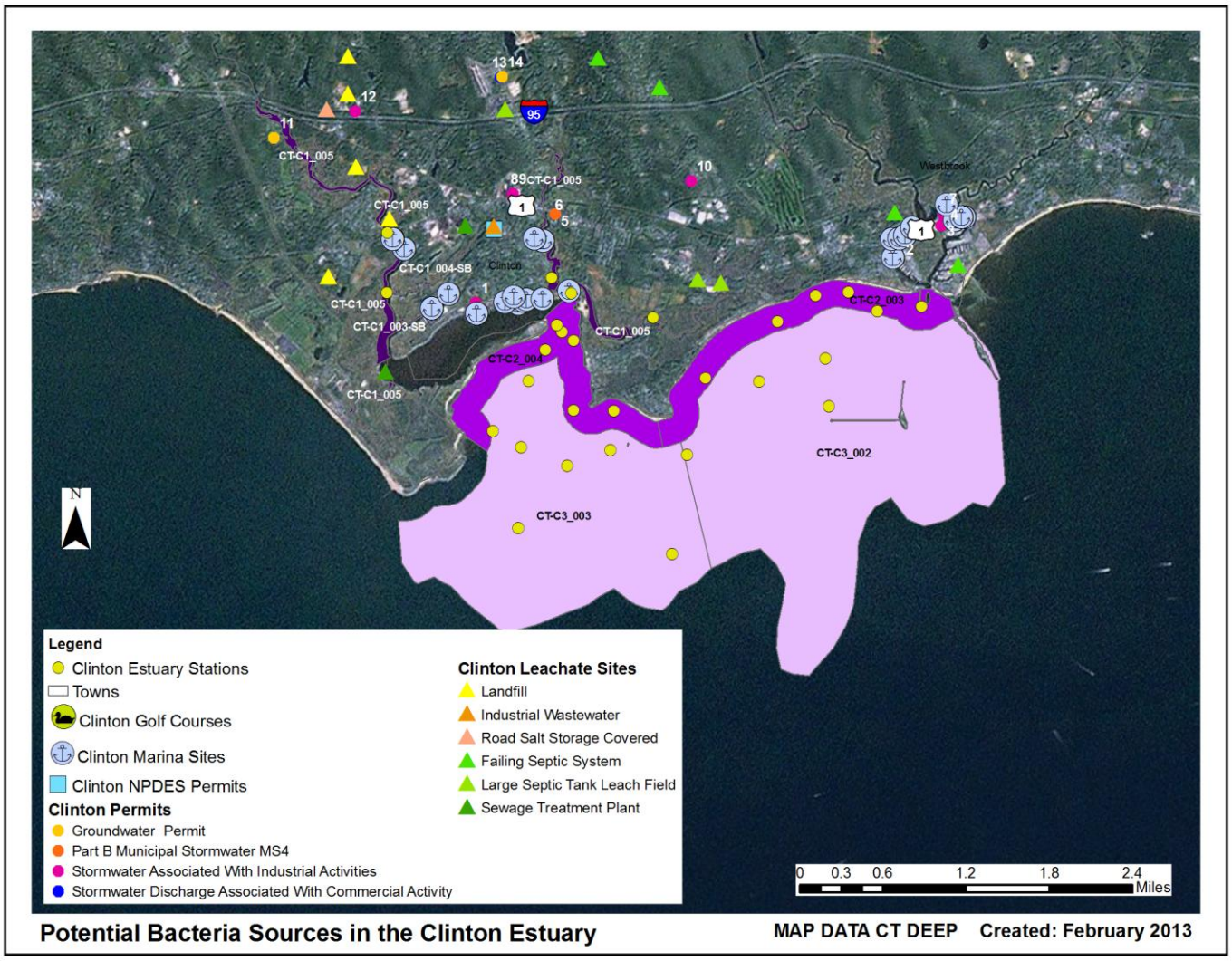
Waterbody ID	Station	Station Description	Municipality	Latitude	Longitude
CT-C1_003-SB	027-13.2	Hammonasset River	Clinton	41.2761	-72.5465
CT-C1_004-SB	027-13.1	Hammonasset River	Clinton	41.2698	-72.5466
CT-C1_005	027-12.4	Hammock R. at Beach Park Rd.	Clinton	41.2671	-72.5097
	027-12.6	Indian R.	Clinton	41.2713	-72.5237
	027-13.4	Indian River at Rt. 1			
CT-C2_003	027-08.0	Off Clinton Beach	Clinton	41.2608	-72.50245
	027-08.1	East End of Clinton Beach	Clinton	41.2667	-72.4923
	027-09.0	Off Grove Beach	Clinton	41.2694	-72.4871
	154-02.0		Westbrook	41.2677	-72.4786
	154-02.1		Westbrook	41.2698	-72.4825
	154-03.0		Westbrook	41.2682	-72.4724
CT-C2_004	027-02.1	off Hammock Pt.	Clinton	41.2575	-72.5207
	027-02.9	at N "12"	Clinton	41.2664	-72.5230
	027-05.0	E of Hammock Pt.	Clinton	41.2574	-72.5151
	027-12.1	Hammock R. at marina	Clinton	41.2697	-72.5210
	027-24.0		Clinton	41.2638	-72.5246
	027-25.0	Clinton Hbr.	Clinton	41.2638	-72.5246
	027-26.0		Clinton	41.2657	-72.5223
	027-27.0	off town beach	Clinton	41.2647	-72.5207
CT-C3_002	027-07.0	SE of Kelsey Pt.	Clinton	41.2528	-72.5050
	027-08.2	off Clinton Beach	Clinton	41.2604	-72.4950

Waterbody ID	Station	Station Description	Municipality	Latitude	Longitude
	027-10.0	midway between Grove Beach and W end of Duck Is. Breakwater	Clinton	41.2628	-72.4858
	027-11.0	at West end of Duck Is. Breakwater	Clinton	41.2578	-72.4854
CT-C3_003	027-01.0	outer Clinton Hbr	Clinton	41.2452	-72.5285
	027-02.0	S of G "3"	Clinton	41.2536	-72.5280
	027-02.3	North of West Rock	Clinton	41.2553	-72.5319
	027-02.5	at C "7"	Clinton	41.2606	-72.5269
	027-03.0	at N "2"	Clinton	41.2517	-72.5217
	027-04.0	W of Stone Is.	Clinton	41.2533	-72.5156
	027-06.0	S of breakwater	Clinton	41.2424	-72.5072

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 Clinton Estuary are presented in Table 3 and Figure 4. However, the list of potential sources is general in nature and should not be considered comprehensive. There may be other sources not listed here that contribute to the observed water quality impairment in the study segments. Further monitoring and investigation will confirm listed sources and discover additional ones. Some segments in this watershed are currently listed as unassessed by CT DEEP procedures. This does not mean that there are no data or impairments in existence in the segment. There are data from permitted sources for some segments, and CT DEEP recommends that any elevated concentrations found from those permitted sources be addressed through voluntary reduction measures. More detailed evaluation of potential sources is expected to become available as activities are conducted to implement these TMDLs.

Figure 4: Potential bacteria sources to the impaired segments in the Clinton Estuary



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

Table 3: Potential bacteria sources to the impaired segments in the Clinton Estuary

Segment #	Impaired Segment	Permit Source	Illicit Discharge	CSO/SSO Issue	Failing Septic System	Marinas	Stormwater Runoff	Nuisance Wildlife/Pets	Other
1	CT-C1_003-SB	x			x	x	x	x	
2	CT-C1_004-SB	x			x	x	x	x	
3	CT-C1_005	x			x	x	x	x	
4	CT-C2_003	x			x	x	x	x	
5	CT-C2_004	x			x	x	x	x	
6	CT-C3_002					x	x		
7	CT-C3_003	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 Clinton estuary is included in Table 5. Additional investigation and monitoring could reveal the presence of other discharges in the estuary.

Table 4: General categories list of permitted discharges

Permit Code	Permit Description Type	Number in Estuary
CT	Surface Water Discharges	0
GPL	Discharge of Swimming Pool Wastewater	0
GSC	Stormwater Discharge Associated with Commercial Activity	1
GSI	Stormwater Associated with Industrial Activity	9
GSM	Part B Municipal Stormwater MS4	1
GSN	Stormwater Registration – Construction	0
LF	Groundwater Permit	2
UI	Underground Injection	0

Permitted Sources

As shown in Table 5, there are multiple permitted discharges in Clinton and Westbrook that could be contributing bacteria to the impaired segments. These facilities include the Town of Clinton, Harry's Marine Repair, Inc., and multiple marinas throughout the watershed, in both Clinton and Westbrook. These include Cedar Island Marina, Clinton Yacht Haven Clinton Harbor Marine Basin, Port Clinton Marina, Harborside Marina, Old Harbor Marina, Lang's Dock, and River's Edge Marina. As shown in Table 6, there are water quality data available for some of these discharges. Although this data cannot be compared to the WQS as there is no single sample shellfish standard for fecal coliform, several samples were high, exceeding 2,000 colonies/100 mL or had results "too numerous to count" (TNTC), including Cedar Island Marina (GSI000401), National Sintered Alloys (GSI000605), and Unilever (GSI000808) (Table 6).

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

Table 5: Permitted facilities in or near Clinton and Westbrook, CT that may be affecting the Clinton Estuary

Town	Client	Permit ID	Permit Type	Site Name	Address	Map #
Clinton	Chelsea GCA Realty Partnership, LP	GSC000106	Stormwater Discharge Associated With Commercial Activity	Clinton Crossing	20 Killingworth Tpke	13
Clinton	Mallace Industries Corp	GSI000308	Stormwater Associated With Industrial Activities	American Coated Products	1 Heritage Park Road	10
Clinton	Cedar Island Marina, Inc.	GSI000401	Stormwater Associated With Industrial Activities	Cedar Island Marina	34 Riverside Dr	1
Clinton	Unilever Home & Personal Care	GSI000808	Stormwater Associated With Industrial Activities	Conopco, Inc. D/B/A Unilever Home & Personal Care	1 John St	8
Clinton	Town Of Clinton	GSI001486	Stormwater Associated With Industrial Activities	Clinton Transfer Station	117 Nod Rd	12
Clinton	Unilever Home & Personal Care	GSI002281	Stormwater Associated With Industrial Activities	Conopco, Inc. D/B/A Unilever Home & Personal Care	1 John St	9
Clinton	Town Of Clinton	GSM000074	Part B Municipal Stormwater Ms4	Town Of Clinton	54 E Main St	6
Clinton	Cpg Partners, L.P.	UI0000296	Groundwater Permit	Clinton Crossing Premium Outlets	20-A Killingworth Turnpike	14

Town	Client	Permit ID	Permit Type	Site Name	Address	Map #
Madison	Margolis-Barkon Realty Company	UI0000010	Groundwater Permit	Strathmore Farms Association, Inc.	River Road	11
Westbrook	Harry's Marine Repair, Inc.	GSI000462	Stormwater Associated With Industrial Activities	38 Hammock Dock Road	38 Hammock Rd S	3
Westbrook	Pier 76, Inc.	GSI000496	Stormwater Associated With Industrial Activities	Pier 76, Inc.	54 Old Boston Post Rd	7
Westbrook	Ritt's Marine Center	GSI001527	Stormwater Associated With Industrial Activities	Ritt'S Marine Center	533 Boston Post Rd	4
Westbrook	Pilot's Point Marina, Inc.	GSI002132	Stormwater Associated With Industrial Activities	Brewer Pilots Point Marina - North Yard	333 Boston Post Rd	2

Table 6: Industrial permits affecting the Clinton 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
Clinton	Cedar Island Marina	GSI000401	LI Sound	lift well	11/14/00	100
Clinton	Cedar Island Marina	GSI000401	LI Sound	F dock CB#2	02/27/02	100
Clinton	Cedar Island Marina	GSI000401	LI Sound	CB#2 btwn F&O dock	10/11/02	tntc
Clinton	Cedar Island Marina	GSI000401	LI Sound	H Dock	07/11/03	6,900
Clinton	Cedar Island Marina	GSI000401	LI Sound	H Dock	07/11/03	2,900
Clinton	National Sintered Alloys	GSI000605	LI Sound	outfall #1	09/19/00	100
Clinton	National Sintered Alloys	GSI000605	LI Sound	outfall #2	09/19/00	100
Clinton	National Sintered Alloys	GSI000605	LI Sound	outfall #3	09/19/00	100
Clinton	National Sintered Alloys	GSI000605	LI Sound	roof drain #1	09/19/00	100
Clinton	National Sintered Alloys	GSI000605	LI Sound	outfall #1	12/14/01	2,300
Clinton	National Sintered Alloys	GSI000605	LI Sound	outfall #2	12/14/01	100
Clinton	National Sintered Alloys	GSI000605	LI Sound	outfall #3	12/14/01	100

