Hempstead Harbor Protection Committee

WATER-MONITORING PROGRAM
HEMPSTEAD HARBOR
Long Island, New York

2007 Water-Monitoring Report

Prepared by

Coalition to Save Hempstead Harbor

and

FUSS & O'NEILL
Disciplines to Deliver

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PROGRAM HISTORY

Twenty years ago, the view of Hempstead Harbor was much different from what it is today. The harbor was suffering from air, water, and land-based problems that resulted from past industrial activities along its shores. These problems were the impetus for the formation of a citizens' activist group in 1986, the Coalition to Save Hempstead Harbor (CSHH). CSHH established Hempstead Harbor's **Citizens Water-Monitoring Program** in 1992 and initially funded the program through membership support, grants from local foundations and businesses, and volunteer services. The program became widely recognized by other monitoring groups and agencies around Hempstead Harbor and Long Island Sound and quickly was able to garner support from local municipalities and government agencies.

As the program continued, positive changes were occurring not only on the landscape around the harbor, but also on the political landscape, as citizens and government learned to work collaboratively to achieve environmental goals. In 2006, the Hempstead Harbor Protection Committee (HHPC) was able to step up to fully fund the harbor's water-monitoring program through a Long Island Sound Study grant administered by the National Fish and Wildlife Foundation. The grant enabled the completion of an EPA-approved **Quality Assurance Project Plan (QAPP)**, which further enhanced the credibility of the monitoring program and enabled the HHPC to obtain future federal funds for the program.

The completion of the QAPP proved timely. During 2007, a copy of the QAPP, water-quality data, and other information from the water-monitoring program was requested for two separate shellfish-related projects. The information was used to help fill out the New York Department of Environmental Conservation’s (DEC’s) data on the level of pathogens in Hempstead Harbor and whether the harbor could be opened to shellfish harvesting in the near term.

Program Initiation

CSHH’s mission, to identify and eliminate environmental threats to Hempstead Harbor and surrounding communities, is longstanding. Its early priorities included preventing increased air pollution from proposed and existing incinerators and ensuring the cleanup of toxic waste sites that were degrading the harbor’s water quality. By 1990, chronic sewage spills from failing treatment plants and cutbacks in Nassau County Department of Health's water-quality monitoring program shifted CSHH's focus to creating a citizens water-monitoring program for Hempstead Harbor. The program was intended as a springboard for public education and outreach to foster an increased awareness of environmental issues and encourage public participation in local conservation efforts.

In the early 1990s, concerns about the health of Long Island Sound gained increased attention. Although CSHH had already focused on the water-quality issues of Hempstead Harbor, it recognized that the priorities established under the Long Island Sound Study’s Comprehensive Conservation and Management Plan (CCMP) articulated the priorities that also had to be addressed, perhaps to a different extent, in Hempstead Harbor. CSHH established its Citizens Water-Monitoring Program to encourage all who live, work, and enjoy recreational activities around Hempstead Harbor to renew their interest in the harbor as well as Long Island Sound and to participate in restoration efforts. An important component of the program has been to involve citizens in observing changing conditions around the harbor and notifying CSHH as well as appropriate municipal and environmental agencies of any unusual events affecting the harbor. Over the years, the scope of the program has expanded, as has the network of partners that have supported it.

Municipal Watershed-Based Management

As CSHH continued it monitoring efforts, the municipalities that share jurisdiction over Hempstead Harbor recognized they also shared the harbor's water-quality problems but did not have the resources to tackle large harbor issues. It became increasingly evident that they needed a mechanism to overcome the complexities of municipal boundaries and facilitate a more coordinated government approach to water-quality problems. In 1995, the Hempstead Harbor Protection Committee was created and became Long Island’s first watershed-based intermunicipal organization, specifically formed to protect and improve the water quality of Hempstead Harbor. CSHH became the first environmental organization to join the committee as nonvoting member and technical adviser.

HHPC first focused on storm-water runoff abatement as it developed a comprehensive *Hempstead Harbor Water-Quality Improvement Plan* (completed in 1998), for which CSHH implemented the plan's water-quality monitoring component. Also, in recognition of the need to balance the diverse uses of Hempstead Harbor, the HHPC secured a grant to prepare the *Harbor Management Plan for Hempstead Harbor* (2004), which was adopted by all nine HHPC municipalities.

CSHH and HHPC Profiles and Activities

The Coalition to Save Hempstead Harbor and the Hempstead Harbor Protection Committee continue to work closely together on improving Hempstead Harbor's water quality. Each organization has offered separate and valuable contributions to improving conditions around the harbor. At the same time, the two organizations illustrate the great successes that can result from creating valuable partnerships that can pool resources and maximize results to benefit the environment and local communities.

CSHH

When CSHH first formed in 1986, it was in response to reports of continued degradation of Hempstead Harbor on a number of fronts. CSHH joined with other community members and successfully prevented a new incinerator from being built on the harbor's western shore and shut down a failing incinerator that was operating on its eastern shore. CSHH sponsored the development of a townwide recycling plan for the Town of North Hempstead, offering a solution to problems of solid-waste management, and became a critical watchdog for the harbor as remediation plans were formulated to clean up contaminated sites.

As CSHH developed its Citizens Water-Monitoring Program, it also participated in the meetings and hearings that led to the completion of the **Long Island Sound Study's Comprehensive Conservation and Management Plan** in 1994. These meetings afforded opportunities to network with many members of nonprofit organizations and government agencies that were involved in water monitoring around Long Island Sound.

In 1996, CSHH initiated the creation of the **Water-Monitoring Work Group**, a soundwide network of environmental agencies and nonprofits, to provide a forum for analyzing current testing parameters, methodologies, and equipment used by members and for examining testing results in a broader context. The soundwide network remains an important resource to check the location and extent of various water conditions around the sound. In addition, the **Long Island Sound Mapping Project** was completed in July 1998 through a grant awarded to CSHH by EPA/Long Island Sound Study. The project was undertaken on behalf of the Water-Monitoring Work Group and achieved the group's goals of mapping sites that are being monitored around Long Island Sound and identifying the agencies and other organizations that are responsible for testing at those sites.

In 1998, CSHH published ***Hempstead Harbor: Its History, Ecology, and Environmental Challenges***. The book supports the goals of the water-monitoring program in encouraging community members to learn about Hempstead Harbor as an important habitat for marine life and other species. It also describes the critical relationship between the ecology of the harbor and sound and the quality of life (as well as economy) of surrounding communities.

In 2000, CSHH became a partner in **EPA's Environmental Monitoring for Public Awareness and Community Tracking (EMPACT)** program. CSHH worked with the Marine Sciences Department of the University of Connecticut to maintain a telemetry link at the EMPACT Web site at www.MYSound.uconn.edu, so that water-quality data from Hempstead Harbor could be viewed on the Web. The Town of Oyster Bay became an important partner in this project, having contributed the stationary probe and use of a boat and staff to assist with probe maintenance. In 2005, logistical problems and lack of funding to purchase and maintain necessary new equipment prevented the continuation of this program.

In 2001, CSHH received the prestigious **Clearwater Award**, announced by The Waterfront Center, a Washington, DC-based educational organization with worldwide membership. CSHH was commended for the scope of its activities in working to improve conditions in and around Hempstead Harbor. Particularly noted were CSHH's book (mentioned above) and the expansion of its water-monitoring program.

In 2002, CSHH was asked by the U.S. EPA Long Island Sound Study Office to plan and coordinate a **Storm-Water Workshop** to help prepare Long Island communities to meet the requirements of the EPA Phase II Storm Water Regulations. CSHH received a grant to host the workshop, which was cosponsored by the EPA Long Island Sound Office, Long Island Sound Study, and the New York Sea Grant Program.

CSHH continues to work with other environmental groups and agencies around Hempstead Harbor and Long Island Sound. CSHH also has participated on advisory committees that have been created around the harbor to develop various revitalization plans, such as the Glen Cove Creek Reclamation Committee, Glenwood Landing Steering Committee, the Roslyn Waterfront Committee, the Glen Cove Waterfront Citizens' Planning Committee, and, most recently, the Glen Cove Master Plan Task Force (formed in 2006; the completion of the plan is anticipated in 2008).

In 2007, CSHH continued working with HHPC, Glen Cove, Nassau County Departments of Health and Public Works, NY Sea Grant, as well as NYSDEC to resolve problems with discharges into Glen Cove Creek from old pipes along the creek's bulkheads. Also, CSHH is a long-standing member of the Long Island Sound Study's Citizens Advisory Committee and served for three years as chair of its Communications Subcommittee.

From 1992 through 2005, CSHH coordinated local activities as part of the International Coastal Cleanup. Special fund-raising events, member contributions, and grants that CSHH has been awarded throughout the years–including those from the NY Department of State, EPA's Long Island Sound Office, the Rauch Foundation, the New York Community Trust, Long Island Community Foundation, and local businesses–have supported CSHH's programs and activities.

HHPC

The idea for a Hempstead Harbor Protection Committee was conceived in the mid-1990s by the then-NYS assemblyman, now NYS comptroller, Tom DiNapoli, and former Sea Cliff mayor Ted Blackburn. In 1995 funds were sought and received from the NYS Department of State to fund a part-time director and to hire coastal experts to prepare an in-depth Water Quality Improvement Plan. Each of the nine municipalities signed an intermunicipal agreement to work cooperatively and to contribute financially on a pro-rata basis. Long Island's first watershed-based intermunicipal coalition was thus born.

HHPC's municipal members include County of Nassau, the Towns of Oyster Bay and North Hempstead, the City of Glen Cove and the Villages of Sea Cliff, Roslyn Harbor, Roslyn, Flower Hill, and Sands Point. The committee accomplishes its mission to protect and improve the harbor's water quality through planning studies, capital improvement projects, educational outreach, water-quality monitoring, information and technology sharing, development of model ordinances, coordination of enforcement, and working with other governmental agencies as well as environmental, educational, community, and business groups. This approach saves each municipality expenses and effort by cooperation, provides for a more coordinated approach to solving harbor problems, and provides year-round focus on harbor issues.

The HHPC recently prepared the **Scudder's Pond Subwatershed Plan** (2006) and has secured nearly a million dollars toward the implementation of its recommendations. This subwatershed (located in Sea Cliff) has been identified as one of the most significant contributors of bacteria-laden storm-water runoff to the harbor. The HHPC will shortly begin a similar study in the **Powerhouse Drain subwatershed** in Glenwood Landing.

In 2007, HHPC applied for federal **No Discharge Zone (NDZ) designation** for Hempstead Harbor; the U.S. EPA's approval is expected by spring 2008. Once designated, the harbor will be afforded the necessary legal basis to restrict boaters from discharging their wastes into the harbor, and avenues for enforcement will be strengthened. The HHPC has also established a Web site (www.HempsteadHarbor.org) as a resource on the harbor. Recent educational efforts have included the production of professional **coastal interpretive signage** and the installation of **pet-waste stations** around the harbor.

The HHPC has also been instrumental in expanding the state's designation of the harbor as a Significant Coastal Fish and Wildlife Habitat Area to encompass the entire harbor; having harbor trails and land acquisition added to the state's Open Space Plan, and having the harbor designated by the Long Island Sound Study as an inaugural "Long Island Sound Stewardship Site." The Hempstead Harbor Protection Committee has been an unqualified success and has spawned the creation of at least one other intermunicipal effort, the Manhasset Bay Protection Committee.

Since 1995, the HHPC has received a total of 23 grants, which have covered most of the committee's costs. The balance of the HHPC's budget (including monetary matches for the grants) is made up of annual contributions (dues) received from the nine member municipalities. These annual contributions (for calendar year 2007) total $113,000.

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ACKNOWLEDGMENTS

Environmental restoration and conservation require dedication, passion, patience, broad-based community support, and collaboration, as well as large infusions of technical expertise and funding. We therefore gratefully acknowledge the financial support and participation of all who have partnered with us to protect our local environment.

We also acknowledge the special efforts of individuals who have helped us maintain our water-monitoring program, including CSHH volunteers and members of local fishing clubs, local beach and marina managers, boaters and sailors, and other members of the community who report on harbor conditions, especially Mark Ring and Peter Emmerich; CSHH fish-survey leader, Dr. John Waldman; Town of Oyster Bay's Department of Environmental Resources staff assistance and for use of its Environmental control boat and Department of Parks staff at Tappen Beach Marina; Nassau County Department of Health Bureau of Environmental Sanitation director, John Jacobs; Interstate Environmental Commission engineer, Peter Sattler; and Nassau County Police Department's Underwater Search and Rescue Team.

Our efforts would not be possible without the assistance of the following organizations and agencies that work with the CSHH and HHPC as technical advisers and partners:

- The New York State Department of State
- The New York State Department of Environmental Conservation
- The New York State Legislative Commission on Water Resource Needs of Long Island
- New York Sea Grant / NEMO
- The Glenwood / Glen Head Civic Association
- The North Shore Country Club
- The U.S. Environmental Protection Agency, Long Island Sound Study Office

Jetty off of Tappen Beach Pool after nor'easter high tide (photo by Carol DiPaolo)

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THE ENCLOSED CD ROM INCLUDES ACCOMPANYING TABLES AND GRAPHS FOR THIS REPORT.

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APPENDIX CONTENTS

STATE OF THE HARBOR 2007

1. HARBOR OVERVIEW

Hempstead Harbor is a deep, V-shaped harbor that lies along the north shore of Long Island, bordering the western portion of Long Island Sound, between Manhasset Bay to the west and Oyster Bay to the east. The harbor is about 5 miles long from mouth to head, and its shoreline extends 14 miles from Sands Point on the west at its mouth to Mattinecock Point on the east. For the most part, the harbor presents a beautiful water body that is quiet and uncrowded, though it has widely mixed uses.

Industrial or commercial enterprises were historically concentrated in four areas along the harbor's shoreline. They remain currently, to a much lesser degree, in three areas of the harbor. The former industrial sites degraded the harbor's shorelines, wetlands, and water quality with the effects of oil spills, sewage spills, toxic contamination, storm-water runoff, air pollution, and industrial discharges. The worst of these effects were noted in the mid-1980s.

Efforts to restore the harbor resulted in the closure of a landfill, two incinerators, and a sewage treatment plant. The remediation of some hazardous waste sites has been completed, and remediation of others is still underway. One sewage treatment plant (in Glen Cove) remains and in 2003 was upgraded, using a biological process to remove nitrogen from its discharge; in late 2006, an ultraviolet disinfection system was installed. These are important steps in improving the harbor's water quality. Revitalization plans are being implemented for sections of the waterfront that suffered the most abuse, such as along Glen Cove Creek and the shore in Glenwood Landing.

Morgan Park, Glen Cove (photo by Carol DiPaolo)

Despite the harbor's impaired condition during the 1980s, in 1987 New York State designated Hempstead Harbor a **Significant Coastal Fish and Wildlife Area,** including the portion of the harbor extending from Mott Point and Prospect Point at the northern section of the harbor south to the Roslyn viaduct. Over the last 15 years, however, the harbor's ecosystem has vastly improved, containing a diversity of marine life and water birds. Wetland grasses have re-covered a large portion of the lower harbor south of the Bar Beach sand spit, once again providing a nursery and healthy habitat for marine species and bird populations. Reflecting

Hempstead Harbor's dramatic turnaround, its designation as a Significant Coastal Fish and Wildlife Area was updated and extended in October 2005 to include the portion of the harbor south of the Roslyn viaduct.

Today, Hempstead Harbor continues to support many diverse uses and activities. Fuel is transported to a Glenwood Landing oil terminal that is adjacent to a power plant that has operated since the early 1900s. Further north, tugboats tow barges to and from a sand and gravel transfer station on the western shore of the harbor and into Glen Cove Creek along the eastern shore. In contrast to these commercial uses, the recreational uses continue to flourish and expand as the harbor's water quality improves. Marinas, yacht clubs, and fishing clubs, which are concentrated in the northern portion of the harbor, are thriving. Town, city, village, and small private beaches are also located along the harbor's shore. As the harbor environment has continued to improve, there has been increased pressure to develop properties along the shoreline, which in time could exacerbate the problems that are currently being mitigated.

A challenge that must be met in planning for the future of Hempstead Harbor is to balance these diverse and often competing interests. The Harbor Management Plan for Hempstead Harbor (Hempstead Harbor Protection Committee, 2004) offers a comprehensive strategy for the municipalities that share Hempstead Harbor to "work cooperatively to address issues related to the wise use and protection of the harbor's surface waters, natural resources, underwater lands, and shorefront."

Specific environmental challenges and priorities that remain for Hempstead Harbor include storm-water-runoff abatement; prevention of inappropriate land use and development, particularly along the shore; continued improvements in water quality; and continued remediation of contamination from former industrial activities.

2. METHODS

It is difficult to draw direct relationships among all the variables that affect water quality, and this is the challenge presented every year in attempting to analyze the past season's water-quality data. The graphs presented in the electronic portion of this report compare parameters (such as rainfall and bacteria levels) that show expected correlations but also noticeable variability. The data collected over the years are a critical resource as we look for trends that point to the health of the harbor.

The story of Hempstead Harbor and Long Island Sound is a complicated one. There are many variables. Some things we can control—such as nitrogen discharges and other pollution from both point and nonpoint sources; other things we can't control—such as rainfall and temperature. However, all of these factors have critical relationships that have an impact on ecological health and survival and human use of the waters, including swimming, fishing, and other recreational pursuits.

The data collected through the water-monitoring program help us learn about the interrelationships that occur in Hempstead Harbor. This information enables us to work with others on a harborwide and soundwide basis to discover causal effects of human activities, so that we can plan and implement best management practices that will assure a healthy environment for the future.

2.1. Quality Assurance Project Plan

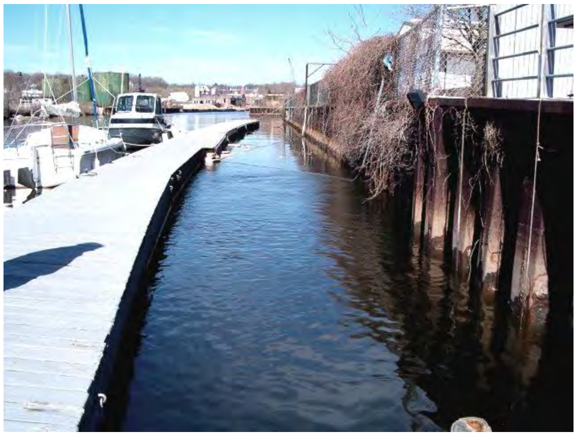
In 2006, a Quality Assurance Project Plan (QAPP) was prepared by the consulting engineering firm of Fuss & O'Neill, Inc., for the Hempstead Harbor Water-Monitoring Program, on behalf of the Coalition to Save Hempstead Harbor and the Hempstead Harbor Protection Committee. The QAPP documents the quality assurance and quality control (QA/QC) procedures implemented in the CSHH program.

Although the QAPP incorporated several new items into the water-monitoring program, the majority of the procedures in the QAPP have been implemented by the program for years. The approval of the QAPP by the U.S. Environmental Protection Agency, Region 2, broadens the use of the program's data by additional outside organizations, enables the program to receive federal funding for future monitoring efforts, reiterates the ongoing commitment of CSHH to provide high-quality monitoring data for Hempstead Harbor, and demonstrates the reliability of the data presented in this and previous, water-quality reports.

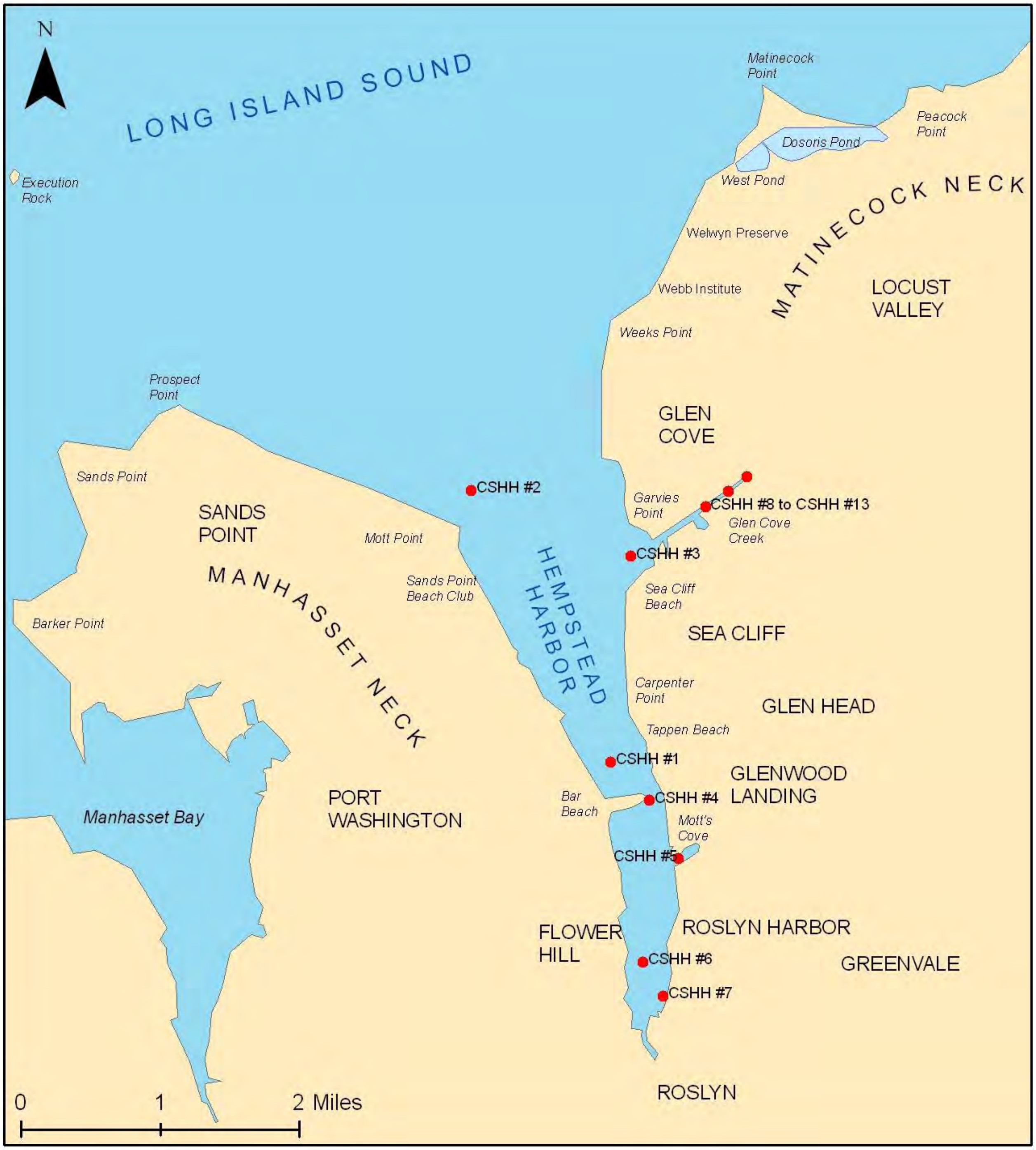
2.2. Location of Testing Stations

The water-monitoring program includes 13 stations in Hempstead Harbor. The principal stations that are sampled weekly during the monitoring season for all program parameters are located in the northern portion of the harbor, between the Bar Beach sand spit and Long Island Sound, as well as stations in Glen Cove Creek. **Table 1** includes the latitude/longitude points for most of the monitoring stations.

At the end of the 2004 monitoring season, CSHH #9, #10, #11, and #12 were added in the vicinity of the Glen Cove sewage treatment plant outfall (CSHH #8) specifically to provide additional samples for bacteria analysis by the NCDH. These stations were added to track the frequency and source of unusual dry- and wet-weather flows that were noticed at discharge points west of the STP outfall and that, on testing, indicated high levels of bacteria; the four stations became a permanent part of the program in 2005. CSHH #13 was also established to monitor bacteria levels and became a permanent part of the program in 2007. CSHH #13 is a somewhat moveable site located at the head of the creek, as close to the Mill Pond weir as possible, depending on the tide. Samples collected at CSHH #13 can help indicate whether the restoration of the pond is curtailing bacteria inputs to Glen Cove Creek.



Dock below Steamboat Landing and Glen Cove STP (of CSHH #8-#11) (photo by Carol DiPaolo)



Map of Hempstead Harbor Showing Locations of CSHH Stations 1-13.

The locations of upper-harbor CSHH monitoring stations are as follows:

- CSHH #1, at Beacon 11 (between Tappen Beach Marina on the east shore and Bar Beach on the west shore);
- CSHH #2, at Bell Buoy 6 (a stationary marker at the harbor mouth, east of Mott Point)
- CSHH #3, at the red channel marker near the mouth of Glen Cove Creek, between the Hempstead Harbor Club (which is adjacent to Garvies Point) and Sea Cliff Beach
- CSHH #8, at the Glen Cove Sewage Treatment Plant (STP) outfall pipe;
- CSHH #9, about 10 feet west of CSHH #8;
- CSHH #10, about 20 feet west of CSHH #8, at the end of the seawall;
- CSHH#11, about 50 feet east of CSHH #8, at the end of the floating dock;
- CSHH #12, about 100 feet east of CSHH #8, in the middle of the creek, north of the bend in the south seawall; and
- CSHH #13, 0-50 feet from the Mill Pond weir, depending on the tide.

The four lower-harbor stations are often inaccessible during low tides and are monitored less frequently (monthly for full survey and as close to weekly, depending on the tide, for collection of samples for bacteria analysis). The locations of the lower-harbor stations are as follows:

- CSHH #4, at the Bar Beach sand spit;
- CSHH #5, at Mott's Cove;
- CSHH #6, at a point east of the site of the former Town of North Hempstead incinerator, now the waste-transfer station;
- CSHH #7, the station farthest south in the harbor, on the east shore just before the walkway for the Sterling Glen and Horizon (totaling 208 senior rental units) and just north of the Roslyn viaduct. (The former marker for this station was a portion of an old oil dock, which was removed during the construction of the new development, formerly referred to as the Forest City Daly and the Bryant Landing project.)

Table 1. Latitude/Longitude Points for Monitoring Stations

Station ID	Latitude N		Longitude W	
	Degrees	Minutes	Degrees	Minutes
Upper-Harbor Stations				
CSHH #1, Beacon 11	40	49.540	73	39.120
CSHH #2, Bell 6	40	51.647	73	40.428
CSHH # 3, Red Channel Marker	40	51.213	73	39.123
CSHH #8, Adjacent to STP Outfall Pipe	40	51.514	73	38.515
CSHH #9, 10 ft West of #8				
CSHH #10, 20 ft West of #8				
CSHH #11, 50 ft East of #8				
CSHH #12, 100 ft East of #8	40	51.561	73	38.430
CSHH #13, Mill Pond Weir	40	51.706	73	38.139
Lower-Harbor Stations				
CSHH #4, East of Bar Beach sand spit	40	49.688	73	39.001
CSHH #5, Mott's Cove	40	49.317	73	38.770
CSHH #6, East of Pt. W. transfer station	40	48.688	73	39.080

2.3. Frequency of Testing and Testing Parameters

Testing is conducted weekly, from May to November, at each station, generally on the same day of the week and at the same time (beginning at approximately 8 AM and typically continuing for 4 hours). CSHH collects samples and conducts water-quality tests with the assistance of Town of Oyster Bay staff for onboard testing and boat transportation to sampling sites.

Water samples are collected weekly (weather and tidal cycles permitting) from all 13 testing stations for bacterial analysis by the Nassau County Department of Health. In addition, tests for dissolved oxygen (DO), salinity, water temperature, pH, nitrite, nitrate, and ammonia are conducted weekly at CSHH #1, #2, #3, and #8 and monthly at CSHH #4, #5, #6, and #7. Chlorine testing is conducted weekly at CSHH #8, near the outfall of the Glen Cove sewage treatment plant. A summary of the samples collected and analyses performed is presented in **Table 2**.

Physical observations are recorded regarding weather conditions, wind direction and velocity, water surface, air temperature, floatables, and wildlife and human activities. Whenever possible, floatable debris is retrieved and brought back to shore for disposal.

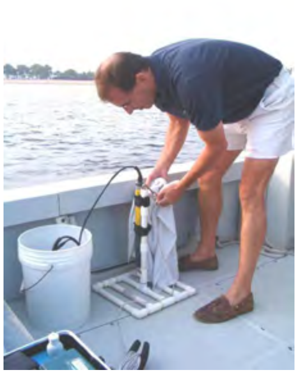
Dissolved oxygen, salinity, water temperature, and pH are recorded with an electronic meter (YSI Model 600 sonde with 650 MDS display unit) at 1-meter depth increments at every station. A DO reading for bottom water is also measured using the Winkler titration method at the first testing station as a quality-assurance check of the electronic meter. A quality assurance test is also performed for pH using a LaMotte test kit– a wide-range indicator that uses a color comparator.

LaMotte test kits are also used to measure ammonia and chlorine levels. Technicians at the Town of Oyster Bay Laboratory use an electronic kit (Hach) for measurement of nitrite and nitrate levels. Periodically, samples are also collected for plankton analysis by the Department of Health. The water samples for the test kits are collected within a half meter of the water surface.

Table 2. CSHH Monitoring-Program Parameters

Parameter	Location	Analyzer or Method	Location of Analysis
Dissolved Oxygen	Vertical profiles at 1-meter intervals locations 1-8	YSI 600	Field
Dissolved Oxygen	One location for electronic meter validation	LaMotte 7414	Field
Water Temperature	Vertical profiles at 1-meter intervals locations 1-8	YSI 600	Field
Water Temperature	One location for electronic meter validation	Calibrated Thermometer	Field
Air Temperature	One measurement at each location during monitoring	Calibrated Thermometer	Field
Salinity	Vertical profiles at 1-meter intervals locations 1-8	YSI 600	Field
pH	Vertical profile at 1-meter intervals locations 1-8	YSI 600	Field

Parameter	Location	Analyzer or Method	Location of Analysis
pH	One location for electronic meter validation	LaMotte 2218 reagent	Field
Ammonia	Grab sample at half-meter depth at all locations	LaMotte 4795 (Nessler Method)	Field
Ammonia	More refined method used when the test above detects ammonia	LaMotte 3304 (Salicylate Method)	Field
Nitrate	Grab sample at half-meter depth at all locations	Hach 8192	Oyster Bay Town Lab
Nitrite	Grab sample at half-meter depth at all locations	Hach 8507	Oyster Bay Town Lab
Chlorine	Surface grab sample at CSHH #8	LaMotte 3308	Field
Clarity	All locations	LaMotte Secchi Disk	Field
Fecal Coliform Bacteria	Grab sample half-meter depth at all locations	Membrane Filter	Nassau County Department of Health
Enterococci	Grab sample at half meter depth at all locations	Membrane Filter	Nassau County Department of Health
Precipitation	Village of Sea Cliff	Visually read rain gauge	Field



Mark Ring with YSI 600

Tony Alfieri lowering Secchi disk

Carol DiPaolo doing Winkler titration for DO

3. MONITORING RESULTS

This section summarizes results of the CSHH sampling program. Where possible, historical data are used for comparison, including data from 1995 through 2006. **Appendices A** and **B** include graphs constructed with the data collected during this period.

