2010 Annual Water Quality Report

Water Quality Monitoring Program

FUSS & O'NEILL

Prepared in 2012 for

Friends of the Bay • P.O. Box 564 • Oyster Bay, New York 11771

www.friendsofthebay.org

This *2010 Annual Water Quality Report* was produced in 2012. It presents and describes data and observations that were recorded by Friends of the Bay Water Quality Monitoring Program during the sampling year as well as information regarding other activities and accomplishments since 2010.

Who We Are

Friends of the Bay (FOB) – a widely respected, not-for-profit organization with thousands of supporters – is dedicated to the protection of the Oyster Bay/Cold Spring Harbor estuary and the surrounding watershed. FOB's advocacy efforts enable the estuary to continue as an unsurpassed scenic, ecological and economically-productive resource.

Our Mission

FOB's mission is to protect, preserve and restore the ecological integrity and productivity of the Oyster Bay/Cold Spring Harbor estuary and the surrounding watershed.

What We Do

- Help to maintain clean waters that sustain a vital ecosystem, a wide range of recreation and a thriving shellfishing aquaculture business.
- Monitor water quality within the estuary.
- Create awareness of the need to preserve water quality and marine life.
- Confront unsound development proposals.
- Promote responsible development and land use planning.
- Partner with residents, organizations, and local businesses.
- Work with government at all levels.

How We Are Perceived

In June 2011, Friends of the Bay completed a Watershed Action Plan for the Oyster Bay/Cold Spring Harbor Estuary and surrounding watershed. The Watershed Action Plan is a comprehensive management plan to protect and restore water resource conditions throughout the Oyster Bay/Cold Spring Harbor Watershed. The plan recommends continuation of the ongoing monitoring programs to monitor changes in the harbor conditions as a result of changing watershed conditions and implementation of plan recommendations. Additional data collection is also recommended to refine the current understanding of water quality impairments in the estuary complex, particularly pollutants for which previous monitoring results have demonstrated the potential for water quality impairment but which are not currently identified by NYSDEC as a listed cause of impairment (e.g., sediment, nutrients, dissolved oxygen.)

The State of The Watershed Report was completed in October of 2009. This report summarizes existing environmental and land use conditions in the watershed. It is a comprehensive document that integrates many environmental indicators to assess the current health of the watershed and potential future threats. The report provides a baseline assessment of watershed conditions, which can be updated periodically to to evaluate changes in the watershed and help direct watershed management planning. The State of the Watershed Report will serve as the basis for a Watershed Action Plan, which will identify prioritized action items to protect and improve the harbor and surrounding upland area.

In April of 2009 Friends of the Bay was awarded the Region 2 Environmental Quality Award by the Environmental Protection Agency for its water quality monitoring program. This award recognizes individuals and organizations that have significantly contributed to improving environmental quality during the prior year; have demonstrated a high level of achievement; and have created unique or location-specific benefits, produced results that are sustainable or reproducible, or increased public involvement in environmental action.

In 1997, we became one of the few East Coast groups ever to receive the prestigious Walter B. Jones Memorial and NOAA (National Oceanic and Atmospheric Administration) Excellence Award in Coastal and Ocean Resource Management presented to the "Non-Governmental Organization of the Year." In 1999, the New York Chapter of the American Planning Association honored FOB with an Award for Meritorious Achievement. Friends of the Bay was selected in the "Best Environmental Organizations" category of the *Long Island Press'* Best of Long Island 2008 issue (issue is Volume 7, Issue 2). (This is the third year the readers of the *Long Island Press* selected us as their choice in this category.)

More importantly, our cooperative planning efforts are models for local governments and other environmental groups around Long Island Sound that seek to prepare watershed management plans to protect their embayments and reap the benefits of a cleaner Sound. Our Executive Director sits on the Long Island Sound Study Citizens Advisory Committee, the Town of Oyster Bay's Eastern Waterfront Visioning Plan Steering Committee, the Oyster Bay/Cold Spring Harbor Protection Committee and the Northport Harbor Protection Committee.

Our History

FOB was formed in 1987 and rallied public support to defeat an environmentally disastrous development plan which would have sited 78 condos, a 225 slip marina with a wave baffle, a restaurant atop a 3-story office building and a boatel – all on a contaminated shipyard site. FOB then led an extraordinary public process that resulted in the "Land Use Plan for the Oyster Bay Western Waterfront."

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Acknowledgements

Friends of the Bay would like to thank the individuals and organizations that make our Water Quality Monitoring Program possible.

National Fish and Wildlife Foundation – Provided a portion of the funding necessary to conduct our Water Quality Monitoring Program.

Frank M. Flower and Sons, Inc. – Dwight and Dave Relyea and Joseph Zahtila, owners of Frank M. Flower and Sons, Inc. have provided dock space, use of boats, and logistical support for Friends of the Bay's monitoring program since 1992.

Oyster Bay Marine Center – Donates fuel for the Baywatch II each year.

Bridge Marina – Richard Valicenti and his staff continuously provide support to Friends of the Bay through repairs, parts, service, and advice for our vessel, the "Baywatch II".

Nassau County Department of Health – Nassau County Department of Health donates laboratory testing services for bacteria samples collected by FOB.

Analytical Chemists Laboratory LLC – Donates their laboratory services for the testing of nitrates, nitrites, total nitrogen, ammonia-N, and organic nitrogen once per month as part of our Water Quality Monitoring Program.

Boat Captains:
Hank Kasven (Syosset)
Scott Sayer (Northport)

Citizen scientists:
Ann Bell (USFWS)
Ryan Colley (USFWS)
Burt Goldfeld (Wantagh)
Peter Goodman (Syosset)
Liz Herdter (USFWS)
Hal Johnson (Oyster Bay)
Terry Kattleman (Oyster Bay)
Lorna Mann (Bayville)
Caroline Massa (USFWS)
Carla Panetta (Bayville)
Jack Panetta (Bayville)
Jamie Petsitis (Northport)
Richard Sack (Oyster Bay)
Ted Scherff (Oyster Bay)
Denise Wurtz (Laurel Hollow)

<u>Locust Valley High School Students and Teachers</u>:
Chris Hoppner (teacher)
Steffie Bousleiman (student)
John Catalano (student)
Gabrielle dell Aquilo (student)
Emma Gugerty (student)
Jamie Jaget (student)
Riley Monck-Rowley (student)
Sharon Sidhous (student)

Executive Summary

Friends of the Bay's Water Quality Monitoring Program is an important component of our efforts to protect the Oyster Bay/Cold Spring Harbor estuary and the surrounding watershed while serving to increase public awareness of local threats to water quality. This program was developed in cooperation with the United States Fish and Wildlife Service, United States Environmental Protection Agency, New York State Department of Environmental Conservation, local governments, and other volunteer monitoring groups around Long Island Sound.

Friends of the Bay (FOB) conducts water quality monitoring in accordance with a Quality Assurance Project Plan (QAPP) approved by the Environmental Protection Agency (EPA). The QAPP formalizes the quality assurance procedures for the data collection portions of our open water body monitoring program, and will ensure that our data can be used by EPA and other government agencies. The QAPP includes many procedures that were already implemented by Friends of the Bay, and introduces a few new quality assurance steps as well.

During 2010, FOB continued data collection in support of the long-term open water body monitoring program. Once a week since 2000, from spring through fall, FOB has collected water quality data in Mill Neck Creek, Oyster Bay Harbor, and Cold Spring Harbor. FOB collected samples during 24 separate monitoring events between April 5th and November 1st, 2010 (20 Mondays and 4 Tuesdays; 5 planned monitoring dates were cancelled for all locations due to lack of a boat captain or inclement weather conditions), collected numerous samples that were analyzed for bacteria (approximately 385 samples each for fecal coliform and enterococci) and nitrogen pollution (approximately 103 samples of each parameter in 2010), recorded hundreds of measurements each of dissolved oxygen, temperature, pH, and salinity (averaged 1,041), and measured water clarity 391 times.

FOB monitored 19 open water body locations within Cold Spring Harbor (FB-1 – FB-4), Oyster Bay Harbor (FB-5 – FB-12), and Mill Neck Creek (FB-13 – FB-19). Each site was monitored in the morning once per week, weather and tide permitting, for dissolved oxygen, bacteria pollution, salinity, temperature, pH, and clarity. Nitrogen samples were collected approximately five times during the monitoring season.

In July 2010, FOB added three monitoring locations in Laurel Hollow (LH-1, LH-2, and LH-3 – all near the Flowers Oyster Hatchery) to the open water body monitoring program at the request of the Village of Laurel Hollow and Nassau County Department of Health (NCDH).

Three major water quality parameters were monitored in 2010: bacteria levels, dissolved oxygen levels, and nitrogen concentrations. Analysis of this season's open water body data provided many useful insights into the estuary's water quality.

In 2010, open water body bacterial levels were lower than 2004, when fecal coliform concentrations were unusually high, and higher than the lows measured in 2005 and 2006. Levels were similar to 2007 and 2008 records. As observed in previous years, bacteria levels in Mill Neck Creek and Cold Spring Harbor were generally higher than in Oyster Bay Harbor. In 2010, none of the locations in Mill Neck Creek met the State shellfishing standard for fecal coliform on a geometric mean basis for the entire season (although levels were below the limit

at some stations in the early and late portion of the monitoring season. Additionally FB-1, FB-2, FB-3, FB-7, FB-8, FB-9 and FB-10 within Cold Spring Harbor and Oyster Bay Harbor did not meet the same State shellfishing standard for fecal coliform during portions of the 2010 monitoring season.

The ninth year of nitrogen monitoring shows an increase in total nitrogen levels in the estuary. In 2010 there was a moderate rebound from a sharp decrease recorded in 2009. Prior to 2009 monitoring showed an increasing trend first observed in 2004 (although the dataset was somewhat limited in that year) and continuing in 2005 through 2008. None of the monitoring locations would have met the nitrogen standard for salt water that New York State applies to the Peconic Bay estuary (standard violation at total nitrogen (TN) > 0.5 mg/l), if that standard were to be applied to Oyster Bay as well. The cause of these increased levels is unclear and warrants additional study.

A $10.6 million advanced wastewater treatment facility serving the Oyster Bay Sewer District (OBSD) went online in December 2005. Microorganisms used to seed the plant were delivered in mid-January 2006, and the plant was fully operational in March 2006. The facility, a Sequencing Batch Reactor, is achieving the 2014 nitrogen limits imposed by the New York State Department of Environmental Conservation. The upgrade has reduced daily nitrogen discharges by as much as 75%. With the completion of this plant, the Friends of the Bay nitrogen data collected in 2002 through 2010 and subsequent years will provide a valuable baseline in evaluating the effect of reduced nitrogen loading on the estuary. The upgrade represents an important improvement in infrastructure available to the public, which should improve water quality of the estuary.

Dissolved oxygen (DO) data was collected throughout the estuary during the open water body monitoring season. In 2010 as well as in past years, DO trends indicate that the waters of the estuary are enriched with nutrients consistent with the nitrogen monitoring observations, since dissolved oxygen levels decrease steadily from spring through late summer, and then begin to increase in late summer. Nutrient enrichment can result from inadequately treated sewage discharges, polluted stormwater runoff, over-fertilization of lawns and gardens, agricultural runoff, and atmospheric deposition of air pollutants. Long-term reductions in nitrogen inputs should reduce the occurrence of extremely low DO conditions in the bottom of the harbor.

Friends of the Bay also continues to implement a stream and outfall monitoring program. The goal of the stream and outfall monitoring program is to establish current baseline water quality conditions, identify water quality impacts from potential point and non-point pollution sources, begin developing a water quality database for the watershed to guide environmental decision-making, and measure the progress toward meeting water quality goals in the estuary watershed. A QAPP has been approved for this monitoring program. This monitoring program, initiated in 2007, includes the sampling of 10 major discharges (OBS 1-10) into the Oyster Bay/Cold Spring Harbor estuary. These discharges included streams, ponds, a formerly untreated sewage discharge ("The Birches"), and a 'rotating' outfall that changed for each event in an effort to identify other pollutant sources.

"The Birches" is a 49-home Locust Valley community that has been dealing with a failing sewage treatment system for over 40 years. In 1983, a chlorination tank was installed to reduce bacteria contamination to Mill Neck Creek, but the treated wastewater continued to not meet

NYSDEC standards. In 2009, it was announced that the Town of Oyster Bay, Nassau County, and NYSDEC would be initiating a joint $13.2 million improvement project to remedy the problem. The construction of this sewer remediation project was initiated in April 2009.