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
Clinton	National Sintered Alloys	GSI000605	unnamed stream to LIS	358 01-OF1	09/26/02	300
Clinton	National Sintered Alloys	GSI000605	unnamed stream to LIS	358 01-OF2	09/26/02	100
Clinton	National Sintered Alloys	GSI000605	unnamed stream to LIS	358 01-OF3	09/26/02	100
Clinton	Unilever	GSI000808	trib to Hammonasett River	roof drain	08/14/00	100
Clinton	Unilever	GSI000808	trib to Hammonasett River	pkng lot	08/14/00	300
Clinton	Unilever	GSI000808	trib to Hammonasett River	pkng lot-location #1	07/26/01	tntc
Clinton	Unilever HPC	GSI000808	Hammonasett River	WWTP Storm Drain	08/20/02	100
Clinton	Unilever HPC	GSI000808	trib to Hammonasett River	WWTP Storm Drain	07/23/03	700

Municipal Stormwater Permitted Sources

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

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

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

While it is possible that CT DEEP will be expanding the reach of the MS4 program to include UC municipalities in the near future they are not currently under the permit. However, the GIS layers used to create the MS4 maps in this Statewide TMDL did include both UA and UC blocks. This factor creates some municipalities that appear to be within an MS4 program that are not currently regulated through an

MS4 permit. This oversight can explain a municipality that is at least partially shaded grey in the maps and there are no active MS4 reporting materials or information included in the appropriate appendix. While these areas are not technically in the MS4 permit program, they are still considered urban by the cluster definition above and are likely to contribute similar stormwater discharges to affected waterbodies covered in this TMDL.

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

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

The impaired segments of the Clinton Estuary are located within the Town of Clinton. Clinton has designated urban areas, as defined by the U.S. Census Bureau and is required to comply with the General Permit for the Discharge of Stormwater from Small Municipal Storm Sewer Systems (MS4 permit) issued by CT DEEP (Figure 5). This general permit is only applicable to municipalities that are identified in Appendix A of the MS4 permit that contain designated urban areas and discharge stormwater via a separate storm sewer system to surface waters of the State. The permit requires municipalities to develop a Stormwater Management Plan (SMP) to reduce the discharge of pollutants as well as protect water quality. The MS4 permit is discussed further in the "TMDL Implementation Guidance" section of the core TMDL document. Additional information regarding stormwater management and the MS4 permit can be obtained on CTDEEP's website (http:// www.ct.gov/deep/stormwater).

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

Figure 5: MS4 areas near the Clinton Estuary

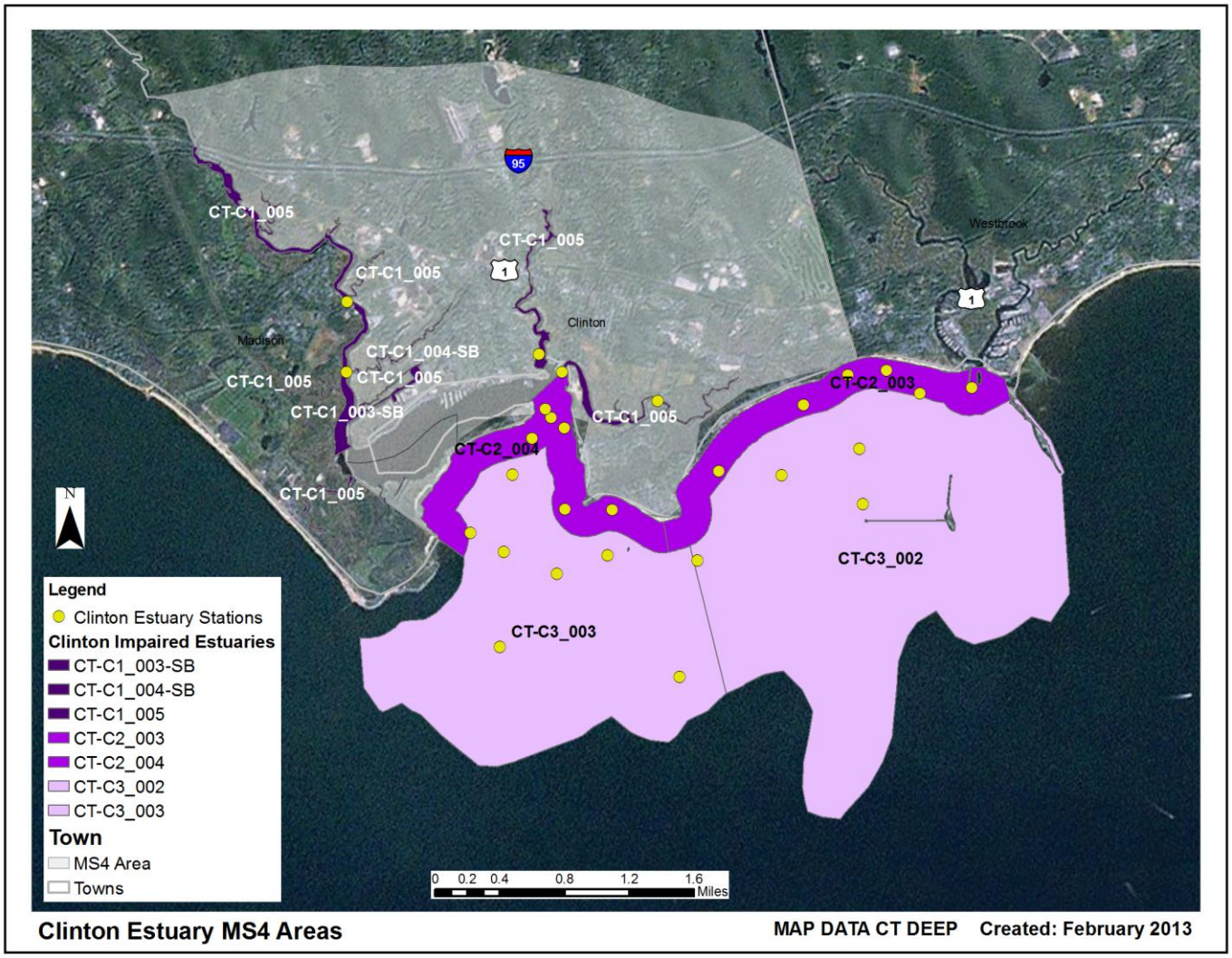


Table 7: List of MS4 sample locations and *E. coli* (colonies/100 mL) results in the Clinton Estuary. The results cannot be compared to the water quality standard as there is no single sample shellfish standard for *E. coli*.

Town	Location	MS4 Type	Receiving Waters	Sample Date	Result
Clinton	R10(CL), off end of Morgan Parks Cul-de-sac	Residential	South Central Shoreline	11/08/06	>4000
Clinton	R10(CL), off end of Morgan Parks Cul-de-sac	Residential	South Central Shoreline	12/13/06	>2000
Clinton	R10(CL), off end of Morgan Parks Cul-de-sac	Residential	South Central Shoreline	09/11/07	>2000
Clinton	R10(CL), off end of Morgan Parks Cul-de-sac	Residential	South Central Shoreline	10/19/2011	710
Clinton	R10(CL), off end of Morgan Parks Cul-de-sac	Residential	South Central Shoreline	10/27/2011	190

Town	Location	MS4 Type	Receiving Waters	Sample Date	Result
Clinton	R20(CL) Meadowview Rd cul-du-sac	Residential	Indian River	11/08/06	>4000
Clinton	R20(CL) Meadowview Rd cul-du-sac	Residential	Indian River	12/13/06	100
Clinton	R20(CL) Meadowview Rd cul-du-sac	Residential	Indian River	09/11/07	400
Clinton	R20(CL) Meadowview Rd cul-du-sac	Residential	Indian River	10/19/2011	19860
Clinton	R20(CL) Meadowview Rd cul-du-sac	Residential	Indian River	10/27/2011	820
Clinton	R30(CL) Dellwood, north bend before cul-du-sac	Residential	Menuketesuck River	11/08/06	>4000
Clinton	R30(CL) Dellwood, north bend before cul-du-sac	Residential	Menuketesuck River	12/13/06	320
Clinton	R30(CL) Dellwood, north bend before cul-du-sac	Residential	Menuketesuck River	09/11/07	>2000
Clinton	R30(CL) Dellwood, north bend before cul-du-sac	Residential	Menuketesuck River	10/19/2011	2060
Clinton	R30(CL) Dellwood, north bend before cul-du-sac	Residential	Menuketesuck River	10/27/2011	70
Clinton	R40(CL) Waterside Lane, west side through retaining wall	Residential	South Central Shoreline	11/08/06	>4000
Clinton	R40(CL) Waterside Lane, west side through retaining wall	Residential	South Central Shoreline	12/13/06	>2000
Clinton	R40(CL) Waterside Lane, west side through retaining wall	Residential	South Central Shoreline	09/11/07	>2000
Clinton	R40(CL) Waterside Lane, west side through retaining wall	Residential	South Central Shoreline	10/19/2011	1020
Clinton	R40(CL) Waterside Lane, west side through retaining wall	Residential	South Central Shoreline	10/27/2011	1500
Clinton	R60(CL) Woods Lane @ stream on S side	Residential	Menuketesuck River	11/08/06	>4000
Clinton	R60(CL) Woods Lane @ stream on S side	Residential	Menuketesuck River	12/13/06	60
Clinton	R60(CL) Woods Lane @ stream on S side	Residential	Menuketesuck River	09/11/07	>2000

Town	Location	MS4 Type	Receiving Waters	Sample Date	Result
Clinton	R60(CL) Woods Lane @ stream on S side	Residential	Menuketesuck River	10/19/2011	930
Clinton	R60(CL) Woods Lane @ stream on S side	Residential	Menuketesuck River	10/27/2011	790
Clinton	R80(CL) Ben Merrill Road, Indian River South side, West side RCP	Residential	Indian River	11/08/06	>4000
Clinton	R80(CL) Ben Merrill Road, Indian River South side, West side RCP	Residential	Indian River	12/13/06	60
Clinton	R80(CL) Ben Merrill Road, Indian River South side, West side RCP	Residential	Indian River	09/11/07	>2000
Clinton	R80(CL) Ben Merrill Road, Indian River South side, West side RCP	Residential	Indian River	10/19/2011	910
Clinton	R80(CL) Ben Merrill Road, Indian River South side, West side RCP	Residential	Indian River	10/27/2011	40

Publicly Owned Treatment Works

According to the 2011 Clinton Estuary Report, there are no water pollution control facilities (WPCFs) in Clinton, public or private

