**FINAL REPORT**

**for**

# Peconic Bay Pathogens TMDL

**Prepared for:**

**U.S. Environmental Protection Agency**
**Oceans and Coastal Protection Division**

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# Executive Summary

This document was provided to support the development of total maximum daily loads (TMDLs) associated with fecal and total coliforms to a series of estuarine receiving waters within the greater Peconic estuary area in New York. The basis for the TMDL analysis lies within New York's 303(d) list of water segments that exhibit impaired conditions. The impairments are associated with numerical water quality standards for pathogens in New York's class SA water bodies.

This analysis is focused on 25 individual water bodies listed on New York's Priority Water Bodies List (PWL) (although 5 of these water bodies share the same PWL number). This assessment is broken into 3 primary steps: (1) collect and analyze pathogen monitoring data from state and county sources and determine the degree and extent of impairment within the study area; (2) provide an assessment of contributing sources of bacteria to each of the 25 water bodies; and (3) determine the degree of bacterial load reductions that would be necessary to achieve positive water quality conditions (i.e., non-impairment) in each water body.

Water quality data were collected from NY State and Suffolk County and analyzed based on National Shellfish Sanitary Program (NSSP) guidance where possible. In some cases where data were limited additional criteria were developed for the purpose of completing a TMDL analysis.

An EPA-approved model, the Watershed Treatment Model (WTM), was applied to estimate relative sources of fecal coliform for each water body. Pathogen loading was based primarily on general land use literature values (anthropogenic and non-anthropogenic sources are not separated out). Separate waterfowl and domestic pet loading estimates were also used. Stormwater drainage maps were provided by the Peconic Estuary Program and modified as necessary to appropriate drainage scales associated with each of the 25 PWL water bodies. Some drainage areas were subdivided further based on site-specific conditions such as geomorphology and spatial distribution of sampling points. The WTM was used in combination with regional and local information on contributing sources of coliforms, but many of the model coefficients were based on default, national values where site-specific data were limited. Additional contributing sources such as sediment resuspension, wrack mats, waterfowl and other wildlife were evaluated and applied in a limited fashion. Suffolk County high resolution land parcel/land use data were used to drive the WTM. The resulting bacterial loads were then estimated as mass loads on an annual basis.

Based on a review of all available water quality data TMDL analyses were not conducted on all 25 water bodies. In some cases sufficient data was not available and in one case no exceedances were found based on all available data. These cases are illustrated in the table below.

TMDLs and associated load reductions were determined using the statistical rollback method, which is a linear reduction relationship between monitoring stations exhibiting impairment and the contributing drainage areas (i.e., watersheds). A margin of safety (MOS) was implicitly applied through a number of conservative assumptions and explicitly applied as 10% of the ultimate loading capacity.

This analysis has determined that the most significant contributors of pathogens to the water bodies within this study are nonpoint sources, particularly stormwater runoff containing waterfowl, wildlife, domestic pet, and livestock waste, as well as direct deposition of waterfowl waste. Stormwater runoff through municipal stormwater conveyance systems (MS4s) has been estimated and is relatively significant in most communities that are within MS4 regulations. Others sources such as septic systems, illicit marine vessel discharges, and other illicit activities may contribute pathogen loads at local and infrequent scales; however, these are not believed to be considerable sources at this time.

| Priority Water Bodies List No. | Water Body | TMDL Development Status<br>X = Completed<br>$N_d$ = Not completed due to incomplete data<br>$N_x$ = Not completed due to non-exceedance |
|---|---|---|
| 1701-0050 | Dering Harbor | X |
| 1701-0234 | Budds Pond | X |
| 1701-0049 | Stirling Creek and Basin | X |
| 1701-0235 | Town/Jockey Creeks and tidal tributaries | X |
| 1701-0236 | Goose Creek | X |
| 1701-0162 | Hashamomuck Pond | X |
| 1701-0245 | Richmond Creek and tidal tributaries | X |
| 1701-0247 | Tidal tributaries, Great Peconic Bay, Northshore, GPB-97 (Downs Creek) | $N_d$ |
| 1701-0247 | Tidal tributaries, Great Peconic Bay, Northshore, GPB-99 (Deep Hole Creek) | X |
| 1701-0247 | Tidal tributaries, Great Peconic Bay, Northshore, GPB-98 (Halls Creek) | $N_d$ |
| 1701-0247 | Tidal tributaries, Great Peconic Bay, Northshore, GPB-99-P492 (Unnamed Pond) | $N_d$ |
| 1701-0247 | Tidal tributaries, Great Peconic Bay, Northshore, GPB-100 (James Creek) | X |
| 1701-0030 | Flanders Bay, east/center and tributaries | X |
| 1701-0272 | Reeves Bay and tidal tributaries | X |
| 1701-0051 | Sebonac Creek/Bullhead Bay and tidal tributaries | X |
| 1701-0354 | Scallop Pond | $N_x$ |
| 1701-0037 | North Sea Harbor and tributaries | X |
| 1701-0048 | Wooley Pond | X |
| 1701-0237 | Noyac Creek and tidal tributaries | X |
| 1701-0035 | Sag Harbor and Sag Harbor Cove | X |
| 1701-0046 | Northwest Creek and tidal tributaries | X |
| 1701-0047 | Acabonac Harbor | X |
| 1701-0031 | Montauk Lake | X |
| 1701-0169 | Oyster Pond/Lake Munchogue | $N_d$ |
| 1701-0253 | Little Sebonac Creek | X |

Using these TMDLs, New York State, with support from the Peconic Estuary Program Management Conference and Comprehensive Conservation and Management Plan process (i.e., triennial updates), should prioritize subwatersheds and develop and implement detailed pathogen reduction plans. Also, TMDLs should be revisited and updated if new information (e.g., Peconic Estuary Program Waterfowl Study) warrants.

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# 1.0 INTRODUCTION

## 1.1 Background

Section 303(d) of the Clean Water Act (CWA) as amended by the Water Quality Act of 1987, Public Law 100-4, and the United States Environmental Protection Agency's (USEPA/EPA) Water Quality Planning and Management Regulations (40 CFR, Part 130) requires each state to identify those waters within its boundaries not meeting water quality standards for any given pollutant applicable to the water's designated uses. Total Maximum Daily Loads (TMDLs) are required to be developed for all pollutants violating or causing violation of applicable water quality standards for each impaired water body. A TMDL determines the maximum amount of pollutant that a water body is capable of assimilating while continuing to meet the existing water quality standards. Such loads are established for all the point and nonpoint sources of pollution that cause the impairment at levels necessary to meet the applicable standards with consideration given to seasonal variations and margin of safety. Therefore, TMDLs provide the framework that allows states to establish and implement pollution control and management plans with the ultimate goal indicated in Section 101(a)(2) of the CWA: "water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water, wherever attainable" (USEPA, 1991).

On the state's 2004 303(d) list, the New York State Department of Environmental Conservation (NYSDEC) listed 25 separate embayments and tributaries in the Peconic Bay estuary as candidates for TMDL development based on impairments due to pathogen levels (NYSDEC, 2004). These 25 water bodies are listed in Table 1-1 and their locations within Peconic Bay are shown in Figure 1-1. The shellfish closure areas in each water body are divided into zones which are further described in Section 2. TMDLs are developed for those zones that are either uncertified/conditionally certified or seasonally certified for shellfish harvesting. See below for the definitions of the various types of shellfish area closures/certifications.

The NYSDEC maintains several types of shellfish area closure classifications. Closed shellfish areas can be categorized as *administrative closures* or *water quality closures*. *Administrative closures* are permanently off limits to shellfishing and include areas surrounding known sources of pathogens (e.g., sewage treatment plant outfalls or high density mooring locations). *Water quality closures* include areas that have failed to meet the National Shellfish Sanitation Program's (NSSP) standards for open shellfish areas. Water quality closures can be further divided into three sub-categories:

- **Year-round closures:** These areas do not meet the NSSP standards at any time of the year and are closed to shellfishing.
- **Seasonal closures:** These areas do not meet NSSP standards during a certain time of year (usually during May to October) and therefore are only open to shellfishing during specific times of the year.
- **Conditional closures:** These areas are usually classified as uncertified, but may be certified by NYSDEC generally from mid-December through mid-April when nonpoint source pollution is reduced. Before an uncertified shellfishing area can be designated as conditionally certified, NYSDEC performs water quality evaluations to determine the amount of rainfall and runoff an area can receive and still meet water quality standards for shellfishing. During the operation of a conditional program, rainfall is measured daily in the vicinity of the conditional harvest area. Shellfish harvesters are allowed to work in the area on a day-to-day basis during dry weather and moderate rainfall conditions, when the daily rainfall reading is less than the threshold amount. When the daily threshold amount is exceeded, the area is closed for a period of seven days and re-opened (certified) on the eighth day if the daily rainfalls during the closed period do not exceed

the threshold amount. The fact that the threshold rainfall for many of the Peconic Bay water bodies with conditional certification has typically been around 0.25 inches demonstrates how sensitive water quality in these areas is to the effects of bacteria-laden storm water runoff in combination with other potential sources (e.g., failing on site disposal systems, boater waste, direct waterfowl inputs). Since conditionally certified areas are actually closed areas whose designation can change from year-to-year, any sampling station located within a conditionally certified area at the writing of this report is treated as being in a closed area.

The scope of this study is limited to New York shellfishing waters classified as Class SA that are listed in the 303(d) list as impacted by pathogens in the Peconic Estuary. The Class SA waters included in this study are listed in Table 1-1 and illustrated in Section 2 (Figures 2-1 through 2-23). These figures also includes shellfish closure areas and stormwater conveyance systems. The locations of shellfish closure areas were made available from the NYSDEC Shellfisheries Section. The information illustrated on stormwater conveyance systems was the best information available from Suffolk County at the time of this report, and may be updated as more information becomes available in the future.

**Table 1-1. Water Bodies in the 303(d) List Within the Peconic Bay Study Area.**

| Priority Water Bodies List No. | Water Body |
|---|---|
| 1701-0050 | Dering Harbor |
| 1701-0234 | Budds Pond |
| 1701-0049 | Stirling Creek and Basin |
| 1701-0235 | Town/Jockey Creeks and tidal tributaries |
| 1701-0236 | Goose Creek |
| 1701-0162 | Hashamomuck Pond |
| 1701-0245 | Richmond Creek and tidal tributaries |
| 1701-0247 | Tidal tributaries, Great Peconic Bay, Northshore, GPB-97 (Downs Creek) |
| 1701-0247 | Tidal tributaries, Great Peconic Bay, Northshore, GPB-99 (Deep Hole Creek) |
| 1701-0247 | Tidal tributaries, Great Peconic Bay, Northshore, GPB-98 (Halls Creek) |
| 1701-0247 | Tidal tributaries, Great Peconic Bay, Northshore, GPB-99-P492 (Unnamed Pond) |
| 1701-0247 | Tidal tributaries, Great Peconic Bay, Northshore, GPB-100 (James Creek) |
| 1701-0030 | Flanders Bay, east/center and tributaries |
| 1701-0272 | Reeves Bay and tidal tributaries |
| 1701-0051 | Sebonac Creek/Bullhead Bay and tidal tributaries |
| 1701-0354 | Scallop Pond |
| 1701-0037 | North Sea Harbor and tributaries |
| 1701-0048 | Wooley Pond |
| 1701-0237 | Noyac Creek and tidal tributaries |
| 1701-0035 | Sag Harbor and Sag Harbor Cove |
| 1701-0046 | Northwest Creek and tidal tributaries |
| 1701-0047 | Acabonac Harbor |
| 1701-0031 | Montauk Lake |
| 1701-0169 | Oyster Pond/Lake Munchogue |
| 1701-0253 | Little Sebonac Creek |

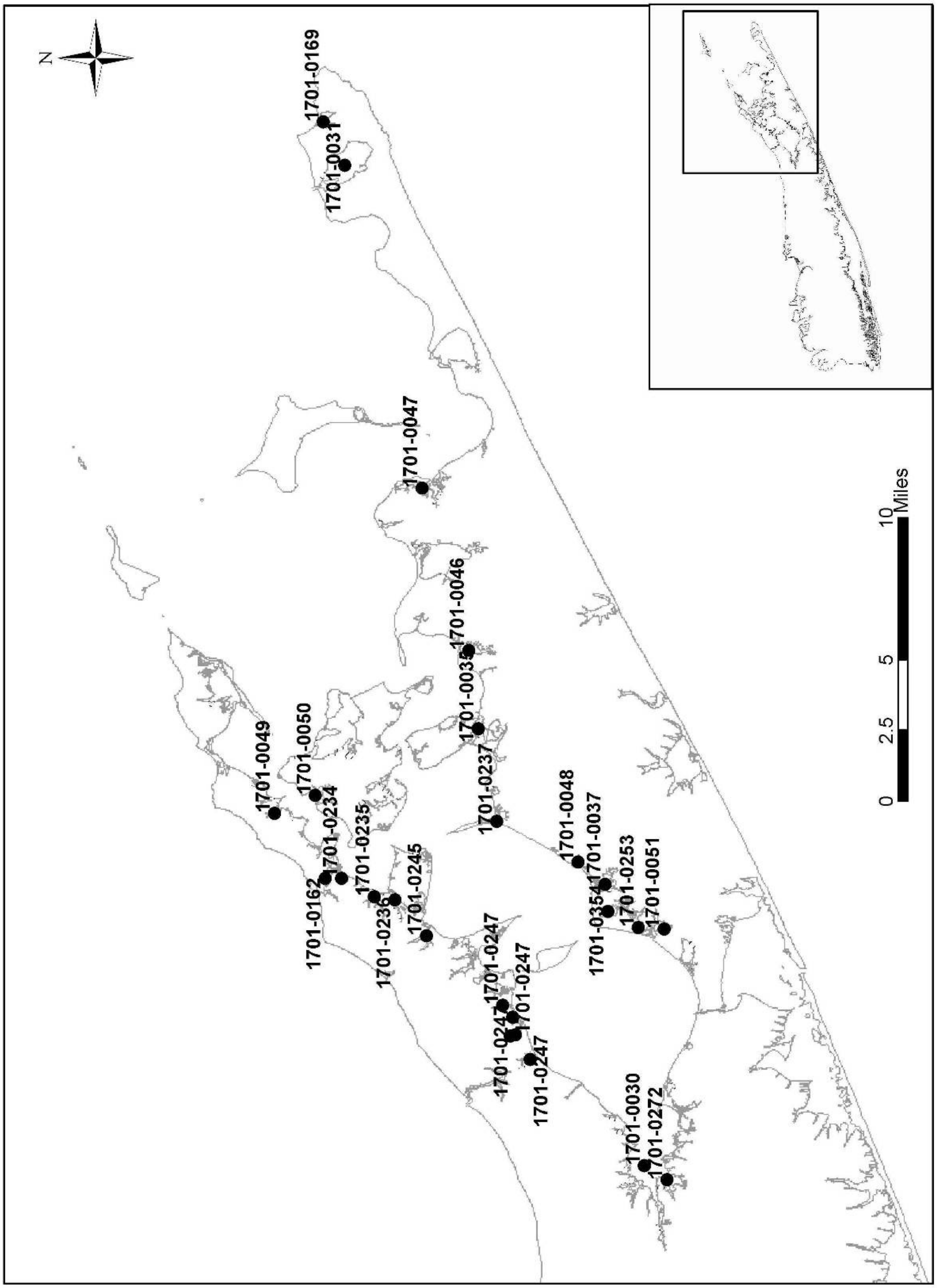


**Figure 1-1. Locations of the 25 Peconic Bay Water Bodies (Refer to Table 1-1 for PWL numbers).**

The zones that are subjected to administrative closures will continue to be closed as discussed in Section 2.

## 1.2 Study Area Description

The Peconic Bay estuary is located between the North and South Forks of Long Island and consists of approximately 100 separate embayments and harbors. The towns that surround the estuary have management authority over the shellfish resources within their respective boundaries. Table 1-1 lists the 25 water bodies covered in this TMDL report. Figure 1-1 is a map of the Peconic Bay estuary region, with each of the 25 water bodies indicated. Additional figures that illustrate further details for each individual water body are presented in Section 2.

The Peconic Estuary, as defined by the Peconic Estuary Program (PEP), consists of approximately 158,000 acres of surface water. Of the approximately 126,000 acres of land in the Peconic watershed, roughly half is developed (including agricultural land and golf courses), over 20% is available for development, and over 30% is protected open space (as of 2001). PEP's Comprehensive Conservation and Management Plan (CCMP) (PEP, 2001) indicates that stormwater runoff from roads, open areas, and undeveloped land is the greatest contributor of nonpoint source pathogenic pollutants to Peconic Bay and its embayments. In June 2002, the entire Peconic Estuary (all open waters, harbors, creeks west of an imaginary line from Orient Point to Montauk Point) was approved as a designated Vessel Waste No Discharge Zone (NDZ)[1]. Due to this NDZ designation, boat-derived waste is undoubtedly a less significant nonpoint source than runoff. Sewage treatment plants (STPs) (e.g., Riverhead, Sag Harbor, Brookhaven National Laboratory, Shelter Island Heights, Calverton Enterprise Park), Atlantis Marine World in Riverhead, Corwin Duck Farm located along Meetinghouse Creek[2], and the municipal separate storm sewer systems (MS4s) in Southampton and Riverhead are among the point sources with the potential to contribute pathogens to the estuary. The STPs employ year-round sodium hypochlorite (Shelter Island Heights) or ultraviolet (Riverhead, Sag Harbor, and Brookhaven National Laboratory) disinfection, which kills coliforms, but not necessarily all viruses. While the majority of the Peconic area is unsewered and is serviced by onsite disposal systems, there is limited evidence to suggest that inadequately sited or functioning systems are causing or contributing to water quality problems, though it remains a possibility. Atlantis Marine World only discharges approximately 2,000 gallons per day and pretreats its discharge using ozone or chlorine. The Corwin Duck Farm is currently constructing an anaerobic/aerobic wastewater treatment system to replace a man-made wetland treatment system. Therefore, nonpoint sources, particularly stormwater runoff containing waterfowl, wildlife, domestic pet, and livestock waste, as well as direct deposition of waterfowl waste, are the most significant contributors of pathogens to Peconic Bay and are likely responsible for the closing of any shellfish areas in the 25 water bodies included in this report.

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[1] While a vessel is inside a NDZ, the discharge valve of a Type I or Type II marine sanitation device (MSD) (which treats the sewage before discharging it) must be visibly closed, preventing wastes from being discharged into surrounding waters. A padlock or a non-releasable wire tie can be used to secure the valve, or the valve handle can be completely removed. A Type III MSD has a holding tank and is permitted in a NDZ as long as pumpout facilities are used to empty the tank.

[2] Meetinghouse Creek is not one of the water bodies addressed in this report, although it empties into Flanders Bay north.

# 2.0 PROBLEM IDENTIFICATION

## 2.1 Problem Definition

Shellfish harvesting is the designated use for the 25 Peconic Bay water bodies described in this report. Molluscan shellfish, such as oysters and clams, are suspension feeders. They effectively filter the water around them to feed on microscopic organisms and other particulates suspended in the water column. If the waters are polluted, pathogens (e.g., viruses or bacteria) that are harmful to humans can potentially be retained in the shellfish. Because oysters and clams are often eaten raw or partially cooked, if they are harvested from waters that are polluted, they have the potential to cause serious illness or death to shellfish consumers. However, because pathogens in a shellfish area may be present in low numbers and difficult to identify, other, more plentiful yet non-harmful bacteria that are commonly associated with pathogens are monitored instead. The detection of these pathogen indicators is assumed to be a reliable sign that dangerous pathogens themselves may also be present. Bacteria associated with human and animal waste (e.g., total and fecal coliforms) are often monitored as pathogen indicators in shellfish growing areas.

New York State Department of Environmental Conservation (NYSDEC) has listed 25 Peconic estuary water bodies (as described in Table 1-1) in the 2004 303(d) list (NYSDEC, 2004) among the water bodies closed for shellfish harvesting due to pathogen impairment. Table 2-1 further provides a crosswalk between the priority water body list (PWL) name and number, water index number (WIN), shellfish growing area (SGA), and the New York State Codes, Rules and Regulations (NYCRR) references. Throughout this report, the water bodies will be referred to by their PWL name and number, and they will be addressed in the same order as presented in Table 2-1. Below are brief characterizations of shellfish harvesting conditions in each water body. Also included are figures that depict New York state Class SA waters and the certification category (e.g., seasonal, closed) for these waters. Since conditionally open areas change designation based on various factors such as storm events and other conditions, they are included within the 'closed' sections. For development of the *Peconic Estuary Stormwater Assessment and Planning Tool* (Horsely and Witten, 2003), the Peconic BayKeeper collected storm drain conveyance and outfall information from village, town, county, and state agencies in 2000. These attributes are included on the figures below. Field verifications by Peconic BayKeeper were conducted and Horsely and Witten digitized the dataset. The storm drain and outfall information is a first-order assessment to help characterize regional stormwater inputs. Storm drain outfalls include various pipes ranging from 4 to 48 inches and constructed of materials such as metal, plastic, PVC, and concrete. Drainage ditches are also defined as stormdrain outfalls. The GIS coverages depicted in the following figures are based on the best information available as of the writing of this report. These coverages should not be used as the sole reference for site-specific stormwater initiatives. Local, county, and state agencies should be consulted for the most current information.

**Table 2-1. Crosswalk Table of Selected Peconic Bay 303(d) Waters with Shellfish Growing Areas and the NYCRR.**

| New York State 303(d) list (PWL = Priority Water body List; WIN = Water Index Number) | | | Shellfish Growing Area (SGA) | | New York [State] Codes, Rules, and Regulations (NYCRR) | | | |
|---|---|---|---|---|---|---|---|---|
| **PWL Name and Number** | **WIN** | **Year** | **SGA #** | **SGA Name** | **Part** | **Item #** | **Class** | **Reference map** |
| Dering Harbor (1701-0050) | (MW6.1b) GB-SIS(-DH) | 1998 | 18 | Shelter Island Sound South | 924 | 47 | SA* | Q-30se |
| Budds Pond (1701-0234) | (MW6.1b) GB-SIS-80c-P418a | 2002 | | | 924 | 75 | SA | Q-30sw |
| Stirling Creek and Basin (1701-0049) | (MW6.1b) GB-SIS-78 | 1998 | 52 | Stirling Basin | 924 | 62 | SA | Q-30se |
| Town/Jockey Creeks and tidal tribs (1701-0235) | (MW6.1b) GB-SIS-83a,83b | 2002 | 22 | Southold Bay | 924 | 79 | SA | Q-30sw |
| Goose Creek (1701-0236) | (MW6.1b) GB-SIS-84-P423 | 2002 | | | 924 | 82 | SA | Q-30sw |
| Hashamomuck Pond (1701-0162) | (MW6.1b) GB-SIS-P420 | 1998 | 23 | Hashamomuck Pond | 924 | 76 | SA | Q-30sw |
| Richmond Creek and tidal tribs (1701-0245) | (MW6.1c) GB..LPB-90 | 2002 | 26 | Little Peconic Bay | 924 | 121 | SA | Q-30sw |
| Tidal Tribs, Gr Peconic Bay, Downs Ck (1701-0247) | (MW6.1d) GB..GPB- 97 thru 104 | 2002 | 28 | Great Peconic Bay | 924 | 147 | SA | Q-30sw; R-30nw |
| Tidal Tribs, Gr Peconic Bay, Deep Hole Ck (1701-0247) | | | | | 924 | 152 | SA | R-29ne |
| Tidal Tribs, Gr Peconic Bay, Halls Ck (1701-0247) | | | | | 924 | 149 | SA | R-29ne |
| Tidal Tribs, Gr Peconic Bay, Unnamed (1701-0247) | | | | | 924 | 153 | SA | R-29ne |
| Tidal Tribs, Gr James Ck (1701-0247) | | | | | 924 | 155 | SA | R-29ne |

**Table 2-1. Crosswalk Table of Selected Peconic Bay 303(d) Waters with Shellfish Growing Areas and the NYCRR, continued.**

| New York State 303(d) list (PWL = Priority Water body List; WIN = Water Index Number) | | | Shellfish Growing Area (SGA) | | New York [State] Codes, Rules, and Regulations (NYCRR) | | | |
|---|---|---|---|---|---|---|---|---|
| **PWL Name and Number** | **WIN** | **Year** | **SGA #** | **SGA Name** | **Part** | **Item #** | **Class** | **Reference map** |
| Flanders Bay, east/center, and tribs (1701-0030) | (MW6.1e) FB | 1998 | 29 | Flanders Bay | 921 | 1 | SA | 2 |
| Reeves Bay and tidal tribs (1701-0272) | (MW6.3a) GB..FB-RB | 2002 | 29 | Flanders Bay | 921 | 60 | SA | 2 |
| Sebonac Cr/Bullhead Bay and tidal tribs (1701-0051) | (MW6.3b) GB..GPB-122-P648 | 1998 | 62 | Sebonac Creek Complex | 924 | 176 | SA SA | R-30nw |
| Scallop Pond (1701-0354) | (MW6.3b) GB..GPB-122a-P652 | 2002 | | | 924 | 178 | SA | R-30nw |
| North Sea Harbor and tribs (1701-0037) | (MW6.3c) GB..LPB-123-P659 | 1998 | 63 | North Sea | 924 | 130 | SA | R-30nw |
| Wooley Pond (1701-0048) | (MW6.3c) GB..LPB-124-P665 | 1998 | 64 | Wooley Pond | 924 | 138 | SA | R-30nw |
| Noyac Creek and tidal tribs (1701-0237) | (MW6.3d) GB-SIS-126 | 2002 | 21 | Noyac Bay | 924 | 85 | SA | R-30ne; Q-30se |
| Sag Harbor and Sag Harbor Cove (1701-0035) | (MW6.3d) GB-SIS-SHB,SHC | 1998 | 19 | Sag Harbor | 924 | 98 | SA | Q-30se; R-30ne |
| Northwest Creek and tidal tribs (1701-0046) | (MW6.3e) GB-SIS-NH-136 | 1998 | 17 | Northwest Harbor | 924 | 32 | SA | Q-30se; R-30ne; Q-31sw |
| Acabonac Harbor (1701-0047) | (MW6.3f) GB-AH | 1998 | 14 | Acabonac Harbor | 924 | 42 | SA | Q-31sw |
| Montauk Lake (1701-0031) | (MW6.3g) BIS..P761 | 1998 | 13 | Montauk Harbor | 924 | 188 | SA | Q-32sw |
| Oyster Pond/Lake Munchogue (1701-0169) | (MW6.3g) BIS..P764 | 1998 | 70 | Oyster Pond | 924 | 192 | SA | Q-32sw |
| Little Sebonac Creek (1701-0253) | (MW6.3b) GB..GPB-122a-P651 | 2002 | 62 | Sebonac Creek Complex | 924 | 177 | SA | R-30nw |

* Class SA waters are surface saline waters. The best usages of Class SA waters are shellfishing for market purposes, primary and secondary contact recreation, and fishing. See New York State Codes, Rules, and Regulations (NYCRR) Title 6, Chapter X, §701.

**Dering Harbor (1701-0050):** Listed as one of the impaired water bodies in NYS's 303(d) list, Dering Harbor is located on the northwest coast of Shelter Island. Dering Harbor is classified as uncertified. From December 28, 2005 through May 14, 2006, the waters of Dering Harbor normally designated as closed were classified as conditionally certified, with the exception of Chase Creek (tributary south of Station 5.2 in Figure 2-1). This conditional designation is not automatic and is established on an annual basis. Conditional areas remain open to shellfishing, provided that the Shelter Island Heights STP continues normal operations and treatment activities.

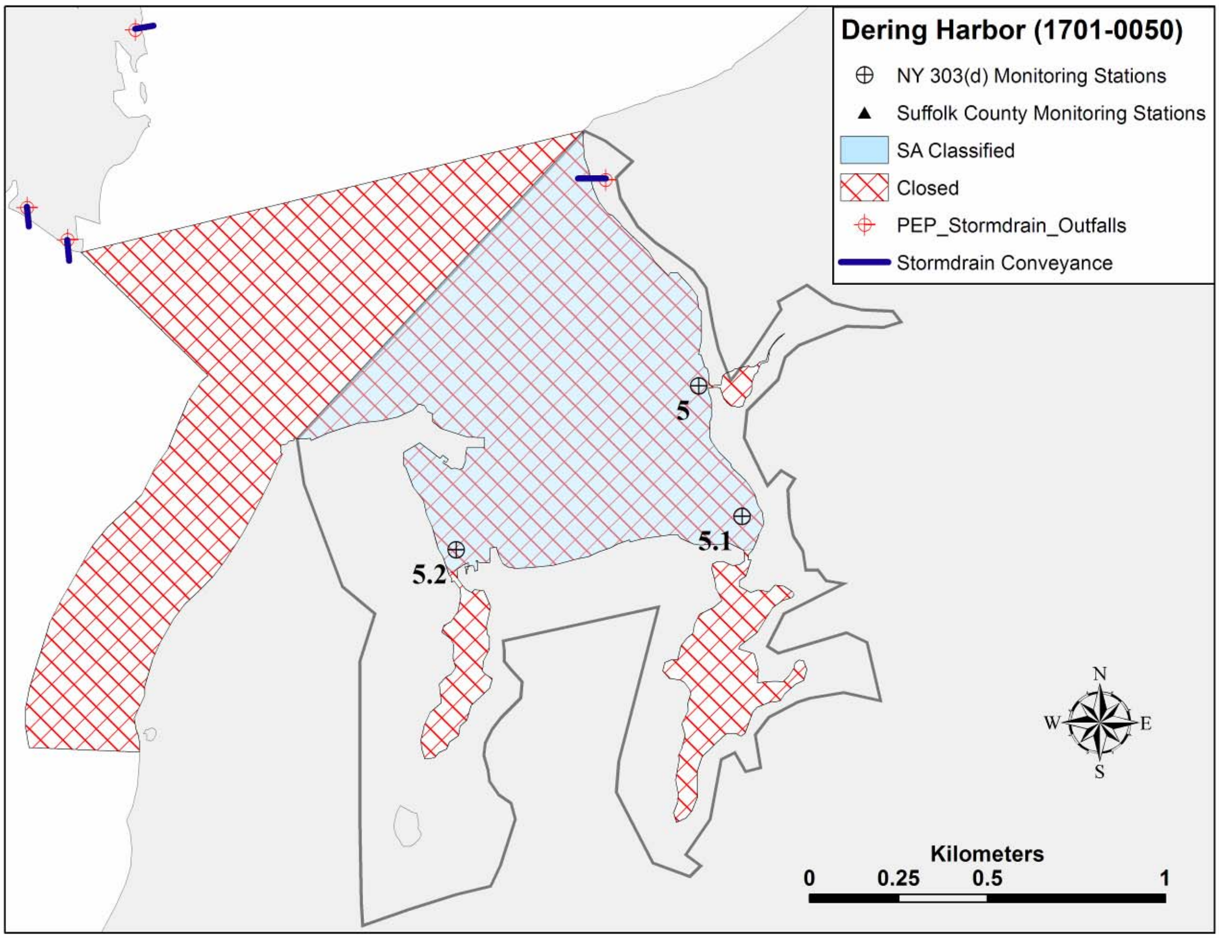


**Figure 2-1. Dering Harbor 303(d). Classification indicating uncertified (closed) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**Budds Pond:** Budds Pond is a semi-enclosed water body situated on the North Fork, bordering Shelter Island Sound. The pond is designated as seasonally certified for shellfishing from November 1 until May 14.

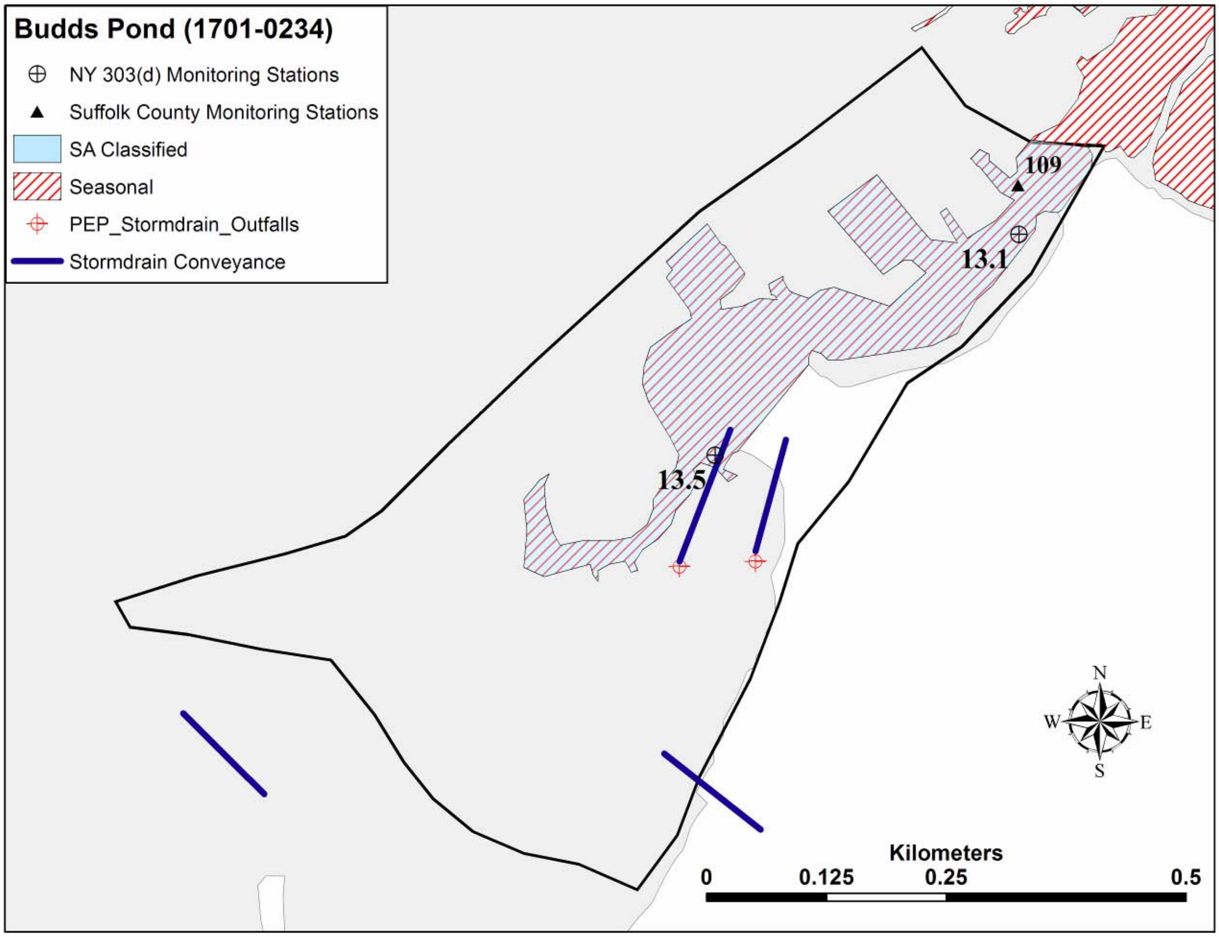


**Figure 2-2. Budds Pond 303(d). Classification indicating seasonally certified (seasonal) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**Stirling Creek and Basin:** Stirling Creek is located on the southern edge of the North Fork, facing Shelter Island. The water body is designated as uncertified.

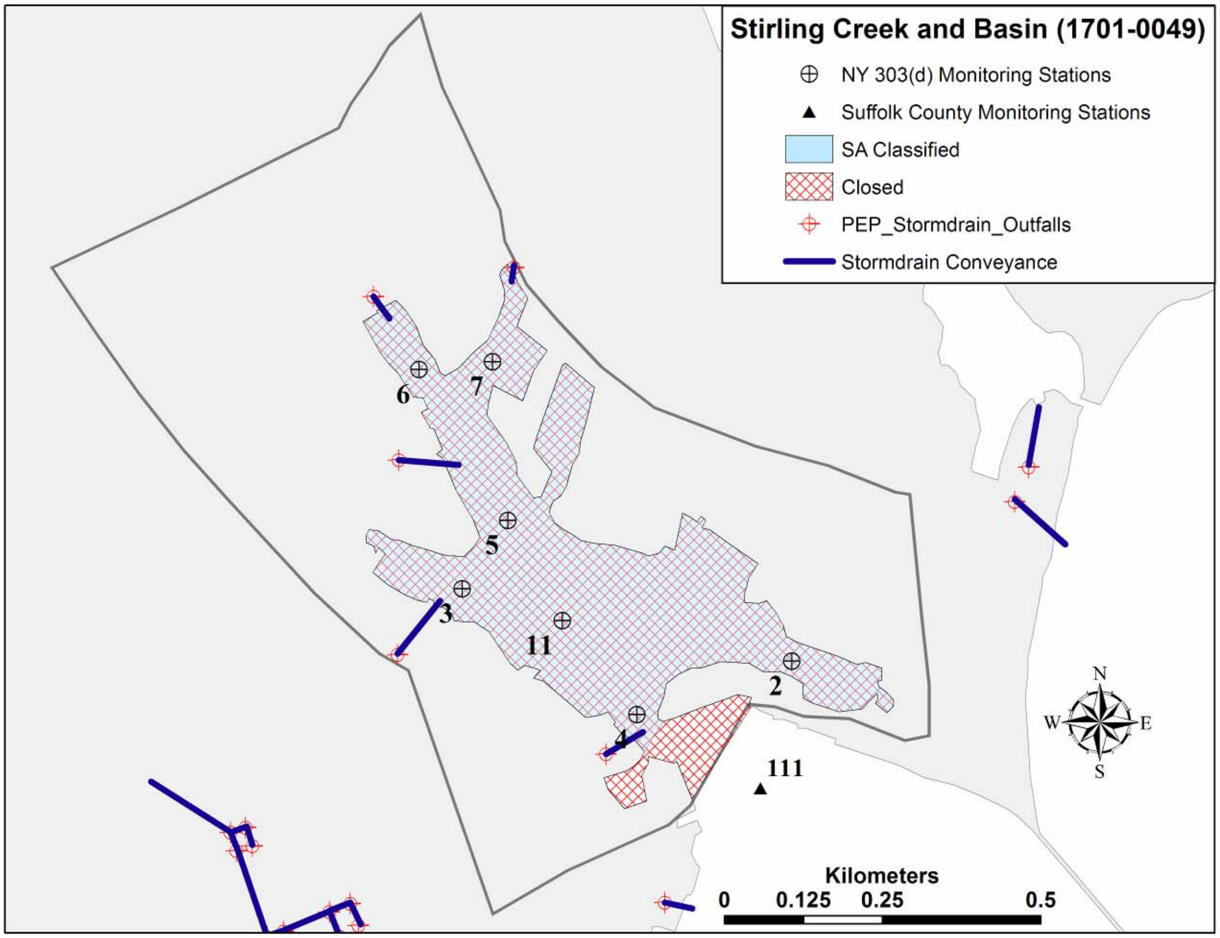


**Figure 2-3. Stirling Creek and Basin 303(d). Classification indicating uncertified (closed) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**Town/Jockey Creeks and tidal tributaries:** The Town and Jockey Creeks and their tributaries border Southold Bay within Shelter Island Sound. Town Creek, its tributaries, and parts of Jockey Creek are seasonally certified from January 1 through April 14. Jockey Creek, however, is uncertified from its headwaters easterly to specific manmade landmarks on either side of the creek.