Sewage infrastructure upgrades have been completed, and nearly all the homes in the Birches residential subdivision are now connected to the Glen Cove sewage treatment plant. Friends of the Bay will continue to monitor the site to document improvements to the water quality in Mill Neck Creek.

Although stream and outfall monitoring has been conducted as five discrete events over four years, some initial observations can be made. Overall, DO values have remained fairly consistent over the sampling period since 2007 and are in the range of 6-14 mg/L. Higher *E.coli* and fecal coliform concentrations were observed in the June and December 2010 samples at almost all locations but more monitoring is required to determine if there is a pattern. pH values remain relatively consistent and within a desirable range. Specific conductivity measurements remain relatively consistent over time and at all stations. In general, more ammonia levels above the reporting limit were reported in 2010 compared to earlier years. However, the maximum reported ammonia concentration was lower in 2010 compared to other years. Nitrate levels were consistently elevated at The Birches (OBS -1) and the highest metals values were observed at that station in 2008 and 2010. Additional data will help to further identify potential pollutions sources and monitor conditions at the streams and outfalls.

In June 2011, Friends of the Bay completed a Watershed Action Plan for the Oyster Bay/Cold Spring Harbor Estuary and surrounding watershed. The Watershed Action Plan is a comprehensive management plan to protect and restore water resource conditions throughout the Oyster Bay/Cold Spring Harbor Watershed. The plan recommends continuation of the ongoing monitoring programs to monitor changes in harbor conditions as a result of changing watershed conditions and implementation of plan recommendations. Additional data collection is also recommended to refine the current understanding of water quality impairments in the estuary complex, particularly pollutants for which previous monitoring results have demonstrated the potential for water quality impairment but which are not currently identified by NYSDEC as a listed cause of impairment (e.g., sediment, nutrients, dissolved oxygen).

Friends of the Bay looks forward to working with citizen scientists, government agencies, and fellow not-for-profit organizations in future monitoring seasons. Together, FOB and its partners will continue to improve and expand their monitoring efforts. These efforts will provide a link to show how investment in water quality protection is affecting the quality of water in Mill Neck Creek, Oyster Bay Harbor and Cold Spring Harbor.

1 Introduction

Friends of the Bay (FOB) is a widely-respected non-profit environmental organization located on the North Shore of Long Island. The mission of FOB is to protect, preserve, and restore the ecological integrity and productivity of the Oyster Bay/Cold Spring Harbor estuary and the surrounding watershed[1]. *Appendix A* presents a fact sheet for the estuary.

The Oyster Bay/Cold Spring Harbor estuary complex consists of a unique ecosystem in close proximity to New York City. Consider:

- Oyster Bay (Mill Neck) is among the 33 Inaugural Stewardship Areas listed within the Long Island Sound Stewardship Initiative 2006 Atlas.[2]
- The U.S. Fish & Wildlife Service maintains a 3,209 acre National Wildlife Refuge (NWR) within the Oyster Bay/Cold Spring Harbor Estuary Complex.[3]
- Two State-designated Significant Coastal Fish and Wildlife Habitat areas exist within the Oyster Bay/Cold Spring Harbor Estuary Complex.[4]
- More than 80 commercial baymen annually harvest up to 90% of New York State's oyster crop[5] and 33% of hard clams[6] from the Oyster Bay NWR.
- The Harbor Complex is home to the Cold Spring Harbor Fish Hatchery & Aquarium. The Hatchery is proud to have the largest living collection of New York State freshwater reptiles, fish, and amphibians.
- Oyster Bay is a designated New York State "historic maritime area."
- The oldest traditional shellfish farmer in New York State, Frank M. Flower and Sons (est. 1887), operates out of Oyster Bay. Frank M. Flower and Sons is the only traditional oyster company still in operation on Long Island (C.Blair, Newsday.com).
- Oyster Bay is designated as an Important Bird Area by the National Audubon Society.

Friends of the Bay's Water Quality Monitoring Program was initiated to continue data collection efforts that would have been terminated due to budget cuts by Nassau County. This program was developed in cooperation with the United States Environmental Protection Agency (EPA), New York State Department of Environmental Conservation (DEC), local governments and other volunteer monitoring groups around the Long Island Sound. Friends of the Bay considers this program a necessary component in the effort to preserve the Oyster Bay/Cold Spring Harbor ecosystem and hopes to increase public awareness of local threats to water quality. The water quality program of Friends of the Bay is being conducted to:

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[1] Friends of the Bay Mission Statement as of 2005

[2] The Stewardship Initiative identifies places with significant biological, scientific, or recreational value throughout Long Island Sound and works to develop a strategy to protect and enhance those special places. The Stewardship Initiative has five specific goals: 1) Preserve native plant and animal communities and unique habitat types; 2) Improve recreation and public access opportunities; 3) Protect threatened and endangered species in their natural habitats; 4) Preserve sites that are important for long-term scientific research and education; and 5) Promote efforts to plan for multiple uses. For additional information, visit http://longislandsoundstudy.net/stewardship/stewardship_atlas06.pdf

[3] http://refuges.fws.gov/profiles/WildHabitat.cfm?ID=52563

[4] http://www.nyswaterfronts.com/waterfront_natural_narratives.asp; For almost two decades, there have been three State designated Significant Coastal Fish and Wildlife Habitats within the Oyster Bay/Cold Spring Harbor Estuary: Cold Spring Harbor, Oyster Bay Harbor, and Mill Neck Creek Wetlands (these habitat designations originated in 1987). On October 15, 2005, The New York State Department of State recommendations to consolidate these designations became effective. The two habitats now include 1) Mill Neck Creek, Beaver Brook, and Frost Creek, and 2) Oyster Bay and Cold Spring Harbor.

[5] http://refuges.fws.gov/profiles/index.cfm?id=52563

[6] 2004 New York Annual Shellfish Landings, New York State Department of Environmental Conservation

1. Provide high quality data to continue the dissolved oxygen-testing baseline established by the Nassau County Department of Health in 1972.
2. Screen for water quality impairments.
3. Monitor the estuary in support of the Total Maximum Daily Load (TMDL) for pathogens that has been established for Oyster Bay and Mill Neck Creek[7]
4. Determine long-term water quality trends.
5. Document effects of water quality improvements.
6. Educate and involve citizens and public officials about water quality protection.
7. Watchdog activity within the watershed and harbor.
8. Assist local, State, and Federal agencies in harbor management by providing data.

This program enables trained citizen scientists working alongside Friends of the Bay staff to monitor various components of the marine ecosystem. Citizen scientists track a number of parameters in the estuary including water temperature, pH, clarity, salinity, dissolved oxygen, nitrogen, enterococci bacteria, and fecal coliform bacteria. Measuring these parameters enables Friends of the Bay to better understand changes within the local marine ecosystem. The design of the program was reviewed and approved by the EPA in May of 2006 through Friends of the Bay's *Open Water Body Water Quality Monitoring Program Quality Assurance Project Plan* (QAPP).

A Memorandum of Understanding exists between Friends of the Bay and the U.S. Fish and Wildlife Service as well.[8] In this agreement, Friends of the Bay supplies collected data to the Fish and Wildlife Service. The objectives of this cooperative effort are to support long-term water quality monitoring within Oyster Bay Harbor, Mill Neck Creek, and Cold Spring Harbor, waterways contained within the Oyster Bay National Wildlife Refuge in addition to cooperative efforts on environmental education, interpretation, and outreach projects.

This Annual Water Quality Report summarizes the data collected during the 2010 monitoring season as well as the results of the stream and outfall monitoring program, which was implemented in 2007. This report was produced in 2012 as part of Friends of the Bay's continuing commitment to study the complex factors that impact water quality within the estuary and the surrounding watershed.

2 Watershed Management

In June 2011, Friends of the Bay completed a watershed management plan for the Oyster Bay/Cold Spring Harbor Estuary and surrounding watershed. The watershed management plan was developed in two phases – a State of the Watershed Report and a Watershed Action Plan – following an approach endorsed by the U.S. Environmental Protection Agency (EPA), the NYSDEC, and the New York State Department of State (NYSDOS) Division of Coastal Resources for developing watershed-based plans.

The State of the Watershed Report, prepared on behalf of Friends of the Bay in November 2009 (Fuss & O'Neill, Inc.), summarized existing environmental and land use conditions within the Oyster Bay/Cold Spring Harbor watershed. The State of the Watershed Report integrated a

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[7] *Pathogen Total Maximum Daily Loads for Shellfish Waters in Oyster Bay Harbor and Mill Neck Creek.* NYSDEC (2003)
[8] Under the authority of the *U.S. Fish and Wildlife Coordination Act,* as amended, (16 U.S.C. Section 661) and Section 7 of the *Fish and Wildlife Act of 1956* [16 U.S.C. 742F(a)(4)], and the *Interior and Related Agencies Appropriation Act of 1992* (PL 102-154, Title 1, 105 Stat. 995.)

variety of environmental indicators to assess the current health of the watershed and potential future threats. The report provided a baseline assessment of watershed conditions, which can be updated periodically to evaluate changes in the watershed and help direct watershed management planning. The State of the Watershed Report therefore serves as the basis for the Watershed Action Plan.

This Watershed Action Plan identifies prioritized action items to protect and improve the health of the Oyster Bay/Cold Spring Harbor watershed and estuary. The plan has been developed to address the priorities and issues identified in the State of the Watershed Report, with significant participation by a steering committee of interested stakeholders and the public. The Watershed Action Plan is designed to have the clear potential to affect on-the-ground change within the watershed by recommending specific, measurable actions to protect and improve water resource conditions.

The Watershed Action Plan recommends continuation of the ongoing monitoring programs to monitor changes in harbor conditions as a result of changing watershed conditions and implementation of plan recommendations. Additional data collection is also recommended to refine the current understanding of water quality impairments in the estuary complex, particularly pollutants for which previous monitoring results have demonstrated the potential for water quality impairment but which are not currently identified by NYSDEC as a listed cause of impairment (e.g., sediment, nutrients, dissolved oxygen).

3 Monitoring program

3.1 Open Water Body Monitoring

Every Monday[9] mornings from April through October 2010, Friends of the Bay staff and citizen scientists collected data on water quality and ambient conditions at 19 open water body sites (increased to 22 locations in July) throughout the estuary complex. The parameters measured by Friends of the Bay included dissolved oxygen, salinity, water temperature, pH, water clarity, coliform bacteria, and nitrogen species.

Dissolved oxygen, salinity, pH, and water temperature were measured using a Hydrolab Quanta. The instrument includes a probe that is lowered within the water column to analyze the water's attributes in-place and a handheld datalogger that interprets the probe measurements and displays them for the sampler.

Water clarity was measured using a Secchi disk, a circular disk with opposing white and black quadrants that is lowered into the water column to the depth at which it can no longer be distinguished by an observer at the surface.

Water samples for coliform bacteria and nitrogen measurement were also collected by Friends of the Bay and analyzed by the Nassau County Department of Health (NCDH) and Analytical Chemists, respectively.

[9] Monitoring is conducted on Tuesday when Monday is a holiday

Field measurements collected and observations made at the time of sampling were recorded on field water quality monitoring sheets, which are presented in *Appendix C*. The following is a summary of the water quality testing locations and methods. These methods are consistent with the Standard Operating Procedures and Quality Assurance Project Plan that were approved by the EPA in May of 2006.

3.1.1 Monitoring Locations

Friends of the Bay monitored a total of 19 open water body sites throughout the Oyster Bay/Cold Spring Harbor estuary, including locations FB-5 through FB-12 in Oyster Bay Harbor, FB-1 through FB-4 in Cold Spring Harbor, and FB-13 through FB-19 in Mill Neck Creek. In July 2010 FOB added three sites in Laurel Hollow to the open water body monitoring program, including LH-1 through LH-3. A map identifying the approximate location of each site and a table of coordinates (latitude/longitude) for each station are included in *Appendix B*. These additional sites were added at the request of the Nassau County Department of Health and the Incorporated Village of Laurel Hollow to assist in determining reasons for high coliform levels leading to beach closures at the Village of Laurel Hollow.

The Oyster Bay/Cold Spring Harbor estuary station locations and identifiers were revised in 2003, so care should be used when comparing results from 2003 through 2010 to results presented in the 2002 monitoring report.