Non-point Sources

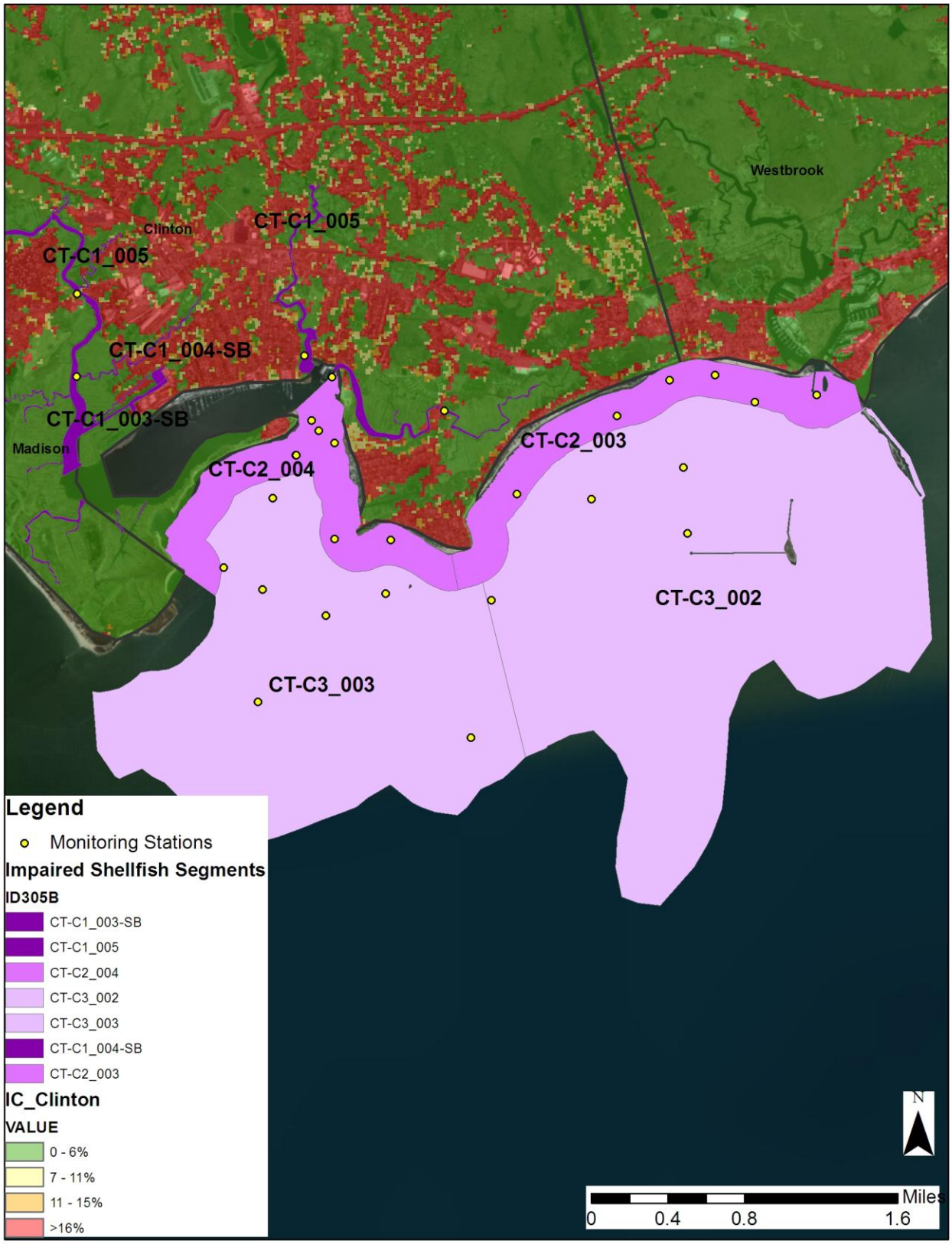
Non-point source (NPS) pollution comes from many diffuse sources and is more difficult to identify and control. NPS pollution is often associated with certain land-use practices. Examples of NPS that can contribute bacteria to surface waters include stormwater runoff, illicit discharges, insufficient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

Stormwater Runoff from Developed Areas

The Towns of Clinton and Westbrook feature some smaller areas of heavy development with greater than 16% 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). Coastal land bordering the Clinton Estuary in Clinton especially along segment (CT-C2_004) features development of >16% impervious cover. Westbrook has >16% impervious surface along the coastline, tracking route 1 (Figure 6). Also, stations located on Segments (CT-C1_003-SB), (CT-C1_004-SB), (CT_C1_005), (CT-C2_004), and (CT-C3_003) 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 Clinton and Westbrook



Illicit Discharges and Insufficient Septic Systems

As indicated in the 2011 Clinton Estuary report, there is no WPCF in Clinton; all properties are served by subsurface sewage disposal systems. 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. According to the 2011 Clinton Estuary Report, there is an active Shellfish Commission in Clinton. The Commission does not have a current Shellfish Management Plan, but is currently working to have a town recreational area opened. The Shellfish Commission assists in collection of water samples from this portion of the proposed Conditional Area. A sanitary survey of the impacted area was done by the CT River Area Health District in 2009. No septic system failures were found. After tropical storm Irene the Health District did another walk over survey of the Clinton shoreline and found damaged homes and septic systems. Repairs and follow-up work must be completed before an upgrade in shellfish water classification can be considered. The town has oyster restoration aquaculture projects in several rivers and several commercial operations have leased grounds in both State and town jurisdictional waters for aquaculture purposes.

Wildlife and Domestic Animal Waste

Wildlife, including waterfowl, and domestic animals within the municipality of Clinton, 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. With the construction of roads and drainage systems, wastes from these waterfowl may no longer be retained on the landscape, but instead may be conveyed via stormwater to the nearest surface waterbody. As such, physical land alterations can exacerbate the impact of these natural sources on water quality (USEPA, 2001).

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.

As indicated previously, portions of Clinton and to a lesser degree Westbrook, feature heavily developed areas with commercial and residential properties. As such, waste from domestic animals, such as dogs, may also be contributing to bacteria concentrations in some of the impaired segments in the Clinton Estuary.

Marinas

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

to the New York state boundary. In these waters the discharge of any sewage from any vessel is prohibited.

As noted previously, multiple marinas are located within the Clinton Estuary, particularly in Clinton Harbor (Figure 4 and Table 5). Marinas are located at the water's edge, and if no measures are taken to reduce pollutants, including buffering, pollutants can be transported via runoff from parking lots and hull maintenance areas directly into the marina basin. Common pollutants from marinas include bacteria and nutrients from stormwater runoff, solid and liquid materials used in boat maintenance and cleaning, fuel and oil, sewage from public restrooms and boat pump-outs, fish waste, and turbidity from boating activities. The CT DEEP has information on regional pump-out boats and facilities at its website, http://www.ct.gov/dep/cwp/view.asp?a=2705&q=323708&depNav_GID=1711. There are three marine pump-out facilities located in Clinton. Most services are free and eliminate the possibility of vessels dumping raw wastes into Long Island Sound, which is prohibited by CT Water Quality Standards Number 24, "the discharge of sewage from any vessel to any water is prohibited."

Recreation

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

Additional Sources

According to the 2011 Clinton Estuary Report, tropical storm Irene in August of 2011 caused extensive damage to the shoreline of CT exposing septic systems, cesspools and destroying homes. The CT River Area Health District did a walk over of shoreline properties after the storm and found extensive damage to septic systems and existing cesspools that were unknown to exist prior to the storm. Based on this information, the DA/BA recommended that systems should be repaired and upgraded before any more work could be done to upgrade current shellfish classifications.

There may be other sources not listed here or identified in Figure 4 that contribute to the observed water quality impairments in the Clinton 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.

Town Of Clinton WPCC 1995-96 results

The Town of Clinton generated fecal coliform data in 1995 and 1996 at a number of groundwater and surface water monitoring locations. There were 12 groundwater wells and as many as 31 surface water grab sample locations. The data from these efforts are included in Table 11 of this document purely as additional information. No load calculations were created utilizing this information. The stations utilized in the 95-96 project may provide useful in determining source tracking efforts as implementation efforts are started in regard to this TMDL document. Actual station locations can be obtained by interested parties by contacting CT DEEP staff.

Current Management Activities

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

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

The sanitary survey includes data and results from the following:

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

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

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

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

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

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

The most recent triennial re-evaluation for the Shellfish Growing Waters in the Town of Clinton was published in 2011 (Clinton, 2011). According to this report, based on the available data and information Clinton shellfishing waters are properly classified and no upgrades are warranted at this time.

Other efforts have been taken by Clinton to reduce bacteria to its surface waters. As indicated previously, Clinton is regulated under the MS4 program. The MS4 General Permit is required for any municipality with urbanized areas that initiates, creates, originates or maintains any discharge of stormwater from a storm sewer system to waters of the State. The MS4 permit requires towns to design a Stormwater Management Plan (SMP) that reduces the discharge of stormwater pollutants to improve water quality. The plan must address the following six minimum measures:

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

Each municipality is also required to submit an annual update outlining steps taken to meet the six minimum measures. The most recent updates that address bacterial contamination in the watershed are summarized in Table 8.

Table 8: Summary of MS4 requirement updates related to the reduction of bacterial contamination from Clinton, CT (Permit # GSM000074)

Minimum Measure	Clinton Annual Report (2011)
Public Outreach and Education	1) Continued to make the State of Connecticut Department of Public Health pamphlet entitled "*Healthy Homes: Avoiding Chemicals in Your Yard and Garden"* available to the public at the front entrance to Town Hall.
Public Involvement and Participation	1)The Town of Clinton website contained a Connecticut River Estuary Regional Planning Agency tab and an Internet Resource List. 2) Continued to involve Town residents in the Household Hazardous Waste Program, the Electronics Collection Program, the Recycling Program and the Bulky Waste Program.
Illicit Discharge Detection and Elimination	1) Repairs to failing subsurface sewage disposal systems. 2) Began process of enacting an Illicit Discharge Detection & Elimination (IDDE) Ordinance
Construction Site Stormwater Runoff Control	1) The Town's Zoning Enforcement Officer/Wetland Enforcement Office conducted periodic construction inspections of erosion control measures for approved subdivisions and site plans.

Minimum Measure	Clinton Annual Report (2011)
	2) Retained Nathan L. Jacobson & Associates, Inc. to review Subdivision Plan, Site Development Plans and Soil Erosion and Sediment Control Plans for larger subdivisions and commercial developments, as well as to conduct periodic construction inspections during subdivision road construction and site development construction.
Post Construction Stormwater management	1) Retained Nathan L. Jacobson & Associates, Inc. to review stormwater runoff management plans for large land developments.
Pollution Prevention and Good Housekeeping	1) The Town of Clinton subcontracted the annual catch basin cleaning. The town inventoried all town owned drainage structures including swales and cross culverts and began the process of cleaning and upgrading where appropriate. 2) The Town Beach was raked weekly from Memorial Day to Labor Day.

RECOMMENDED NEXT STEPS

Clinton has 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 – 5 in the Clinton Estuary and have been prioritized below.

1) Continue monitoring of permitted sources.

There are at least 14 permitted sources in the Clinton Estuary, some of which have shown historically high bacteria concentrations. Further monitoring will provide information essential to better locate, understand, and reduce pollution sources. If any current monitoring is not done with appropriate bacterial indicator based on the receiving water, then a recommended change during the next permit reissuance is to include the appropriate indicator species. If facility monitoring indicates elevated bacteria, then implementation of permit is required, and any voluntary measures to identify and reduce sources of bacterial contamination at the facility are also recommended. Regular monitoring should be established for all permitted sources to ensure compliance with permit requirements and to determine if current requirements are adequate or if additional measures are necessary for water quality protection.

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

Tables 9 and 10 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 Clinton Estuary.

For any municipality subject to an MS4 permit and affected by a TMDL, the permit requires a modification of the SMP to include BMPs that address the included impairment. In the case of bacteria related impairments municipal BMPs could include: implementation or improvement to existing nuisance wildlife programs, septic system monitoring programs, any additional measures that can be added to the required illicit discharge detection and elimination (IDDE) programs, and increased street sweeping above basic permit requirements. Any non-MS4 municipalities can implement these same types of initiatives in effort to reduce bacteria source loading to impaired waterways.

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

Table 9. Bacteria (Enterococci) TMDLs, WLAs, and LAs for Recreational Uses.

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

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

(1) **Designated Swimming.** Procedures for monitoring and closure of bathing areas by State and Local Health Authorities are specified in: Guidelines for Monitoring Bathing Waters and Closure Protocol, adopted jointly by the Department of Environmental Protections and the Department of Public Health. May 1989. Revised April 2003 and updated December 2008.

(2) **Non-Designated Swimming.** Includes areas otherwise suitable for swimming but which have not been designated by State or Local authorities as bathing areas, waters which support tubing, water skiing, or other recreational activities where full body contact is likely.

(3) **All Other Recreational Uses.**

(4) Criteria for the protection of recreational uses in Class B waters do not apply when disinfection of sewage treatment plant effluents is not required consistent with Standard 23. (Class B surface waters located north of Interstate Highway I-95 and downstream of a sewage treatment plant providing seasonal disinfection May 1 through October 1, as authorized by the Commissioner.)

(5) Human direct discharge = swimmers

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

(7) Replace numeric value with "natural levels" if only source is naturally occurring wildlife. Natural is defined as the biological, chemical and physical conditions and communities that occur within the environment which are unaffected or minimally affected by human influences (CT DEEP 2011a). Sections 2.2.2 and 6.2.7 of this Core Document deal with BMPs and delineating type of wildlife inputs.

Table 10: Bacteria (Fecal Coliform) TMDLs, WLAs, and LAs for Shellfish Harvesting Areas.