3.1. Dissolved Oxygen

Dissolved oxygen, the form of oxygen that marine life needs to survive, is an important indicator of the health of our Long Island Sound estuary. Hypoxia (low oxygen) and anoxia (no oxygen) are common water-quality problems that occur during the summer in Hempstead Harbor and in other areas in and around Long Island Sound, particularly in the western sound. DO is indirectly affected by nutrient enrichment, particularly nitrogen, which can enter Hempstead Harbor through storm-water runoff, discharges from sewage treatment plants, or leaching from failing septic systems. Nitrogen accelerates the growth of phytoplankton or algae and increases the density of organisms that grow. The increased number and growth rate causes frequent or prolonged "blooms." When the cells in the plankton blooms die off, the decomposition process depletes dissolved oxygen that fish, shellfish, and other aquatic organisms need to survive. The larvae of these organisms are often especially sensitive to low DO concentrations. In addition to these direct effects of low DO levels, indirect effects can also occur. Low DO levels can cause some bacteria to produce hydrogen sulfide, which is a gas that can be toxic to fish.

Although many algal species produce oxygen during their growth stage through photosynthesis, algal mortality and subsequent decay generally influence DO levels more strongly, especially later in the summer when more organic matter is decaying and rates of photosynthesis are declining. Therefore, productive aquatic ecosystems with larger nutrient loads are more prone to low DO levels. The impact of temperature and salinity on DO levels in these ecosystems is generally of secondary importance. Generally, as temperature and salinity increase, the dissolved oxygen concentration decreases. Since the majority of organic-matter decay occurs at the estuary bottom, DO levels tend to be higher at the surface and lower at the bottom of the water column. Density-dependent stratification, such as elevated salinity levels at the harbor bottom, inhibits mixing and exaggerates this affect.

Generally, DO levels above 5.0 ppm are considered healthy; DO levels below 5.0 ppm begin to cause various adverse impacts (related to growth, reproduction, and survival of organisms). **Figure 1** presents some of the effects of decreasing dissolved oxygen levels on common aquatic organisms. The severity of impacts, and threshold DO levels where impacts occur, are strongly species dependent. A new dissolved oxygen standard was implemented by the New York State Department of Environmental Conservation on February 16, 2008. For estuarine waters such as Hempstead Harbor, the chronic, or long-term DO standard is 4.8 ppm. The standard allows levels to fall below 4.8 ppm for short periods of time; the lower the level, the shorter the time interval allowable. The acute DO standard is 3.0 ppm, meaning that the estuary is considered impaired if DO measurements ever fall below this level.

However, states often interpret effects of environmental conditions on marine life differently; for example, Connecticut has established a standard of 5.0 ppm, and defined maximum periods for which exposure to low DO is allowed. These standards are similar to the New York standards, although not completely consistent. Critical levels of DO, below 3.0 ppm, can be lethal for certain marine species.

Percent saturation of dissolved oxygen is also monitored in Hempstead Harbor. Percent saturation is a measure of the amount of oxygen currently dissolved in water compared with the amount that can be dissolved in the water, and is influenced by variability in water temperature and salinity. In a marine system with abundant nutrients and organisms, such as Hempstead Harbor, dissolved oxygen levels near the surface can be oversaturated during the day (greater than 100%) due to photosynthesis by algae, and undersaturated at night (50% or lower) due to decay of dead organic matter (respiration).

This report evaluates DO measurements collected at the bottom of Hempstead Harbor, which are considered critical because bottom-dwelling marine life have more difficulty than other marine species in trying to escape low DO conditions. Hypoxic conditions (low DO, interpreted to be less than 3.0 ppm in this report) and anoxic conditions (no DO, less than 1.0 ppm in this report) have been implicated in fish kills in Hempstead Harbor, particularly of Atlantic menhaden (commonly known as bunker) but also of juvenile flounder and other species.

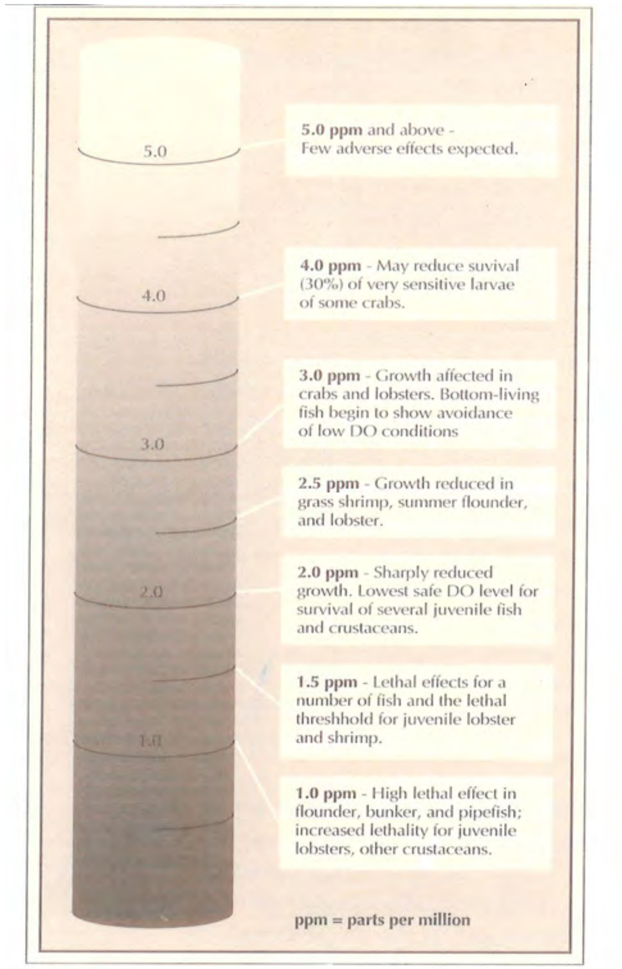


Figure 1. Effect of depleted DO on marine life
(Source: Hempstead Harbor, Its History, Ecology, and Environmental Challenges, 1998)

Fortunately, there were no fish kills during 2001 through 2004 despite extended periods of hypoxia. A clam kill occurred in 2005 south of Bar Beach, near CSHH #5, but this kill reportedly resulted from lunar/tidal effects and not hypoxia. A small, localized fish kill occurred in 2006 from an unusual condition off of Morgan Beach. (In August 2006, a small area near the mouth of Glen Cove Creek turned bright blue and had a distinctive odor. Several dozen small fish were seen dead or dying in the area as a result of low DO and hydrogen sulfide produced by sulfur bacteria present in the decomposition of algal cells.) (See **Section 4.7** of this report.) No fish kills were observed or reported in 2007.

Figure 2 presents average annual dissolved oxygen levels at CSHH #1, CSHH #2, and CSHH #3 for the period of record. The data are also summarized in **Table 3**, along with results for CSHH #8.

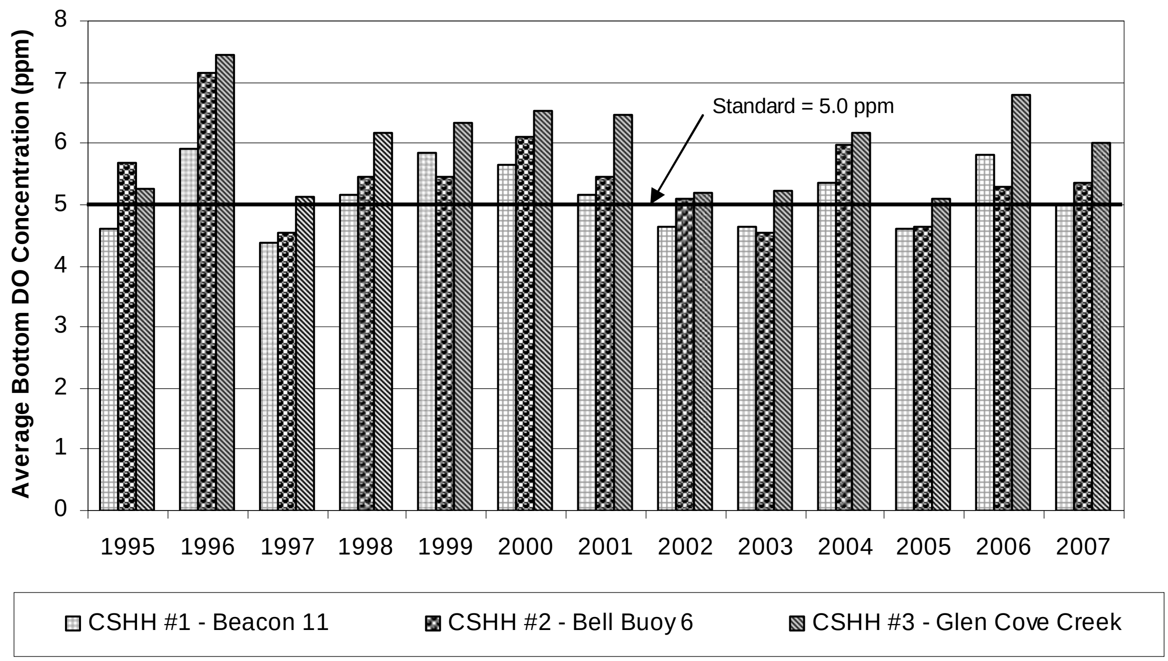


Figure 2. Measured average DO in Hempstead Harbor for 3 monitoring stations

Table 3. Average Monitoring Season Dissolved Oxygen Levels in Hempstead Harbor

Average Bottom DO (ppm)	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996	1995
CSHH #1	4.99	5.76	4.59	5.36	4.63	4.64	5.16	5.64	5.85	5.17	4.39	5.90	4.60
CSHH #2	5.37	5.27	4.63	5.96	4.55	5.11	5.46	6.10	5.44	5.45	4.54	7.11	5.67
CSHH #3	6.02	6.80	5.09	6.17	5.21	5.20	6.47	6.54	6.32	6.48	5.15	7.45	5.26
CSHH #8	5.93	7.05	5.76	6.58	5.28	6.11	6.82	7.35	7.14	N/A	N/A	N/A	N/A

Average DO levels at CSHH #1, CSHH #3, and CSHH #8 for the 2007 monitoring season were generally within the range of values for many previous years. Average levels at CSHH #1 (4.99 ppm) are consistent with the average values of DO levels for the previous five years. Average levels at CSHH #2 (5.37 ppm) were slightly above the average for the previous five years but the fifth lowest on record for that location. Levels at CSHH #3 (6.02 ppm) were above the average for the previous five years but in the bottom half of the range of average values for that location. Levels at CSHH #8 (5.93 ppm) were the third lowest on record for that location.

These generally low to average DO values follow a year with higher than average DO levels and resemble several previous years in which average DO levels were generally lower than typical. The 2001 through 2003 Water-Quality Report stated that bottom DO averages for 2002-2003 were lower than in preceding years. Higher average DO levels were observed during 2004, ranging from 5.4 to 6.6 ppm between the sampling locations, while 2005 levels were similar to those recorded in 2003 and 2002 (average levels at the sampling locations ranged from 4.6 to 5.8 during that monitoring season). DO concentrations appear to be consistently lower at CSHH #1 in most years, although not in 2006. Levels increase through CSHH #2 and #3, and are consistently highest at CSHH #8. This pattern of higher DO in the outfall is likely an effect of the aeration from the STP

The number of hypoxic measurements in 2007 was low. Hypoxic conditions were recorded on only two days in July: on July 11 at CSHH #1 (2.83 ppm) and July 20 at CSHH #2 (2.54 ppm), and only one day in August: on August 22 at CSHH #1 (1.4ppm), CSHH #3 (1.36 ppm), and CSHH #8 (1.32 ppm). No anoxic events were measured during May 30 through October 31, 2007 sampling.

Despite the relatively few hypoxic measurements that were recorded, the percentage of DO measurements in the high DO range decreased significantly in 2007 compared with levels in 2006 and several previous years. The percentage of DO measurements in the mid- to low-level ranges in 2007 compared with the percentage in previous years increased significantly at CSHH #1, CSHH #2, and CSHH #3. The percentage of DO measurements in the hypoxic range decreased significantly in 2007 compared to the previous three years at CSHH#2 and CSHH #3.

These results differ from previous seasons, where hypoxic DO levels were typically measured for one to two months, starting in late July, and anoxic levels were measured at each of the locations presented above, except CSHH #8, which may benefit from DO levels in the discharge from the sewage treatment plant.

The cause of low DO is difficult to discern. Anthropogenic factors that may be reducing DO levels at the bottom of Hempstead Harbor and Long Island Sound include nutrient enrichment from wastewater-treatment-plant discharges; overuse of fertilizers in agriculture, home gardening, and golf-course maintenance; and residual oxygen demand in bottom sediments from past industrial activities.

Likewise, the cause of apparently improved DO levels in 2007 could be the result of natural and human factors, such as mixing of the water column by wind, reduced nitrogen discharges from the sewage treatment plant, improved storm-water quality resulting from watershed initiatives, and others that are not known. Changes in air and water temperature and the physical nature and chemistry of the water can also influence DO levels, although typical effects are relatively minor. (See **Sections 3.2** and **3.3.**) It is also possible that differences in wind patterns could affect vertical mixing within the water column, resulting in a well-mixed water column during some years, and a more stratified water column in others.

Table 4. DO Readings 1996-2007 Number and Percentage of Testing Dates at Which DO Tested at Specific Levels

	>6 ppm		**5 to 6 ppm**		**3 to 5 ppm**		**<3 ppm**	
			CSHH #1–Beacon 11					
1996	11	58%	—	—%	3	16%	5	26%
1997	4	27	3	20	4	27	4	27
1998	8	40	4	20	6	30	2	10
1999	11	50	3	14	5	23	3	14
2000	8	44	2	11	8	44	0	0
2001	7	37	3	16	6	31	3	16

	>6 ppm		5 to 6 ppm		3 to 5 ppm		<3 ppm	
2002	5	26	5	26	3	16	6	32
2003	5	25	5	25	5	25	5	25
2004	7	35	1	5	9	45	3	15
2005	8	35	2	9	4	17	9	39
2006	11	50	1	5	7	32	3	14
2007	5	24	3	14	11	52	2	10
			CSHH #2–Bell Buoy 6					
1996	10	63%	2	13%	3	19%	1	6%
1997	2	13	2	13	5	33	6	40
1998	9	50	2	15	5	28	2	11
1999	8	42	1	5	6	32	4	21
2000	11	61	3	17	3	17	1	6
2001	8	42	5	26	2	10	4	21
2002	9	50	0	0	4	22	5	28
2003	6	32	4	21	4	21	5	26
2004	8	44	3	17	4	22	3	17
2005	5	22	2	9	8	35	8	35
2006	8	36	2	9	4	18	8	36
2007	3	15	7	35	9	45	1	5
			CSHH #3–Glen Cove Creek					
1996	12	63%	2	11%	4	21%	1	5%
1997	6	38	2	13	4	25	4	25
1998	12	63	2	11	3	16	2	11
1999	13	59	3	14	3	14	3	14
2000	13	68	2	11	4	21	0	0
2001	11	58	2	10	4	21	2	10
2002	10	53	0	0	4	21	5	26
2003	8	42	3	16	5	26	3	16
2004	8	40	3	15	8	40	1	5
2005	7	30	3	13	7	30	6	26
2006	14	64	3	14	3	14	2	9
2007	7	33	6	29	7	33	1	5
			CSHH #8–Glen Cove STP Outfall					
2001	12	63%	5	26%	1	5%	1	5%
2002	7	37	8	42	3	16	1	5
2003	7	35	6	30	5	25	2	10
2004	11	65	2	10	5	25	2	10
2005	10	43	1	4	7	30	5	22
2006	16	73	2	9	4	18	0	0
2007	8	40	6	30	5	25	1	5

3.2. Temperature

Water temperature is monitored to record seasonal and annual changes of temperature within the harbor, and to determine whether temperature could be affecting marine life, especially organisms that are in the southernmost limit of their habitat in the harbor. Although a warming trend has been observed in Long Island Sound (about 1-1.1ºC warmer over the last 15 years at bottom and surface, respectively), when temperatures are averaged throughout the sound, a difference is also observed between the western and eastern portion of the sound: the western portion, influenced most by fresh water inputs, is cooler than the eastern portion, influenced most by ocean water. The effects of climate change are not discernible in Hempstead Harbor probably because the shallower water and tidal flushing are affected most by the cooler water of western Long Island Sound.

Water temperature is also used to determine the percent saturation of DO within the harbor, as described earlier in this report. Percent saturation is a measure of the amount of oxygen currently dissolved in water compared with the amount that can be dissolved in the water. Percent saturation is strongly influenced by temperature. For example, at 32ºF (0 ºC), the saturation concentration of DO in water (meaning that the water is 100% saturated) is 14.6 ppm, whereas at 86ºF (30 ºC), the DO saturation concentration is 7.6 ppm.

Additionally, temperature monitoring determines whether the water column is stratified or well mixed. Stratification is the process through which water at the surface of the harbor can warm while water at the bottom stays cold. Since the colder water is denser, it stays at the bottom and cannot mix easily with the warmer water. This colder water becomes isolated from the surface where the majority of oxygen transfer occurs, which prevents replacement of DO lost through consumption by organisms. Hempstead Harbor does not generally exhibit pronounced stratification; since the harbor is relatively shallow and strongly influenced by tides, vertical mixing continues through much of the season.

Figure 3 presents average annual water temperature for each monitoring location for the period of record. Many factors affect water temperature, but water temperature is more representative of conditions that occurred over several days and is not heavily influenced by daily variation in air temperature.

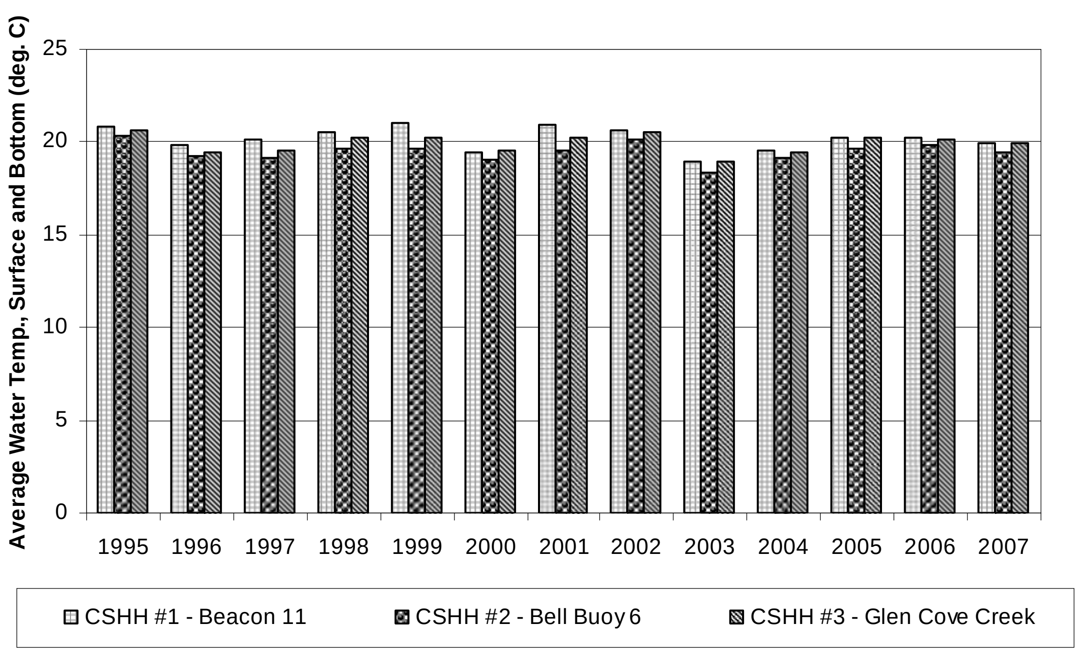


Figure 3. Average water temperature recorded during seasonal monitoring events

Measured water temperatures at CSHH #2 were slightly lower than at the other monitoring locations during each year, although the temperature difference is generally less than 1 ºC. CSHH #2 is located at the mouth of the harbor and is more significantly influenced by the Long Island Sound's deeper, and thus cooler, water. In 2004, water temperature was slightly cooler than typical, as the second-coolest year on record (although approximately 0.5 ºC warmer than in 2003). Water temperatures recorded during the 2006 and 2007 monitoring seasons were approximately equal to the average of the previous ten years, at approximately 20 ºC. See **Appendix A** for additional air and water temperature monitoring data.

Air temperature affects aquatic temperature, which affects both dissolved oxygen concentrations and biological activity within an aquatic system. However, since CSHH records temperature data only during monitoring events, temperature more strongly indicates the time of day that CSHH monitored a certain location. As a whole, however, monitoring events began at similar times each season and have similar durations. As such, changes in temperature averaged between sites during a season could be indicative of annual variability in weather conditions.

Figure 4 presents average monitoring-season air temperature recorded at CSHH #1 through CSHH #3 for each year since 1995. Average air temperatures recorded during the monitoring events vary by approximately 4 degrees during the period of record. On average, 2004 was the coolest monitoring season on record, with an average temperature of 19.5 ºC recorded at the three stations, whereas average air temperatures for 1995 through 2003 and 2005 were 2 ºC warmer. Average air temperatures recorded from 2005 through 2007 were more consistent with average air temperature recorded from 1995-2003.

Somewhat similar characteristics are apparent in the air temperature data as compared to the water temperature data collected by CSHH during the monitoring season.

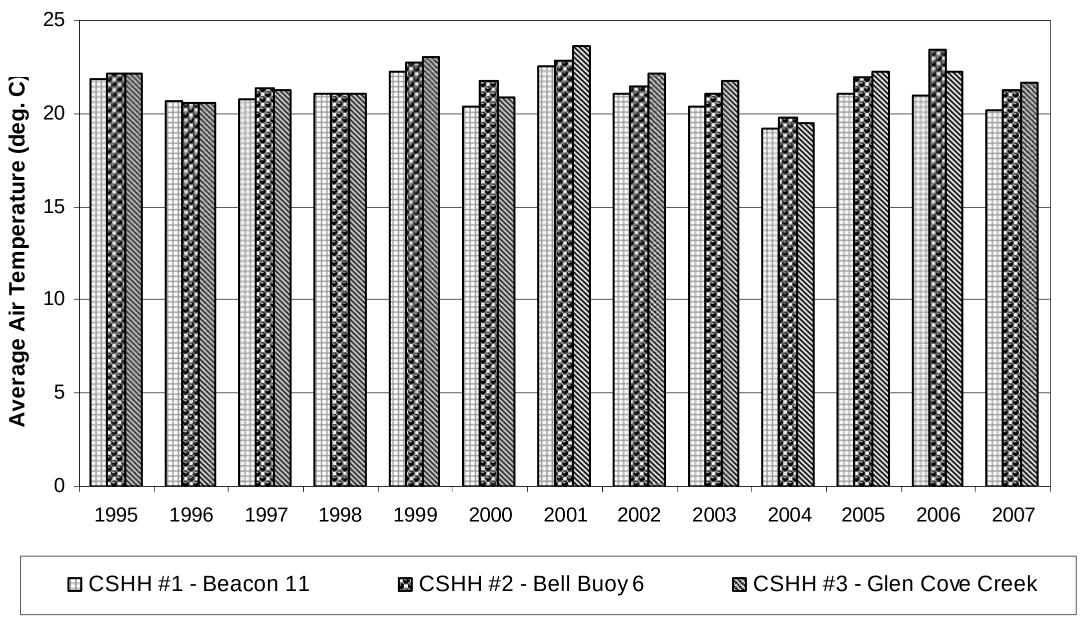


Figure 4. Average air temperature recorded during seasonal monitoring events

3.3. Salinity

Monitoring salinity assists in determining whether the harbor is being influenced by tidal water or, instead, by freshwater from the watershed (i.e., from rivers or streams, storm water, wastewater, or other discharges). Like temperature, salinity is an indicator of the water's oxygen-holding capacity and whether the water column is stratified.

Salinity can also affect dissolved oxygen levels; the saturation level of dissolved oxygen at 25 ppt salinity is equal to approximately 85% of the saturation level of dissolved oxygen for freshwater. In Long Island Sound, salinity generally ranges between 21 ppt and 28 ppt (as compared with 32 ppt, which is typical in the open ocean). Salinity levels within an estuary are generally affected by proximity to freshwater inflows, such as rivers or sewage treatment plant discharges, and through direct precipitation and runoff.

Figure 5 presents average annual salinity levels at CSHH #1, #2, and #3 for the period of record. Salinity levels in Hempstead Harbor generally vary less than in the sound. During the testing season, salinity readings in Hempstead Harbor usually range from 23 ppt to 28 ppt, with lower readings generally observed in the spring, and gradually increasing through the fall.

Additionally, salinity levels measured at the bottom of the harbor are generally higher than those near the surface, because high-salinity water is denser and tends to sink. Surface salinity levels are often approximately 1 ppt lower than those at the bottom, suggesting that slight stratification is occurring in the harbor.

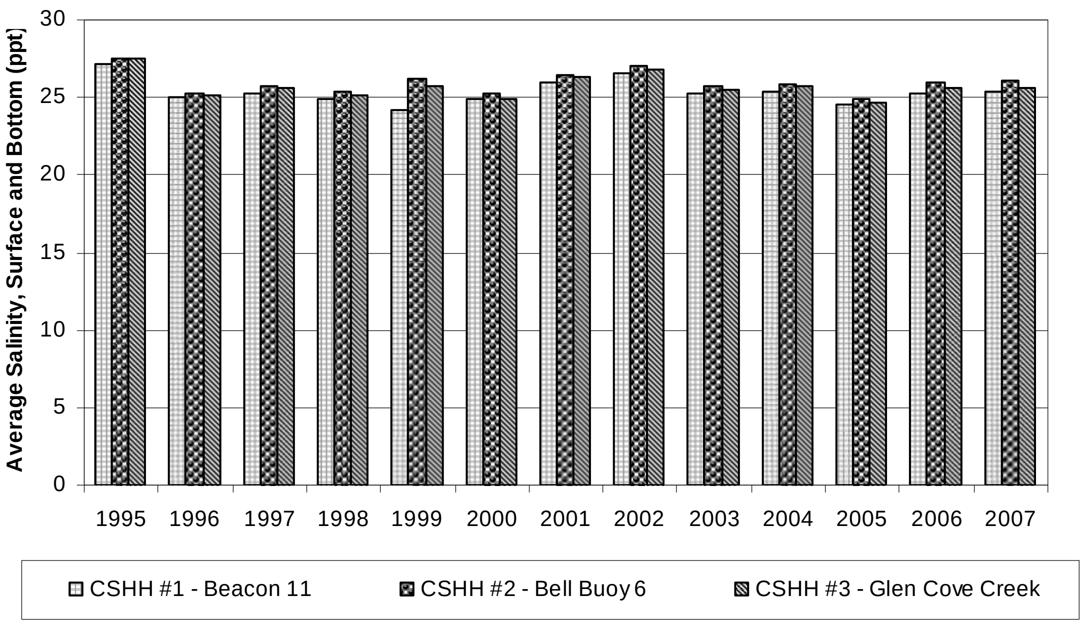


Figure 5. Measured average salinity in Hempstead Harbor during the monitoring season

In most years (1996 through 2000, and 2003 through 2007), average salinity levels within the harbor during the monitoring season were approximately 25 ppt (± 1 ppt), and the remaining years were characterized by slightly elevated levels, such as 1995 when average salinity during the monitoring season was above 27 ppt at each station. Average salinity levels in 2007 (25.7 ppt) were approximately equal to average levels from 1995 through 2004. Levels in 2005 were the lowest measured during the period of record. See **Appendix A** for additional salinity data results.

In 2007, salinity levels were relatively constant and generally increased slightly as the seasons progressed from spring to fall. Salinity levels in June ranged approximately from 23.5 ppm to 24.5 ppm while salinity levels in October ranged from approximately 26 ppm to 27 ppm.

3.4. pH

pH is monitored to follow trends in aquatic life and water chemistry. Carbon dioxide (CO_2) release by bacteria respiration and uptake via plant photosynthesis affect aquatic pH over short periods (hours to days), whereas the increase in atmospheric CO_2 may affect aquatic pH over decades. Measured average pH was relatively consistent over the previous three monitoring seasons.

3.5. Nitrogen

3.5.1. The Nitrogen Cycle

Ammonia, nitrate, and nitrite are three nitrogen-based compounds that are commonly present in marine waters. CSHH collects data for each of these compounds. Others include organic nitrogen and nitrogen gas. **Figure 6** presents a diagram of the nitrogen cycle in the water environment.