3.1.2 Monitoring Methods

Friends of the Bay monitored each open water body site for the following water quality parameters:

- **Dissolved Oxygen, Water Temperature, and pH** – Dissolved oxygen (DO), water temperature, and pH were measured at 19 monitoring sites (increased to 22 in July) using the Hydrolab Quanta datalogger and sonde. At each station, depth permitting, dissolved oxygen readings were taken at approximately one half-meter above the bay bottom, one-half meter below the water surface, and one meter below the water surface. The DO data was measured and recorded in milligrams per liter (mg/l), which is equivalent to parts per million (ppm). The measured values are then compared to ranges that describe the effect of dissolved oxygen on aquatic life, which are well established. In general, dissolved oxygen levels above 5 mg/l are preferred. Levels between 4 and 5 mg/l can cause harm to some species of organisms, especially the larvae of crustaceans such as lobster and crabs. Levels between 2 and 4 mg/l can cause harm to many organisms if exposure is prolonged. When dissolved oxygen levels decline below 2 mg/l, many organisms can be harmed quickly. Few organisms can survive exposure to levels below 1 mg/l for more than very short periods.
- **Salinity** – Salinity is the measurement of the concentration of dissolved salts in the water. Friends of the Bay monitored salinity with the Quanta meter, which measures specific conductivity (a direct measurement of the ease with which electricity passes through water) and converts that measurement to salinity. In earlier years, Friends of the Bay monitored salinity with a hydrometer, an instrument used to measure the specific gravity of liquids.

- **Water Clarity** – Friends of the Bay measured water clarity with a Secchi disk. The 8-inch diameter disk is divided into alternating black and white quadrants. The disk is lowered into the water with the sun at the citizen scientist's back. The point at which the disk becomes completely obscured is noted. The disk is then raised and the point at which the disk becomes visible again is noted. The average of these two numbers is the Secchi Depth, recorded to the nearest tenth of a meter (decimeter).
- **Bacteria** – Water samples were collected by Friends of the Bay in sterile bottles approximately one foot below the water surface. The bottles, supplied by NCDH, are then stored in a cooler with ice and transported immediately to the NCDH laboratory in Hempstead for analysis. The NCDH uses the Multiple-Tube Fermentation Technique - Method No.9221 (Standard Methods for the Examination of Water and Wastewater, 1995), which uses a 5-tube decimal dilution test. The level of fecal coliform bacteria and enterococci in a water sample is expressed as the most probable number per 100ml (MPN/100ml). A trip blank, supplied by the NCDH laboratory, is used to ensure that proper temperature standards are met. It is placed in the cooler with the ice and, upon arrival at the NCDH laboratory; the trip blank temperature is immediately recorded. If the trip blank exceeds 6°C, NCDH laboratory personnel flag the results on the chain of custody form and then Friends of the Bay flags the data in the electronic database.
- **Nutrients** – Nitrogen species water samples were collected at the Oyster Bay/Cold Spring Harbor estuary stations from the water surface in plastic bottles prepared byAnalytical Chemists. The bottles contain sulfuric acid and are placed into a cooler with ice packs. Once filled, they are transported to Analytical Chemists, located in Farmingdale, New York. The water samples are analyzed for common forms of nitrogen, including nitrate/nitrite, ammonia, and organic nitrogen, collectively called nitrogen species. The techniques used for analysis include the following methods from APHA and AWWA (1995): Nitrate/nitrite-N (mg/l) 4500-NO_3-E & 4500-NO_2-B, Total Kjeldahl Nitrogen (mg/l) 4500-N_{org}-B, Ammonia-N (mg/l) 4500-NH_3-D. Total Kjeldahl Nitrogen (TKN) measures oxidizable nitrogen, including organic and ammonia nitrogen concentrations collectively. Organic nitrogen levels are then calculated as the difference of TKN and ammonia. Total nitrogen can be calculated by adding TKN and nitrate/nitrite results.
- **Other Parameters** – Other information collected at the sites include: the time the sample was collected; qualitative description of rainfall in the previous 24 hours; tidal stage (scale of 1-4), air temperature (°C); wind direction (1 of 8 directions); wind speed (estimated in 5-mph increments); wave height (subjective, on a scale of 0-5); weather conditions (on a predetermined 1-6 scale); water color (subjective color, e.g. yellow-brown), cloud cover (0-5 scale) and any unusual conditions (i.e., odors, fish kills, debris).

3.1.3 Quality Assurance and Control

The 2006 season was the first in which Friends of the Bay implemented a QAPP that was prepared for the open water body monitoring project. The QAPP was prepared with assistance from Fuss & O'Neill, approved by the EPA, and was implemented by Friends of the Bay in June 2006. Friends of the Bay performed many of the tasks required by the QAPP in earlier years, but the QAPP provides a procedural framework to ensure that the data collected meets

EPA standards. The Friends of the Bay continued to implement the QAPP during the 2010 monitoring season. The QAPP includes:

- Formalized monitoring locations and standard parameter list.
- Defined sampling analysis procedures.
- Required collection of duplicate samples.
- Validation of field data through calibration checks and validation with other measurement methods.

The QAPP can be viewed at Friends of the Bay's office in Oyster Bay and is posted on their website at www.friendsofthebay.org.

It should be noted that data generated by the water quality meter was not consistently validated through calibration checks (e.g., titration) and when the titrations were completed the QA/QC readings were found to be outside of the acceptable range (deviate more than 0.5 mg/l) for approximately 23% of the checks performed in 2010 (14% were 2 or more failed titrations per sampling event, 3 total checks per event), such that some of the collected data does not meet QA/QC requirements of the QAPP. It should be noted that some of the titration failures were close to the acceptance criterion (deviate between 0.5 and 1.0 mg/l). Friends of the Bay is working to improve the quality of data collected through citizen scientist training to reduce QA/QC discrepancies.

3.2 Stream and Outfall Monitoring Program

A stream and outfall monitoring program was initiated in 2007 to establish current baseline water quality conditions in the watershed, identify water quality impacts from potential point and non-point pollution sources, begin developing a water quality database for the watershed to guide environmental decision-making, and measure the progress toward meeting water quality goals in the Oyster Bay/Cold Spring Harbor estuary watershed.

3.2.1 Monitoring Locations

Friends of the Bay monitored a total of 10 major discharges (OBS 1-10) into the estuary. These discharges included streams, ponds, an untreated sewage discharge, and a 'rotating' outfall that changed for each event in an effort to identify other pollutant sources. A map identifying the approximate location of each site and a table of coordinates (latitude/longitude) for each station are included in *Appendix B*.

3.2.2 Monitoring Methods

Friends of the Bay monitored each stream and outfall site for the following water quality parameters:

- **Field Parameters** – Dissolved oxygen (DO), water temperature, and pH were measured at 10 monitoring sites using the Hydrolab Quanta datalogger and sonde. The

DO data was measured and recorded in milligrams per liter (mg/l), which is equivalent to parts per million (ppm).

- **Salinity** – Salinity is the measurement of the concentration of dissolved salts in the water. Friends of the Bay monitored salinity with the Quanta meter, which measures specific conductivity (a direct measurement of the ease with which electricity passes through water) and converts that measurement to salinity.
- **Bacteria** – Water samples are collected by Friends of the Bay in sterile bottles approximately one foot below the water surface. The bottles, supplied by NCDH, are then stored in a cooler with ice and transported immediately to the NCDH laboratory in Hempstead for analysis. See *Section 1.1.2* for additional description regarding the bacteria sampling and analysis techniques used.
- **Nutrients** – Nitrogen species water samples are collected in plastic bottles prepared by South Malls Analytical Labs containing sulfuric acid and placed into a cooler with ice packs. They are then transported to South Mall Analytical Labs located in Plainview, New York. The water samples are analyzed for common forms of nitrogen, including nitrate/nitrite, ammonia, and organic nitrogen, collectively called nitrogen species. See *Section 1.1.2* for additional description regarding the nutrient sampling and analysis techniques used.
- **Metals** – Samples were collected in plastic bottles prepared by South Malls Analytical Labs containing nitric acid and analyzed for hardness (mg/l), lead (mg/l), copper (mg/l), and zinc (mg/l).
- **Other Parameters** – Other information collected at the sites include: the time the sample was collected; air temperature (°C); qualitative description of rainfall in the previous 24 hours, water color (scale of 0-3), water odor (scale 0-3), particulates (scale 0-3), and floatables (scale 0-3).

3.2.3 Quality Assurance and Control

The 2007 season was the first monitoring season in which Friends of the Bay implemented a QAPP for the stream and outfall monitoring program. The QAPP was prepared with assistance from Fuss & O'Neill, approved by EPA, and was implemented by Friends of the Bay in November 2007. The QAPP includes:

- Formalized monitoring locations and standard parameter list.
- Defined sampling analysis procedures.
- Required collection of duplicate samples.

4 Results, Analysis, and Discussion

4.1 Open Water Body Monitoring

With the help of citizen scientists, Friends of the Bay monitored water quality at a total of 19 open water body locations (increased to 22 in July) on 24 monitoring dates (20 Mondays and 4 Tuesdays, 5 planned monitoring dates cancelled for all locations) from April through November, 2010. Four sites are located in Cold Spring Harbor, eight are located in Oyster Bay

Harbor, and seven are located in Mill Neck Creek. Data collected during this season was analyzed both spatially (differences between areas in the estuary) and temporally (changes throughout the season) and compared to results recorded during previous seasons. The estuary was considered as a whole, and in terms of the three primary water bodies that comprise the estuary: Cold Spring Harbor (monitoring locations FB-1 through FB-4), Oyster Bay Harbor (FB-5 through FB-12), and Mill Neck Creek (FB-13 through FB-19).

These three water bodies are distinguished by hydrographic separations and differ in terms of physical characteristics, use, watershed features, and tidal influence (see Monitoring Locations Map in *Appendix B* and Tide Chart in *Appendix D*). Relatively narrow constrictions separate each water body. Plum Point separates Oyster Bay Harbor from Cold Spring Harbor, and the narrows at the Bayville Bridge divide Oyster Bay Harbor from Mill Neck Creek. Mill Neck Creek is shallow and likely to be more influenced by tributary inflows than the other hydrographic areas. Oyster Bay Harbor contains a large mooring area and industrial facilities, is more densely developed on its south shore, and is somewhat separated from Long Island Sound by Centre Island and the landmass that includes incorporated and unincorporated parts of Bayville. Cold Spring Harbor is open to Long Island Sound and is likely to be most rapidly impacted by tidal inflows and water quality within the Sound. Tributaries flowing into the estuary include Whites Creek, Mill River, Beaver Brook, Spring Lake, Tiffany Creek, Cold Spring Brook, and others.

A long-term data analysis was performed in January 2009. This analysis evaluated the open water body water quality monitoring data that was collected by the Friends of the Bay from 2000 to 2006. The data was evaluated for spatial and temporal trends in order to identify how water quality in the Oyster Bay/Cold Spring Harbor estuary has changed and the progress that has been made as a result of management efforts to address water quality problems in the estuary.

In July 2010, Friends of the Bay added three sites in Laurel Hollow (LH-1, LH-2, LH-3) to the open water body monitoring program at the request of the Village of Laurel Hollow and NCDH. The beaches in this area were being closed by the NCDH's onshore monitoring. However, the high, intermittent coliform levels did not appear to be correlated with high or low tides. Dye testing of cesspools was completed in the area but there were no significant deficiencies found. The NCDH also suspected sewage dumping by recreational boaters may be the source; however, the moorings in the area are for very small vessels – most without onboard sanitary facilities. Finally the NCDH deduced that the exceedences most likely are caused by the Canada geese that frequent the open lawn areas upstream of the beach. As the Laurel Hollow locations were only sampled for a short portion of the monitoring season, the data has not been analyzed in this report but included as raw data in *Appendix E*.

4.1.1 Physical Parameters

Salinity, water temperature, pH, air temperature, and water clarity were measured at each open water body sampling station throughout the season. These physical parameters can impact environmental and ecological conditions within the estuary. *Figure 1* shows data averaged by sampling season (April through October) for parameters monitored in Oyster Bay during 2000 through 2010.

Water temperature significantly influences water quality. Dissolved oxygen (DO) solubility decreases while biological activity increases with increasing temperature. In the summer months, the decay of dead algae and other organisms is accelerated, consuming DO while DO is also being driven out of solution by elevated temperatures. These factors often result in hypoxic (low DO) or anoxic (no DO) conditions that can severely inhibit or kill aquatic macroorganisms.