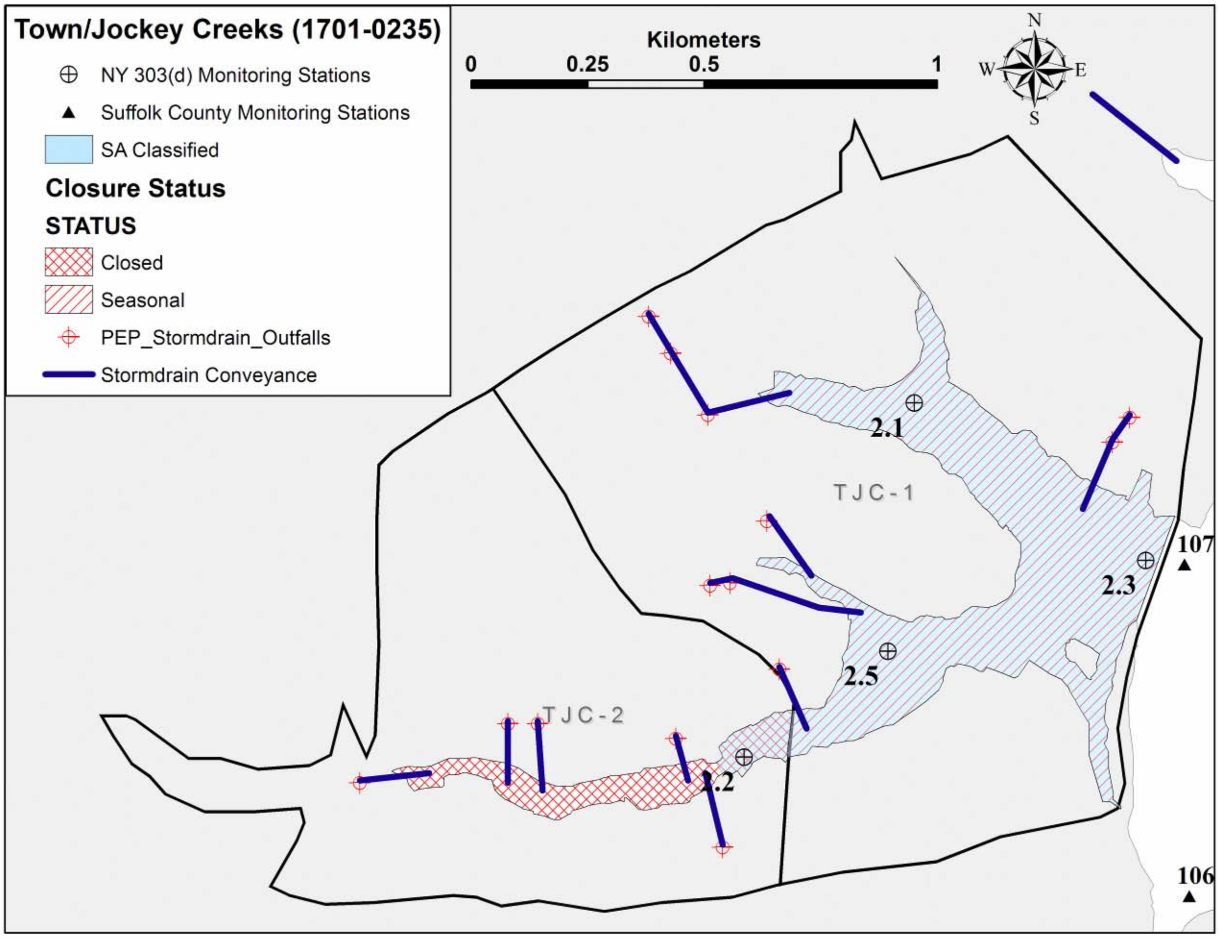


**Figure 2-4. Town/Jockey Creeks 303(d). Classification indicating seasonally certified (seasonal) and uncertified (closed) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**Goose Creek:** Goose Creek is located south of Town and Jockey Creeks, also emptying into Southold Bay. Goose Creek is seasonally certified for shellfishing between January 1 and April 14, inclusive.

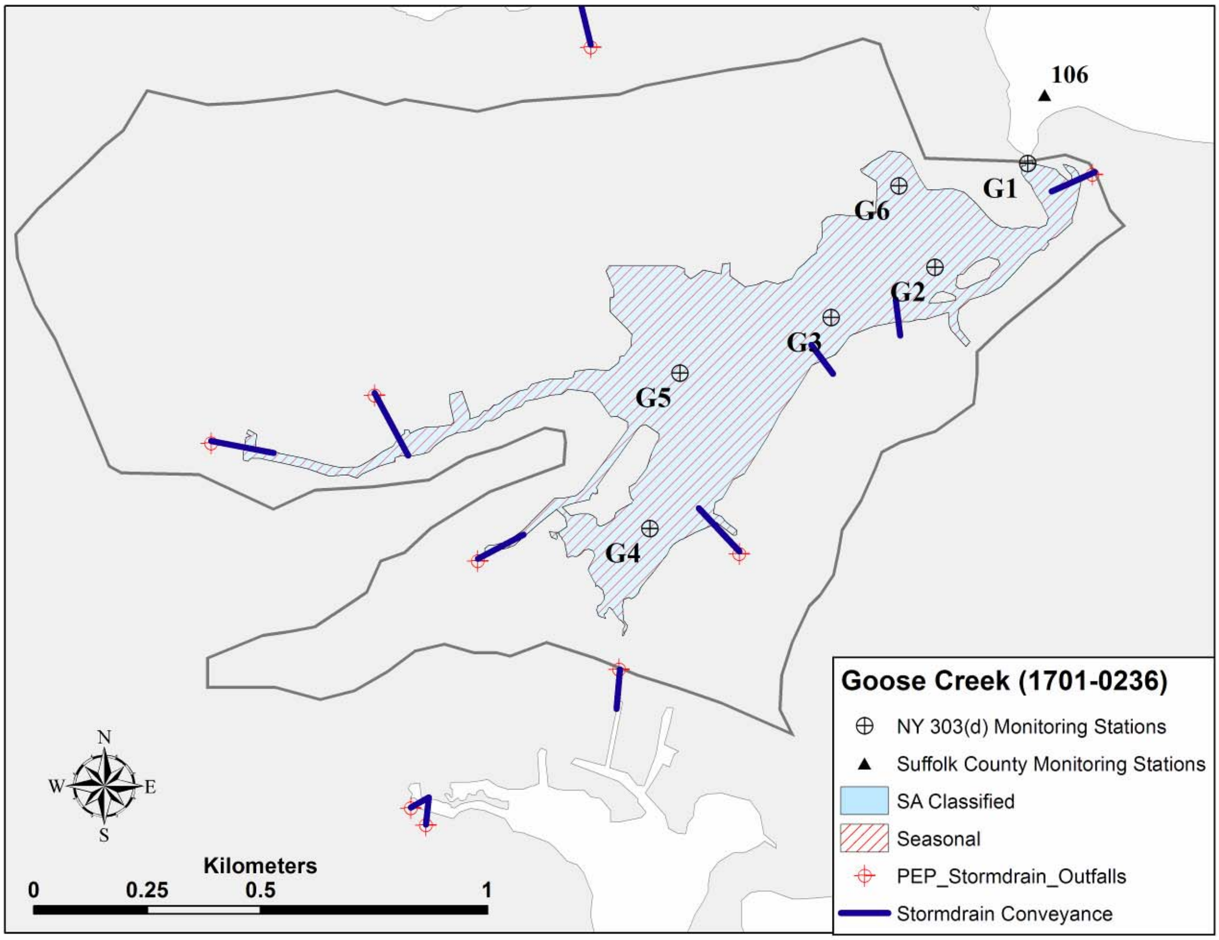


**Figure 2-5. Goose Creek 303(d). Classification indicating seasonally certified (seasonal) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**Hashamomuck Pond:** Hashamomuck Pond is a large water body located on the North Fork that empties into a protected basin that includes Budds Pond, among other water bodies, and that borders Shelter Island Sound. Hashamomuck Pond is seasonally certified for shellfishing between December 1 and April 30. The creek that flows into Hashamomuck Pond (Long Creek), however, is uncertified for shellfishing. From December 21, 2005 through April 30, 2006, the waters of Hashamomuck Pond normally designated as closed were classified as conditionally certified, with the exception of the Clay Pit (enclosed pond in Zone HP-2 in Figure 2-6). This conditional designation is not automatic and is established on an annual basis. Conditional areas remain open to shellfishing provided that not more that 0.35 inches of rainfall is recorded in a 24-hour period.

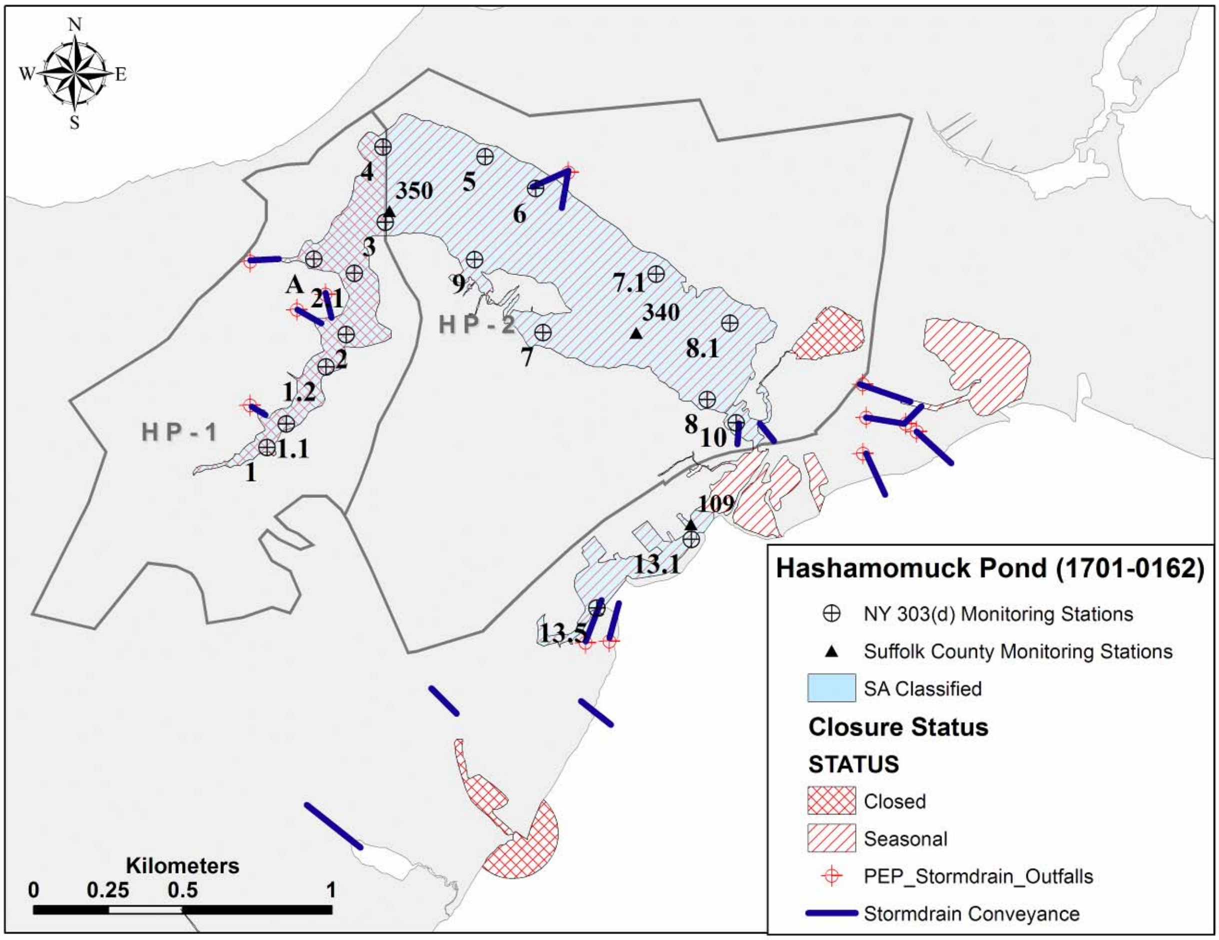


**Figure 2-6. Hashamomuck 303(d). Classification indicating seasonally certified (seasonal) and uncertified (closed) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**Richmond Creek and tidal tributaries:** Richmond Creek and its tidal tributaries lie farther west on the North Fork than the previously described water bodies, bordering Little Peconic Bay. All the water bodies are seasonally certified for shellfishing between November 1 and March 31.

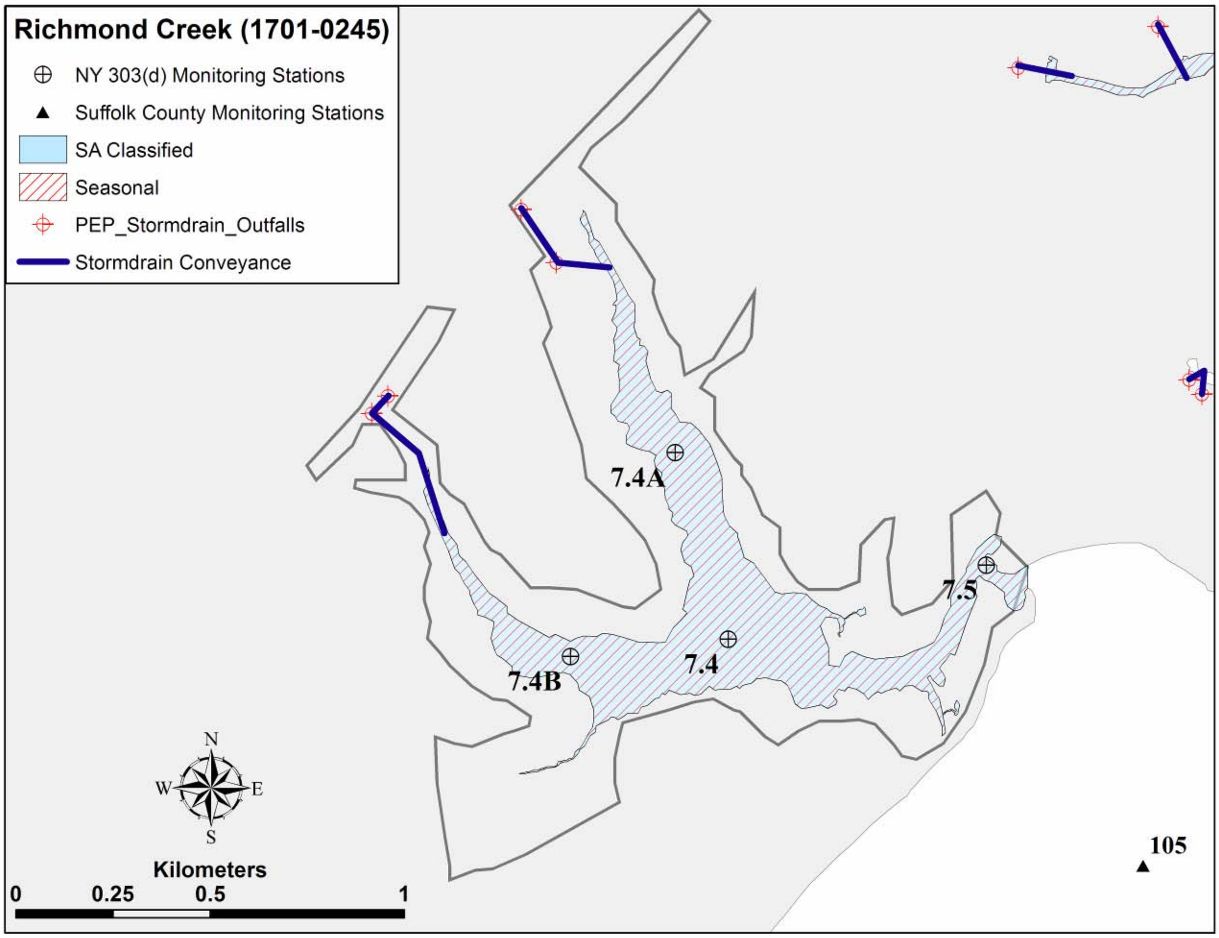


**Figure 2-7. Richmond Creek 303(d). Classification indicating seasonally certified (seasonal) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**Tidal tributaries of Great Peconic Bay—Downs Creek, Deep Hole Creek (and "Unnamed Pond"), Halls Creek, and James Creek:** These five water bodies are various small tidal tributaries that empty into Great Peconic Bay on the North Fork. James Creek, Deep Hole Creek, and Halls Creek are all seasonally certified for shellfishing between December 1 and April 30. Unnamed Pond is the lagoon-like water body immediately north of Deep Hole Creek. Downs Creek is currently certified.

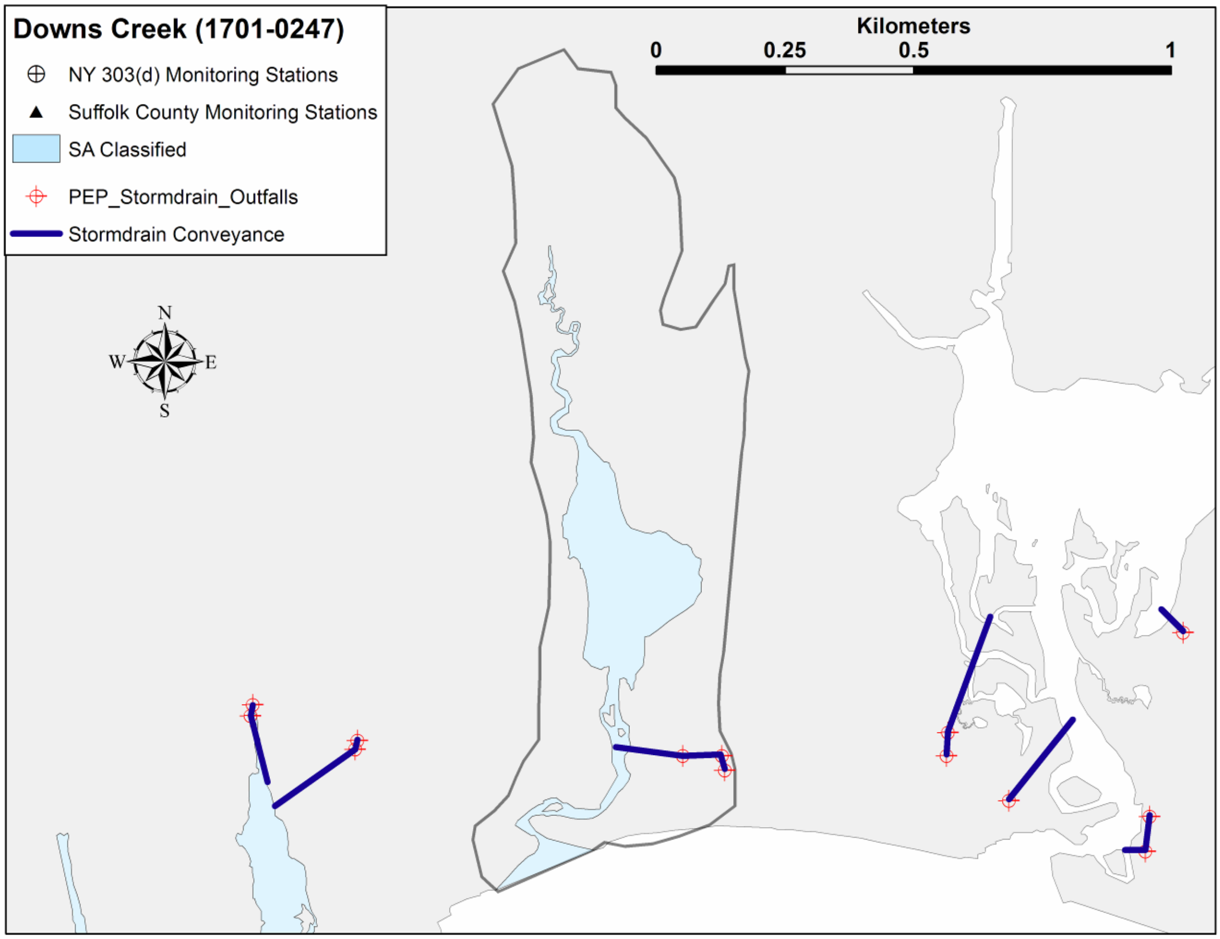


**Figure 2-8. Downs Creek 303(d). Classification indicating SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

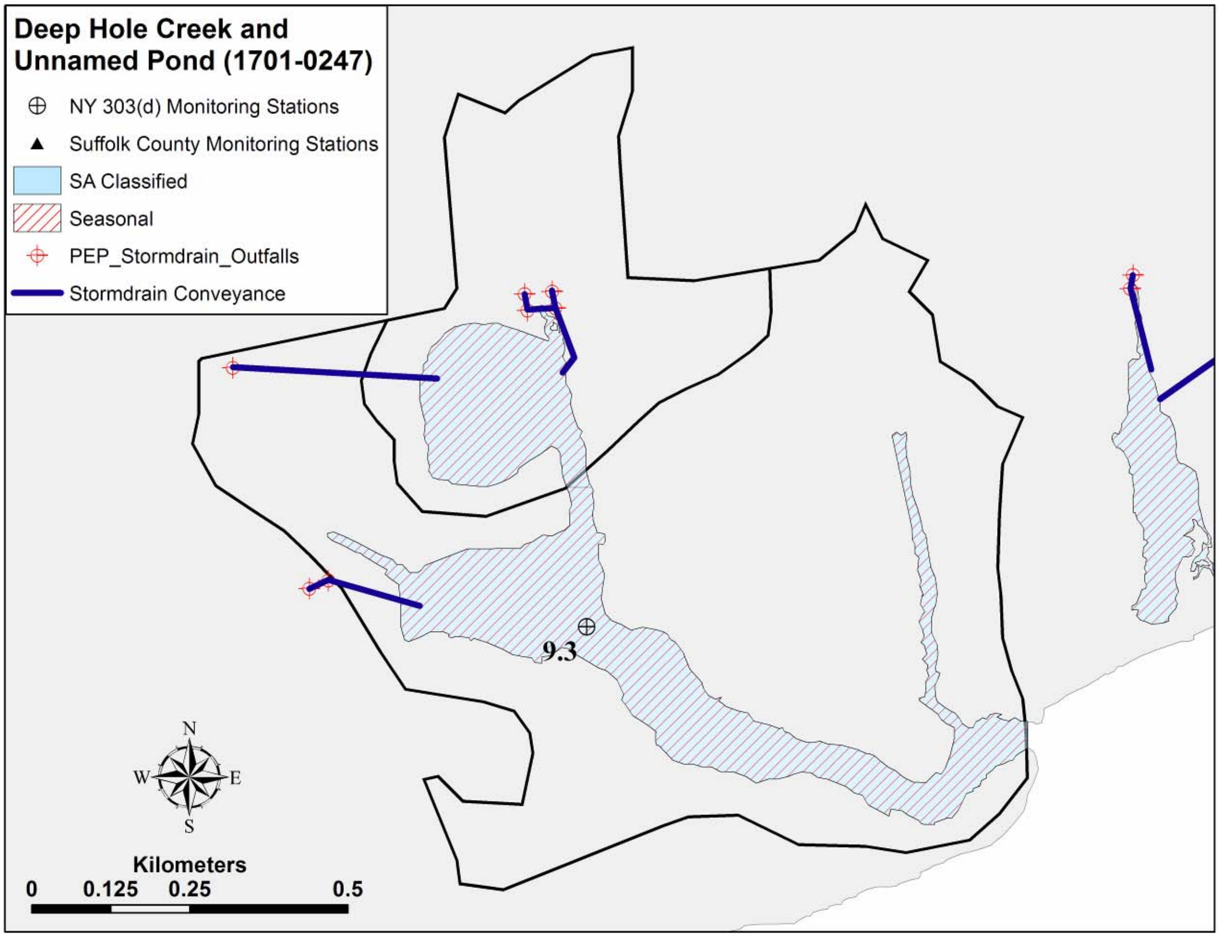


**Figure 2-9. Deep Hole Creek (and "Unnamed Pond") 303(d). Classification indicating seasonally certified (seasonal) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

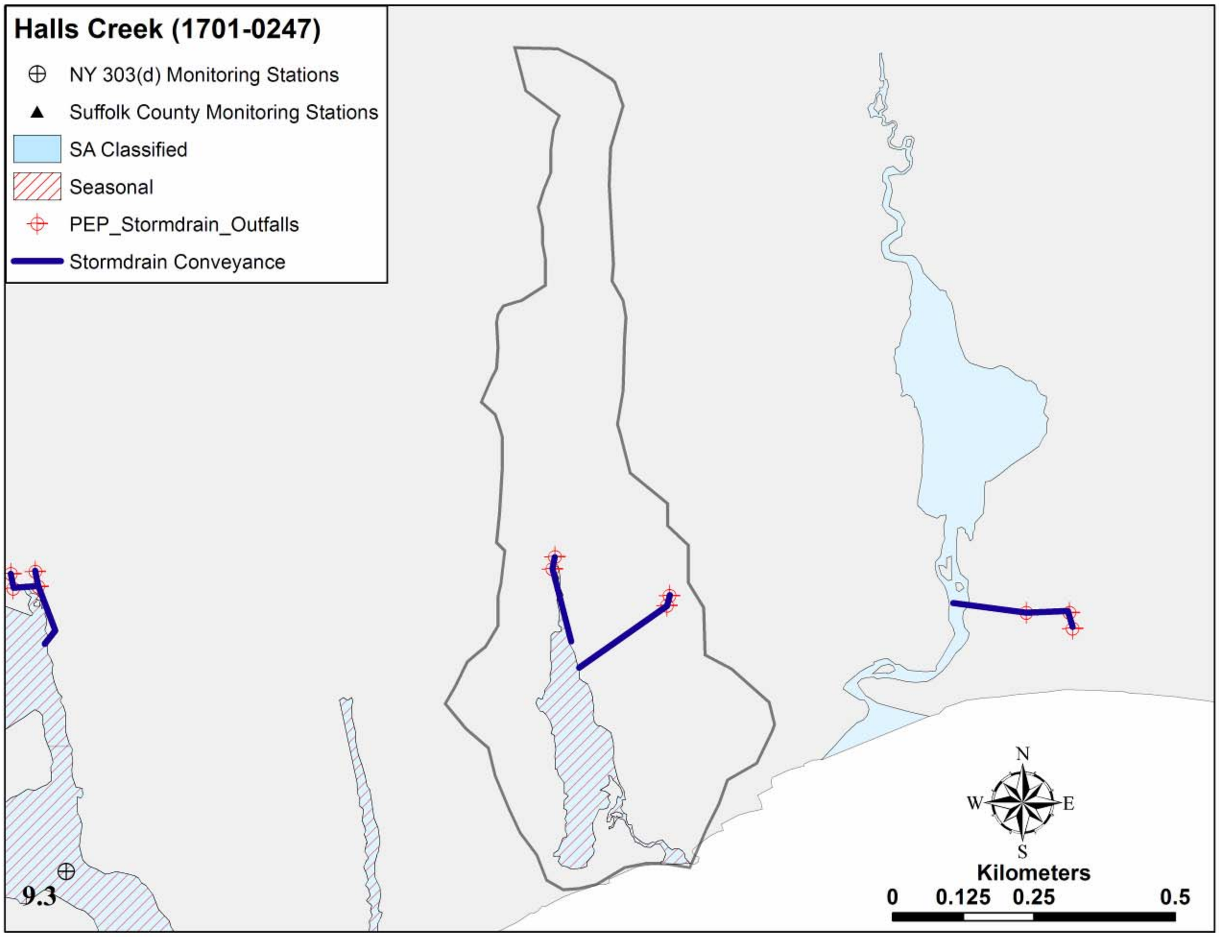


**Figure 2-10. Halls Creek 303(d). Classification indicating seasonally certified (seasonal) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

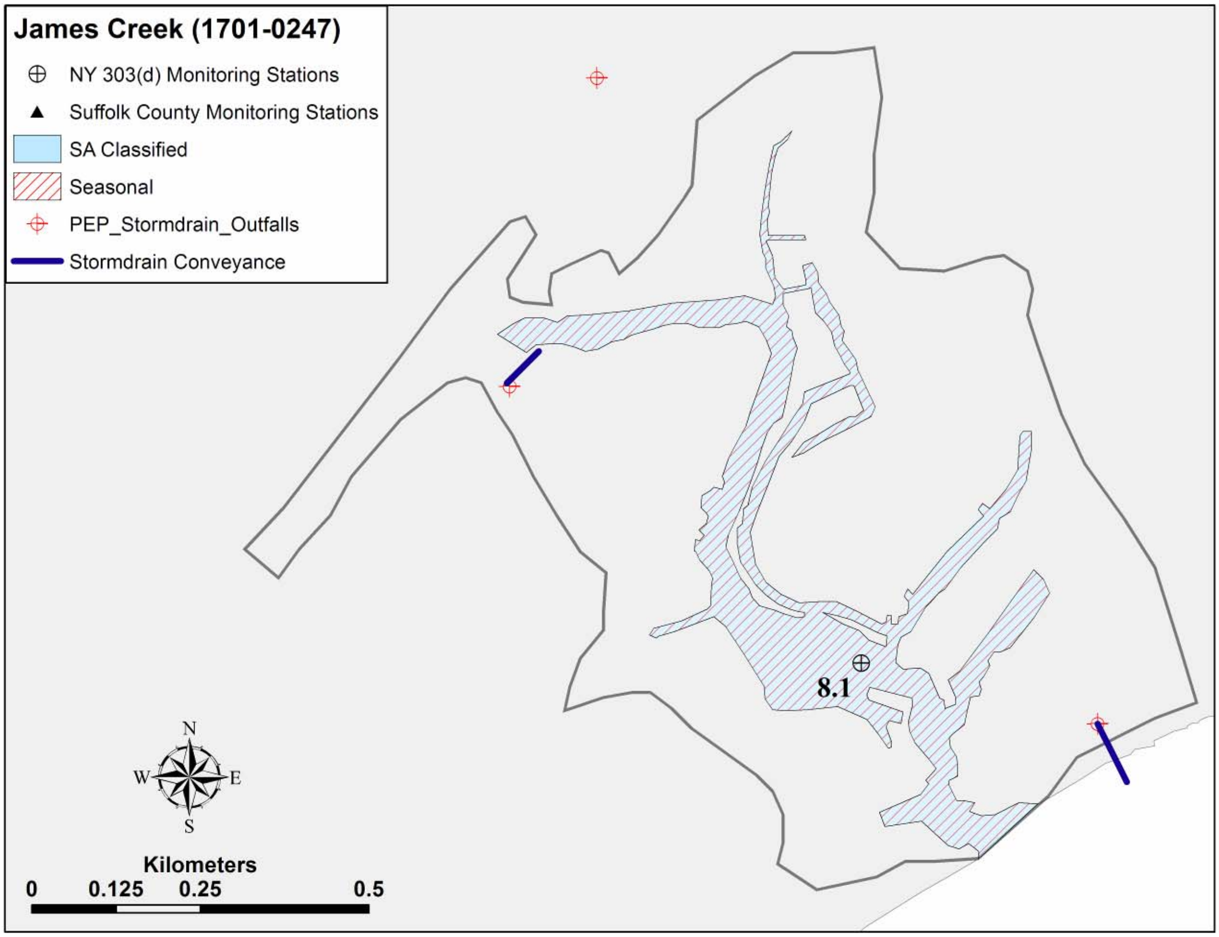


**Figure 2-11. James Creek 303(d). Classification indicating seasonally certified (seasonal) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**Flanders Bay, east/center, and tributaries:** Flanders Bay and its tidal tributaries are located around the mouth of the Peconic River at the juncture of the North and South Forks. All of Flanders Bay (stretching from the northernmost tip of Goose Creek Point to the southernmost tip of Simmons Point) and its tributaries are uncertified for shellfishing.

**Reeves Bay and tidal tributaries:** Reeves Bay is an embayment located immediately south of the mouth of the Peconic River. The shellfishing areas in Reeves Bay and its tributaries are uncertified. From January 16, 2006 through April 15, 2006, the waters of Reeves Bay normally designated as closed were classified as conditionally certified. This conditional designation is not automatic and is established on an annual basis. Conditional areas remain open to shellfishing, provided that not more that 0.05 inches of rainfall is recorded in a 24-hour period.

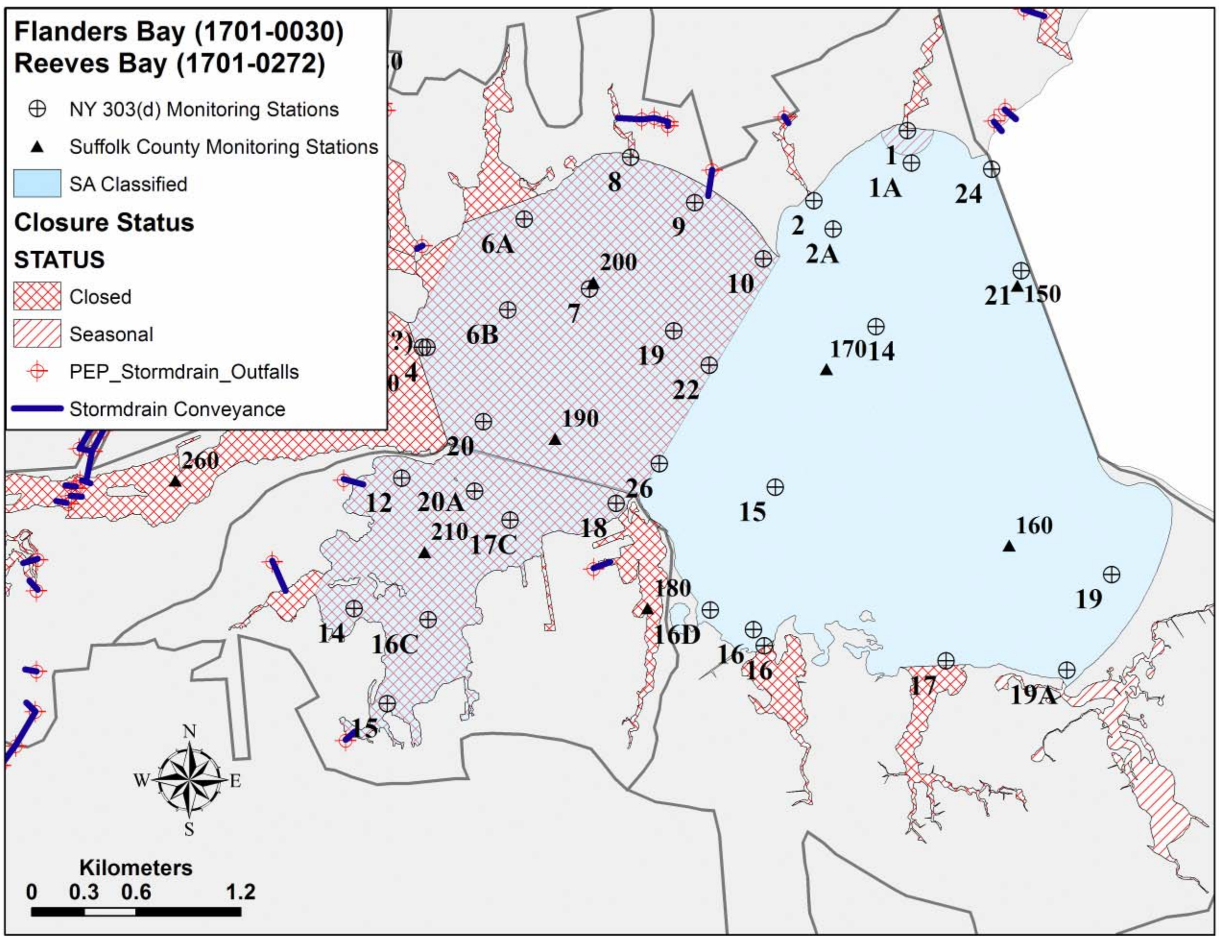


**Figure 2-12. Flanders and Reeves Bays 303(d). Classification indicating seasonally certified (seasonal) and uncertified (closed) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**Sebonac Creek/Bullhead Bay and tidal tributaries:** The Sebonac Creek/Bullhead Bay complex lies on the South Fork and borders Great Peconic Bay. The entire complex is seasonally certified for shellfishing between December 1 and April 30.

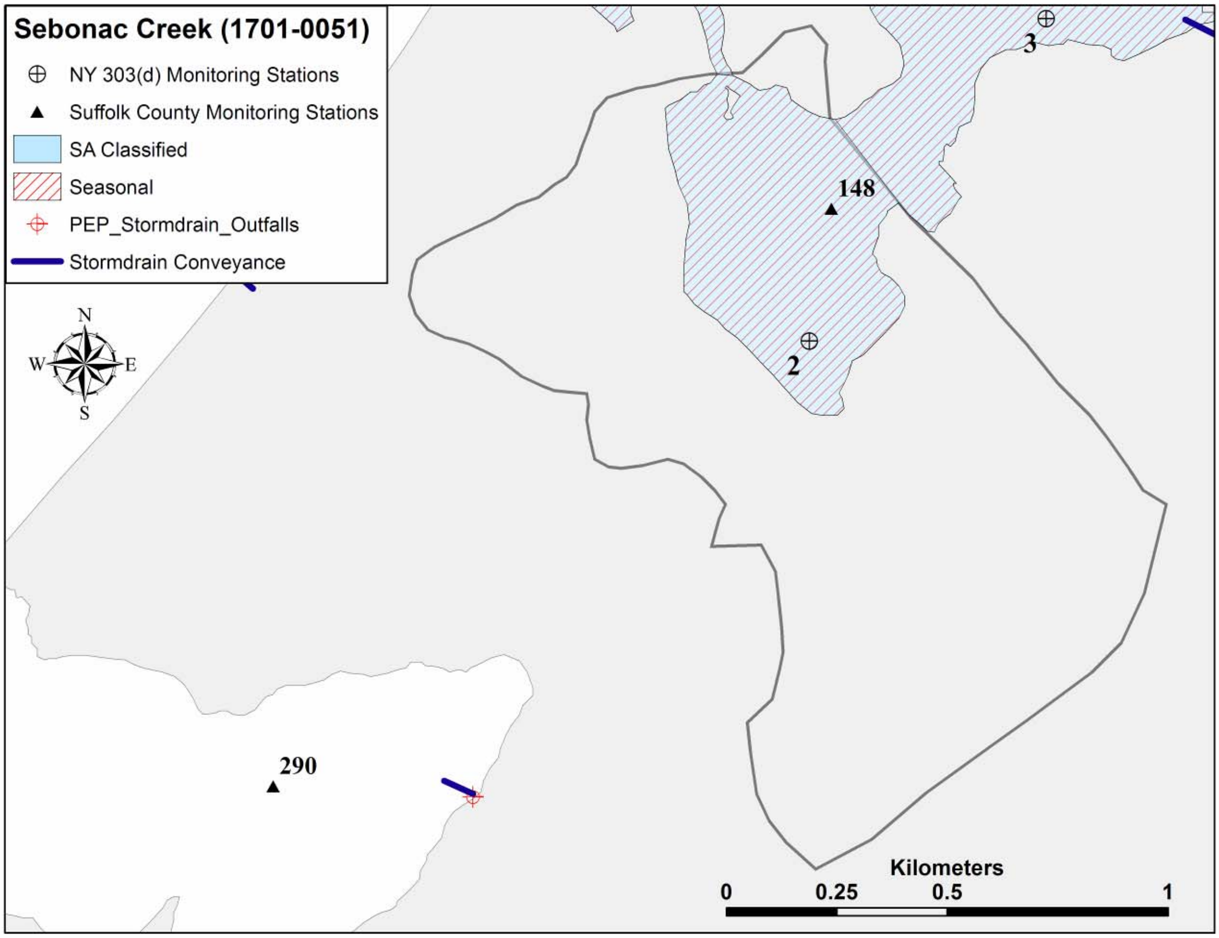


**Figure 2-13. Sebonac Creek/Bullhead Bay 303(d). Classification indicating seasonally certified (seasonal) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**Scallop Pond:** Scallop Pond is connected to the Sebonac Creek/Bullhead Bay complex along the South Fork and is also certified for shellfishing between the dates of December 1 and April 30.