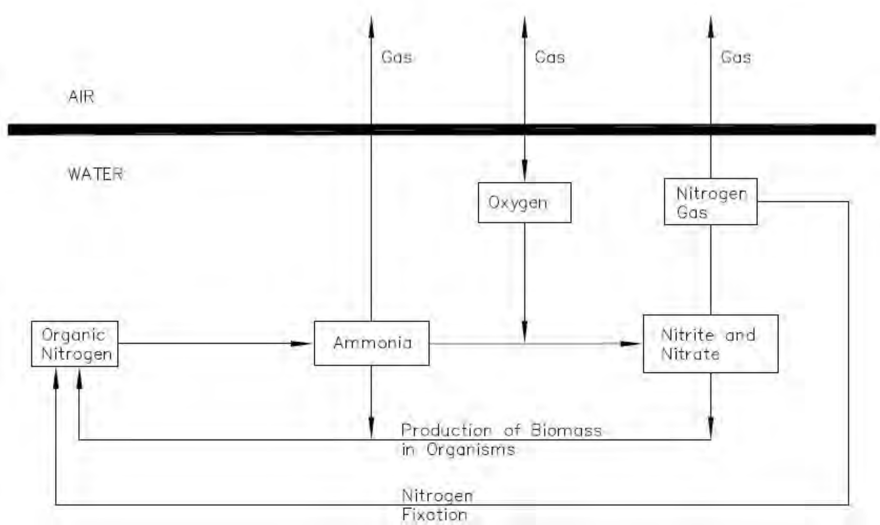


Figure 6. Nitrogen in marine environments
(Source: Surface Water Quality Modeling, Steven Chapra, McGraw-Hill, 1997)

Nitrogen is generally made available to a marine ecosystem from the atmosphere (called fixation) and from the watershed. Nitrogen fixation is usually a smaller source of nitrogen than the watershed sources (i.e., overfertilization of gardens, lawns, and farmlands; failing septic systems; storm-water runoff; and old or failing wastewater treatment plants). Inputs of nitrogen from the watershed are in the form of ammonia, nitrite, or nitrate. Ammonia and nitrate generally originate from fertilizer, and human or animal wastes from old or failing septic systems and wastewater treatment plants and storm-water runoff. Nitrate is also a product of properly functioning treatment plants, which convert ammonia to nitrate.

Ammonia and nitrate are important for organisms, which require nitrogen for growth and reproduction. Nitrogen forms amino acids, proteins, urea, and other compounds that are needed for life. These forms of nitrogen are referred to as organic nitrogen.

Many forms of organic nitrogen are quickly converted to ammonia in water. One form of ammonia can form a gas and be released into the atmosphere. Some forms are toxic to marine life in high concentrations.

Ammonia can also be converted to nitrite in the presence of oxygen as part of the nitrification process, but as more oxygen is added, nitrite (which is highly unstable) quickly transforms to nitrate. When anoxic conditions form, certain bacteria convert nitrate into nitrogen gas, which is released to the atmosphere

Sewage treatment plants can be upgraded to provide biological nutrient (nitrogen) removal. The Glen Cove treatment plant was upgraded to do so. Older wastewater treatment plants blow oxygen into the wastewater to promote the growth of microorganisms, which decay carbon-based waste rapidly and produce carbon dioxide. Ammonia is converted into nitrate as a byproduct. Plants with nitrogen removal upgrades have an anoxic zone in the wastewater treatment tanks, and circulate wastewater that has been treated with oxygen already. Highly specialized bacteria remove the oxygen from the nitrate, releasing nitrogen gas and removing the nitrogen from the wastewater stream.

3.5.2. Nitrogen Monitoring by CSHH

CSHH takes samples weekly at upper-harbor stations (CSHH #1, #2, #3, and #8) and approximately monthly at other upper- and lower-harbor stations to test for ammonia, nitrite, and nitrate. In 2004-2006, the samples that were sent to the town lab for analysis produced results that indicated interferences with the ammonia testing techniques from possibly the saltwater, turbidity, or water color. In 2007, nitrite and nitrate samples continued to be analyzed at the Town of Oyster Bay lab using an electronic Hach kit, but ammonia was measured on board at the different stations using LaMotte testing kits that employ either the nessler or salicylate methods.

The presence of ***ammonia (NH_3)*** in the harbor can indicate nutrient enrichment. Ammonia is usually only detected when wastewater treatment systems, including septic tanks, cesspools, and publicly owned treatment works (POTWs), are malfunctioning and discharging to the harbor. However, elevated ammonia levels can also be present in the harbor from storm-water discharges or may even indicate a large presence of fish. If ammonia is detectable at CSHH #1, a midpoint in the harbor, ammonia levels are then measured at the other locations using a salicylate method for fine-tuning the results. If ammonia is not detectable at CSHH #1, it is unlikely that ammonia will be detectable at other locations except CSHH #8 (due to the discharge from the Glen Cove STP).

Nitrate (NO_3) and ***nitrite (NO_2)*** occur in later stages of the nitrogen cycle and are normally present in the estuary. However, high concentrations indicate enrichment problems and can also be used to anticipate algal blooms and hypoxia.

Following years of studies and modeling around Long Island Sound, nitrogen discharge limitations were imposed on sewage treatment plants all around the sound to reduce nitrogen inputs, thereby reducing algal blooms and the frequency and duration of low oxygen levels throughout the sound. However, reducing storm-water inputs is more complicated because the sources of nitrogen and other pollutants are so diffuse.

3.6. Chlorine

CSHH's program includes monitoring of total and free chlorine adjacent to the STP outfall to monitor the amount of chlorine discharged into Glen Cove Creek. Through the 2006 sampling season, the Glen Cove STP was chlorinating its effluent to kill off potential pathogens. The STP then removed the chlorine before discharging the treated water to Glen Cove Creek. Because chlorine by-products can have an adverse impact on marine life, regulations require that residual chlorine contained in the water discharged from the STP to the creek be limited to 1-2 ppm, similar to the residual concentration of chlorine typically present in drinking water.

At the end of the 2006 monitoring season, a new disinfection system was installed at the plant that uses ultraviolet (UV) light for disinfecting the wastewater prior to discharge. UV disinfection leaves no chemical residual and will not affect the environment when it is discharged. However, the plant retains the chlorination system and runs it in conjunction with the UV system to prevent untreated sewage from entering the harbor in the event of a power failure. The amount of chlorine residual in the STP discharge has decreased to 0.5 ppm (the typical chlorine residual was 2 ppm before the UV system began operating). On March 1, 2008, Nassau County assumed responsibility for the operation of the Glen Cove STP, and by the end of year the installation of a back-up power source is planned, so that all use of chlorine can be eliminated.

3.7. Water Clarity

Water clarity is monitored through the use of a Secchi disk–a white plastic disk that is lowered into the water to determine the lowest depth at which ambient light can penetrate the water column. In most nutrient-rich waters, such as Hempstead Harbor and Long Island Sound, the depth at which the Secchi disk is visible is limited by the amount of plankton or algae in the water, and so Secchi readings are typically 1 to 2 meters for Hempstead Harbor during the summer months but can range from 0.25 m to 3 m during the monitoring season. For 2007, the range for the monitoring season was 0.5 m to 3 m. The large amount of plankton in the water also gives the harbor its usual green to brown color.

3.8. Bacteria

The Nassau County Department of Health and the New York State Department of Environmental Conservation (DEC) use ***bacteria levels*** to open or close swimming beaches and shellfish beds. **Coliform** and **enterococci** bacteria are typically found in human and warm-blooded animals and are indicators of fecal contamination and the potential for the existence of other organisms that may have an adverse impact on human health.

Total coliform bacteria is widely present in the environment, whereas **fecal coliform** is most commonly found in the intestines of warm-blooded animals and birds, and enterococci is most prevalent in the human digestive system. Through 2005, NCDH measured and recorded the most probable number (MPN) of bacterial cells present in a sample and then calculated the logarithmic average of the results, which reduces the influence of large spikes on the average values. The resulting values are used to determine the likelihood that fecal contamination is present. In 2006, NCDH began using a filtration method of measuring fecal coliform and enterococci. This methodology is believed to be more precise and has the advantage of producing results in 24 hours, a shorter time frame than was required with the previous methodology. The filtration method produces results measured in colony forming units (CFUs).

The membrane filter test is performed by pulling a sample of water through a sterile filter with a vacuum pump. The filter is then placed on an agar plate and incubated. Bacteria from the water that collected on the plate multiplies during incubation, forming colonies that can be seen and counted without a microscope.

3.8.1. Beach Monitoring for Bacteria Levels

Each beach season, samples for bacteria testing are collected twice a week by the Nassau County Department of Health at five beaches around the harbor. These bacteria samples are analyzed at the NCDH laboratory, currently for fecal coliform and enterococci, in conformance with beach closure standards that were implemented in 2004 (see Section 3.8.2).

During the 1980s, there were chronic raw sewage spills into Hempstead Harbor, which caused elevated levels of pathogen contamination, affecting shellfish beds and recreational use of the harbor. Between 1986 and 1990, beaches around Hempstead Harbor were closed an average of eight days each beach season due to high coliform counts. Beach closures dropped off significantly during the early years of CSHH's monitoring program, and, for beach seasons 1994-1999, there were no beach closures due to high bacteria levels.

However, in 2000 NCDH initiated a preemptive beach-closure program; that is, in addition to beach closings based on bacteria sample results, NCDH instituted **preemptive or administrative beach closings** following rain events that exceed a threshold level and duration of precipitation. That threshold is established at the beginning of each season based on previous sample results (often ½ inch of rain or more). Therefore, even though water quality has improved remarkably, beach closures started to increase because of the preemptive-closure program. In 2007, the beaches around Hempstead Harbor were closed preemptively for eight days (as was the case in 2006), related to six rain events. The beach closings occurred on 6/28, 6/29, 7/5, 7/18, 7/23, 7/24, 8/8, 8/21, based on a threshold of ½-inch of precipitation over a 24-hour period.

3.8.2. Beach Closure Standards

In October 2000, Congress enacted the Beaches Environmental Assessment and Coastal Act of 2000 (BEACH Act), which gave EPA the authority to set and impose water-quality standards for coastal beaches throughout the United States and compelled all states to adopt new criteria for determining beach closures by April 2004. The NCDH began doing parallel testing in 2002, using the state's then-current indicator—coliform (both total and fecal)—along with the proposed indicator—enterococcus. Both coliform and enterococcus are naturally present in the human intestine and, therefore, could indicate the presence of other potentially harmful organisms. (Both coliform and enterococci are present also in the intestines of warm-blooded animals and birds.) EPA considers the enterococcal standard to be more closely correlated with gastrointestinal illnesses and, therefore, more protective of human health. However, there have been only limited studies as to the effectiveness of using the enterococcal standard. A primary advantage in switching to the enterococcal standard is that it takes only 24 hours to obtain results, whereas it takes 48 hours to obtain results using the coliform standard.

New York State instituted revised beach closure standards on June 23, 2004, presented in NYCRR Title 10, Section 6-2.15. The standards for marine water now include:

(1) Based on a single sample, the upper value for the density of bacteria shall be:

- 1,000 fecal coliform bacteria per 100 ml; or
- 104 enterococci per 100 ml.

(2) Based on the mean of the logarithms of the results of the total number of samples collected in a 30-day period, the upper value for the density of bacteria shall be:

- 2,400 total coliform bacteria per 100 ml; or
- 200 fecal coliform bacteria per 100 ml; or
- 35 enterococci per 100 ml.

3.8.3. Monitoring Midharbor Points and Glen Cove Creek for Bacterial Levels

CSHH collects bacteria data weekly (weather and tide permitting) at the 13 CSHH monitoring stations in Hempstead Harbor. Five of these sites (CSHH #9-13) started as temporary sites but became part of the regular sampling program to test for the presence of bacteria from discharge pipes in Glen Cove Creek in the vicinity of the STP.

Overpass near Mill Pond weir (CSHH #13) (photo by Carol DiPaolo)

Unusual discharges from these pipes were noted in 2004-2006 and were brought to the attention of city officials in Glen Cove, the NCDH, and HHPC, NC Department of Public Works (DPW), and NYSDEC. In 2006, a boat tour of Glen Cove Creek took place with representatives from Glen Cove, the city's consultants, and CSHH to view the discharge pipes along the creek. Also in 2006, the city received a grant from the New York Department of State to map and source the outfalls along both the north and south sides of the creek. As several water samples from the area continued to show high levels of fecal coliform and enterococci, further investigation was needed. In 2007, HHPC requested a meeting and follow-up with Glen Cove officials, consultants, as well as representatives from CSHH, NYSDEC, NCDH, NCDPW, and NY Sea Grant (NEMO Program). As result, NCDPW and NCDH did further testing, but there were no definitive answers as to the source of the bacteria. Glen Cove is expected to release its report on the discharge pipes along the creek in April 2008. CSHH and HHPC will continue to work with all parties to resolve the discharge problems, and all of the stations in the creek will be monitored during the 2008 season.

3.8.4. Comparing Bacteria Data

Variability in bacteria concentrations from samples collected at an individual beach on a particular day are presented in the data contained in **Appendix B**. Although rainfall can increase bacteria in a water body, it is difficult to see clear and consistent influences from rainfall when rainfall dates are plotted against coliform counts, as presented in **Appendix B** as well. It is also important to note that changes in government regulations, testing protocols, and methodologies for sample analysis make it difficult to compare water-quality conditions relating to bacteria levels over time. For example, the method used for enterococci analysis by the NCDH laboratory changed from the 2004 to 2005 monitoring seasons, making comparisons between data from the two years difficult.

Several notable characteristics of the bacteria data are presented in **Table 5.** In general, fecal coliform and enterococci data vary consistently between months, and changes in fecal coliform levels generally correspond to proportional changes in enterococci levels. For example, the 2007 Sea Cliff Beach monitoring data show enterococci and fecal coliform levels increasing from 10.52 and 193.7 CFU/ mL, respectively, in July to 72.78 and 358.33 CFU/100 mL respectively in August. In several instances, the data do not follow this trend, such as in April, when the average enterococci and fecal coliform levels were 73.42 and 5.64 CFU/100 mL, respectively. In that instance, the enterococci value resulted from an unusually high measurement of 360 CFU/100 mL recorded on April 16.

Table 5. Monthly Average Beach Enterococci and Fecal Coliform Data for 2007

	Units in CFU/100 mL	Tappen Beach	Sea Cliff Beach	Bar Beach	Hempstead Harbor Beach	Sands Point Golf Club
April	Enterococci	35.8	73.42	15.02	8.82	7.62
	Fecal	**89**	**5.64**	**12.42**	**14.22**	**8.82**
May	Enterococci	43.92	9.49	26.36	35.91	16.22
	Fecal	**49.89**	**17.8**	**84.68**	**157**	**29.36**
June	Enterococci	14.89	10.57	46.44	45.11	38.39
	Fecal	**130.67**	**73.33**	**219**	**438.56**	**27.38**
July	Enterococci	16.4	10.52	36.4	51.33	143.89
	Fecal	**519.6**	**193.70**	**581**	**877**	**890.25**
August	Enterococci	17.78	72.78	68.56	188.44	297
	Fecal	**248.44**	**358.33**	**272.8**	**1173**	**166.11**
Season Average	*Enterococci*	*25.76*	*35.35*	*38.56*	*65.92*	*100.62*
	Fecal	***207.52***	***129.76***	***233.9***	***531.96***	***224.38***

In addition to the monthly average beach data, time series plots of bacteria monitoring results and precipitation are presented in **Appendix B**. As bacteria data are collected on a weekly basis, these plots show a "snapshot" of conditions at the time of sampling. Given the inherent variability in microbial water quality, these data are most useful to determine whether certain monitoring locations have consistently higher or lower bacteria concentrations or whether a monitoring location is particularly influenced by rainfall, wind, and currents.

The time series plots in **Appendix B** indicate that elevated bacteria concentrations at CSHH #9, #10, #11, #12, and #13 typically occur following precipitation events, whereas elevated levels at the other monitoring locations do not appear to correlate as well to precipitation. Based on field observations, however, bacteria levels were generally higher when this area was monitored during low tide and a dry weather discharge was occurring from nearby pipes. These trends will be examined during next monitoring season.

In general, bacteria levels at CSHH #2 are lower than other locations. CSHH #2 is located at the mouth of the harbor and is thus less influenced by discharges to the watershed, which are likely the largest source of bacteria to the harbor.

3.8.5. Shellfish Pathogen TMDLs

Shellfish beds in Hempstead Harbor and most other areas around western Long Island Sound have been restricted or closed to harvesting for approximately 75 years. Pathogen contamination is the main concern with shellfish beds because of the risk to humans who consume shellfish contaminated by harmful bacteria or viruses present in the water. Total and fecal coliform are the indicator organisms that are used to determine whether certain water bodies are safe for shellfish harvesting. These coliform bacteria are associated with human and animal waste and are used to indicate the presence of other more harmful bacteria, similar to the processes used to measure water quality for beaches (see the Beach Closure Standards at 3.8.2 above).

In August 2007, NYSDEC announced the release of a report on "Shellfish Pathogen TMDLs for 27 303(d)-listed Waters" and an informational meeting to discuss the TMDLs (total maximum daily loads) scheduled for August 10, 2007. Under Section 303(d) of the federal Clean Water Act, states are required to develop plans to decrease the total maximum daily loads of all pollutants that cause violations of water-quality standards. The NYSDEC had listed 71 "Class SA" water bodies as being pathogen impaired, which therefore made them impaired for shellfishing; 25 of these water bodies were included in a 2006 TMDL report, and 27, including Hempstead Harbor, were described in the 2007 report. (Class SA is the highest classification given to marine and estuarine waters and is applied to waters that are considered to have ecological, social, scenic, economic, or recreational importance. Class SA waters are offered the highest level of protection and must, by law, be suitable for recreation in and on the water, fishing, aquaculture, propagation and harvesting of shellfish, and as habitat for fish and other marine life.) Representatives of CSHH, HHPC, and NCDPW attended the informational meeting on the TMDLs, which were developed based on available data and scientific modeling assumptions. Both CSHH and HHPC provided comments on the TMDLs for Hempstead Harbor and requested that the comment period for the report be extended to allow the report writers to gather additional information available from the Hempstead Harbor water-monitoring program and NCDC and NCDPW. The TMDL report called for a percentage load reduction that contradicted even recent NYSDEC test results, which showed that a portion of the harbor's shellfish beds may soon be reopened. NYSDEC's Bureau of Water Assessment and Management agreed to extend the report comment period and to examine data provided by CSHH, HHPC, and NCDH to help develop more realistic TMDL assumptions and reduction targets. EPA approved the TMDL report in September. It is uncertain at this point what impact the DEC's TMDL reduction target of 95% for Hempstead Harbor will have on local municipalities' efforts to reduce storm-water inputs to the harbor and on other water-quality initiatives.

3.9. Precipitation

Precipitation affects Hempstead Harbor water quality through direct precipitation (precipitation that falls directly on the harbor surface) and through storm-water runoff. Although both of these inputs can reduce the harbor’s salinity, direct precipitation will tend to dilute the quantity of pollutants (although direct precipitation can carry airbourne pollutants) in the harbor, whereas storm-water runoff will tend to increase pollutant loads by washing bacteria, chemicals, and nutrients that have accumulated on the ground surface in the watershed into the harbor.

CSHH collects precipitation data using a rain gauge located in Sea Cliff (note that 25.4 mm is equivalent to approximately 1 inch). **Table 6** presents monthly total precipitation for June through October, 1997 through 2007.

Table 6. Monthly Rainfall Totals for the 1997-2007 Monitoring Seasons, in mm

	June	July	August	September	October	Total
2007	159.5	198.5	132.5	36.5	136	663
2006	262	148	89	105	166.5	770.5
2005	45	81	41	28.5	460.5	656
2004	95	214	91	310.5	40	750.5
2003	291.5	87	88	194.5	134	795
2002	180.5	22.5	175.5	116.5 (9/15-30)	180	675+
2001	167	70.5	165	94	19.5	516
2000	146	159	158	125	6	594
1999	31	21	135	323	92	602
1998	191	59	145	90	97	582
1997	47	232	141	84	27 (10/1-15)	531+

The total quantity of precipitation that fell in 2007 was less than the quantity received in 2006 and 2004 through 2002. However, the total quantity was 16 mm greater than the 1997 through 2006 mean, which is 647 mm. In general, the distribution of precipitation varied from month to month. June and July were typical months, with between 150 and 200 mm of precipitation each month. However, September of 2007 was the second driest September on record as measured by this monitoring program. A sixteen-day period with no precipitation occurred from August 25 through Sept 9.

4. OBSERVATIONS

4.1. Reconnaissance Trip

The purpose of the pre-sampling season reconnaissance trip is to check all stations in the upper and lower harbor and in Glen Cove Creek to see what changes, if any, have occurred along the harbor's shoreline from the previous season. When we conducted this trip on April 20, 2007, we were interested in seeing whether there were any effects from **two notable events** that had occurred prior to the this station survey: (1) **a spill of dielectric fluid into the harbor on April 5** and (2) a **nor'easter storm on April 15**.

On **April 5,** while contractors working for the Town of North Hempstead were doing a boring as part of a groundwater study (addressing concerns related to the Port Washington Landfill) ordered by EPA, they hit a LIPA line that is filled with dielectric fluid. Approximately 30,000 gallons of the **fluid spilled along the shoreline near Bar Beach**. Approximately 20,000 gallons of the fluid (which was a non-PCB type resembling mineral oil) was recovered within two days of the spill. The DEC had been immediately notified of the spill and was the lead contact agency. There was no reported impact to marine life. No evidence of the spill was visible during the April 20 survey, other than the trucks from Waste Recycling and Environmental Services were still stationed along the road near the site of the spill, and a white boom was set out in the water near the shoreline.

Trucks from Waste Recycling and Environmental Services at cleanup site (April 20, 2007) (photo by Carol DiPaolo)

Second, on **April 15, a nor'easter** dropped record amounts of rain, with about 7½ inches recorded in Central Park and nearly 4½ inches over Hempstead Harbor. The Glen Cove breakwater was under water at high tide on April 16, and it seemed that the high tide stayed unusually high for days. In the aftermath of the storm, huge amounts of debris collected in the harbor and were still evident on April 20 in the harbor and around the shoreline and included planks of wood, reeds, and other vegetation, as well as floatables such as Styrofoam pieces, bottles, and cans.

View of Sea Isle sand spit at high tide (April 20, 2007) (photo by Carol DiPaolo)

The April survey was conducted from 1:30 to 4:30 PM–timed around the incoming tide with high tide at about 3:15. We began the survey at CSHH #1, where an osprey was on a nest at the top of the navigational light and another osprey was on the railing that surrounded the nest.

Osprey on top of railing at Beacon 11 (April 20, 2007)
(photo by Carol DiPaolo)

We then went to the lower harbor stations–CSHH #4-#7. All of the osprey nests visible in previous years were occupied again. Thirteen ospreys were seen on or near nests on (1) Beacon 11, (2) the blue sailboat near Mott's Cove (no eggs in the nest), (3) the old pilings north of the Port Washington transfer station, (4) the west shore platform that is north of the pilings, (5) the pilings of a resident's dock on the east shore, (6) the end of an old dock on the west shore, (7) old pilings near the power line on the west shore, south of Bar Beach. (A second platform north of an old dock on the west shore had no nest visible on April 20, but two ospreys were nearby and a nest was visible later.) Also noted throughout the harbor were 5 swans, 2 egrets, 20 cormorants, 1½ dozen Canada geese, and about 2 dozen ducks.

Osprey nest at end of old dock on west shore south of Bar Beach (April 20, 2007) (photo by Carol DiPaolo)

Barges anchored near the KeySpan property last year were still there, including the barge that was closest to the now-vacant parcel adjacent to the Tappen Beach Marina and the barge near the former HinFin site that has part of the old Glen Cove ferry terminal on it. Pieces of old barges and docks were seen by the Superfund site south of the HinFin property. The mast of the sunken sailboat south of the Hempstead Harbor Club and near entrance to Glen Cove Creek was no longer visible (it was noted in 2005 and 2006).

Work at Sterling Glen and Horizon, the newly constructed senior rental facilities near the Roslyn viaduct, were near completion, and work on the Roslyn viaduct progressed with the beginning of deconstruction of two lanes on the north side.

View of Sterling Glen, Roslyn (April 20, 2007) (photo by Carol DiPaolo)

4.2. Fish-Survey Reports

The two fish-survey reports described below have been cited in the last two Hempstead Harbor annual reports because they provide additional information regarding the diversity and quantity of marine life in Hempstead Harbor.

4.2.1. Glenwood Power Station Entrainment and Impingement Monitoring Report

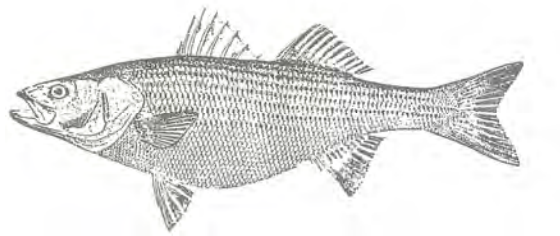
The power station report (by ASA Analysis & Communication, Inc., September 2005) summarized the monitoring program conducted from January 14, 2004, to January 5, 2005, for KeySpan Generation LLC. KeySpan was required by its State Pollution Discharge Elimination System Permit (SPDES) to conduct a one-year study to estimate the numbers of fish and invertebrates that are drawn into the plant's water intake from Hempstead Harbor (harbor water is used in a "once-through cooling water system" to cool steam electric-generating units) and become either trapped in the system or impinged on the intake screen.

Because of the frequency of the monitoring samples taken as part of this study (weekly from March through September and every other week during the rest of the monitoring period), we have a more accurate picture of fish and other species that are found in Hempstead Harbor. Thirty-four types of fish and several other marine animals were found in samples, and each species found was categorized by life stage, from egg to yearling and older. Direct losses were calculated for these species during the power plant's actual operation, and estimates of losses were calculated had the power plant been running full time. In addition, potential annual losses were estimated for seven species (Atlantic menhaden, Atlantic silverside, bay anchovy, Gobiidae, mummichog, striped killifish, and winter flounder).

The federal Environmental Protection Agency requires power plants to address the problem of fish entrainment and impingement, and the KeySpan power plant was required by NYS Department of Environmental Conservation to provide a technology review for the Glenwood Landing plant, which it did in 2007. The technology review, which was approved by NYSDEC October 1, 2007, provides a list of possible technologies to decrease the numbers of fish and other species destroyed through the plant's water intake. The technologies described in the KeySpan report include:

- Behavioral systems to deter fish, such as water jets, electrical barriers, and high-frequency sound.
- Diversion systems to guide fish away from the intake, such as inclined screens and traveling screens.
- Physical barriers, such as different types of barrier screens and nets.
- Screen-collection systems that would wash fish off of screens.
- Closed-cycle cooling, which would reuse and cool water in the plant rather than taking cool water in from the harbor and discharging the warmed water, as in the current one-cycle cooling system.
- Pump shutdowns to decrease the number of entrained and/or impinged fish and other marine animals.

The NYSDEC is currently reviewing the KeySpan report to determine the best technology for the plant. Once that decision is made and the new technology is installed, KeySpan will be required to conduct another monitoring study to verify that the new technology is effective in reducing fish impingement and entrainment.



Striped bass (H.B . Bigelow and W.C. Schroeder, Fishes of the Gulf of Maine, U.S. Fish and Wildlife Service, Fishery Bulletin 74 (1953)

4.2.2. A Study of the Striped Bass in the Marine District of New York State

Seine surveys for the NYDEC's striped bass study have been conducted in western Long Island bays since 1984 and in the Hudson River since 1979. The most recent report prepared by DEC marine biologist Julia Socrates (November 2007) includes the information on the NYSDEC's 2006 Western Long Island Beach Seine Survey and the Hudson River Young-of-the-Year Striped Bass Survey.

It has been reported that Hudson River striped bass generally spend their first year of life in the lower Hudson River, although, according to the study, recent information indicates that the nursery for young-of-the-year striped bass is expanding. In the following spring, these yearling fish can be found in the Hudson River as well as in bays around western Long Island. Although the purpose of the study is to examine the striped bass that have migrated out of the Hudson River as one- and two-year-old fish, the report provides information on other species as well.

Western Long Island sampling occurred primarily in Jamaica Bay on the south shore of Long Island and Little Neck and Manhasset Bays on the north shore. Hempstead Harbor, Oyster Bay, and Port Jefferson Harbor were also sampled on the north shore, but not as frequently. The 2007 report covers 185 seine hauls on 36 dates between May 10, 2006, and October 26, 2006.

Striped bass were caught from May through October 2006, with the highest number caught in August. The report compares catches by age and length between north shore and south shore for the 2006 period as well as in comparison with previous years' catches. Some of the findings of the report are listed below (see "A Study of the Striped Bass in the Marine District of New York State," NYS DEC, November 2007, pp. 4-16; 36):

- In 2006, 1,517 striped bass were caught in the 185 seine hauls for the survey.
- North shore bays had more young-of-the-year striped bass catches than south shore bays.
- North shore bays continue to have a greater range of sizes of striped bass.
- Older striped bass have ranked in the top10 species caught in 20 out of the 23 years of study.

- Catches per unit of effort (CPUEs) for bluefish, winter flounder, summer flounder, blackfish, weakfish, blueback herring, and Atlantic tomcod were down from 2005 efforts.
- CPUEs for horseshoe crabs and blue crabs were up from 2005.
- Almost all baitfish CPUEs were down from 2005.
- In 2006, 27 seine hauls in Hempstead Harbor produced 24 finfish species, 9 crab species, and 1 diamondback terrapin
- The five most abundant species caught in Hempstead Harbor for the 2006 survey were silversides, bluefish, killifish, striped bass, and northern pipefish.
- The highest catch efforts for young-of-the-year bluefish in 2006 for both shores of Long Island occurred in Hempstead Harbor, and most of them caught in August.
- Winter flounder were caught on both shores of Long Island throughout the survey period (May-October), and the highest catch efforts were during June in Jamaica Bay.
- In 2006, the majority of blackfish counted in the survey were caught in Hempstead Harbor

4.3. Fish Observations and Recreational Fishing Reports

Fish observations are generally limited to what can be seen dockside at marinas, in shallow water near bulkheads, or just below the surface of the water at midharbor stations. Often, schools of fish can also be seen at a distance, breaking the surface in chase of smaller fish in the food chain or away from larger fish. To obtain more information about the fish and other marine life that inhabit Hempstead Harbor, we rely on written reports and studies such as those mentioned above, as well as reports from local residents who use the harbor for recreational fishing and other activities.