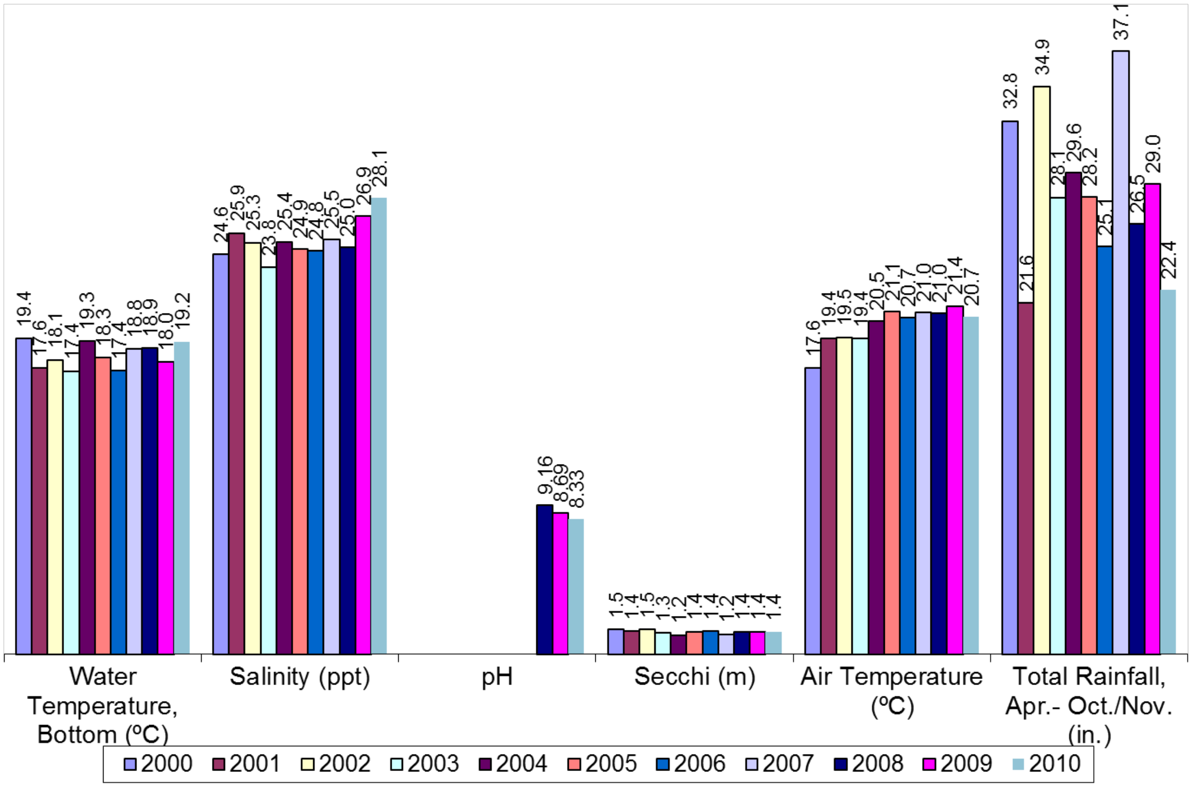

Figure 1. Physical conditions in the Oyster Bay/Cold Spring Harbor estuary for eleven monitoring seasons

The seasonal average values for each physical parameter measured by Friends of the Bay in 2010, with the exception of salinity and pH, were within the range of values from previous years. Average salinity was at the highest level recorded, and pH was slightly lower than the other two sampling seasons of record. Average air temperature, which had increased 9 of the 10 subsequent monitoring years, was abnormally lower in 2010 (compared to 2005-2009). This trend is not reflected in the average temperature of water in the estuary bottom. Average bottom water temperatures in 2010 increased, to the third highest level in the eleven sampling seasons. It should be noted that warmer temperature waters do not allow for as high dissolved oxygen levels as do cooler waters.

Water salinity can also affect DO levels; the saturation dissolved oxygen level at 25 parts per thousand (ppt) of salinity is approximately 85% the saturation dissolved oxygen level of freshwater (Chapra, 1997). Average salinity levels recorded in 2010 surpassed all other years – 1.2 ppt above the next highest average (2009). These differences in salinity are unlikely to significantly impact dissolved oxygen levels in the estuary. For example, at a temperature of

20ºC, the DO saturation would range from approximately 87% to 84% of the saturation dissolved oxygen level of freshwater for salinity of 23 to 29 ppt, respectively.

During the 2010 season, the rainfall recorded was lower than most of the other seasons of record and similar to the rainfall observed in 2001 (lowest of the 11-year monitoring period). At Levittown, Long Island, 22.4 inches of precipitation was recorded during the 2010 monitoring season, which is significantly lower than the average seasonal precipitation from 2000 through 2009 (29.3 inches).

Secchi disk depth is an indication of water clarity. Light that penetrates the surface of the water passes through the water column, reflects off the disk, and passes back through the water column to the eye of the observer. Secchi disk depth is the depth where enough light is scattered (by objects, such as sediment particles) or absorbed (by being converted to heat or chemical energy, such as by algae) within the water column that the light reflected by the disk can no longer return to the surface. Dissolved solids, particulate solids, algae, and other biota can impact clarity in a water column. Secchi disk depths in the Oyster Bay/Cold Spring Harbor complex are generally between 2.5 and 0.5 m (in 2010 the range was 3.0 to 0.3 m). Although the cause of the attenuation has not been studied in detail, it is likely to be caused by algal growth fueled by nitrogen inputs to the Bay.

Figure 2 presents 2010 Secchi disk depth results as averaged for Cold Spring Harbor, Oyster Bay Harbor, and Mill Neck Creek. Average Secchi disk depths in 2010 for these areas were 1.38, 1.56 and 1.11 m, respectively. As was the case in past years, Mill Neck Creek is generally less clear than Oyster Bay Harbor and Cold Spring Harbor, possibly a result of increased biological activity due to it shallow depth, marshy areas, and close proximity to tributary discharges. Secchi disk depths were variable throughout the season, and it is difficult to discern any definitive trends in the 2010 data although the lowest clarity levels seem to occur mid-sampling season at all locations. See *Appendix E* for additional physical data.

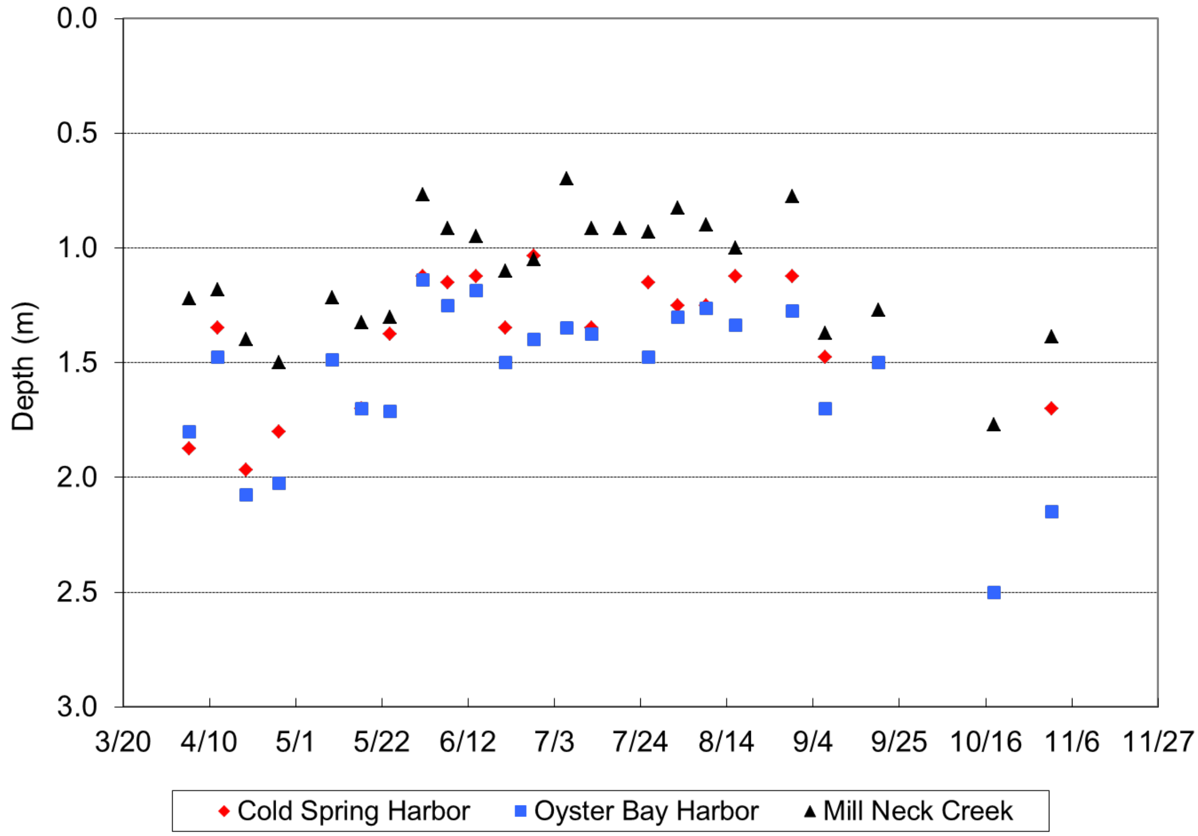

Figure 2. 2010 Secchi disk results, averaged locationally

4.1.2 Bacteria

Bacteria are ubiquitous in the environment. Certain types, however, can be used to indicate the possible presence of human pathogens. Common environmental indicator bacteria include fecal coliform and enterococci. Bacteria are introduced in the marine environment through various point and non-point sources such as surface water runoff, industrial and agricultural discharges or wastewater discharges. The New York Code of Rules and Regulations (NYCRR) specify levels of fecal coliform bacteria that should be met in bodies of water designated for different purposes. Waters used for shellfish cultivation and harvest have to meet the most stringent bacteriological criteria.

Coliform bacteria levels are reported as logarithmic average with a 30-day averaging period (also known as the geometric mean, or geomean). Geomeans are often used for regulatory thresholds as they are less prone to influence by outlier values which frequently result during bacterial analysis.

Friends of the Bay collected bacteria data during 24 of 29 weeks monitored during the 2010 open water body monitoring season (5 dates were cancelled completely for all locations due to inclement weather or lack of a captain). The completeness of monitoring runs, calculated by dividing the number of runs performed (24) by the number of possible runs (29) and expressed as a percent, is 83%[10] for the 2010 monitoring season. In comparison, completeness of monitoring runs in previous years has ranged from 77% to 96%.

Table 1 summarizes shellfish standards for fecal coliform bacteria that are enforced by New York State (NYS). In 2004, new beach closure standards were implemented that are based on measured levels of enterococci, an alternate indicator bacteria, and fecal coliform (although a total coliform standard is still included). The new standards are summarized in *Table 2*.

Table 1. NYS Coliform Bacteria Standards

	Shellfishing *
Fecal Coliform	LOG AVG <14 MPN/100 ml and If < 10% of samples do not exceed 43 MPN/100 ml

* 6 NYCRR §47.3

Table 2. NYS Coliform Bacteria Standards, effective 2004

	Swimming †
Fecal Coliform	LOG AVG 30 days < 200 MPN/100ml, and no sample greater than 1,000 MPN/100 ml
Enterococci	LOG AVG 30 days <35 MPN/100 ml, and no sample greater than 104 MPN per 100 ml

†10 NYCRR Section 6-2.15 - Water quality monitoring

Fecal coliform and enterococci levels were measured and reported at all nineteen (19) locations (increased to 21 in July) during the 2010 monitoring season. Fecal coliform has been measured by Friends of the Bay since the inception of the monitoring program, while enterococci has been measured since 2004.[11] Samples were collected for enterococci as well, but a different laboratory method was used in 2004 than in 2005 and later. The method used in 2004 resulted in elevated values compared to these later years, so 2004 enterococci results are not included for comparison in this report.

Table 3 presents a summary of the season's bacteria results compared to the New York State Shellfishing Standards in *Table 1*. The shaded cells in *Table 3* indicate that the seasonal geomean and/or the 90th percentile value at that station exceeded the State standard. Although only fecal coliform data were collected in 2010, in earlier years of the monitoring program, total coliform exceedances were generally accompanied by exceedances in fecal coliform as well.

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[10] Completeness is typically calculated as the number of total datapoints collected divided the number of datapoints planned. However, completeness calculated in this manner is less meaningful for Friends of the Bay, since several monitoring locations cannot be sampled under certain tidal conditions.

[11] The NCDH laboratory, which performs bacterial analysis for Friends of the Bay, changed analysis methods from the 2004 to 2005 season. As such, data from 2004 is not comparable to data from later years.