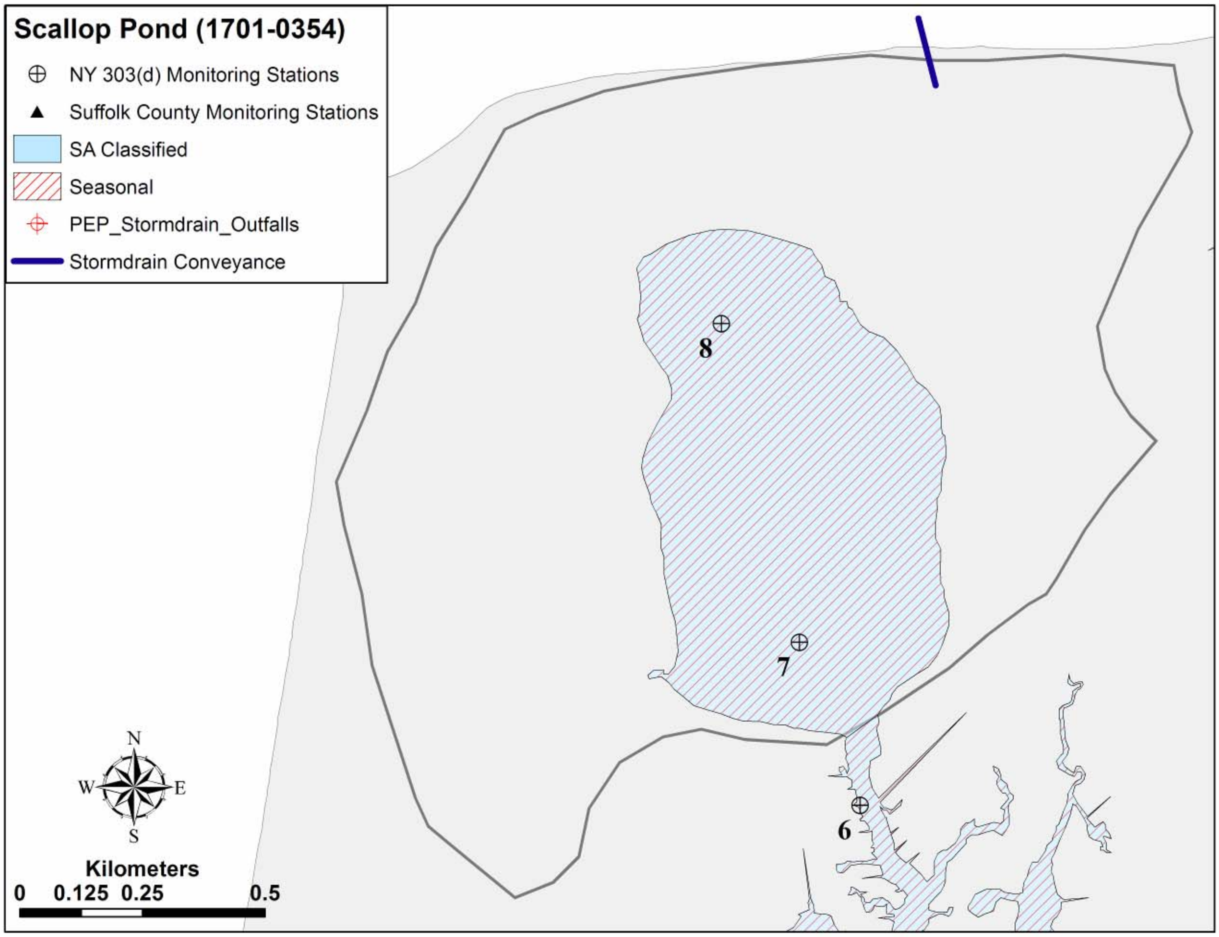


**Figure 2-14. Scallop Pond 303(d). Classification indicating seasonally certified (seasonal) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**North Sea Harbor and tributaries:** North Sea Harbor and its tributaries lie to the east of the Sebonac Creek/Bullhead Bay complex on the South Fork and empty into Little Peconic Bay. Davis Creek, which flows from Turtle Cove into the North Sea Harbor, is seasonally certified and may be harvested for shellfish between December 1 and April 30. From December 20, 2004 through April 23, 2005, the North Sea Harbor waters normally designated as closed were classified as conditionally certified (with the exception of Turtle Cove (Zone NSH-3 in Figure 2-15) and Alewife Creek (the tributary in Zone NSH-1). An update for the 2005-2006 season on the conditional status of these waters was unavailable. This conditional designation is not automatic and is established on an annual basis. Conditional areas remain open to shellfishing, provided that not more that 0.25 inches of rainfall is recorded in a 24-hour period.

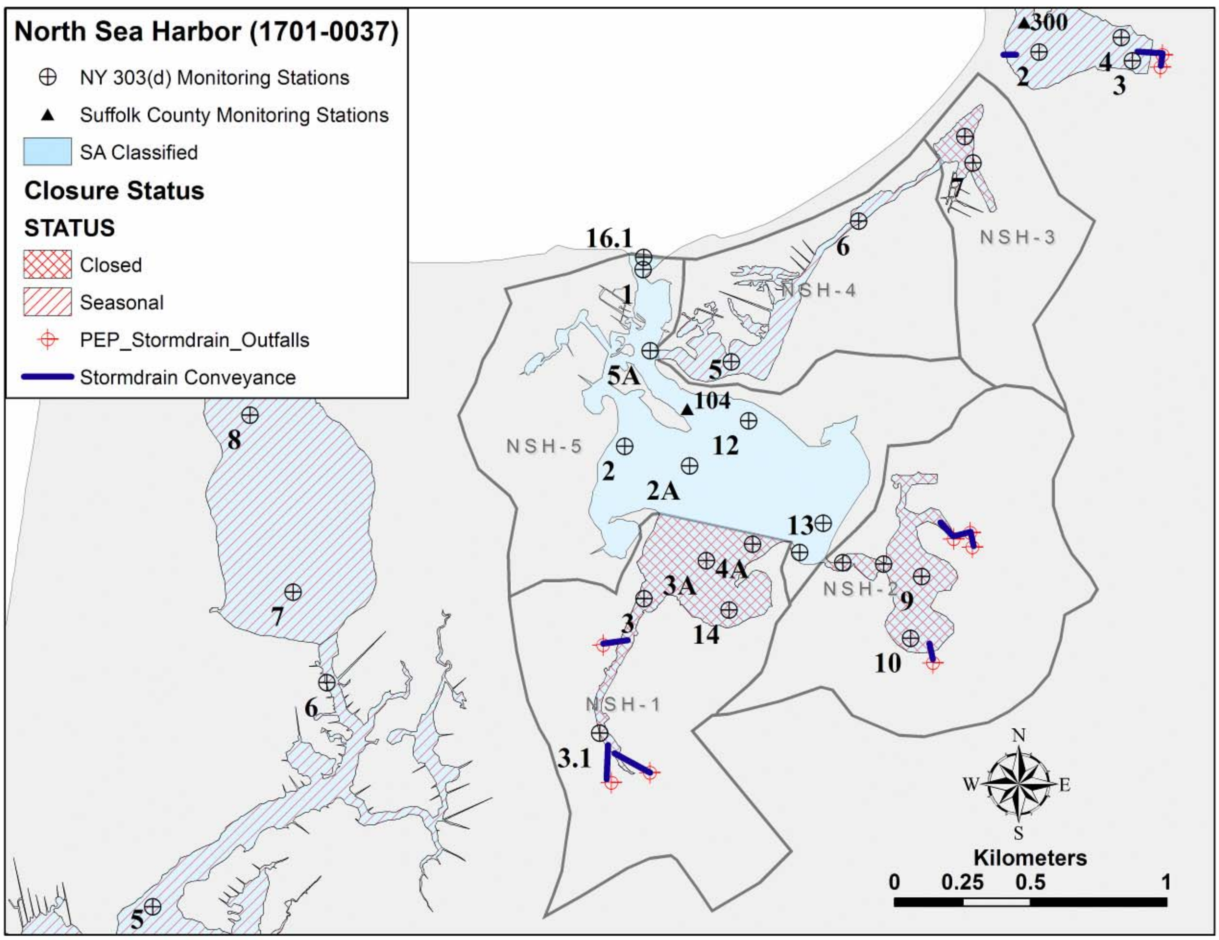


**Figure 2-15. North Sea Harbor 303(d). Classification indicating seasonally certified (seasonal) and uncertified (closed) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**Wooley Pond:** Wooley Pond lies along the South Fork, northeast of North Sea Harbor. Wooley Pond is seasonally certified for shellfish harvesting between December 1 and April 30.

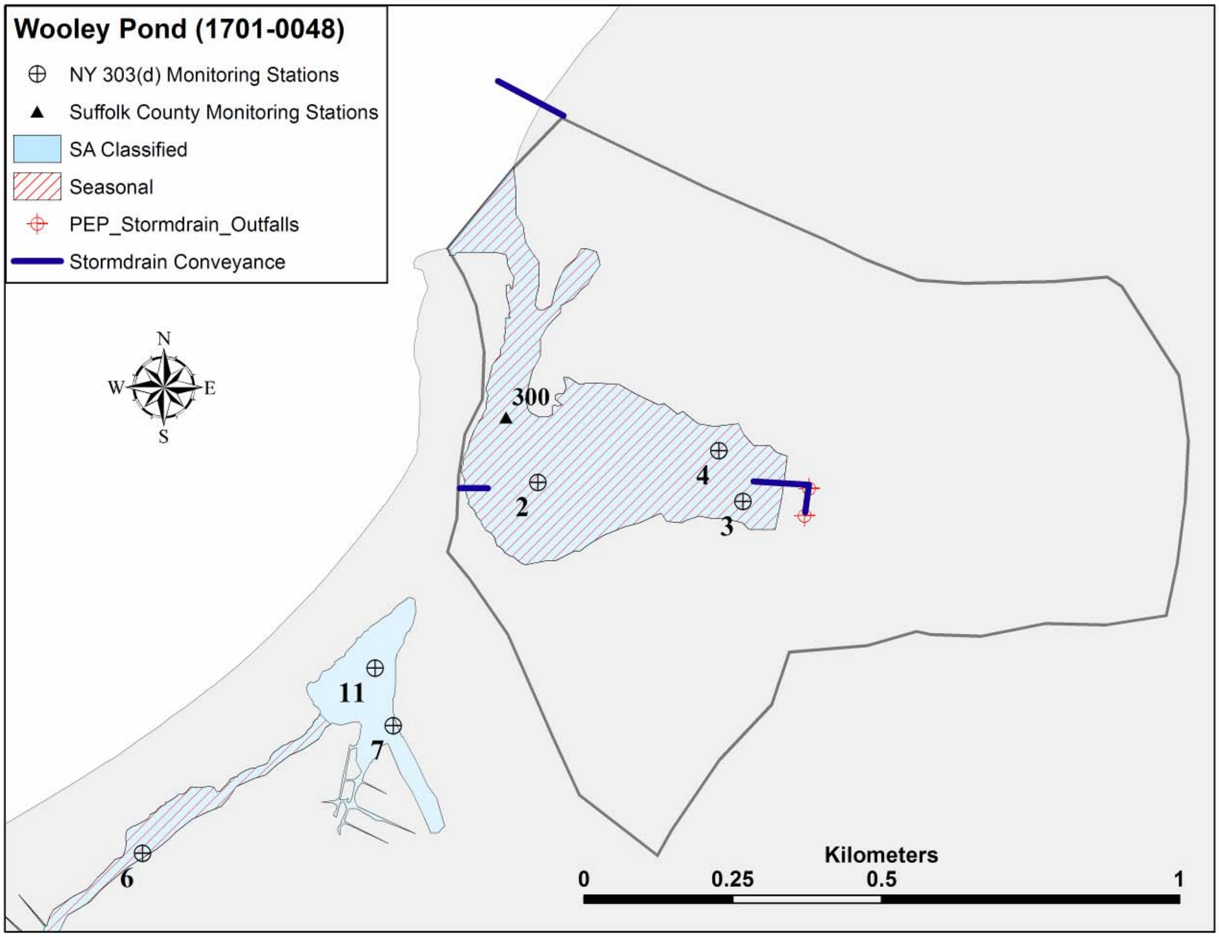


**Figure 2-16. Wooley Pond 303(d). Classification indicating seasonally certified (seasonal) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**Noyac Creek and tidal tributaries:** Noyac Creek lies northeast of Wooley Pond along the South Fork, just east of Jessup's Neck, a long peninsula that juts into Peconic Bay. Noyac Creek is certified for shellfishing between December 1 and April 30.

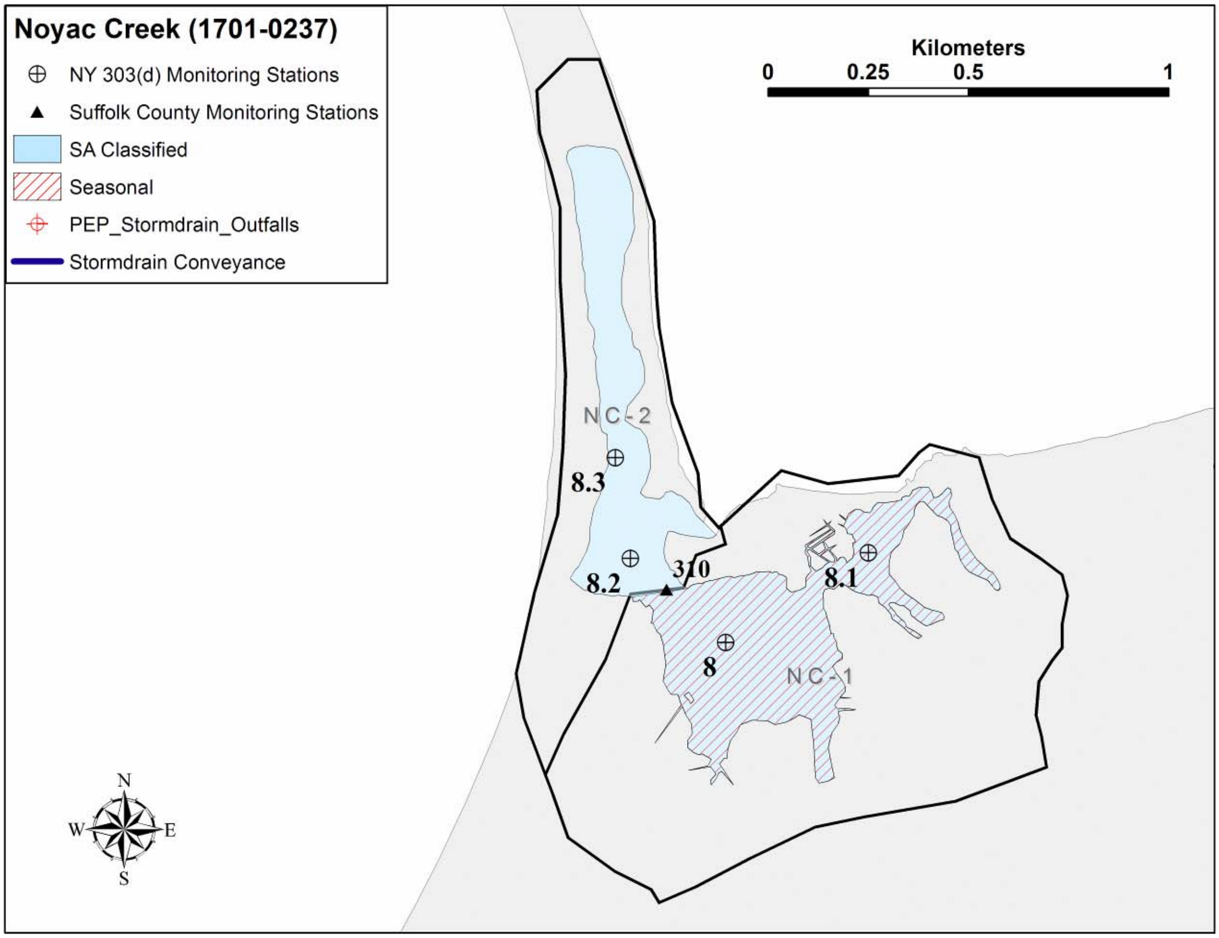


**Figure 2-17. Noyac Creek 303(d). Classification indicating seasonally certified (seasonal) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**Sag Harbor and Sag Harbor Cove:** Sag Harbor Cove is located east of Noyac Creek on the South Fork, bordering Noyac Bay on the west (but without an outlet) and emptying into Sag Harbor on the east. Sag Harbor itself, from the mouth of Sag Harbor Cove to the breakwaters, is uncertified for shellfish harvesting. Portions of Sag Harbor Cove are also uncertified, including upper Paynes Creek in the western section of the cove complex and a portion of Upper Sag Harbor Cove, adjacent to Bluff Point. The two parts of Sag Harbor Cove that are seasonally certified for shellfishing from November 1 until May 14 are the Redwood Canal and the easternmost section of the cove, before it empties into Sag Harbor. From December 19, 2005 through April 30, 2006, the waters of the Sag Harbor Complex normally designated as closed were classified as conditionally certified, with the exception of Sag Harbor Proper. This conditional designation is not automatic and is established on an annual basis. Conditional areas remain open to shellfishing, provided that not more that 0.40 inches of rainfall is recorded in a 24-hour period.

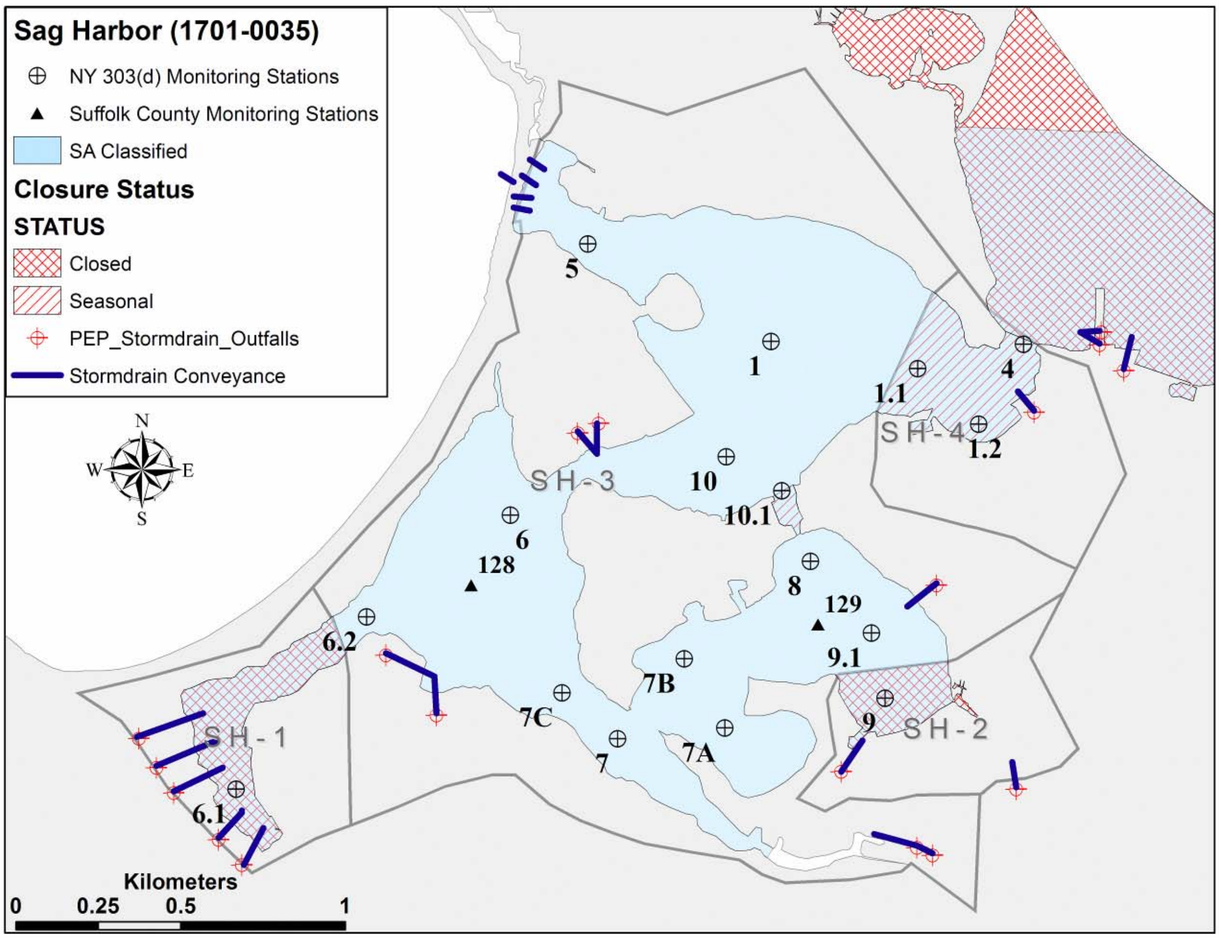


**Figure 2-18. Sag Harbor 303(d). Classification indicating seasonally certified (seasonal) and uncertified (closed) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**Northwest Creek and tidal tributaries:** Northwest Creek lies to the east of Sag Harbor along the South Fork of Long Island. The creek and its tributaries are normally uncertified for shellfish harvesting. However, between December 20 and April 30, the water body (with the exception of two small areas) is conditionally certified as long as precipitation over a seven day timespan does not exceed 0.25 inches. The two areas that remain uncertified for harvesting are unnamed tributary systems in the easternmost part of the creek. From January 9, 2006 through April 30, 2006, the waters of Northwest Creek normally designated as closed were classified as conditionally certified. This conditional designation is not automatic and is established on an annual basis. Conditional areas remain open to shellfishing, provided that not more that 0.40 inches of rainfall is recorded in a 24-hour period.

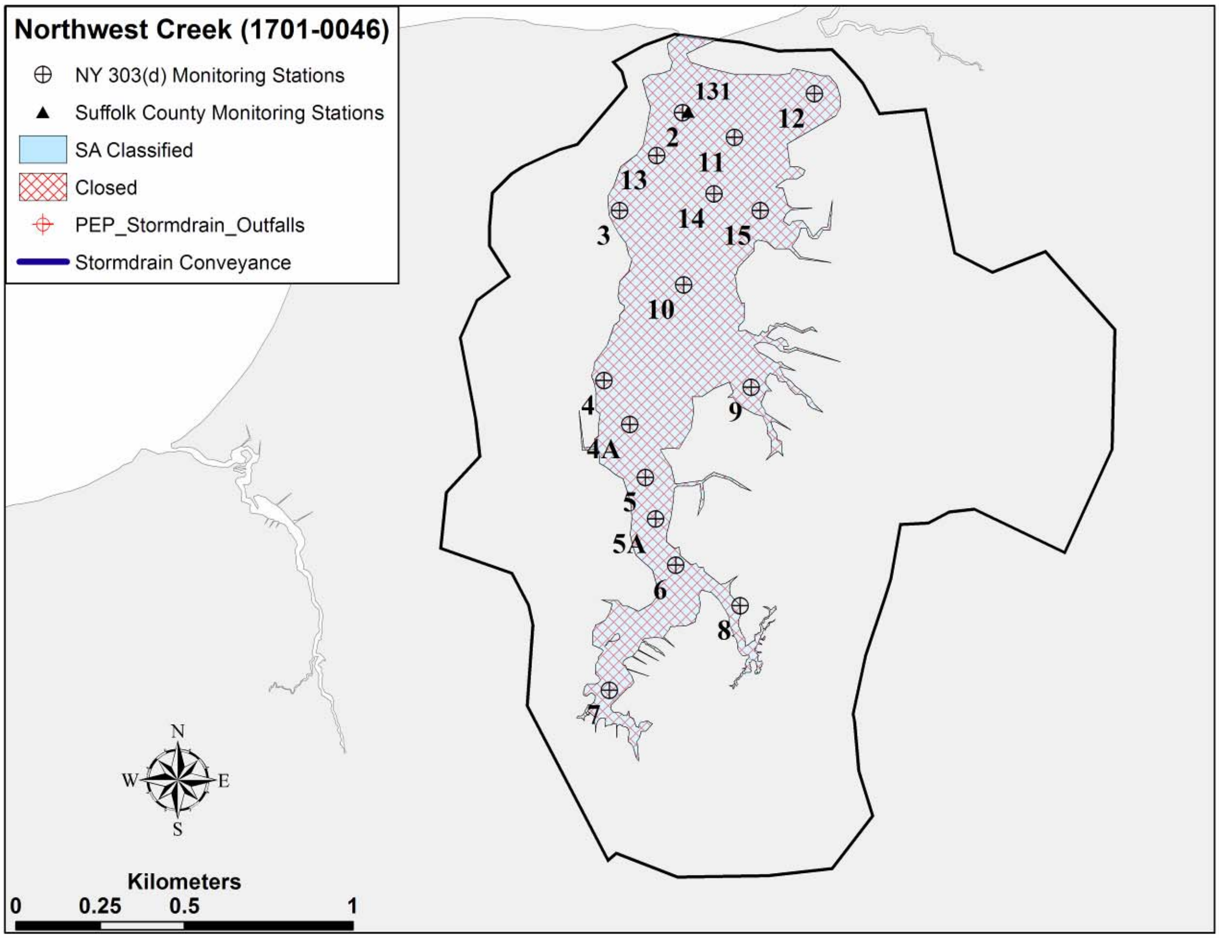


**Figure 2-19. Northwest Creek 303(d). Classification indicating uncertified (closed) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**Acabonac Harbor:** Acabonac Harbor is one of the most easterly of the water bodies covered by this TMDL report, being located on the South Fork, facing Block Island Sound. Between December 20 and April 30, the northernmost sections of Acabonac Harbor as well as the southernmost tributary system are conditionally certified for shellfishing, provided precipitation does not exceed 0.3 inches during a seven day timespan. The remaining part of Acabonac Harbor south of Sage Island is seasonally certified between December 1 and April 30. From December 12, 2005 through April 30, 2006, the waters of Acabonac Harbor normally designated as closed were classified as conditionally certified. This conditional designation is not automatic and is established on an annual basis. Conditional areas remain open to shellfishing, provided that not more that 0.30 inches of rainfall is recorded in a 24-hour period.

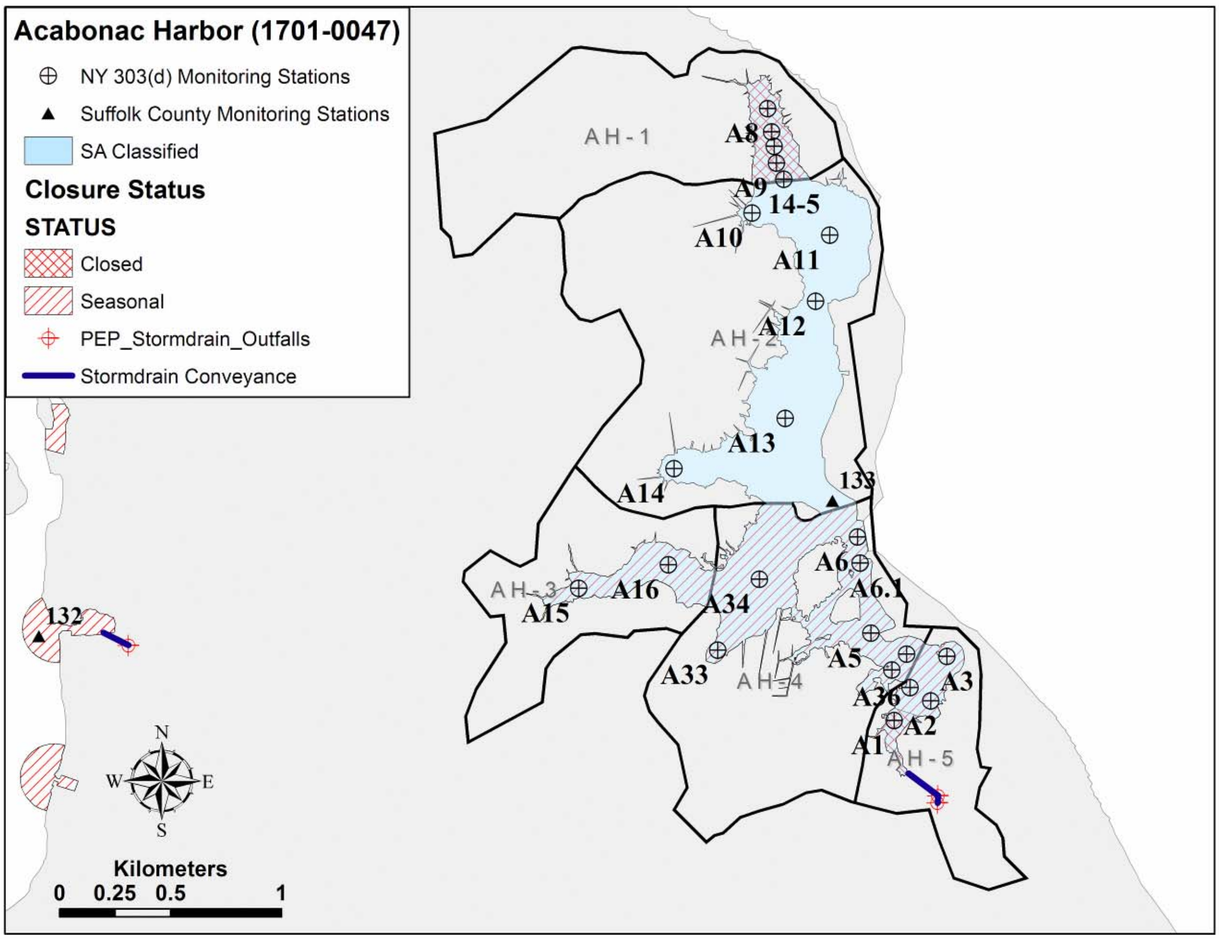


**Figure 2-20. Acabonac Harbor 303(d). Classification indicating seasonally certified (seasonal) and uncertified (closed) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**Montauk Lake:** Montauk Lake lies near the extreme tip of the South Fork, with an outlet to Block Island Sound. The region of Montauk Lake between the jetties marking the entrance to the lake and the northern tip of Star Island (along with the western side of the island) is uncertified for shellfish harvesting. Other sections of the lake, however, are seasonally certified, including the area directly south of the uncertified section (and to the east of Star Island) and the area surrounding the Montauk Lake Marina and Club, which are open for shellfishing between October 16 and May 14. Another section (the southernmost tip of the lake) is certified from December 15 until March 30.

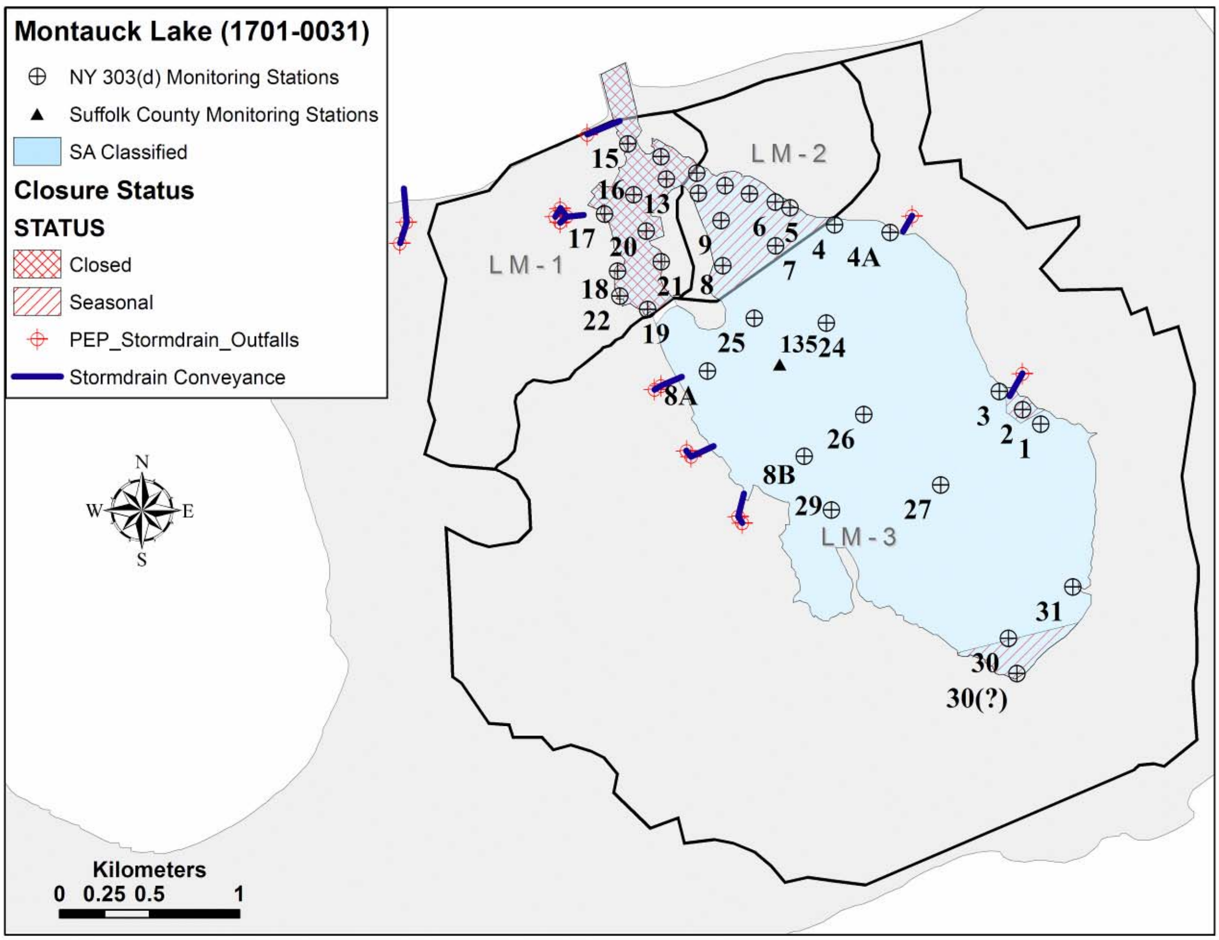


**Figure 2-21. Montauk Lake 303(d). Classification indicating seasonally certified (seasonal) and uncertified (closed) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

**Oyster Pond/Lake Munchogue:** Oyster Pond is located adjacent to Montauk Lake, with a small outlet to Block Island Sound. The entire lake is uncertified for shellfish harvesting.

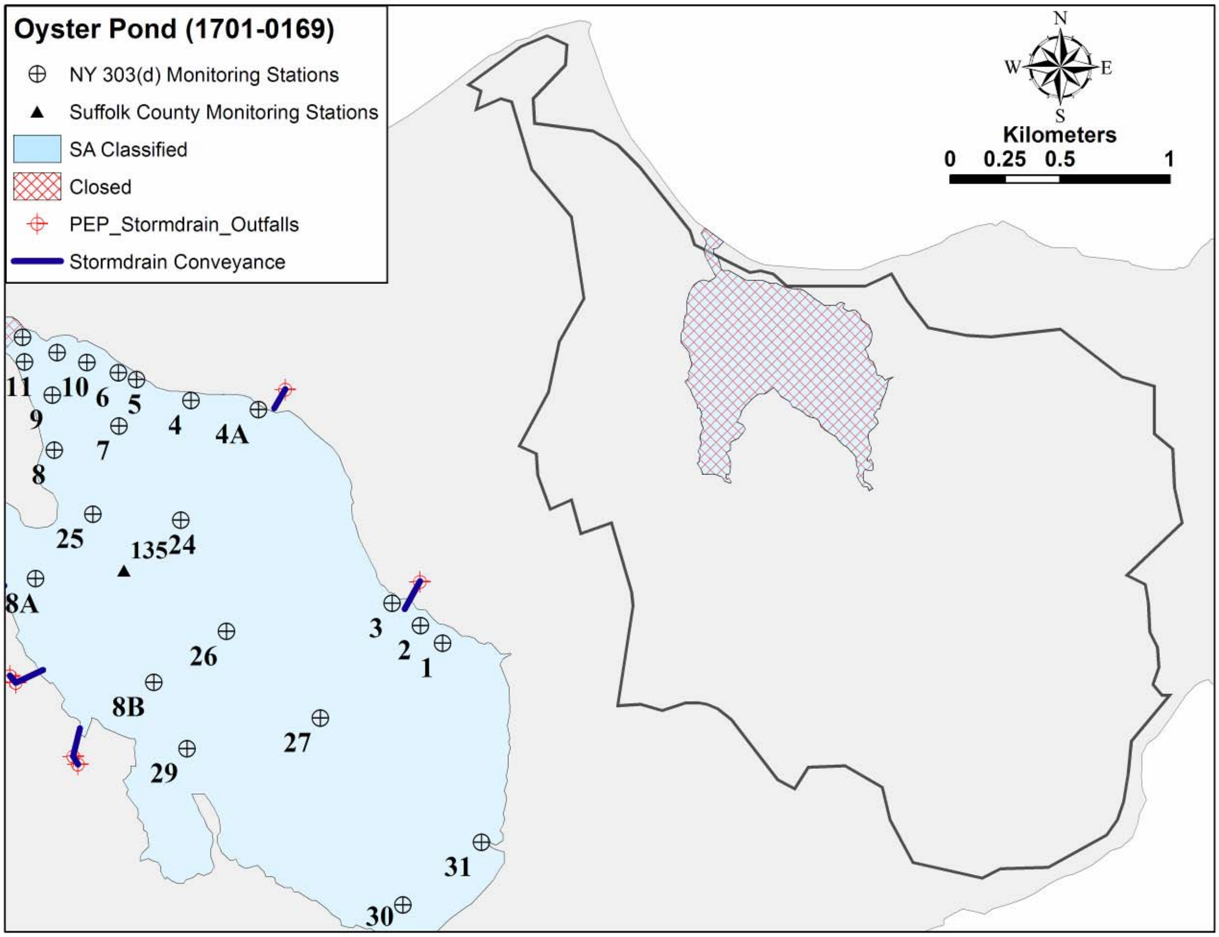


**Figure 2-22. Oyster Pond/Lake Munchogue 303(d). Classification indicating uncertified (closed) SA waters. NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations do not exist within Oyster Pond and associated contributing zone. Gray boundary indicates stormwater contributing zones.**

**Little Sebonac Creek:** Little Sebonac Creek is a section of the Sebonac Creek/Bullhead Bay complex and is seasonally certified for shellfishing between December 1 and April 30.

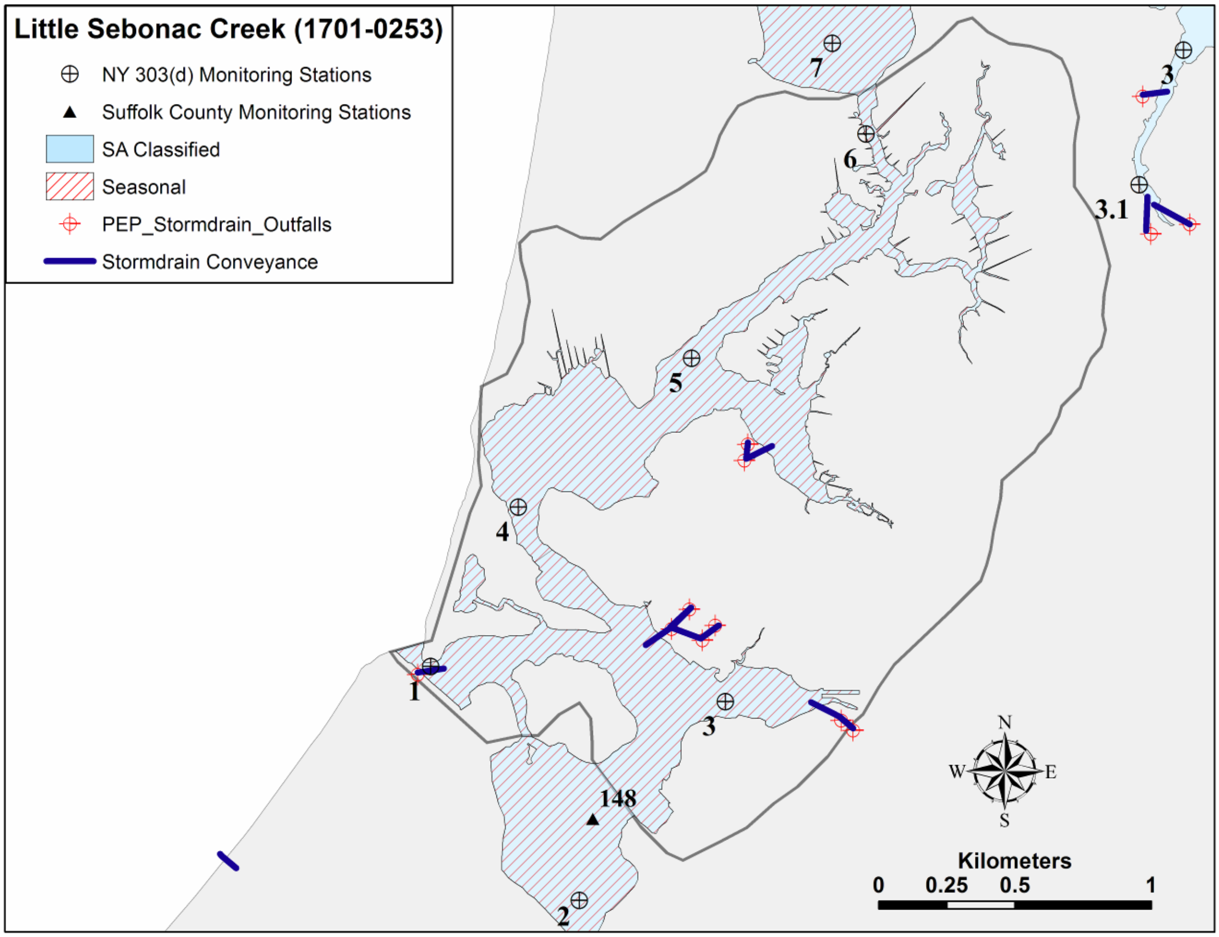


**Figure 2-23. Little Sebonac Creek 303(d). Classification indicating seasonally certified (seasonal) SA waters, NYS and Suffolk County sampling stations, stormdrain conveyances, and outfall locations. Gray boundary indicates stormwater contributing zones.**

NYSDEC maintains administrative closures around sewage treatment plant (STP) outfalls. Although water quality within the administrative closure might meet the bacteriological criteria for certified shellfishing areas, the closures are necessary in the event of STP failure or malfunction, such as loss of disinfection. These closures serve as buffer zones between the actual point source (the STP outfall) and the nearest certified shellfishing areas. The closures are of sufficient size that untreated or inadequately treated sewage would be contained for long enough for NYSDEC officials to notify shellfish harvesters to stop harvesting in the adjacent certified waters.