Green heron on Tappen Marina dock piling with blue heron in the background on ledge of bulkhead (May 22, 2007) (photo by Carol DiPaolo)

May

When we started regular sampling at the end of May, things were pretty quiet on the water. But we had a different view from Peter Emmerich, member of the Hempstead Harbor Anglers Club, who provided the following report on May 22, the week before our first sampling date:

> *Boat is in the water, went out last night, and Hempstead* [Harbor] *is LOADED with bunker. I would give anything if it would stay just like this to Dec 15. Bass are starting to be caught. My buddy had a 32 lb bass last Thursday. I had a 30 inch bass last night by Falaise* [Sands Point Museum]*. A 9- lb bluefish was weighed in at Duffy's yesterday. The bass run should be in full swing this week and go to July. We are waiting for the fluke to make their way west and into our harbor.*

June

In June, we saw only bunker on June 13 and 27, breaking out of the water near Beacon 11. Again, Pete Emmerich was able to provide more details. On June 20, he reported:

> *Fishing I feel has been late; water temp was still 61 - 63 early this week, but this week the Bass run went into high gear. We have been catching OK for a few weeks, but small fish. That changed this week– friends have fish to 46 pounds in the Sound, I hit one 32 pounds on 6/18 along with other in the high 20's.*
>
> *Three weeks ago, bunker had been all over the back harbor; they moved out but are numerous in the mouth of the harbor all the way across the Sound. The deal this week is, make your way out of the harbor around 6:00, find bunker swirling off Webb* [Webb Institute, east shore of harbor, north of Glen Cove breakwater] *and beyond, snag bait, find big bunker schools, and anchor up. It does not take long for bass, and blues up to 12 pounds to find you. You have to see the parade of fish after dark on the fish finder coming through the Sound.*

On June 27, Pete wrote:

> *We slammed the fish last night, best night by far of the year. There are fish EVERYWHERE. Bunker were heavy from the power plant to Tappen* [Beach Park and Marina]*. All along the harbor on the west side all the way to Lowe's* [site of old Lowe Estate, east shore of harbor, north of Glen Cove breakwater] *there are hordes of 2 to 3 pound bluefish just rolling everywhere on small bait. I'm not sure what it is, but there must be some large influx of small bait, I'm guessing sand eels, but you would know better. Fish were breaking water and finning everywhere. We snagged bait and fished about a mile off the beach of Webb* [Institute] *in about 48 feet of water and we caught more stripers than we could count (almost). Most were in the 22 to 25 pound range, but I had a couple barely legal and a couple in the 30-pound range. Could not keep bait in the water. Caught many bluefish mixed in, some in the 10 to 12 pound range. Started fishing around 7 and left them biting around 9:30. This is a contact sport, I am black and blue from the rod butt, my hands are raw from being up to my elbows in fish mouths removing barbless hooks. Looks like the incoming tide is best now, but when is the wind ever going to stop blowing?*
>
> *Clean water = mega bait = excellent fishing.*
>
> *Can't wait to see what the Blue Moon brings on the 30th. Cinder worm hatch maybe?*

July

On July 5, we noted only **bunker** breaking the surface at Tappen Marina, and on July 20 we started noticing **blue-claw crabs** clinging to the bulkheads in Tappen Marina and Glen Cove Creek. On July 25, we observed a lot more activity than previously: thick schools of **silversides** and bunker could be seen in Tappen Marina, and large schools of silversides were seen breaking the surface in the lower harbor, south of Bar Beach. This along with the filleted remains of two **bluefish** and one **striped bass** floating on the surface, and lots of bird activity throughout the harbor pointed to large numbers of fish in the harbor that we weren't seeing.

August

Monitoring was suspended on August 1 and 8, because the boat was out of commission. When we resumed monitoring on August 15, we saw thick schools of **silversides** in Glen Cove Creek, some **snappers** that were breaking the surface in the creek, and, for the first time during the season, we noted a few **comb jellies** (both sea walnuts and sea gooseberries) at CSHH #1 and #2. On August 22, the activity at Tappen Marina was dramatic, and we were delayed in starting our regular monitoring! The marina was teeming with life! We had 50 mm of rain over the preceding week, which contributed to runoff into the harbor and the cycle that causes low DO; the low DO that day (1.4 ppm at the bottom at Beacon 11) was probably the reason we saw so many fish and crabs close to the surface, trying to get more oxygen. **Unprecedented numbers of blue-claw crabs** (in Tappen Marina, Glen Cove Creek, by CSHH #1) were visible with other marine species we hadn't noted before during this season. Tappen Marina was thick with schools of bunker, silversides, and other baitfish. Thick clouds of comb jellies were also in the marina with thousands of tiny **shrimp**. There were also about a half dozen 1"-2" **flounder** (including **windowpane**), 2 dozen juvenile **sea bass**, and five **pipefish** near the gas dock of the marina.

Blue-claw crab bonanza in Hempstead Harbor! (August 22, 2007)
(photo by Carol DiPaolo)

On August 21, **NYSDEC** staff were **seining** in Hempstead Harbor as part of the striped bass study (see 4.2.2 above). DEC marine biologist Julia Socrates provided preliminary information on the seining, which corresponded with what we saw the next day: a diversity of marine life and lots of blue-claw crabs. (DEC's DO numbers corresponded with ours as well.) During the seining in Hempstead Harbor, DEC staff caught over 60 blue-claw crabs–most of them in the northeastern part of the harbor (near Morgan Park). Julia's description of the crabs also matched ours–healthy and feisty. Also caught were **alewife**, **striped bass**, bunker, **kingfish**, **blackfish**, pipefish, **scup**, **striped sea robins**, **winter flounder**, **weakfish**, black sea bass, windowpane flounder, **tom cod**, **cunner**, **northern puffer**, as well as an **assortment of crabs**–lady, green, spider, horseshoe, and Asian shore crabs. The birds were busy!

By August 29, DO was up from the preceding week, and relatively little fish (and bird) activity was noted. Many blue crabs were noted, but fewer than during the preceding sampling date.

September

On September 5, we had reached the thirteenth day without any rain, DO ranged at the bottom between 3.6 and 6.2, and Tappen Marina was again teeming with life, although we didn't see the diversity of species that we did during the low DO event of August 22. Blue-claw crabs were still plentiful in the marina (and in Glen Cove Creek), and also noted were thick schools of **silversides**, **bunker**, and thousands of tiny **shrimp**. Only one **comb jelly** was seen in the marina and four near CSHH #1–both sea walnuts and **sea gooseberries**. On September 13, thick schools of baitfish were noted throughout the harbor and were particularly evident in Tappen Marina and Glen Cove Creek near CSHH #8. In the marina there were still thousands of tiny shrimp, and blue-claw crabs were visible on the bulkheads in the marina, Glen Cove Creek, and on Beacon 11 (CSHH#1). About a half dozen comb jellies were noted only at CSHH #1. On September 19, Tappen Marina had lots of baitfish present (some breaking the surface), along with numerous shrimp (1 inch or less) around the main dock. Lots of small fish were also present in Glen Cove Creek, and 8 blue-claw crabs were clinging to the bulkhead between CSHH #8 and #11. Thick schools of silversides were present throughout the harbor and particularly evident in Tappen Marina and Glen Cove Creek near CSHH #8. Also in Tappen Marina were large numbers of tiny shrimp (but fewer than in previous weeks), thick schools of peanut bunker, and a few blue-claw crabs. (Many more blue crabs were visible by the western bulkhead of Steamboat Landing later in the day during low tide.) Large schools of **bluefish** were seen breaking the surface off of Tappen Beach.

Two **snapper derbies** were held on September 8–one at the Tappen Beach dock (Hempstead Harbor Anglers) and one at the Sea Cliff Yacht Club. About 16 snappers were caught near Tappen (and reportedly many more were lost because young children were fishing), but hundreds of snappers were caught by the yacht club.

October

On October 3, thick schools of baitfish were breaking the surface in Tappen Marina, midharbor, and throughout Glen Cove Creek. Large schools of small **bunker** (about 6 inches) were swirling at the surface in Glen Cove Creek. A few **blue crabs** were noted in the creek, Tappen Marina, and at CSHH #1. Large numbers of **shrimp** were present in the marina but fewer than in previous weeks.

We saw **DEC staff on October 3 making their way to Bar Beach as part of the DEC's annual striped bass study.** DEC marine biologist Julia Socrates described what was caught during the seining in Hempstead Harbor: blue-claw crabs (near Bar Beach), **lady crabs**, **green crabs**, **silversides**, **killies**, **bluefish**, young of the year **winter flounder**, **striped bass** (a 7-pounder and some young of the year), **cunner**, a **striped sea robin**, tautog (**blackfish**), **scup**, and 1 **sea star**.

Pete Emmerich's report for October 2 provided more details:

> *Fish are everywhere.*

The marina is loaded with bunker; babies are growing fast. The entire harbor is loaded with bunker and spearing. I caught about 25 schoolie stripers at the barges last night.

Friends of mine told me that there was an amazing amount of bass rolling on bait during the day yesterday in the shallow water along the walkway at shore road in Sea Cliff. They also said the bluefish came in heavy during the day to feed, but I did not see that last night.

As long as all this bait stays put, the fishing will just get better as the water temp drops. Blackfish season opened yesterday; it is a bit early but I can't wait to see if they are in yet.

On October 10, fish were breaking the surface in both the lower and upper harbor, and gulls were working the water around them. Numerous comb jellies were noted (both sea walnuts and sea gooseberries) at CSHH #1 and #6. On October 17, large schools of spearing were seen in Tappen Marina and throughout Glen Cove Creek, and larger fish were seen breaking the surface in different parts of the harbor, including along the entrance to the mooring field, and gulls working the water around them. Most notable were the huge schools of peanut bunker that seemed to fill the entire creek. Numerous comb jellies were noted at CSHH #1 (mostly sea gooseberries) and only a couple noted at CSHH #2 (sea walnuts). Two blue-claw crabs were clinging to the bulkhead in Glen Cove Creek. After describing the scene to Pete Emmerich, he wrote back:

We went out around 4 pm on Monday 10/15, and the bluefish were just incredible. These were larger blues, up to around 12 pounds, and they were crashing the bait everywhere. We chased them from Hempstead [Harbor] *beach, to Bar Beach, to Lilco* [KeySpan/LIPA]*, and back out again. Fishing on light tackle, they would hit a boot if that is what you chose to use. The blues would go down, corral more bait, then hit the surface in a serious boil. Go down again, and come up a short distance away.*

Funny, did the same thing Tuesday night and did not see one bluefish. I managed to jig three striped bass at the barges. Porgies are everywhere and are large now. Some blackfish being caught, but the water is too warm, and you can't get through the porgies to get to the blackfish.

You are right,bait is everywhere, baby bunker spraying through the air. I know the blues have been hitting morning and night. A friend I had out with me Tuesday said when he fished the beach on Monday, the blues were in 2 feet of water driving the bunker onto dry land. When we finished Tuesday night and were in Tappen's parking lot, we had some excited people tell us to hurry onto the beach, everyone there was pulling in all the fish they wanted.

On October 24, large schools of bunker–peanut size to 6 inches–were noted again in Glen Cove Creek, with a few comb jellies noted at CSHH #1, #4, and #8. On the last sampling date for the season (October 31), numerous comb jellies were noted at CSHH #1 and a few at #3. Large schools of bunker were throughout Glen Cove Creek. Pete wrote in his last report for the season:

Fall is bringing in some fine fishing. I stopped by the barges last Wednesday [October 31] *and jigged up 35 schoolie bass to 24 inches. I understand the schoolie fishing has also been fine over in front of Lowe's near the marina openings. I had a phone call last Thursday from a friend who was driving down Shore Road and he told me the entire harbor was white with fish breaking–blues and bass. The very good news is there is a fantastic blackfish bite on this year. Blacks have been caught from opening day and people are catching many, and of good size. Really, the water is too warm and this has not happened in recent years, but right now the blacks are making a good showing of themselves.*

4.3.1. Crabs

An assortment of crabs can be seen around Hempstead Harbor, including blue-claw, lady, green, spider, horseshoe, mud, fiddler, and Asian shore crabs. Some are walking crabs, and some are swimmers, like the blue-claw crabs, which have back legs that are shaped like paddles. The Asian shore crab is an invasive species that started showing up around Long Island Sound in the late 1990s, and can tolerate wide range of salinity and may be pushing out native species.

Summer 2007 was the summer of the blue-claw crab! Although blue-claws have always been present in Hempstead Harbor, particularly in the lower harbor, they appeared in remarkable numbers last summer.

4.3.2. Jellies

Two types of **comb jellies** (which are classified separately from the stinging-celled jellyfish) are seen in Hempstead Harbor: the larger egg-shaped sea walnuts and the tiny, rounder sea gooseberries. The sea walnuts have lobes that are rimmed with short comb-like appendages that are phosphorescent. They can be seen at night glowing as the water is moved around them, as in the wake of a boat. Sea gooseberries have a tail-like appendage that can be seen when they are up close to the surface. Comb jellies do not sting. They usually appear in large numbers in Hempstead Harbor in late June and through mid-October. In 2007, it was unusual that we didn't see them until August 15. We noted fewer of both types of comb jellies and only sporadically through the season, although we were surprised to see them as late as October 31.

Two tentacled types of jellyfish that may be seen in the harbor are the purple-brown **lion's mane jellyfish**, with long tentacles that sting, and the round, bell-shaped moon jelly that has short tentacles around its rim that do not produce a stinging sensation. **Moon jellies** are easily identified by the four, whitish, horseshoe-shaped gonads on the top of the bell. It's been several years since we've seen either the lion's mane jellyfish or the moon jelly in large quantities in the harbor; none were observed on any of the 2007 monitoring dates.

4.4. Shellfish

Shellfishing was an important commercial activity in Hempstead Harbor from about the first quarter of the nineteenth century into the first quarter of the twentieth century, and clams and oysters were shipped regularly to New York City, until restrictions were imposed because of dwindling resources. By 1928, the lower portion of the harbor was closed to shellfishing because of increasing levels of bacteria in the water (as was the case for most bays in western Long Island Sound and other New York waters). For a time, clam dredgers could be seen in Hempstead Harbor harvesting clams and then transporting them to the Peconic Bay, where they were transplanted and remained for several weeks for purification so they could be sold commercially.

By the late 1990s, clams, oysters, and mussels were abundant throughout the harbor, and because of improved water quality, it seemed time to pursue one of the longstanding goals of reopening the harbor's shellfish beds. In 1998, CSHH initiated the first step and worked with the Interstate Environmental Commission, NYSDEC, Town of North Hempstead (TNH), and local baymen to conduct a hard-clam survey to determine the extent and condition of the clam population. The survey showed a healthy population of hard clams, but rigorous water sampling would have to be conducted by NYSDEC to determine whether water quality had improved enough to reopen the shellfish beds.

In 2004, NYSDEC began collecting water samples in the outer portion of Hempstead Harbor, north of the Glen Cove breakwater, with good results. In 2007, NYSDEC met with CSHH, HHPC, and Town of Oyster Bay (TOBAY) to discuss, among other things, water-sampling results and assistance with sampling from TOBAY staff. Water sampling will be completed in 2008, and then several samples of the shellfish from the harbor will have to be tested; a sanitary survey of the shoreline will also be completed to better identify potential contamination sources.

4.4.1. Shellfish Seeding

At the same time that NYSDEC shellfish division was nearing completion of a series of water-quality tests that would determine whether a section of the upper harbor could be reopened for shellfish harvesting, Nassau County Executive Thomas Suozzi began exploring the possibility of seeding Hempstead Harbor with clams and oysters as part of the county's "Healthy Nassau" campaign. The seeding project was a joint initiative that included Nassau County, the TNH, TOBAY, Cornell Cooperative Extension, Frank M. Flower & Sons Oyster Company, as well as HHPC and CSHH, and was intended to add biomass to the harbor using a resource that could help improve water quality–each clam and oyster can filter 1 to 2.5 gallons of water per hour, with daily estimates (for oysters) of 30 to 60 gallons.

The seeding took place on October 9. The shellfish stock came from Cornell Cooperative Extension and Frank M. Flower & Sons Oyster Company, and included more than 1.3 million seeds, consisting of two types of hard-shell clams (Mercenaria mercenaria and M. mercenaria notata) and oysters. The 1883 oyster sloop *Christine* and TOBAY's Environmental Resources water- sampling boat (used regularly for the Hempstead Harbor water-monitoring program) were used for the seeding, and Nassau County Marine Police boats took press and guests to the seeding site.

Throwing shellfish seeds from the Christine *into Hempstead Harbor (October 9, 2007) (photo by Carol DiPaolo)*

Because of space limitations, about 10 tubs of oysters were left behind. Each tub contained about 10,000 oysters that had been started in May 2007 and will reach maturity in 18 to 24 months. On October 10, 2007, following our scheduled water-quality sampling, we met Nassau County DPW staff at Tappen Marina to load the Environmental Resources boat with the oysters that remained from the day before. We went back to the seeding area and took GPS readings as each tub of oysters was spread out over the harbor. The GPS readings will allow us to go back and check on the density and condition of the shellfish. One of the types of clams used in the seeding (M. mercenaria notata) has markings that are different from the northern quahog stock normally found in Hempstead Harbor, which will help in gauging the survival rate of the seeds.

M. mercenaria notata clams (about the size of a nickel)
(October 10, 2007) (photo by Carol DiPaolo)

Oyster stock started in May 2007 will take 18 to 24 months to mature
(October 10, 2007) (photo by Carol DiPaolo)

4.5. Birds

During 2007, **egrets, blue herons, swans, gulls, terns, mallards, black ducks, Canada geese, cormorants**, and **ospreys** were observed throughout the season. **Green herons** were also occasionally observed.

One or two **belted kingfishers** were often seen at the head of Glen Cove Creek. In addition, there were variety of birds observed during monitoring that that were rarely or never observed during monitoring in Glen Cove Creek previously, including two **plover-type birds** that were noted at the head of Glen Cove Creek, two small, brown (with light streaks) **hawks** or falcons near the mouth of the creek, and a bird that looked like a **black-headed grosbeak** (yellow body, black head) along the north shore of the creek, near the head of the creek. A falcon or hawk was noted on top of the LIPA plant, and dozens of tiny **sandpiper-type birds** were seen along the shore of Mott's Cove.

An extremely rare sighting of a **western kingbird** was reported at the end of the monitoring season at Garvies Point Road. It had been spotted during October 19-26, and the sighting was reported to Audubon New York.

In 2007, we counted eight osprey nests visible in the harbor; they were built on old pilings, a private dock, platforms, a navigational light, and on a sailboat in the lower harbor. On May 30 we saw three eggs (same as in 2006) in the nest on the sailboat in the lower harbor; on June 13, we saw three newly hatched chicks in the nest. By July 25, the fledglings were still in the nest, but one of the three was very small and weak and didn't seem likely to survive.

Various gulls, swallows, crows, pigeons, and other common land-based birds are observed near beaches, but their numbers are not recorded.

Newly hatched ospreys in sailboat nest (June 13, 2007) (photo by Eric Swenson)

4.6. Diamondback Terrapins

Diamondback terrapins are the only turtle found in estuarine waters and grow up to 9 inches long. In spring of 2005, diamondbacks were observed in large numbers in the lower harbor, near the Roslyn viaduct. Diamondbacks typically converge by the hundreds in one area in the spring and mate for several weeks, and information about their presence in Hempstead Harbor was used to support efforts to extend Hempstead Harbor's designation as a "significant coastal fish and wildlife habitat" to include the area south of the Roslyn viaduct.

In 2006, dramatic changes occurred in the area near the viaduct with the construction of the Sterling Glen and Horizon senior communities at Bryant Landing and the start of construction for the new viaduct. Construction of the viaduct continues, and materials are barged from the area north of Mott's Cove to the viaduct during high tide. It is not known whether this activity has had an impact on the diamondbacks. In 2006, two turtles were reported seen in Glen Cove Creek, and one was caught during a seining in Hempstead Harbor for the NYS DEC's striped bass survey. No sightings of diamondbacks were reported in 2007.

Construction at Roslyn Viaduct (photo by Carol DiPaolo)

Cormorants in lower harbor (October 10, 2007) (photo by Carol DiPaolo)

4.7. Algal Blooms

Color and turbidity of water within the harbor in 2007 was, for the most part, typical of conditions generally observed during the monitoring period. During most monitoring seasons, Hempstead Harbor Secchi-disk depths (an indicator of light penetration into the water column) consistently range from 0.25 m to 3 m. In 2007, the lowest Secchi-depth reading was 0.5 m. Low Secchi-disk depths are a strong indicator of the presence of algal blooms because algae absorbs more light and is present in greater quantities than other particulate material. (The water is typically characterized by a brown to green color.) During October sampling, the water appeared very clear, with Secchi-depth reaching the upper 2-3 m levels.

In 2007, noticeable plankton blooms occurred on June 6, July 25, August 15, September 5, and September 27, with four making the water appear thick and green and one green-brown. Also, on September 27, a kayaker noted the unusual green stripes of color in Glen Cove Creek (alternating between dark green and a lighter opaque green), took a water sample, examined it under a microscope, identified the plankton in the samples as Heterosigma (which usually causes a brown tide and, in large concentrations, can have toxic effects on marine life), and sent a photo of the slide to the NCDH. With assistance from Glen Cove Harbor Patrol, additional samples were collected 5:10-5:30 PM, and the distinct stripes of color noted earlier were gone on the outgoing tide, although a change in color from a deep green to lighter opaque green was still visible between the two easternmost docks at Jude Thaddeus Marina and CSHH #12. The low tide prevented us from going to the head of the creek. The samples were picked up by the NCDH and analyzed by John Jacobs, who saw only normal amounts of Heterosigma with a higher concentration of Eutreptia, a plankton species commonly found in the harbor.

BLANK DATA REPORTING SHEETS

Water-Monitoring Data Sheet

Collection Date : ________________ **Time :** ________________

Monitor Name : ________________________________

Site Name : CSHH #1, Beacon 11 **Location :** Hempstead Harbor

Weather : ❑ fog/haze ❑ drizzle ❑ intermittent rain ❑ rain ❑ snow ❑ clear ❑ partly cloudy

% Cloud Cover : ❑ 0% ❑ 25% ❑ 50% ❑ 75% ❑ 100% other ________

Wind Direction : ❑ N ❑ NE ❑ NW ❑ S ❑ SE ❑ SW ❑ E ❑ W **Velocity :** _______ kt (mph)

			Date	Amount
Rainfall :	Previous 24 hrs accumulation	_____.__ mm	________	________
	Previous 48 hrs accumulation	_____.__ mm	________	________
	Previous week's accumulation	_____.__ mm	________	________

Tidal Stage : ❑ incoming ❑ outgoing hours to high tide : ____________

Water Surface : ❑ calm ❑ ripple ❑ waves ❑ whitecaps

Water Color : ❑ normal : ❑ brown ❑ green other ________
❑ abnormal : ❑ brown ❑ green other ________

Water Observations : ❑ jelly fish ❑ dead fish ❑ dead crabs ❑ algal bloom
❑ odors ❑ sea weed ❑ bubbles ❑ foam
❑ oil slick ❑ floatables ❑ ice
❑ submerged aquatic vegetation (SAV) ❑ turbidity (suspended particles)

Comments ________________________________

Plankton count ________ type ________ sample taken : ❑ surface ❑ below surface

Wildlife Observations (type, approximate number ...)

CSHH #1 ________________________________

CSHH #2 ________________________________

CSHH #3-8 ________________________________

Floatables Observations (type, approximate number ...)

____

Human Activities

____

Cal. constants: ____________

Water Monitoring Data Sheet

Date: ____________

Air Temperature : ______ °C

Station :

Time : ____________

Depth (meters)	Temp °C	Salinity (ppt)	DO (ppm)	pH	Secchi (meters)	Nitrogen (ppm) NO_2	NO_3	NH_3
Surface								
0.5								
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

DO Cal check ___% sat.

Air Temp: ______

Station :

Time : ____________

Depth (meters)	Temp °C	Salinity (ppt)	DO (ppm)	pH	Secchi (meters)	Nitrogen (ppm) NO_2	NO_3	NH_3
Surface								
0.5								
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

DO Cal. check ___% sat.

Air Temp: ______

Station :

Time : ____________

Depth (meters)	Temp °C	Salinity (ppt)	DO (ppm)	pH	Secchi (meters)	Nitrogen (ppm) NO_2	NO_3	NH_3
Surface								
0.5								
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

DO Cal. check ___% sat.

BEACH MONITORING - DAILY SAMPLING LOG

COALITION TO SAVE HEMPSTEAD HARBOR

ELAP ID #10339

NASSAU COUNTY DEPARTMENT OF HEALTH
DIVISION OF PUBLIC HEALTH LABORATORIES
209 MAIN STREET, HEMPSTEAD N.Y. 11550
PEDRO J. FRANCO M.D., DIRECTOR TELEPHONE (516) 572-1200 FAX (516) 572-1206

COLLECTOR'S NAME: DATE:

ALL SAMPLES SUBMITTED IN STERILE POLYSTYRENE VESSELS CONTAINING SODIUM THIOSULFATE (UNLESS OTHERWISE SPECIFIED)

FIELD NO.	AREA NO.	POINT NO.	SAMPLE TYPE	LOCATION	TIME	TEMPERATURE AIR	TEMPERATURE WATER	WIND	WEATHER	WAVE HEIGHT	LABORATORY USE ONLY: LAB NUMBER	FECAL COLIFORMS	ENTEROCOCCI	COMMENTS
CSHH-1	10		5	BEACON ELEVEN										
CSHH-2	10		5	BELL BUOY 6										
CSHH-3	10		5	RED MARKER GLEN COVE CREEK										
CSHH-4	10		5	BAR BEACH SPIT										
CSHH-5	10		5	MOTT'S COVE										
CSHH-6	10		5	EAST OF INCINERATOR										
CSHH-7	10		5	BRYANT LANDING										
CSHH-8	10		5	GLEN COVE STP										
CSHH-9				FIRST PIPE WEST OF STP OUTFALL										
CSHH-10				PIPE AT CORNER OF SEAWALL WEST OF STP OUTFALL										
CSHH-11				50 YARDS EAST OF STP OUTFALL										
CSHH-12				EAST OF STP OUTFALL BY BEND IN SEAWALL										
TRIP BLANK														

COMMENTS / REMARKS

Data Entry__________ Proofed__________

TEST	METHOD	CODE
Fecal Coliform / 100 ml.	Membrane Filtration	SM-18-20 9222D
Enterococci / 100 ml.	Membrane Filtration	EPA Method 1600

TEMP CONTROL: DATE RECEIVED: TIME RECEIVED:

SAMPLE ACCEPTABLE: Yes_____ No_____ ANALYSIS SUCCESSFUL: Yes_____ No_____

LABORATORY ACCREDITATION NOTICE:
The results provided on this report have been produced in compliance with "NELAC" (National Environmental Laboratory Accreditation Conference) standards and relate only to the identified sample. Any deviations from the accepted "NELAC" collection requirements for non-potable samples are appropriately noted. This report shall not be reproduced except in full without the written approval of the laboratory. Current New York State laboratory certification status is maintained under ELAP ID #10339.

VERIFICATION REVIEW

NAME: TITLE: DATE:

COMMENTS:

FORM #BCH-MF6 06/07/2005

CODES FOR DAILY SAMPLING LOG

TIME - use military time; 9:00 a.m.= 0900, 2:30 p.m.= 1430

TEMP - use two spaces and report in degrees centigrade to nearest whole number
(if 9 degrees, report as 09, if 23 degrees, report as 23)

WIND - use one or two places for direction and two places for speed:
south at 15 mph should be reported as S-15; northwest at 2 mph
should be entered as as NW-02. No wind or "calm" should be
be entered as N-00.

WEATHER - 1 = fair, 2 = partly cloudy, 3 = cloudy, 4 = rain, 5 = snow, 6 = fog

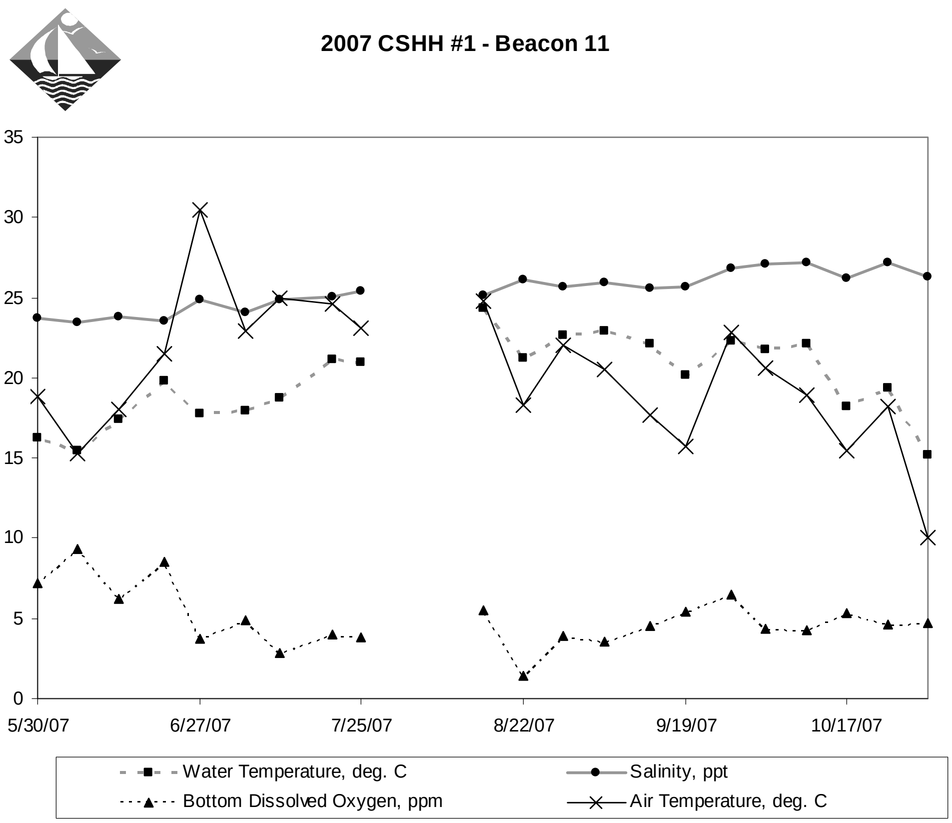
WAVE HEIGHT - should be entered to nearest half foot, using two digits:
CALM = 0.0; 2 1/2 FOOT WAVES = 2.5

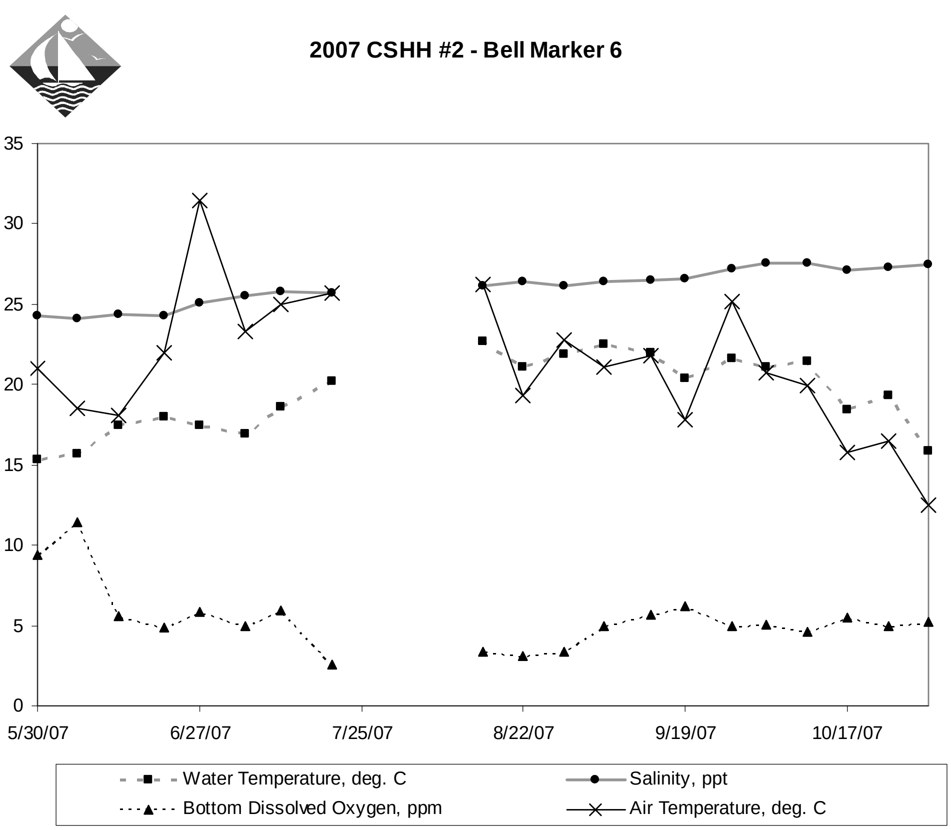
SAMPLE TYPE - 3 = fresh water pond/stream/drain,
4 = sewage, 5 = beach, 6 = other

COMMENTS, REMARKS - use this area to record any unusal conditions or
observations.