Table 3. Comparison of 2010 Monitoring Results to State Shellfishing Standards

Fecal Coliform			
Station	Seasonal Geomean	90th Percentile	Location
FB-1	227	1374	CSH
FB-2	95	686	CSH
FB-3	30	391	CSH
FB-4	2	10	CSH
FB-5	2	6	OBH
FB-6	3	13	OBH
FB-7	23	263	OBH
FB-8	6	34	OBH
FB-9	5	38	OBH
FB-10	35	320	OBH
FB-11	3	8	OBH
FB-12	3	9	OBH
FB-13	22	177	MNC
FB-14	33	206	MNC
FB-15	242	925	MNC
FB-16	105	376	MNC
FB-17	125	610	MNC
FB-18	13	75	MNC
FB-19	19	99	MNC
Shellfish Standard	14	43	

Bacteria levels exceeded the fecal coliform standard at FB-1, FB-2, FB-3, FB-7, FB-10, FB-13, FB-14, FB-15, FB-16, FB-17, FB-18, and FB-19. These results are encouraging, since the majority of Oyster Bay Harbor met the standard for fecal coliform (FB-1, FB-2, and FB-3 are located in Cold Spring Harbor, FB-7 in is the center of Oyster Bay Cove, FB-10 is located near Beekman Creek, and FB-13, FB-14, FB-15, FB-16, and FB-17 are located in Mill Neck Creek). Oyster Bay Harbor is where the majority of shellfishing occurs in the estuary. In 1983, the New York State Department of Environmental Conservation closed Mill Neck Creek to shellfishing due to the elevated coliform bacteria levels found there, which was likely the result of the sewage overflows from "The Birches" (also known as Continental Villa) housing development in Locust Valley that have plagued Mill Neck Creek.

This subdivision historically operated its own sewage treatment system, which suffered chronic problems due to cesspool overflows and inadequate treatment of waste, impacting low-lying wetlands and the adjacent creek. Failing and/or low-functioning individual on-site sewage disposal systems located in this area are also believed to have contributed to these chronic problems. Sewage infrastructure upgrades have been completed, and nearly all the homes in the Birches residential subdivision are now connected to the Glen Cove sewage treatment plant. Friends of the Bay will continue to monitor the site to document improvements to the water quality in Mill Neck Creek.

Figure 3 and *Figure 4* present seasonal geometric means (i.e., May through October) for fecal coliform and enterococci, respectively, for each of the estuary's embayments. Geometric mean levels of fecal coliform increased in Cold Spring Harbor (second highest average on record), decreased in Mill Neck Creek, while they were similar to past years in Oyster Bay Harbor. All locations have increased geometric means from levels reported in 2006 (area's average lowest level on record). The enterococci geometric means followed the same trend recorded for fecal coliform in 2010 – Cold Spring Harbor increased (highest average on record), Mill Neck Creek decreased, and Oyster Bay remained constant.

Although the shellfish and swimming standards are included on the figures below, the locationally-averaged geomeans cannot be used to directly assess compliance with the standards.

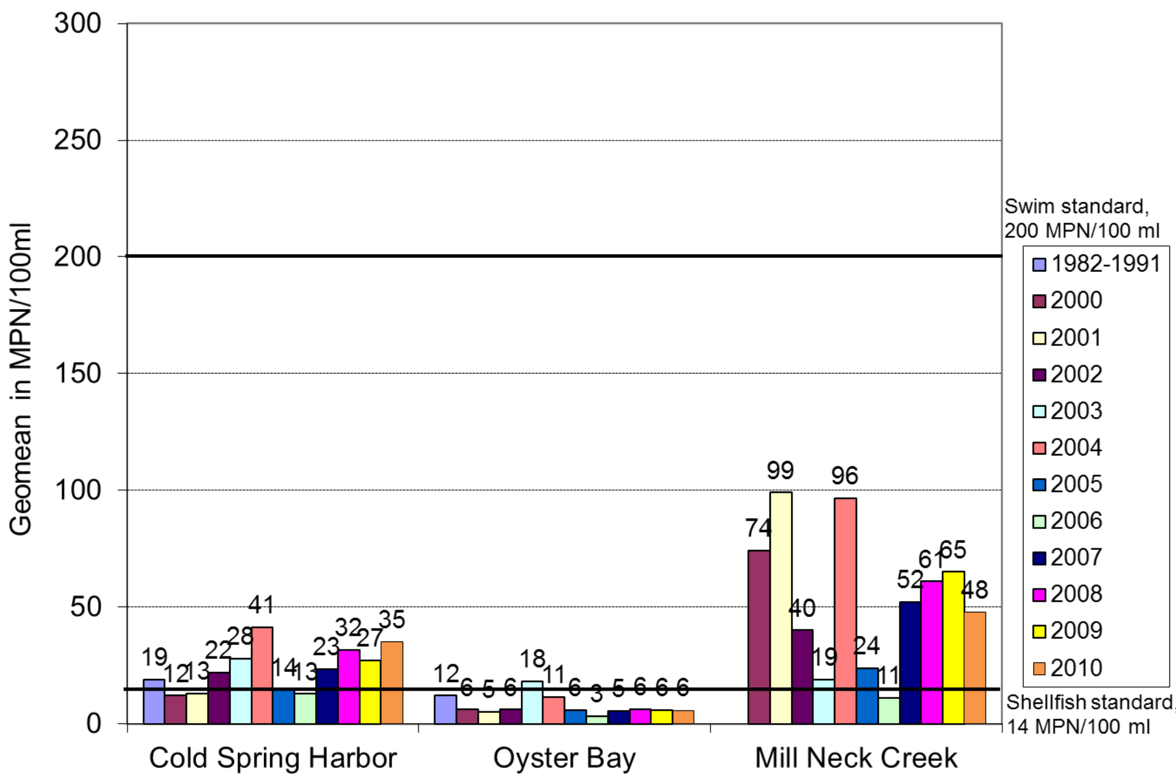

Figure 3. Seasonal geomeans of fecal coliform data by location

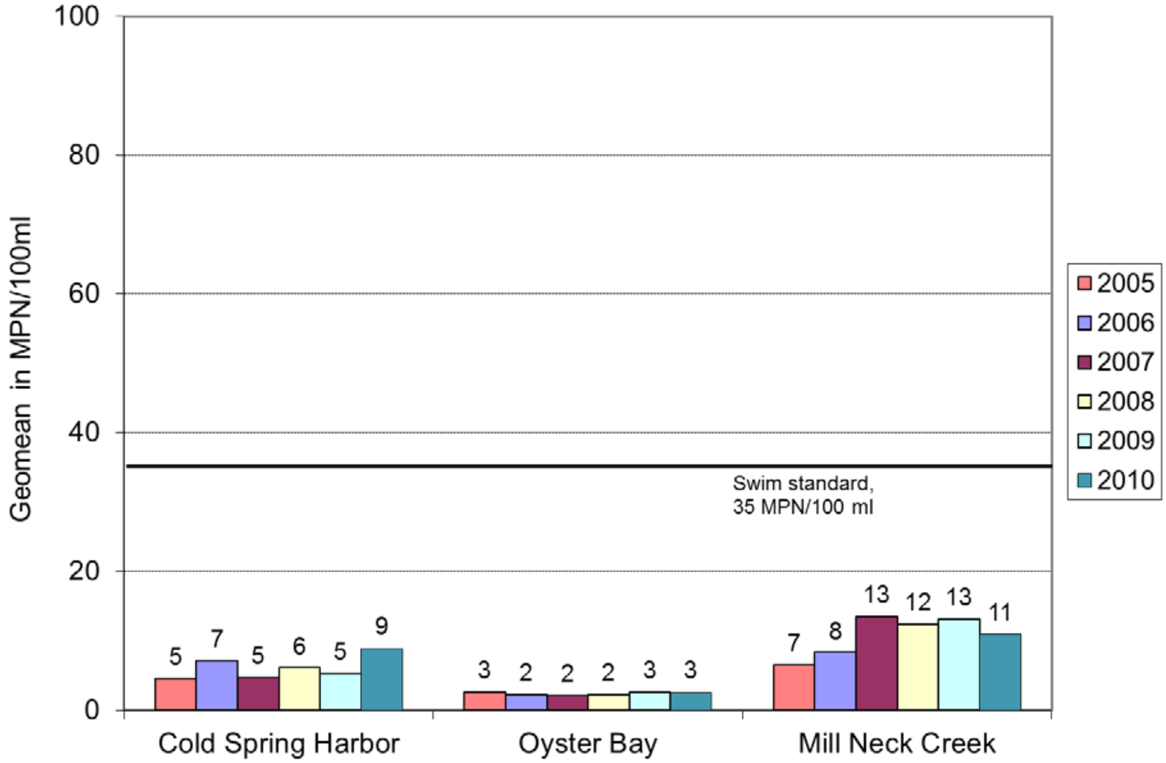

Figure 4. Seasonal geomeans of enterococci data, by location

Figure 5 presents total monthly precipitation as recorded at a precipitation station in Levittown during the 2010 sampling season. Total monthly precipitation during 2010 was relatively evenly distributed. Precipitation quantities ranged from 1.06 inches in June to 4.69 inches in October. Distribution of precipitation through the monitoring season is important since stormwater runoff can transport bacteria pollution to receiving waters. See *Appendix E* for additional bacteria data.

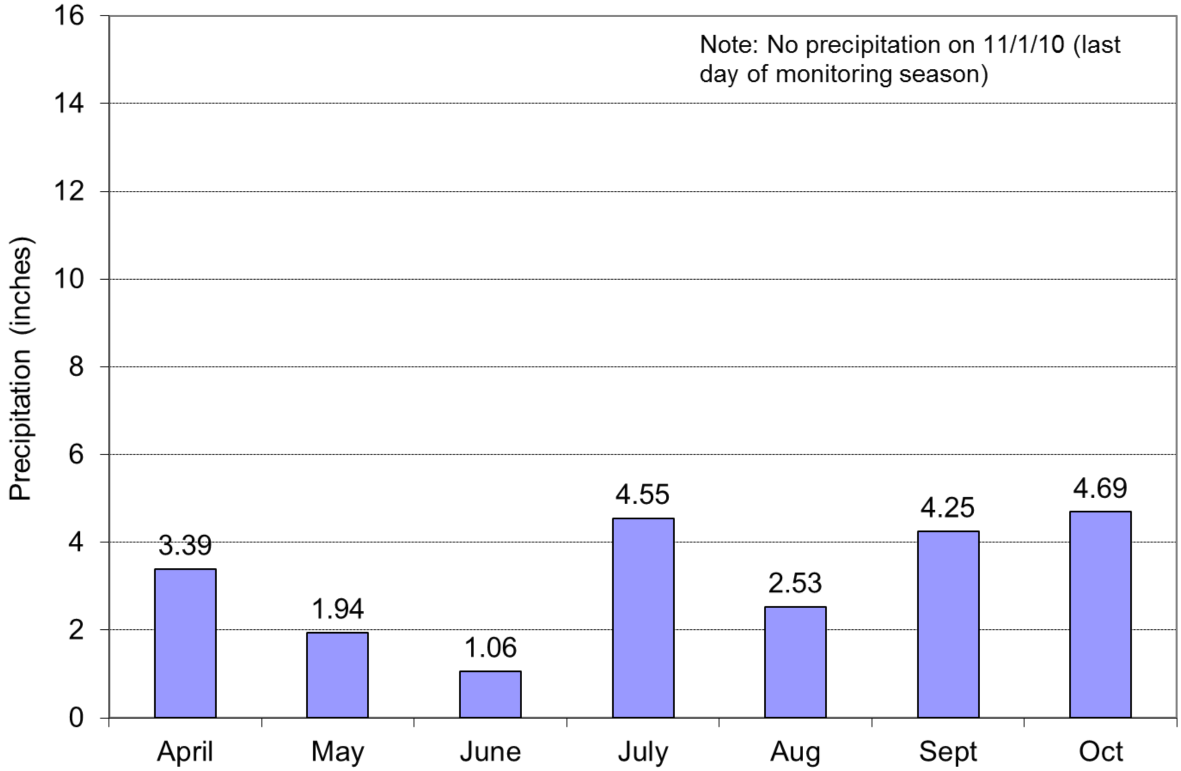

Figure 5. Precipitation recorded at Levittown, Long Island, 2010

4.1.2.1 Cold Spring Harbor Results

Four stations were monitored for fecal coliform and enterococci bacteria in Cold Spring Harbor in 2010. *Figure 6* and *Figure 7* present the 2010 fecal coliform and enterococci 30-day running bacteria geometric means for each station. In some cases, fewer than two samples were collected in the preceding 30-day period, so some breaks in the line graph are present.

The results for shellfishing are consistent with those presented in *Table 3*; only one station in Cold Spring Harbor (FB-4) complied with the fecal coliform NYS shellfish geometric mean standard for the duration of the 2010 season. The other three stations failed to comply with this standard for fecal coliform bacteria for all or portions of the monitoring seasons. In 2010, FB-4 met the fecal coliform standard with the highest calculated 30-day mean reaching 6 MPN/100ml.