Similarly, NYSDEC also maintains administrative closures within and around marinas and boat mooring areas due to the presence of marine sanitation devices (MSD) onboard boats. The guidelines of the National Shellfish Sanitation Program (NSSP, 2003) require closures within all marinas having more than 10 boats and also areas adjacent to the marinas that may be affected by MSD discharge. The size of the closures around marinas or mooring areas is based on a number of variables, including: the number of boats with MSDs, the number of people occupying the boats, the availability of shore-based toilets, the tidal range and current in the area, etc.

The TMDL developed in this study will address impairment at the remaining uncertified and seasonally uncertified areas within SA-classified water bodies and develop load allocations for point and nonpoint sources to achieve the water quality goals for shellfish harvesting in the 25 water bodies. This will be done through a thorough evaluation of state and county water quality data (total and fecal coliform), determination of percent reduction (if needed) to statistically achieve coliform standards, an evaluation of likely sources of coliform loads to each impaired water body, and recommendations toward achieving necessary load reductions.

# 3.0 APPLICABLE WATER QUALITY STANDARDS

## 3.1 National Shellfish Sanitation Program Standards

New York State participates in the National Shellfish Sanitation Program (NSSP) which recommends strict bacteriological water quality standards for shellfishing areas to be designated as approved, or certified, for the harvest of shellfish for human consumption [Note: New York State's water quality standards for certified shellfish lands are specified in 6 NYCRR, Part 47, "Certification of Shellfish Lands."]

The standards are developed for specific indicator organisms, which are assumed to indicate the presence of human pathogenic organisms associated with fecal material from warm blooded animals.

NSSP guidelines (2003) allow either total or fecal coliform standards for growing area classification. Two sampling strategies, adverse pollution condition (APC) and systematic random sampling (SRS) are acceptable per NSSP guidelines for total or fecal coliform determination. For APC sampling, a minimum of the 15 most recent samples collected under APC (with a minimum of five annually) are required to classify growing areas. These sampling stations are to be established adjacent to actual or potential sources of pollution. For SRS sampling, a minimum of the 30 most recent samples (with a minimum of six annually), collected under various environmental conditions during the certified period, are required to classify growing areas affected by pollution sources. Remote areas are required to have a minimum of 15 samples (with a minimum of two samples collected annually) to classify growing areas. Although the NSSP guidance dictates that transitioning from APC to SRS should only allow up to 15 of the most recent APC samples prior to SRS collection to be used for a transition period not to exceed three years, there were some stations where more than 15 APC samples were used for the statistical analyses in order to reach the 30 sample minimum.

Prior to June 1998, NYS used both total and fecal coliforms as indicator organisms for classifying shellfish harvest areas. Between June 1998 and January 2001, however, only total coliforms were used as indicators, due to laboratory staffing shortages. After January 2001, the laboratory resumed testing for both coliforms, but as of February 13, 2003, the lab has only been testing for fecal coliforms. Table 3-1 tabulates these temporal changes in the indicator organisms used by New York State.

**Table 3-1. Changes in Indicator Organisms Used for Classification of Harvest Areas.**

| | Total Coliforms | Fecal Coliforms |
|---|---|---|
| Before June 1998 | X | X |
| June 1998-January 2001 | X | |
| January 2001-February 2003 | X | X |
| February 2003-present | | X |

The type of sampling used to test NYS shellfish harvesting areas has also changed over the years. Prior to January 1997, NYS used APC sampling for determining whether the embayments and tributaries of Peconic Bay estuary met NYS and NSSP standards for certified areas. APCs were considered to exist when rainfall is greater than 0.25 inches but less than 3.0 inches in one or more of the days during the 96 hours (4 days) prior to sampling. APC sampling was conducted only during outgoing tides. Although APC sampling was primarily phased out in 1997 (in favor of SRS sampling, as described below), some limited APC sampling is still done in areas uncertified for shellfish harvesting. APC sampling is targeted to limited post-rainfall (0.05" - 1.5") conditions. It is performed in those areas in which the local Towns have requested that NYSDEC perform a water quality study to determine if the area is suitable for a rainfall related conditional harvesting program. If the results of this limited APC sampling are acceptable, the shellfishing area may be opened to harvesting on a conditional basis.

Beginning in 1998, NYS began to utilize SRS to test the waters of shellfish harvesting areas. SRS sampling events are scheduled randomly in advance (also only during outgoing tides) to develop a collection of data that includes water quality during different weather conditions.

Thresholds to determine harvest area compliance with coliform standards listed in the NSSP are calculated using geometric mean (MPN, or $X_{geomean}$) and 90$^{th}$ percentile values ($X_{90}$). A geometric mean is used versus an average or typical mean to dampen the effect of very high or low values which oftentimes occurs in fecal sampling; as levels can vary anywhere from 10 to 10,000 fold over a given period. The 90$^{th}$ percentile takes into account the variability factor which assumes 90 percent of the samples were collected under uniform conditions (variability only due to the test procedure and the additional allowance for some additional variability arising from changing conditions in the water being sampled). This statistical method assumes no more than 10 percent of the samples derived under uniform conditions will exceed the MPN standards. Some shellfish water sampling data may be collected following intermittent pollution events which increases the variability when combined with data collected under normal conditions. As variability is increased, the 90$^{th}$ percentile will reflect the increased variability and will protect against the potential public health problems that may result when shellfish are consumed from growing waters that are adversely affected by intermittent pollution events and improperly classified.

The standards for when APC-sampled water bodies and SRS-sampled water bodies are designated as certified for shellfish harvesting are described in Table 3-2. APC data collected between 1987 and 1996 at all the water bodies, and being collected now at selected water bodies, are reviewed and analyzed based on the standards in Table 3-2. NSSP Standards listed in the table below apply to each station.

**Table 3-2. NSSP Standards for Shellfish Harvesting Areas Affected by Point and Nonpoint Pollution Sources.**

| Sampling Technique | Indicators | NSSP Standards* *Note: values are based on a 3-tube, decimal dilution test. | |
|---|---|---|---|
| **APC Sampling** | **Total coliform** | The median of samples shall not exceed 70 MPN/100ml | Not more than 10% of the samples may exceed 330 MPN/100ml |
| | **Fecal coliform** | The median of samples shall not exceed 14 MPN/100ml | Not more than 10% of the samples shall exceed 49 MPN/100ml |
| **SRS Sampling** | **Total coliform** | Geometric mean of samples shall not exceed 70 MPN/100ml | The estimated 90$^{th}$ percentile (X90) value shall not exceed 330 MPN/100ml |
| | **Fecal coliform** | Geometric mean of samples shall not exceed 14 MPN/100ml | The estimated 90$^{th}$ percentile (X90) value shall not exceed 49 MPN/100ml |
| **Remote Classification*** | **Total Coliform** | Geometric mean of samples shall not exceed 70 MPN/100ml | Not more than 10% of the samples shall exceed 330 MPN/100ml |
| | **Fecal Coliform** | Geometric mean of samples shall not exceed 14 MPN/100ml | Not more than 10% of the samples shall exceed 49 MPN/100ml |

* A shellfish growing area that is classified as remote has no human habitation and is not impacted by any actual or potential pollution sources. Remote areas must be sampled at least twice annually.

$X_{geomean}$ and $X_{90}$ are calculated as below:

$$X_{geomean} = Anti\log[(\sum_{i=1}^{n} \log(X_i)) / n]$$

where $X_1$, ... $X_n$ are the coliform concentrations from the SRS sampling. The estimated 90$^{th}$ percentile is computed as:

$$X_{90} = \text{Anti}\log[(S_{\log})*1.28 + XAVG_{\log}]$$

where $S_{log}$ is the standard deviation of the logarithms of the MPN values and $XAVG_{log}$ is the mean of the logarithms of the MPN values comprising the data set (also known as the log mean or the arithmetic average of the logarithms - the geometric mean is the antilog of $XAVG_{log}$). $S_{log}$ is calculated as follows:

$$S_{\log} = \sqrt{\sum_{i=1}^{n} (\log(X_i) - XAVG_{\log})^2 / (n-1)}$$

Although the NYS water quality standard for Class SA is expressed as a median value of 70 MPN/100ml, the same numerical value is used as geometric mean criterion for SRS data. According to NSSP guidelines (NSSP, 2003), these two are equivalent in terms of public protection.

### 3.2 NYSDEC Water Quality Regulations

NYSDEC maintains water quality regulations for surface water and groundwater as Title 6, Chapter X Sections 700-706, last amended August 4, 1999. Contained within these regulations are standards for coliform (Section 703.4). The New York Commissioner of Environmental Conservation determines which waters are acceptable for shellfishing. Water quality closures (year-round, conditional and seasonal) are defined in Section 1.1.

The determination of conformance is based on whether the waters meet appropriate standards. The standard for total coliform in SA waters as outlined in Title 6, Chapter X, Section 703.4: the median most probable number (MPN) value in any series of representative samples shall not be in excess of 70. However, since 2003, the NYSDEC shellfish sanitation program classifies shellfish harvest areas based on fecal coliform standards. Fecal coliform standards are not currently addressed within NYSDEC water quality regulations. The National Shellfish Sanitation Program has developed the following guidelines regarding fecal coliform: for an area to be certified, the geometric mean should not exceed 14 FC/100ml and the $90^{th}$ percentile value should not exceed 49 FC/100ml. These standards apply to each station. A station on a closure line should also meet certified criteria.

### 3.3 Standard Used for Shellfish TMDLs

The NSSP program standards are used by the state's shellfish program to determine whether or not shellfish waters are open for harvesting. Since shellfish harvesting is the designated use for the 25 water bodies covered in this report, the standards used to determine the usability of the shellfish harvesting waters are used in the TMDL. As noted in Section 3-1, the NYS shellfish standard of "a median value of 70MPN/100ML" is equivalent to NSSP standards of a geometric mean criterion for SRS data. Therefore, the NSSP standards are used as the endpoint in achieving acceptable water quality in the water bodies.

Since NYSDEC's shellfish sanitation program now only analyzes water samples for fecal coliform bacteria, in the future the assessment of the effectiveness of achieving the TMDLs will have to be based on fecal coliform data.

# 4.0 WATER QUALITY AND WATERSHED CHARACTERIZATION

A wide range of data and information were used to characterize the Peconic Bay water bodies and their corresponding watersheds, or contributing zones. The categories of data used include physiographic data that describe the physical conditions of the watershed, environmental monitoring data that identify potential pollution sources and their contributions, and ambient water quality monitoring data. Table 4-1 summarizes the various data types and data sources used in this characterization. Some of these data types are described in the subsequent sections.

**Table 4-1. Summary of Data Types and Sources Used in Water Quality and Watershed Characterization.**

| Data Category | Description | Data Source(s) |
|---|---|---|
| Watershed Physiographic Data | Land Use | The Nature Conservancy[3] |
| | Weather Information | National Climatic Data Center |
| | Stream Flows | USGS |
| | Storm Water Drainage Outfalls | Suffolk County |
| Environmental Monitoring Data | 303(d) Listed Waters | NYSDEC |
| | Ambient Water Quality | NYSDEC |
| | Monitoring Data | Suffolk County |

## 4.1 Water Quality Data

The water quality data relevant for development of TMDLs in the study area were assembled from a series of databases originating from the NYSDEC and Suffolk County. Attachment 1 contains the geomean and 90$^{th}$ percentile statistical values for both fecal and total coliform. The entire dataset for each sample station was used to calculate the geomean and 90$^{th}$ percentile for fecal and total coliform at the stations. Calculations were performed for sampling stations which did not contain the minimum 30 samples, per NSSP guidelines, and are indicated as such in Attachment 1. Additional calculations were also performed for areas classified with seasonal closures, determining the geomean and 90$^{th}$ percentile of fecal and total coliform during the closed period (Attachment 1). Subsequently, the stations within each water body that possess values that exceed state standards for shellfish harvesting areas are identified. These water bodies may be subject to further study necessary to establish TMDLs. These include load reduction analyses, watershed modeling of sources, and the determination of acceptable TMDLs. As described in Section 1.1, any sampling station that was located within a conditionally certified area at the writing of this report is treated as being within a closed area.

[3] These land use data were originally developed by the Suffolk County Planning Department in 1997 and subsequently updated by the Nature Conservancy in 2001.

### 4.1.1 NYSDEC Data

The NYSDEC shellfish sanitation program has typically collected 8 to 16 samples per year since 1986 at ambient water quality monitoring stations throughout Peconic Bay. Since 1986, NYSDEC has examined water samples for total and fecal coliform bacteria, although not necessarily simultaneously (see Table 3-1 for clarification). Prior to 1997, samples were collected using APC sampling. Since January 1997, NYSDEC samples have been collected using systematic random sampling (SRS) (see Section 3.1 for further clarification). The datasets provided by NYSDEC contain monitoring for both fecal and total coliform, with a lack of fecal coliform readings from mid-1998 through 2000, and an end to total coliform measurements occurring between 2002 and 2003.

The NYSDEC total coliform data is generally constrained by a minimum detection limit of 3 MPN/100mL and a maximum limit of 2,400 MPN/100mL. Indeterminate sample results below the sensitivity of the MPN procedure used by NYSDEC are reported as <3 MPN/100ml. Sample results above the sensitivity of the MPN procedure are reported as 2400 MPN/100ml. For purposes of data analyses, NYSDEC converts <3 MPN/100ml values to 2.9 MPN/100ml and 2400 MPN/100ml values to 2501 MPN/100ml. Data within some of the sampling stations recorded a "0" reading. These "0" values have been confirmed by NYSDEC to represent no data collection during that sampling date. Therefore, "0"s were not used during the analysis.

Differences existed among the frequency, time of year of the sampling, and type of sampling (SRS versus APC) which affected the use of the data. Refer to Section 3.1 for NSSP standards. A summary of the datasets by shellfish growing area and the range of data collection dates are shown in Table 4-2. The timeframes of the compiled data sampling sets varied among sampling stations (see Column 2, Table 4-2). Some of the monitoring stations within each water body did not have the required 30 samples post 1997. As samples prior to 1997 were collected under APC conditions, these stations have a component of data which is reflective of APC conditions. Stations having APC sampling within the data analysis are noted in the two right columns of Table 4-2. A large portion of the stations having APC measurements are the ones positioned in closed areas. Geomean and 90$^{th}$ percentile values were also determined during the "closed" periods of seasonally certified stations, which typically required a longer timeframe to accumulate the minimum 30 samples. Calculations of stations below the 30 minimum samples are indicated in Attachment 1 and their sample sizes are given.

### 4.1.2 Suffolk County Data

Suffolk County has conducted long-term monitoring for both total and fecal coliform at stations throughout the Peconic Estuary dating back to 1976. The County identifies their sampling stations using the prefix '060' followed by a three-digit station number. In this report, the County sampling stations are identified using only the station number. Some County stations ceased monitoring in 1989 (e.g., 150, 160, 190, 200). These stations were not included in the exceedance analyses because the data were determined to be too old and not relevant to recent conditions. The total and fecal coliform detection minimums used by the County differed from NYSDEC protocol. The detection minimum as reported by Suffolk County was '<20'. If a result was reported as '<20', it was not used in the exceedance calculations because the actual value is not known and using an assumed value may artificially inflate or deflate the statistical results. As is noted in the Attachment 1 tables, all of the County stations had fewer than the standard minimum requirement of 30 samples.

**Table 4-2. NYSDEC Data Overview of APC Sampling Within This Study.**

| Shellfish Growing Area Name | Data Range (years) | | Stations with APC Fecal Coliform Sampling* | Stations with APC Total Coliform Sampling* |
|---|---|---|---|---|
| | Fecal | Total | | |
| *Shelter Island Sound* | 1997-2004 | 1997-2002 | None | None |
| *Stirling Basin* | 2001-2004 | 1999-2002 | None | None |
| *Southold Bay* (Goose Creek, Town & Jockey Creeks, Inner Jockey Creek) | 1997-2004 | 1997-2002 | None | None |
| *Hashamomuck* (Hashamomuck, Long Creek, Mill Creek, & Budd's Pond | 1997-2004 | 1997-2004 | None | None |
| *Little Peconic Bay* (Richmond Creek & North Sea) | No Data | No Data | N/A | N/A |
| *Great Peconic Bay* (James Creek & Deep Hole Creek) | 1988-2004 | 1988-2002 | 8a, 9c | 8a, 9c |
| *Flanders Bay SGA 29* | 1997-2004 | 1988-2002 | None | 1 |
| *Flanders Bay SGA 29C* (Flanders Bay & Reeves Bay) | 1988-2004 | 1988-2002 | 4, 6a, 6b, 7-10, 12, 14, 15, 16C, 26, 17C, 19, 18 | 4, 6a, 6b, 7-10, 12, 14, 15, 16C, 26, 19, 18 |
| *Sebonac Creeks* (Sebonac Creek, Bullhead Bay, Scallop Pond) | 1997-2004 | 1987-2002 | None | None |
| *North Sea Harbor* | 1990-2004 | 1990-2003 | 5, 6 | 5, 6 |
| *Wooley Pond* | 1988-2004 | 1988-2002 | None | None |
| *Noyac Bay* | 1988-2004 | 1988-2002 | 8, 8.1 | None |
| *Sag Harbor* | 1986-2004 | 1986-2003 | 1.1, 1.2, 4 | 1.1, 1.2, 4 |
| *Northwest Harbor* (Outer Northwest Creek) | 1990-2004 | 1990-2003 | 5, 6, 7, 8 | 5, 6, 7, 8 |
| *Acabonac Harbor* | 1997-2004 | 1997-2002 | None | None |
| *Montauk Harbor* | 1988-2004 | 1988-2002 | 2, 5-11, 30 | 2, 5-11, 30 |

*Stations listed here include primarily data prior to 1997 where sampling was conducted under APC.

### 4.1.3 Data Analysis

The data from both NYSDEC and Suffolk County were screened for relevance and acceptability and statistical analyses were performed based on the following set of rules:

- Sampling stations must be located within Class SA waters within the water bodies listed in Table 1-1;
- If a station had 30 or more samples taken during the SRS period (1997-present), then all of those SRS samples were used to calculate exceedances.
- If a station had fewer than 30 samples taken during the SRS period, then samples taken during the APC period (pre-1997) were included in the calculations, until a sample size of 30 was reached.

- If a station had fewer than 30 samples taken overall (i.e., during *both* the SRS and APC periods), then all of the samples, regardless of whether they were APC or SRS, were used in the calculations.
- At both state and county stations that were located in seasonally certified shellfish areas, the exceedances were calculated using only data taken during the closed period of the year.
- At both state and county stations that were located in uncertified shellfish areas, the exceedances were calculated using data taken throughout the year, regardless of season.
- Some Suffolk County sampling data were expressed as '< 20' or '< 2', indicating the detection minimum. Since the actual measurement is not known and choosing one would be random and arbitrary, these data were not included in the exceedance calculations.
- Some Suffolk County sampling stations had data only from 1976 until 1989, with no results from more recent times. Exceedances were not calculated from these stations, in order to prevent irrelevant historic data from affecting the exceedance results. Other stations had data taken only during the timespan of a few days in 1995. Due to the narrow scope of this sampling scheme, exceedances were not calculated for these stations.

Following these rules, statistical analyses were conducted on all relevant NYSDEC and Suffolk County data associated with monitoring stations located within the appropriate Class SA boundary of each water body listed in Table 1-1.

Maps of NYSDEC and Suffolk County sampling locations within each water body are provided in Section 2.0. As depicted on the maps, each water body contains a variety of different shellfish classification areas (i.e., closed, seasonally certified) and, naturally, the sampling stations are located in differently classified waters. Conditionally open areas are not shown separately on the maps because their designation changes on an annual basis. Any areas that may be conditionally certified are included within the 'closed' sections of the maps (see Section 1.1 for clarification).

Attachment 1 provides the results of the analysis of NYSDEC and County water quality data and includes the geomean and 90$^{th}$ percentile statistical values for both fecal and total coliform. As stated in Section 3, these values are equivalent in terms of public protection. Those data sets that fail to meet the minimum requirements of acceptability associated with quantifying coliform exceedances are noted. Ultimately, the water bodies that possess one or more stations that indicate impairment (i.e., total or fecal coliform levels in excess of state standards) are selected for further analysis in accordance with the TMDL process.

The 90$^{th}$ percentile value for fecal coliform measurements exceeded the NSSP thresholds most often, and was therefore, determined to be the most sensitive indicator for this study. According to the NYSDEC, closures of shellfish lands are rarely based on water quality at a station failing to meet the geometric mean component of the total or fecal coliform standards. Typically water quality problems at a station were determined by the failure to meet the estimated 90$^{th}$ percentile component of the standard. Failure to meet the 90$^{th}$ percentile component of the standard means that water quality at the station is more variable than the inherent variability of the most probable number (MPN) method used for examining samples. Therefore, TMDL standards and modeling will be conducted using primarily fecal coliform data. Table 4-3 shows the water bodies and the stations within them that exceeded any of the NSSP standards for both fecal and total coliform, although those stations that exceeded the NSSP 90$^{th}$ percentile threshold of 49 MPN for fecal coliform are most noteworthy. Table 4-3 identifies the water bodies for which subsequent TMDL analyses will be performed. Water bodies or zones not listed within Table 4-3 will not undergo TMDL analysis due to either lack of sufficient data for analysis or lack of coliform exceedances (refer to Attachment 1). Water bodies not exceeding the applicable standards included Dering Harbor and Scallop Pond. Existing loads in Dering Harbor, however, were very close to exceedances levels, and therefore, a

TMDL was developed. Water bodies without sufficient data for analysis included Downs Creek, Halls Creek, Unnamed Pond, and Oyster Pond. Individual zones within larger water bodies also may not have exhibited exceedances, and therefore were not included in Table 4-3. These zones include TJC-2, NH-4, NC-2, SH-1, SH-3, SH-4, and AH-1.

**Table 4-3. Summary of Stations in Each 303(d) Water Body that Exhibits Exceedances for Fecal and Total Coliform.**

| PWL Water Body Name | Zone | Fecal Coliform (MPN/100 ml) Geomean ≥ 14 MPN 90th Percentile ≥ 49 MPN | | | | Total Coliform (MPN/100 ml) Geomean ≥ 70 MPN 90th Percentile ≥ 330 MPN | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sampling Station | Geomean | 90th percentile | n | Sampling Station | Geomean | 90th percentile | n |
| Budds Pond (1701-0234) | N/A | 109 | 28.7 | 124 | 14 | - | - | - | - |
| Stirling Creek and Basin (1701-0049) | N/A | - | - | - | | TC-3 | - | 412 | 19 |
| Town/Jockey Creeks and tidal tributaries (1701-0235) | TJ-1 | 2.1 | 19.1 | 180.9 | 24 | - | - | - | - |
| | TJ-1 | 2.3 | 21 | 93 | 25 | - | - | - | - |
| | TJ-1 | 2.5 | 20.9 | 78 | 24 | - | - | - | - |
| Goose Creek (1701-0236) | N/A | G2 | - | 115.8 | 27 | - | - | - | - |
| | N/A | G3 | 16.1 | 141 | 27 | - | - | - | - |
| | N/A | G4 | 16.3 | 151.8 | 27 | - | - | - | - |
| | N/A | FC1_3 | - | 51 | 27 | - | - | - | - |
| | N/A | G6 | - | 59 | 26 | - | - | - | - |
| Hashamomuck Pond (1701-0162) | HP-1 | FC-1 | - | 204 | 35 | TC-1 | - | 460 | 40 |
| | HP-1 | FC-1.1 | 14.5 | 460 | 36 | TC-1.1 | | 460 | 42 |
| | HP-1 | FC-1.2 | - | 53.7 | 40 | - | - | - | - |
| | HP-1 | - | - | - | - | TCA | - | 350 | 46 |
| | HP-2 | 350 | 25.2 | - | 3 | - | - | - | - |
| | HP-2 | 340 | 20 | - | 3 | - | - | - | - |
| Richmond Creek and tidal tributaries (1701-0245) | N/A | FC-7.4 | 17.1 | 93 | 30 | - | - | - | - |
| | N/A | FC-7.4A | 33.8 | 262 | 30 | - | - | - | - |
| | N/A | FC-7.4B | 23.9 | 95.7 | 30 | - | - | - | - |
| Tidal Tributaries - Gr Peconic Bay, Deep Hole Ck (1701-0247) | N/A | FC-9C | 18.1 | - | 30 | - | - | - | - |
| Tidal Tributaries - Gr James Ck (1701-0247) | N/A | FC-8A | 22.9 | 93 | 30 | - | - | - | - |
| Flanders Bay, east/center, and tributaries (1701-0030) | N/A | FC-6B | - | 53.7 | 30 | - | - | - | - |
| | N/A | FC-7 | - | 66.9 | 30 | - | - | - | - |
| | N/A | FC-26 | - | 76.8 | 30 | - | - | - | - |
| | N/A | FC-15 | - | 168 | 49 | - | - | - | - |
| | N/A | 170 | 34.4 | 86 | 10 | - | - | - | - |

**Table 4–3. Summary of Stations in Each 303(d) Water Body that Exhibits Exceedances for Fecal and Total Coliform, continued.**

| PWL Water Body Name | Zone | Fecal Coliform (MPN/100 ml) Geomean ≥ 14 MPN 90th Percentile ≥ 49 MPN | | | | Total Coliform (MPN/100 ml) Geomean ≥ 70 MPN 90th Percentile ≥ 330 MPN | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sampling Station | Geomean | 90th percentile | n | Sampling Station | Geomean | 90th percentile | n |
| Reeves Bay and tidal tributaries (1701-0272) | N/A | FC-12 | - | 93 | 30 | - | - | - | - |
| | N/A | FC-16C | - | 75 | 30 | - | - | - | - |
| | N/A | FC-17C | 15.7 | 75 | 30 | - | - | - | - |
| | N/A | FC-20A | 19.4 | 240 | 30 | - | - | - | - |
| | N/A | 210 | 78.3 | 478 | 10 | - | - | - | - |
| Sebonac Creek / Bullhead Bay and tidal tributaries (1701-0051) | N/A | FC-2 | 19.1 | 85.8 | 17 | - | - | - | - |
| | N/A | 148 | 49 | 58 | 2 | - | - | - | - |
| North Sea Harbor and tributaries (1701-0037) | NH-1 | FC-3 | 22.8 | 240 | 40 | TC-3 | 87.3 | 460 | 42 |
| | NH-1 | - | - | - | - | TC-3.1 | 140.6 | 418.3 | 2 |
| | NH-2 | FC-4.2 | - | 71.8 | 52 | - | - | - | - |
| | NH-2 | FC-9 | - | 93 | 51 | - | - | - | - |
| | NH-2 | FC-10 | - | 93 | 51 | - | - | - | - |
| | NH-3 | FC-7 | 26.2 | 225.3 | 30 | TC-7 | - | 438 | 30 |
| | NH-5 | 104 | 30.1 | 67 | 8 | - | - | - | - |
| Wooley Pond (1701-0048) | N/A | FC-2 | - | 93 | 30 | - | - | - | - |
| | N/A | FC-3 | 32.5 | 240 | 30 | TC-3 | 78.3 | 1100 | 30 |
| | N/A | FC-4 | 33.1 | 240 | 30 | TC-4 | - | 460 | 30 |
| | N/A | 300 | 31.7 | 60 | 6 | - | - | - | - |
| Noyac Creek and Tidal Tribs. (1701-0237) | NC-1 | 310 | 26.4 | 56 | 5 | - | - | - | - |
| Sag Harbor and Sag Harbor Cove (1701-0035) | SH-2 | FC-9 | - | 78 | 44 | - | - | - | - |
| Northwest Harbor and tidal tributaries (1701-0046) | N/A | FC-4 | - | 195.9 | 34 | TC-4 | - | 460 | 40 |
| | N/A | FC-5 | 15.4 | 262 | 30 | TC-5 | - | 524 | 30 |
| | N/A | FC-6 | 19.1 | 460 | 30 | TC-6 | 72.5 | 1240.1 | 30 |
| | N/A | FC-7 | 21.7 | 460 | 30 | TC-7 | - | 460 | 30 |
| | N/A | FC-8 | 24.2 | 460 | 30 | TC-8 | - | 1100 | 30 |
| | N/A | FC-9 | - | 213 | 34 | TC-9 | - | 460 | 41 |
| | N/A | FC-10 | - | 65.4 | 34 | - | - | - | - |
| | N/A | FC-15 | - | 78 | 34 | - | - | - | - |
| | N/A | 131 | 36.9 | 140 | 14 | - | - | - | - |

**Table 4–3. Summary of Stations in Each 303(d) Water Body that Exhibits Exceedances for Fecal and Total Coliform, continued.**

| PWL Water Body Name | Zone | Fecal Coliform (MPN/100 ml) Geomean ≥ 14 MPN 90th Percentile ≥ 49 MPN | | | | Total Coliform (MPN/100 ml) Geomean ≥ 70 MPN 90th Percentile ≥ 330 MPN | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Sampling Station | Geomean | 90th percentile | n | Sampling Station | Geomean | 90th percentile | n |
| Acabonac Harbor (1701-0047) | AH-2 | 133 | 21.5 | 80 | 11 | - | - | - | - |
| | AH-2 | FC-13 | - | 73 | 45 | - | - | - | - |
| | AH-3 | FC-15 | 81.7 | 460 | 24 | TC-15 | 308.4 | 2501 | 30 |
| | AH-3 | FC-16 | 24.4 | 195.9 | 24 | TC-16 | - | 460 | 30 |
| | AH-4 | FC-33 | 28.7 | 460 | 24 | TC-33 | - | 524 | 30 |
| | AH-4 | FC-34 | 38.6 | 460 | 28 | TC-34 | - | 524 | 30 |
| | AH-4 | FC-35 | 31 | 460 | 24 | TC-35 | 71.2 | 1100 | 30 |
| | AH-4 | FC-36 | 29.6 | 240 | 24 | TC-36 | - | 460 | 30 |
| | AH-4 | FC-4 | 46.3 | 652 | 28 | TC-4 | - | 460 | 30 |
| | AH-4 | FC-5 | 23.8 | 240 | 24 | TC-5 | - | 1100 | 30 |
| | AH-4 | FC-6 | 20.7 | 306 | 28 | TC-6 | - | 460 | 30 |
| | AH-4 | FC-6.1 | 22.9 | 213 | 24 | TC-6.1 | - | 716 | 27 |
| | AH-5 | FC-1 | 17.6 | 240 | 52 | TC-1 | - | 1100 | 55 |
| | AH-5 | FC-2 | 14.3 | 240 | 52 | - | - | - | - |
| | AH-5 | FC-3 | 39.2 | 460 | 24 | TC-3 | - | 1100 | 30 |
| Montauk Lake (1701-0031) | LM-1 | FC-14 | - | - | - | TC-14 | - | 416 | 46 |
| | LM-1 | FC-17 | - | 93 | 37 | - | - | - | - |
| | LM-2 | FC-9 | - | - | - | TC-9 | - | 460 | 30 |
| | LM-2 | FC-11 | | 98.7 | 30 | TC-11 | 81.3 | 1100 | 30 |
| | LM-3 | FC-28 | - | 53 | 30 | - | - | - | - |
| | LM-3 | 135 | - | 25.3 | 11 | - | - | - | - |
| Little Sebonac Creek (1701-0253) | N/A | FC-3 | 14.2 | 93 | 17 | TC-3 | - | 460 | 30 |

## 4.2 Land Use

The analysis of land use information is necessary to determine the likely sources of pathogens to receiving waters. The relative magnitude of pathogen transport from sources within the watershed can be assessed by evaluating land uses within specific contributing zones. For this study, land use information is used in a watershed model (Section 6) to determine relative pathogen loads to each impaired water body.

Land use data were immediately available through the EPA BASINS program; however, these data are based on a relatively coarse spatial scale. This was of concern because some of the Peconic Bay water bodies, and contributing watersheds, are relatively small in size and the resolution difference in the BASINS land use data could limit confidence levels of the pathogen loading analysis. However, land use data have been developed by The Nature Conservancy for Suffolk County based on a finer scale of resolution. These land use data are based on aggregations of parcel attributes originally developed for the Suffolk County Real EstateTax Map. The categories available within the Suffolk County GIS maps were aggregated into 15 general land use categories as part of an effort to establish accurate GIS data at the tax map scale (Suffolk County Department of Planning, 2000). The 15 categories are defined in Table 4-4.

**Table 4-4. Fifteen Land Use Categories Associated with the Suffolk County Department of Planning Land Use.**

| Cat. # | Description | Description |
|---|---|---|
| 1 | Low Density Residential | ≤ 1 dwelling unit (d.u.)/acre |
| 2 | Medium Density Residential | > 1 to <5 d.u./acre |
| 3 | High Density Residential | ≥ 5 d.u./acre |
| 4 | Commercial | Hotels, retail and office buildings, sports areas, marinas |
| 5 | Industrial | Storage/warehouse facilities, mining/quarrying operations, gas or water pipelines |
| 6 | Institutional | Schools, churches, hospitals, government offices, military installations, jails |
| 7 | Recreation/Open Space | Golf courses, parks, conservation land, camps, cemeteries |
| 8 | Agriculture | Livestock, field crops, orchards, poultry farms |
| 9 | Vacant | Vacant lots, abandoned agricultural land, private forest lands |
| 10 | Transportation | Roads, highways, tunnels, railroad |
| 11 | Utilities | Power generation facilities, water supply, communication infrastructure, utility pipelines |
| 12 | Waste Handling & Management | Landfills, sewage treatment |
| 13 | Surface Waters | Oysterlands, private or government owned land under water |
| 14 | Not documented | Probably open coastal waters[4] |
| 15 | Not documented | Probably forested land[1] |

Table 4-5 summarizes the 1999 land use acreage for each contributing watershed in the study areas (Section 4.1.3).

[4] See discussion of these categories in Section 6.2.1.

## Table 4-5. Watershed Land Use

| Water Body | ACREAGE | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | Low Density | Medium Density | High Density | Commercial | Industrial | Institutional | Recreation/ Open Space | Agriculture | Vacant | Transportation | Utilities | Waste Handle. and Mgmt. | Surface Waters | Unknown | Unknown |
| Dering Harbor | 69.34 | 41.01 | 8.36 | 13.49 | 0.54 | 1.22 | 22.50 | | 38.98 | 30.42 | 0.36 | | 235.99 | 3.91 | |
| Budds Pond | 1.59 | 14.44 | | 9.67 | 1.96 | | 2.48 | 15.55 | 10.45 | 7.31 | | | 15.80 | | |
| Stirling Creek | 2.83 | 34.22 | 24.25 | 23.97 | 4.24 | 6.50 | 13.69 | | 31.72 | 23.42 | 0.02 | | 39.47 | | |
| Town/Jockey Creeks | | | | | | | | | | | | | | | |
| TJC-1 | 49.40 | 136.95 | 10.2 | 14.6 | | 11.89 | 3.08 | | 26.00 | 44.24 | 1.26 | | 70.84 | | |
| TJC-2 | 33.94 | 53.53 | 2.5 | 7.89 | 0.97 | 45.06 | 2.83 | 4.33 | 12.98 | 20.83 | 0.02 | | 12.43 | | 1.00 |
| Goose Creek | 64.39 | 204.64 | 2.89 | 2.36 | | 6.97 | 13.43 | 27.28 | 60.00 | 59.00 | 0.35 | | 88.50 | | 12.77 |
| Hashamomuck | | | | | | | | | | | | | | | |
| HP-1 | 15.42 | 77.51 | 3.7 | 4.89 | | 0.84 | 7.62 | 66.76 | 34.00 | 28.74 | | | 37.65 | | 0.79 |
| HP-2 | 32.43 | 43.53 | 2.36 | 3.19 | 7.37 | | 70.13 | 94.04 | 112.13 | 28.48 | 0.47 | | 140.71 | | 31.71 |
| Richmond Creek | 59.31 | 20.62 | 0.21 | 0.39 | | | 7.16 | 67.63 | 20.23 | 15.42 | 0.75 | | 82.66 | | 4.18 |
| Downs Creek | 38.58 | 7.85 | | | | | 27.75 | | 16.02 | 5.05 | | | 22.07 | 19.47 | |
| Deep Hole Creek | 30.07 | 110.88 | 1.31 | 2.27 | | | | 16.12 | 18.04 | 25.65 | 1.78 | | 43.96 | | 1.91 |
| Halls Creek | 24.47 | 10.95 | 0.18 | | | | 12.46 | 2.96 | 6.26 | 4.38 | | | 7.15 | | 23.74 |
| Unnamed Pond | 6.95 | 24.33 | 0.15 | | | | | 3.12 | 6.88 | 6.59 | | | 12.92 | | 1.91 |
| James Creek | 37.74 | 67.85 | 3.12 | 10.85 | 0.16 | | 4.72 | | 23.93 | 18.80 | 0.16 | | 26.02 | | |
| Flanders Bay | 269.65 | 457.82 | 114.21 | 197.41 | 59.15 | 95.95 | 3949.6 | 66.35 | 587.53 | 483.51 | 57.75 | 0.59 | 2928.25 | 167.08 | 37.27 |
| Reeves Bay | 58.00 | 139.47 | 45.66 | 13.64 | | 2.63 | 147.29 | | 137.96 | 72.49 | | | 398.00 | | |
| Sebonac Creek | 20.05 | 13.38 | | | | | 3.45 | | 65.27 | 15.92 | | | 67.21 | 184.91 | |
| Scallop Pond | 6.84 | 12.75 | 5.25 | | | | 283.21 | | 0.80 | 6.19 | | | 124.87 | | |
| North Sea Harbor | | | | | | | | | | | | | | | |
| NSH-1 | 39.67 | 50.28 | 10.69 | 5.39 | 0.07 | 0.95 | 25.08 | | 38.77 | 30.3 | | | 41.82 | | |
| NSH-2 | 41.53 | 65.9 | 0.4 | | | 0.01 | 14.2 | | 74.89 | 20.98 | | | 26.03 | | |
| NSH-3 | 11.00 | 49.86 | | 0.03 | 0.003 | | 6.95 | | 10.89 | 15.46 | | | 7.03 | | |
| NSH-4 | 62.67 | 8.9 | 1.22 | 0.28 | | | 8.82 | | 36.29 | 9.35 | | | 20.32 | | |
| NSH-5 | 12.39 | 26.64 | 5.7 | 2.62 | | | 110.56 | | 20.57 | 19.08 | | | 124.71 | | |

**Table 4–5. Watershed Land Use, continued.**

| Water Body | ACREAGE | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | Low Density | Medium Density | High Density | Commercial | Industrial | Institutional | Recreation/ Open Space | Agriculture | Vacant | Transportation | Utilities | Waste Handle. and Mgmt. | Surface Waters | Unknown | Unknown |
| Wooley Pond | 44.49 | 63.3 | 1.68 | 1.57 | | 0.93 | 2.13 | | 45.67 | 28.54 | | | 37.42 | | |
| Noyac Creek | 35.57 | 31.85 | 0.49 | 0.43 | | 0.79 | 122.41 | | 19.59 | 11.28 | | | 114.04 | | |
| Sag Harbor | | | | | | | | | | | | | | | |
| SH-1 | 4.83 | 24.08 | 1.50 | 1.07 | | | 16.20 | | 4.25 | 13.29 | | | 28.35 | | |
| SH-2 | 8.97 | 19.86 | 5.27 | 0.62 | | 1.70 | 11.08 | | 2.31 | 9.52 | | | 14.04 | | |
| SH-3 | 66.98 | 175.84 | 30.45 | 7.51 | | 32.79 | 19.83 | | 41.91 | 64.15 | | | 386.86 | | |
| SH-4 | 2.20 | 9.59 | 6.46 | 17.49 | | 4.72 | 6.56 | | 12.26 | 14.86 | 0.86 | | 30.57 | | |
| Northwest Creek | 106.98 | 3.93 | 0.53 | 3.55 | | | 408.84 | | 56.08 | 31.73 | | | | 18.07 | |
| Acabonac Harbor | | | | | | | | | | | | | | | |
| AH-1 | 27.64 | 121.61 | 0.55 | | | | 17.9 | | 26.33 | 31.83 | | | 18.79 | | |
| AH-2 | 81.34 | 65.25 | 0.19 | | | | 101.33 | | 39.44 | 22.25 | | | 141.45 | | |
| AH-3 | 24.00 | 10.71 | 0.38 | 1.76 | | 6.52 | 56.35 | | 27.03 | 9.56 | | | 28.45 | | |
| AH-4 | 67.10 | 6.1 | | | | | 118.6 | | 14.86 | 10.28 | | | 87.82 | | |
| AH-5 | 38.43 | 18.29 | 0.32 | | | | 20.18 | | 5.58 | 7.02 | | | 20.79 | | |
| Montauk Lake | | | | | | | | | | | | | | | |
| LM-1 | 10.22 | 64.58 | 26.27 | 52.43 | 4.88 | 2.05 | 110.24 | | 42.79 | 64.68 | 4.00 | | 74.59 | | |
| LM-2 | 15.41 | 1.12 | | 20.68 | 0.56 | | 99.48 | | 8.34 | 27.21 | | | 66.42 | | |
| LM-3 | 287.80 | 433.8 | 45.66 | 22.57 | | | 406.84 | 29.59 | 317.20 | 325.7 | 7.3 | | 922.96 | 177.04 | |
| Oyster Pond | 39.06 | 8.66 | | | | | 1,341.37 | | 77.15 | 63.55 | | | | | |
| Little Sebonac Creek | 150.38 | 29.52 | 1.26 | 1.74 | | | 542.81 | | 127.09 | 29.32 | | | 276.87 | 7.42 | |

### 4.3 Climate

Official climatic data from the National Climatic Data Center recorded since January 1971 were available from Riverhead Research Farm and Bridgehampton, New York (Station Numbers: 307134 and 300889, respectively), as well as from Brookhaven National Laboratory (BNL). The Riverhead Research Farm Station is located near the mouth of the Peconic River and should be somewhat representative of conditions at the western end of the Peconic estuary. The Bridgehampton station is located midway along the south fork of Long Island and is the most easterly station on Long Island with available recent rainfall data. BNL is located in Upton, NY, west of the Peconic Estuary mouth. Table 4-6 summarizes the annual precipitation averages for each station throughout the period of record that is coincident with the water quality data analysis. The wettest year across all stations was 2003 and the driest year for every station but Bridgehampton was 1997.