APPENDIX A

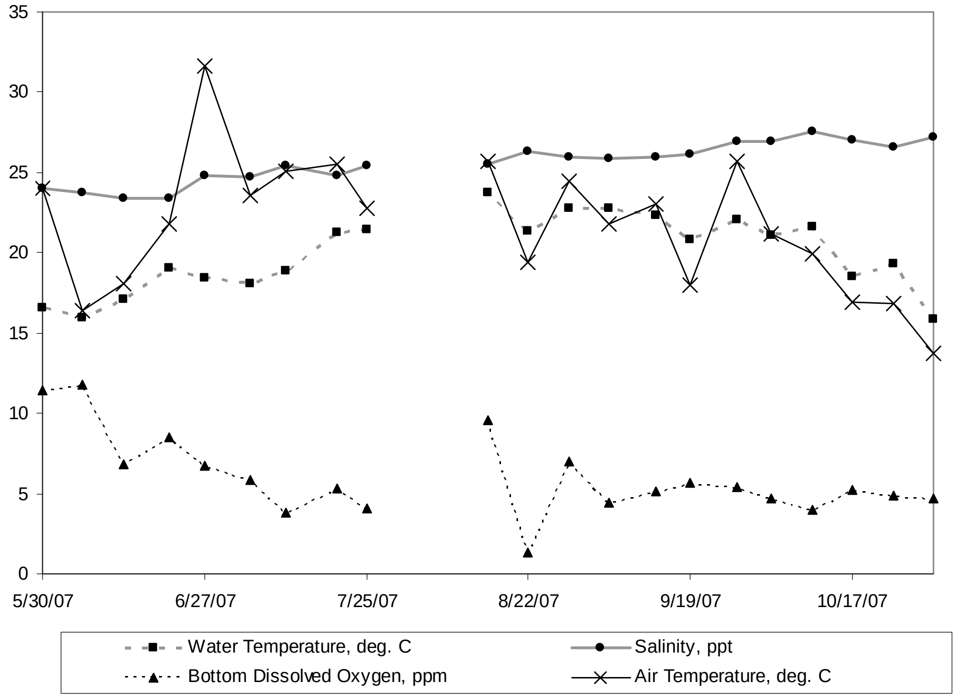
2007 Field Monitoring Results


2007 CSHH #1 - Beacon 11
35
30
25
20
15
10
5
0
5/30/07
6/27/07
7/25/07
8/22/07
9/19/07
10/17/07
Water Temperature, deg. C
Salinity, ppt
Bottom Dissolved Oxygen, ppm
Air Temperature, deg. C

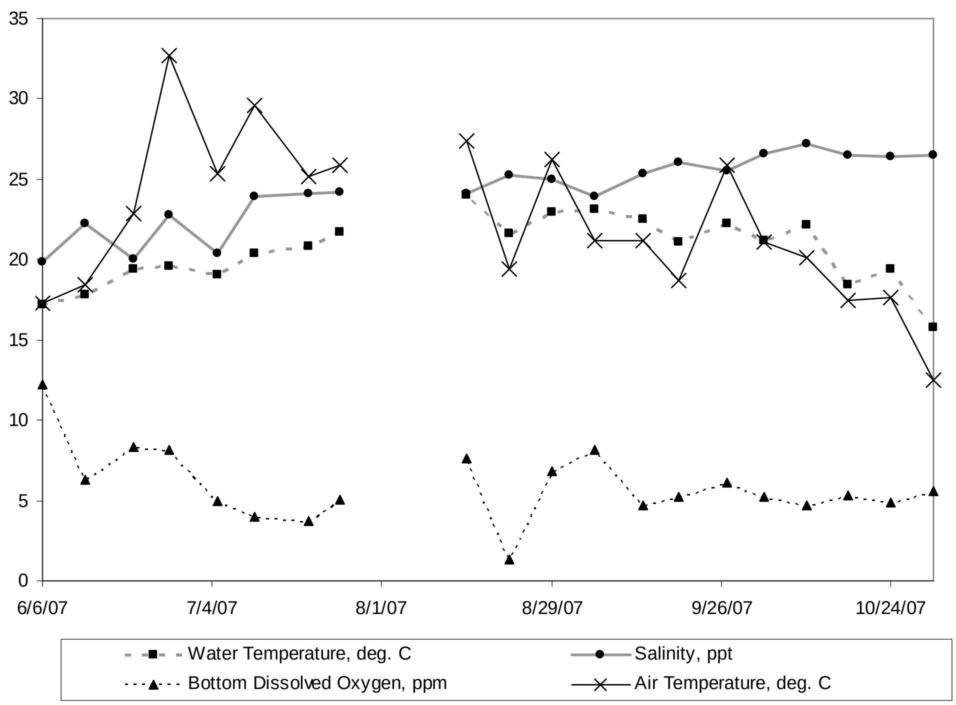

2007 CSHH #2 - Bell Marker 6
35
30
25
20
15
10
5
0
5/30/07
6/27/07
7/25/07
8/22/07
9/19/07
10/17/07
Water Temperature, deg. C
Salinity, ppt
Bottom Dissolved Oxygen, ppm
Air Temperature, deg. C

Appendix A – 2007 Weekly Results Graphs for Water-Quality Parameters

2007 CSHH #3 - Glen Cove Creek



2007 CSHH #8 - Glen Cove STP Outfall



CSHH Water-Monitoring Program 2007

Date	Water Temp (°C)			Salinity (ppt)			DO (ppm)		pH (ppm)		Air Temp	Depth (m)	Time
	Surface	Bottom	Average	Surface	Bottom	Average	Surface	Bottom	Surface	Bottom	(°C)	(bottom)	AM
CSHH #1 - Beacon 11													
10/31/2007	15.16	15.20	15.18	26.30	26.32	26.31	5.52	4.68	7.6	7.7	10.0	2.5	8:35
10/24/2007	19.36	19.30	19.33	26.93	27.47	27.20	4.87	4.62	7.7	7.6	18.2	5.1	8:30
10/17/07	18.09	18.34	18.22	25.95	26.54	26.25	5.43	5.36	7.5	7.5	15.5	2.7	8:35
10/10/07	22.36	21.92	22.14	26.85	27.52	27.19	4.53	4.22	7.4	7.4	18.9	3.2	8:15
10/3/07	21.76	21.75	21.76	27.10	27.10	27.10	4.45	4.39	7.4	7.4	20.6	3.2	8.58
9/27/07	22.56	21.97	22.27	26.56	27.06	26.81	6.37	6.51	7.5	7.4	22.8	3.4	8:35
9/19/07	19.78	20.51	20.15	25.18	26.08	25.63	6.27	5.44	7.6	7.6	15.7	4.0	8:53
9/13/07	22.09	22.20	22.15	25.51	25.69	25.60	4.70	4.57	7.5	7.5	17.7	2.8	8:30
9/5/07	23.19	22.66	22.93	25.73	26.2	25.97	7.56	3.55	7.9	7.4	20.5	4.6	8:28
8/29/07	22.78	22.55	22.67	25.57	25.82	25.70	5.3	3.91	7.6	7.5	22.0	2.2	8:15
8/22/07	20.93	21.59	21.26	25.62	26.6	26.11	2.99	1.40	7.4	7.3	18.3	4.8	8:35
8/15/07	24.85	23.86	24.36	24.85	25.35	25.10	7.99	5.53	8.0	7.7	24.8	2.6	8:30
8/8/07	No sampling--boat out of commission.												
8/1/07	No sampling--boat out of commission.												
7/25/07	21.54	20.37	20.955	25.01	25.84	25.43	7.75	3.86	7.9	7.5	23.1	3.5	8:45
7/20/07	21.49	20.83	21.16	24.78	25.24	25.01	4.35	4.04	7.5	7.5	24.6	2.8	8:50
7/11/07	20.38	17.18	18.78	24.46	25.22	24.84	4.46	2.83	7.5	7.4	25	4.4	8:17
7/5/07	17.97	17.93	17.95	23.98	24.08	24.03	5.1	4.92	7.6	7.6	22.9	2.2	8:50
6/27/07	19.53	16.05	17.79	24.58	25.12	24.85	8.40	3.74	7.9	7.4	30.5	4.2	9:05
6/21/07	19.89	19.74	19.815	23.47	23.64	23.56	8.11	8.53	8.2	8.2	21.5	3.4	9:00
6/13/07	18.3	16.57	17.435	23.47	24.2	23.84	6.89	6.25	8.1	8.0	18.0	4.8	8:35
6/6/07	15.53	15.47	15.5	23.37	23.46	23.42	8.60	9.29	8.3	8.3	15.3	2.6	9:01
5/30/07	18.26	14.18	16.22	23.22	24.13	23.68	10.49	7.23	8.3	8.0	18.8	4.6	10:10
Average			*19.90*			*25.41*		*4.9938*			*20.22*		

Date	Water Temp (°C)			Salinity (ppt)			DO (ppm)		pH (ppm)		Air Temp (°C)	Depth (m) (bottom)	Time AM
	Surface	Bottom	Average	Surface	Bottom	Average	Surface	Bottom	Surface	Bottom			
CSHH #2 - Bell Marker 6													
10/31/07	15.66	16.01	15.84	27.38	27.54	27.46	5.70	5.19	7.8	7.8	12.5	7.2	9:03
10/24/07	19.29	19.30	19.30	27.18	27.45	27.32	5.51	4.93	7.8	7.7	16.5	7.5	10:30
10/17/07	17.92	18.96	18.44	26.61	27.62	27.12	6.41	5.52	7.7	7.6	15.8	7.1	9:05
10/10/07	21.45	21.45	21.45	27.15	27.91	27.53	5.84	4.61	7.5	7.5	19.9	9.0	10:55
10/3/07	21.19	20.90	21.05	27.38	27.74	27.56	5.79	5.09	7.6	7.5	20.7	6.6	9:30
09/27/07	21.74	21.53	21.64	26.86	27.46	27.16	6.47	4.92	7.6	7.5	25.2	8.5	9:20
09/19/07	20.34	20.41	20.38	26.52	26.67	26.60	6.88	6.20	7.8	7.7	17.8	6.3	9:23
9/13/07	22.03	21.95	21.99	26.49	26.52	26.51	5.96	5.67	7.7	7.7	21.8	6.5	8:56
9/5/07	22.74	22.32	22.53	26.27	26.47	26.37	7.51	4.94	8.0	7.6	21.1	7.7	9:42
8/29/07	22.21	21.48	21.85	25.91	26.32	26.12	6.36	3.39	7.6	7.4	22.8	6.6	8:30
8/22/07	20.93	21.28	21.11	26.29	26.53	26.41	4.66	3.12	7.5	7.3	19.3	7.3	9:54
8/15/07	23.13	22.18	22.66	26.02	26.22	26.12	7.39	3.34	7.9	7.4	26.2	7.4	9:10
8/8/07	No sampling--boat out of commission.												
8/1/07	No sampling--boat out of commission.												
7/25/07	No water sampling at this site.												
7/20/07	21.11	19.38	20.25	25.37	26.07	25.72	7.58	2.54	7.9	7.4	25.7	8.0	9:40
7/11/07	20.19	17.10	18.65	25.62	25.94	25.78	8.67	5.95	8.0	7.6	25.0	8.8	9:55
7/5/07	17.39	16.38	16.89	25.42	25.64	25.53	7.02	4.99	7.8	7.6	23.3	6.8	9:18
6/27/07	19.84	15.09	17.47	24.71	25.47	25.09	12.01	5.81	8.4	7.7	31.5	8.9	9:30
6/21/07	18.81	17.21	18.01	24.14	24.40	24.27	9.77	4.86	8.4	7.8	22.0	7.2	10:00
6/13/07	18.42	16.51	17.47	24.23	24.5	24.37	NG	5.6	8.2	8.0	18.1	8.6	10:25
6/6/07	16.08	15.31	15.70	23.94	24.25	24.10	11.91	11.41	8.6	8.5	18.5	6.9	11:03
5/30/07	18.37	12.23	15.30	23.96	24.56	24.26	13.01	9.40	8.6	8.0	21.0	9.1	11:25
Average			*19.40*			*26.07*		*5.37*			*21.24*		

Date	Water Temp (°C)			Salinity (ppt)			DO (ppm)		pH (ppm)		Air Temp (°C)	Depth (m) (bottom)	Time AM
	Surface	Bottom	Average	Surface	Bottom	Average	Surface	Bottom	Surface	Bottom			
CSHH #3 - Glen Cove Creek, Red Marker													
10/31/07	15.81	15.93	15.87	26.99	27.40	27.20	5.12	4.71	7.8	7.8	13.7	3.3	9:25
10/24/07	19.25	19.33	19.29	25.75	27.44	26.60	5.31	4.85	7.7	7.7	16.8	5.4	10:55
10/17/07	18.41	18.70	18.56	26.59	27.50	27.05	6.11	5.23	7.7	7.6	16.9	3.5	9:25
10/10/07	21.77	21.54	21.66	27.37	27.80	27.59	5.39	4.02	7.5	7.4	19.9	5.7	11:12
10/3/2007	21.20	21.04	21.12	26.15	27.79	26.97	5.68	4.70	7.5	7.4	21.2	3.5	9:58
09/27/07	22.30	21.90	22.10	26.80	27.16	26.98	7.05	5.43	7.7	7.5	25.7	5.1	9:56
09/19/07	20.75	20.86	20.81	25.61	26.63	26.12	6.38	5.66	7.7	7.6	18.0	3.7	9:53
9/13/07	22.20	22.38	22.29	25.69	26.32	26.01	5.93	5.16	7.6	7.6	23.0	3.5	9:15
9/5/07	23.17	22.35	22.76	25.27	26.39	25.83	8.37	4.46	8.0	7.5	21.8	4.2	10:04
8/29/07	22.91	22.63	22.77	25.88	26.10	25.99	8.10	6.97	7.8	7.6	24.5	3.6	9:00
8/22/07	21.20	21.58	21.39	25.90	26.74	26.32	3.15	1.36	7.4	7.3	19.4	4.4	10:13
8/15/07	23.75	23.80	23.78	25.45	25.65	25.55	9.66	9.60	8.2	8.1	25.7	3.5	9:50
8/8/07	No sampling--boat out of commission.												
8/1/07	No sampling--boat out of commission.												
7/25/07	22.52	20.35	21.44	25.02	25.91	25.47	11.26	4.04	8.2	7.5	22.8	4.2	11:06
7/20/07	21.45	21.06	21.26	24.59	25.08	24.84	7.92	5.35	7.9	7.7	25.5	2.6	10:16
7/11/07	19.94	17.86	18.90	25.15	25.65	25.40	6.50	3.78	7.6	7.4	25.1	5.2	10:15
7/5/07	18.59	17.49	18.04	24.53	24.97	24.75	6.42	5.83	7.8	7.7	23.6	2.7	9:45
6/27/07	20.37	16.46	18.42	24.53	25.08	24.81	12.20	6.73	8.4	7.8	31.6	4.9	9:55
6/21/07	19.39	18.68	19.04	23.51	23.30	23.41	9.48	8.49	8.2	8.2	21.8	3.4	10:25
6/13/07	17.87	16.35	17.11	22.56	24.3	23.43	6.73	6.84	8.0	8.1	18.1	5.9	11:00
6/6/07	16.15	15.77	15.96	23.60	23.90	23.75	11.00	11.81	8.5	8.4	16.4	3.2	9:29
5/30/07	19.57	13.55	16.56	23.69	24.40	24.05	9.81	11.40	8.4	8.1	24.0	5.2	11:58
Average			*19.96*			*25.62*		*6.02*			*21.69*		

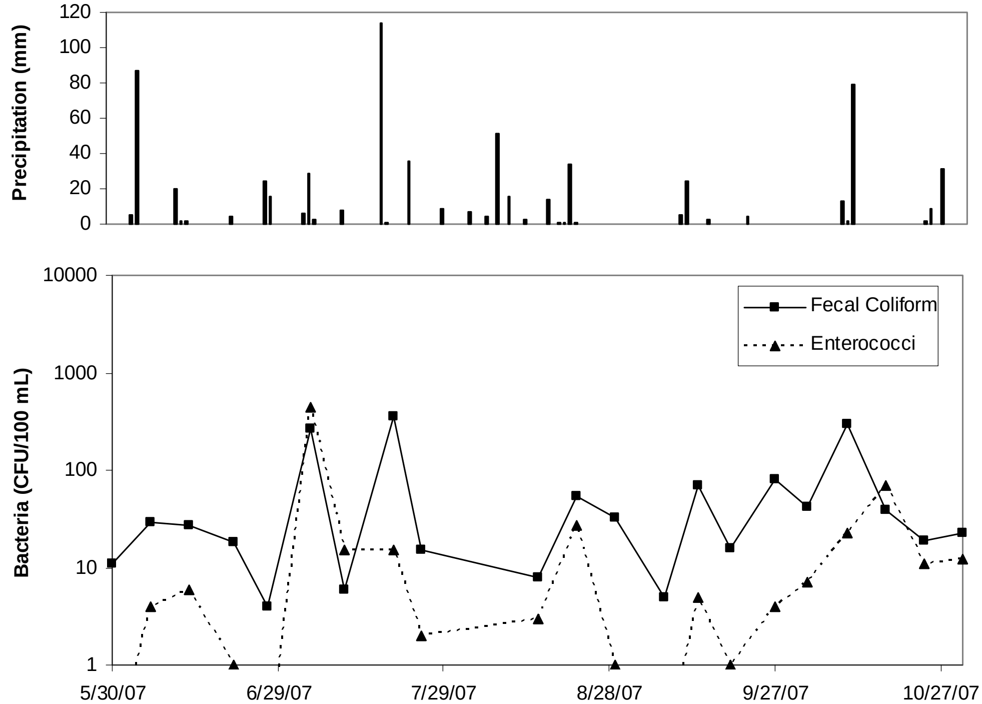
Date	Water Temp (°C)			Salinity (ppt)			DO (ppm)		pH (ppm)		Air Temp	Depth (m)	Time
	Surface	Bottom	Average	Surface	Bottom	Average	Surface	Bottom	Surface	Bottom	(°C)	(bottom)	AM
CSHH #8 - Glen Cove Sewage Treatment Plant Outfall													
10/31/07	15.89	15.66	15.78	26.23	26.77	26.50	6.03	5.54	7.7	7.7	12.5	2.6	9:53
10/24/07	19.43	19.37	19.40	25.60	27.25	26.43	4.40	4.87	7.5	7.6	17.6	4.9	11.20
10/17/07	18.45	18.48	18.47	26.23	26.69	26.46	5.29	5.35	7.5	7.6	17.5	2.8	9:40
10/10/07	22.45	21.77	22.11	27.09	27.31	27.20	4.18	4.69	7.4	7.4	20.1	5.2	11:40
10/03/07	21.14	21.24	21.19	26.11	27.05	26.58	4.86	5.19	7.4	7.5	21.1	2.7	10:45
09/27/07	22.33	22.15	22.24	24.30	26.80	25.55	7.26	6.07	7.7	7.6	25.9	5.0	10:25
09/19/07	21.30	20.86	21.08	25.84	26.23	26.04	5.77	5.27	7.6	7.6	18.7	2.7	10:20
9/13/07	22.60	22.45	22.53	24.50	26.21	25.36	4.71	4.70	7.5	7.6	21.2	2.9	9:46
9/5/07	23.12	23.20	23.16	22.06	25.84	23.95	8.07	8.17	7.9	7.9	21.2	1.9	10:30
8/29/07	23.04	22.81	22.93	24.12	25.87	25.00	8.21	6.83	7.7	7.6	26.2	3.4	9:30
8/22/07	21.71	21.60	21.66	23.94	26.48	25.21	2.27	1.32	7.3	7.3	19.4	3.1	10:40
8/15/07	24.16	23.86	24.01	22.99	25.17	24.08	9.65	7.66	8.1	7.9	27.4	3.4	10:30
8/8/07	No sampling--boat out of commission.												
8/1/07	No sampling--boat out of commission.												
7/25/07	22.21	21.13	21.67	22.91	25.51	24.21	7.69	5.07	7.8	7.6	25.9	2.9	11:32
7/20/07	21.32	20.40	20.86	22.96	25.28	24.12	7.44	3.76	7.7	7.4	25.2	2.2	10:53
7/11/07	21.67	19.09	20.38	22.37	25.55	23.96	7.11	4.01	7.5	7.5	29.6	3.1	10:40
7/5/07	19.73	18.41	19.07	16.05	24.71	20.38	7.00	5.00	7.5	7.6	25.3	1.9	10:00
6/27/07	20.71	18.44	19.58	20.85	24.75	22.80	9.40	8.14	8.2	8.0	32.7	4.0	10:25
6/21/07	19.85	18.98	19.42	16.07	24.04	20.06	9.44	8.36	8.2	8.1	22.9	2.6	10:58
6/13/07	18.50	17.19	17.85	20.47	24.05	22.26	6.14	6.30	7.9	8.0	18.4	4.7	11:30
6/6/07	18.20	16.15	17.18	16.47	23.26	19.87	12.09	12.20	8.4	8.5	17.3	2.5	9:50
Average			*20.53*			*24.30*		*5.93*			*22.31*		

Date	Water Temp (°C)			Salinity (ppt)			DO (ppm)		pH (ppm)		Air Temp	Depth (m)	Time
	Surface	Bottom	Average	Surface	Bottom	Average	Surface	Bottom	Surface	Bottom	(°C)	(bottom)	
CSHH #4 - Bar Beach Spit													
10/24/07	19.35	19.36	19.36	27.02	27.15	27.09	4.29	4.29	7.6	7.6	18.2	2.9	9:00
10/10/07	22.09	22.05	22.07	27.29	27.37	27.33	5.43	4.61	7.4	7.4	18.9	4.3	9:12
9/5/07	23.13	23.08	23.11	25.70	25.83	25.77	7.38	6.18	7.9	7.7	21.4	5.4	9:05
8/22/07	20.49	21.19	20.84	24.47	25.80	25.14	4.53	2.39	7.4	7.4	19.0	3.1	9:28
7/25/07	21.71	20.95	21.33	25.25	25.56	25.41	8.13	5.48	8.0	7.7	23.0	3.0	10:30
7/11/07	19.74	17.44	18.59	25.36	25.68	25.52	4.59	2.95	7.5	7.4	23.9	5.8	8:40
CSHH #5 - Mott's Cove													
10/24/07	19.33	19.36	19.35	26.67	26.99	26.83	4.22	4.29	7.6	7.6	17.8	2.0	9:15
10/10/07	22.47	22.44	22.46	26.93	27.19	27.06	4.28	4.19	7.3	7.3	19.7	1.9	9:35
9/5/07	22.39	23.05	22.72	25.02	25.54	25.28	6.25	5.80	7.6	7.6	21.5	1.3	8:55
8/22/07	20.78	21.19	20.99	24.57	25.35	24.96	3.32	1.96	7.3	7.3	18.9	1.3	9:10
7/25/07	22.08	20.86	21.47	24.22	25.17	24.70	10.56	5.68	8.0	7.6	23.6	1.3	10:15
7/11/07	19.14	18.70	18.92	24.95	25.39	25.17	5.36	2.99	7.4	7.3	24.9	1.7	9:00
CSHH #6 - East of Former Incinerator Site													
10/24/07	19.35	19.42	19.39	26.49	26.72	26.61	4.49	4.52	7.6	7.6	17.6	2.6	9:38
10/10/07	23.10	23.02	23.06	26.59	26.76	26.68	4.58	3.79	7.3	7.3	20.2	2.3	9:55
09/05/07	No sampling at this site because of outgoing tide.												
8/22/07	No sampling at this site because of outgoing tide.												
7/25/07	21.86	20.99	21.43	24.76	25.39	25.08	8.60	4.73	8.0	7.5	22.8	1.7	9:50
7/11/07	20.32	18.98	19.65	24.99	25.35	25.17	5.50	2.60	7.4	7.3	24.7	4.7	9:15
CSHH #7 - West of Bryant Landing (formerly site of oil dock)													
10/24/07	19.30	19.36	19.33	25.91	26.09	26.00	4.32	4.34	7.5	7.5	17.8	2.3	9:50
10/10/07	22.40	22.93	22.67	25.81	26.75	26.28	5.61	5.76	7.2	7.3	19.8	2.0	10:10
09/05/07	No sampling at this site because of outgoing tide.												
8/22/07	No sampling at this site because of outgoing tide.												
7/25/07	21.48	21.38	21.43	24.48	24.90	24.69	7.57	4.60	7.8	7.5	25.2	1.6	9:30
7/11/07	20.64	20.27	20.46	24.77	25.10	24.94	3.19	2.22	7.3	7.3	24.8	1.4	9:30