FB-4 also met both the fecal coliform and enterococci geometric mean components of the swimming standards for the 2010 season, FB-3 met the standard for enterococci but not for fecal coliform. FB-1 and FB-2, particularly FB-1, exceeded the swimming standards during the majority of the summer season (late June through late August). Three fecal coliform samples at the FB-1 location and two at the FB-2 station exceeded the 1,000 MPN/100 ml swimming standard during the 2010 season. Additionally, the 104 MPN/100 ml single sample standard for enterococci was exceeded three times at FB-1 in 2010. These results would have resulted in beach closures.

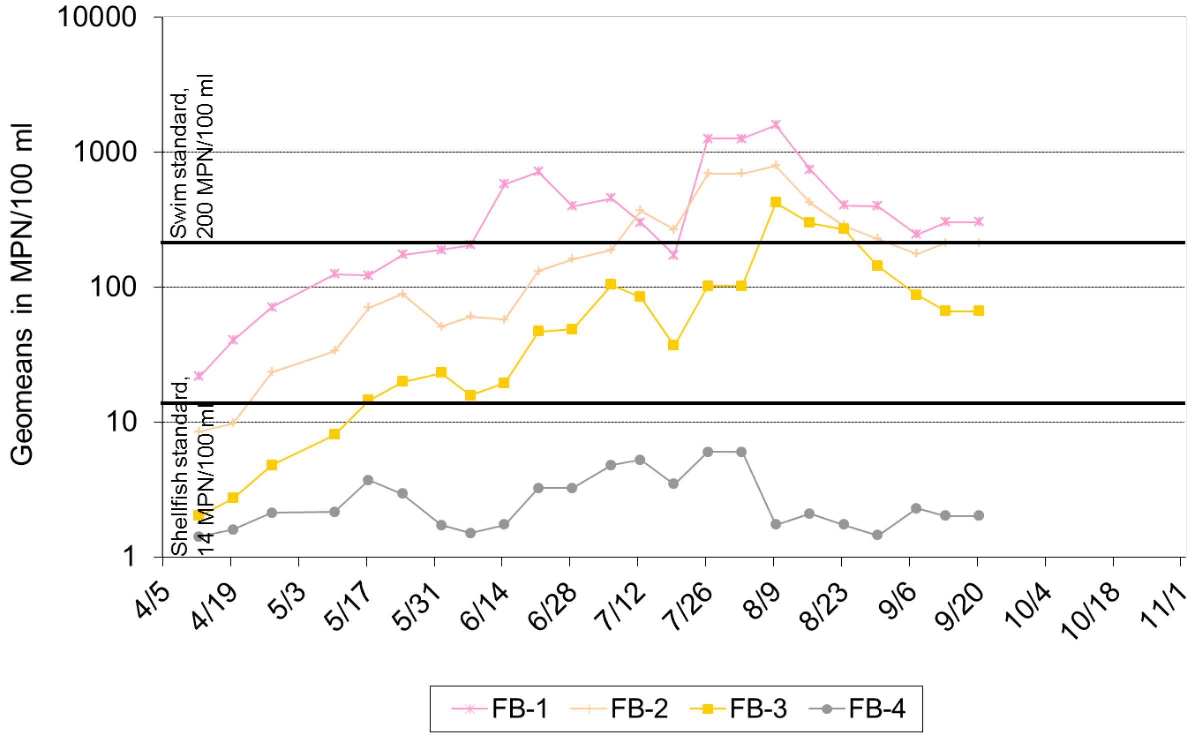

Figure 6. 30-day running geometric mean of 2010 Cold Spring Harbor fecal coliform samples

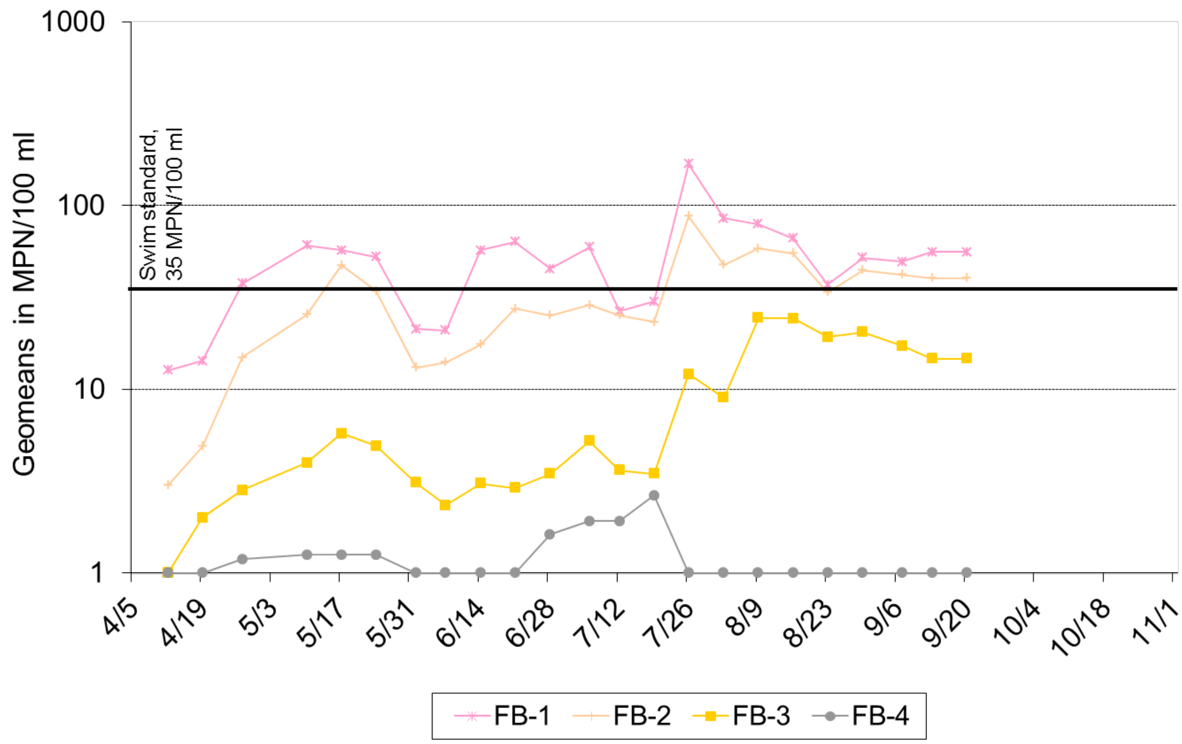

Figure 7. 30-day running geometric mean of 2010 Cold Spring Harbor enterococci samples

4.1.2.2 Oyster Bay Harbor Results

A total of eight stations were monitored for fecal coliform and enterococci bacteria in Oyster Bay Harbor in 2010 as depicted in *Figure 8* and *Figure 9*. As shown in *Figure 8* the geometric mean of fecal coliform results at many of the stations did not meet the geometric mean component of the NYS water quality criteria for shellfishing for the 2010 season. In 2010, FB-7, FB-8, FB-9, and FB-10 exceeded the standard during a portion of the season.

The single sample standard of 1,000 MPN/100 ml for fecal coliform was not exceeded in 2010 within Oyster Bar Harbor, while the 104 MPN/100 ml enterococci standard was exceeded twice each at FB-7, FB-8, and FB-10. The running 30-day enterococci geometric mean standard (35 MPN/100 ml) was reached but not exceeded once in July for enterococci at FB-10, while the 30-day fecal coliform geometric mean standard (200 MPN/100 ml) was not exceeded at any of the stations in 2010.

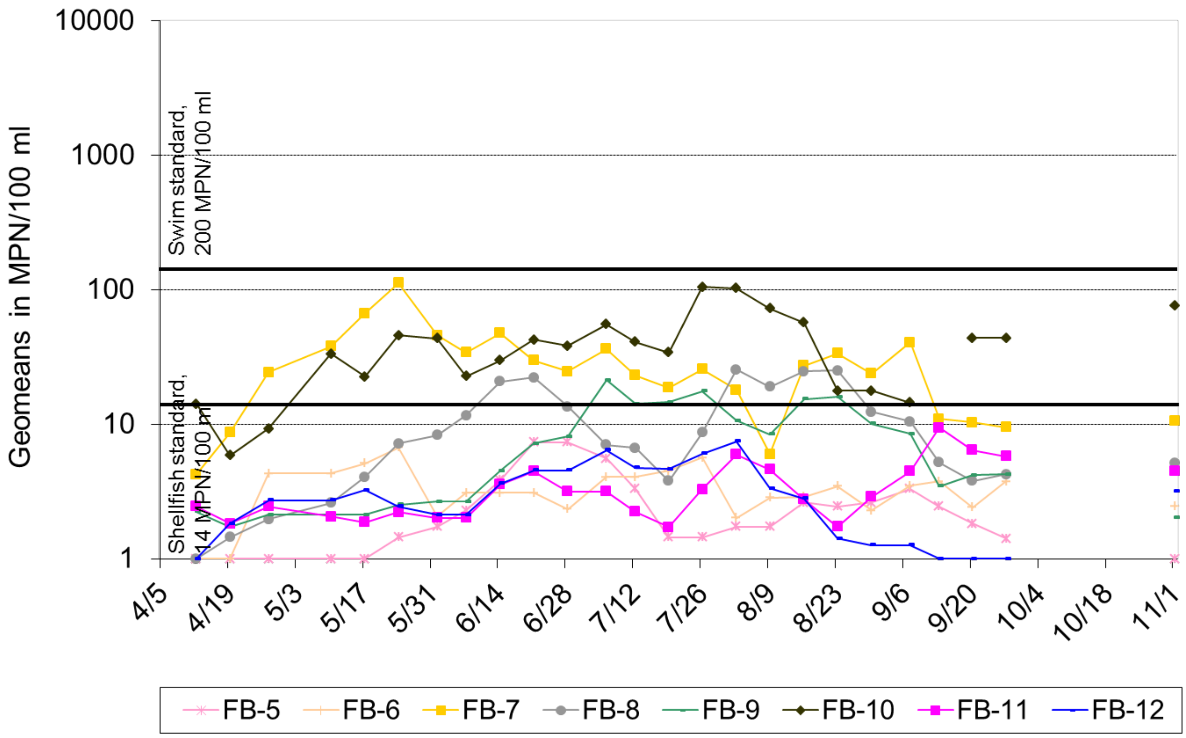

Figure 8. 30-day running geometric mean of 2010 Oyster Bay Harbor fecal coliform samples

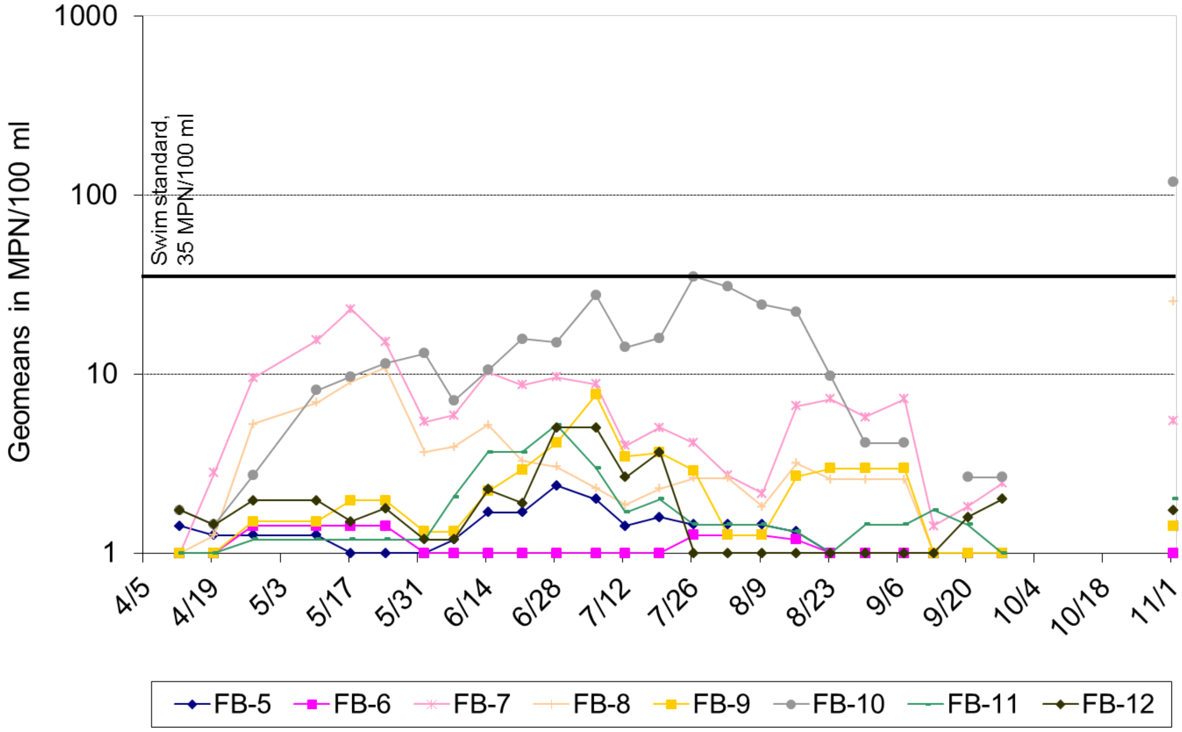

Figure 9. 30-day running geometric mean of 2010 Oyster Bay Harbor enterococci samples

4.1.2.3 Mill Neck Creek Results

In 2010, seven stations were monitored in Mill Neck Creek for fecal coliform and enterococci, and monthly geometric means were calculated for the data. *Figure 10* and *Figure 11* present the results of this analysis.