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

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

(2) Human direct discharge = swimmers

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

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

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

(6) Replace numeric value with "natural levels" if only source is naturally occurring wildlife. Natural is defined as the biological, chemical and physical conditions and communities that occur within the environment which are unaffected or minimally affected by human influences (CT DEEP 2011a). Sections 2.2.2 and 6.2.7 of this Core Document deal with BMPs and delineating type of wildlife inputs.

2) Identify areas in Madison, Clinton, and Westbrook to implement Best Management Practices (BMPs) to control stormwater runoff.

As noted previously, much of the coastal land in the center of the Clinton Estuary has impervious cover greater than 12% and some of the impaired segments (CT-C1_004-SB and CT-C1_005) are surrounded by >16% impervious cover. The Towns contain urban areas regulated under the MS4 program. As such,

stormwater runoff is likely contributing bacteria to the Clinton 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 Clinton Estuary. To treat stormwater runoff, the towns should identify areas along the developed sections of the impaired segments to install BMPs designed to encourage stormwater to infiltrate the ground before entering the waterbodies. These BMPs would disconnect impervious areas and reduce pollutant loads to the estuary. More detailed information and BMP recommendations can be found in the core TMDL document established in September 2012 and available at http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/ct_bacteria_coredoc_tmdl.pdf.

3) Develop a system to monitor septic systems.

The majority of residents near the Clinton Estuary rely on septic systems. If not already in place, Clinton should establish a program to ensure that existing septic systems are properly operated and maintained. For instance, communities can create an inventory of existing septic systems through mandatory inspections. Inspections help encourage proper maintenance and identify failed and sub-standard systems. Policies that govern the eventual replacement of the sub-standard systems within a reasonable timeframe could be adopted. Municipalities can also develop programs to assist citizens with the replacement and repair of older and failing systems.

4) 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 Clinton 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.

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

Marinas must comply with permit requirements that limit bacteria contribution to the Clinton Estuary. Other programs, such as Connecticut's Clean Marina Program, may also be adopted by all marinas in the estuary to reduce bacteria contribution from non-point source pollution from marinas (http://www.ct.gov/dep/cwp/view.asp?a=2705&q=323530&depNav_GID=1635). The Clean Marina Program is a voluntary program that encourages inland and coastal marina operators to minimize pollution, and recognizes Connecticut marinas, boatyards, and yacht clubs that go above and beyond regulatory compliance as "Certified Clean Marinas." All certified marinas receive a weatherproof Clean Marina Flag to fly at their facility and authorization to use the Clean Marina Program logo on company publications. CT DEEP recognizes certified Clean Marinas through press releases, on its web page, and at public events. As a companion to the Clean Marina Program, the Clean Boater Program encourages boaters to use clean boating techniques when operating and maintaining their boats.

HISTORICAL SUPPLEMENTAL DATA

TABLE 11. TOWN OF CLINTON WATER POLLUTION CONTROL COMMISSION 1995-96 SURFACE AND GROUNDWATER SAMPLING RESULTS (FECAL COLIFORM)

Town of Clinton WPCC // Study of Fecal Coliform Bacteria (colonies/mL)							
		3/30/1995	*6/12/1995*	*10/2/1995*	*12/27/1995*	*3/27/1996*	*9/27/1996*
Groundwater	*MW-1*	1800	50	50	50	50	50
Groundwater	*MW-2*	1200	50	50	2100	50	50
Groundwater	*MW-4*	1100	50	50	50	50	50
Groundwater	*MW-5*	50	50	50	50	50	50
Groundwater	*MW-6*	50	50	50	50	50	50
Groundwater	*MW-7*	50	50	50	50	50	50
Groundwater	*MW-8*	50	50	50	50	50	
Groundwater	*MW-9*	50	50		50	50	
Groundwater	*MW-10*	50	2000		300	300	
Groundwater	*MW-11*	50	50		50	50	
Groundwater	*MW-12*	50	50		50	50	
Surface Water	*Site #3*	50	50	1300	50	50	1100
Surface Water	*Site #5*	50	3500		50	50	800
Surface Water	*Site #9*	1500	3100	50	50	50	
Surface Water	*Site #13*	50	200		50	50	50
Surface Water	*Site #16*	700	TNTC		50	800	4000
Surface Water	*Site #21*	100	1000	50	50	50	
Surface Water	*Site #22*	TNTC	TNTC	2200	3200	30000	100
Surface Water	*Site #23*	50	100	400	50	50	
Surface Water	*Site #25*	50	200	200	50	50	
Surface Water	*Site #28*			50	50	50	
Surface Water	*Site #29*	50	700	100	50		
Surface Water	*Site #30*					50	5000
Surface Water	*Site #31*	50	100		50	100	
Surface Water	*Site #32*		200	100	50	50	50

BACTERIA DATA AND PERCENT REDUCTIONS TO MEET THE TMDL

Table 12: Segment 1: LIS CB Inner - Hammonasset River Bacteria Data

Waterbody ID: CT-C1_003-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: 48.5%
90% of Samples Less Than: 90%

Data : 2000 – 2010 from CT DEEP target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS CB Inner – Hammonasset River, Clinton (CT-C1_003-SB) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-13.2	Hammonasset River, Clinton	1/12/2000	54	Dry	88.3	n/a
027-13.2	Hammonasset River, Clinton	2/15/2000	179	Dry		
027-13.2	Hammonasset River, Clinton	3/21/2000	8.7	Dry		
027-13.2	Hammonasset River, Clinton	8/16/2000	258	Dry		
027-13.2	Hammonasset River, Clinton	9/21/2000	248	Dry		
027-13.2	Hammonasset River, Clinton	2/20/2001	8.6	Dry	8.6	n/a
027-13.2	Hammonasset River, Clinton	1/16/2002	54	Dry	49.5	n/a
027-13.2	Hammonasset River, Clinton	5/6/2002	8.7	Dry		
027-13.2	Hammonasset River, Clinton	10/28/2002	258	Dry		
027-13.2	Hammonasset River, Clinton	11/24/2003	88	Dry	88	n/a
027-13.2	Hammonasset River, Clinton	5/22/2006	25	Dry	65.4	n/a
027-13.2	Hammonasset River, Clinton	10/18/2006	171	Wet		
027-13.2	Hammonasset River, Clinton	11/7/2007	82	Wet	36.2	n/a
027-13.2	Hammonasset River, Clinton	11/29/2007	16	Dry		
027-13.2	Hammonasset River, Clinton	8/31/2009	171	Dry	171	n/a
027-13.2	Hammonasset River, Clinton	9/29/2009	171	Wet		
027-13.2	Hammonasset River, Clinton	12/15/2010	62	Wet	62	n/a

Shaded cells indicate an exceedance of water quality criteria

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

100/n = P%

(P%) *E = PE **90 – PE = (RG)** **Where: n = # of samples** **E = # of samples that did not exceed criteria**

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS CB Inner – Hammonasset River, Clinton (CT-C1_003-SB)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
027-13.2	Hammonasset River, Clinton	2000-2011	4	11	64	110	55
Shaded cells indicate an exceedance of water quality criteria							

Table 13: Segment 2: LIS CB Inner - Hayden Creek Bacteria Data

Waterbody ID: CT-C1_004-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: 60%

90% of Samples Less Than: 90%

Data : 2000 – 2010 from CT DEEP target sampling efforts, 2012 TMDL cycle

Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS CB Inner – Hammonasset River, Clinton (CT-C1_003-SB) with annual geometric means and reduction goals for samples

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-13.1	Hammonasset River, Clinton	3/21/2000	8.6	dry	47.1	n/a
027-13.1	Hammonasset River, Clinton	9/21/2000	258	Dry		
027-13.1	Hammonasset River, Clinton	9/17/2001	179	Dry	179	n/a
027-13.1	Hammonasset River, Clinton	1/16/2002	8.7	Dry	61.9	n/a
027-13.1	Hammonasset River, Clinton	6/17/2002	248	Dry		
027-13.1	Hammonasset River, Clinton	6/18/2002	110	Dry		
027-13.1	Hammonasset River, Clinton	8/20/2003	311	Dry	311	90
027-13.1	Hammonasset River, Clinton	06/14/04	36	Dry	67.482	
027-13.1	Hammonasset River, Clinton	06/30/04	224	Dry		
027-13.1	Hammonasset River, Clinton	07/12/04	311	wet		
027-13.1	Hammonasset River, Clinton	8/8/2004	23	Dry		n/a
027-13.1	Hammonasset River, Clinton	09/07/04	321	Dry		
027-13.1	Hammonasset River, Clinton	10/06/04	5.1	Dry		
027-13.1	Hammonasset River, Clinton	08/07/05	70	Dry	219.77	
027-13.1	Hammonasset River, Clinton	08/15/05	690	Wet		
027-13.1	Hammonasset River, Clinton	4/25/2006	81	Wet	87.8	n/a
027-13.1	Hammonasset River, Clinton	7/9/2006	112	Dry		
027-13.1	Hammonasset River, Clinton	8/14/06	30	dry		
027-13.1	Hammonasset River, Clinton	9/18/2006	81	Dry		
027-13.1	Hammonasset River, Clinton	9/19/2006	81	Dry		

027-13.1	Hammonasset River, Clinton	10/09/06	74	dry		
027-13.1	Hammonasset River, Clinton	09/17/07	20	dry	26.31408	n/a
027-13.1	Hammonasset River, Clinton	09/24/07	81	dry		
027-13.1	Hammonasset River, Clinton	09/26/07	59	dry		
027-13.1	Hammonasset River, Clinton	11/05/07	22	dry		
027-13.1	Hammonasset River, Clinton	11/19/07	6	dry		
027-13.1	Hammonasset River, Clinton	08/03/08	171	wet	58.41568	n/a
027-13.1	Hammonasset River, Clinton	08/13/08	56	dry		
027-13.1	Hammonasset River, Clinton	08/25/08	76	dry		
027-13.1	Hammonasset River, Clinton	08/27/08	16	dry		
027-13.1	Hammonasset River, Clinton	8/31/2009	171	Dry	125.7	n/a
027-13.1	Hammonasset River, Clinton	9/14/2009	171	Dry		
027-13.1	Hammonasset River, Clinton	9/30/2009	50	Dry		
027-13.1	Hammonasset River, Clinton	10/26/2009	171	Dry		
Shaded cells indicate an exceedance of water quality criteria						

Wet and dry weather geometric mean values for all monitoring stations on segment: LIS CB Inner – Hammonasset River, Clinton (CT-C1_004-SB)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
027-13.1	Hammonasset River, Clinton	2000-2010	31	9	58.02	53.45	59.42
Shaded cells indicate an exceedance of water quality criteria							

Table 14: Segment 3: LIS CB Inner – Clinton Harbor Bacteria Data

Waterbody ID: CT-C1_005
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: 92%
90% of Samples Less Than: 90%