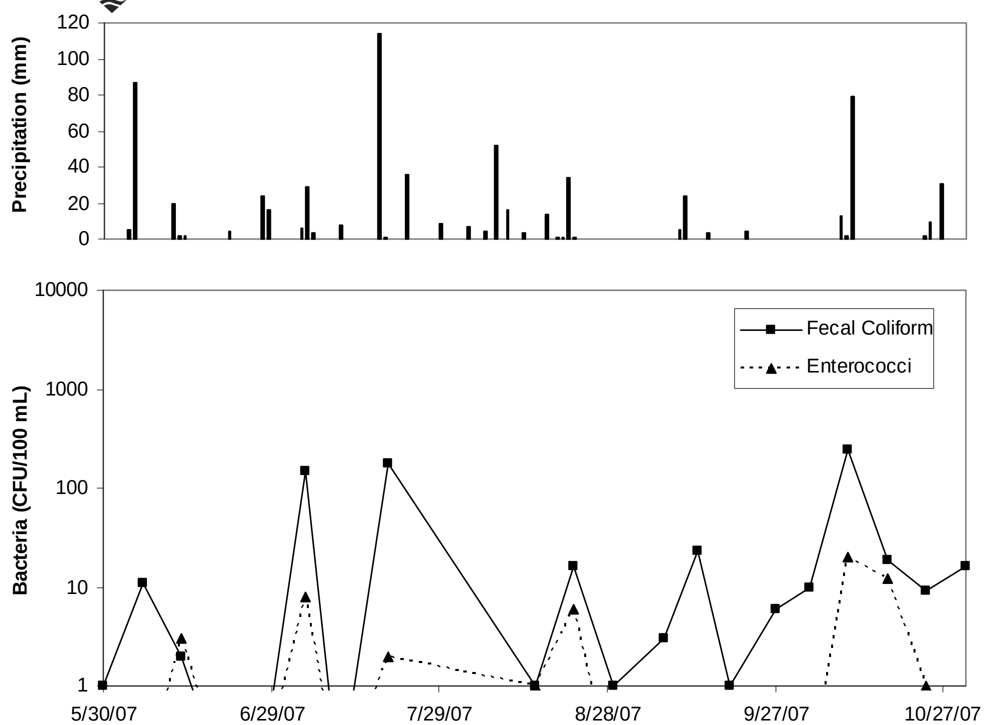
APPENDIX B

2007 Bacteria and Precipitation Data

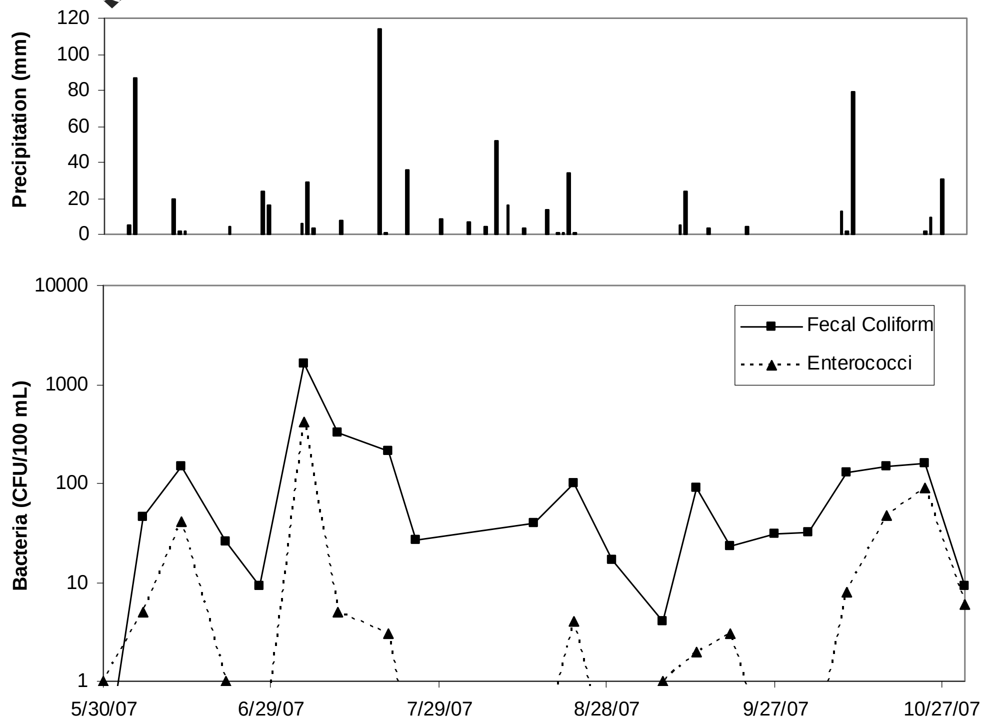
2007 CSHH#1 - Beacon 11



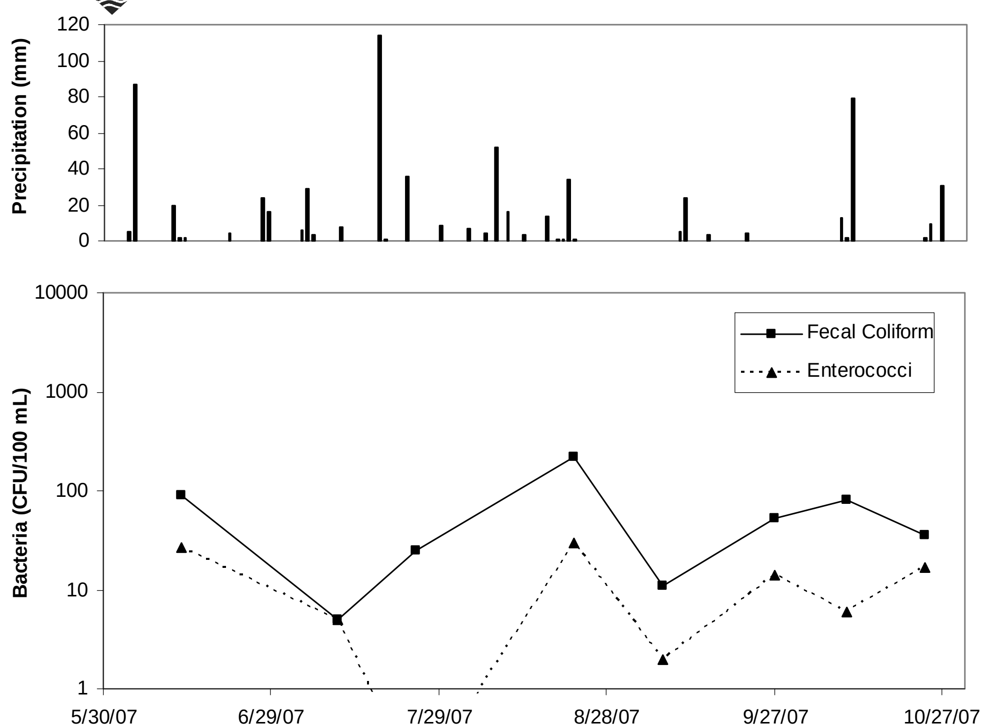
2007 CSHH#2 - Bell Marker 6



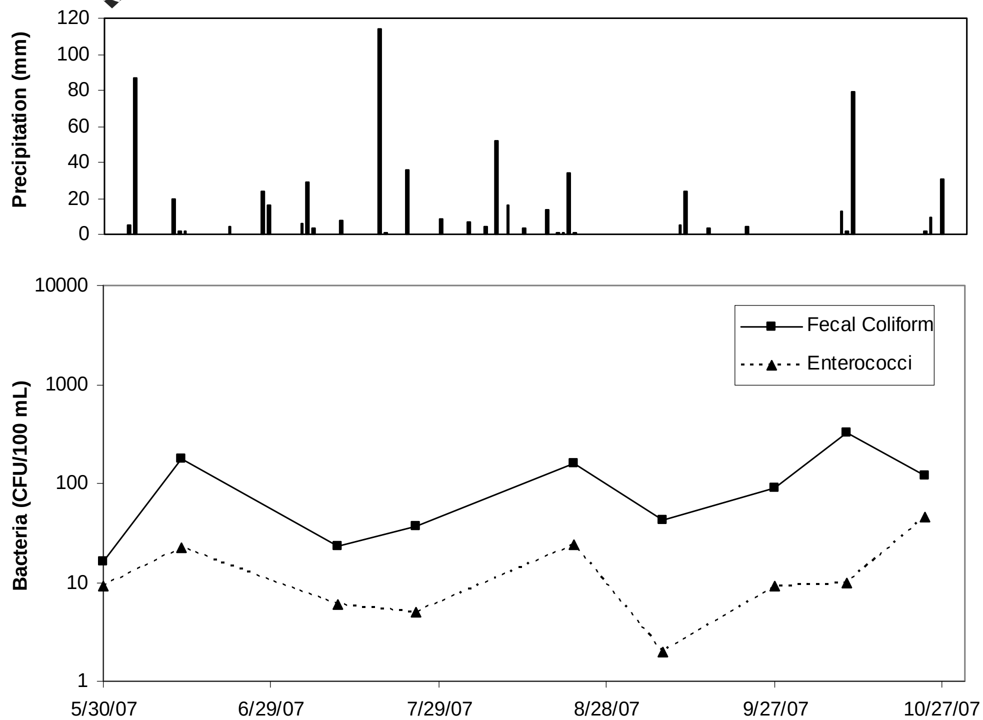
2007 CSHH#3 - Glen Cove Creek



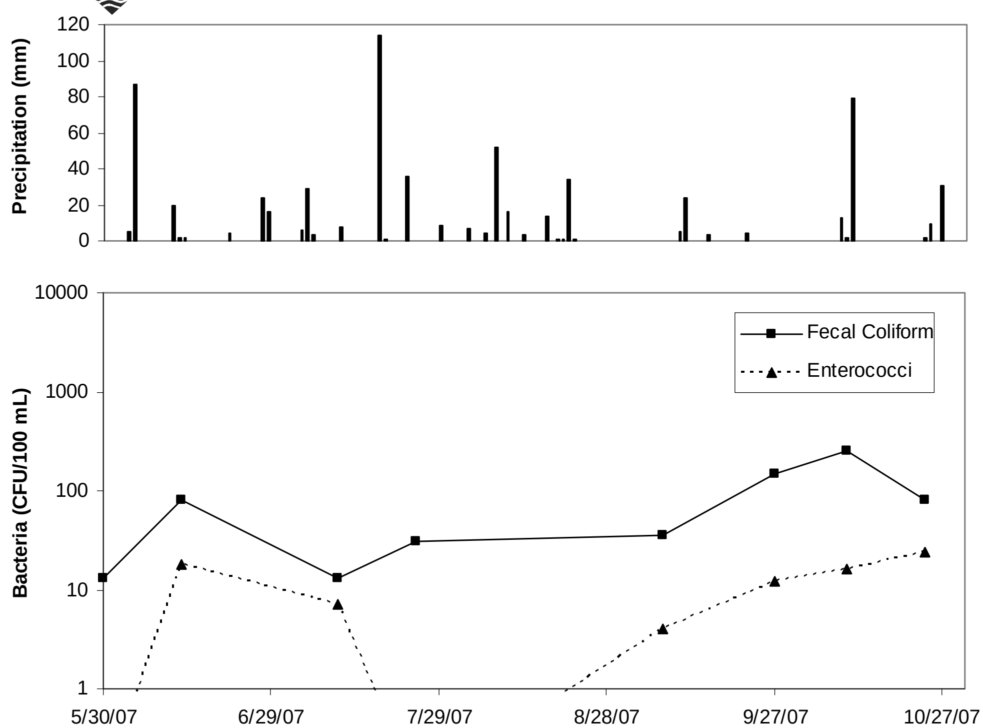
2007 CSHH#4 - Bar Beach Sand Split



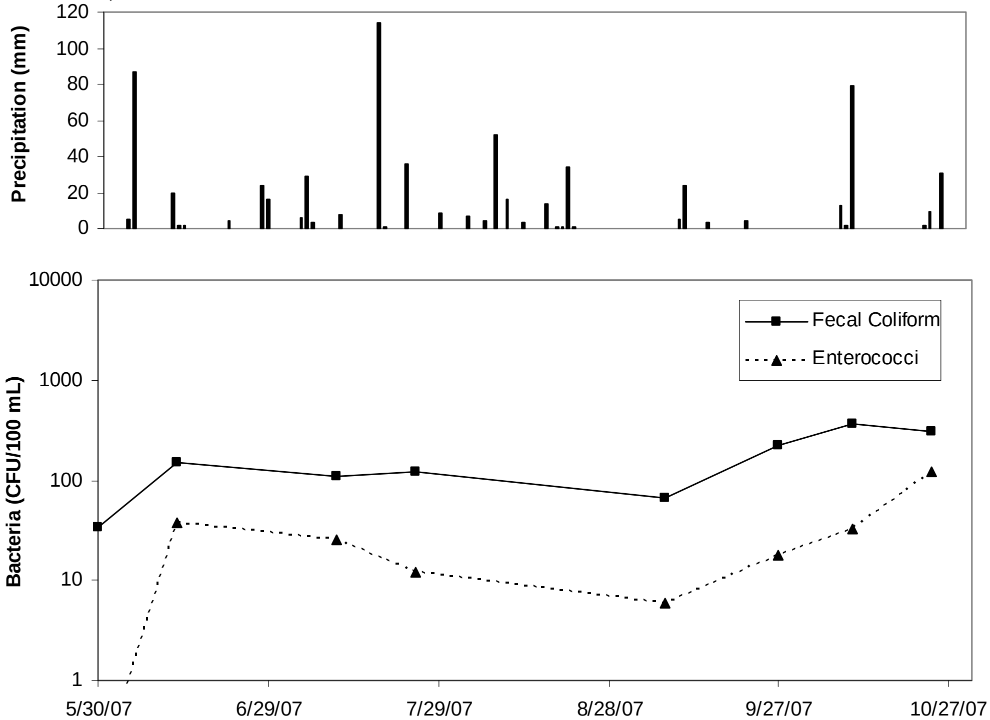
2007 CSHH#5 - Mott's Cove



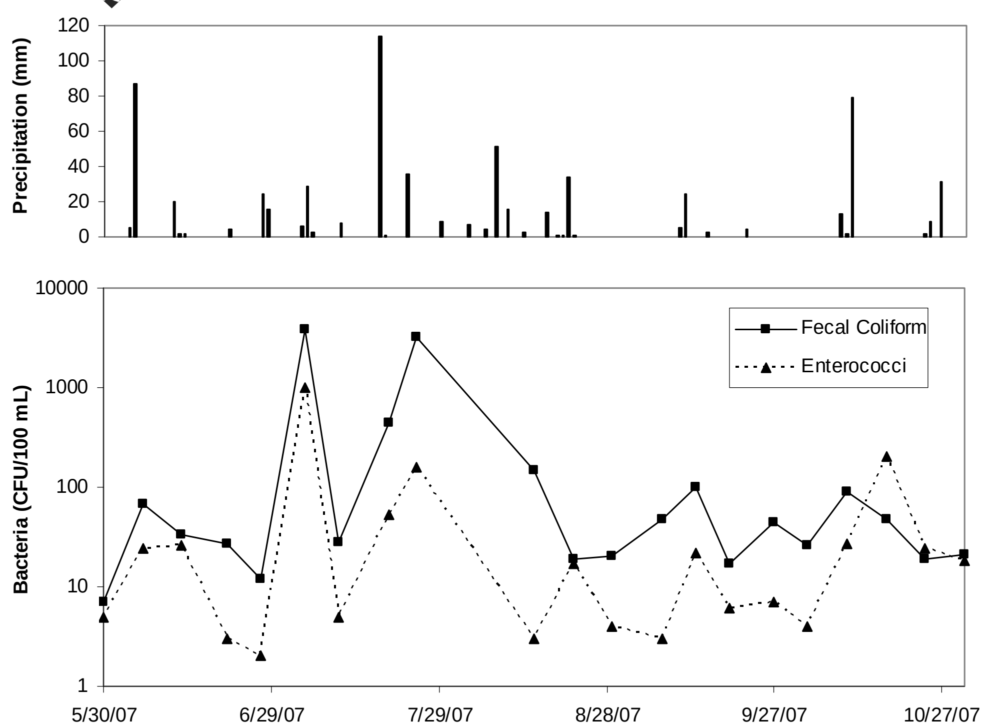
2007 CSHH#6 - East of the Former Incinerator Site



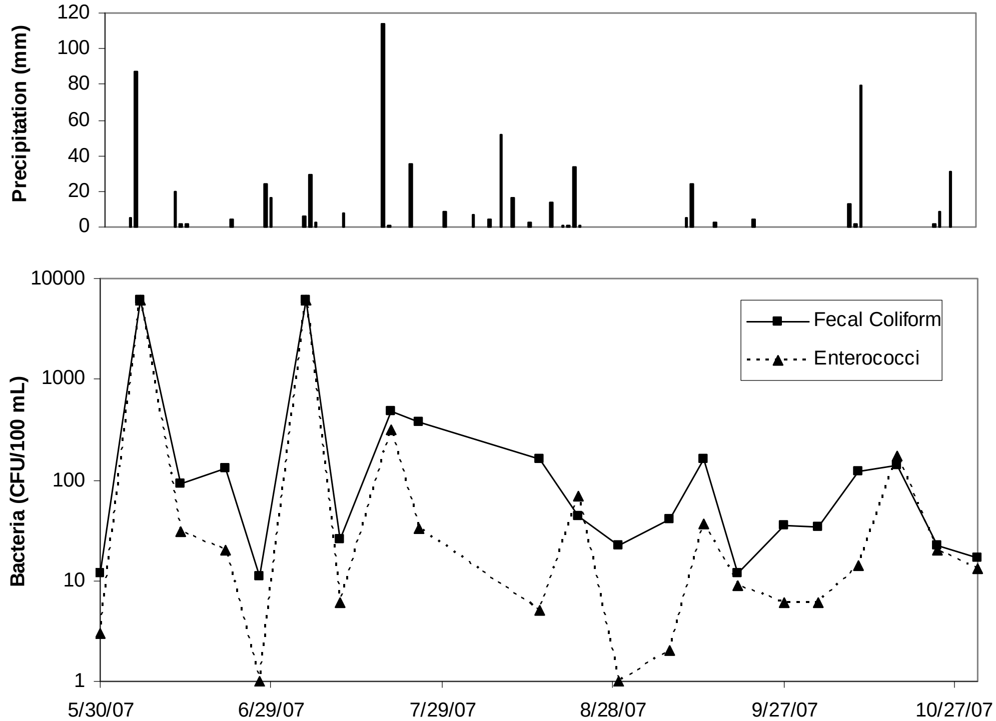
2007 CSHH#7 - West of the Old Oil Dock



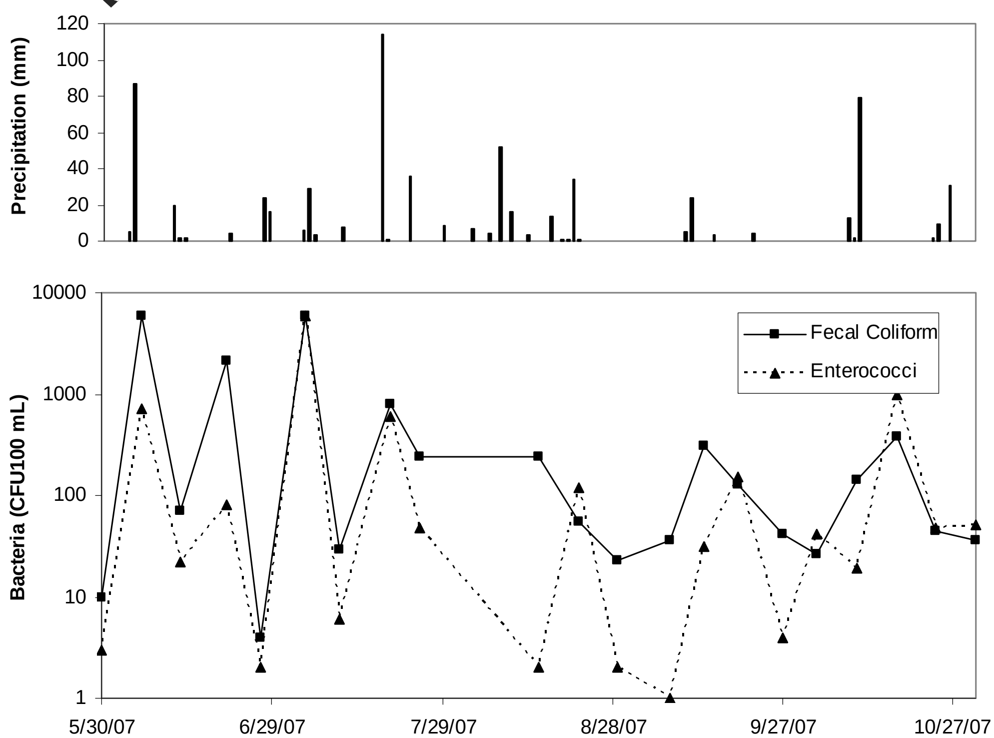
2007 CSHH#8 - Glen Cove Sewage Treatment Plant Outfall



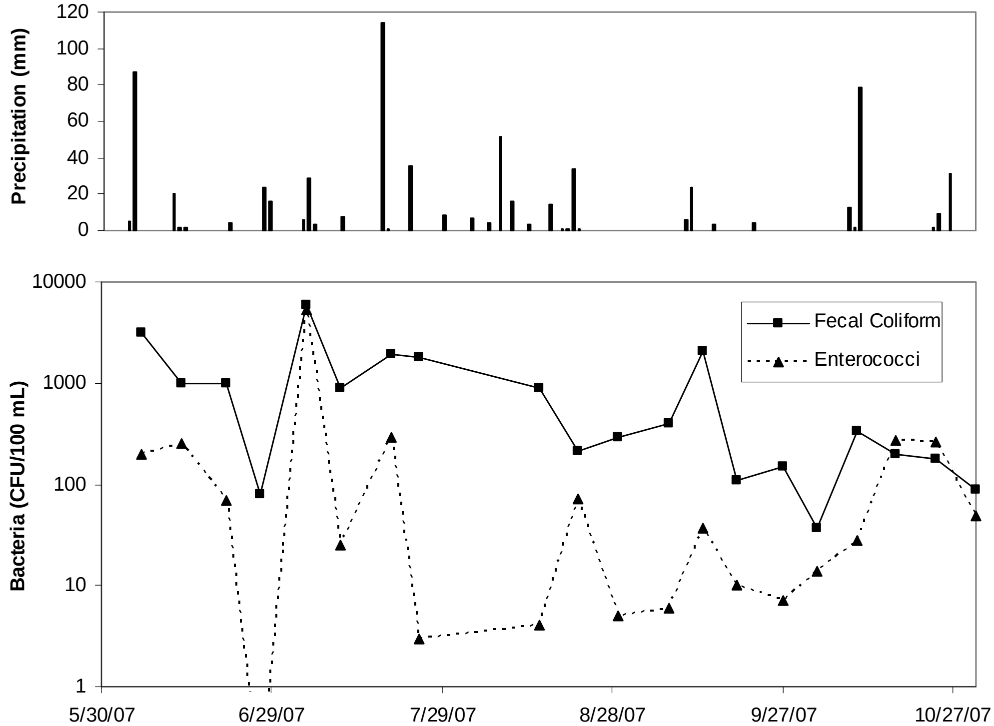
2007 CSHH#9 - First Pipe West of STP Outfall



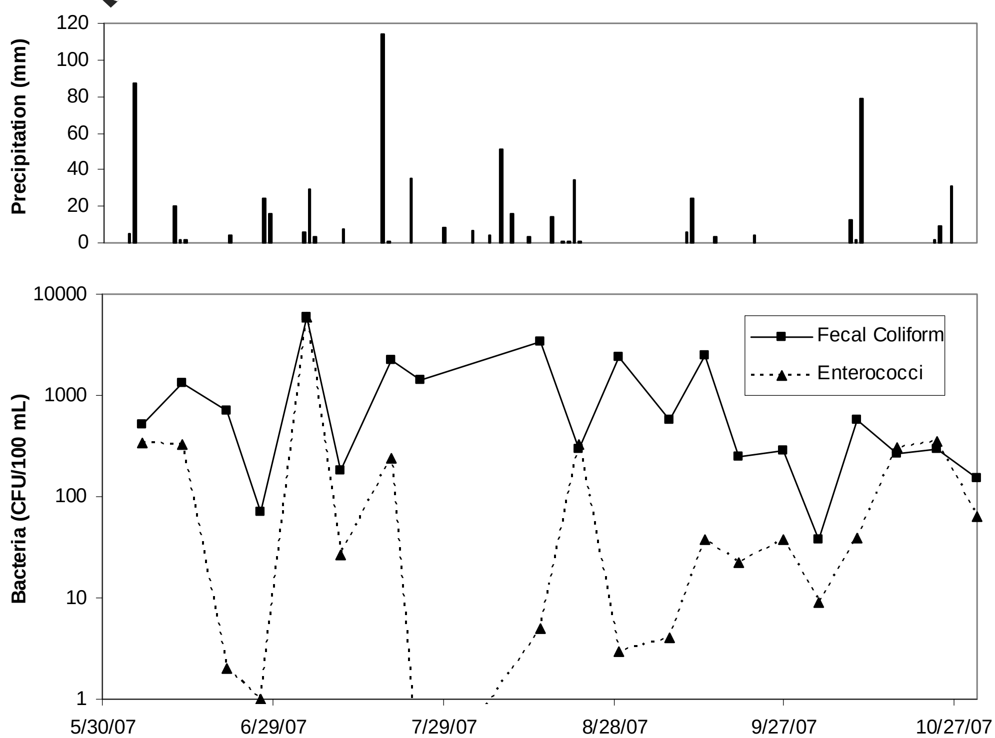
2007 CSHH#10 - Pipe at Seawall Corner West of STP Outfall

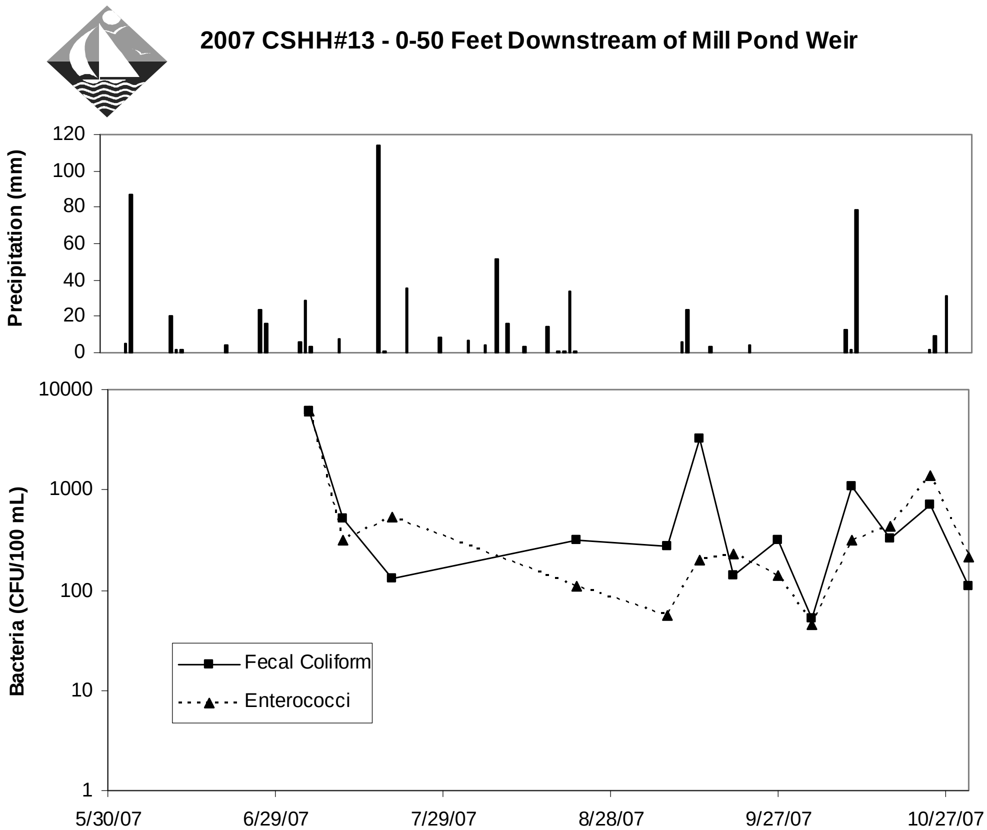


2007 CSHH#11 - 50 Yards East of STP Outfall



2007 CSHH#12 - Bend in Seawall East of STP Outfall




2007 CSHH#13 - 0-50 Feet Downstream of Mill Pond Weir
Precipitation (mm)
120
100
80
60
40
20
0
Bacteria (CFU/100 mL)
10000
1000
100
10
1
Fecal Coliform
Enterococci
5/30/07
6/29/07
7/29/07
8/28/07
9/27/07
10/27/07

CSHH #1 - Beacon 11

	Fecal Coliform		*Enterococci*	
Date	***CFU/100ml***	***Log AvgFC***	***CFU/100ml***	***Log AvgEnt***
05/30/07	11.00		0.10	
06/06/07	29.00		4.00	
06/13/07	27.00	20.50	6.00	1.34
06/21/07	18.00	19.84	1.00	1.24
06/27/07	4.00	14.40	0.10	0.75
07/05/07	270.00	27.32	***450.00***	4.04
07/11/07	6.00	19.94	15.00	5.27
07/20/07	350.00	33.28	15.00	6.33
07/25/07	15.00	32.09	2.00	7.27
08/15/07	8.00	34.76	3.00	4.48
08/22/07	54.00	18.64	27.00	5.45
08/29/07	33.00	24.25	1.00	4.33
09/07/07	5.00	16.34	0.10	1.69
09/13/07	70.00	21.86	5.00	2.10
09/19/07	16.00	25.11	1.00	1.68
09/27/07	80.00	27.16	4.00	1.15
10/03/07	42.00	28.50	7.00	1.70
10/10/07	300.00	64.65	23.00	5.03
10/17/07	39.00	57.51	70.00	8.53
10/24/07	19.00	59.52	11.00	13.77
10/31/07	23.00	46.39	12.00	17.16

CSHH #2 - Bell Marker 6

	Fecal Coliform		*Enterococci*	
Date	***CFU/100ml***	***Log AvgFC***	***CFU/100ml***	***Log AvgEnt***
05/30/07	1.00		0.10	
06/06/07	11.00		0.10	
06/13/07	2.00	2.80	3.00	0.31
06/21/07	0.10	1.22	0.10	0.23
06/27/07	0.10	0.74	0.10	0.20
07/05/07	150.00	2.01	8.00	0.47
07/11/07	0.10	0.79	0.10	0.47
07/20/07	180.00	1.93	2.00	0.44
08/15/07	1.00	13.42	1.00	1.41
08/22/07	16.00	4.00	6.00	2.45
08/29/07	1.00	2.52	0.10	0.84
09/07/07	3.00	2.63	0.10	0.49
09/13/07	23.00	4.06	0.10	0.36
09/19/07	1.00	4.06	0.10	0.23
09/27/07	6.00	3.34	0.10	0.10
10/03/07	10.00	5.29	0.10	0.10
10/10/07	240.00	12.71	20.00	0.29
10/17/07	19.00	12.23	12.00	0.75
10/24/07	9.00	18.98	1.00	1.19
10/31/07	16.00	23.09	0.10	1.19

Note: CFU refers to the number of colony forming units, or the number of bacterial cells in the water sample. Log AvgFC (log average for fecal coliform) and Log AvgEnt (log average for enterococci) refer to the running seasonal average of bacteria results at each location. Boldfaced, italicized values exceed the NYS beach closure standards of 1,000 CFU/100 ml for fecal coliform; 200 Log AvgFC/100 ml; 104 CFU/100 ml for enterococci; and 35 Log AvgEnt 35.

CSHH #3 - Glen Cove Creek

	Fecal Coliform		*Enterococci*	
Date	***CFU/100ml***	***Log AvgFC***	***CFU/100ml***	***Log AvgEnt***
05/30/07	0.10		1.00	
06/06/07	45.00		5.00	
06/13/07	150.00	8.77	41.00	5.90
06/21/07	26.00	11.51	1.00	3.78
06/27/07	9.00	10.96	0.10	1.83
07/05/07	***1600.00***	75.95	***420.00***	6.12
07/11/07	320.00	112.44	5.00	6.12
07/20/07	210.00	120.27	3.00	3.63
07/25/07	27.00	121.18	0.10	2.29
08/15/07	39.00	60.47	0.10	0.31
08/22/07	100.00	47.22	4.00	0.34
08/29/07	17.00	40.47	0.10	0.34
09/07/07	4.00	22.69	1.00	0.45
09/13/07	90.00	29.89	2.00	0.60
09/19/07	23.00	26.90	3.00	1.19
09/27/07	31.00	21.28	0.10	0.57
10/03/07	32.00	24.15	0.10	0.57
10/10/07	130.00	48.45	8.00	0.86
10/17/07	150.00	53.66	47.00	1.62
10/24/07	160.00	79.09	90.00	3.21
10/31/07	9.00	61.76	6.00	7.27

CSHH #4 - Bar Beach Sand Split

	Fecal Coliform		*Enterococci*	
Date	***CFU/100ml***	***Log AvgFC***	***CFU/100ml***	***Log AvgEnt***
06/13/07	90.00		27.00	
07/11/07	5.00		5.00	
07/25/07	25.00	11.18	0.10	0.71
08/22/07	220.00	74.16	30.00	1.73
09/07/07	11.00	49.19	2.00	7.75
09/27/07	53.00	24.15	14.00	5.29
10/10/07	80.00	65.12	6.00	9.17
10/24/07	36.00	53.44	17.00	11.26

Note: CFU refers to the number of colony forming units, or the number of bacterial cells in the water sample. Log AvgFC (log average for fecal coliform) and Log AvgEnt (log average for enterococci) refer to the running seasonal average of bacteria results at each location. Boldfaced, italicized values exceed the NYS beach closure standards of 1,000 CFU/100 ml for fecal coliform; 200 Log AvgFC/100 ml; 104 CFU/100 ml for enterococci; and 35 Log AvgEnt 35.