FB-15, FB-16, and FB-17 are difficult to monitor since low tidal conditions often prevent access; FB-15, FB-16, and FB-17 were only successfully sampled on 55%, 48%, and 45% of the monitoring events during 2010, respectively. Therefore, the analysis is based on a much smaller pool of data, which may affect the analysis of the resulting data. In general, sample collection at these sites was consistent; samples were collected at each location at least once a month during the monitoring season.

None of the Mill Neck Creek locations met the geometric mean component of the State shellfishing standards for the entire 2010 monitoring season. Locations FB-15, FB-16, and FB-17 did not meet the geometric mean component of the State swimming fecal coliform and enterococci standards for a significant portion of the 2010 season as well. Monitoring station FB-15 exceeded the single sample fecal coliform standard (1000 MPN/100 ml) twice, while locations FB-13, FB-14, FB-15, FB-16, and FB-17 exceeded the enterococci standard (104 MPN/100 ml) one, two, four, two, and two times in 2010, respectively.

The highest levels of fecal coliform and enterococci generally occur at FB-15. It is notable that FB-15 is located in tidal flats that could accumulate bird droppings during periods of low tide.

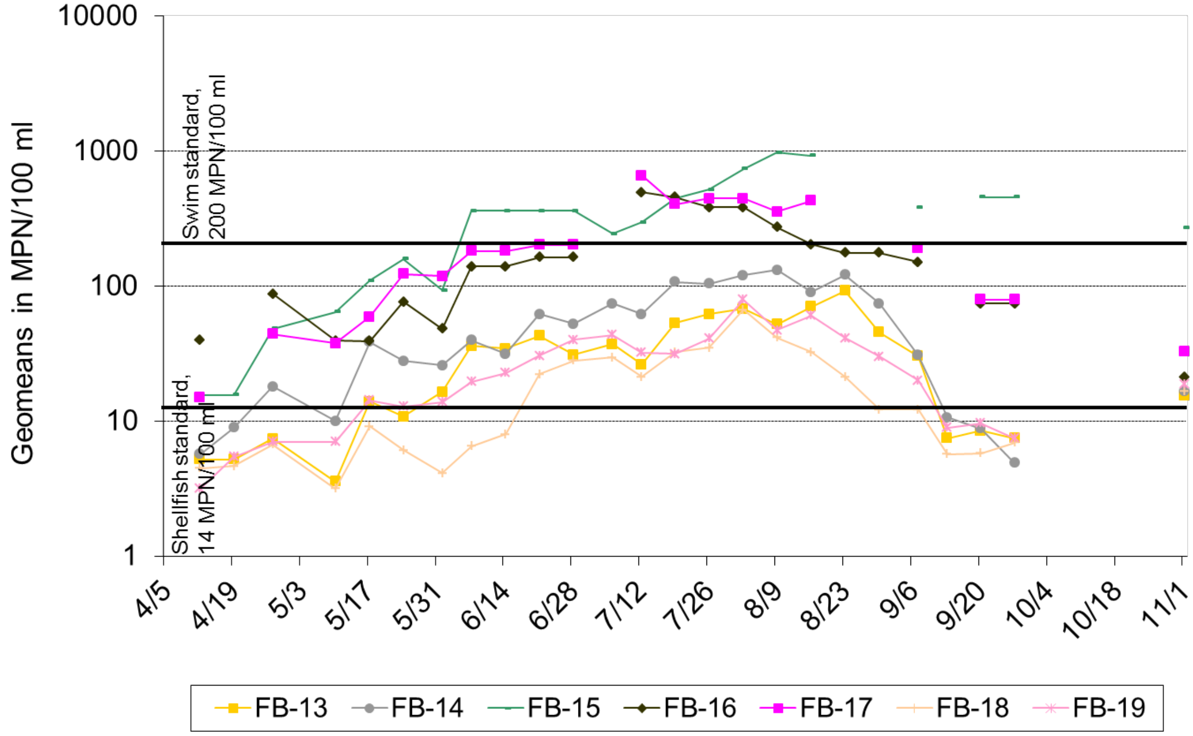

Figure 10. 30-day running geometric mean of 2010 Mill Neck Creek fecal coliform samples

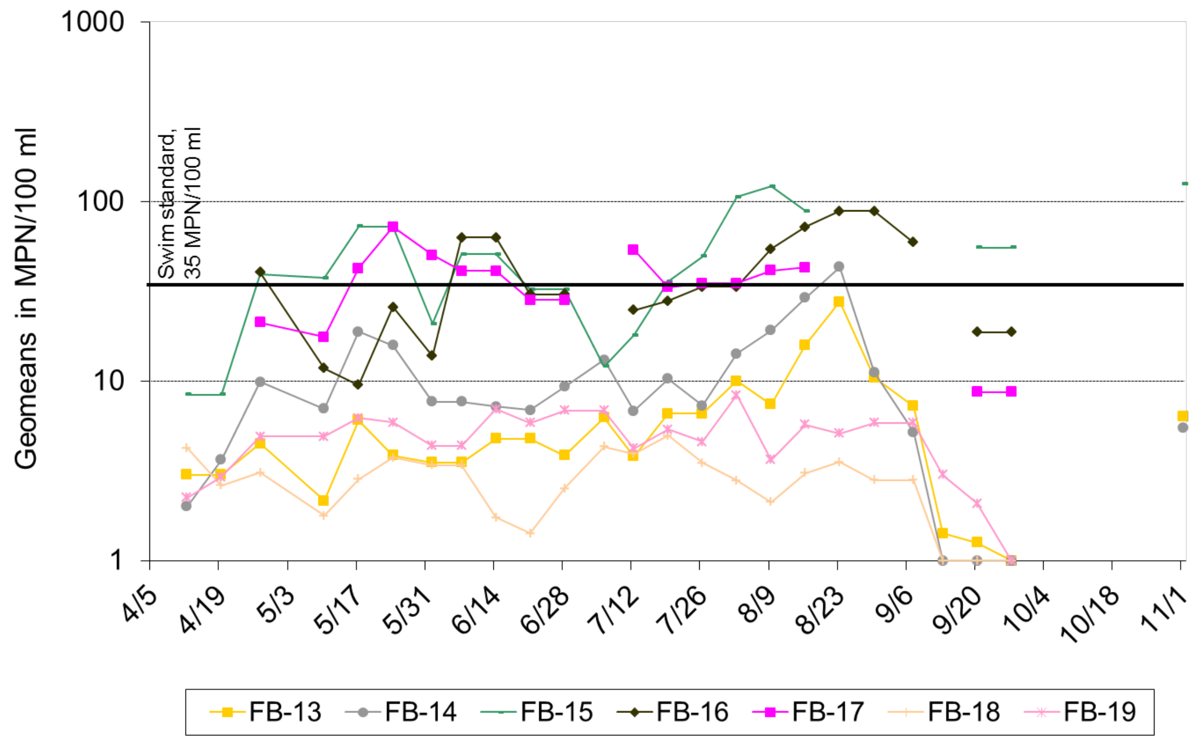

Figure 11. 30-day running geometric mean of 2010 Mill Neck Creek enterococci samples

4.1.3 Nutrient Enrichment by Nitrogen

4.1.3.1 The Nitrogen Cycle

The nutrients nitrogen and phosphorus, as well as other minerals, are essential components for organisms in Oyster Bay. Nitrogen and phosphorus are typically the limiting factor in the quantity of biomass (organisms, such as algae, bacteria, fish, and plants) that can grow in a water body. When nutrient inputs to a water body increase, microorganism populations also increase. These increases are generally first seen in the density of algae, resulting in an algal bloom.

A common rule of thumb is that the ratio of nitrogen to phosphorus in biomass is approximately 7 to 2. This means that, if the nitrogen concentration divided by the available phosphorus is less than 3.5, biological growth will be limited by the amount of nitrogen (Chapra 1997) in the water. If this ratio is greater than 3.5, then phosphorus will limit biological growth (other nutrients, such as silica, are known to limit growth as well in less common instances).

In marine ecosystems, such as the Oyster Bay/Cold Spring Harbor complex, phosphorus is generally abundant. The amount of biological growth that occurs is directly related to the amount of nitrogen that is present in the water. For this reason, Friends of the Bay monitors nitrogen parameters in the estuary.

Several algal blooms may occur during the year, depleting the nutrient concentrations within the water column. When the nutrients are depleted, phytoplankton populations die off and sink to the bottom, contributing to large amounts of organic matter in the water column. This organic matter decays while sinking and is further decomposed by bacteria in the estuarine sediments.

While decomposing dead phytoplankton, bacteria consume oxygen. This depletion of oxygen may result in hypoxia (DO less than 3 mg/l) at the harbor bottom. Typically, hypoxia occurs in summer, when the water column stratification hinders oxygen replenishment in deep water.

There are four nitrogen species commonly present in marine waters: ammonia-N, nitrate, nitrite and organic nitrogen. *Figure 12* presents a schematic of the interrelationships between these species, showing the processes that impact nitrogen in the marine environment.

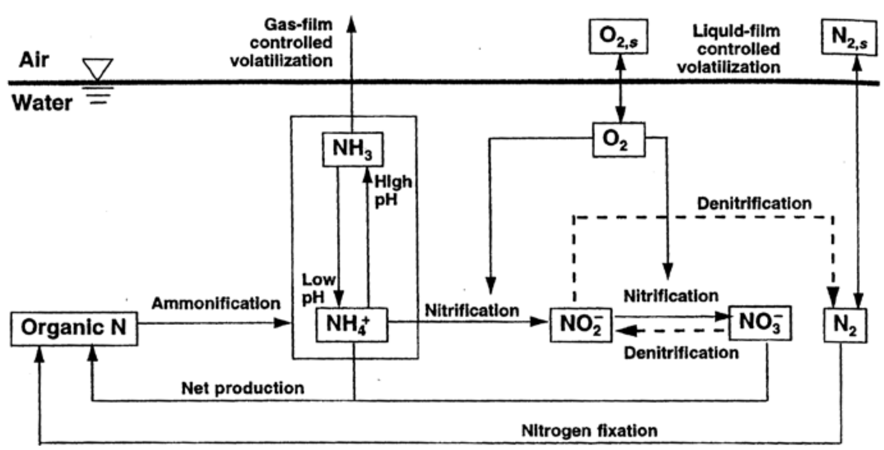

Figure 12. Nitrogen species and processes in marine environments
(Source: Chapra 1997)

Organic nitrogen is present in the form of urea, amino acids, proteins and other compounds (LISS, 1994). It can be bound to organic matter such as plants or algae. Dissolved forms of organic nitrogen come from sewage plants effluent, sewer overflow, failing septic systems and stormwater runoff. Dissolved forms of organic nitrogen are available to bacteria and phytoplankton populations and promote their growth.

Phytoplankton also utilize inorganic forms of nitrogen, including ammonia, nitrate, and nitrite. Organic nitrogen decays through ammonification to ammonia. Nitrates and nitrites are carried into the marine waters by stormwater runoff or result from nitrification of ammonia within the water body. Nitrates and nitrites can be converted to nitrogen gas by bacteria under anoxic conditions, and thus removed from the aqueous environment. High levels of ammonia may pose a danger to aquatic life. With rising temperatures and pH, ammonia ions (NH_4^+) change at increased rates into an un-ionized form of ammonia (NH_3). This form of ammonia is toxic to fish and aquatic plants.