Data : 2000 – 2010 from CT DEEP target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS CB Inner – Clinton Harbor (SA Inputs), Clinton (CT-C1_005) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-12.4	Hammock River at Beach Park Road	1/12/2000	70	Dry	50	70
027-12.4	Hammock River at Beach Park Road	2/15/2000	70	Dry		
027-12.4	Hammock River at Beach Park Road	3/21/2000	8.7	dry		
027-12.4	Hammock River at Beach Park Road	8/16/2000	41	wet		
027-12.4	Hammock River at Beach Park Road	9/21/2000	179	Dry		
027-12.4	Hammock River at Beach Park Road	2/20/2001	8.6	Dry	8.6	n/a
027-12.4	Hammock River at Beach Park Road	1/16/2002	8.7	Dry	39.5	57
027-12.4	Hammock River at Beach Park Road	5/6/2002	139	Dry		
027-12.4	Hammock River at Beach Park Road	10/28/2002	51	Dry		
027-12.4	Hammock River at Beach Park Road	11/24/2003	36	Dry	36	90
027-12.4	Hammock River at Beach Park Road	9/22/2005	124	Dry	124	90
027-12.4	Hammock River at Beach Park Road	5/22/2006	81	Dry	25.2	23
027-12.4	Hammock River at Beach Park Road	10/18/2006	22	Wet		
027-12.4	Hammock River at Beach Park Road	12/4/2006	9	Dry		
027-12.4	Hammock River at Beach Park Road	11/7/2007	54	Wet	3.5	90
027-12.4	Hammock River at Beach Park Road	11/29/2007	60	Dry		
027-12.4	Hammock River at Beach Park Road	9/29/2009	30	Wet	30	n/a
027-12.4	Hammock River at Beach Park Road	12/15/2010	112	Wet	112	90
027-12.6	Indian River	2/15/2000	29	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-12.6	Indian River	3/21/2000	8.7	dry	48.9	40
027-12.6	Indian River	8/16/2000	88	wet		
027-12.6	Indian River	9/21/2000	258	Dry		
027-12.6	Indian River	2/20/2001	54	Dry	54	90
027-12.6	Indian River	1/16/2002	8.6	Dry	4	40
027-12.6	Indian River	10/28/2002	51	Dry		
027-12.6	Indian River	11/24/2003	67	Dry	67	90
027-12.6	Indian River	9/22/2005	171	Dry	171	
027-12.6	Indian River	5/22/2006	81	Dry	47.2	57
027-12.6	Indian River	10/18/2006	81	Wet		
027-12.6	Indian River	12/4/2006	16	Dry		
027-12.6	Indian River	11/7/2007	72	Wet	44.1	40
027-12.6	Indian River	11/29/2007	27	Dry		
027-12.6	Indian River	8/31/2009	56	Dry	97.9	90
027-12.6	Indian River	9/29/2009	171	Wet		
027-13.4	Indian River at Route 1	1/12/2000	18	Dry	38.6	30
027-13.4	Indian River at Route 1	2/15/2000	8.6	Dry		
027-13.4	Indian River at Route 1	3/21/2000	8.6	Unknown		
027-13.4	Indian River at Route 1	8/16/2000	248	Unknown		
027-13.4	Indian River at Route 1	9/21/2000	258	Dry		
027-13.4	Indian River at Route 1	2/20/2001	18	Dry	18	n/a
027-13.4	Indian River at Route 1	1/16/2002	29	Dry	100	57
027-13.4	Indian River at Route 1	5/6/2002	139	Dry		
027-13.4	Indian River at Route 1	10/28/2002	248	Dry		
027-13.4	Indian River at Route 1	11/24/2003	88	Dry	88	n/a
027-13.4	Indian River at Route 1	5/22/2006	50	Dry	49.3	57
027-13.4	Indian River at Route 1	10/18/2006	171	Wet		
027-13.4	Indian River at Route 1	12/4/2006	14	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-13.4	Indian River at Route 1	11/7/2007	171	Wet	116.2	90
027-13.4	Indian River at Route 1	11/29/2007	79	Dry		
027-13.4	Indian River at Route 1	9/29/2009	171	Wet	171	90
027-13.4	Indian River at Route 1	12/15/2010	58	Wet	58	90
Shaded cells indicate an exceedance of water quality criteria						

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS CB Inner – Clinton Harbor (SA Inputs), Clinton (CT-C1_005)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
027-12.4	Hammock River at Beach Park Road	2000-2011	4	12	41	45	46
027-12.6	Indian River	2000-2011	3	11	52	100	49
027-13.4	Indian River at Route 1	2000-2011	4	11	61	130	49
Shaded cells indicate an exceedance of water quality criteria							

Table 15: Segment 4: LIS CB Shore – Clinton Beach Bacteria Data

Waterbody ID: CT-C2_003

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: NA

90% of Samples Less Than: 15%

Data : 2000 – 2010 from CT DEEP target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS CB Shore –Clinton Beach, Clinton (CT-C2_003) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/dry	Geomean	90% Reduction
027-08.0	Off Clinton Beach	06/14/04	1.6	dry	1.639274028	N/A
027-08.0	Off Clinton Beach	06/30/04	1.7	dry		
027-08.0	Off Clinton Beach	07/12/04	1.6	wet		
027-08.0	Off Clinton Beach	09/07/04	1.6	dry		
027-08.0	Off Clinton Beach	10/06/04	1.7	dry		
027-08.0	Off Clinton Beach	07/12/05	1	dry	4.053600464	N/A
027-08.0	Off Clinton Beach	07/13/05	6	dry		
027-08.0	Off Clinton Beach	07/20/05	15	dry		
027-08.0	Off Clinton Beach	08/15/05	3	wet		
027-08.0	Off Clinton Beach	04/25/06	2	wet	1.64375183	N/A
027-08.0	Off Clinton Beach	09/18/06	2	dry		
027-08.0	Off Clinton Beach	09/19/06	3	dry		
027-08.0	Off Clinton Beach	10/02/06	1	wet		
027-08.0	Off Clinton Beach	10/03/06	1	dry		
027-08.0	Off Clinton Beach	08/08/07	3	wet	3.402459532	N/A
027-08.0	Off Clinton Beach	09/24/07	4	dry		
027-08.0	Off Clinton Beach	09/26/07	1	dry		
027-08.0	Off Clinton Beach	11/05/07	2	dry		
027-08.0	Off Clinton Beach	11/19/07	19	dry		
027-08.0	Off Clinton Beach	07/29/08	12	dry	6.942503429	N/A
027-08.0	Off Clinton Beach	07/30/08	7	dry		
027-08.0	Off Clinton Beach	08/13/08	24	dry		
027-08.0	Off Clinton Beach	08/25/08	1	dry		
027-08.0	Off Clinton Beach	08/27/08	8	dry		

Station #	Station Name	Date	Results	Wet/dry	Geomean	90% Reduction
027-08.1	East End of Clinton Beach	07/20/05	14	dry	6.480740698	N/A
027-08.1	East End of Clinton Beach	08/15/05	3	wet		
027-08.1	East End of Clinton Beach	04/25/06	5	wet	1.967989671	N/A
027-08.1	East End of Clinton Beach	09/18/06	1	dry		
027-08.1	East End of Clinton Beach	09/19/06	1	dry		
027-08.1	East End of Clinton Beach	10/03/06	3	dry		
027-08.1	East End of Clinton Beach	08/08/07	3	wet	2.521854548	N/A
027-08.1	East End of Clinton Beach	09/24/07	1	dry		
027-08.1	East End of Clinton Beach	09/26/07	1	dry		
027-08.1	East End of Clinton Beach	11/05/07	2	dry		
027-08.1	East End of Clinton Beach	11/19/07	17	dry		
027-08.1	East End of Clinton Beach	07/29/08	8	dry	8.189978923	10%
027-08.1	East End of Clinton Beach	07/30/08	14	dry		
027-08.1	East End of Clinton Beach	08/13/08	47	dry		
027-08.1	East End of Clinton Beach	08/25/08	1	dry		
027-08.1	East End of Clinton Beach	08/27/08	7	dry		
027-09.0	Off Grove Beach	06/14/04	1.7	dry	2.295040496	N/A
027-09.0	Off Grove Beach	06/30/04	1.7	dry		
027-09.0	Off Grove Beach	07/12/04	1.7	wet		
027-09.0	Off Grove Beach	09/07/04	3.6	dry		
027-09.0	Off Grove Beach	10/06/04	3.6	dry		
027-09.0	Off Grove Beach	07/12/05	5	dry	6.472458585	N/A
027-09.0	Off Grove Beach	07/13/05	13	dry		
027-09.0	Off Grove Beach	07/20/05	27	dry		
027-09.0	Off Grove Beach	08/15/05	1	wet		
027-09.0	Off Grove Beach	04/25/06	20	wet	1.681792831	N/A

Station #	Station Name	Date	Results	Wet/dry	Geomean	90% Reduction
027-09.0	Off Grove Beach	09/18/06	2	dry		
027-09.0	Off Grove Beach	09/19/06	1	dry		
027-09.0	Off Grove Beach	10/02/06	2	wet		
027-09.0	Off Grove Beach	10/03/06	2	dry		
027-09.0	Off Grove Beach	08/08/07	7	wet		
027-09.0	Off Grove Beach	09/24/07	1	dry		
027-09.0	Off Grove Beach	09/26/07	1	dry		N/A
027-09.0	Off Grove Beach	11/05/07	2	dry		
027-09.0	Off Grove Beach	11/19/07	26	dry	3.252522254	
027-09.0	Off Grove Beach	07/29/08	11	dry		
027-09.0	Off Grove Beach	07/30/08	18	dry		
027-09.0	Off Grove Beach	08/13/08	43	dry		10%
027-09.0	Off Grove Beach	08/25/08	2	dry	8.061924514	
027-09.0	Off Grove Beach	8/27/08	2	dry		
154-02.0		06/14/04	1.7	dry		
154-02.0		06/30/04	3.6	wet		
154-02.0		07/12/04	1.6	wet	3.00481266	N/A
154-02.0		09/01/04	3.6	dry		
154-02.0		09/07/04	5.8	dry		
154-02.0		10/06/04	3.6	dry		
154-02.0		07/12/05	3	dry		
154-02.0		07/13/05	13	dry	7.35413279	N/A
154-02.0		07/20/05	25	dry		
154-02.0		08/15/05	3	wet		
154-02.0		04/25/06	12	wet		
154-02.0		09/18/06	3	dry		
154-02.0		09/19/06	2	dry	4.09534502	N/A
154-02.0		10/02/06	4	wet		
154-02.0		10/03/06	4	dry		
154-02.0		08/08/07	1	wet		
154-02.0		11/05/07	6	dry	3.30192725	N/A
154-02.0		11/19/07	6	dry		
154-02.0		07/29/08	16	dry		
154-02.0		07/30/08	3	dry	3.13016916	N/A
154-02.0		08/25/08	1	dry		
154-02.0		08/27/08	2	dry		
154-02.1		06/14/04	1.7	dry		
154-02.1		06/30/04	3.6	wet	2.80339724	N/A
154-02.1		07/12/04	3.6	wet		

Station #	Station Name	Date	Results	Wet/dry	Geomean	90% Reduction
154-02.1		09/01/04	1.7	dry		
154-02.1		09/07/04	3.6	dry		
154-02.1		10/06/04	3.6	dry		
154-02.1		07/12/05	2	dry	10.1024159	N/A
154-02.1		07/13/05	31	dry		
154-02.1		07/20/05	24	dry		
154-02.1		08/15/05	7	wet		
154-02.1		04/25/06	7	wet	2.11178576	N/A
154-02.1		09/18/06	1	dry		
154-02.1		09/19/06	1	dry		
154-02.1		10/02/06	2	wet		
154-02.1		10/03/06	3	dry		
154-02.1		08/08/07	7	wet	N/A	N/A
154-02.1		07/30/08	10	dry	3.10723251	N/A
154-02.1		08/25/08	1	dry		
154-02.1		08/27/08	3	dry		
154-03.0		06/14/04	5.8	dry	12.0267611	N/A
154-03.0		06/30/04	14	wet		
154-03.0		07/12/04	14	wet		
154-03.0		09/01/04	11	dry		
154-03.0		09/07/04	22	dry		
154-03.0		10/06/04	11	dry		
154-03.0		07/12/05	1	dry	9.02152758	15%
154-03.0		07/13/05	46	dry		
154-03.0		07/20/05	12	dry		
154-03.0		08/15/05	12	wet		
154-03.0		04/25/06	3	wet	10.4247517	10%
154-03.0		09/18/06	20	dry		
154-03.0		09/19/06	2	dry		
154-03.0		10/02/06	19	wet		
154-03.0		10/03/06	54	dry		
154-03.0		08/08/07	27	wet	8.06225775	N/A
154-03.0		11/05/07	5	dry		
154-03.0		11/19/07	13	dry		
154-03.0		07/29/08	32	dry	7.87195869	15%
154-03.0		07/30/08	10	dry		
154-03.0		08/25/08	4	dry		
154-03.0		08/27/08	3	dry		

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS CB Shore – Clinton Beach, Clinton (CT-C2_003)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
027-08.0	Off Clinton Beach	2000-2010	5	19	3.00	1.958	3.356
027-08.1	East End of Clinton Beach	2000-2010	3	13	3.854	3.557	3.926
027-09.0	Off Grove Beach	2000-2010	5	19	3.960	3.432	4.112
154-02.0		2000-2010	6	16	4.00	3.065	4.442
154-02.1		2000-2010	6	14	3.528	4.552	3.163
154-03.0		2000-2010	6	16	10.234	12.391	10.285
Shaded cells indicate an exceedance of water quality criteria							