CSHH #5 - Mott's Cove

	Fecal Coliform		*Enterococci*	
Date	***CFU/100ml***	***Log AvgFC***	***CFU/100ml***	***Log AvgEnt***
05/30/07	16.00		9.00	
06/13/07	180.00		22.00	
07/11/07	23.00	64.34	6.00	11.49
07/25/07	37.00	29.17	5.00	5.48
08/22/07	160.00	76.94	24.00	10.95
09/07/07	43.00	82.95	2.00	6.93
09/27/07	90.00	62.21	9.00	4.24
10/10/07	320.00	169.71	10.00	9.49
10/24/07	120.00	151.19	45.00	15.94

CSHH #6 - East of the Former Incinerator Site

	Fecal Coliform		*Enterococci*	
Date	***CFU/100ml***	***Log AvgFC***	***CFU/100ml***	***Log AvgEnt***
05/30/07	13.00		0.10	
06/13/07	80.00		18.00	
07/11/07	13.00	32.25	7.00	11.22
07/25/07	31.00	20.07	0.10	0.84
09/07/07	35.00	0.00	4.00	0.00
09/27/07	150.00	72.46	12.00	6.93
10/10/07	250.00	193.65	16.00	13.86
10/24/07	80.00	144.22	24.00	16.64

CSHH #7 - West of Old Oil Dock

	Fecal Coliform		*Enterococci*	
Date	***CFU/100ml***	***Log AvgFC***	***CFU/100ml***	***Log AvgEnt***
5/30/2007	34.00		0.10	
6/13/2007	150.00		37.00	
7/11/2007	110.00	128.45	25.00	30.41
7/25/2007	120.00	114.89	12.00	17.32
7-Sep	66.00	0.00	6.00	0.00
27-Sep	220.00	120.50	18.00	10.39
10/10/2007	370.00	***285.31***	33.00	24.37
10/24/07	310.00		***120.00***	

Note: CFU refers to the number of colony forming units, or the number of bacterial cells in the water sample. Log AvgFC (log average for fecal coliform) and Log AvgEnt (log average for enterococci) refer to the running seasonal average of bacteria results at each location. Boldfaced, italicized values exceed the NYS beach closure standards of 1,000 CFU/100 ml for fecal coliform; 200 Log AvgFC/100 ml; 104 CFU/100 ml for enterococci; and 35 Log AvgEnt 35.

CSHH #8 - Glen Cove STP Outfall

	Fecal Coliform		*Enterococci*	
Date	***CFU/100ml***	***Log AvgFC***	***CFU/100ml***	***Log AvgEnt***
05/30/07	7.00		5.00	
06/06/07	68.00		24.00	
06/13/07	33.00	25.04	26.00	14.61
06/21/07	27.00	25.52	3.00	9.84
06/27/07	12.00	21.94	2.00	7.15
07/05/07	***3800.00***	77.32	***1000.00***	20.64
07/11/07	28.00	64.74	5.00	15.08
07/20/07	440.00	108.69	52.00	17.32
07/25/07	***3200.00***	***282.45***	***160.00***	***38.37***
08/15/07	150.00	***595.52***	3.00	29.22
08/22/07	19.00	***208.93***	17.00	20.13
08/29/07	20.00	38.49	4.00	5.89
09/07/07	47.00	40.46	3.00	4.97
09/13/07	100.00	48.48	22.00	6.70
09/19/07	17.00	31.37	6.00	7.69
09/27/07	44.00	37.10	7.00	6.44
10/03/07	26.00	39.10	4.00	6.44
10/10/07	90.00	44.53	27.00	10.00
10/17/07	47.00	38.29	***200.00***	15.54
10/24/07	19.00	39.15	24.00	20.51
10/31/07	21.00	33.76	18.00	24.77

CSHH#9 - First Pipe West of STP Outfall

	Fecal Coliform		*Enterococci*	
Date	***CFU/100ml***	***Log AvgFC***	***CFU/100ml***	***Log AvgEnt***
05/30/07	12.00		3.00	
06/06/07	***6001.00***		***6001.00***	
06/13/07	90.00	186.44	31.00	***82.33***
06/21/07	130.00	170.37	20.00	***57.80***
06/27/07	11.00	98.49	1.00	25.68
07/05/07	***6001.00***	***341.35***	***6001.00***	***117.43***
07/11/07	26.00	114.96	6.00	29.50
07/20/07	480.00	160.68	***320.00***	***47.04***
07/25/07	370.00	198.06	33.00	***52.00***
08/15/07	160.00	***305.16***	5.00	***37.52***
08/22/07	44.00	137.59	70.00	22.60
08/29/07	22.00	53.70	1.00	7.05
09/07/07	41.00	50.20	2.00	5.14
09/13/07	160.00	63.30	36.00	7.59
09/19/07	12.00	37.70	9.00	8.54
09/27/07	35.00	36.02	6.00	5.22
10/03/07	34.00	39.29	6.00	7.47
10/10/07	120.00	48.71	14.00	11.03
10/17/07	140.00	47.43	***170.00***	15.05
10/24/07	22.00	53.54	20.00	17.65
10/31/07	17.00	46.34	13.00	20.60

Note: CFU refers to the number of colony forming units, or the number of bacterial cells in the water sample. Log AvgFC (log average for fecal coliform) and Log AvgEnt (log average for enterococci) refer to the running seasonal average of bacteria results at each location. Boldfaced, italicized values exceed the NYS beach closure standards of 1,000 CFU/100 ml for fecal coliform; 200 Log AvgFC/100 ml; 104 CFU/100 ml for enterococci; and 35 Log AvgEnt 35.

CSHH#10 - Pipe at Corner of Seawall West of STP Outfall

	Fecal Coliform		*Enterococci*	
Date	***CFU/100ml***	***Log AvgFC***	***CFU/100ml***	***Log AvgEnt***
05/30/07	10.00		3.00	
06/06/07	***6001.00***		***710.00***	
06/13/07	70.00	161.35	22.00	***36.05***
06/21/07	***2100.00***	***306.47***	80.00	***44.00***
06/27/07	4.00	128.68	2.00	23.71
07/05/07	***6001.00***	***462.56***	***6001.00***	***108.44***
07/11/07	29.00	159.22	6.00	***41.74***
07/20/07	800.00	***259.18***	***610.00***	***81.13***
07/25/07	240.00	167.96	48.00	***73.25***
08/15/07	240.00	***358.51***	2.00	***38.83***
08/22/07	55.00	146.87	***120.00***	22.58
08/29/07	23.00	67.21	2.00	7.83
09/07/07	36.00	57.50	1.00	4.68
09/13/07	310.00	80.54	31.00	6.83
09/19/07	130.00	71.24	***150.00***	16.20
09/27/07	42.00	67.50	4.00	8.21
10/03/07	26.00	69.18	41.00	15.01
10/10/07	140.00	90.77	19.00	27.05
10/17/07	380.00	94.54	***1000.00***	***54.19***
10/24/07	44.00	76.12	47.00	***42.97***
10/31/07	36.00	73.81	52.00	***71.77***

CSHH #11 - 50 Yards East of STP Outfall

	Fecal Coliform		*Enterococci*	
Date	***CFU/100ml***	***Log AvgFC***	***CFU/100ml***	***Log AvgEnt***
06/06/07	***3200.00***		***200.00***	
06/13/07	1000.00		***250.00***	
06/21/07	1000.00	***1473.61***	70.00	***151.83***
06/27/07	80.00	***711.31***	0.10	24.32
07/05/07	***6001.00***	***1089.66***	***5300.00***	***71.40***
07/11/07	900.00	***845.50***	25.00	***47.10***
07/20/07	***1900.00***	***961.31***	***290.00***	***48.52***
07/25/07	***1800.00***	***1081.23***	3.00	25.84
08/15/07	900.00	***1454.64***	4.00	15.15
08/22/07	210.00	***698.09***	72.00	9.52
08/29/07	290.00	***379.86***	5.00	11.29
09/07/07	400.00	***384.80***	6.00	9.64
09/13/07	***2100.00***	***540.29***	37.00	12.62
09/19/07	110.00	***354.86***	10.00	15.15
09/27/07	150.00	***331.77***	7.00	9.51
10/03/07	37.00	***219.78***	14.00	11.68
10/10/07	330.00	***211.49***	28.00	15.90
10/17/07	200.00	132.14	***270.00***	23.66
10/24/07	180.00	145.82	***260.00***	***45.39***
10/31/07	90.00	131.66	48.00	***66.71***

Note: CFU refers to the number of colony forming units, or the number of bacterial cells in the water sample. Log AvgFC (log average for fecal coliform) and Log AvgEnt (log average for enterococci) refer to the running seasonal average of bacteria results at each location. Boldfaced, italicized values exceed the NYS beach closure standards of 1,000 CFU/100 ml for fecal coliform; 200 Log AvgFC/100 ml; 104 CFU/100 ml for enterococci; and 35 Log AvgEnt 35.

CSHH #12 - Bend in Seawall East of STP Outfall

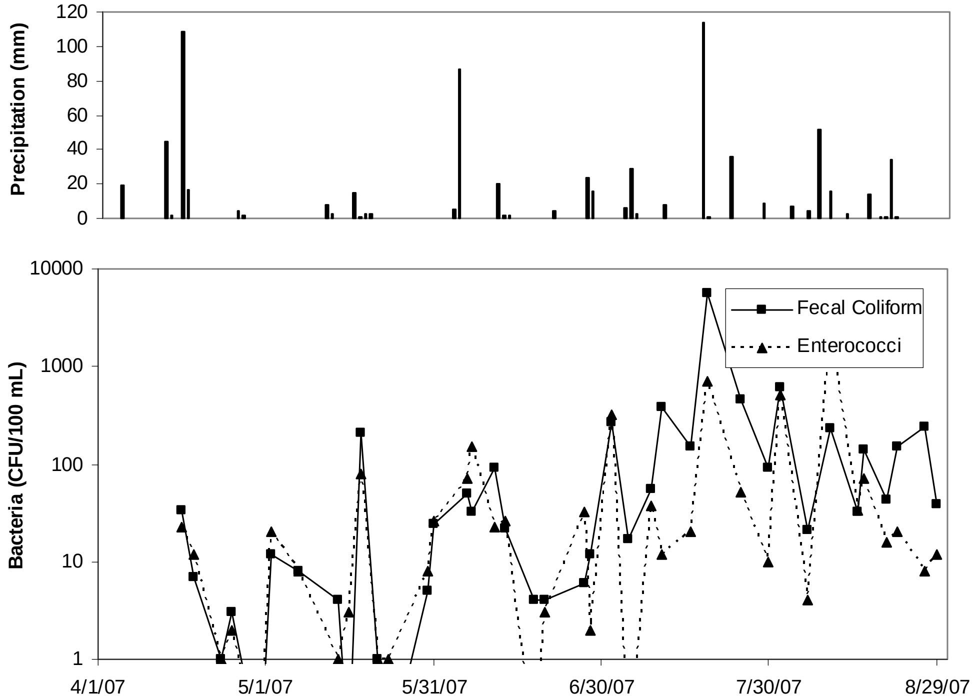
	Fecal Coliform		Enterococci	
Date	***CFU/100ml***	***Log AvgFC***	***CFU/100ml***	***Log AvgEnt***
06/06/07	520.00		***340.00***	
06/13/07	***1300.00***		***330.00***	
06/21/07	700.00	***779.26***	2.00	***60.77***
06/27/07	70.00	***426.61***	1.00	21.76
07/05/07	***6001.00***	***723.89***	***6001.00***	***66.97***
07/11/07	180.00	***585.50***	27.00	***40.35***
07/20/07	***2200.00***	***650.46***	***240.00***	***37.86***
07/25/07	***1400.00***	***747.19***	0.10	20.80
08/15/07	***3400.00***	***2187.81***	5.00	4.93
08/22/07	290.00	***1113.44***	***330.00***	5.48
08/29/07	***2400.00***	***1332.59***	3.00	17.04
09/07/07	580.00	***1082.38***	4.00	11.86
09/13/07	***2500.00***	***1279.65***	38.00	14.97
09/19/07	250.00	***759.25***	22.00	20.14
09/27/07	280.00	***753.94***	37.00	13.00
10/03/07	38.00	***329.04***	9.00	16.19
10/10/07	580.00	***329.04***	39.00	25.54
10/17/07	270.00	***210.83***	***310.00***	***38.86***
10/24/07	290.00	***217.18***	***350.00***	***67.58***
10/31/07	150.00	191.70	63.00	***75.16***

CSHH #13 – 0-50 Feet Downstream of Mill Pond Weir

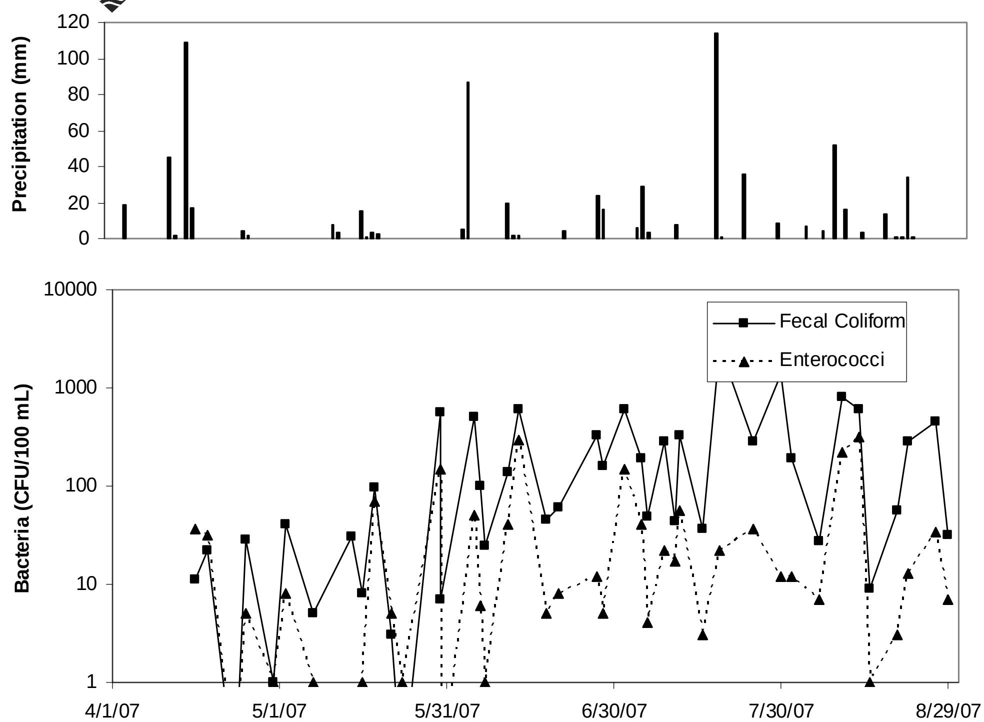
	Fecal Coliform		Enterococci	
Date	***CFU/100ml***	***Log AvgFC***	***CFU/100ml***	***Log AvgEnt***
07/05/07	***6001.00***		***6001.00***	
07/11/07	510.00		***320.00***	
07/20/07	130.00	***735.49***	***540.00***	***1012.18***
08/22/07	320.00	***276.84***	***110.00***	***266.88***
09/07/07	270.00	***223.95***	56.00	***149.28***
09/13/07	***3200.00***	***651.46***	***200.00***	***107.20***
9/19/2007	140.00	***494.55***	***230.00***	***137.08***
9/27/2007	320.00	***523.37***	***140.00***	***186.05***
10/3/2007	52.00	132.56	46.00	***113.99***
10/10/2007	***1080.00***	***261.93***	***320.00***	***127.26***
10/17/2007	330.00	***264.63***	***430.00***	***184.98***
10/24/2007	700.00	***629.52***	***1400.00***	***577.54***
10/31/2007	110.00	***293.99***	***210.00***	***501.89***

Note: CFU refers to the number of colony forming units, or the number of bacterial cells in the water sample. Log AvgFC (log average for fecal coliform) and Log AvgEnt (log average for enterococci) refer to the running seasonal average of bacteria results at each location. Boldfaced, italicized values exceed the NYS beach closure standards of 1,000 CFU/100 ml for fecal coliform; 200 Log AvgFC/100 ml; 104 CFU/100 ml for enterococci; and 35 Log AvgEnt 35.

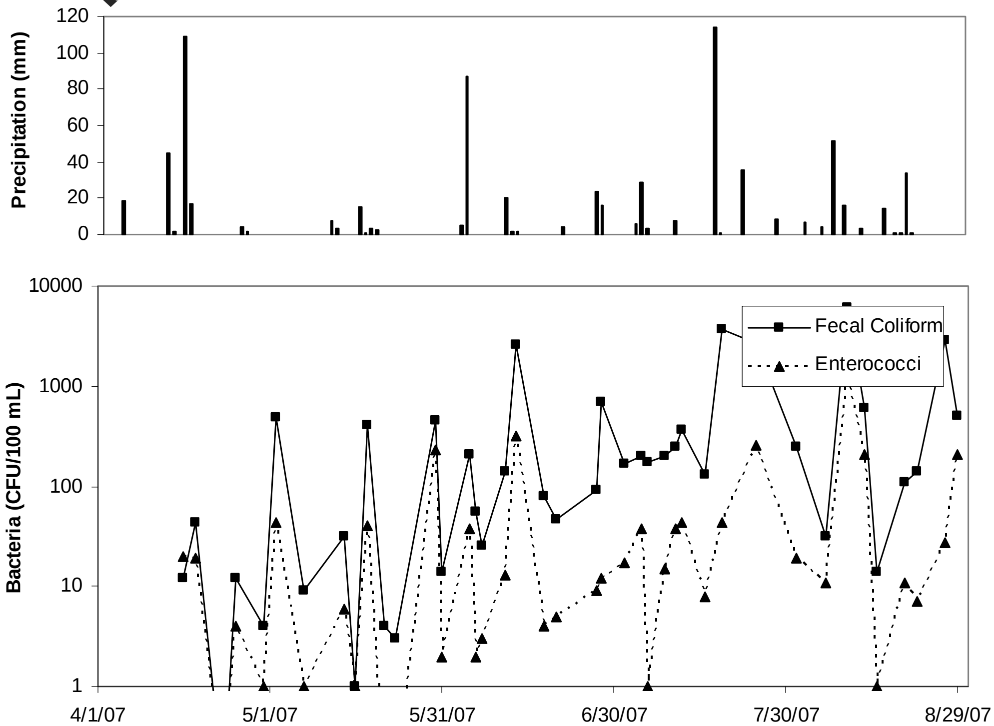
2007 Sands Point Golf Club (IBM) Beach



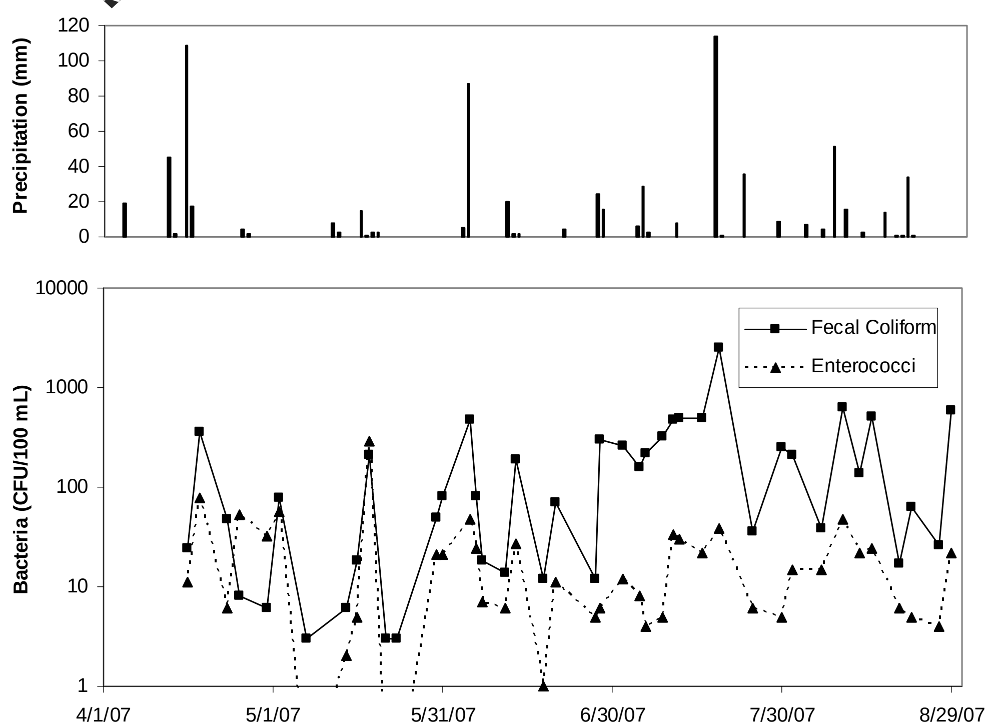
2007 Bar Beach



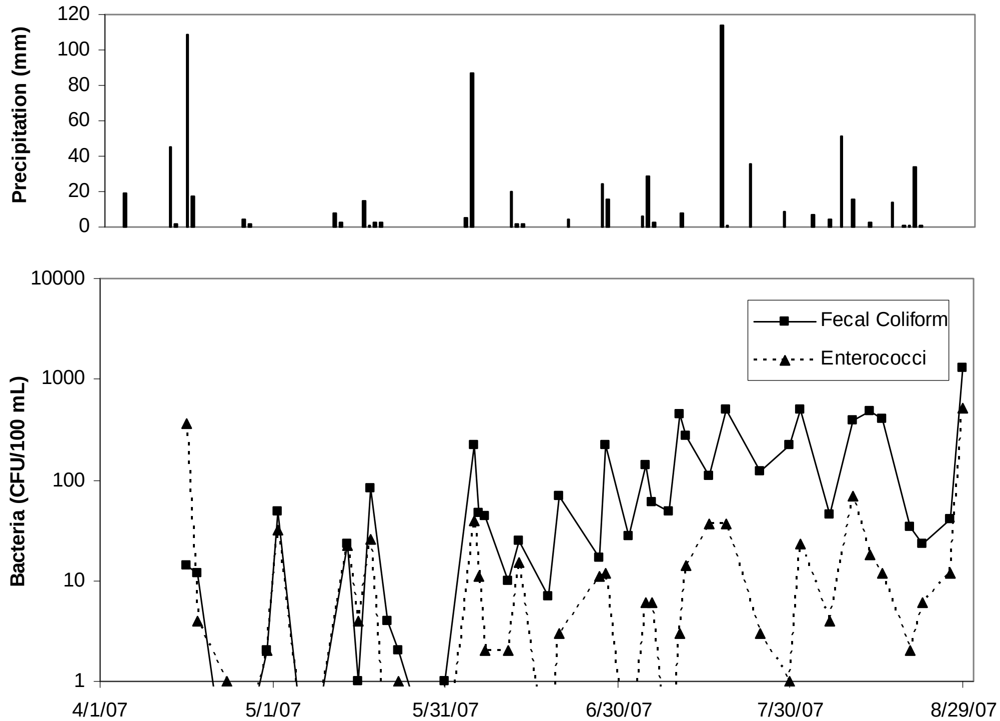
2007 Hempstead Harbor Beach



2007 Tappen Beach



2007 Sea Cliff Beach



Sands Point Beach (Formerly IBM Beach)

Date	*Fecal Coliform CFU/100ml*	*Log AvgFC*	*Enterococci CFU/100ml*	*Log AvgEnt*
04/16/07	33.00		23.00	
04/18/07	7.00		12.00	
04/23/07	1.00	6.14	1.00	6.51
04/25/07	3.00	5.13	2.00	4.85
04/30/07	0.10	2.33	0.10	2.23
05/02/07	12.00	3.07	20.00	3.21
05/07/07	8.00	3.52	8.00	3.66
05/14/07	4.00	3.57	1.00	3.11
05/16/07	0.10	2.40	3.00	3.10
05/18/07	210.00	2.95	78.00	3.55
05/21/07	1.00	2.38	1.00	2.69
05/23/07	0.10	1.73	1.00	2.44
05/30/07	5.00	1.95	8.00	3.14
05/31/07	24.00	3.58	26.00	5.83
06/06/07	49.00	4.19	71.00	6.71
06/07/07	32.00	4.88	***150.00***	9.30
06/11/07	90.00	6.54	23.00	10.18
06/13/07	22.00	7.30	26.00	11.08
06/18/07	4.00	8.09	0.10	7.99
06/20/07	4.00	7.54	3.00	7.24
06/27/07	6.00	14.88	32.00	13.27
06/28/07	12.00	14.56	2.00	10.98
07/02/07	270.00	21.46	***320.00***	15.03
07/05/07	17.00	20.97	0.10	9.10
07/09/07	55.00	20.26	37.00	6.20
07/11/07	380.00	27.16	12.00	6.63
07/16/07	150.00	29.43	20.00	5.60
07/19/07	***5700.00***	65.96	***700.00***	14.99
07/25/07	460.00	111.74	52.00	20.58
07/30/07	90.00	***207.19***	10.00	23.81
08/01/07	601.00	***233.21***	***510.00***	33.47
08/06/07	21.00	***235.11***	4.00	***40.03***
08/10/07	230	***281.16***	***2000***	***65.92***
08/15/07	32	***206.36***	33	***74.80***
08/16/07	140	***204.58***	70	***87.48***
08/20/07	43	111.06	16	***54.55***
08/22/07	150	114.83	20	***48.80***
08/27/07	240	106.83	8	***39.63***
08/29/07	38	96.34	12	***35.17***

Note: CFU refers to the number of colony forming units, or the number of bacterial cells in the water sample. Log AvgFC (log average for fecal coliform) and Log AvgEnt (log average for enterococci) refer to the running seasonal average of bacteria results at each location. Boldfaced, italicized values exceed the NYS beach closure standards of 1,000 CFU/100 ml for fecal coliform; 200 Log AvgFC/100 ml; 104 CFU/100 ml for enterococci; and 35 Log AvgEnt 35.

Bar Beach

	Fecal Coliform		*Enterococci*	
Date	***CFU/100ml***	***Log AvgFC***	***CFU/100ml***	***Log AvgEnt***
04/16/07	11.00		37.00	
04/18/06	22.00		32.00	
04/23/07	0.10	0.00	0.10	0.00
04/25/07	28.00	1.67	5.00	0.71
04/30/07	1.00	1.41	1.00	0.79
05/02/07	40.00	3.25	8.00	1.41
05/07/07	5.00	3.55	1.00	1.32
05/14/07	31.00	5.09	0.10	0.86
05/16/07	8.00	5.43	1.00	0.88
05/18/07	98.00	7.79	71.00	1.52
05/21/07	3.00	7.01	5.00	1.73
05/23/07	0.10	4.58	1.00	1.64
05/30/07	570.00	9.80	***150.00***	3.27
05/30/07	7.00	9.47	0.10	2.31
06/05/07	510.00	16.14	51.00	3.11
06/06/07	100.00	19.37	6.00	3.32
06/07/07	25.00	22.75	1.00	3.32
06/11/07	140.00	26.83	40.00	4.16
06/13/07	600.00	34.76	***290.00***	5.93
06/18/07	46.00	37.76	5.00	8.17
06/20/07	60.00	39.39	8.00	8.16
06/27/07	330.00	114.56	12.00	10.98
06/28/07	160.00	118.09	5.00	10.23
07/02/07	600.00	157.45	***150.00***	16.24
07/05/07	190.00	160.16	40.00	17.63
07/06/07	49.00	129.44	4.00	13.99
07/09/07	280.00	169.13	22.00	20.74
07/11/07	44.00	149.64	17.00	20.37
07/12/07	330.00	161.77	57.00	21.03
07/16/07	37.00	125.58	3.00	13.88
07/19/07	***2600.00***	181.22	22.00	15.88
07/25/07	280.00	***208.46***	37.00	18.25
07/30/07	***1400***	***247.33***	12	20.78
08/01/07	190	***241.47***	12	19.77
08/06/07	27	***209.77***	7	15.53
08/10/07	800	***235.72***	***220***	20.05
08/13/07	601	***313.38***	***320***	25.40
08/15/07	9	***211.23***	1	17.73
08/20/07	56	162.55	3	17.26
08/22/07	280	172.67	13	16.73
08/27/07	460	182.46	34	16.57
08/29/07	32	153.31	7	15.20

Note: CFU refers to the number of colony forming units, or the number of bacterial cells in the water sample. Log AvgFC (log average for fecal coliform) and Log AvgEnt (log average for enterococci) refer to the running seasonal average of bacteria results at each location. Boldfaced, italicized values exceed the NYS beach closure standards of 1,000 CFU/100 ml for fecal coliform; 200 Log AvgFC/100 ml; 104 CFU/100 ml for enterococci; and 35 Log AvgEnt 35.