**Table 4-6. Precipitation Data (in inches) from the Brookhaven National Laboratory, the Riverhead Research Farm, and in Bridgehampton, New York.**

| Year | Brookhaven National Laboratory | Riverhead Research Farm | Bridgehampton | Average |
|---|---|---|---|---|
| 1997 | 40.04 | 38.38 | 47.47 | 41.96 |
| 1998 | 56.61 | 42.89 | 55.79 | 51.76 |
| 1999 | 51.72 | 48.58 | 43.91 | 48.07 |
| 2000 | 54.37 | 43.19 | 43.29 | 46.95 |
| 2001 | 45.55 | 46.59 | 49.27 | 47.14 |
| 2002 | 52.07 | 46.50 | 52.50 | 50.36 |
| **2003** | **63.11** | **57.50** | **60.10** | **60.24** |
| 2004 | 35.86 | 44.34 | 53.46 | 48.90 |
| AVERAGE | 49.92 | 46.00 | 50.72 | - |

### 4.4 Watershed Contributing Zones

Total and fecal coliform delivery to the Peconic Estuary is believed to be primarily driven by storm water transport due to the relatively high hydraulic conductivity of the soils and aquifer materials in this region of New York. This results in high rates of surface water infiltration of surface waters and the recharge of groundwater, which acts as a net sink for pathogens. However, precipitation landing on impervious surfaces such as rooftops, parking lots, and roads is often routed through storm water infrastructure to either infiltration beds or directly to receiving water bodies. Infiltration beds are effective in upper watersheds where the distance between the land's surface and the water table (vadose zone) can be significant. However, in urbanized coastal areas, storm water systems are often designed to discharge into tidal creeks and estuaries to avoid the risk of flooding due to the relatively lower infiltration capacity.

Rather than delineating topographically-based whole watersheds, a series of contributing zones, or subwatersheds, have been delineated for each of the Peconic Bay water bodies that are based on existing Peconic Bay storm water contributing zones. These zones were provided by the Peconic Estuary Program (PEP). These delineations are based on an existing stormwater contributing zone map of the entire Peconic Bay watershed (Suffolk County, NY). All of the water bodies in this study required slight modification to this bay-wide contributing zone due to their relatively small size. Water body-specific contributing zones were delineated on a GIS by overlaying the Peconic Bay stormwater contributing area over spatially rectified USGS quad maps (supplied by EPA Region 2). Subsequent delineations of each contributing zone were based on local topography and road networks.

Each zone is shown, with respect to sampling locations and closure status, in Section 2.

# 5.0 SOURCE ASSESSMENT

This section identifies the potential sources of fecal coliforms in the study area discharging into the Peconic Bay estuarine system. Sources of information include GIS data and literature provided by EPA Region 2, NYSDEC, and the PEP. The Brown Tide Comprehensive Assessment and Monitoring Program (BTCAMP) study conducted by the Suffolk County Department of Health (1992), and previously summarized by HydroQual (2003), also assisted in characterizing the relationship between point and nonpoint source loadings and in-stream responses at the monitoring stations located throughout the Peconic Bay study area.

Based on the historic water quality monitoring, the NYSDEC has indicated that the water quality standards were generally exceeded in a number of water bodies within Peconic Bay (see Section 4). The standards were often met in the open water except the areas in the vicinity of storm water outfalls, STP effluent outfalls and tributaries (e.g., Flanders Bay).

Point sources of pollution are those that discharge flows and pollutant loads to a water body from a fixed location or through a single point of entry such as a discrete pipe or ditch. The major point sources in the study area include: (1) STPs that receive and treat domestic/commercial/industrial wastewater; (2) commercial and industrial plants whose discharges are permitted such as duck farms; and (3) urban storm water from permanent drainage areas such as those with Phase 1 or Phase 2 storm water permits.

Non-point sources encompass those pollution sources that have no single identifiable point of entry for the contamination. One example is wildlife which is often a major source of bacterial contamination to the surface waters with large open spaces/forests and wildlife population. Other potential nonpoint sources include contributions from poorly designed, or failing, septic systems and cesspools; marinas; boating activities; and limited bacterial contamination from ground water. Storm water from municipalities not covered by Phase 1 or Phase 2 storm water permits is considered a nonpoint source for this study.

The following sections summarize the likely point and nonpoint sources of pollution in the study area.

## 5.1 Point Sources

There are five STPs with surface water discharges regulated by NYSDEC through State Pollution Discharge Elimination System (SPDES) that contribute directly to the Peconic estuary system. Located in Riverhead, the Calverton Enterprise Park (formerly Grumman Aerospace) outfall flows into McKay Lake which feeds Swan Pond which feeds the freshwater (non-tidal) Peconic River. The Town of Riverhead is currently in the design phase of a planned upgrade for the Calverton STP, which includes upgrading the STP to provide nitrogen removal and relocating the outfall to discharge to groundwater rather than surface water. The Brookhaven National Laboratory STP discharges to the freshwater (non-tidal) Peconic River and has recently been upgraded to employ ultraviolet disinfection. The Riverhead STP effluent is combined with the Riverhead/Southampton Scavenger Waste Facility. This facility has also been recently upgraded and the effluent is subjected to ultraviolet disinfection prior to being discharged to the tidal portion of the Peconic River. Discharge from the Sag Harbor STP outfall is located outside of the Sag Harbor study area has resulted in an administrative closure of an area immediately seaward of the harbor's mouth. This facility has recently been upgraded and employs ultraviolet disinfection. Data on the potential for tidal transport of pollutants from this point source to inner Sag Harbor are currently not available. The Shelter Island Heights STP is a small sequencing batch reactor (SBR) that uses sodium hypochlorite disinfection and is capable of treating up to 72,000 gallons per day (gpd). In addition to the five STPs, Atlantis Marine World discharges approximately 2,000 gallons per day and pretreats its discharge using ozone or chlorine prior to discharge to the tidal Peconic River. There are no combined sewers[5] in the entire area. A majority of the Peconic Watershed is served by septic systems and a portion of the Towns of Brookhaven, Riverhead, and Southampton within the watershed are served by separate sanitary and storm sewers. The village of Greenport is also sewered, but the STP discharge is to Long Island Sound.

The towns of Riverhead and Southampton are both regulated under the EPA's Phase II Stormwater Program, as are the New York State Department of Transportation and the Suffolk County Department of Public Works, within these towns. As of March 2003, the municipal separate storm sewer systems (MS4s) that serve these two towns were required to have a NPDES permit and a management plan that prevents pollutant-laden stormwater from being discharged into nearby water bodies and impacting water quality. The outfalls from these MS4s are considered point sources to the Peconic Estuary.

Duck farms have typically been the active permitted industrial discharges in the study area. By 1976, most of the duck farms that discharged into the Peconic system went out of business. Although the Corwin Duck Farm is the sole remaining duck farm in operation in the Peconic Watershed, it no longer directly discharges processing waste to surface water as of the late 1980s. This farm is located north of Hubbard Avenue in the upstream reach of Meetinghouse Creek, and has a renewed SPDES permit that prohibits discharge except in the case of a 10 year, 24-hour rainfall event. Limited monitoring conducted by NYSDEC and SCDHS has shown high levels of total coliform bacteria in the Meetinghouse Creek, particularly after the rain events. This is potentially due to surface runoff from Corwin duck farm during high rainfall events along with other sources such as urban storm water from the creek's drainage area.

The PEP has delineated groundwater subbasins that discharge to the Peconic Estuary. Heatherwood Golf Club at Calverton has a groundwater discharge in the vicinity of the western Peconic River. In addition, nine operating or closed landfills are identified as possible point sources of contamination. The industrial discharges or landfills have been shown in the BTCAMP studies to have adversely affected groundwater and surface water ecosystems. Although the groundwater discharges and landfills may contribute other pollutants such as nutrients, these are minor sources for pollutants such as pathogens.

The extent and intensity of storm water runoff was investigated by the Long Island 208 Wastewater Management Treatment Plan (LIRPB, 1978). The Long Island Segment of the Nationwide Urban Runoff Program (LI NURP) further explored the problem of storm water runoff as it relates to local groundwater and surface water quality (LIRPB, 1982). Both the 208 and LI NURP studies identified storm water runoff as the major source of bacterial loadings to surface waters in Suffolk County.

## 5.2 Non-Point Sources

The nonpoint sources that typically contribute pathogens into estuarine systems include failing on-site sewage disposal (septic) system; storm water runoff from developed areas not covered by Phase 1 or Phase 2 Stormwater permits; runoff from agricultural areas and open space/forest; direct waterfowl/wildlife inputs; and boats and marinas. Relative contributions from each type of source are significantly site-specific in nature, particularly in localized areas of study.

[5] Combined sewers are historic sewer systems designed to contain stormwater and sanitary sewage in the same pipe. Under normal weather conditions, combined sewers transport the wastewater directly to a treatment plant. However, during periods of heavy precipitation, these systems are designed to occasionally overflow and discharge the stormwater and raw sewage directly into nearby water bodies.

### 5.2.1 Agricultural Sources

Although county-wide data on estimated livestock abundance has been compiled, no site-specific data have been analyzed. Table 5-1 summarizes the Suffolk County agricultural data. Site-specific information on livestock populations (i.e., representative of individual contributing areas) is not available which makes estimating these sources difficult.

**Table 5-1. Summary of Suffolk County Agricultural Data.**

| Type of Livestock | Suffolk County | |
|---|---|---|
| | 1997 Number | 2002 Number |
| Total Cattle and Calves | 188 | 232 |
| Total Hogs and Pigs | 553 | 175 |
| Poultry | | |
| Layers 20 weeks or older | 3,719 | 3,544 |
| Broilers | not available | not available |
| Pullets | not available | 1,146 |
| Turkeys | not available | 270 |
| Horses and Ponies | not available | 1,391 |
| Sheep and Lambs | 392 | 182 |
| Total Number of Farms (crops and livestock) | 721 | 651 |

SOURCE: USDA, 2002

### 5.2.2 Marine Vessels and Marinas

Increased development throughout the coastal zone in conjunction with increasing demand for recreational marina facilities has created the need to protect sensitive coastal environments while enhancing multiple uses of valuable coastal resources. In 1993, the Peconic Estuary Program Comprehensive Conservation and Management Plan (PEP, 2001) conservatively estimated that approximately 1,150 establishments within the Peconic watershed were estuarine dependent (e.g., commercial fishing, marinas, boat repair, hotels/motels, and other businesses aimed at tourists and/or recreationists). The estimated asset values (in 1995 dollars) of recreational fishing and boating were assessed to be $276 million and $210 million, respectively.

In June 2002, the Peconic Estuary was officially approved as a designated Vessel Waste No Discharge Zone (NDZ) by the EPA (67 FR 39720). While a vessel is inside a NDZ, the discharge valve of a Type I or Type II marine sanitation device (MSD) (Type I and II MSDs treat the sewage before discharging it) must be visibly closed, preventing wastes from being discharged into surrounding waters. A padlock or a non-releasable wire tie can be used to secure the valve, or the valve handle can be completely removed. A Type III MSD has a holding tank and is permitted in a NDZ as long as pumpout facilities are used to empty the tank. An ongoing public education plan was designed to inform boaters that discharging raw or treated sewage within the NDZ is illegal and that all sewage from a Type III MSD must be held onboard the vessel until a pumpout facility or specialized boat can empty the holding tank. For violations of the NDZ law, section 33-e of New York State's Navigation Law provides for fines of up to $500 for a first discharge offense and $1,000 for further violations. According to the 2000 Peconic Estuary "Petition for Determination Regarding Adequacy of the Number of Vessel Waste Pumpout Facilities in a Water Body to Support a No Discharge Zone" , there are enough pumpout facilities in the greater Peconic Estuary area to service between 10,800 and 21,600 vessels with Type III MSDs. Vessel counts conducted for the same petition estimated that, in 2000, there were between 7,200 and 11,247 boats in the Estuary on a given summer weekend (Table 2 in Attachment 2), and not every one of these vessels has a Type III MSD onboard. It should be noted that there is transient boating (people who take day trips from Connecticut, New York City and other ports around Long Island) which is difficult to quantify due to lack of data. Based on the available information, the EPA concluded that more than enough pumpouts exist within the Peconic Estuary to support a NDZ designation. Given the 2002 NDZ designation and the sufficient pumpout facilities available, it is unlikely that vessel-derived human waste is a major source of coliform bacteria in Peconic Estuary waters. Even though sewage originating from vessels is thought to be a minor contributing source, it is believed that marine vessel waste disposal systems are efficient and illicit discharges are likely diminishing over time. The difficulty in estimating loading from this source makes modeling it futile, however, the NDZ and the increasing effectiveness of pumpout facilities likely renders value estimates for discharges from this source unnecessary.

Data on land-based and mobile pumpout facilities serving the Peconic Estuary were compiled for the 2000 Peconic Estuary "Petition for Determination Regarding Adequacy of the Number of Vessel Waste Pumpout Facilities in a Water Body to Support a No Discharge Zone". The facilities, as well as their location and their pumpout capacity, are presented in Table 1 in Attachment 2. To estimate the number of vessels using the Peconic Estuary on a regular or transient basis, this NDZ petition also compiled information on the number of slips, moorings, and private docks within several water bodies. These data are shown in Table 2 in Attachment 2. Finally, Table 3 in Attachment 2 presents the number of gallons of vessel waste pumped out by the several pumpout boats operating within the Estuary between 1995 and 2002.

### 5.2.3 Urban/Residential Sources

Urban and residential sources of fecal and total coliform bacteria are dependent upon a few primary factors. These include residential density and the associated impervious surface area within a contributing zone, domestic pet populations, wildlife populations, and the effectiveness of onsite wastewater disposal systems. The modeling approach (Watershed Treatment Model (WTM)) applied in this study assumes default values of "urban" or "residential" source and runoff coefficients to yield a bulk annual fecal coliform load to each receiving water in the study. These default values are based on extensive literature review and comparative studies within the U.S. (Caraco, 2001). See Section 6.0 for further information on the WTM and its default values.

Several thousand dogs and other pets are also estimated to be present (personal communication: NYSDEC, 2003). According to the Long Island Power Authority's 2004 Population Census, the five towns surrounding the Peconic Estuary had approximately 52,881 year-round households (LIPA, 2004). In its 2004-2005 Statistical Abstract, the United States Census Bureau made a national estimate that about 36% of households have dogs, and each household has an average of 1.6 dogs (U.S. Census Bureau, 2004). From these approximations, it can be assumed there are about 30,500 dogs in the five towns surrounding the Peconic Estuary.

### 5.2.4 Waterfowl

Large waterfowl populations are present during the migration and winter seasons. Smaller, but significant, numbers of waterfowl are present throughout the year. Several sources including NYSDEC, Suffolk County Department of Health Services (SCDHS), and the local Audubon Society were contacted to get an estimate of the number of birds, but this data was not readily available.

Horsely and Witten (2003) provided a series of site-specific analyses of fecal coliform loads and transport within the Peconic Bay area. In these studies, they rely on information reported by Weiskel *et al*. (1996) in their estimation of waterfowl contributions to coastal waters. Based on their analysis, they assume that one can account for about 0.3 waterfowl per acre of surface water. They then multiply the area by this "occupancy rate" and again by the estimated fecal coliform load associated with waterfowl waste generation (applied an average of $10^8$ FC/day/bird). Because no additional site-specific rates of waterfowl presence in the Peconic Bay area are available, this loading algorithm is applied consistently across the 25 water bodies in this study. This annually integrated rate does not represent event-driven abundances in fecal coliform detection in these water bodies, especially in local conditions (i.e., particular feeding or breeding areas). Based on personal communication with local scientists and managers, the paucity of waterfowl and other wildlife data suggest that further research in this area is necessary to reduce uncertainties in relative magnitudes of these load sources (Dr. Robert Nuzzi, personal communication).

Additional information on waterfowl contributions to some of the water bodies within the study area is described in Section 5.3.1.

### 5.2.5 Beach Wrack

Beach wrack is the mat of organic material that often lines recent high tide lines along the coastal zone. These mats largely consist of resident aquatic vegetation that has either died or been pruned by tidal, storm, or animal disturbance. Wrack mats can harbor bacterial populations and can also provide environments for growth and redistribution of bacteria. Weiskel *et al*. (1996) estimated that wrack yielded approximately 1.25 x $10^6$ FC/kg. However, no site-specific data on the abundance, or variability, of wrack biomass is currently available and literature values are extremely variable. For example, Dugan et al. (2003) reported observations of 1,200 to 2,179 kg/m/year of kelp wrack in South Africa and 473 kg (wet) of macrophyte wrack per meter per year in a California coastal zone. These values are clearly not applicable to Peconic Bay, but demonstrate the large ranges in wrack production and deposition. In a recent analysis of several embayments in Peconic Bay Horsely and Witten (2003) reported a general lack of information on wrack deposition rates; however, they surmised that this could be an important source of bacteria to Peconic Bay water bodies. Therefore, more analysis is required to establish the spatial and temporal contributions of beach wrack as a source of bacteria in the Peconic Bay embayments.

### 5.2.6 Marine Sediment Resuspension

The resuspension of bacteria present in coastal sediments can potentially be a significant source to shallow, localized areas. However, the resuspension is highly variable (Weiskel et al., 1996) and can be quite difficult to predict due to a variety of confounding factors. Rates reported by Valiela et al. (1991) and further discussed by Horsely and Witten (2003) range from 7 to 18 FC/100 mL seawater.

## 5.3 Summary of Pollution Sources

Based on the review of past studies conducted by NYSDEC and SCDHS, the bays within the Peconic Estuary are primarily affected by urban storm water runoff (which carries waterfowl, wildlife, and domestic pet waste into the Estuary) and direct waterfowl and wildlife inputs, followed by STPs, failing septic systems, and boater waste. In the absence of quantifiable and accurate data on many of these sources, limited data reported in literature from previous studies and experience gained from similar nation-wide studies were used to develop reasonable estimates of pollutant loads. These assumptions are discussed throughout the following section on modeling approach.

### 5.3.1 Bacterial Source Tracking

The Cornell Cooperative Extension of Suffolk County has developed an *E. coli* bacteria library of potential sources in the Peconic Estuary area. This library is being used to estimate predominant sources of *E. coli* bacteria in surface waters, through DNA analyses, and help in the development of a more accurate characterization of bacterial sources in specific areas under various environmental conditions.

The sampling and analysis effort associated with this study spanned from 1999 to 2002 and results have been reported in Hasbrouck (2004), *Identification of* E. coli *Sources for the Peconic Estuary Watershed for Effective Mitigation of Nonpoint Source Pollution*. This effort included 4 of the 25 water bodies identified in this TMDL study:

(1) Sag Harbor

(2) Hashamomuck Pond

(3) Northwest Creek

(4) Reeves Bay

The results suggest that while there are a variety of predominant sources of *E. coli* in the Peconic Bay estuarine systems, the majority of samples indicate that waterfowl and other coastal inhabitants (e.g., muskrat and fox) typically rank among the highest in both wet events (i.e., rain events) and dry periods. Table 5-2 summarizes the stations that occur within the 4 water bodies listed above.

**Table 5-2. Summary of *E. coli* detection in 4 of the 25 study area water bodies as reported by Hasbrouck (2003). Values represent percentages of total observations that are associated with each defined source category during wet and dry conditions.**

| Water Body | Station | Date | Wet/Dry | Human % | Waterfowl % | Dog % | Other Wildlife % | Unknown % |
|---|---|---|---|---|---|---|---|---|
| Sag Harbor | 9 | Aug 1999 | Dry | 0 | 100 | 0 | 0 | 0 |
| Sag Harbor | 9 | Oct 1999 | Wet | 0 | 0 | 4.5 | 95.5 | 0 |
| Sag Harbor | 9 | Oct 1999 | Dry | 0 | 55.5 | 0 | 22.2 | 22.2 |
| Sag Harbor | 9 | Nov 1999 | Wet | 0 | 0 | 0 | 0 | 100 |
| Reeves Bay (Goose Creek) | 18C | Nov 2001 | Dry | 0 | 33.3 | 11.1 | 33.3 | 22.2 |
| Reeves Bay (Goose Creek) | 18C | Nov 2001 | Wet | 8.3 | 91.6 | 0 | 0 | 0 |
| Hashamomuck Pond | 1.1 | Sep 1999 | Wet | 5.2 | 0 | 21.1 | 21.1 | 52.6 |
| Hashamomuck Pond | 1.1 | Oct 1999 | Dry | 0 | 77.7 | 0 | 0 | 22.2 |
| Hashamomuck Pond | 1.1 | Nov 1999 | Wet | 0 | 0 | 0 | 25 | 75 |
| Hashamomuck Pond | 2.1 | Dec 2001 | Wet | 0 | 0 | 100 | 0 | 0 |
| Hashamomuck Pond | 2 | Dec 2001 | Dry | 0 | 66.6 | 0 | 0 | 33.3 |
| Hashamomuck Pond | 2 | Dec 2001 | Wet | 0 | 100 | 0 | 0 | 0 |
| Hashamomuck Pond | 2 | Jan 2002 | Dry | 0 | 0 | 0 | 100 | 0 |
| Northwest Creek | 3 | Nov 2001 | Wet | 66.6 | 8.3 | 0 | 8.3 | 16.6 |
| Northwest Creek | 3 | July 2000 | Dry | 0 | 100 | 0 | 0 | 0 |
| Northwest Creek | 3 | Aug 2000 | Wet | 0 | 0 | 0 | 0 | 100 |
| Northwest Creek | 3 | Nov 2001 | Wet | 0 | 100 | 0 | 0 | 0 |

# 6.0 MODELING APPROACH

The most critical component of TMDL development is the establishment of the relationship between source loadings and the impacts on the receiving water body. This relationship will assist in the screening and selection of appropriate watershed management options that will eventually achieve the desired water quality goals.

Some of the core principles in selecting modeling approaches for the Peconic Bay water bodies include: (1) the TMDL must be based on scientific analysis and reasonable and acceptable assumptions. All major assumptions must have been based on available data and experience gained from similar watersheds; (2) the TMDL must use the best available data. All available data in the appropriate watersheds were reviewed and used in the assessment wherever possible; and (3) methods should be clear and as simple as possible to facilitate explanation to stakeholders. All methods and major assumptions used here are described in detail and presented in a format accessible to a wide range of audiences.

To achieve these objectives, a Watershed Treatment Model (WTM; Caraco, 2001) has been utilized for characterizing the 25 Peconic Bay water bodies. Some of these water bodies either did not exhibit exceedances of coliform standards or they lacked data essential to determine impairment (see Section 4, Table 4-3). However, all 25 water bodies were included in the WTM source assessment. Most of the water bodies in question have one certification status (uncertified, conditionally certified, or seasonally certified) for the entire water body. However, several water bodies contained more than one type of certification status and therefore have been divided into local zones to simplify the TMDL analysis. Each of these zones within these water bodies are addressed through separate TMDLs.

## 6.1 Statistical Rollback Method

The statistical rollback method (Ott, 1995) was applied as a method to estimate the reductions in fecal coliform load necessary to meet the water quality standards of 14 MPN/100 mL (geomean) and 49 MPN/100 mL (90$^{th}$ percentile). This method is appropriate when the observed data follow a lognormal distribution (i.e., most observed values are relatively low while a few are significantly higher) which is the case with bacteria population distributions in aquatic environments. Compliance with the most restrictive of the dual fecal coliform criteria determines the reduction necessary. The method compares the observed geomean and 90$^{th}$ percentile values to the corresponding water quality standards. The reduction needed for each target value to be reached is determined by calculating the rollback factor ($f_{rollback}$). For example, the method for determining the geomean rollback factor follows:

$F_{rollback}$ = (Observed geomean – water quality standard)/(Observed geomean)

The same method is applied for the 90$^{th}$ percentile values and standards and the most restrictive of the two (i.e., the greatest percent reduction required) is chosen as the target reduction.

$F_{rollback}$ = (Observed 90$^{th}$ percentile – water quality standard)/(Observed 90$^{th}$ percentile)

## 6.2 Watershed Treatment Model

The NYSDEC has water quality data from 203 separate sampling stations spread among the 25 water bodies covered by this TMDL. The locations of these sampling stations are presented in Section 2 which contains maps of all 25 water bodies, the sampling stations (NYSDEC and Suffolk County), shellfish closure status, and stormwater contributing zones. The Watershed Treatment Model (Caraco, 2001) has been used to characterize each of the contributing areas associated with the 25 water bodies whether or not they indicate violations of either fecal or total coliform standards. The application of the WTM is simple yet detailed enough in terms of pollution source characterization. A series of spreadsheets quantifies the loading of fecal coliform bacteria (it does not consider total coliform) based on land use, precipitation, and fate and transport information, where available. The model is designed as a planning level tool for watersheds that do not have sufficient data or resources necessary for complex modeling applications. The WTM has several tiers of data specificity; however, this general model has the capacity to be modified to accommodate site-specific characteristics or variable data quantity and quality. In most cases, fecal coliform loading estimates can be produced using readily available land use data. The spreadsheets calculate an annual fecal coliform load through the application of a series of algorithms that are based on statistical relationships associated with the fate and transport of bacteria from sources to receiving waters. These algorithms are based on empirical relationships and comparative studies over a wide array of watershed/water body systems (Caraco, 2001). Inputs into the model are aggregated into primary and secondary sources, described below.

Primary sources in WTM include general land use categories that are assigned either a coefficient that is then multiplied by an annual runoff volume to calculate an annual load (e.g., urban land uses) or an annual unit load that is applied as a function of land use (e.g., rural land uses). See Tables 6-1 and 6-2 for a listing of the WTM model default values. These coefficients were chosen based upon research that is summarized in WTM's user manual (Caraco, 2001). Secondary sources represent a more refined set of model inputs and can include more specific information such as combined sewer overflows or the presence of livestock and wildlife within a watershed. Similar to the primary source calculations, the secondary sources are assigned a loading coefficient based on the extent of the land use activity. Depending on data availability, specific data for point source discharges may be placed in this section of the model as well as head counts for various livestock animals. Watershed areas with specific data on watershed management strategies can use the model to calculate load reductions that are 'discounted' based on the extent and success of implementation. The presence of Best Management Practices (BMPs) such as detention basins or buffer strips, or the use of public education regarding the management of animal waste can be accounted for in existing and future loading scenarios.

**Table 6-1. Watershed Treatment Model Default Values for Primary Sources**

See Table 4-4 for definitions of land use categories

| Land Use | Impervious Cover (%) |
|---|---|
| Low density residential | 11 |
| Medium density residential | 21 |
| High density residential | 33 |
| Multifamily | 44 |
| Commercial | 72 |
| Roadway | 80 |
| Industrial | 53 |
| Forest | 0 |
| Rural | 0 |

* These rates assume a fecal coliform concentration of 20,000 MPN/100ml. for areas with impervious surfaces.

**Table 6-2. Watershed Treatment Model Default Values for Secondary Sources.**

| General Sewage Use | |
|---|---|
| Individuals/Dwelling Unit | 2.7 |
| Water Use (gpcd[6]) | 70 |
| Fecal coliform concentration in wastewater (MPN/100ml) | 10,000,000 |

The goal of applying WTM is to characterize all the point and nonpoint sources of fecal coliform and to determine their relative annually averaged contributions to the water bodies of interest within the Peconic Bay estuary. The derived loading values will serve as the reference point from which reductions could be made toward the TMDL target. Since flow and water quality data for creeks and storm water were not available, the point and nonpoint sources, including storm water (including urban and residential sources) and waterfowl are assessed based on available information. Additional potential nonpoint sources do exist (beach wrack, marine sediment resuspension) but the lack of site-specific or even regional data preclude their consideration at this scale of study. Site-specific studies of local conditions may be necessary to elucidate the potential for these additional sources, particularly if DNA source-tracking studies indicate strong evidence for these sources (See Section 5.3).

Percent reductions required to achieve the water quality goals are derived by analyzing the water quality data using the statistical rollback method (Ott, 1995). Once the targeted reductions for point and nonpoint sources are derived, specific and general management strategies can be identified for the watersheds of interest.

### 6.2.1 Modeling of Primary Sources

A land use analysis was performed for the drainage areas to the Peconic Bay water bodies and described in Section 4 of this report. The overall land use map was intersected with the drainage areas for each of the water bodies under current TMDL consideration, and land use distribution within these water bodies were determined. The stormwater contributing areas, as determined by the Peconic Estuary Program, were used as the drainage area for each subwatershed. Wetlands and surface water areas were omitted from the analysis because the spreadsheet model considers these land uses as non-contributing sources of pathogens.

The WTM requires an annual rate of precipitation for the study areas. Precipitation data from the National Climatic Data Center were available for the Riverhead Research Farm and Bridgehampton stations (Station Numbers: 307134 and 300889, respectively). As described in Section 4, the Riverhead and Bridgehampton stations are assumed to be adequately representative of conditions at most of the water bodies within the study area.

Primary source inputs required by the WTM include the following:

- Residential
    - Low Density Residential (LDR) (<1dwelling unit (du)/acre)
    - Medium Density Residential (MDR) (1-4 du/acre)
    - High Density Residential (HDR) (>4 du/acre)

[6] Gallons per capita per day.

  - Multifamily
- Commercial
- Roadway
- Industrial
- Forest
- Rural
- Open Water
- Vacant Lots
- Annual Rainfall (inches)

The Suffolk County land use data is based on a tax assessor parcel scale. The individual tax assessor codes have been aggregated into 13 more general land use categories (Table 4-4). Further aggregation of some of these categories was performed to adequately meet the input requirements of the WTM model. Institutional is grouped with Commercial and Industrial contains Utilities and Waste Handling & Management classes. Two unclassified categories (14 and 15) were not documented in the Suffolk County land use report and were found to be infrequent in the study area. However, when these unclassified categories (BTCAMP codes) were encountered they were found to often occur as open coastal waters or forested areas, respectively, when compared to regional land use data and USGS topographic maps. These classifications should be reconciled by the creators of the data. The open water areas were omitted for reasons explained above, and the forested areas were incorporated into the WTM input values where necessary.

### 6.2.2 Modeling of Secondary Sources

Secondary sources available for input into the WTM are shown in Table 6-3. Several of these secondary sources were found to be inappropriate or unnecessary for this study. The number of households were attained from county parcel data (described above). The rate of septic failure was set at zero in the model, therefore the percent of unsewered households was not a required input. Partially treated or untreated sewage can be released to surface waters due to sanitary sewer overflows (SSOs) or combined sewer overflows (CSOs). However, none exist in the Peconic Bay study area and, therefore, not factored into the WTM. Marinas do exist within Peconic Bay, however, as described in Section 5.2.2, the No Discharge Zone (NDZ) designation and the increasing effectiveness of pumpout facilities renders value estimates for discharges from this source unnecessary. Waterfowl estimates have been made independently of the WTM and incorporated into the final calculation of fecal coliform loads to each water body. These are based on "occupancy rates" reported by Horsely and Witten (2003) and references within. Although some livestock exist in some of the contributing zones in the study area, only county-wide estimates were available and, therefore, difficult to apply at the local scale. More study is required to assess the role of livestock in several of the water bodies, particularly in light of some of the *E. coli* source-tracking results reported by Hasbrouck (2004) (See Section 5.3). Sewage treatment plants (STPs) were accounted for in Flanders Bay only, and maximum permitted flows were applied as input. Fecal coliform concentrations in STP flows were set at 200 MPN/100 mL which is the SPDES permit requirement.

**Table 6-3. Summary of Secondary Sources Associated with the WTM Model.**

| **# of House-hold Units** | Un-Sewered Units (%) | Miles of SSOs | CSOs | | | Marinas | | **Livestock/Wildlife** | | **Non-Stormwater Point Source** | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Median Storm Event (inches) | Sewer-shed Area (acres) | Sewershed Imper-vious Cover (%) | Berths | Season Length | **Water Fowl** | Horses | **Flow (MGD)** | **FC (MPN/100mL)** |

Note: Those sources directly applied in this study are shown in bold. Other potential sources were evaluated but found not to be directly relevant to the load assessment (e.g., no CSOs present).

### 6.2.3 Load Characterization

The primary and secondary sources listed above were applied to the WTM to determine their relative distribution within each of the water bodies.

The WTM uses default values for source loadings where the user does not have site-specific data. Default values for terrestrial loading were set at 20,000 MPN/100 mL of surface runoff and influenced by additional factors such as land uses and their relative areas, precipitation and impervious surfaces. Rates of pet and waterfowl loads, and loads that are not yet quantifiable (e.g., wrack), are described in Section 5.

# 7.0 LOAD ALLOCATIONS

## 7.1 Background

The objective of a TMDL plan is to allocate allowable loads among the various pathogen sources so that the appropriate management actions can be taken to achieve the desired water quality results. The specific objective of the TMDLs for the Peconic Bay water bodies is to determine the required reductions in fecal coliform loadings from various nonpoint and point sources in order to meet the two water quality standards of 14 MPN/100mL as geometric mean and a 90$^{th}$ percentile value of less than 49 MPN/100mL. In cases where fecal coliform data were limited, total coliform data were applied, if possible. This occurred in only one instance: Stirling Creek. The incorporation of different sources into the TMDL is defined in the following equation (USEPA, 1999):

$$TMDL = WLA + LA + MOS$$

where:

WLA = waste load allocation (point sources)

LA = load allocation (nonpoint sources), and

MOS = margin of safety.

In addition, the selection of critical conditions that increase the overall protectiveness of the TMDL is an important element in the TMDL development process, along with consideration of seasonal variation and a margin of safety. These elements are described in the following sections.

## 7.2 Seasonal Variations and Critical Conditions

Fecal coliform bacteria concentrations can vary on a seasonal basis in some parts of the study area. The seasonality of shellfish bed closures reflects the cyclical nature of fecal coliform loads to receiving waters. Therefore, the closure periods (typically from May 1 through October 31) were chosen for analysis with the expectation that the pollution management plans developed for this period will protect the water body during the winter period (typically from November 1 through April 30). Although the May 1-October 31 timeframe was examined here, the shellfish area closure schedules in some of the water bodies may vary slightly from these dates (see Section 2.0 for discussion on the specific closure dates for individual water bodies).

In addition to being the period in which SRS sampling data are available, the 1997-2004 period contains a mix of wet years (above the long-term average) and average years. The year 2003 exhibited highest seasonal as well as annual precipitation among these seven years, therefore, was chosen as the critical year for TMDL development.

### 7.2.1 Margin of Safety

The margin of safety (MOS) is included in the TMDL development process to account for any uncertainty on loadings and the fate and transport of fecal coliform in the watershed. There are two basic approaches for incorporating the MOS (USEPA, 1999):

- Implicit incorporation of MOS using conservative model assumptions to develop allocations, or
- Explicit incorporation of MOS as a portion of the total TMDL and the remainder is used for the allocations.

The MOS was included in this study as a combination of the implicit and explicit approaches for the Peconic Bay estuarine systems as described in the following sections. A 10% explicit margin of safety was incorporated into the loading capacity.

A series of implicit approaches to increase the conservative (protective) nature of this analysis include the following:

- Use of seasonal data instead of the annual data for conservative assessment of water quality conditions in seasonally certified water bodies.
- Use of the year 2003 as critical condition in which precipitation was highest among the approximate seven years spanning the water quality period of record.
- Use of design (maximum) flows for the STP treatment facilities that contribute to Flanders/Reeves Bay rather than flows from recent discharge monitoring reports that are typically lower.

### 7.3 Allocation Scenario

As described in Section 3, the geometric mean (14 MPN/100mL) and the 90th percentile (49 MPN/100mL) criteria must be met in order to designate the water body for shellfish harvest. New York state standards set no averaging period (but specifies a minimum number of samples to be used for calculation of geometric mean and 90th percentile values) on which to calculate these values from the historic water quality data for comparison with the standards. The SRS data and the data compiled by NYSDEC in the past have shown that the geometric mean criterion is usually met and the 90th percentile criterion is often the difficult target to meet.

However, the estimated 90th percentile of the fecal coliform standards does not indicate that fecal coliform values at certified shellfishing areas are allowed to exceed the criteria ten percent of the time. Rather, the 90th percentile is a measure of water quality variation at a particular station compared to the variability inherent in the multiple-tube, multiple-dilution MPN method for examining water samples. When the variability of actual station data exceeds the inherent variability of the MPN procedure, there are likely to be some environmental factors (e.g., pollution sources) affecting water quality at that station that make the area unsuitable for shellfishing certification.

A statistical rollback method (Ott, 1995) describes a way to use the statistical characteristics of a set of water quality parameter results to estimate the distribution of future results after abatement processes are applied to sources. The method relies on basic dispersion and dilution assumptions and their effect on the mean and standard deviation of bacteria sample results at a monitoring site downstream from a source. The rollback method then provides a statistical estimate of the new population after a chosen reduction factor is applied to the existing pathogen source. In this load allocation process, compliance with the most restrictive of the dual fecal coliform criteria will determine the bacteria reduction needed. The target reductions developed for the Peconic Bay estuarine systems are provided in the following sections. These sections contain two tables for each water body: (1) loads of fecal coliform from watershed and waterfowl sources as determined through the application of the WTM and waterfowl occupancy and loading rates derived from Horsely and Witten (2003); and (2) summary of load reductions based on the rollback method, including a 10% MOS explicitly applied to the loading capacity.