Table 16: Segment 5: LIS CB Shore – Outer Clinton Harbor Bacteria Data

Waterbody ID: CT-C2_004

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 – 2010 from CT DEEP target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS CB Shore – Outer Clinton Harbor, Clinton (CT-C2_004) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-02.1	Off Hammock Point	11/19/2006	4	Dry	4	n/a
027-02.1	Off Hammock Point	6/12/2007	1	Dry	1	n/a
027-02.1	Off Hammock Point	7/22/2007	1	Dry		
027-02.1	Off Hammock Point	7/29/2008	8	Dry	8	n/a
027-02.1	Off Hammock Point	7/8/2009	8	Wet	5.7	n/a
027-02.1	Off Hammock Point	11/15/2009	4	Wet		
027-02.1	Off Hammock Point	8/27/2010	1	Dry	1.7	n/a
027-02.1	Off Hammock Point	9/6/2010	1	Dry		
027-02.1	Off Hammock Point	10/17/2010	1	Dry		
027-02.1	Off Hammock Point	11/7/2010	9	Dry		
027-02.9	At N"12"	8/13/2001	258	Dry	47.10	40
027-02.9	At N"12"	8/16/2001	8.6	Dry		
027-02.9	At N"12"	6/17/2002	51	Dry	46.5	65
027-02.9	At N"12"	6/18/2002	41	Dry		
027-02.9	At N"12"	9/17/2002	258	Wet		
027-02.9	At N"12"	9/19/2002	8.7	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-02.9	At N"12"	8/20/2003	36	Dry	36	90
027-02.9	At N"12"	7/12/2005	16	Dry	30.5	40
027-02.9	At N"12"	7/13/2005	58	Dry		
027-02.9	At N"12"	4/25/2006	9	Wet	11.5	7
027-02.9	At N"12"	7/9/2006	36	Dry		
027-02.9	At N"12"	9/18/2006	15	Dry		
027-02.9	At N"12"	9/19/2006	4	Dry		
027-02.9	At N"12"	10/3/2006	7	Dry		
027-02.9	At N"12"	11/19/2006	17	Dry		
027-02.9	At N"12"	7/22/2007	3	Dry	3	n/a
027-02.9	At N"12"	7/30/2008	6	Dry	6	n/a
027-02.9	At N"12"	7/8/2009	64	Wet	9.7	19
027-02.9	At N"12"	9/14/2009	15	Dry		
027-02.9	At N"12"	9/30/2009	6	Dry		
027-02.9	At N"12"	10/6/2009	4	Dry		
027-02.9	At N"12"	10/26/2009	102	Dry		
027-02.9	At N"12"	11/15/2009	5	Wet		
027-02.9	At N"12"	8/27/2010	1	Dry	1.7	n/a
027-02.9	At N"12"	9/6/2010	1	Dry		
027-02.9	At N"12"	10/17/2010	4	Dry		
027-02.9	At N"12"	11/7/2010	2	Dry		
027-05.0	E of Hammock Point	5/15/2000	51	Dry	9.7	n/a
027-05.0	E of Hammock Point	6/7/2000	1.7	Unknown		
027-05.0	E of Hammock Point	6/13/2000	28	Dry		
027-05.0	E of Hammock Point	9/18/2000	3.6	Dry		
027-05.0	E of Hammock Point	8/13/2001	1.7	Dry	2.5	n/a
027-05.0	E of Hammock Point	8/16/2001	3.6	Dry		
027-05.0	E of Hammock Point	6/17/2002	5.8	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-05.0	E of Hammock Point	6/18/2002	1.7	Dry	2.1	n/a
027-05.0	E of Hammock Point	9/17/2002	1.7	Wet		
027-05.0	E of Hammock Point	9/19/2002	1.6	Dry		
027-05.0	E of Hammock Point	9/30/2002	1.7	Dry		
027-05.0	E of Hammock Point	8/20/2003	5.8	Dry	5.8	n/a
027-05.0	E of Hammock Point	7/12/2005	1	Dry	2.8	n/a
027-05.0	E of Hammock Point	7/13/2005	3	Dry		
027-05.0	E of Hammock Point	4/25/2006	1	Wet	1.4	n/a
027-05.0	E of Hammock Point	9/18/2006	3	Dry		
027-05.0	E of Hammock Point	9/19/2006	1	Dry		
027-05.0	E of Hammock Point	10/2/2006	2	Wet		
027-05.0	E of Hammock Point	10/3/2006	1	Dry		
027-05.0	E of Hammock Point	7/29/2008	4	Dry	2.8	n/a
027-05.0	E of Hammock Point	7/30/2008	7	Dry		
027-05.0	E of Hammock Point	7/8/2009	8	Wet	2.5	n/a
027-05.0	E of Hammock Point	8/31/2009	1	Dry		
027-05.0	E of Hammock Point	9/14/2009	2	Dry		
027-05.0	E of Hammock Point	9/30/2009	1	Dry		
027-05.0	E of Hammock Point	10/26/2009	5	Dry		
027-05.0	E of Hammock Point	11/15/2009	3	Wet		
027-05.0	E of Hammock Point	8/27/2010	1	Dry	1.9	n/a
027-05.0	E of Hammock Point	9/6/2010	1	Dry		
027-05.0	E of Hammock Point	10/17/2010	1	Dry		
027-05.0	E of Hammock Point	11/7/2010	14	Dry		
027-12.1	Hammock Road at marina	2/15/2000	8.7	Dry	24.7	40
027-12.1	Hammock Road at marina	3/21/2000	8.7	Unknown		
027-12.1	Hammock Road at marina	8/16/2000	70	Unknown		
027-12.1	Hammock Road at marina	9/21/2000	70	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-12.1	Hammock Road at marina	2/20/2001	8.6	Dry	8.6	n/a
027-12.1	Hammock Road at marina	1/16/2002	8.6	Dry	23.3	n/a
027-12.1	Hammock Road at marina	5/6/2002	29	Dry		
027-12.1	Hammock Road at marina	10/28/2002	51	Dry		
027-12.1	Hammock Road at marina	11/24/2003	11	Dry	11	n/a
027-12.1	Hammock Road at marina	7/12/2005	102	Dry	118.6	90
027-12.1	Hammock Road at marina	7/13/2005	138	Dry		
027-12.1	Hammock Road at marina	4/25/2006	2	Wet	14.3	15
027-12.1	Hammock Road at marina	5/22/2006	74	Dry		
027-12.1	Hammock Road at marina	9/18/2006	19	Dry		
027-12.1	Hammock Road at marina	9/19/2006	15	Dry		
027-12.1	Hammock Road at marina	11/7/2007	32	Wet	32	90
027-12.1	Hammock Road at marina	7/30/2008	26	Dry	26	90
027-12.1	Hammock Road at marina	8/31/2009	60	Dry	58.9	70
027-12.1	Hammock Road at marina	9/14/2009	114	Dry		
027-12.1	Hammock Road at marina	9/29/2009	80	Wet		
027-12.1	Hammock Road at marina	10/6/2009	16	Dry		
027-12.1	Hammock Road at marina	10/26/2009	81	Dry		
027-24.0	LIS CB Shore - Outer Clinton Harbor, Clinton	11/19/2006	7	Dry	7	n/a
027-24.0	LIS CB Shore - Outer Clinton Harbor, Clinton	7/22/2007	2	Dry	2	n/a
027-24.0	LIS CB Shore - Outer Clinton Harbor, Clinton	7/8/2009	24	Wet	2.8	n/a
027-24.0	LIS CB Shore - Outer Clinton Harbor, Clinton	11/15/2009	7	Wet		
027-24.0	LIS CB Shore - Outer Clinton Harbor, Clinton	8/27/2010	1	Dry	1.6	n/a
027-24.0	LIS CB Shore - Outer Clinton Harbor, Clinton	9/6/2010	1	Dry		
027-24.0	LIS CB Shore - Outer Clinton Harbor, Clinton	10/17/2010	3	Dry		
027-24.0	LIS CB Shore - Outer Clinton Harbor, Clinton	11/7/2010	2	Dry		
027-25.0	Clinton Harbor	11/19/2006	9	Dry	9	n/a
027-25.0	Clinton Harbor	7/22/2007	3	Dry	3	n/a

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-25.0	Clinton Harbor	7/8/2009	20	Wet	7.7	n/a
027-25.0	Clinton Harbor	11/15/2009	3	Wet		
027-25.0	Clinton Harbor	8/27/2010	1	Dry	1.4	n/a
027-25.0	Clinton Harbor	9/6/2010	2	Dry		
027-25.0	Clinton Harbor	10/17/2010	1	Dry		
027-25.0	Clinton Harbor	11/7/2010	2	Dry		
027-26.0	LIS CB Shore - Outer Clinton Harbor, Clinton	11/19/2006	8	Dry	8	n/a
027-26.0	LIS CB Shore - Outer Clinton Harbor, Clinton	7/8/2009	24	Wet	13.9	n/a
027-26.0	LIS CB Shore - Outer Clinton Harbor, Clinton	11/15/2009	8	Wet		
027-26.0	LIS CB Shore - Outer Clinton Harbor, Clinton	8/27/2010	1	Dry	1	n/a
027-26.0	LIS CB Shore - Outer Clinton Harbor, Clinton	9/6/2010	1	Dry		
027-26.0	LIS CB Shore - Outer Clinton Harbor, Clinton	10/17/2010	1	Dry		
027-26.0	LIS CB Shore - Outer Clinton Harbor, Clinton	11/7/2010	1	Dry		
027-27.0	Off Town Beach	11/19/2006	9	Dry	9	n/a
027-27.0	Off Town Beach	7/22/2007	2	Dry	2	n/a
027-27.0	Off Town Beach	7/8/2009	54	Wet	10.4	40
027-27.0	Off Town Beach	11/15/2009	2	Wet		
027-27.0	Off Town Beach	8/27/2010	1	Dry	1	n/a
027-27.0	Off Town Beach	9/6/2010	1	Dry		
027-27.0	Off Town Beach	10/17/2010	1	Dry		
027-27.0	Off Town Beach	11/7/2010	1	Dry		
Shaded cells indicate an exceedance of water quality criteria						

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS CB Shore – Outer Clinton Harbor, Clinton (CT-C2_004)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
027-02.1	Off Hammock Point	2000-2010	2	8	2	6	2
027-02.9	At N "12"	2000-2010	4	23	13	29	11
027-05.0	East of Hammock Point	2000-2010	5	25	3	2	3

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
027-12.1	Hammock River at marina	2000-2010	3	17	29	17	32
027-24.0	LIS CB Shore - Outer Clinton Harbor, Clinton	2000-2010	2	6	3	13	2
027-25.0	Clinton Harbor	2000-2010	2	6	3	8	2
027-26.0	LIS CB Shore - Outer Clinton Harbor, Clinton	2000-2010	2	5	3	14	2
027-27.0	Off Town Beach	2000-2010	2	6	3	10	2
Shaded cells indicate an exceedance of water quality criteria							

Table 17: Segment 6: LIS CB Midshore – Duck Island Area Bacteria Data

Waterbody ID: CT-C3_002
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: 11.9%
90% of Samples Less Than: 15%