Hempstead Harbor Beach

	Fecal Coliform		*Enterococci*	
Date	***CFU/100ml***	***Log AvgFC***	***CFU/100ml***	***Log AvgEnt***
04/16/07	12.00		20.00	
04/18/07	43.00		19.00	
04/23/07	0.10	3.72	0.10	3.36
04/25/07	12.00	4.99	4.00	3.51
04/30/07	4.00	4.77	1.00	2.73
05/02/07	490.00	10.33	43.00	4.32
05/07/07	9.00	10.13	1.00	3.51
05/14/07	32.00	11.69	6.00	3.75
05/16/07	1.00	8.90	1.00	3.24
05/18/07	410.00	13.17	40.00	3.50
05/21/07	4.00	10.12	0.10	1.95
05/23/07	3.00	8.96	0.10	1.45
05/30/07	450.00	22.08	***230.00***	3.06
05/31/07	14.00	25.38	2.00	3.31
06/05/07	210.00	23.10	38.00	3.26
06/06/07	56.00	25.24	2.00	3.11
06/07/07	25.00	27.96	3.00	3.47
06/11/07	140.00	32.37	13.00	3.91
06/13/07	***2600.00***	46.65	***320.00***	5.65
06/18/07	80.00	60.41	4.00	5.30
06/20/07	46.00	58.93	5.00	5.27
06/27/07	90.00	108.36	9.00	12.29
06/28/07	700.00	128.39	12.00	12.26
07/02/07	170.00	145.38	17.00	11.33
07/05/07	200.00	149.66	37.00	12.62
07/06/07	173.00	147.04	1.00	9.06
07/09/07	200.00	199.38	15.00	12.38
07/11/07	250.00	***203.52***	37.00	13.68
07/12/07	370.00	***222.32***	44.00	15.28
07/16/07	130.00	169.32	8.00	10.93
07/19/07	***3700.00***	***239.93***	43.00	13.56
07/25/07	***2700.00***	***347.43***	***260.00***	19.42
08/01/07	250	***358.77***	19	21.96
08/06/07	31	***341.78***	11	28.67
08/10/07	***6001***	***522.87***	***1200***	***49.58***
08/13/07	601	***622.69***	***210***	***64.63***
08/15/07	14	***387.48***	1	***38.38***
08/20/07	110	***274.09***	11	***39.52***
08/22/07	140	***252.02***	7	31.83
08/27/07	***2900***	***254.28***	27	23.98
08/29/07	510	***274.72***	***210***	30.52

Note: CFU refers to the number of colony forming units, or the number of bacterial cells in the water sample. Log AvgFC (log average for fecal coliform) and Log AvgEnt (log average for enterococci) refer to the running seasonal average of bacteria results at each location. Boldfaced, italicized values exceed the NYS beach closure standards of 1,000 CFU/100 ml for fecal coliform; 200 Log AvgFC/100 ml; 104 CFU/100 ml for enterococci; and 35 Log AvgEnt 35.

Tappen Beach

	Fecal Coliform		*Enterococci*	
Date	***CFU/100ml***	***Log AvgFC***	***CFU/100ml***	***Log AvgEnt***
04/16/07	24.00		11.00	
04/18/07	360.00		78.00	
04/23/07	47.00	74.05	6.00	17.27
04/25/07	8.00	42.45	52.00	22.75
04/30/07	6.00	28.71	32.00	24.35
05/02/07	77.00	33.84	56.00	27.98
05/07/07	3.00	23.94	0.10	12.51
05/14/07	6.00	20.14	2.00	9.95
05/16/07	18.00	19.89	5.00	9.22
05/18/07	210.00	25.31	***290.00***	13.26
05/21/07	3.00	14.87	0.10	6.33
05/23/07	3.00	12.67	0.10	4.18
05/30/07	49.00	13.39	21.00	3.63
05/31/07	80.00	17.86	21.00	3.46
06/05/07	480.00	21.89	47.00	3.40
06/06/07	80.00	24.92	24.00	4.13
06/07/07	18.00	29.80	7.00	6.32
06/11/07	14.00	27.83	6.00	6.29
06/13/07	190.00	32.66	27.00	7.10
06/18/07	12.00	30.84	1.00	4.73
06/20/07	70.00	33.23	11.00	5.11
06/27/07	12.00	48.54	5.00	11.20
06/28/07	300.00	57.28	6.00	10.58
07/02/07	260.00	65.46	12.00	9.34
07/05/07	160.00	71.00	8.00	9.21
07/06/07	220.00	66.14	4.00	7.36
07/09/07	320.00	86.54	5.00	6.33
07/11/07	470.00	100.93	33.00	7.35
07/12/07	490.00	139.44	30.00	8.51
07/16/07	490.00	151.98	22.00	8.35
07/19/07	***2500.00***	***246.94***	39.00	11.65
07/25/07	36.00	***232.45***	6.00	11.03
07/30/07	250	***307.00***	5	11.72
08/01/07	210	***296.58***	15	11.99
08/06/07	39	***265.94***	15	14.52
08/10/07	640	***287.24***	47	18.62
08/13/07	140	***230.94***	22	16.68
08/15/07	510	***252.19***	24	17.37
08/20/07	17	124.37	6	13.34
08/22/07	64	115.52	5	11.96
08/27/07	26	111.42	4	11.44
08/29/07	590	131.63	22	12.21

Note: CFU refers to the number of colony forming units, or the number of bacterial cells in the water sample. Log AvgFC (log average for fecal coliform) and Log AvgEnt (log average for enterococci) refer to the running seasonal average of bacteria results at each location. Boldfaced, italicized values exceed the NYS beach closure standards of 1,000 CFU/100 ml for fecal coliform; 200 Log AvgFC/100 ml; 104 CFU/100 ml for enterococci; and 35 Log AvgEnt 35.

Sea Cliff Village Beach

Date	***Fecal Coliform CFU/100ml***	***Log AvgFC***	***Enterococci CFU/100ml***	***Log AvgEnt***
04/16/07	14.00		***360.00***	
04/18/07	12.00		4.00	
04/23/07	0.10	2.56	1.00	11.29
04/25/07	0.10	1.14	0.10	3.46
04/30/07	2.00	1.27	2.00	3.10
05/02/07	48.00	2.33	32.00	4.58
05/07/07	0.10	1.49	0.10	2.65
05/14/07	23.00	2.09	22.00	3.45
05/16/07	1.00	1.93	4.00	3.51
05/18/07	81.00	2.35	26.00	2.62
05/21/07	4.00	2.08	0.10	1.74
05/23/07	2.00	2.07	1.00	1.65
05/30/07	0.10	2.90	0.10	1.74
05/31/07	1.00	2.68	0.10	1.25
06/05/07	220.00	3.18	39.00	1.28
06/06/07	47.00	4.16	11.00	1.58
06/07/07	44.00	7.64	2.00	2.13
06/11/07	10.00	7.83	2.00	2.12
06/13/07	25.00	8.63	15.00	2.50
06/18/07	7.00	7.59	0.10	1.10
06/20/07	70.00	9.29	3.00	1.20
06/27/07	17.00	12.52	11.00	1.96
06/28/07	220.00	16.25	12.00	2.31
07/02/07	28.00	37.72	0.10	3.17
07/05/07	140.00	42.50	6.00	3.36
07/06/07	61.00	37.82	6.00	2.83
07/09/07	48.00	37.33	0.10	1.83
07/11/07	450.00	46.81	3.00	1.92
07/12/07	270.00	63.17	14.00	2.29
07/16/07	110.00	72.28	36.00	2.48
07/19/07	490.00	106.35	36.00	4.23
07/25/07	120.00	111.69	3.00	4.23
07/30/07	220	134.82	1	3.00
08/01/07	501	151.91	23	3.61
08/06/07	46	179.27	4	4.86
08/10/07	390	***226.26***	68	10.02
08/13/07	480	***223.11***	18	12.03
08/15/07	410	***238.71***	12	12.02
08/20/07	34	188.41	2	7.30
08/22/07	23	149.15	6	7.15
08/27/07	41	132.37	12	8.34
08/29/07	***1300***	166.34	***510***	12.58

Note: CFU refers to the number of colony forming units, or the number of bacterial cells in the water sample. Log AvgFC (log average for fecal coliform) and Log AvgEnt (log average for enterococci) refer to the running seasonal average of bacteria results at each location. Boldfaced, italicized values exceed the NYS beach closure standards of 1,000 CFU/100 ml for fecal coliform; 200 Log AvgFC/100 ml; 104 CFU/100 ml for enterococci; and 35 Log AvgEnt 35.

MO/DAY	AMT(MM)	MO/DAY	AMT(MM)	MO/DAY	AMT(MM)	MO/DAY	AMT(MM)
JAN		**MAY**		**JULY**		**SEPT**	
		11	8	4	6	10	5.5
		12	3	5**	29	11	24
		13	4	6	3	15	3
		16	15	11	7.5	22	4
		17	1	18**	114	28	trace
FEB		18	3	19	1	**Total**	**36.5**
rain=		19	2.5	23**	35.5		
		Total	**36.5**	24**	**0**		
snow=				29	8.5		
				Total	**198.5**		
MAR							

APR		**JUNE**		**AUG**		**OCT**	
4	>19*	3	5	3	7	3	trace
12	45	4	87	6	4	9	13
13	2	11	20	8**	51.5	10	2
15	109	12	2	10	16	11	79
16	17	13	1.5	13	3	12	trace
17	1	21	4	15	trace	24	2
25	4	27	24	17	14	25	9
26	1.5	28**	16	19	1	26	trace
27-28	46	29**	---	20	1	27	31
Total	**244.5**	**Total**	**159.5**	21**	34	**Total**	**136**
				22**	1		
				23	trace		
				Total	**132.5**		

*This amount is for noon to midnight (but rain started at 9am). All other amounts are for midnight to midnight.
**Beaches closed.

APPENDIX C

Summary Tables for 2007 and Previous Seasons

CSHH #1 - Beacon 11

	2007			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	16.96	6.95	24.11	21.33
July	19.08	3.91	25.10	23.90
August	22.67	3.61	25.92	21.70
September	21.84	5.02	26.26	19.18
October	19.3	4.65	26.99	16.64
Averages	19.97	4.83	25.68	20.55

	2006				2005			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	17.35	6.81	25.22	22.42	17.19	4.5	22.94	20.22
July	20.78	3.77	25.79	24.18	23.19	4.22	24.52	24.3
August	23.64	3.29	25.64	23.78	23.73	1.85	25.36	24.4
September	20.58	7.28	25.4	18.9	22.54	4.85	26.49	23.6
October	16.41	7.98	25.56	14.78	16.3	7.36	25.09	13.3
Averages	19.75	5.83	25.52	20.81	20.59	4.56	24.88	21.16

	2004				2003			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	18.3	5.38	25	23.6	17	5.82	23.67	24.6
July	20.87	4.28	25.9	24	18.74	3.6	24.97	21.9
August	22.33	3.86	26.31	24	21.75	2.1	25.79	23.6
September	22.14	3.67	26.15	20.4	21.6	4.32	26.4	22.2
October	16.53	7.66	25.21	12.9	16.49	6.73	25.23	12.8
Averages	20.10	4.94	25.73	20.80	18.94	4.63	25.25	20.40

	2002				2001			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	18.85	4.82	26.42	24.1	20.31	6.62	24.78	24.1
July	21.28	2.31	26.55	25	19.4	3.8	25.68	25.2
August	24.02	2.91	26.89	25	23.25	2.96	26.19	25.4
September	21.98	5.7	26.5	20.3	22.56	5.45	26.7	20.5
October	17.12	7.13	26.38	13.5	17.05	7.86	26.79	15.8
Averages	20.67	4.64	26.56	21.10	20.90	5.16	26.02	22.50

CSHH #1 - Beacon 11

	2000				1999			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	17.1	5.63	24.43	22.2	19.66	7.07	24.89	23
July	21.8	5.27	25.03	22.2	21.72	3.42	25.78	30
August	22.53	6.41	24.7	24.2	24.35	4.6	25.99	25
September	20.99	4.9	25.07	20.9	21.9	5.57	25.72	22
October	16.78	6.02	25.24	13.2	17.76	8.29	24.7	12
Averages	19.49	5.64	24.87	20.40	21.01	5.85	24.15	22.22

	1998				1997			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	17.24	6.24	24.18	21.33	18.1	7.01	23.71	24.33
July	21.23	4.89	24.66	24.6	20.83	4.34	24.78	23.5
August	23.95	3.66	24.84	24.5	21.85	1.96	25.96	21.5
September	22.02	4.57	25.48	20.5	22.13	3.26	25.81	19.5
October	17.19	6.84	25.27	13.75	17.45	5.83	26.06	13.67
Averages	20.52	5.17	24.88	21.10	20.10	4.39	25.20	20.81

	1996				1995			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	19	8.35	N/A	23.25	17.78	5.3	26.27	19.67
July	20.04	3.74	24.66	22.75	20.77	2.66	26.53	25.25
August	21.75	2.88	25.13	22.25	23.78	4.56	27.56	24.7
September	21.7	5.14	25.48	19.83	21.72	4.34	28.05	20.5
October	17.34	9.21	24.97	15.25	17.71	6.9	27.34	16.5
Averages	19.87	5.90	25.03	20.71	20.80	4.60	27.21	21.84

CSHH #2 - Bell Marker 6

	2007			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	16.03	6.92	24.66	22.53
July	17.62	4.49	25.88	24.67
August	21.65	3.28	26.36	22.77
September	21.55	5.43	26.78	21.48
October	19.32	5.07	27.65	17.08
Averages	19.23	5.04	26.27	21.71

	2006				2005			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	16.93	7.74	25.89	22.72	16.8	5.22	23.21	21.9
July	18.67	3.99	26.51	25.5	21.78	4.59	23.03	24.4
August	21.91	1.91	26.42	26.53	23.13	2.07	25.58	26.6
September	20.41	5.98	26.24	20.33	22.8	2.98	27.01	24.2
October	17.66	7.3	26.32	18.89	17.01	6.84	25.91	13.9
Averages	19.12	5.38	26.28	22.79	20.30	4.34	25.35	22.22

	2004				2003			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	16.38	5.92	25.41	22.5	15.58	6.35	24.26	22.4
July	19.82	5.11	26.24	24.8	17.16	2.93	25.35	22.9
August	21.47	3.04	26.62	24.1	21.01	1.74	26.14	23.6
September	21.96	6.17	26.33	20.7	21.2	5.38	26.55	22
October	17.37	8.16	25.63	14.3	17.19	6.47	26.03	15
Averages	19.49	5.57	26.06	21.50	18.37	4.55	25.70	21.10

	2002				2001			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	18.06	6.13	26.55	23.4	16.67	4.97	25.36	23.2
July	19.91	1.81	26.87	27.4	18.45	5.32	26	26.2
August	22.85	3.08	27.23	25.4	22.33	3.83	26.46	26
September	21.97	5.84	26.89	21.4	21.88	5.8	27.07	21.1
October	17.74	7.68	27.25	13.9	16.94	8.55	27.24	15.9
Averages	20.13	5.11	26.99	21.50	19.58	5.46	26.41	22.80

CSHH #2 - Bell Marker 6

	2000				1999			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	16.45	6.29	24.77	22.4	17.13	6.41	25.42	23
July	20.19	4.8	25.38	22.7	19.62	2.87	26.23	27
August	22.08	6.46	24.95	24.7	22.88	4.29	26.8	25
September	20.89	6.08	25.54	22.3	22.15	5.75	26.84	26
October	16.86	7.18	26.07	16.3	17.18	8.46	26.3	13
Averages	19.03	6.10	25.28	21.80	19.67	5.44	26.21	22.73

	1998				1997			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	16.39	6.9	24.45	21.33	16.7	9.12	24.14	24.5
July	19.88	4.78	25.13	24.6	18.32	3.12	25.33	23.25
August	22.88	3.3	25.27	24.5	21.12	2.86	26.41	21.37
September	21.62	6.03	25.82	20.5	21.33	3.18	26.79	19.75
October	17.18	6.9	26.27	13.75	18.02	5.22	26.59	14.5
Averages	19.66	5.45	25.40	21.10	19.12	4.54	25.69	21.37

	1996				1995			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	17.5	7.8	N/A	22	17.61	7.78	26.5	21.25
July	19.15	5.17	24.92	24.5	20.09	4.19	26.93	24.87
August	21.1	4.29	24.99	23.17	22.9	4.87	27.77	25.12
September	22.05	8	25.73	20.17	21.73	5.27	28.44	21.5
October	16.95	9.11	25.34	15.75	17.48	7.72	27.8	15.83
Averages	19.20	7.14	25.28	20.53	20.30	5.67	27.53	22.16

CSHH #3 - Glen Cove Creek

	2007			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	16.82	8.47	24.15	21.98
July	19.19	4.75	25.40	24.25
August	22.67	5.98	26.16	23.20
September	21.87	5.18	26.63	22.13
October	19.31	4.70	27.59	17.70
Averages	19.97	5.82	25.99	21.85

	2006				2005			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	17.37	8.35	25.6	23.38	17.46	5.46	23.08	22.32
July	20.32	4.51	25.98	25.25	22.32	4.29	24.82	24.8
August	23.19	5.13	26.13	25.46	23.53	2.16	25.67	25.3
September	20.58	7.5	26	19.85	22.76	5.23	26.8	24.8
October	16.91	8.55	26.17	16.03	16.66	8.14	25.58	14.3
Averages	19.67	6.81	25.98	21.99	20.54	5.05	25.19	22.29

	2004				2003			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	17.67	7.36	25.23	23.4	16.47	7.02	23.97	23.9
July	20.39	4.96	26.15	25.1	18.41	4.25	25.08	22.8
August	22	4.3	26.48	22.8	21.26	3.74	25.92	23.6
September	22.02	4.66	26.34	21.3	21.48	4.81	26.49	22.4
October	16.86	7.62	25.97	13.1	16.97	6.58	25.61	15.6
Averages	19.87	5.76	26.04	20.90	18.90	5.21	25.45	21.80

	2002				2001			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	19.05	6.36	26.48	23.7	18.45	7.63	25.23	24.4
July	20.71	2.61	26.69	25.4	18.55	4.53	25.92	26
August	23.36	2.49	27.1	26.9	23.09	4.83	26.34	27.7
September	21.78	6.49	26.71	22	22.1	6.92	26.88	21.3
October	17.7	7.98	27.05	14.7	17.02	9.01	27.12	16.3
Averages	20.53	5.20	26.83	22.10	20.23	6.47	26.27	23.60

CSHH #3 - Glen Cove Creek

	2000				1999			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	17.69	6.6	24.35	21.6	18.43	6.32	25.09	23
July	21.16	5.87	25.26	23	21.57	5.02	25.89	30
August	22.66	6.44	24.68	23.5	23.82	4.87	26.44	26
September	21.45	6.13	24.99	20.5	21.8	6.16	26.25	23
October	16.69	7.5	25.52	16.7	16.74	8.7	25.81	14
Averages	19.59	6.54	24.94	20.90	20.20	6.32	25.74	23.04

	1998				1997			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	17.23	7.25	24.27	21.33	17.36	8.32	24.11	26.5
July	21.03	6.34	24.76	24.6	20.2	6.21	25.07	23.37
August	23.39	3.87	25.14	24.5	21.34	2.29	26.29	21.5
September	21.88	5.76	25.75	20.5	21.61	3.12	26.67	20
October	16.9	7.79	25.88	13.75	17.12	5.69	26.69	13.67
Averages	20.28	6.16	25.16	21.10	19.55	5.14	25.66	21.25

	1996				1995			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	18.25	9.35	N/A	22.12	17.82	5.4	26.58	21.5
July	20.32	7.1	24.46	23.67	20.74	4.5	26.87	25
August	21.45	3.2	25.29	22.87	23.24	4.79	27.94	24.7
September	22.09	6.85	25.69	20.83	21.61	4.78	28.22	21
October	16.61	9.88	25.12	15.4	17.4	7.54	27.57	16.5
Averages	19.43	7.44	25.15	20.55	20.59	5.26	27.55	22.18

CSHH #8- Glen Cove Creek STP Outfall

	2007			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	17.69	8.75	24.03	22.83
July	19.76	4.46	25.26	26.50
August	22.76	5.27	25.84	24.33
September	22.17	6.05	26.27	21.75
October	19.30	5.13	27.59	17.76
Averages	20.34	5.93	25.80	22.63

	2006				2005			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	18.21	7.98	25.27	24.52	18.9	7.1	22.25	23.72
July	21.43	5.08	25.51	26.33	23.07	5.48	24.5	25.5
August	24	8.85	25.71	25.18	24.32	3.45	25.32	27.2
September	20.65	8.25	25.36	20.2	23.24	5.07	26.42	25.2
October	17.12	8.18	25.97	15.57	16.98	7.31	25.28	14
Averages	20.28	7.67	25.56	22.36	21.30	5.68	24.75	23.10

	2004				2003			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	19.38	8.14	24.8	26.3	17.01	5.92	23.7	25.7
July	21.26	4.52	25.39	27	18.94	4.03	24.94	24.4
August	22.78	5.98	25.89	24.4	22.51	5.23	25.51	26.1
September	22.22	4.66	25.62	22.1	21.58	4.87	25.99	23.5
October	16.6	7.79	25.72	13.4	16.49	6.49	25.1	14.6
Averages	20.49	6.22	25.50	22.20	19.10	5.28	25.09	22.10

	2002				2001			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	19.89	7.65	26.12	25.5	20.11	7.61	24.57	26.6
July	22.13	4.33	26.27	26.8	20.18	5.56	25.31	27.1
August	24.64	4.85	26.67	27.7	23.82	6.16	25.86	29.2
September	21.91	6.01	26.41	23	22.45	5.74	26.58	22.1
October	17.67	7.69	26.77	16.4	16.67	9.56	26.54	16.7
Averages	21.29	6.11	26.47	23.40	21.05	6.82	25.76	24.80

CSHH #8- Glen Cove Creek STP Outfall

	2000				1999			
	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)	Avg. Water Temp. (°C) (Bottom)	Avg. DO (ppm) (Bottom)	Avg. Salinity (ppt) (Bottom)	Avg. Air Temp. (°C)
June	18.66	7.13	23.59	23.8	19.99	9.11	24.71	23
July	21.99	6.51	24.93	24.1	22.7	6.03	25.53	30
August	23.58	7.75	24.18	24.5	24.28	5.32	26.19	26
September	21.17	8.63	24.81	23.6	21.78	6.14	25.84	24
October	17.25	7.17	24.87	15.3	16.63	8.63	25.53	15
Averages	20.40	7.35	24.40	21.90	21.02	7.14	25.49	23.70

2007

	Units in CFU/100 mL	Tappen Beach	Sea Cliff Beach	Bar Beach	Hempstead Harbor Beach	Sands Point Golf Club
April	Enterococci	35.8	73.42	15.02	8.82	7.62
	Fecal	**89**	**5.64**	**12.42**	**14.22**	**8.82**
May	Enterococci	43.92	9.49	26.36	35.91	16.22
	Fecal	**49.89**	**17.8**	**84.68**	**157**	**29.36**
June	Enterococci	14.89	10.57	46.44	45.11	38.39
	Fecal	**130.67**	**73.33**	**219**	**438.56**	**27.38**
July	Enterococci	16.4	10.52	36.4	51.33	143.89
	Fecal	**519.6**	**193.70**	**581**	**877**	**890.25**
August	Enterococci	17.78	72.78	68.56	188.44	297
	Fecal	**248.44**	**358.33**	**272.8**	**1173**	**166.11**
Season Average	*Enterococci*	*25.76*	*35.35*	*38.56*	*65.92*	*100.62*
	Fecal	***207.52***	***129.76***	***233.9***	***531.96***	***224.38***

2006

	Units in CFU/100 mL	Tappen Beach	Sea Cliff Beach	Bar Beach	Hempstead Harbor Beach	Sands Point Golf Club
April	Enterococci	2	0.1	0..1	0.1	0.1
	Fecal	**5**	**0.6**	**1**	**0.6**	**7**
May	Enterococci	333	73	35	16	7
	Fecal	**20**	**14**	**100**	**9**	**16**
June	Enterococci	33	12	30	27	6
	Fecal	**73**	**68**	**107**	**98**	**9**
July	Enterococci	35	47	40	46	68
	Fecal	**150**	**277**	**154**	**567**	**259**
August	Enterococci	11	65	76	46	120
	Fecal	**94**	**51**	**100**	**97**	**106**
Season Average	Enterococci	*83*	*39*	*36*	*27*	*40*
	Fecal	***69***	***82***	***92***	***151***	***79***

2005

	Units in MPN/100 mL	Tappen Beach	Sea Cliff Beach	Bar Beach	Hempstead Harbor Beach	Sands Point Golf Club
April	Enterococci	12	1	33	5	1
	Fecal	**19**	**43**	**289**	**60**	**12**
May	Enterococci	19	13	33	29	8
	Fecal	**21**	**18**	**120.23**	**89**	**15**
June	Enterococci	5	3	9	20	9
	Fecal	**87**	**86**	**118**	**330**	**77**
July	Enterococci	15	39	6	26	17
	Fecal	**472**	**596**	**159**	**561**	**176**
August	Enterococci	20	18	79	50	186
	Fecal	**346**	**239**	**256**	**166**	**265**
Season Average	Enterococci	*14.2*	*14.8*	*32*	*26*	*44.2*
	Fecal	***189***	***196***	***188***	***241***	***109***

2004

	Units in MPN/100 mL	Tappen Beach	Sea Cliff Beach	Bar Beach	Hempstead Harbor Beach	Sands Point Golf Club
April	Total	265	161	36	76	57
	Fecal	**66**	**25**	**29**	**71**	**4**
May	Total	851	22029	1910	1137	140
	Fecal	**210**	**3859**	**822**	**141**	**46**
June	Total	701	864	560	1179	168
	Fecal	**557**	**298**	**167**	**615**	**44**
July	Total	790	624	571	2353	146
	Fecal	**301**	**222**	**341**	**460**	**43**
August	Total	414	727	445	993	634
	Fecal	**313**	**442**	**383**	**905**	**375**
September	Total	*80*	*230*	*17*	*22*	*700*
	Fecal	***80***	***130***	***11***	***17***	***500***
Season Average	*Total*	*682*	*3574*	*701*	*1582*	*268*
	Fecal	***337***	***761***	***359***	***505***	***126***

2003

	Units in MPN/100 mL	Tappen Beach	Sea Cliff Beach	Bar Beach	Hempstead Harbor Beach	Sands Pont Golf Club
April	Total	155	19	159	140	13
	Fecal	**19**	**5**	**152**	**44**	**8**
May	Total	154	1277	130	122	161
	Fecal	**88**	**143**	**47**	**35**	**62**
June	Total	724	915	478	1747	197
	Fecal	**255**	**111**	**64**	**136**	**80**
July	Total	517	1810	1237	781	239
	Fecal	**203**	**304**	**874**	**539**	**65**
August	Total	2117	22364	804	678	347
	Fecal	**1904**	**3114**	**334**	**344**	**81**
September	Total	*910*	*1820*	*1033*	*3500*	*6567*
	Fecal	***274***	***110***	***177***	***1090***	***977***
Season Average	*Total*	*1097*	*8735*	*816*	*949*	*632*
	Fecal	***809***	***1222***	***421***	***370***	***126***

2002

	Units in MPN/100 mL	Tappen Beach	Sea Cliff Beach	Bar Beach	Hempstead Harbor Beach	Sands Point Golf Club
April	Total	728	163	157	326	160
	Fecal	**658**	**53**	**11**	**39**	**44**
May	Total	282	194	127	145	130
	Fecal	**169**	**46**	**78**	**124**	**76**
June	Total	1604	750	431	674	560
	Fecal	**1016**	**154**	**168**	**559**	**123**
July	Total	2770	4779	964	1921	613
	Fecal	**1367**	**210**	**831**	**810**	**246**
August	Total	1625	1832	6202	3277	4773
	Fecal	**1278**	**839**	**2130**	**2971**	**2593**
Season Average	*Total*	*1463*	*1626*	*3096*	*1969*	*1226*
	Fecal	***1008***	***451***	***1133***	***1637***	***605***

2001

	Units in MPN/100 mL	Tappen Beach	Sea Cliff Beach	Bar Beach	Hempstead Harbor Beach	Sands Point Golf Club
April	Total	194	86	68	239	26
	Fecal	**103**	**43**	**36**	**85**	**9**
May	Total	944	1689	364	486	559
	Fecal	**555**	**274**	**106**	**83**	**21**
June	Total	1045	494	1091	974	2373
	Fecal	**365**	**60**	**451**	**488**	**157**
July	Total	1308	1501	11526	6025	242
	Fecal	**566**	**399**	**11297**	**3458**	**44**
August	Total	12230	24148	2594	3360	2183
	Fecal	**10285**	**1623**	**1872**	**1000**	**124**
September	Total	1500	1100	570	348	468
	Fecal	**1308**	**300**	**116**	**110**	**53**
Season Average	***Total***	***4513***	***9080***	***4187***	***2848***	***1143***
	Fecal	***3559***	***717***	***3754***	***1325***	***75***

Salinity Averages

	Beacon 11 CSHH #1	**Bell 6 CSHH #2**	**Red Channel Marker, Near Glen Cove Creek, CSHH #3**	**Glen Cove STP Outfall, CSHH #8**
2007	25.41 ppt	26.07 ppt	25.62 ppt	24.30 ppt
2006	25.3 ppt	26.0 ppt	25.6 ppt	24.3 ppt
2005	24.60	24.95	24.71	23.66
2004	25.73	26.06	26.04	25.50
2003	25.25	25.70	25.45	25.09
2002	26.56	26.99	26.83	26.47
2001	26.02	26.41	26.27	25.76
2000	24.87	25.28	24.94	24.40
1999	24.15	26.21	25.49	25.49
1998	24.88	25.40	25.16	N/A
1997	25.20	25.69	25.66	N/A

Total Precipitation Per Month

	June	**July**	**August**	**September**	**October**
2007	159.5 mm	198.5 mm	132.5 mm	36.5 mm	136 mm
2006	262 mm	148 mm	89 mm	105 mm	166.5 mm
2005	45	81	41	28.5	460.5
2004	95	214	91	310.5	40
2003	291.5	87	88	194.5	134
2002	180.5	22.5	175.5	116.5 (9/15-9/30)	180
2001	167	70.5	165	94	19.5
2000	146	159	158	125	6
1999	31	21	135	323	92
1998	191	59	145	90	97
1997	47	232	141	84	27 (10/1-15)

Bottom Dissolved Oxygen Averages

Averages for Bottom DO	***2007***	***2006***	***2005***	***2004***	***2003***	***2002***
Beacon 11, CSHH #1	4.99 ppm	5.8 ppm	4.59 ppm	4.94 ppm	4.63 ppm	4.64 ppm
Bell Buoy 6, CSHH #2	5.37 ppm	5.3	4.63	5.57	4.55	5.11
Glen Cove Creek, Red Channel Marker, CSHH #3	6.02 ppm	6.8	5.09	5.76	5.21	5.20
Glen Cove STP Outfall, CSHH #8	5.93 ppm	7.0	5.76	6.22	5.28	6.11

Averages for Bottom DO	***2001***	***2000***	***1999***	***1998***	***1997***	***1996***
Beacon 11, CSHH #1	5.16 ppm	5.64 ppm	5.85 ppm	5.17 ppm	4.39 ppm	5.90 ppm
Bell Buoy 6, CSHH #2	5.46	6.10	5.44	5.45	4.54	7.11
Glen Cove Creek, Red Channel Marker, CSHH #3	6.47	6.54	6.32	6.48	5.15	7.45
Glen Cove STP Outfall, CSHH #8	6.82	7.35	7.14	N/A	N/A	N/A