For water bodies within the towns of Riverhead and Southampton, part of the load from urban stormwater determined through the application of WTM was attributed to MS4s. These loads were treated as a part of "waste load allocation" (WLA) category in accordance with EPA guidance. Based upon the field reconnaissance, review of the land use and watersheds maps and using best professional judgment, a percentage of the existing estimated load of MS4 was assigned to the conveyances. The remainder of the stormwater load was assumed to flow directly from private properties to watercourse and is considered as a component of nonpoint source load – "Load allocation" (LA). As nonpoint source load includes the waterfowl load and runoff from rural land and the stormwater directly discharged to the watercourses (treated as NPS), a reduction of 25 percent was assumed (based upon best professional judgment) to be maximum that could be reasonably achieved. This percentage reduction was used to calculate the load allocation (LA).

### 7.3.1 Dering Harbor (1701-0050)

**Table 7-1. WTM Fecal Coliform Loads to Dering Harbor**

| SOURCES | Billion FC/year |
|---|---|
| **POINT SOURCES** | |
| Sewage Treatment Plant | 0 |
| **RESIDENTIAL/URBAN LAND[1,2]** | |
| MS4 Contribution[3] | 0 |
| Non-MS4 Contribution[4] | 47,722 |
| **OTHER NONPOINT SOURCES** | |
| Rural Land | - |
| Forest | 270 |
| Waterfowl | 2,628 |
| **TOTAL LOAD (Billions)** | **50,620** |
| Water Body (ha) | 97.12 |
| Billions FC Load/ha/yr | 521 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 18,732 billion FC/year.
[3] 0% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 100% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-2. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Dering Harbor**

| Rollback Based on Station 5.2 | Condition | Units | Dering Harbor | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| **Existing Conditions** | **Nonpoint Sources** | (billion FC/yr) | **50,620** | **-** | **-** |
| | **Permitted Point Source Contributions** | (billion FC/yr) | **0** | **-** | **-** |
| | **Total Existing Loads** | (billion FC/yr) | **50,620** | **-** | **-** |
| **TMDL** | **LA** | (billion FC/yr) | **45,558** | **5,062*** | **10** |
| | **WLA** | (billion FC/yr) | **0** | **-** | **-** |
| | **MOS** | (billion FC/yr) | **5,062** | **-** | **-** |
| | **TMDL** | (billion FC/yr) | **50,620** | **5,062** | **10** |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 138.68 billion FC/day.

*Dering Harbor load reductions are based on the 10% MOS due to a relatively small margin of assimilative capacity. That is, the existing conditions exhibit fecal coliform levels that are not in exceedance but are close. For protective reasons, the TMDL was set at the existing estimated loads and the 10% MOS provides a load reduction necessary to maintain compliance with the numeric standards.

### 7.3.2 Budds Pond (1701-0234)

**Table 7-3. WTM Fecal Coliform Loads to Budds Pond**

| SOURCES | Billion FC/year |
|---|---|
| **POINT SOURCES** | |
| Sewage Treatment Plant | 0 |
| **RESIDENTIAL/URBAN LAND**[1,2] | |
| MS4 Contribution[3] | 0 |
| Non-MS4 Contribution[4] | 14,264 |
| **OTHER NONPOINT SOURCES** | |
| Rural Land | 607 |
| Forest | 30 |
| Waterfowl | 166 |
| **TOTAL LOAD (Billions)** | **15,067** |
| Water Body (ha) | 6.07 |
| Billions FC Load/ha/yr | 2,482 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 3,784 billion FC/year.
[3] 0% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 100% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-4. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Budds Pond**

| Rollback Based on Station 109 | Condition | Units | Budds Pond | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | **Nonpoint Sources** | (billion FC/yr) | **15,067** | - | - |
| | **Permitted Point Source Contributions** | (billion FC/yr) | **0** | - | - |
| | **Total Existing Loads** | (billion FC/yr) | **15,067** | - | - |
| TMDL | **LA** | (billion FC/yr) | **5,356** | **9,116** | **64.5** |
| | **WLA** | (billion FC/yr) | **0** | **0** | **0** |
| | **MOS** | (billion FC/yr) | **595** | - | - |
| | **TMDL** | (billion FC/yr) | **5,951** | **9,116** | **64.5** |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 16.30 billion FC/day.

### 7.3.3 Stirling Creek (1701-0049)

**Table 7-5. WTM Fecal Coliform Loads to Stirling Creek**

| SOURCES | Billion FC/year |
|---|---|
| **POINT SOURCES** | |
| Sewage Treatment Plant | 0 |
| **RESIDENTIAL/URBAN LAND**[1,2] | |
| MS4 Contribution[3] | 0 |
| Non-MS4 Contribution[4] | 48,865 |
| **OTHER NONPOINT SOURCES** | |
| Rural Land | - |
| Forest | 164 |
| Waterfowl | 563 |
| **TOTAL LOAD (Billions)** | **49,592** |
| Water Body (ha) | 20.64 |
| Billions FC Load/ha/yr | 2,420 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 30,842 billion FC/year.
[3] 0% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 100% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-6. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Stirling Creek**

| Rollback Based on Station TC-3 | Condition | Units | Stirling Creek | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| **Existing Conditions** | **Nonpoint Sources** | (billion FC/yr) | **49,592** | **-** | **-** |
| | **Permitted Point Source Contributions** | (billion FC/yr) | **0** | **-** | **-** |
| | **Total Existing Loads** | (billion FC/yr) | **49,592** | **-** | **-** |
| **TMDL** | **LA** | (billion FC/yr) | **35,751** | **9,869** | **28** |
| | **WLA** | (billion FC/yr) | **0** | **0** | **0** |
| | **MOS** | (billion FC/yr) | **3,972** | **-** | **-** |
| | **TMDL** | (billion FC/yr) | **39,723** | **9,869** | **28** |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 108.83 billion FC/day.

### 7.3.4 Town and Jockey Creeks (1701-0235)

**Table 7-7. WTM Fecal Coliform Loads to Town and Jockey Creeks**

| SOURCES | TJ-1 Billion FC/year | TJ-2 Billion FC/year |
|---|---|---|
| **POINT SOURCES** | | |
| Sewage Treatment Plant | 0 | 0 |
| **RESIDENTIAL/URBAN LAND** [1,2] | | |
| MS4 Contribution[3] | 0 | 0 |
| Non-MS4 Contribution[4] | 80,798 | 59,844 |
| **OTHER NONPOINT SOURCES** | | |
| Rural Land | - | - |
| Forest | 72 | 34 |
| Waterfowl | 805 | 148 |
| **TOTAL LOAD (Billions)** | **81,675** | **60,026** |
| Water Body (ha) | 29.95 | 5.67 |
| Billions FC Load/ha/yr | 2,727 | 10,587 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 37,465 (TJ-1) and 16,589 (TJ-2) billion FC/year.
[3] 0% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 100% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-8. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Town and Jockey Creeks**

| Rollback Based on Station 2.1 | Condition | Units | Town and Jockey Creeks | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | **Nonpoint Sources** | (billion FC/yr) | **81,675** | - | - |
| | **Permitted Point Source Contributions** | (billion FC/yr) | **0** | - | - |
| | **Total Existing Loads** | (billion FC/yr) | **81,675** | - | - |
| TMDL | **LA** | (billion FC/yr) | **19,921** | **59,541** | **76** |
| | **WLA** | (billion FC/yr) | **0** | **0** | **0** |
| | **MOS** | (billion FC/yr) | **2,213** | - | - |
| | **TMDL** | (billion FC/yr) | **22,134** | **59,541** | **76** |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 60.64 billion FC/day.

Note: A TMDL was not calculated for Zone TJ-2 because, based on available water quality data, there were no coliform concentration exceedances

### 7.3.5 Goose Creek (1701-0236)

**Table 7-9. WTM Fecal Coliform Loads to Goose Creek**

| SOURCES | Billion FC/year |
|---|---|
| **POINT SOURCES** | |
| Sewage Treatment Plant | 0 |
| **RESIDENTIAL/URBAN LAND**[1,2] | |
| MS4 Contribution[3] | 0 |
| Non-MS4 Contribution[4] | 93,127 |
| **OTHER NONPOINT SOURCES** | |
| Rural Land | 1,064 |
| Forest | 333 |
| Waterfowl | 1,065 |
| **TOTAL LOAD (Billions)** | **95,589** |
| Water Body (ha) | 39.25 |
| Billions FC Load/ha/yr | 2,435 |

[1]"Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 49,858 billion FC/year.
[3] 0% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 100% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-10. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Goose Creek**

| Rollback Based on Station G4 | Condition | Units | Goose Creek | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| **Existing Conditions** | **Nonpoint Sources** | (billion FC/yr) | **95,589** | **-** | **-** |
| | **Permitted Point Source Contributions** | (billion FC/yr) | **0** | **-** | **-** |
| | **Total Existing Loads** | (billion FC/yr) | **95,589** | **-** | **-** |
| **TMDL** | **LA** | (billion FC/yr) | **27,788** | **64,714** | **71** |
| | **WLA** | (billion FC/yr) | **0** | **0** | **0** |
| | **MOS** | (billion FC/yr) | **3,088** | **-** | **-** |
| | **TMDL** | (billion FC/yr) | **30,875** | **64,714** | **71** |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 84.59 billion FC/day.

### 7.3.6 Hashamomuck Pond (1701-0162)

**Table 7-11. WTM Fecal Coliform Loads to Hashamomuck Pond**

| SOURCES | HP-1 Billion FC/year | HP-2 Billion FC/year |
|---|---|---|
| **POINT SOURCES** | | |
| Sewage Treatment Plant | 0 | 0 |
| **RESIDENTIAL/URBAN LAND** [1,2] | | |
| MS4 Contribution[3] | 0 | 0 |
| Non-MS4 Contribution[4] | 40,238 | 36,995 |
| **OTHER NONPOINT SOURCES** | | |
| Rural Land | 2,603 | 3,668 |
| Forest | 91 | 842 |
| Waterfowl | 392 | 1,500 |
| **TOTAL LOAD (Billions)** | **43,324** | **43,005** |
| Water Body (ha) | 14.57 | 55.44 |
| Billions FC Load/ha/yr | 2,973 | 776 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 16,556 (HP-1) and 11,637 (HP-2) billion FC/year.
[3] 0% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 100% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-12a. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Hashamomuck Pond, Zone HP-1**

| Rollback Based on Station FC-1.1 | Condition | Units | Hashamomuck Pond (HP-1) | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 43,324 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 0 | - | - |
| | Total Existing Loads | (billion FC/yr) | 43,324 | - | - |
| TMDL | LA | (billion FC/yr) | 4,153 | 38,710 | 90 |
| | WLA | (billion FC/yr) | 0 | 0 | 0 |
| | MOS | (billion FC/yr) | 461 | - | - |
| | TMDL | (billion FC/yr) | 4,614 | 38,710 | 90 |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 12.64 billion FC/day.

**Table 7-12b.**

**Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Hashamomuck Pond, Zone HP-2**

| Rollback Based on Station 350 | Condition | Units | Hashamomuck Pond (HP-2) | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 43,005 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 0 | - | - |
| | Total Existing Loads | (billion FC/yr) | 43,005 | - | - |
| TMDL | LA | (billion FC/yr) | 21,520 | 19,094 | 50 |
| | WLA | (billion FC/yr) | 0 | 0 | 0 |
| | MOS | (billion FC/yr) | 2,391 | - | - |
| | TMDL | (billion FC/yr) | 23,911 | 19,094 | 50 |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 65.51 billion FC/day.

### 7.3.7 Richmond Creek (1701-0245)

**Table 7-13. WTM Fecal Coliform Loads to Richmond Creek**

| SOURCES | Billion FC/year |
|---|---|
| **POINT SOURCES** | |
| Sewage Treatment Plant | 0 |
| **RESIDENTIAL/URBAN LAND[1,2]** | |
| MS4 Contribution[3] | 0 |
| Non-MS4 Contribution[4] | 22,015 |
| **OTHER NONPOINT SOURCES** | |
| Rural Land | 2,637 |
| Forest | 86 |
| Waterfowl | 913 |
| **TOTAL LOAD (Billions)** | **25,651** |
| Water Body (ha) | 33.6 |
| Billions FC Load/ha/yr | 763 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 10,028 billion FC/year.
[3] 0% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 100% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-14. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Richmond Creek**

| No Station Data Available | Condition | Units | Richmond Creek | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 25,651 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | - | - | - |
| | Total Existing Loads | (billion FC/yr) | 25,651 | - | - |
| TMDL | LA | (billion FC/yr) | 4,317 | 20,854 | 83 |
| | WLA | (billion FC/yr) | 0 | 0 | 0 |
| | MOS | (billion FC/yr) | 480 | - | - |
| | TMDL | (billion FC/yr) | 4,797 | 20,854 | 83 |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 13.14 billion FC/day.

### 7.3.8 Downs Creek (1701-0247)

**Table 7-15. WTM Fecal Coliform Loads to Downs Creek**

| SOURCES | Billion FC/year |
|---|---|
| **POINT SOURCES** | |
| Sewage Treatment Plant | 0 |
| **RESIDENTIAL/URBAN LAND**[1,2] | |
| MS4 Contribution[3] | 0 |
| Non-MS4 Contribution[4] | 9,603 |
| **OTHER NONPOINT SOURCES** | |
| Rural Land | - |
| Forest | 333 |
| Waterfowl | 230 |
| **TOTAL LOAD (Billions)** | **10,166** |
| Water Body (ha) | 8.5 |
| Billions FC Load/ha/yr | 1,196 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 3,311 billion FC/year.
[3] 0% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 100% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

Note: A TMDL was not calculated for Downs Creek due to the lack of data associated with the water body.

### 7.3.9 Deep Hole Creek and Unnamed Pond (1701-0247)

**Table 7-16. WTM Fecal Coliform Loads to Deep Hole Creek and Unnamed Pond**

| SOURCES | Deep Hole Creek Billion FC/year | Unnamed Creek Billion FC/Year |
|---|---|---|
| **POINT SOURCES** | | |
| Sewage Treatment Plant | 0 | 0 |
| **RESIDENTIAL/URBAN LAND [1,2]** | | |
| MS4 Contribution[3] | 0 | 0 |
| Non-MS4 Contribution[4] | 34,817 | 9,991 |
| **OTHER NONPOINT SOURCES** | | |
| Rural Land | 507 | 122 |
| Forest | - | - |
| Waterfowl | 344 | 151 |
| **TOTAL LOAD (Billions)** | **35,668** | |
| Water Body (ha) | 12.55 | 14.00 |
| Billions FC Load/ha/yr | 2,842 | 10,263 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 20,341 billion FC/year.
[3] 0% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 100% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-17. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Deep Hole Creek**

| Rollback Based on Station FC-9C | Condition | Units | Deep Hole Creek | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| **Existing Conditions** | **Nonpoint Sources** | (billion FC/yr) | **35,668** | **-** | **-** |
| | **Permitted Point Source Contributions** | (billion FC/yr) | **0** | **-** | **-** |
| | **Total Existing Loads** | (billion FC/yr) | **35,668** | **-** | **-** |
| **TMDL** | **LA** | (billion FC/yr) | **24,830** | **8,079** | **30** |
| | **WLA** | (billion FC/yr) | **0** | **0** | **0** |
| | **MOS** | (billion FC/yr) | **2,759** | **-** | **-** |
| | **TMDL** | (billion FC/yr) | **27,589** | **8,079** | **30** |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 75.59 billion FC/day.

Note: A TMDL was not calculated for Unnamed Pond due to the lack of data associated with the water body.

### 7.3.10 Halls Creek (1701-0247)

**Table 7-18. WTM Fecal Coliform Loads to Halls Creek.**

| SOURCES | Billion FC/year |
|---|---|
| **POINT SOURCES** | |
| Sewage Treatment Plant | 0 |
| **RESIDENTIAL/URBAN LAND**[1,2] | |
| MS4 Contribution[3] | 0 |
| Non-MS4 Contribution[4] | 8,716 |
| **OTHER NONPOINT SOURCES** | |
| Rural Land | 116 |
| Forest | 150 |
| Waterfowl | 90 |
| **TOTAL LOAD (Billions)** | **9,072** |
| Water Body (ha) | 3.24 |
| Billions FC Load/ha/yr | 2,800 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 4,541 billion FC/year.
[3] 0% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 100% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

Note: A TMDL was not calculated for Halls Creek due to the lack of data associated with the water body.

### 7.3.11 James Creek (1701-0247)

**Table 7-19. WTM Fecal Coliform Loads to James Creek**

| SOURCES | Billion FC/year |
|---|---|
| **POINT SOURCES** | |
| Sewage Treatment Plant | 0 |
| **RESIDENTIAL/URBAN LAND**[1,2] | |
| MS4 Contribution[3] | 0 |
| Non-MS4 Contribution[4] | 37,663 |
| **OTHER NONPOINT SOURCES** | |
| Rural Land | - |
| Forest | 57 |
| Waterfowl | 334 |
| **TOTAL LOAD (Billions)** | **38,054** |
| Water Body (ha) | 12.55 |
| Billions FC Load/ha/yr | 3,032 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 21,760 billion FC/year.
[3] 0% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 100% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-20. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in James Creek**

| Rollback Based on Station FC-8A | Condition | Units | James Creek | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 38,054 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 0 | - | - |
| | Total Existing Loads | (billion FC/yr) | 38,054 | - | - |
| TMDL | LA | (billion FC/yr) | 18,046 | 18,003 | 53 |
| | WLA | (billion FC/yr) | 0 | 0 | 0 |
| | MOS | (billion FC/yr) | 2,005 | - | - |
| | TMDL | (billion FC/yr) | 20,051 | 18,003 | 53 |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 54.93 billion FC/day.

### 7.3.12 Flanders Bay (1701-0030)

The WTM results for the watershed zones that are contributing to specific station exceedances are shown in Table 7-21. The total fecal coliform load is estimated at 773,118 billion per year. Discharge from the three STPs are assumed to be at maximum permitted rates, but at the average observed fecal coliform concentrations (200 MPN/100 mL; PEP, 2001). The assumed percentage of non-STP loads that are associated with MS4 contributions is 75%.

**Table 7-21. WTM Fecal Coliform Loads to Flanders Bay**

| SOURCES | Billion FC/year |
|---|---|
| **POINT SOURCES** | |
| Sewage Treatment Plant | 14,794 |
| **RESIDENTIAL/URBAN LAND[1,2]** | |
| MS4 Contribution[3] | 520,751 |
| Non-MS4 Contribution[4] | 173,584 |
| **OTHER NONPOINT SOURCES** | |
| Rural Land | 2,588 |
| Forest | 49,400 |
| Waterfowl | 12,002 |
| **TOTAL LOAD (Billions)** | **773,119** |
| Water Body (ha) | 443.54 |
| Billions FC Load/ha/yr | 1,743 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 164,807 billion FC/year.
[3] 75% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 25% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-22. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Flanders Bay**

| Rollback Based on Station FC-15 | Condition | Units | Flanders Bay | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 237,574 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 535,545 | - | - |
| | Total Existing Loads | (billion FC/yr) | 773,119 | - | - |
| TMDL | LA | (billion FC/yr) | 178,180 | 59,393 | 25 |
| | WLA | (billion FC/yr) | 24,787* | 495,964 | 98 |
| | MOS | (billion FC/yr) | 22,552 | - | - |
| | TMDL | (billion FC/yr) | 225,519 | 547,600 | 74 |

*The WLA is apportioned to the STP (14,794 billion FC/year) and the MS4s (9,993 billion FC/year). This is associated with the following flows and FC concentrations:

- Riverhead STP (NPDES NY0078131): 1.3 MGD, 200 MPN/100ml, total of 3,588 billion FC/year;
- Brookhaven National Laboratory(NPDES NY0005835): 2.3 MGD, 200 MPN/100ml, total of 6,348 billion FC/year;
- Former NWIRP Calverton, NY (NPDES NY0025453): 1.76 MGD, 200 MPN/100ml, total of 4,857.6 billion FC/year.

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 617.86 billion FC/day.

### 7.3.13 Reeves Bay (1701-0272)

**Table 7-23. WTM Fecal Coliform Loads to Reeves Bay**

| SOURCES | Billion FC/year |
|---|---|
| **POINT SOURCES** | |
| Sewage Treatment Plant | 0 |
| **RESIDENTIAL/URBAN LAND[1,2]** | |
| MS4 Contribution[3] | 120,351 |
| Non-MS4 Contribution[4] | 6,334 |
| **OTHER NONPOINT SOURCES** | |
| Rural Land | - |
| Forest | - |
| Waterfowl | 4,577 |
| **TOTAL LOAD (Billions)** | **131,262** |
| Water Body (ha) | 169.16 |
| Billions FC Load/ha/yr | 776 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 75,024 billion FC/year.
[3] 95% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 5% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-24. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Reeves Bay**

| Rollback Based on Station 210 | Condition | Units | Reeves Bay | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 10,911 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 120,351 | - | - |
| | Total Existing Loads | (billion FC/yr) | 131,262 | - | - |
| TMDL | LA | (billion FC/yr) | 8,183 | 2,728 | 25 |
| | WLA | (billion FC/yr) | 3,925 | 116,425 | 97 |
| | MOS | (billion FC/yr) | 1,345 | - | - |
| | TMDL | (billion FC/yr) | 13,453 | 117,809 | 91 |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 36.86 billion FC/day.

### 7.3.14 Sebonac Creek (1701-0051)

**Table 7-25. WTM Fecal Coliform Loads to Sebonac Creek**

| SOURCES | Billion FC/year |
|---|---|
| **POINT SOURCES** | |
| Sewage Treatment Plant | 0 |
| **RESIDENTIAL/URBAN LAND[1,2]** | |
| MS4 Contribution[3] | 11,541 |
| Non-MS4 Contribution[4] | 3,847 |
| **OTHER NONPOINT SOURCES** | |
| Rural Land | - |
| Forest | 41 |
| Waterfowl | 730 |
| **TOTAL LOAD (Billions)** | **16,159** |
| Water Body (ha) | 27.11 |
| Billions FC Load/ha/yr | 596 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 3,406 billion FC/year.
[3] 75% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 25% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-26. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Sebonac Creek**

| Rollback Based on Station FC-3 | Condition | Units | Sebonac Creek | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 4,618 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 11,541 | - | - |
| | Total Existing Loads | (billion FC/yr) | 16,159 | - | - |
| TMDL | LA | (billion FC/yr) | 3,464 | 1,155 | 25 |
| | WLA | (billion FC/yr) | 4,842 | 6,699 | 58 |
| | MOS | (billion FC/yr) | 923 | - | - |
| | TMDL | (billion FC/yr) | 9,229 | 6,930 | 49 |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 25.28 billion FC/day.

### 7.3.15 Scallop Pond (1701-0354)

**Table 7-27. WTM Fecal Coliform Loads to Scallop Pond**

| SOURCES | Billion FC/year |
|---|---|
| **POINT SOURCES** | |
| Sewage Treatment Plant | 0 |
| **RESIDENTIAL/URBAN LAND**[1,2] | |
| MS4 Contribution[3] | 1,597 |
| Non-MS4 Contribution[4] | 14,381 |
| **OTHER NONPOINT SOURCES** | |
| Rural Land | - |
| Forest | 3,399 |
| Waterfowl | 1,380 |
| **TOTAL LOAD (Billions)** | **20,757** |
| Water Body (ha) | 51 |
| Billions FC Load/ha/yr | 407 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 5,960 billion FC/year.
[3] 10% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 90% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

Note: A TMDL was not calculated for Scallop Pond because analysis of the monitoring data suggested that no exceedances exist. However, it must be noted that only 17 data points were available for analysis and it is recommended that this water body be evaluated on an annual basis. However, MS4 contributions were estimated based on 10% of residential land.

### 7.3.16 North Sea Harbor (1701-0037)

**Table 7-28. WTM Fecal Coliform Loads to North Sea Harbor**

| SOURCES | NSH-1 Billion FC/year | NSH-2 Billion FC/year | NSH-3 Billion FC/year | NSH-4 Billion FC/year | NSH-5 Billion FC/year |
|---|---|---|---|---|---|
| **POINT SOURCES** | | | | | |
| Sewage Treatment Plant | 0 | 0 | 0 | 0 | 0 |
| **RESIDENTIAL/URBAN LAND[1,2]** | | | | | |
| MS4 Contribution | 32,580[3] | 23,923[4] | 15,943[4] | 12,066[4] | 16,713[4] |
| Non-MS4 Contribution | 8,145 | 7,974 | 5,314 | 4,022 | 5,571 |
| **OTHER NONPOINT SOURCES** | | | | | |
| Rural Land | - | - | - | - | - |
| Forest | 301 | 170 | 83 | 106 | 1,327 |
| Waterfowl | 464 | 307 | 83 | 287 | 1,369 |
| **TOTAL LOAD (Billions)** | **41,490** | **32,374** | **21,423** | **16,481** | **24,980** |
| Water Body (ha) | 17 | 11.33 | 3.24 | 10.52 | 50.59 |
| Billions FC Load/ha/yr | 2,440 | 2,857 | 6,612 | 1,567 | 494 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 22,706 (NSH-1), 18,732 (NSH-2), 5,756 (NSH-3), 7,663 (NSH-4), and 11,826 (NSH-5) billion FC/year.
[3] 80% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data, and 20% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.
[4] 75% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data, and 25% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-29a. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in North Sea Harbor, Zone NSH-1**

| Rollback Based on Station FC-3.1 | Condition | Units | North Sea Harbor (NSH-1) | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| **Existing Conditions** | **Nonpoint Sources** | (billion FC/yr) | **8,910** | **-** | **-** |
| | **Permitted Point Source Contributions** | (billion FC/yr) | **32,580** | **-** | **-** |
| | **Total Existing Loads** | (billion FC/yr) | **41,490** | **-** | **-** |
| **TMDL** | **LA** | (billion FC/yr) | **6,683** | **2,228** | **25** |
| | **WLA** | (billion FC/yr) | **831** | **31,749** | **97** |
| | **MOS** | (billion FC/yr) | **835** | **-** | **-** |
| | **TMDL** | (billion FC/yr) | **8,349** | **33,141** | **82** |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 22.87 billion FC/day.

**Table 7-29b. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in North Sea Harbor, Zone NSH-2**

| Rollback Based on Station FC-10 | Condition | Units | North Sea Harbor (NSH-2) | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 8,451 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 23,923 | - | - |
| | Total Existing Loads | (billion FC/yr) | 32,374 | - | - |
| TMDL | LA | (billion FC/yr) | 6,338 | 2,228 | 25 |
| | WLA | (billion FC/yr) | 9,014 | 15,859 | 62 |
| | MOS | (billion FC/yr) | 1,706 | - | - |
| | TMDL | (billion FC/yr) | 17,058 | 15,316 | 53 |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 46.73 billion FC/day.

**Table 7-29c. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in North Sea Harbor, Zone NSH-3**

| Rollback Based on Station FC-7 | Condition | Units | North Sea Harbor (NSH-3) | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 5,480 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 15,943 | - | - |
| | Total Existing Loads | (billion FC/yr) | 21,423 | - | - |
| TMDL | LA | (billion FC/yr) | 4,110 | 1,370 | 25 |
| | WLA | (billion FC/yr) | 83 | 15,859 | 99 |
| | MOS | (billion FC/yr) | 466 | - | - |
| | TMDL | (billion FC/yr) | 4,659 | 16,764 | 80 |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 12.76 billion FC/day.

Note: A TMDL was not calculated for Zone NSH-4 because, based on available water quality data, there were no coliform concentration exceedances.

**Table 7-29d. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in North Sea Harbor, Zone NSH-5**

| Rollback Based on Station 104 | Condition | Units | North Sea Harbor (NSH-5) | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 8,267 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 16,713 | - | - |
| | Total Existing Loads | (billion FC/yr) | 24,980 | - | - |
| TMDL | LA | (billion FC/yr) | 6,200 | 2,067 | 25 |
| | WLA | (billion FC/yr) | 4,274 | 12,439 | 74 |
| | MOS | (billion FC/yr) | 1,164 | - | - |
| | TMDL | (billion FC/yr) | 11,638 | 13,342 | 58 |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 31.88 billion FC/day.

### 7.3.17 Wooley Pond (1701-0048)

**Table 7-30. WTM Fecal Coliform Loads to Wooley Pond**

| SOURCES | Billion FC/year |
|---|---|
| **POINT SOURCES** | |
| Sewage Treatment Plant | 0 |
| **RESIDENTIAL/URBAN LAND[1,2]** | |
| MS4 Contribution[3] | 30,745 |
| Non-MS4 Contribution[4] | 7,686 |
| **OTHER NONPOINT SOURCES** | |
| Rural Land | - |
| Forest | 26 |
| Waterfowl | 378 |
| **TOTAL LOAD (Billions)** | **38,835** |
| Water Body (ha) | 14.16 |
| Billions FC Load/ha/yr | 2,743 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 15,421 billion FC/year.
[3] 80% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 20% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-31. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Wooley Pond**

| Rollback Based on Station FC-4 | Condition | Units | Wooley Pond | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 8,090 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 30,745 | - | - |
| | Total Existing Loads | (billion FC/yr) | 38,835 | - | - |
| TMDL | LA | (billion FC/yr) | 6,068 | 2,023 | 25 |
| | WLA | (billion FC/yr) | 993 | 29,752 | 97 |
| | MOS | (billion FC/yr) | 784 | - | - |
| | TMDL | (billion FC/yr) | 7,845 | 30,990 | 82 |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 21.49 billion FC/day.

### 7.3.18 Noyac Creek (1701-0237)

**Table 7-32. WTM Fecal Coliform Loads to Noyac Creek**

| SOURCES | NC-1 billion FC/year | NC-2 Billion FC/year |
|---|---|---|
| **POINT SOURCES** | | |
| Sewage Treatment Plant | 0 | 0 |
| **RESIDENTIAL/URBAN LAND [1,2]** | | |
| MS4 Contribution[3] | 14,150 | - |
| Non-MS4 Contribution[4] | 4,716 | - |
| **OTHER NONPOINT SOURCES** | | |
| Rural Land | - | - |
| Forest | 863 | 606 |
| Waterfowl | 592 | 420 |
| **TOTAL LOAD (Billions)** | **20,321** | **606** |
| Water Body (ha) | 21.85 | 15.38 |
| Billions FC Load/ha/yr | 930 | 39 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 8,893 billion FC/year.
[3] 75% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 25% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-33. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Noyac Creek, Zone NC-1**

| Rollback Based on Station FC-8.1 | Condition | Units | Noyac Creek (NC-1) | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 6,171 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 14,150 | - | - |
| | Total Existing Loads | (billion FC/yr) | 20,321 | - | - |
| TMDL | LA | (billion FC/yr) | 4,629 | 1,543 | 25 |
| | WLA | (billion FC/yr) | 5,070 | 9,080 | 64 |
| | MOS | (billion FC/yr) | 1,078 | - | - |
| | TMDL | (billion FC/yr) | 10,777 | 9,544 | 52 |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 29.53 billion FC/day.

Note: A TMDL was not calculated for Zone NC-2 because, based on available water quality data, there were no coliform concentration exceedances

### 7.3.19 Sag Harbor (1701-0035)

**Table 7-34. WTM Fecal Coliform Loads to Sag Harbor**

| SOURCES | SH-1 Billion FC/year | SH-2 Billion FC/year | SH-3 Billion FC/year | SH-4 Billion FC/year |
|---|---|---|---|---|
| **POINT SOURCES** | | | | |
| Sewage Treatment Plant | 0 | 0 | 0 | 0 |
| **RESIDENTIAL/URBAN LAND[1,2]** | | | | |
| MS4 Contribution[3] | 11,250 | 10,547 | 87,659 | 20,185 |
| Non-MS4 Contribution[4] | 3,750 | 3,516 | 29,220 | 6,728 |
| **OTHER NONPOINT SOURCES** | | | | |
| Rural Land | - | - | - | - |
| Forest | 194 | 194 | 238 | 79 |
| Waterfowl | 307 | 152 | 4,216 | 343 |
| **TOTAL LOAD (Billions)** | **15,501** | **14,409** | **121,333** | **27,335** |
| Water Body (ha) | 11.33 | 5.67 | 155.8 | 12.55 |
| Billions FC Load/ha/yr | 1,368 | 2,541 | 779 | 2,178 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 8,799 (SH-1), 11,164 (SH-2), 68,780 (SH-3), and 9,839 (SH-4) billion FC/year.
[3] 75% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 25% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

Note: A TMDL was not calculated for Zones SH-1, SH-3, and SH-4 because, based on available water quality data, there were no coliform concentration exceedances

**Table 7-35. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Sag Harbor, Zone SH-2**

| Rollback Based on Station FC-9 | Condition | Units | Sag Harbor (SH-2) | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 3,862 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 10,547 | - | - |
| | Total Existing Loads | (billion FC/yr) | 14,409 | - | - |
| TMDL | LA | (billion FC/yr) | 2,896 | 965 | 25 |
| | WLA | (billion FC/yr) | 5,250 | 5,297 | 50 |
| | MOS | (billion FC/yr) | 905 | - | - |
| | TMDL | (billion FC/yr) | 9,051 | 5,358 | 43 |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 24.80 billion FC/day.

### 7.3.20 Northwest Creek (1701-0046)

**Table 7-36. WTM Fecal Coliform Loads to Northwest Creek**

| SOURCES | Billion FC/year |
|---|---|
| **POINT SOURCES** | |
| Sewage Treatment Plant | 0 |
| **RESIDENTIAL/URBAN LAND[1,2]** | |
| MS4 Contribution[3] | 0 |
| Non-MS4 Contribution[4] | 36,688 |
| **OTHER NONPOINT SOURCES** | |
| Rural Land | - |
| Forest | 5,123 |
| Waterfowl | 1,772 |
| **TOTAL LOAD (Billions)** | **43,583** |
| Water Body (ha) | 65.56 |
| Billions FC Load/ha/yr | 665 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 10,543 billion FC/year.
[3] 0% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 100% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-37. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Northwest Creek.**

| Rollback Based on Station FC-7 | Condition | Units | Northwest Creek | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | **43,583** | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | **0** | - | - |
| | Total Existing Loads | (billion FC/yr) | **43,583** | - | - |
| TMDL | LA | (billion FC/yr) | **4,177** | **38,941** | **90** |
| | WLA | (billion FC/yr) | **0** | **0** | **0** |
| | MOS | (billion FC/yr) | **464** | - | - |
| | TMDL | (billion FC/yr) | **4,642** | **38,941** | **90** |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 12.72 billion FC/day.

### 7.3.21 Acabonac Harbor (1701-0031)

**Table 7-38. WTM Fecal Coliform Loads to Acabonac**

| SOURCES | AH-1 Billion FC/year | AH-2 Billion FC/year | AH-3 Billion FC/year | AH-4 Billion FC/year | AH-5 Billion FC/year |
|---|---|---|---|---|---|
| **POINT SOURCES** | | | | | |
| Sewage Treatment Plant | 0 | 0 | 0 | 0 | 0 |
| **RESIDENTIAL/URBAN LAND[1,2]** | | | | | |
| MS4 Contribution[3] | 0 | 0 | 0 | 0 | 0 |
| Non-MS4 Contribution[4] | 48,290 | 43,625 | 16,191 | 16,162 | 13,027 |
| **OTHER NONPOINT SOURCES** | | | | | |
| Rural Land | - | - | - | - | - |
| Forest | 215 | 1,216 | 676 | 1,423 | 242 |
| Waterfowl | 219 | 1,599 | 318 | 934 | 241 |
| **TOTAL LOAD (Billions)** | **48,724** | **46,440** | **17,185** | **18,519** | **13,510** |
| Water Body (ha) | 8.09 | 59.08 | 11.74 | 34.40 | 8.9 |
| Billions FC Load/ha/yr | 6,023 | 786 | 1,464 | 538 | 1,518 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 31,126 (AH-1), 19,868 (AH-2), 4,257 (AH-3), 4,541 (AH-4), and 7,569 (AH-5) billion FC/year.
[3] 0% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 100% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

Note: A TMDL was not calculated for Zone AH-1 because, based on available water quality data, there were no coliform concentration exceedances

**Table 7-39a. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Acabonac Harbor, Zone AH-2**

| Rollback Based on Station 133 | Condition | Units | Acabonac Harbor (AH-2) | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 46,440 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 0 | - | - |
| | Total Existing Loads | (billion FC/yr) | 46,440 | - | - |
| TMDL | LA | (billion FC/yr) | 25,600 | 17,996 | 45 |
| | WLA | (billion FC/yr) | 0 | 0 | 0 |
| | MOS | (billion FC/yr) | 2,844 | - | - |
| | TMDL | (billion FC/yr) | 28,445 | 17,996 | 45 |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 77.93 billion FC/day.

**Table 7-39b. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Acabonac Harbor, Zone AH-3**

| Rollback Based on Station FC-15 | Condition | Units | Acabonac Harbor (AH-3) | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 17,185 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 0 | - | - |
| | Total Existing Loads | (billion FC/yr) | 17,185 | - | - |
| TMDL | LA | (billion FC/yr) | 1,647 | 15,355 | 90 |
| | WLA | (billion FC/yr) | 0 | 0 | 0 |
| | MOS | (billion FC/yr) | 183 | - | - |
| | TMDL | (billion FC/yr) | 1,830 | 15,355 | 90 |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 5.01 billion FC/day.

**Table 7-39c. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Acabonac Harbor, Zone AH-4**

| Rollback Based on Station FC-4 | Condition | Units | Acabonac Harbor (AH-4) | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 18,519 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 0 | - | - |
| | Total Existing Loads | (billion FC/yr) | 18,519 | - | - |
| TMDL | LA | (billion FC/yr) | 1,253 | 17,126 | 93 |
| | WLA | (billion FC/yr) | 0 | 0 | 0 |
| | MOS | (billion FC/yr) | 139 | - | - |
| | TMDL | (billion FC/yr) | 1,393 | 17,126 | 93 |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 3.82 billion FC/day.

**Table 7-39d. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Acabonac Harbor, Zone AH-5**

| Rollback Based on Station FC-1 | Condition | Units | Acabonac Harbor (AH-5) | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 13,510 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 0 | - | - |
| | Total Existing Loads | (billion FC/yr) | 13,510 | - | - |
| TMDL | LA | (billion FC/yr) | 1,295 | 12,071 | 90 |
| | WLA | (billion FC/yr) | 0 | 0 | 0 |
| | MOS | (billion FC/yr) | 144 | - | - |
| | TMDL | (billion FC/yr) | 1,439 | 12,071 | 90 |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 3.94 billion FC/day.

### 7.3.22 Lake Montauk (1701-0031)

**Table 7-40. WTM Fecal Coliform Loads to Montauk Lake**

| SOURCES | LM-1 Billion FC/year | LM-2 Billion FC/year | LM-3 Billion FC/year |
|---|---|---|---|
| **POINT SOURCES** | | | |
| Sewage Treatment Plant | 0 | 0 | 0 |
| **RESICENTIAL/URBAN LAND[1,2]** | | | |
| MS4 Contributions[3] | 0 | 0 | 0 |
| Non-MS4 Contributions[4] | 98,939 | 31,912 | 361,078 |
| **OTHER NONPOINT SOURCES** | | | |
| Rural Land | - | - | 1,154 |
| Forest | 1,323 | 1,194 | 4,882 |
| Waterfowl | 911 | 794 | 10,041 |
| **TOTAL LOAD (Billions)** | **101,173** | **33,900** | **377,155** |
| Water Body (ha) | 33.59 | 29.54 | 371.1 |
| Billions FC Load/ha/yr | 3,012 | 1,148 | 1,016 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 35,194 (LM-1), 851 (LM-2), and 121,571 (LM-3) billion FC/year.
[3] 0% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 100% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-41a. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Montauk Lake, Zone LM-1**

| Rollback Based on Station FC-20 | Condition | Units | Lake Montauk (LM-1) | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | **101,173** | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | **0** | - | - |
| | Total Existing Loads | (billion FC/yr) | **101,173** | - | - |
| TMDL | LA | (billion FC/yr) | **47,977** | **47,865** | **53** |
| | WLA | (billion FC/yr) | **0** | **0** | **0** |
| | MOS | (billion FC/yr) | **5,331** | - | - |
| | TMDL | (billion FC/yr) | **53,308** | **47,865** | **53** |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 146.05 billion FC/day.