Data : 2000 – 2001 from CT DEEP target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS CB Midshore – Duck island area, Clinton (CT-C3_002) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-07.0	SE of Kelsey Point	5/15/2000	28	Dry	4.7	n/a
027-07.0	SE of Kelsey Point	6/7/2000	1.6	Wet		
027-07.0	SE of Kelsey Point	6/13/2000	18	Dry		
027-07.0	SE of Kelsey Point	9/18/2000	1.6	Dry		
027-07.0	SE of Kelsey Point	9/19/2000	1.7	Dry		
027-07.0	SE of Kelsey Point	8/13/2001	1.7	Dry	2.2	n/a
027-07.0	SE of Kelsey Point	8/16/2001	1.7	Dry		
027-07.0	SE of Kelsey Point	8/21/2001	3.6	Dry		
027-07.0	SE of Kelsey Point	6/17/2002	3.6	Dry	2.3	n/a
027-07.0	SE of Kelsey Point	6/18/2002	3.6	Dry		
027-07.0	SE of Kelsey Point	9/17/2002	1.7	Wet		
027-07.0	SE of Kelsey Point	9/19/2002	1.6	Dry		
027-07.0	SE of Kelsey Point	9/30/2002	1.7	Dry		
027-07.0	SE of Kelsey Point	8/20/2003	1.6	Dry	1.6	n/a
027-07.0	SE of Kelsey Point	7/12/2005	2	Dry	2	n/a
027-07.0	SE of Kelsey Point	7/13/2005	2	Dry		
027-07.0	SE of Kelsey Point	4/25/2006	4	Wet	1.6	n/a
027-07.0	SE of Kelsey Point	9/18/2006	3	Dry		
027-07.0	SE of Kelsey Point	9/19/2006	1	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-07.0	SE of Kelsey Point	10/2/2006	1	Wet		
027-07.0	SE of Kelsey Point	10/3/2006	1	Dry		
027-07.0	SE of Kelsey Point	7/29/2008	4	Dry	2.8	n/a
027-07.0	SE of Kelsey Point	7/30/2008	2	Dry		
027-07.0	SE of Kelsey Point	7/8/2009	2	Wet	1.9	n/a
027-07.0	SE of Kelsey Point	8/31/2009	3	Dry		
027-07.0	SE of Kelsey Point	9/14/2009	2	Dry		
027-07.0	SE of Kelsey Point	9/30/2009	1	Dry		
027-07.0	SE of Kelsey Point	10/26/2009	4	Dry		
027-07.0	SE of Kelsey Point	11/15/2009	1	Wet		
027-07.0	SE of Kelsey Point	9/6/2010	1	Dry	2.9	n/a
027-07.0	SE of Kelsey Point	10/17/2010	2	Dry		
027-07.0	SE of Kelsey Point	11/7/2010	12	Dry		
027-08.2	Off Clinton Beach	6/7/2000	1.6	wet	1.6	n/a
027-08.2	Off Clinton Beach	9/19/2000	1.6	Dry		
027-08.2	Off Clinton Beach	8/13/2001	8.1	Dry	2.8	n/a
027-08.2	Off Clinton Beach	8/16/2001	1.7	Dry		
027-08.2	Off Clinton Beach	8/21/2001	1.6	Dry		
027-08.2	Off Clinton Beach	6/17/2002	3.6	Dry	2.3	n/a
027-08.2	Off Clinton Beach	6/18/2002	1.7	Dry		
027-08.2	Off Clinton Beach	9/17/2002	1.6	Wet		
027-08.2	Off Clinton Beach	9/19/2002	3.6	Dry		
027-08.2	Off Clinton Beach	9/30/2002	1.7	Dry		
027-08.2	Off Clinton Beach	8/20/2003	1.6	Dry	1.6	n/a
027-08.2	Off Clinton Beach	7/12/2005	1	Dry	1.7	n/a
027-08.2	Off Clinton Beach	7/13/2005	3	Dry		
027-08.2	Off Clinton Beach	4/25/2006	2	Wet	1.7	n/a
027-08.2	Off Clinton Beach	9/18/2006	1	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-08.2	Off Clinton Beach	9/19/2006	4	Dry		
027-08.2	Off Clinton Beach	10/2/2006	2	Wet		
027-08.2	Off Clinton Beach	10/3/2006	1	Dry		
027-08.2	Off Clinton Beach	7/29/2008	2	Dry	2	n/a
027-08.2	Off Clinton Beach	7/30/2008	2	Dry		
027-08.2	Off Clinton Beach	7/8/2009	1	Wet	1.3	n/a
027-08.2	Off Clinton Beach	8/31/2009	1	Dry		
027-08.2	Off Clinton Beach	9/14/2009	1	Dry		
027-08.2	Off Clinton Beach	9/30/2009	1	Dry		
027-08.2	Off Clinton Beach	10/26/2009	3	Dry		
027-08.2	Off Clinton Beach	11/15/2009	2	Wet		
027-08.2	Off Clinton Beach	9/6/2010	1	Dry	2.6	n/a
027-08.2	Off Clinton Beach	10/17/2010	1	Dry		
027-08.2	Off Clinton Beach	11/7/2010	17	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	5/15/2000	14	Dry	4.3	n/a
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	6/7/2000	1.7	Wet		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	6/13/2000	22	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	9/18/2000	1.7	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	9/19/2000	1.6	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	8/13/2001	11	Dry	8.9	n/a
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	8/16/2001	11	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	8/21/2001	5.8	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	6/17/2002	3.6	Dry	2.4	n/a
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	6/18/2002	3.6	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	9/17/2002	1.6	Wet		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	9/19/2002	1.7	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	8/20/2003	1.6	Dry	1.6	n/a
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	7/12/2005	4	Dry	3.5	n/a
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	7/13/2005	3	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	4/25/2006	1	Wet	1.6	n/a
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	9/18/2006	2	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	9/19/2006	2	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	10/2/2006	1	Wet		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	10/3/2006	3	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	7/29/2008	12	Dry	14.7	n/a
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	7/30/2008	18	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	7/8/2009	1	Wet	1.6	n/a
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	8/31/2009	1	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	9/14/2009	1	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	9/30/2009	1	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	10/26/2009	3	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	11/15/2009	5	Wet		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	9/6/2010	1	Dry	2.5	n/a
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	10/17/2010	1	Dry		
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	11/7/2010	16	Dry		
027-11.0	At West end of Duck Island breakwater	5/15/2000	28	Dry	15.9	15
027-11.0	At West end of Duck Island breakwater	6/7/2000	51	Unknown		
027-11.0	At West end of Duck Island breakwater	6/13/2000	28	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-11.0	At West end of Duck Island breakwater	9/19/2000	1.6	Dry		
027-11.0	At West end of Duck Island breakwater	8/13/2001	11	Dry	6.3	n/a
027-11.0	At West end of Duck Island breakwater	8/21/2001	3.6	Dry		
027-11.0	At West end of Duck Island breakwater	6/17/2002	3.6	Dry	2.9	n/a
027-11.0	At West end of Duck Island breakwater	6/18/2002	5.8	Dry		
027-11.0	At West end of Duck Island breakwater	9/17/2002	3.6	Wet		
027-11.0	At West end of Duck Island breakwater	9/19/2002	1.6	Dry		
027-11.0	At West end of Duck Island breakwater	9/30/2002	1.6	Dry		
027-11.0	At West end of Duck Island breakwater	8/20/2003	1.7	Dry	1.7	n/a
027-11.0	At West end of Duck Island breakwater	7/12/2005	2	Dry	3.2	n/a
027-11.0	At West end of Duck Island breakwater	7/13/2005	5	Dry		
027-11.0	At West end of Duck Island breakwater	4/25/2006	1	Wet	1.2	n/a
027-11.0	At West end of Duck Island breakwater	9/18/2006	3	Dry		
027-11.0	At West end of Duck Island breakwater	9/19/2006	1	Dry		
027-11.0	At West end of Duck Island breakwater	10/2/2006	1	Wet		
027-11.0	At West end of Duck Island breakwater	10/3/2006	1	Dry		
027-11.0	At West end of Duck Island breakwater	7/29/2008	9	Dry	7.9	n/a
027-11.0	At West end of Duck Island breakwater	7/30/2008	7	Dry		
027-11.0	At West end of Duck Island breakwater	7/8/2009	1	Wet	1.6	n/a
027-11.0	At West end of Duck Island breakwater	8/31/2009	3	Dry		
027-11.0	At West end of Duck Island breakwater	9/14/2009	1	Dry		
027-11.0	At West end of Duck Island breakwater	9/30/2009	1	Dry		
027-11.0	At West end of Duck Island breakwater	10/26/2009	5	Dry		
027-11.0	At West end of Duck Island breakwater	11/15/2009	1	Wet		
027-11.0	At West end of Duck Island breakwater	9/6/2010	1	Dry	2.5	n/a
027-11.0	At West end of Duck Island breakwater	10/17/2010	1	Dry		
027-11.0	At West end of Duck Island breakwater	11/7/2010	15	Dry		
Shaded cells indicate an exceedance of water quality criteria						

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS CB Midshore – Duck island area, Clinton (CT-C3_002)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
027-07.0	SE of Kelsey Point	2000-2010	5	26	2	2	3
027-08.2	Off Clinton Beach	2000-2010	5	23	2	2	2
027-10.0	Midway between Grove Beach and West end of Duck Island breakwater	2000-2010	5	25	3	2	3
027-11.0	At West end of Duck Island breakwater	2000-2010	5	24	3	1	3

Table 18: Segment 7: LIS CB Midshore – Outer Clinton Harbor River Bacteria Data

Waterbody ID: CT-C3_003
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: 61%

90% of Samples Less Than: 40%

Data : 2000 – 2010 from CT DEEP target sampling efforts, 2012 TMDL cycle
Single sample fecal coliform data (colonies/100mL) for all monitoring stations on segment : LIS CB Midshore – Outer Clinton Harbor, Clinton (CT-C3_003) with annual geometric means and reduction goals for samples.

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-01.0	Outer Clinton Harbor	5/15/2000	5.8	Dry	3.4	n/a
027-01.0	Outer Clinton Harbor	6/7/2000	1.6	Unknown		
027-01.0	Outer Clinton Harbor	6/13/2000	18	Dry		
027-01.0	Outer Clinton Harbor	9/18/2000	1.6	Dry		
027-01.0	Outer Clinton Harbor	9/19/2000	1.7	Dry		
027-01.0	Outer Clinton Harbor	8/13/2001	8.1	Dry	3.7	n/a
027-01.0	Outer Clinton Harbor	8/16/2001	1.7	Dry		
027-01.0	Outer Clinton Harbor	6/17/2002	11	Dry	2.4	n/a
027-01.0	Outer Clinton Harbor	6/18/2002	1.7	Dry		
027-01.0	Outer Clinton Harbor	9/17/2002	1.7	Wet		
027-01.0	Outer Clinton Harbor	9/19/2002	1.7	Dry		
027-01.0	Outer Clinton Harbor	9/30/2002	1.6	Dry		
027-01.0	Outer Clinton Harbor	8/20/2003	1.6	Dry	1.6	n/a
027-01.0	Outer Clinton Harbor	7/12/2005	2	Dry	2.4	n/a
027-01.0	Outer Clinton Harbor	7/13/2005	3	Dry		
027-01.0	Outer Clinton Harbor	4/25/2006	1	Wet	1.1	n/a
027-01.0	Outer Clinton Harbor	9/18/2006	1	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-01.0	Outer Clinton Harbor	9/19/2006	1	Dry		
027-01.0	Outer Clinton Harbor	10/2/2006	1	Wet		
027-01.0	Outer Clinton Harbor	10/3/2006	2	Dry		
027-01.0	Outer Clinton Harbor	7/29/2008	1	Dry	1.7	n/a
027-01.0	Outer Clinton Harbor	7/30/2008	3	Dry		
027-01.0	Outer Clinton Harbor	8/31/2009	1	Dry	1.4	n/a
027-01.0	Outer Clinton Harbor	9/14/2009	1	Dry		
027-01.0	Outer Clinton Harbor	9/30/2009	1	Dry		
027-01.0	Outer Clinton Harbor	10/6/2009	1	Dry		
027-01.0	Outer Clinton Harbor	10/26/2009	6	Dry		
027-02.0	S of G "3"	5/15/2000	3.6	Dry	15.2	10
027-02.0	S of G "3"	6/7/2000	54	Unknown		
027-02.0	S of G "3"	6/13/2000	22	Dry		
027-02.0	S of G "3"	9/18/2000	22	Dry		
027-02.0	S of G "3"	9/19/2000	8.6	Dry		
027-02.0	S of G "3"	8/13/2001	3.6	Dry	2.5	n/a
027-02.0	S of G "3"	8/16/2001	1.7	Dry		
027-02.0	S of G "3"	6/17/2002	18	Dry	9.2	10
027-02.0	S of G "3"	6/18/2002	18	Dry		
027-02.0	S of G "3"	9/17/2002	36	Wet		
027-02.0	S of G "3"	9/19/2002	1.6	Dry		
027-02.0	S of G "3"	9/30/2002	3.6	Dry		
027-02.0	S of G "3"	8/20/2003	5.8	Dry	5.8	n/a
027-02.0	S of G "3"	7/12/2005	1	Dry	1	n/a
027-02.0	S of G "3"	7/13/2005	1	Dry		
027-02.0	S of G "3"	4/25/2006	1	Wet	1.3	n/a
027-02.0	S of G "3"	9/18/2006	1	Dry		
027-02.0	S of G "3"	9/19/2006	1	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-02.0	S of G "3"	10/2/2006	4	Wet		
027-02.0	S of G "3"	10/3/2006	1	Dry		
027-02.0	S of G "3"	7/29/2008	2	Dry	2	n/a
027-02.0	S of G "3"	7/30/2008	2	Dry		
027-02.0	S of G "3"	7/8/2009	1	Wet	1.7	n/a
027-02.0	S of G "3"	8/31/2009	1	Dry		
027-02.0	S of G "3"	9/14/2009	2	Dry		
027-02.0	S of G "3"	9/30/2009	1	Dry		
027-02.0	S of G "3"	10/6/2009	1	Dry		
027-02.0	S of G "3"	10/26/2009	23	Dry		
027-02.0	S of G "3"	11/15/2009	1	Wet		
027-02.0	S of G "3"	8/27/2010	2	Dry	1.4	n/a
027-02.0	S of G "3"	9/6/2010	1	Dry		
027-02.0	S of G "3"	10/17/2010	2	Dry		
027-02.0	S of G "3"	11/7/2010	1	Dry		
027-02.3	N of West Rock	5/15/2000	1.7	Dry	7.1	15
027-02.3	N of West Rock	6/7/2000	18	Unknown		
027-02.3	N of West Rock	6/13/2000	51	Dry		
027-02.3	N of West Rock	9/18/2000	1.6	Dry		
027-02.3	N of West Rock	6/17/2002	18	Dry	10.2	10
027-02.3	N of West Rock	6/18/2002	1.6	Dry		
027-02.3	N of West Rock	9/17/2002	51	Wet		
027-02.3	N of West Rock	9/19/2002	8.6	Dry		
027-02.3	N of West Rock	9/30/2002	8.7	Dry		
027-02.3	N of West Rock	8/20/2003	1.6	Dry	1.6	n/a
027-02.3	N of West Rock	7/12/2005	4	Dry	6.9	n/a
027-02.3	N of West Rock	7/13/2005	12	Dry		
027-02.3	N of West Rock	4/25/2006	1	Wet	1.2	n/a