**Table 7-41b. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Montauk Lake, Zone LM-2**

| Rollback Based on Station FC-5 | Condition | Units | Lake Montauk (LM-2) | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 33,900 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 0 | - | - |
| | Total Existing Loads | (billion FC/yr) | 33,900 | - | - |
| TMDL | LA | (billion FC/yr) | 15,148 | 17,069 | 55 |
| | WLA | (billion FC/yr) | 0 | 0 | 0 |
| | MOS | (billion FC/yr) | 1,683 | - | - |
| | TMDL | (billion FC/yr) | 16,831 | 17,069 | 55 |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 46.11 billion FC/day.

**Table 7-41c. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Montauk Lake, Zone LM-3**

| Rollback Based on Station FC-30 | Condition | Units | Lake Montauk (LM-3) | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| Existing Conditions | Nonpoint Sources | (billion FC/yr) | 377,155 | - | - |
| | Permitted Point Source Contributions | (billion FC/yr) | 0 | - | - |
| | Total Existing Loads | (billion FC/yr) | 377,155 | - | - |
| TMDL | LA | (billion FC/yr) | 187,710 | 168,588 | 50* |
| | WLA | (billion FC/yr) | 0 | 0 | 0 |
| | MOS | (billion FC/yr) | 20,857 | - | - |
| | TMDL | (billion FC/yr) | 208,567 | 168,588 | 50* |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 571.42 billion FC/day.

* Note: Load reduction is based on the TC exceedence which was greater than the FC exceedance. The load reduction based on FC exceedance is 81.6%.

### 7.3.23 Oyster Pond (1701-0169)

**Table 7-42. WTM Fecal Coliform Loads to Oyster Pond**

| SOURCES | Billion FC/year |
|---|---|
| **POINT SOURCES** | |
| Sewage Treatment Plant | 0 |
| **RESIDENTIAL/URBAN LAND**[1,2] | |
| MS4 Contribution[3] | 0 |
| Non-MS4 Contribution[4] | 47,407 |
| **OTHER NONPOINT SOURCES** | |
| Rural Land | - |
| Forest | 16,096 |
| Waterfowl | 1,501 |
| **TOTAL LOAD (Billions)** | **65,004** |
| Water Body (ha) | 55.44 |
| Billions FC Load/ha/yr | 1,172 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 4,447 billion FC/year.
[3] 0% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 100% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

Note: A TMDL was not calculated for Oyster Pond due to the lack of data associated with the water body.

### 7.3.24 Little Sebonac Creek (1701-0253)

**Table 7-43. WTM Fecal Coliform Loads to Little Sebonac Creek**

| SOURCES | Billion FC/year |
|---|---|
| **POINT SOURCES** | |
| Sewage Treatment Plant | 0 |
| **RESIDENTIAL/URBAN LAND**[1,2] | |
| MS4 Contribution[3] | 22,397 |
| Non-MS4 Contribution[4] | 22,397 |
| **OTHER NONPOINT SOURCES** | |
| Rural Land | - |
| Forest | 6,514 |
| Waterfowl | 2,957 |
| **TOTAL LOAD (Billions)** | **54,265** |
| Water Body (ha) | 109.27 |
| Billions FC Load/ha/yr | 497 |

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 9,934 billion FC/year.
[3] 50% of the residential/urban load was attributed to MS4 conveyances, based on a review of maps in Chapter 2 and land use data.
[4] 50% of the residential/urban load was attributed to stormwater not flowing through MS4 conveyances.

**Table 7-44. Summary of Current Fecal Coliform Loads and Percent Reductions Necessary to Meet Target TMDL Loads in Little Sebonac Creek**

| Rollback Based on Station FC-3 | Condition | Units | Little Sebonac Creek | Load Reduction (billion FC/yr) | Load Reduction (%) |
|---|---|---|---|---|---|
| **Existing Conditions** | **Nonpoint Sources** | (billion FC/yr) | **31,868** | **-** | **-** |
| | **Permitted Point Source Contributions** | (billion FC/yr) | **22,397** | **-** | **-** |
| | **Total Existing Loads** | (billion FC/yr) | **54,265** | **-** | **-** |
| **TMDL** | **LA** | (billion FC/yr) | **23,901** | **7,967** | **25** |
| | **WLA** | (billion FC/yr) | **6,779** | **15,618** | **70** |
| | **MOS** | (billion FC/yr) | **3,409** | **-** | **-** |
| | **TMDL** | (billion FC/yr) | **34,089** | **20,176** | **43** |

Note: The TMDL value reported in the table is the annually integrated value. The TMDL (daily) value is 93.40 billion FC/day.

# 8.0 IMPLEMENTATION PLAN

One of the critical factors in the successful development and implementation of TMDLs is the identification of potential management alternatives, such as best management practices (BMPs) and load reduction from point sources, and screening and selection of final alternatives in collaboration with the involved stakeholders. Extensive care must be exercised to identify any naturally-occurring pathogen loads not associated with or exacerbated by human activities, and if they are significant in comparison to the controllable point and nonpoint sources of pollution, the option of prohibiting shellfish harvesting through administrative closures may be explored.

All the ongoing watershed protection efforts, e.g., watershed characterization, restoration, and volunteer monitoring, must be identified to take advantage of them in the TMDL development and implementation process. Coordination of this process with state agencies, federal agencies, local governments, and stakeholders such as the general public, environmental interest groups, and representatives from the point and nonpoint pollution sources will ensure that the proposed management alternatives are technically and financially feasible.

As an example, the Suffolk County conducted the Brown-Tide Comprehensive Assessment and Management Program (BTCAMP) in the Peconic Estuary between 1988 and 1992. This program's final report was used as a primary source for the Peconic Estuary Program (PEP) Nomination Report (the PEP commenced in 1993) and acts as the initial Brown Tide characterization for the PEP. The ambient water quality conditions in Flanders Bay, located at the mouth of the Estuary, have been monitored extensively by the County to support the development of a comprehensive hydrodynamic/water quality model for assessment of nutrient fate and transport. Total and fecal coliforms are among the parameters monitored by the County. In addition, EPA Region 2 has funded microbial source tracking studies in the Estuary conducted by Cornell Cooperative Extension of Suffolk County. Findings from these studies may assist in the assessment of sources and potentially, the allocation of loads, i.e., development of targeted pollution reductions for all the point and nonpoint sources that contribute pathogen loads to the Estuary.

The receiving waters of the Peconic Estuary study areas are affected by several major generators of nonpoint source pollution:

- Direct contributions from waterfowl and wildlife to surface waters
- Domestic pets, livestock, and wildlife wastes on the landscape
- The potential for localized effects associated with failing septic systems (presently undocumented).
- Marinas and boating

Storm water runoff is an important transmission vehicle for those pathogen wastes deposited on the landscape, including flows from lawns, driveways, and roads. Appropriate management practices to mitigate these environmental impacts range from management, to housekeeping measures, to structural approaches. The implementation plan is discussed in the following sections with the specific management plans for the respective sources of pollution.

## 8.1 Nonpoint Source Reduction

The most effective mechanism for reducing nonpoint source pathogen loads to the Peconic Estuary will focus on both reducing pathogen wastes itself and reducing stormwater volumes that reach surface waters. Recommendations from the Peconic Estuary Program follow. They are applicable to all lands including those owned or managed as private residences, businesses, non-profit institutions, and governmental entities. They are also applicable to year-round and seasonal residents, employees, and visitors.

- Protect or establish a buffer (100 meters wide, if possible) around all creeks, ponds, and bays.
- Minimize impervious surfaces on properties. Remove unused portions of driveway and outdoor concrete and replace them with shrubs and trees.
- Disconnect impervious surface conduits. For example, a downspout from a roof leading to a driveway sends stormwater directly to the road and a storm drain. Move downspouts a few inches to lawns or a rain garden and allow stormwater to infiltrate naturally.
- Create a rain garden. Rain gardens are designed to collect and infiltrate stormwater with moisture tolerant native plantings.
- Pick up pet waste, and dispose of it in the trash.
- Don't feed waterfowl or create unnatural conditions where they congregate (e.g., lawns that extend to the water's edge). Non-migratory Canada geese are especially a problem.
- Keep curbsides clean and free of leaves, grass clippings, sand, and litter that will wind up in catch basins or surface waters.

Livestock may be an emerging issue in the Peconic watershed and owners should comply with all local requirements and best management practices and take steps to insure that livestock wastes are managed properly and do not impact surface or groundwaters. Habitat restoration projects may also be an effective means of reducing pathogen loads and direct stormwater contributions to surface waters, particularly in near shore areas. A particular focus for habitat restoration projects may be in areas where wetlands have been extensively grid ditched for mosquito control purposes, potentially leading to the "short-circuiting" of stormwaters to coastal waters without the benefit of the filtering capacity of these wetland systems. This phenomenon has been discussed by the Peconic Estuary Program but the extent of the impact has not been documented.

## 8.2 Urban Storm Water

In order to reduce or eliminate the loading of coliform bacteria to surface waters through storm water, the runoff can be treated with a variety of structural BMPs that can remove bacteria at different levels of effectiveness. Most management strategies designed to treat storm water runoff structurally will artificially introduce environments or chemicals that encourage bacteria decay. Other management strategies will not necessarily kill bacteria, but can seclude them from sensitive areas such as shellfish harvesting beds. Selection of individual BMPs or combinations of BMPs will depend upon continued evaluation of the subwatershed characteristics, the priorities of the Peconic Estuary Program and other stakeholders, and the available funding for implementing the remedial projects. In general, strategies for bacteria removal will operate in three possible ways:

- Detention of storm water
- Infiltration of storm water
- Filtration with wetland vegetation

The use of any of these three strategies can produce favorable results depending on the characteristics of a contributing watershed. Further enhanced treatment can also be achieved by using more than one technique at a single site. The management strategies chosen for a site will depend on several factors including:

- size of the drainage area;
- amount of space available for treating runoff;

- complexity and costs associated with permitting;
- potential for harmful environmental effects from installing a particular treatment structure
- desired removal rate for bacteria and other pollutants;
- cost of construction;
- resources necessary for proper maintenance; and
- expected longevity of the structure.

Storm water mitigation structures may be feasible with minimal disruption to the existing landscape, although they are without utility unless properly maintained. The implementation of such a program must include at least twice-yearly inspections of the facilities, preferably before and after the wettest season, and preparations for annual maintenance. Such work is likely to include cleaning, some replanting, and general refurbishment. If such a program is in place, the annual work load should remain rather light, and the BMP's effectiveness will be at a maximum.

In addition to the above maintenance program, a monitoring program should be included to determine the level of impact and reduction of pathogen inflow from the various tributaries that discharge to the study areas. A single station located downstream of each implemented BMP would be sufficient. Samples taken weekly, plus additional samples after storm events will be ideal. These data will supplement other sampling programs taken in the water bodies included in the study area. The monitoring program should begin before construction of the discharge BMPs so that the impact/improvement can be correctly gauged. Examples of urban BMPs are listed here for consideration:

**Enhanced Extended Detention Basins** – these are dry basins where storm water is temporarily collected and retained during significant wet weather events. The main components of these basins are a sediment forebay for trapping suspended solids and a micropool connected by a riprap channel to aid bacterial decay.

**Wet Retention Ponds** - these ponds utilize a permanent pool of water as the primary catchment for storm water runoff. A shallow marsh or sediment forebay may be used in conjunction with the wet retention pond to slow runoff velocity and enhance the overall settlement of sediments. If the turbidity can be managed, high levels of bacteria decay could be expected from exposure to sunlight.

**Constructed Wetlands** - these are artificially designed wetland systems that facilitate the settling of sediments from runoff, the retention of potentially large amounts of runoff, and the uptake of pollutants by wetland vegetation. These wetlands may be used in conjunction with other storm water BMPs for enhanced mitigation. Different types of constructed wetlands such as shallow marsh systems, pond systems, and pocket wetlands offer distinct advantages, and the watershed managers can determine which is best suited to the local conditions.

**Water Quality Swales** - these BMPs differ from drainage channels in that they provide pollution attenuation in addition to safe runoff conveyance. These are generally categorized into three types: dry swales, wet swales and grassed or biofilter swales.

Horsley and Witten (2003) conducted a regional storm water assessment report for PEP that can be used as the starting point for urban storm water management to achieve the desired reductions in bacteria loads in the study area's water bodies.

## 8.3 Waterfowl

The deposits of fecal matter by resident and migrating waterfowl has an exacerbated impact on some of the water bodies in the study area, particularly those embayments with reduced flushing and open space for congregating birds. A particular problem of some local significance is migratory waterfowl that have become resident (Canada geese) and invasive species (mute swans). The Peconic Estuary Program has received funding for studying the waterfowl population in and around Peconic Bay. This study will provide site-specific information on numbers, species, and range of waterfowl that may contribute to bacteria levels within the study area. Although the project has not yet begun, several general waterfowl management measures can still be considered within the study area. These include:

- Elimination of open lawns along the water's edge that are inviting to roosting waterfowl;
- Placement of noise generators at roosting or nesting sites to discourage birds from landing;
- The firing of blank cartridges over a period of time to make a roosting or nesting site inhospitable;
- Destruction of nesting areas;
- Public education efforts to discourage people from feeding wild waterfowl; and
- The shooting of birds.

Bird mitigation programs must be tailored to specific regions, and will have varying levels of success. In addition, some species of waterfowl may be protected by law from harassment and/or hunting and these legal determinations should be examined carefully on a site-by-site basis. Many options are available short of hunting local fowl, which may be objectionable in settled areas.

## 8.4 Septic Systems

As discussed in Section 5, the BTCAMP study conducted by Suffolk County Department of Health Services (SCDHS, 1992) has documented the potential coliform loadings from the areas within the Towns of Riverhead and Southampton. These areas are served by septic systems which can fail during wet periods or when the ground water levels are high, resulting in an influx of organically contaminated water to the local soil that may interact with tidal waters. A complete sewering of the areas, and direction via force-main to the STPs is one means of eliminating the impacts from densely settled areas served by septic systems. Short of new drainage infrastructure, the potential for exfiltration from waste system to the Flanders Bay or Reeves Bay or the tributaries that drain to these bays could be intercepted by a modified French Drain system. This would comprise porous conduits (perforated pipe, or gravel filled trench) placed along the perimeter of the settled areas to intercept groundwater flow between the settled areas and the receiving waters. The drains would discharge into excavated basins, enclosed or open, which could be periodically cleaned or pumped out. A small constructed wetland would be an appropriate means of clarifying the discharge from the collecting trench. This sort of measure should be coupled with an intensive inspection program to ensure that these practices would eventually achieve the desired reductions in pollutant loads.

The actual occurrence of failing septic systems in the Peconic watershed is however, thought to be small, and the need to pursue new or extensions of sewering may not be necessary. New development and extensive redevelopment requires onsite disposal systems to comply with stringent siting and operational requirements overseen by Suffolk County

## 8.5 Marinas/Transient Boats

In June 2002, the Peconic Estuary was officially approved as a designated Vessel Waste No Discharge Zone (NDZ) by the EPA (67 FR 39720). An ongoing public education plan was designed to inform boaters that discharging raw or treated sewage within the NDZ is illegal and that all sewage must be held onboard the vessel until a pumpout facility or specialized boat can empty the holding tank. For violations of the NDZ law, section 33-e of New York State's Navigation Law provides for fines of up to $500 for a first discharge offense and $1,000 for further violations. Vessel-derived human waste is, therefore, not likely to be a major source of coliform bacteria in the Estuary's waters. However, some boaters may be unaware of or refuse to comply with the NDZ designation. Pollution originating from these vessels as well as from marinas can be further reduced by adopting appropriate mitigation techniques including:

- more extensive public awareness campaigns on illicit dumping of wastewater;
- introduction of local ordinances to penalize wastewater dumping;
- the inclusion of NDZ areas on nautical charts;
- enhancement of public toilet facilities near the shore so that boat owners would minimize the use of their onboard toilet; and
- expansion of current pump-out programs including mobile and on-shore pump-out facilities.

### 8.6 Zoning Enhancements

In addition to the measures described above, the adoption and implementation of enhanced local zoning requirements may successfully address some of the problems associated with pathogens and excess stormwater. An in-place example already exists in the Town of East Hampton, which has established a Harbor Protection Overlay District. The requirements imposed in this overlay district are in the CODE OF THE TOWN OF EAST HAMPTON, NEW YORK, v22 Updated 01-20-2006, PART II GENERAL LEGISLATION, Chapter 255, ZONING, ARTICLE III, Overlay Districts, § 255-3-70. Harbor Protection Overlay District. [Added 10-6-1995 by L.L. No. 12-1995 and also at http://www.town.east-hampton.ny.us/ As stated in this Town Code, among other provision, the Harbor Protection Overlay District will help prevent the entry of stormwater runoff into the Town's waters; gradually require the upgrading of out-moded or inoperable septic systems; and preserve important indigenous vegetation. This overlay district includes all properties that are immediately adjacent to surface waters. The other municipalities in the Peconic Estuary watershed should be encouraged to adopt similar local legislation.

The most applicable sections of this regulation are included here.

§ 255-3-75. Regulations. [Added 10-6-1995 by L.L. No. 12-1995]

In addition to any other provisions of this chapter which may apply to them, lots, lands, buildings, structures, uses and activities within the Harbor Protection Overlay District shall be subject to the following restrictions and regulations:

A. Control of stormwater runoff. The following regulations shall apply to structures or activities which produce or contribute to stormwater pollution of the Town's surface waters:

(1) No parking lot or private driveway shall hereafter be constructed unless it has either an unimproved surface (e.g., dirt, crushed shells) or an improved surface consisting of one or more of the following materials: poured concrete, hot plant mix asphalt, rapid-curing cut-back asphalt or quartz gravel.

(2) No road, private driveway or parking lot with an improved surface shall hereafter be constructed unless all stormwater generated by said structure is directed into one or more catchment basins. Said catchment basin or basins shall have a combined volume (in cubic feet) equal to the surface area of the road, driveway and/or parking area (in square feet), divided by six.

(3) Any road, private driveway or parking lot which is hereafter constructed with an improved surface shall be maintained so that all stormwater generated by said structure is actually directed into the catchment basin or basins required by the preceding subsection. Any catchment basin required by the preceding subsection shall be kept clean and maintained so that it recharges stormwater into the ground without overflowing.

(4) No pipe, culvert, drain or similar conduit may hereafter be constructed or installed which discharges stormwater into wetlands (including surface waters).

(5 ) Every principal building or addition to a principal building which is hereafter constructed or erected shall be furnished with gutters and leaders to direct stormwater from roofs into one or more catchment basins. Said catchment basin or basins shall have a combined volume (in cubic feet) equal to the surface area of the roof (in square feet), divided by six.

(6) During construction work the disturbance of natural vegetation and land contours shall be minimized to the maximum extent practicable. Project-limiting fencing, siltation mesh, strawbales or similar devices for limiting land disturbance and retarding erosion and siltation shall be used during construction work and during any land clearing or grading in preparation for or associated with construction work.

B. New sanitary septic systems. The following regulations shall govern the installation of all septic systems after this date, except for septic systems, which are installed to replace legally preexisting septic systems:

(1) No such septic system shall be installed or constructed unless it is set back a minimum of 200 feet from the surface waters of Acabonac Creek, Fort Pond (including the arm of Fort Pond north of Industrial Road), Georgica Pond, Great Pond (Lake Montauk), Hog Creek, Napeague Harbor, Northwest Creek, Northwest Harbor, Steppingstones Pond, Three Mile Harbor, Tuthill Pond and/or Wainscott Pond and from the upland boundary of any wetlands contiguous to the foregoing bodies of water. To the extent that any provision of Article IV imposes a lesser wetland setback for septic systems, the requirements of this subsection shall be controlling with respect to lands within the Harbor Protection Overlay District.

(2) No septic system leaching pool shall hereafter be installed unless the bottom of the leaching pool is situated a minimum of four feet above the groundwater table.

C. Existing sanitary septic systems. Any septic system which legally exists on a residential property on January 1, 1996, shall be replaced or upgraded in the following circumstances and to the following extent:

(1) Every septic system regulated by this subsection shall be replaced or upgraded if:

(a) A natural resources special permit is required for work to be performed on the lot or parcel containing the septic system;

(b) The work to be performed will increase the habitable floor area of a principal building on the lot or will increase the number of bathrooms within a building on the lot; and

(c) The septic system in question does not meet the minimum requirements of the Suffolk County Department of Health Services for vertical separation to groundwater, for setback to surface waters or for septic system capacity, or in that it lacks a septic tank.

(2) Where this subsection requires that an existing septic system be replaced or upgraded, the new or upgraded septic system shall meet the following requirements:

(a) It shall comply with the requirements of the Suffolk County Department of Health Services for new septic systems and shall be installed under the supervision of the Sanitation Inspector; and

(b) It shall be set back a minimum of 150 feet from the upland boundary of all tidal wetlands (including tidal surface waters) or, if that is not feasible, it shall be set back the maximum practicable distance from the surface waters of Accabonac Creek, Fort Pond (including the arm of Fort Pond north of Industrial Road) Georgica Pond, Great Pond (Lake Montauk), Hog Creek, Napeague Harbor, Northwest Creek, Northwest Harbor, Steppingstones Pond, Three Mile Harbor, Tuthill Pond and/or Wainscott Pond and from the upland boundary of any wetlands contiguous to the foregoing bodies of water, taking into consideration such factors as the physical constraints of the site and the location of nearby water supply wells.

D. Limited clearing of lots or parcels of land within the Harbor Protection Overlay District shall be further restricted as set forth herein. [Amended 11-6-1998 by L.L. No. 36-1998; 6-8-2004 by L.L. No. 15-2004]

(1) The total area of a lot which may be cleared of indigenous natural vegetation shall not exceed the following amounts for any lot located wholly or partly within the overlay district:

| Lot Area (square feet) | Maximum Clearing Permitted (square feet) |
|---|---|
| **Residence Districts:** | |
| Up to and including 39,999 | 10,000 or 35% of lot area, whichever is greater |
| From 40,000 to and including 280,000 | 10,000 + (lot area * 12.5%) |
| Greater than 280,000 | 45,000 |
| **Commercial Districts:** | |
| All lots | 10,000 or 50% of lot area, whichever is greater |

In calculating the amount of clearing permitted by this subsection on a flag lot or a lot which is burdened by a common driveway easement or access easement, the area of any flag strip or any common driveway easement or access easement shall be excluded from lot area. Likewise, any clearing for driveway purposes within the flag strip or within the common driveway easement or access easement shall not be counted into the permissible amount of clearing.

(2) Clearing in excess of 45,000 square feet on any lot in a residence district is prohibited unless the following requirements are met:
(a) The area of the lot, excluding the area of any flag strip but otherwise determined as set forth in § 255-1-20 hereof, exceeds 300,000 square feet; and
(b) Site plan approval and a special permit have been first obtained from the Planning Board.

## 9.0 REASONABLE ASSURANCE FOR IMPLEMENTATION

This TMDL is for 20 waterbodies located in the Peconic Estuary Watershed – Dering Harbor, Budds Pond, Sterling Creek and Basin, Town/Jockey Creeks and tidal tributaries, Goose Creek, Hashamomuck Pond, Richmond Creek and tidal tributaries, Deep Hole Creek, James Creek, Flanders Bay – east/center and tributaries, Reeves Bay and tidal tributaries, Sebonac Creek/Bullhead Bay and tributaries, North Sea Harbor and tributaries, Wooley Pond, Noyac Creek and tributaries, Sag Harbor and Sag Harbor Cove, Northwest Creek and tributaries, Acabonac Harbor, Montauk Lake and Little Sebonac Creek. The percentage distributions of pathogen loadings from various sources for these water bodies are indicated in the following table:

| Pathogens Source | All Embayments |
|---|---|
| MS4 Contribution | 35.2 % |
| Non-MS4 Contribution | 57.9% |
| Forest Runoff | 3.6% |
| Waterfowl | 2.2% |
| Rural Land | 0.6% |
| Point Sources (STPs) | 0.5% |

The major sources currently identified are the point sources of urban storm water and domestic pets, making up 93% of pathogen loadings to Peconic estuary embayments. The remaining 7% of loadings are not being targeted for reductions under the individual areas, but best management practices should be used to reduce discharges to the maximum extent feasible as further described below.

The Riverhead STP, Sag Harbor STP, and the Shelter Island Heights STP are covered by NYSDEC's existing SPDES permits. These permits are reviewed and re-issued at regular intervals. These STPs should be maintained and operated in conformance with their State Pollutant Discharge Elimination System (SPDES) permits and minimize the amount of pathogens discharged to the maximum extent feasible.

As indicated in Section 5.2, Suffolk County has abundant livestock but no site-specific data was available. It is also indicated that the County has 651 farms which house cattle and calves, hogs and pigs, poultry (pullets, turkeys, etc.), horses and ponies, sheep and lambs, and other livestock.

All farms and even individual horse owners should be educated regarding manure best management practices. Horses produce large amounts of manure that can threaten local water quality, especially when receiving waters are shallow and poorly flushed. Good housekeeping practices for horses are similar to those applied successfully to small dairy farm operations, and involve the close control of manure, limiting the use of spreading, careful construction of composting areas, preventing horse traffic or grazing over small streams, and similar measures. The practices need not impose any large cost on the affected parties, and often involve more careful use of existing facilities or adjustment of common practices. In addition, levels of coliform bacteria may be reduced through waterfowl mitigation programs and through storm water management mitigation strategies. If these types of areas are located within municipalities, they should be addressed through their implementation of the Phase II stormwater program.

### 9.1 Follow-Up Monitoring

The NYSDEC will continue the shellfish monitoring program to ascertain the suitability of New York State waters for shellfishing. The beach data frequently monitored by Suffolk County will continue to be used in conjunction with the NYSDEC data to evaluate reductions in pathogen loads and the effectiveness of the TMDL in attaining and maintaining the water quality standards for shellfish harvesting. The above data, along with any other data provided to NYSDEC will be used in NYSDECs assessment of the water quality for these waterbodies during the development of the NYSDEC 303(d) list of impaired waters. The review of these data for the 303(d) report will be the tracking mechanism to determine if the TMDL is moving water quality in the direction necessary to open the waters to shellfishing. (NOTE: As of February 2003, NYSDEC began examining its water samples for shellfish harvest area classification with A-1 medium which only gives fecal coliform results)

The NYSDEC will establish compliance of the TMDL(s) and applicable water quality criteria through monitoring prior to opening shellfish areas consistent with the National Shellfish Sanitation Program's (NSSP) guidelines, and the NYS regulations and criteria.

### 9.2 No Discharge Zone

The Peconic Estuary has been designated by both EPA and by NYSDEC as a No-Discharge Zone. The pollution from marinas and boat mooring areas in Peconic Estuary should be further reduced using appropriate mitigation techniques such as:

- Public awareness campaigns on illicit dumping of wastewater,
- Enhancement of onshore public toilet facilities minimizing the use of on-boat facilities, and
- Expansion of current pumpout programs including the mobile and on-shore pumpout facilities.

### 9.3 Implementation of Phase II Stormwater Regulations

NYSDEC has expanded its permitting program to include a new federally mandated program to control stormwater runoff and protect waterways.

According to the federal law, commonly known as Stormwater Phase II, permits will be required for stormwater discharges from Municipal Separate Storm Sewer Systems (MS4s) in urbanized areas and for construction activities disturbing one or more acres. To implement the law, the NYSDEC has developed two general SPDES permits, one for MS4s in urbanized areas and one for construction activities. Operators of regulated small MS4s seeking authorization to discharge stormwater in compliance with the federal Clean Water Act are required to apply for and secure coverage under the SPDES General Permit for Municipal Separate Storm Sewer Systems. Operators of regulated MS4s and construction activities must obtained either a SPDES or a general permit no later than March 10, 2003 or prior to the commencement of construction.

The MS4 municipalities are required to develop, implement and enforce a stormwater management program (SWMP). The SWMP must describe the Best Management Practices (BMPs) for each of the minimum control measures:

1. Public education and outreach program to inform the public about the impacts of the stormwater on the receiving water quality.

2. Public involvement and participation.
3. Illicit discharge detection and elimination.
4. Construction site stormwater runoff control program for sites disturbing one or more acres.
5. Post-construction runoff control program for new development and redevelopment sites disturbing one or more acres.
6. Pollution prevention and good housekeeping operation and maintenance program.

Operators must have developed the initial SWMP prior to March 10, 2003 and have provided adequate resources to fully implement the SWMP no later than five years from the issuance date of the MS4 permit. Each of the regulated MS4s in this TMDL (see table below) has developed an initial SWMP and has coverage under the general permit (GP-02-02). An MS4 may modify its SWMP at any time, although any changes to a SWMP shall be reported to the NYSDEC in the MS4's annual report. MS4s are required to make steady progress toward full implementation.

| Permittee | SPDES # | Date NOI Submitted |
|---|---|---|
| Town of Riverhead | NYR20A020 | 03/04/2003 |
| Town of Southampton | NYR20A454 | 03/04/2003 |
| Village of Sag Harbor | NYR20A095 | 02/27/2003 |
| Village of North Haven | NYR20A500 | 12/15/2003 |
| Suffolk County | NYR20A180 | 3/25/2003 |
| NYSDOT | NYR20A288 | 3/10/2003 |

NOI: Notice of Intent

A SWMP is designed to reduce the discharge of pollutants to the maximum extent practicable (MEP) to protect water quality and to satisfy the appropriate water quality requirements of the Environmental Conservation Law and the Clean Water Act. MEP is a technology-based standard established by Congress in the Clean Water Act. Since no precise definition of MEP exists, it allows for maximum flexibility on the part of MS4 operators as they develop their programs. If stormwater is being discharged to a 303(d)-listed segment of a water body, the SWMP must ensure there is no resulting increase in the pollutant of concern to the, receiving waters. Where required to meet water quality standards NYSDEC enforces additional requirements based on WLAs determined through a TMDL. The MS4 must review the applicable TMDL to see if it includes requirements for control of stormwater discharges. If an MS4 is not meeting the TMDL stormwater allocations, it must, within six (6) months of the TMDL's approval, modify its SWMP to ensure that reduction of the pollutant of concern specified in the TMDL is achieved. Modifications must be considered for each of the six minimum measures. The revised management program must include an updated schedule for implementation.

The MS4s that discharge to Flanders Bay (east/center and tributaries), North Sea Harbor, Noyac Creek and tidal tributaries, Reeves Bay and tidal tributaries, Sag Harbor and Sag Harbor Cove, Sebonac Creek/Bullhead Bay and tidal tributaries and Wooley Pond are owned and operated by the municipalities located around this waterbodies. Accordingly, all municipalities identified in the TMDL have submitted an application to gain coverage under New York's SPDES General Permit for Municipal Separate Storm Sewer Systems:

NYSDEC will continue to work with these municipalities to identify funding sources and to evaluate locations and designs for stormwater control BMPs throughout the watershed. Under the State's

Environmental Protection Fund (EPF), $10.8 million were made available last year (2005) through an application process to assist communities in implementing the Stormwater Phase II regulations and for non-agricultural nonpoint source abatement and control projects.

Currently, East Hampton, Southold and Town of Shelter Island are not part of an MS4 area, although these municipalities or local governments could be made part of the MS4 area after the approval of this TMDL by EPA. The waterbodies covered under this TMDL that are located in these towns are as follows:

A. East Hampton:
    1. Outer Northwest Creek
    2. Acabonac Harbor
    3. Montauk Harbor

B. Southold:
    1. Town/Jockey Creek
    2. Hashamomuck Pond

C. Town of Shelter Island
    1. Dering Harbor

This TMDL does not invoke additional requirements set forth in the SPDES General Permit for Stormwater Discharges from Construction Activity, Permit No. GP-02-01, applicable to facilities satisfying Condition A of Part III.A.1.b.(1) for construction sites discharging to these waterbodies.

### 9.3.1 Additional Requirements Based on This TMDL

Under the SPDES General Permit for Stormwater Discharges from MS4s, Permit No. GP-02-02, Part III.B.2, the MS4 dischargers must provide controls beyond the six minimum measures, such that economically feasible programs are developed and implemented to reduce known pathogens sources to a level which will meet the pathogen standards necessary to open the waters to shellfishing based on NSSP standards.

Once sampling is obtained which meets the NSSP standards for this area, and if the sampling indicates that the shellfish waters continue to violate shellfish standards, additional measures will be required such that pathogens are reduced to the extent necessary to meet the allocation set forth in this TMDL. As an alternative to additional measures, if shellfishing waters continue to violate shellfish standards after economically feasible programs have been put in place, the towns may perform a Use Attainability Analysis to determine if the area's designated use can be changed to eliminate shellfishing.

# 10.0 PUBLIC PARTICIPATION

NYSDEC and U.S. EPA Region 2 have worked together to prepare this total maximum daily load (TMDL) document to meet the requirements of Section 303(d) of the Clean Water Act. NYSDEC will make this document available to the public, local agencies, and stakeholders for their review and feedback. The stakeholders will include, but are not limited to, the following municipal, government, and non-government organizations: the Towns of Riverhead, Southampton, East Hampton, Southold, and Shelter Island; Brookhaven National Laboratory, Riverhead, Sag Harbor, and NWIRP Calverton STPs; local Audubon Societies; marina operators and boaters associations; and the Suffolk County Departments of Health and Public Works; and the New York State Department of Transportation.

NYSDEC published notice in the Environmental Notice Bulletin on July 19,2006 concerning the availability of this TMDL document and specified where the interested parties can obtain a copy of the document either in electronic or in printed form. The public was given 30 days to submit comments to NYSDEC. No public comments were received.

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# Attachment 1

# Water Quality Data Analysis Summary

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Dering Harbor** | | | |
|---|---|---|---|
| **Dering Total** | **TC_5** | **TC_5_1** | **TC_5_2** |
| Geomean n = 30 | | | |
| 90th Percentile n = 30 | | | |
| Geomean SRS | 9.9 | 11.0 | 18.5 |
| 90th Percentile SRS | 43.0 | 43.0 | 93.0 |
| *n* | *36* | *36* | *36* |
| **Dering Fecal** | **5** | **5.1** | **5.2** |
| Geomean n = 30 | | | |
| 90th Percentile n = 30 | | | |
| Geomean SRS | 7.3 | 8.0 | 8.1 |
| 90th Percentile SRS | 43.0 | 23.0 | 43.0 |
| *n* | *31* | *31* | *31* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
- Fecal - 14 MPN Geomean
- Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
- Fecal - 49 MPN
- Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Budd's Pond** | | | |
|---|---|---|---|
| **Budd's Total** | **TC_13.1** | **TC_13.5** | ***109*** |
| Geomean n = 30 | 8.6 | | N/A |
| 90th Percentile n = 30 | 43.0 | | N/A |
| Geomean SRS | 8.4 | | 32.3 |
| 90th Percentile SRS | 43.0 | | 120 |
| *n* | *37* | | *16* |
| **Budd's Fecal** | **FC_13.1** | **FC_13.5** | ***109*** |
| Geomean n = 30 | 6.2 | N/A | N/A |
| 90th Percentile n = 30 | 25.0 | N/A | N/A |
| Geomean SRS | 6.0 | 5.8 | 28.7 |
| 90th Percentile SRS | 23.0 | 19.0 | 124 |
| *n* | *31* | *3* | *14* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
- Fecal - 14 MPN Geomean
- Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
- Fecal - 49 MPN
- Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analaysis Summary**

| **Stirling Creek & Basin** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Stirling Total** | **TC2** | **TC3** | **TC4** | **TC5** | **TC6** | **TC7** | **TC9** | **TC11** |
| Geomean n = 30 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 90th Percentile n = 30 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Geomean SRS | 6.4 | 23.9 | 12.9 | 19.4 | 17.4 | 16.5 | 8.5 | 16.0 |
| 90th Percentile SRS | 23.0 | 412.0 | 82.4 | 212.0 | 43.0 | 93.0 | 93.0 | 239.8 |
| *n* | *19* | *19* | *19* | *19* | *19* | *19* | *19* | *17* |
| **Stirling Fecal** | **FC2** | **FC3** | **FC4** | **FC5** | **FC6** | **FC7** | **FC9** | **FC11** |
| Geomean n = 30 | | | | | | | | |
| 90th Percentile n = 30 | | | | | | | | |
| Geomean SRS | 5.3 | 6.4 | 4.4 | 5.9 | 6.2 | 5.3 | 5.2 | 5.1 |
| 90th Percentile SRS | 37.4 | 41.0 | 9.0 | 22.2 | 43.0 | 22.2 | 22.2 | 23.0 |
| *n* | *32* | *32* | *32* | *32* | *32* | *32* | *32* | *30* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
- Fecal - 14 MPN Geomean
- Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
- Fecal - 49 MPN
- Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Town/Jockey Creeks** | | | | |
|---|---|---|---|---|
| **Town/Jockey Total** | **2.1** | **2.2** | **2.3** | **2.5** |
| Geomean n = 30 | N/A | | N/A | N/A |
| 90th Percentile n = 30 | N/A | | N/A | N/A |
| Geomean SRS | 23.8 | 28.4 | 28.7 | 36.4 |
| 90th Percentile SRS | 93.0 | 240.0 | 93.0 | 106.5 |
| *n* | *26* | *45* | *26* | *26* |
| **Town/Jockey Fecal** | **2.1** | **2.2** | **2.3** | **2.5** |
| Geomean n = 30 | N/A | | N/A | N/A |
| 90th Percentile n = 30 | N/A | | N/A | N/A |
| Geomean SRS | 19.1 | 11.1 | 21.0 | 20.9 |
| 90th Percentile SRS | 180.9 | 43.0 | 93.0 | 78.0 |
| *n* | *24* | *41* | *25* | *24* |

**LEGEND**

***Column Headings:***
Grey: Uncertified areas
Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***
Red: Exceeds Geomean NSSP Standards
Fecal - 14 MPN Geomean
Total - 70 MPN Geomean
Purple: Exceeds 90th percentile NSSP Standard
Fecal - 49 MPN
Total - 330 MPN
N/A = not enough samples to determine "most recent 30"
n = number of samples used for data analysis
Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Goose Creek** | | | | | | |
|---|---|---|---|---|---|---|
| **Goose Total** | **G1** | **G2** | **G3** | **G4** | **G5** | **G6** |
| Geomean n = 30 | | | | | | |
| 90th Percentile n = 30 | | | | | | |
| Geomean SRS | 20.5 | 17.0 | 19.4 | 33.6 | 24.8 | 20.3 |
| 90th Percentile SRS | 93.0 | 93.0 | 78.0 | 240.0 | 150.0 | 43.0 |
| *n* | *35* | *31* | *34* | *31* | *31* | *31* |
| **Goose Fecal** | **G1** | **G2** | **G3** | **G4** | **FC1_3*** | **G6** |
| Geomean n = 30 | | N/A | N/A | N/A | N/A | N/A |
| 90th Percentile n = 30 | | N/A | N/A | N/A | N/A | N/A |
| Geomean SRS | 10.5 | 13.5 | 16.1 | 16.3 | 12.7 | 11.6 |
| 90th Percentile SRS | 43.0 | 115.8 | 141.0 | 151.8 | 51.0 | 59.0 |
| *n* | *33* | *27* | *27* | *27* | *27* | *26* |

*This station is not shown in Figure 2-5.

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
- Fecal - 14 MPN Geomean
- Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
- Fecal - 49 MPN
- Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Hashamomuck Pond** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hashamomuck Total** | **TC1** | **TC1_1** | **TC1_2** | **TC2** | **TC2_1** | **TC3** | **TC4** | **TC5** | **TC6** | **TC7** | **TC7_1** |
| Geomean n = 30 | | | | | | | | N/A | N/A | N/A | N/A |
| 90th Percentile n = 30 | | | | | | | | N/A | N/A | N/A | N/A |
| Geomean SRS | 45.3 | 34.1 | 21.3 | 14.0 | 10.5 | 7.1 | 5.8 | 6.5 | 4.1 | 3.9 | 4.9 |
| 90th Percentile SRS | 460.0 | 460.0 | 240.0 | 151.8 | 82.2 | 75.1 | 29.0 | 19.8 | 7.0 | 7.0 | 10.6 |
| *n* | *40* | *42* | *45* | *47* | *47* | *48* | *48* | *5* | *5* | *5* | *5* |
| **Hashamomuck Fecal** | **FC1** | **FC1_1** | **FC1_2** | **FC2** | **FC2_1** | **FC3** | **FC4** | **FC5** | **FC6** | **FC7** | **FC7_1** |
| Geomean n = 30 | | | | | | | | N/A | N/A | N/A | N/A |
| 90th Percentile n = 30 | | | | | | | | N/A | N/A | N/A | N/A |
| Geomean SRS | 13.4 | 14.5 | 8.5 | 6.9 | 4.8 | 5.0 | 3.6 | 4.2 | 3.8 | 4.7 | 3.8 |
| 90th Percentile SRS | 204.0 | 460.0 | 53.7 | 43.0 | 23.0 | 23.0 | 8.4 | 11.6 | 8.4 | 11.5 | 8.4 |
| *n* | *35* | *36* | *40* | *41* | *41* | *44* | *44* | *7* | *7* | *7* | *7* |

**<u>LEGEND</u>**
***Column Headings:***
Grey: Uncertified areas
Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)
***Data:***
Red: Exceeds Geomean NSSP Standards
Fecal - 14 MPN Geomean
Total - 70 MPN Geomean
Purple: Exceeds 90th percentile NSSP Standard
Fecal - 49 MPN
Total - 330 MPN
N/A = not enough samples to determine "most recent 30"
n = number of samples used for data analysis
Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Hashamomuck Pond** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Hashamomuck Total** | **TC8** | **TC8_1** | **TC9** | **TC10** | **TCA** | ***350*** | ***340*** | |
| Geomean n = 30 | N/A | N/A | N/A | 7.1 | | N/A | N/A | |
| 90th Percentile n = 30 | N/A | N/A | N/A | 7.1 | | N/A | N/A | |
| Geomean SRS | 5.4 | 3.3 | 6.5 | 7.4 | 15.6 | 31.7 | 24.4 | |
| 90th Percentile SRS | 12.0 | 4.0 | 12.6 | 17.4 | 350.0 | 40.0 | 40.0 | |
| *n* | *5* | *5* | *5* | *5* | *46* | *6* | *7* | |
| **Hashamomuck Fecal** | **FC8** | **FC8_1** | **FC9** | **FC10** | **FC10_1*** | **FCA** | ***350*** | ***340*** |
| Geomean n = 30 | N/A | N/A | N/A | N/A | N/A | | N/A | N/A |
| 90th Percentile n = 30 | N/A | N/A | N/A | N/A | N/A | | N/A | N/A |
| Geomean SRS | 3.9 | 5.2 | 4.6 | 7.4 | 3.5 | 5.8 | 25.2 | 20.0 |
| 90th Percentile SRS | 6.5 | 16.0 | 10.8 | 23.0 | 7.0 | 23.0 | 36.0 | 20.0 |
| *n* | *6* | *6* | *7* | *6* | *18* | *37* | *3* | *3* |

*This station is not shown in Figure 2-6.

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
Fecal - 14 MPN Geomean
Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
Fecal - 49 MPN
Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Richmond Creek** | | | | |
|---|---|---|---|---|
| **Richmond Creek Total** | **TC_7.4** | **TC_7.4A** | **TC_7.4B** | **TC_7.5** |
| Geomean n = 30 | Data Missing | | | |
| 90th Percentile n = 30 | | | | |
| Geomean SRS | | | | |
| 90th Percentile SRS | | | | |
| *SRS n* | | | | |
| **Richmond Creek Fecal** | **FC_7.4** | **FC_7.4A** | **FC_7.4B** | **FC_7.5** |
| Geomean n = 30 | 17.1 | 33.8 | 23.9 | Data Missing |
| 90th Percentile n = 30 | 93 | 262 | 95.7 | |
| Geomean SRS | | | | |
| 90th Percentile SRS | | | | |
| *SRS n* | *14* | *13* | *13* | |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
- Fecal - 14 MPN Geomean
- Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
- Fecal - 49 MPN
- Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Great Peconic Bay & Tidal Tributaries** | | |
|---|---|---|
| **GPB_SGA28 Total** | **TC_8A** | **TC_9C** |
| Geomean n = 30 | 41.8 | 33.9 |
| 90th Percentile n = 30 | 240.0 | 240.0 |
| Geomean SRS | | |
| 90th Percentile SRS | | |
| *SRS n* | *26* | *26* |
| **GPB SGA28 Fecal** | **FC_8A** | **FC_9C** |
| Geomean n = 30 | 22.9 | 18.1 |
| 90th Percentile n = 30 | 93.0 | 48.0 |
| Geomean SRS | | |
| 90th Percentile SRS | | |
| *SRS n* | *21* | *21* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
- Fecal - 14 MPN Geomean
- Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
- Fecal - 49 MPN
- Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Flanders Bay** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Flanders SGA 29C Total** | **TC_4** | **TC_6A** | **TC_6B** | **TC_7** | **TC_8** | **TC_9** | **TC_10** | **TC_26** | **TC_19** |
| Geomean n = 30 | 31.5 | 11.6 | 20.3 | 12.3 | 20.3 | 7.7 | 7.4 | 23.4 | 12.7 |
| 90th Percentile n = 30 | 98.7 | 43.0 | 98.7 | 66.9 | 159.0 | 48.0 | 46.2 | 93.0 | 93.0 |
| Geomean SRS | | | | | | | | | |
| 90th Percentile SRS | | | | | | | | | |
| *SRS n* | *11* | *11* | *11* | *23* | *11* | *23* | *25* | *26* | *23* |
| **Flanders SGA 29C Fecal** | **FC_4** | **FC_6A** | **FC_6B** | **FC_7** | **FC_8** | **FC_9** | **FC_10** | **FC_26** | **FC_19** |
| Geomean n = 30 | 8.0 | 6.1 | 10.3 | 10.0 | 9.2 | 6.0 | 4.5 | 12.1 | 8.4 |
| 90th Percentile n = 30 | 23.0 | 39.4 | 53.7 | 66.9 | 48.0 | 43.0 | 15.8 | 76.8 | 43.0 |
| Geomean SRS | | | | | | | | | |
| 90th Percentile SRS | | | | | | | | | |
| *SRS n* | *18* | *14* | *14* | *19* | *13* | *19* | *23* | *26* | *19* |

| **Flanders SGA 29 Total** | **TC_21** | **TC_19** | **TC_19A** | **TC_17** | **TC_16** | **TC_16D** | **TC_15** | **TC_14** | **TC_2A** | **TC_2** | **TC_1A** | **TC_1** | **TC_24** | ***170*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Geomean n = 30 | | | | | | | | | | | | | | |
| 90th Percentile n = 30 | | | | | | | | | | | | | | |
| Geomean SRS | 6.2 | 8.7 | 15.2 | 13.8 | 19.9 | 12.9 | 21.3 | 7.9 | 5.7 | 15.4 | 6.3 | 23.4 | 6.1 | 57.6 |
| 90th Percentile SRS | 35.0 | 43.0 | 93.0 | 115.8 | 151.8 | 93.0 | 240.0 | 37.4 | 23.0 | 87.6 | 32.6 | 240.0 | 41.4 | 140.0 |
| *n* | *55* | *56* | *57* | *57* | *57* | *55* | *56* | *55* | *54* | *54* | *55* | *53* | *55* | *11* |
| **Flanders SGA 29 Fecal** | **FC_21** | **FC_19** | **FC_19A** | **FC_17** | **FC_16** | **FC_16D** | **FC_15** | **FC_14** | **FC_2A** | **FC_2** | **FC_1A** | **FC_1** | **FC_24** | ***170*** |
| Geomean n = 30 | | | | | | | | | | | | | | |
| 90th Percentile n = 30 | | | | | | | | | | | | | | |
| Geomean SRS | 4.4 | 5.2 | 6.7 | 5.9 | 9.7 | 6.8 | 13.8 | 5.4 | 4.0 | 6.7 | 4.1 | 6.9 | 3.6 | 34.4 |
| 90th Percentile SRS | 15.0 | 12.4 | 43.0 | 25.0 | 43.0 | 29.0 | 168.0 | 23.0 | 9.0 | 23.0 | 9.0 | 39.4 | 6.4 | 86.0 |
| *n* | *51* | *50* | *53* | *50* | *50* | *48* | *49* | *53* | *47* | *48* | *53* | *50* | *53* | *10* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
- Fecal - 14 MPN Geomean
- Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
- Fecal - 49 MPN
- Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Reeves Bay** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Reeves Total** | **TC_12** | **TC_14** | **TC_15** | **TC_16C** | **TC_17C** | **TC_18** | **TC_20A** | ***210*** |
| Geomean n = 30 | 13.4 | 11.9 | 9.9 | | | 17.2 | | |
| 90th Percentile n = 30 | 48.0 | 48.0 | 48.0 | | | 93.0 | | |
| Geomean SRS | | | | 11.9 | 20.2 | | 24.3 | 55.1 |
| 90th Percentile SRS | | | | 76.8 | 93.0 | | 159.0 | 228.0 |
| *SRS n* | *29* | *29* | *29* | *30* | *30* | *22* | *30* | *13* |
| **Reeves Fecal** | **FC_12** | **FC_14** | **FC_15** | **FC_16C** | **FC_17C** | **FC_18** | **FC_20A** | ***210*** |
| Geomean n = 30 | 11.0 | 9.2 | 6.6 | 8.8 | 15.7 | 13.5 | 19.4 | |
| 90th Percentile n = 30 | 93.0 | 43.0 | 46.2 | 75.0 | 75.0 | 48.0 | 240.0 | |
| Geomean SRS | | | | | | | | 78.3 |
| 90th Percentile SRS | | | | | | | | 478.0 |
| *SRS n* | *25* | *24* | *24* | *25* | *25* | *18* | *26* | *10* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
Fecal - 14 MPN Geomean
Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
Fecal - 49 MPN
Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Sebonac Creek/Bullhead Bay & Tributaries** | | |
|---|---|---|
| **Sebonac Total** | **TC_2** | ***148*** |
| Geomean n = 30 | 32.4 | |
| 90th Percentile n = 30 | 240.0 | |
| Geomean SRS | | 55.5 |
| 90th Percentile SRS | | 161.0 |
| *n* | *17* | *4* |
| **Sebonac Fecal** | **FC_2** | ***148*** |
| Geomean n = 30 | N/A | |
| 90th Percentile n = 30 | N/A | |
| Geomean SRS | 19.1 | 49.0 |
| 90th Percentile SRS | 85.8 | 58.0 |
| *n* | *17* | *2* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
Fecal - 14 MPN Geomean
Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
Fecal - 49 MPN
Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Scallop Pond** | | |
|---|---|---|
| **Scallop Total** | **TC_7** | **TC_8** |
| Geomean n = 30 | 10.3 | 8.6 |
| 90th Percentile n = 30 | 93.0 | 43.0 |
| Geomean SRS | | |
| 90th Percentile SRS | | |
| *n* | *17* | *17* |
| **Scallop Fecal** | **FC_7** | **FC_8** |
| Geomean n = 30 | N/A | N/A |
| 90th Percentile n = 30 | N/A | N/A |
| Geomean SRS | 4.4 | 4.9 |
| 90th Percentile SRS | 11.4 | 11.4 |
| *n* | *17* | *17* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
- Fecal - 14 MPN Geomean
- Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
- Fecal - 49 MPN
- Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **North Sea Harbor** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **North Sea Total** | **TC_4** | **TC_4_1** | **TC_4_2** | **TC_9*** | **TC_10** | **TC_4A** | **TC_3** | **TC_13** | **TC_12** | **TC_2A** | **TC_5A** |
| Geomean n = 30 | | | | | | | | | | | |
| 90th Percentile n = 30 | | | | | | | | | | | |
| Geomean SRS | 16.6 | 15.6 | 18.3 | 23.2 | 23.2 | 9.5 | 87.3 | 8.5 | 7.9 | 8.9 | 7.4 |
| 90th Percentile SRS | 93.0 | 115.8 | 240.0 | 127.2 | 228.0 | 93.0 | 460.0 | 43.0 | 41.8 | 43.0 | 31.0 |
| *n* | *60* | *57* | *56* | *55* | *55* | *60* | *42* | *47* | *44* | *42* | *47* |
| **North Sea Fecal** | **FC_4** | **FC_4_1** | **FC_4_2** | **FC_9*** | **FC_10** | **FC_4A** | **FC_3** | **FC_13** | **FC_12** | **FC_2A** | **FC_5A** |
| Geomean n = 30 | | | | | | | | | | | |
| 90th Percentile n = 30 | | | | | | | | | | | |
| Geomean SRS | 8.6 | 7.3 | 8.6 | 12.0 | 10.4 | 5.3 | 22.8 | 6.4 | 5.8 | 5.6 | 5.4 |
| 90th Percentile SRS | 43.0 | 23.0 | 71.8 | 93.0 | 93.0 | 23.0 | 240.0 | 23.0 | 23.0 | 18.2 | 15.0 |
| *n* | *61* | *52* | *52* | *51* | *51* | *55* | *40* | *51* | *41* | *47* | *43* |

*This station is not shown in Figure 2-16.

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
- Fecal - 14 MPN Geomean
- Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
- Fecal - 49 MPN
- Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **North Sea Harbor** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **North Sea Total** | **TC_5** | **TC_6** | **TC_7** | **TC_11** | **TC_1** | **TC_2** | **TC_3A** | **TC_3_1** | **TC_14** | ***104*** |
| Geomean n = 30 | 10.9 | 28.3 | 67.9 | 56.2 | | | | N/A | | |
| 90th Percentile n = 30 | 43.0 | 107.7 | 438.0 | 240.0 | | | | N/A | | |
| Geomean SRS | | | | | 7.0 | 6.1 | 15.4 | 140.6 | 14.0 | 34.6 |
| 90th Percentile SRS | | | | | 23.0 | 23.0 | 122.4 | 418.3 | 93.0 | 40.0 |
| *n* | *27* | *15* | *12* | *21* | *44* | *43* | *59* | *2* | *57* | *12* |
| **North Sea Fecal** | **FC_5** | **FC_6** | **FC_7** | **FC_11** | **FC_1** | **FC_2** | **FC_3A** | **FC_3_1** | **FC_14** | ***104*** |
| Geomean n = 30 | 7.6 | N/A | 26.2 | 12.8 | | | | N/A | | |
| 90th Percentile n = 30 | 43.0 | N/A | 225.3 | 43.0 | | | | N/A | | |
| Geomean SRS | | 11.0 | | | 5.4 | 5.1 | 7.7 | 4.0 | 7.5 | 30.1 |
| 90th Percentile SRS | | 41.0 | | | 18.2 | 9.0 | 43.0 | 4.0 | 43.0 | 67.0 |
| *n* | *25* | *12* | *12* | *23* | *47* | *47* | *57* | *2* | *52* | *8* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
- Fecal - 14 MPN Geomean
- Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
- Fecal - 49 MPN
- Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Wooley Pond** | | | | |
|---|---|---|---|---|
| **Wooley Total** | **TC_2** | **TC_3** | **TC_4** | ***300*** |
| Geomean n = 30 | 20.7 | 78.3 | 54.8 | |
| 90th Percentile n = 30 | 262.0 | 1100.0 | 460.0 | |
| Geomean SRS | | | | 39.2 |
| 90th Percentile SRS | | | | 74 |
| *n* | *16* | *16* | *16* | *7* |
| **Wooley Fecal** | **FC_2** | **FC_3** | **FC_4** | ***300*** |
| Geomean n = 30 | 11.0 | 32.5 | 33.1 | |
| 90th Percentile n = 30 | 93.0 | 240.0 | 240.0 | |
| Geomean SRS | | | | 31.7 |
| 90th Percentile SRS | | | | 60 |
| *n* | *15* | *15* | *15* | *6* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
Fecal - 14 MPN Geomean
Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
Fecal - 49 MPN
Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Noyac Creek** | | | | | |
|---|---|---|---|---|---|
| **Noyac Total** | **TC_8** | **TC_8_1** | **TC_8_2** | **TC_8_3** | ***310*** |
| Geomean n = 30 | 12.8 | 27.3 | | | |
| 90th Percentile n = 30 | 93.0 | 129.7 | | | |
| Geomean SRS | | | 11.7 | 5.5 | 46.2 |
| 90th Percentile SRS | | | 93.0 | 23.0 | 136.0 |
| *n* | *16* | *16* | *48* | *42* | *7* |
| **Noyac Fecal** | **FC_8** | **FC_8_1** | **FC_8_2** | **FC_8_3** | ***310*** |
| Geomean n = 30 | 7.9 | 12.2 | | | |
| 90th Percentile n = 30 | 48.0 | 76.8 | | | |
| Geomean SRS | | | 5.2 | 4.4 | 26.4 |
| 90th Percentile SRS | | | 23.0 | 19.8 | 56.0 |
| *n* | *26* | *26* | *47* | *43* | *5* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
Fecal - 14 MPN Geomean
Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
Fecal - 49 MPN
Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Sag Harbor** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sag Harbor Total** | **TC_4** | **TC_1_2** | **TC_1A_1** | **TC_1** | **TC_5** | **TC_10** | **TC_10_1** | **TC_6** | **TC_6_2** | **TC_6_1** | **TC_7** |
| Geomean n = 30 | | 13.1 | 16.7 | | | | | | | | |
| 90th Percentile n = 30 | | 107.7 | 93.0 | | | | | | | | |
| Geomean SRS | 6.9 | | | 6.7 | 6.5 | 5.4 | 5.7 | 5.5 | 6.9 | 12.0 | 7.4 |
| 90th Percentile SRS | 43.0 | | | 41.0 | 43.0 | 23.0 | 23.0 | 23.0 | 43.0 | 151.8 | 23.0 |
| *n* | *49* | *22* | *22* | *42* | *41* | *44* | *50* | *41* | *46* | *47* | *41* |
| **Sag Harbor Fecal** | **FC_4** | **FC_1_2** | **FC_1_1** | **FC_1** | **FC_5** | **FC_10** | **FC_10_1** | **FC_6** | **FC_6_2** | **FC_6_1** | **FC_7** |
| Geomean n = 30 | | 7.4 | 7.9 | | | | | | | | |
| 90th Percentile n = 30 | | 39.4 | 46.2 | | | | | | | | |
| Geomean SRS | 6.0 | | | 3.9 | 5.2 | 4.4 | 4.6 | 4.5 | 5.0 | 6.3 | 7.0 |
| 90th Percentile SRS | 43.0 | | | 7.1 | 18.6 | 9.0 | 14.2 | 19.0 | 18.8 | 33.0 | 43.0 |
| *n* | *50* | *20* | *20* | *45* | *45* | *44* | *43* | *46* | *54* | *46* | *46* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
- Fecal - 14 MPN Geomean
- Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
- Fecal - 49 MPN
- Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Sag Harbor** | | | | | | |
|---|---|---|---|---|---|---|
| **Sag Harbor Total** | **TC_9** | **TC_8** | **TC_7A** | **TC_9_1** | **TC_7B** | **TC_7C** |
| Geomean n = 30 | | | | | | |
| 90th Percentile n = 30 | | | | | | |
| Geomean SRS | 14.7 | 6.7 | 5.8 | 5.8 | 7.1 | 7.5 |
| 90th Percentile SRS | 204.0 | 23.0 | 23.0 | 23.0 | 23.0 | 23.0 |
| *n* | *45* | *41* | *41* | *46* | *41* | *41* |
| **Sag Harbor Fecal** | **FC_9** | **FC_8** | **FC_7A** | **FC_9_1** | **FC_7B** | **FC_7C** |
| Geomean n = 30 | | | | | | |
| 90th Percentile n = 30 | | | | | | |
| Geomean SRS | 7.7 | 5.6 | 4.3 | 4.0 | 5.2 | 5.5 |
| 90th Percentile SRS | 78.0 | 23.0 | 9.0 | 9.0 | 23.0 | 23.0 |
| *n* | *44* | *44* | *36* | *46* | *36* | *36* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
Fecal - 14 MPN Geomean
Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
Fecal - 49 MPN
Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Northwest Creek** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Northwest Total** | **TC_2** | **TC_4** | **TC_5** | **TC_6** | **TC_9** | **TC_10** | **TC_12** | **TC_3** | **TC_7** | **TC_8** |
| Geomean n = 30 | | | 31.3 | 72.5 | | | | | 53.2 | 58.7 |
| 90th Percentile n = 30 | | | 524.0 | 1240.1 | | | | | 460.0 | 1100.0 |
| Geomean SRS | 8.8 | 20.9 | | | 33.4 | 15.5 | 11.1 | 9.7 | | |
| 90th Percentile SRS | 93.0 | 460.0 | | | 460.0 | 240.0 | 132.9 | 127.5 | | |
| *n* | *41* | *40* | *29* | *27* | *41* | *41* | *44* | *44* | *26* | *25* |
| **Northwest Fecal** | **FC_2** | **FC_4** | **FC_5** | **FC_6** | **FC_9** | **FC_10** | **FC_12** | **FC_3** | **FC_7** | **FC_8** |
| Geomean n = 30 | | | 15.4 | 19.1 | | | | | 21.7 | 24.2 |
| 90th Percentile n = 30 | | | 262.0 | 460.0 | | | | | 460.0 | 460.0 |
| Geomean SRS | 6.3 | 9.1 | | | 10.5 | 6.5 | 6.5 | 6.2 | | |
| 90th Percentile SRS | 35.0 | 195.9 | | | 213.0 | 65.4 | 34.2 | 20.6 | | |
| *n* | *35* | *34* | *25* | *23* | *34* | *34* | *34* | *34* | *20* | *22* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
- Fecal - 14 MPN Geomean
- Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
- Fecal - 49 MPN
- Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Northwest Creek** | | | | | |
|---|---|---|---|---|---|
| **Northwest Total** | **TC_11** | **TC_13** | **TC_14** | **TC_15** | ***131*** |
| Geomean n = 30 | | | | | |
| 90th Percentile n = 30 | | | | | |
| Geomean SRS | 11.2 | 9.5 | 11.4 | 17.3 | 49.9 |
| 90th Percentile SRS | 150.0 | 93.0 | 98.7 | 240.0 | 158.0 |
| *n* | *40* | *41* | *40* | *40* | *15* |
| **Northwest Fecal** | **FC_11** | **FC_13** | **FC_14** | **FC_15** | ***131*** |
| Geomean n = 30 | | | | | |
| 90th Percentile n = 30 | | | | | |
| Geomean SRS | 5.4 | 5.9 | 6.5 | 7.3 | 36.9 |
| 90th Percentile SRS | 23.0 | 43.0 | 23.0 | 78.0 | 140.0 |
| *n* | *31* | *31* | *31* | *34* | *14* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
- Fecal - 14 MPN Geomean
- Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
- Fecal - 49 MPN
- Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Acabonac Harbor** | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Acabonac Total** | **TC_1** | **TC_2** | **TC_4** | **TC_5** | **TC_6** | **TC_15** | **TC_16** | **TC_33** | **TC_34** | **TC_3** | **TC_13** | **TC_12** | **TC_11** | **TC_9** |
| Geomean n = 30 | | | 66.1 | 59.8 | 31.6 | 308.4 | 55.3 | 58.9 | 45.5 | 67.7 | | | | |
| 90th Percentile n = 30 | | | 460.0 | 1100.0 | 460.0 | 2501.0 | 460.0 | 524.0 | 524.0 | 1100.0 | | | | |
| Geomean SRS | 35.5 | 23.7 | | | | | | | | | 6.8 | 6.0 | 6.7 | 6.5 |
| 90th Percentile SRS | 1100.0 | 240.0 | | | | | | | | | 83.0 | 35.8 | 42.2 | 43.0 |
| *n* | *55* | *56* | *27* | *27* | *27* | *27* | *27* | *27* | *27* | *27* | *43* | *43* | *43* | *58* |
| **Acabonac Fecal** | **FC_1** | **FC_2** | **FC_4** | **FC_5** | **FC_6** | **FC_15** | **FC_16** | **FC_33** | **FC_34** | **FC_3** | **FC_13** | **FC_12** | **FC_11** | **FC_9** |
| Geomean n = 30 | | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | | | |
| 90th Percentile n = 30 | | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | | | |
| Geomean SRS | 17.6 | 14.3 | 46.3 | 23.8 | 20.7 | 81.7 | 24.4 | 28.7 | 38.6 | 39.2 | 7.2 | 5.8 | 5.9 | 5.2 |
| 90th Percentile SRS | 240.0 | 240.0 | 652.0 | 240.0 | 306.0 | 460.0 | 195.9 | 460.0 | 460.0 | 460.0 | 73.0 | 43.0 | 43.0 | 23.0 |
| *n* | *52* | *52* | *28* | *24* | *28* | *24* | *24* | *24* | *28* | *24* | *45* | *44* | *44* | *59* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
- Fecal - 14 MPN Geomean
- Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
- Fecal - 49 MPN
- Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Acabonac Harbor** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Acabonac Total** | **TC_8** | **TC_10** | **TC_14** | **TC_35** | **TC_36** | **TC_6_1** | ***133*** |
| Geomean n = 30 | | | | 71.2 | 65.2 | N/A | |
| 90th Percentile n = 30 | | | | 1100.0 | 460.0 | N/A | |
| Geomean SRS | 7.1 | 7.6 | 9.8 | | | 52.3 | 34.2 |
| 90th Percentile SRS | 43.0 | 43.0 | 83.0 | | | 716.0 | 126 |
| *n* | *58* | *44* | *43* | *25* | *24* | *27* | *13* |
| **Acabonac Fecal** | **FC_8** | **FC_10** | **FC_14** | **FC_35** | **FC_36** | **FC_6_1** | ***133*** |
| Geomean n = 30 | | | | N/A | N/A | N/A | |
| 90th Percentile n = 30 | | | | N/A | N/A | N/A | |
| Geomean SRS | 4.8 | 5.5 | 6.7 | 31.0 | 29.6 | 22.9 | 21.5 |
| 90th Percentile SRS | 23.0 | 43.0 | 43.0 | 460.0 | 240.0 | 213.0 | 80 |
| *n* | *51* | *38* | *45* | *24* | *24* | *24* | *11* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
- Fecal - 14 MPN Geomean
- Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
- Fecal - 49 MPN
- Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Montauk Lake** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Montauk Total** | **TC_2** | **TC_4** | **TC_5** | **TC_6** | **TC_7** | **TC_8** | **TC_9** | **TC_10** | **TC_11** | **TC_13** | **TC_14** |
| Geomean n = 30 | 19.9 | | 11.2 | 22.6 | 10.9 | 20.3 | 25.5 | 29.0 | 81.3 | | |
| 90th Percentile n = 30 | 159.0 | | 53.7 | 107.7 | 62.7 | 93.0 | 460.0 | 159.0 | 1100.0 | | |
| Geomean SRS | | 4.4 | | | | | | | | 11.0 | 12.2 |
| 90th Percentile SRS | | 18.8 | | | | | | | | 43.0 | 416.0 |
| *SRS n* | *17* | *66* | *16* | *16* | *17* | *17* | *16* | *16* | *16* | *45* | *46* |
| **Montauk Fecal** | **FC_2** | **FC_4** | **FC_5** | **FC_6** | **FC_7** | **FC_8** | **FC_9** | **FC_10** | **FC_11** | **FC_13** | **FC_14** |
| Geomean n = 30 | 10.4 | | 5.2 | 8.0 | 6.6 | 7.5 | 8.0 | 9.5 | 19.1 | | |
| 90th Percentile n = 30 | 48.0 | | 9.0 | 43.0 | 25.0 | 23.0 | 43.0 | 43.0 | 98.7 | | |
| Geomean SRS | | 3.4 | | | | | | | | 6.5 | 5.1 |
| 90th Percentile SRS | | 4.0 | | | | | | | | 23.0 | 9.0 |
| *n* | *17* | *40* | *17* | *17* | *17* | *17* | *17* | *17* | *17* | *37* | *37* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
- Fecal - 14 MPN Geomean
- Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
- Fecal - 49 MPN
- Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Montauk Lake** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Montauk Total** | **TC_15** | **TC_16** | **TC_17** | **TC_18** | **TC_19** | **TC_20** | **TC_21** | **TC_22** | **TC_24** | **TC_25** | **TC_26** |
| Geomean n = 30 | | | | | | | | | | | |
| 90th Percentile n = 30 | | | | | | | | | | | |
| Geomean SRS | 14.4 | 16.0 | 20.4 | 15.1 | 20.9 | 17.3 | 13.7 | 19.5 | 4.3 | 6.5 | 4.4 |
| 90th Percentile SRS | 150.0 | 93.0 | 198.0 | 240.0 | 150.0 | 138.6 | 240.0 | 222.0 | 9.0 | 31.0 | 18.8 |
| *SRS n* | *43* | *43* | *44* | *43* | *43* | *43* | *43* | *43* | *43* | *43* | *44* |
| **Montauk Fecal** | **FC_15** | **FC_16** | **FC_17** | **FC_18** | **FC_19** | **FC_20** | **FC_21** | **FC_22** | **FC_24** | **FC_25** | **FC_26** |
| Geomean n = 30 | | | | | | | | | | | |
| 90th Percentile n = 30 | | | | | | | | | | | |
| Geomean SRS | 6.3 | 6.4 | 8.6 | 6.4 | 6.6 | 5.7 | 4.5 | 6.3 | 3.4 | 3.8 | 3.6 |
| 90th Percentile SRS | 31.0 | 40.6 | 93.0 | 23.0 | 43.0 | 31.0 | 15.8 | 31.0 | 4.0 | 9.0 | 4.0 |
| *n* | *37* | *37* | *37* | *37* | *37* | *37* | *37* | *37* | *41* | *40* | *43* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
- Fecal - 14 MPN Geomean
- Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
- Fecal - 49 MPN
- Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Montauk Lake** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Montauk Total** | **TC_28** | **TC_29** | **TC_30** | **TC_31** | **TC_4A** | **TC_8A** | **TC_8B** | ***135*** |
| Geomean n = 30 | 14.6 | | | | | | | |
| 90th Percentile n = 30 | 328.0 | | | | | | | |
| Geomean SRS | | 4.4 | 5.2 | 6.1 | 5.0 | 7.2 | 5.8 | 36.6 |
| 90th Percentile SRS | | 13.8 | 22.8 | 25.0 | 17.4 | 72.0 | 37.0 | 122 |
| *SRS n* | *17* | *44* | *32* | *30* | *46* | *42* | *45* | *20* |
| **Montauk Fecal** | **FC_28** | **FC_29** | **FC_30** | **FC_31** | **FC_4A** | **FC_8A** | **FC_8B** | ***135*** |
| Geomean n = 30 | 7.6 | | | | | | | |
| 90th Percentile n = 30 | 53.0 | | | | | | | |
| Geomean SRS | | 4.2 | 3.4 | 5.8 | 4.8 | 4.4 | 3.6 | 25.3 |
| 90th Percentile SRS | | 8.0 | 4.0 | 39.6 | 4.8 | 4.4 | 3.6 | 40 |
| *n* | *22* | *43* | *31* | *32* | *44* | *43* | *38* | *11* |

**LEGEND**

***Column Headings:***

Grey: Uncertified areas

Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)

***Data:***

Red: Exceeds Geomean NSSP Standards
Fecal - 14 MPN Geomean
Total - 70 MPN Geomean

Purple: Exceeds 90th percentile NSSP Standard
Fecal - 49 MPN
Total - 330 MPN

N/A = not enough samples to determine "most recent 30"

n = number of samples used for data analysis

Yellow: Limited Data (n = less that 30 samples)

**Attachment 1**

**Water Quality Data Analysis Summary**

| **Little Sebonac Creek** | | | | | |
|---|---|---|---|---|---|
| **Little Sebonac Total** | **TC_1** | **TC_3** | **TC_4** | **TC_5** | **TC_6** |
| Geomean n = 30 | 8.2 | 27.7 | 15.2 | 13.9 | 9.4 |
| 90th Percentile n = 30 | 43.0 | 460.0 | 107.7 | 48.0 | 76.8 |
| Geomean SRS | | | | | |
| 90th Percentile SRS | | | | | |
| *SRS n* | *17* | *17* | *17* | *17* | *17* |
| **Little Sebonac Fecal** | **FC_1** | **FC_3** | **FC_4** | **FC_5** | **FC_6** |
| Geomean n = 30 | N/A | N/A | N/A | N/A | N/A |
| 90th Percentile n = 30 | N/A | N/A | N/A | N/A | N/A |
| Geomean SRS | 6.8 | 14.2 | 5.5 | 5.5 | 5.6 |
| 90th Percentile SRS | 27.0 | 93.0 | 9.0 | 23.0 | 26.2 |
| *n* | *19* | *17* | *17* | *17* | *17* |

**LEGEND**
***Column Headings:***
Grey: Uncertified areas
Light Blue: Seasonally certified areas (data analysis used only monitoring data collected during uncertified period)
***Data:***
Red: Exceeds Geomean NSSP Standards
Fecal - 14 MPN Geomean
Total - 70 MPN Geomean
Purple: Exceeds 90th percentile NSSP Standard
Fecal - 49 MPN
Total - 330 MPN
N/A = not enough samples to determine "most recent 30"
n = number of samples used for data analysis
Yellow: Limited Data (n = less that 30 samples)

# Attachment 2

# Marina and Pumpout Facility Data

**Table 1. Land-based and Mobile Pumpout Facilities in the Peconic Estuary**

| Municipality and Water body | Marina/Dock/Boat Name | Pumpout Capacity |
|---|---|---|
| Village of Greenport—Stirling Basin | Brewers Yacht Yard | Unlimited (septic system) |
| Village of Greenport—Greenport Harbor | Claudio's Marina | Unlimited (town sewer) |
| Town of Southold—Sage Cove | Brick Cove Marina | 40 gallon holding tank |
| Town of Southold—Budds Pond/Mill Creek | Goldsmith's Boat Shop | 250 gallon holding tank |
| Town of Southold—Budds Pond/Mill Creek | Port of Egypt | 500 gallon holding tank |
| Town of Southold—Budds Pond/Mill Creek | Albertson's Marine | 250 gallons (septic system) |
| Town of Southold—Wickham Creek | Cutchogue Harbor Marina | 200 gallon holding tank |
| Town of Southold—Cutchogue Harbor | New Suffolk Shipyard | 275 gallon holding tank |
| Town of Southold—James Creek | Strong's Marina | Unlimited (septic system) |
| Town of Riverhead—South Jamesport | Town Dock (municipal) | 1000 gallon holding tank |
| Town of Riverhead—Great Peconic Bay/Flanders Bay | Great Peconic Bay Marina | Unlimited (septic system) |
| Town of Riverhead—Meetinghouse Creek/Flanders Bay | Larry's Lighthouse Marina | 500 gallon holding tank |
| Town of Riverhead—Peconic River | Downtown Riverhead | 1000 gallon holding tank |
| Town of Riverhead—Peconic River | Treasure Cove Marina | 500 gallon holding tank |
| Town of Southampton—Shinnecock Canal | Shinnecock Canal County Marina | 1000 gallon holding tank |
| Town of Southampton—Westhampton Beach | Town Pumpout Boat #1 (municipal) | 250 gallon boat |
| Town of Southampton—Shinnecock Canal west to Riverhead/Great Peconic Bay | Town Pumpout Boat #2 (Hamptons Harbor Marina) (municipal) | 250 gallon boat |
| Town of Southampton—Red Creek Pond to Cold Spring Pond/Great Peconic Bay | Town Pumpout Boat #4 (Mariners Cove Marina) (municipal) | 250 gallon boat |
| Town of Southampton—Cold Spring Pond to Jessup Neck | Town Pumpout Boat #3 (Wooley Pond Bulkhead) (municipal) | 250 gallon boat |
| Village of Sag Harbor—Noyak to West Neck Bay to Sag Harbor | Town Pumpout Boat #5 (Village Marina) (municipal) | 250 gallon boat |
| Village of Sag Harbor—Sag Harbor | Marine Park Docks | 1500 gallon holding tank |
| Town of East Hampton—Three Mile Harbor | Town Pumpout Boat (Gann Road) (municipal) | 300 gallon boat |
| Town of East Hampton—Three Mile Harbor | Darenberg Marine Pumpout Boat | 300 gallon boat |

**Table 1. Land-based and Mobile Pumpout Facilities in the Peconic Estuary, continued**

| Municipality and Water body | Marina/Dock/Boat Name | Pumpout Capacity |
|---|---|---|
| Town of East Hampton—Three Mile Harbor | Shagwong Marina | 60 gallon unit emptied into 1000 gallon septic system |
| Town of East Hampton—Three Mile Harbor | East Hampton Point Marina | 50 gallon unit emptied into 1000 gallon septic system |
| Town of East Hampton—Three Mile Harbor | Maidstone Harbor Marina | Vaccuflush unit emptied into 900 gallon septic system |
| Town of East Hampton—Three Mile Harbor | Town Dock, Gann Road (municipal) | 2,376 gallon and 725 gallon holding tanks |
| Town of East Hampton—Three Mile Harbor | Harbor Marina | 30 gallon portable unit |
| Town of East Hampton—Montauk Harbor | Montauk Sportsman's Dock | 60-80 gallon unit emptied into 1000 gallon septic system |
| Town of East Hampton—Montauk Harbor | Town Dock, Star Island (municipal) | 2,376 gallon holding tank |
| Town of East Hampton—Montauk Harbor | Gone Fishing Marina | 60 gallon unit emptied into 1000 gallon septic system |
| Town of Shelter Island—Dering Harbor | Picozzi's Dering Harbor Marina | 250 gallon holding tank |
| Town of Shelter Island—Coecles Harbor | Coecles Harbor Marina | Unlimited (septic system) |

Source: New York Sea Grant

**Table 2. Number of Docks, Moorings, and Slips Available in the Peconic Estuary Area**

| Water body | Private Docks | Moorings | Marina Slips | Total Recreational Vessels |
|---|---|---|---|---|
| Orient Harbor | 7 | 65 | 209 | 281 |
| Greenport Harbor | 175 | 69 | 782 | 1026 |
| Southold Bay | 238 | 106 | 975 | 1319 |
| Hog Neck Bay | 103 | 76 | 72 | 251 |
| Cutchogue Harbor Complex | 253 | 110 | 336 | 699 |
| Southold | 127 | 65 | 257 | 449 |
| Flanders Bay Complex | 9 | 13 | 550 | 572 |
| Red Creek Pond | 53 | 134 | 0 | 187 |
| Cold Spring Pond | 19 | 0 | 322 | 341 |
| Bullhead Bay/Sebonac Complex | 16 | 0 | 60 | 76 |
| North Sea Harbor | 0 | 35 | 218 | 253 |
| Noyak Bay | 21 | 134 | 145 | 300 |
| Sag Harbor Complex | 184 | 896 | 787 | 1867 |
| Three Mile Harbor | 64 | 153 | 1045 | 1262 |
| Acabonac Harbor | 0 | 56 | 0 | 56 |
| Napeague Harbor | 0 | 20 | 0 | 20 |
| Fort Pond Bay | 0 | 0 | 0 | 0 |
| Montauk Lake | 68 | 20 | 1186 | 1274 |
| Dering Harbor | 0 | 285 | 96 | 381 |
| Coecles Harbor | 0 | 237 | 50 | 287 |
| West Neck Harbor | 0 | 249 | 97 | 346 |
| | | | **Total** | 11247 |

Source: New York Sea Grant

**Table 3. Mobile Pumpout Facilities Data for Peconic Bay**

| Operator of Pumpout Boat | Area Covered | Gallons Pumped | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
| Southampton Town Pumpout Boat #1 | Westhampton Beach | 1,340 | 3,365 | 3,866 | 5,204 | 6261 | 8686 | 7,660 | 7,906 |
| Southampton Town Pumpout Boat #2 | Shinnecock Canal west to Riverhead | 2,187 | 4,642 | 5,437 | 4,417 | 3,100 | Inactive | NA | NA |
| Southampton Town Pumpout Boat #3 | Cold Spring Pond to Jessup Neck | Inactive | 3,119 | 8,977 | 14,544 | 7,905 | 440 | 4,885 | 1,694 |
| Southampton Town Pumpout Boat #4 | Red Creek Pond to Cold Spring Pond | 447 | 1,535 | 2,873 | 3,110 | 3,472 | 4,203 | 4,184 | NA |
| Southampton Town Pumpout Boat #5 | Noyak to West Neck Bay to Sag Harbor | 4,277 | 19,953 | 15,104 | 20,773 | 35,780 | 44,143 | 38,172 | 46,989 |
| East Hampton (owned by town) | Three Mile Harbor | NA | NA | NA | NA | NA | 16,979 | NA | NA |
| East Hampton (Darenberg Marine) | Three Mile Harbor and Montauk Lake | NA | NA | NA | NA | 30,000 | 43,000 | NA | NA |

NA=not available
Source: Peconic Bay Estuary Program.