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-02.3	N of West Rock	9/18/2006	1	Dry		
027-02.3	N of West Rock	9/19/2006	1	Dry		
027-02.3	N of West Rock	10/3/2006	1	Dry		
027-02.3	N of West Rock	11/19/2006	3	Dry		
027-02.3	N of West Rock	6/12/2007	6	Dry	2.4	n/a
027-02.3	N of West Rock	7/22/2007	1	Dry		
027-02.3	N of West Rock	7/29/2008	1	Dry	2.8	n/a
027-02.3	N of West Rock	7/30/2008	8	Dry		
027-02.3	N of West Rock	7/8/2009	3	Wet	2.4	4
027-02.3	N of West Rock	8/31/2009	2	Dry		
027-02.3	N of West Rock	9/14/2009	1	Dry		
027-02.3	N of West Rock	9/30/2009	1	Dry		
027-02.3	N of West Rock	10/6/2009	1	Dry		
027-02.3	N of West Rock	10/26/2009	37	Dry		
027-02.3	N of West Rock	11/15/2009	2	Wet		
027-02.3	N of West Rock	8/27/2010	1	Dry	1.8	n/a
027-02.3	N of West Rock	9/6/2010	1	Dry		
027-02.3	N of West Rock	10/17/2010	1	Dry		
027-02.3	N of West Rock	11/7/2010	11	Dry		
027-02.5	At C "7"	6/7/2000	18	Unknown	12.4	n/a
027-02.5	At C "7"	9/19/2000	8.6	Dry		
027-02.5	At C "7"	8/13/2001	54	Dry	31.2	40
027-02.5	At C "7"	8/16/2001	18	Dry		
027-02.5	At C "7"	6/17/2002	28	Dry	34.3	15
027-02.5	At C "7"	6/18/2002	22	Dry		
027-02.5	At C "7"	9/17/2002	258	Wet		
027-02.5	At C "7"	9/19/2002	8.7	Dry		
027-02.5	At C "7"	8/20/2003	36	Dry	36	90

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-02.5	At C "7"	7/12/2005	1	Dry	6	90
027-02.5	At C "7"	7/13/2005	36	Dry		
027-02.5	At C "7"	4/25/2006	2	Wet	5.8	4
027-02.5	At C "7"	7/9/2006	56	Dry		
027-02.5	At C "7"	9/18/2006	7	Dry		
027-02.5	At C "7"	9/19/2006	2	Dry		
027-02.5	At C "7"	10/2/2006	14	Wet		
027-02.5	At C "7"	10/3/2006	5	Dry		
027-02.5	At C "7"	11/19/2006	2	Dry		
027-02.5	At C "7"	7/22/2007	1	Dry	1	n/a
027-02.5	At C "7"	7/29/2008	18	Dry	4.2	n/a
027-02.5	At C "7"	7/30/2008	1	Dry		
027-02.5	At C "7"	7/8/2009	5	Wet	6.3	4
027-02.5	At C "7"	8/31/2009	2	Dry		
027-02.5	At C "7"	9/14/2009	22	Dry		
027-02.5	At C "7"	9/30/2009	6	Dry		
027-02.5	At C "7"	10/6/2009	1	Dry		
027-02.5	At C "7"	10/26/2009	49	Dry		
027-02.5	At C "7"	11/15/2009	6	Wet		
027-02.5	At C "7"	8/27/2010	1	Dry	1.8	n/a
027-02.5	At C "7"	9/6/2010	1	Dry		
027-02.5	At C "7"	10/17/2010	2	Dry		
027-02.5	At C "7"	11/7/2010	5	Dry		
027-03.0	At N "12"	5/15/2000	5.8	Dry	4.9	n/a
027-03.0	At N "12"	6/7/2000	8.6	Wet		
027-03.0	At N "12"	6/13/2000	22	Dry		
027-03.0	At N "12"	9/18/2000	1.6	Dry		
027-03.0	At N "12"	9/19/2000	1.6	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-03.0	At N "12"	8/13/2001	1.6	Dry	1.6	n/a
027-03.0	At N "12"	8/16/2001	1.7	Dry		
027-03.0	At N "12"	6/17/2002	14	Dry	2.6	n/a
027-03.0	At N "12"	6/18/2002	1.7	Dry		
027-03.0	At N "12"	9/17/2002	1.7	Wet		
027-03.0	At N "12"	9/19/2002	1.6	Dry		
027-03.0	At N "12"	9/30/2002	1.7	Dry		
027-03.0	At N "12"	8/20/2003	5.8	Dry	5.8	n/a
027-03.0	At N "12"	7/12/2005	1	Dry	1.7	n/a
027-03.0	At N "12"	7/13/2005	3	Dry		
027-03.0	At N "12"	4/25/2006	1	Wet	1	n/a
027-03.0	At N "12"	9/18/2006	1	Dry		
027-03.0	At N "12"	9/19/2006	1	Dry		
027-03.0	At N "12"	10/2/2006	1	Wet		
027-03.0	At N "12"	10/3/2006	1	Dry		
027-03.0	At N "12"	7/29/2008	12	Dry	9.2	n/a
027-03.0	At N "12"	7/30/2008	7	Dry		
027-03.0	At N "12"	7/8/2009	1	Wet	2.2	6
027-03.0	At N "12"	8/31/2009	1	Dry		
027-03.0	At N "12"	9/14/2009	1	Dry		
027-03.0	At N "12"	9/30/2009	1	Dry		
027-03.0	At N "12"	10/26/2009	34	Dry		
027-03.0	At N "12"	11/15/2009	3	Wet		
027-03.0	At N "12"	8/27/2010	3	Dry	2.4	n/a
027-03.0	At N "12"	9/6/2010	1	Dry		
027-03.0	At N "12"	10/17/2010	1	Dry		
027-03.0	At N "12"	11/7/2010	12	Dry		
027-04.0	W of Stone Island	5/15/2000	50	Dry	5.3	15

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-04.0	W of Stone Island	6/7/2000	1.6	Wet		
027-04.0	W of Stone Island	6/13/2000	5.8	Dry		
027-04.0	W of Stone Island	9/18/2000	1.7	Dry		
027-04.0	W of Stone Island	8/13/2001	5.8	Dry	3	n/a
027-04.0	W of Stone Island	8/16/2001	1.6	Dry		
027-04.0	W of Stone Island	6/17/2002	5.8	Dry	2.1	n/a
027-04.0	W of Stone Island	6/18/2002	1.6	Dry		
027-04.0	W of Stone Island	9/17/2002	1.6	Wet		
027-04.0	W of Stone Island	9/19/2002	1.6	Dry		
027-04.0	W of Stone Island	9/30/2002	1.6	Dry		
027-04.0	W of Stone Island	8/20/2003	1.6	Dry	1.6	n/a
027-04.0	W of Stone Island	7/12/2005	1	Dry	1.4	n/a
027-04.0	W of Stone Island	7/13/2005	2	Dry		
027-04.0	W of Stone Island	4/25/2006	1	Wet	1.2	n/a
027-04.0	W of Stone Island	9/18/2006	1	Dry		
027-04.0	W of Stone Island	9/19/2006	3	Dry		
027-04.0	W of Stone Island	10/2/2006	1	Wet		
027-04.0	W of Stone Island	10/3/2006	1	Dry		
027-04.0	W of Stone Island	7/29/2008	7	Dry	5.3	n/a
027-04.0	W of Stone Island	7/30/2008	4	Dry		
027-04.0	W of Stone Island	7/8/2009	4	Wet	2.4	n/a
027-04.0	W of Stone Island	8/31/2009	2	Dry		
027-04.0	W of Stone Island	9/14/2009	1	Dry		
027-04.0	W of Stone Island	9/30/2009	1	Dry		
027-04.0	W of Stone Island	10/26/2009	13	Dry		
027-04.0	W of Stone Island	11/15/2009	2	Wet		
027-04.0	W of Stone Island	8/27/2010	1	Dry	2	n/a
027-04.0	W of Stone Island	10/17/2010	1	Dry		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-04.0	W of Stone Island	11/7/2010	8	Dry		
027-06.0	South of breakwater	5/15/2000	36	Dry	7.9	n/a
027-06.0	South of breakwater	6/7/2000	3.6	wet		
027-06.0	South of breakwater	6/13/2000	18	Dry		
027-06.0	South of breakwater	9/18/2000	8.1	Dry		
027-06.0	South of breakwater	9/19/2000	1.6	Dry		
027-06.0	South of breakwater	8/13/2001	8.1	Dry	3.7	n/a
027-06.0	South of breakwater	8/16/2001	1.7	Dry		
027-06.0	South of breakwater	6/17/2002	1.7	Dry	1.6	n/a
027-06.0	South of breakwater	6/18/2002	1.6	Dry		
027-06.0	South of breakwater	9/17/2002	1.6	Wet		
027-06.0	South of breakwater	9/19/2002	1.6	Dry		
027-06.0	South of breakwater	9/30/2002	1.6	Dry		
027-06.0	South of breakwater	8/20/2003	1.6	Dry	1.6	n/a
027-06.0	South of breakwater	7/12/2005	2	Dry	2.8	n/a
027-06.0	South of breakwater	7/13/2005	4	Dry		
027-06.0	South of breakwater	4/25/2006	1	Wet	1.2	n/a
027-06.0	South of breakwater	9/18/2006	1	Dry		
027-06.0	South of breakwater	9/19/2006	3	Dry		
027-06.0	South of breakwater	10/2/2006	1	Wet		
027-06.0	South of breakwater	10/3/2006	1	Dry		
027-06.0	South of breakwater	7/29/2008	1	Dry	1.4	n/a
027-06.0	South of breakwater	7/30/2008	2	Dry		
027-06.0	South of breakwater	7/8/2009	1	Wet	1.7	n/a
027-06.0	South of breakwater	8/31/2009	1	Dry		
027-06.0	South of breakwater	9/14/2009	3	Dry		
027-06.0	South of breakwater	9/30/2009	1	Dry		
027-06.0	South of breakwater	10/26/2009	7	Dry		
027-06.0	South of breakwater	11/15/2009	1	Wet		

Station #	Station Name	Date	Results	Wet/Dry	Geomean	90% Reduction
027-06.0	South of breakwater	9/6/2010	1	Dry	2.6	n/a
027-06.0	South of breakwater	10/17/2010	2	Dry		
027-06.0	South of breakwater	11/7/2010	9	Dry		
Shaded cells indicate an exceedance of water quality criteria						

Wet and dry weather geometric mean values for all monitoring stations on segment : LIS CB Midshore – Outer Clinton Harbor, Clinton (CT-C3_003)

Station #	Station Name	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
027-01.0	Outer Clinton Harbor	2000-2010	3	23	2	1	2
027-02.0	South of G"3"	2000-2010	5	27	3	3	3
027-02.3	North of West Rock	2000-2010	4	27	3	4	3
027-02.5	At C "7"	2000-2010	5	26	7	12	6
027-03.0	At N "12"	2000-2010	5	26	2	1	3
027-04.0	West of Stone Island	2000-2010	5	24	2	2	3
027-06.0	South of breakwater	2000-2010	5	25	2	1	3

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