4.1.3.2 Nitrogen Criteria and Standards

In 1989, the U.S. EPA proposed ambient water quality criteria for ammonia (NH_3) in salt water. These criteria are pH, salinity, and temperature dependent. The EPA recommends that continuous total ammonia levels should not exceed 0.72 mg/l for waters having the following conditions: salinity 20 ppt, temperature 2°C, and pH 8. However, for slightly more alkaline conditions (pH 8.4), the criterion decreases to 0.30 mg/l.

The 1994 Long Island Sound Study (LISS) identified several major sources of nitrogen. These sources include deposition from air pollution, delivery from large tributaries, sewage treatment plants, failing septic systems, and storm water runoff. LISS presented several management options for controlling the nitrogen load into the Sound. Two of these options, including sewage treatment plant upgrades for nitrogen removal and reduction of nitrogen from non-point sources, could potentially result in a 55% reduction of nitrogen load to Long Island Sound.

Nitrogen water quality standards vary across the U.S. Some States follow total maximum daily load (TMDL) criteria. Others use site-specific or waterbody-based ambient nutrient levels (National Research Council, 2000). New York State adopted a new aquatic life standard for ammonia level in marine waters on February 16, 2008. For estuarine waters such as Oyster Bay, the **chronic**, or long-term aquatic standard for ammonia (un-ionized ammonia as NH_3) is 35 µg/L (0.035 mg/l). The **acute** ammonia standard is 230 µg/L (0.23 mg/l), meaning that the estuary is considered impaired if measurements exceed this level.

In addition, the NYS DEC has adopted a total nitrogen (TN) guideline of 0.5 mg/l for the Peconic Bay estuary surface water (Suffolk County Department of Health Services, 1999). This guideline is based on the 1988-1990 summer data correlation of the mean TN levels with an occurrence of dissolved oxygen standard violations. The 1999 Comprehensive Conservation and Management Plan for the Peconic Bay Estuary proposed a change of this guideline to 0.45 mg/l based on more recent data (1994-1996). A more stringent criterion of 0.4 mg/L TN is being considered for shallow waters in order to protect eelgrass habitat areas.

LISS established a target of 58.5% nitrogen reduction from the 1990 baseline for cumulative point and non-point in-basin sources (NYS DEC, 2000). This target is to be achieved through maintaining maximum annual loads of nitrogen at 11 management zones. As of 2002, sewage treatment plant upgrades decreased nitrogen loads to the Sound by 28% (EPA 2006). An additional 12% reduction was targeted for completion by August 2004 (it is unknown if this goal was accomplished).

With the intent of reducing nitrogen discharges into Oyster Bay and Long Island Sound, the Oyster Bay Sewer District (OBSD) upgraded its plant in 2006 to provide advanced treatment for nitrogen removal. To address this water quality problem, NYSDEC imposed limits to reduce nitrogen discharged from the municipal treatment plants located on the north shore of Long Island. NYSDEC issued a revised discharge permit that required the OBSD to reduce nitrogen discharged to Oyster Bay from the treatment plant by 63.8 percent in three 5-year increments by August 2014. The OBSD advanced treatment facility is achieving the 2014 nitrogen limits imposed by NYSDEC permit, and the upgrade has reduced the daily nitrogen discharged by as much as 75%.

4.1.3.3 Monitoring Results

FOB began monitoring nitrogen in 2002 with the goal of establishing a baseline of data and identifying possible areas of concern in the estuary. In 2010 FOB monitored three species of nitrogen at 19 sites (increased to 22 in July) in the Oyster Bay estuary, including ammonia-N, nitrate/nitrite-N and TKN. Samples were collected approximately once per month as scheduled. From these analyses, Organic Nitrogen levels (TKN minus ammonia) and total nitrogen (i.e., TKN plus nitrate and nitrite) can be calculated.

Figure 13 shows averages of nitrogen species for the monitored open water body stations in 2010. Following the NYS DEC guideline for the Peconic Bay estuary, all of the Cold Spring Harbor, Oyster Bay Harbor, and Mill Neck Creek monitoring locations would have exceeded the total nitrogen seasonal mean of 0.5 mg/l in 2010. As a comparison, all 19 monitoring locations have exceeded this threshold since 2005 (in 2002, 2003, and 2004, 17, 11, and 12 locations, respectively, would have exceeded the standard).

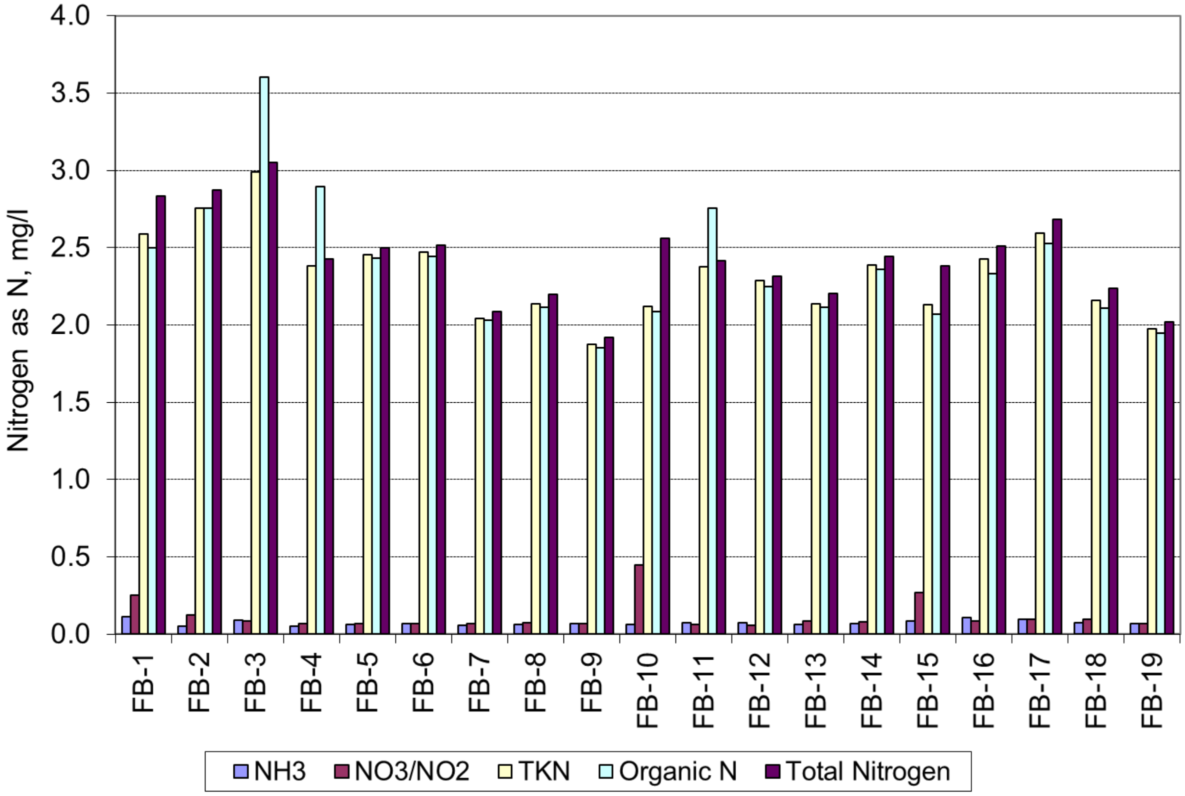

Figure 13. Seasonal average nitrogen species results for 19 stations in the Oyster Bay/Cold Spring Harbor Estuary, 2010

Organic-N is typically present in larger quantities in the Oyster Bay/Cold Spring Harbor estuary waters than ammonia and nitrate plus nitrite, generally accounting for more than 50% of total nitrogen at the sites that FOB monitors. In 2010, organic nitrogen accounted for more than 92% of total nitrogen at most locations. Organic nitrogen seasonal averages exceeded 1.8 mg/l at all locations in 2010.

Ammonia and nitrate/nitrite levels were low compared to organic nitrogen levels. The detection limit for ammonia is 0.050 mg/l which in itself exceeds DEC's acute aquatic standard, thus it's difficult to determine the chronic conditions within the estuary. The seasonal average for all locations was 0.07 mg/l in 2010.

Total nitrogen levels measured in 2010 at Cold Spring Harbor and Oyster Bay Harbor stations increased from levels recorded in 2009 while levels decreased in Mill Neck Creek from 2009. *Figure 14* presents seasonally and locationally-averaged total nitrogen data for seasons 2002 through 2010. Total nitrogen levels appear to have been increasing in the estuary from 2003 to 2008 with a sharp decrease in 2009 and a moderate rebound in 2010. The elevated levels were described in Friends of the Bay's 2004 Water Quality Report, but nitrogen samples were only collected on two occasions in that year and the elevated results could not be verified. However, in other years, a similar number of samples were collected, so the limited 2004 and 2008 sample sets (37 and 27 samples, respectively) are unlikely to significantly affect the result. *Figure 14* also shows the number of nitrogen samples collected in each year. See *Appendix E* for additional nitrogen data.

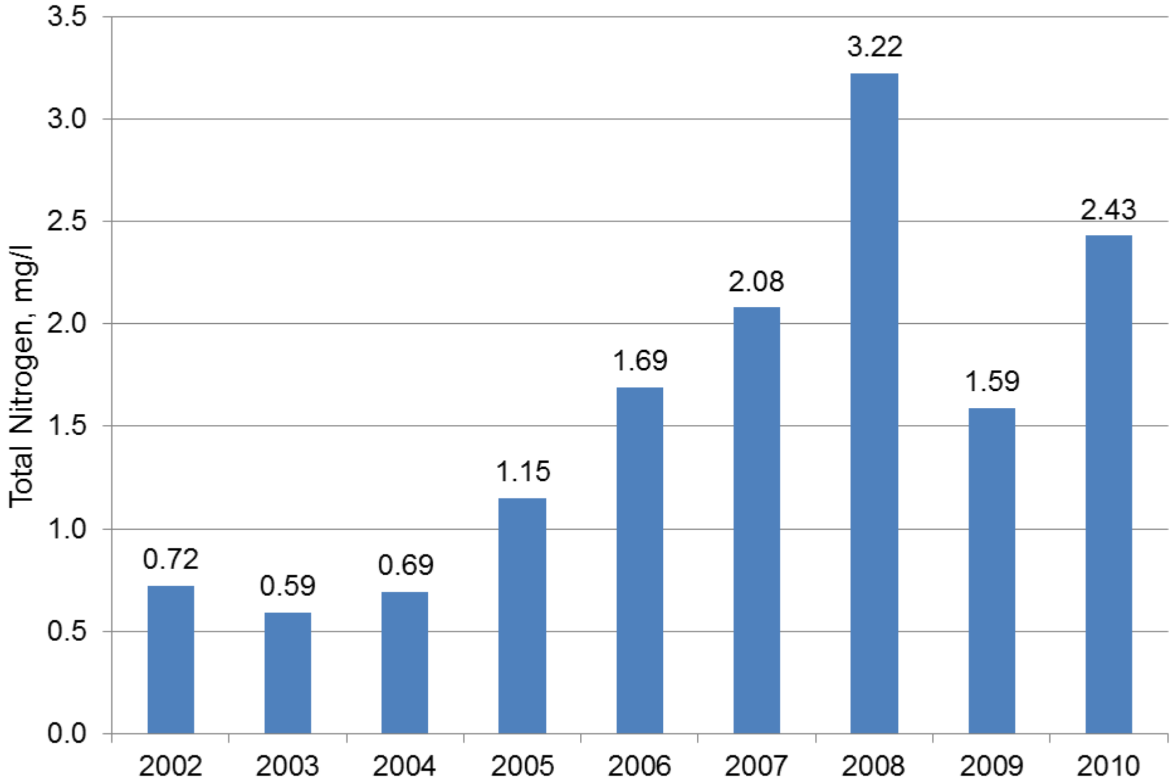

Figure 14. Seasonal averages for total nitrogen

4.1.4 Dissolved Oxygen

LISS (1994) concluded that low dissolved oxygen (hypoxia) poses the most serious threat to the health of the Sound ecosystem. The waters of the western and central portions of the Sound generally exhibit hypoxia through the months of July, August and September. During these months, dissolved oxygen concentrations in the top level of the water column are typically 5-8 mg/l (measurement range is approximately 1.1-15.5 mg/l for 2010), while on the bottom levels of as 3-4 mg/l (measurement range is approximately 1.2-15.0 mg/l for 2010) can be observed.

All aquatic life depends on oxygen availability in the water column. Low levels of oxygen have multiple effects on the marine ecosystems such as a change of species behavior, sensitive species growth impairment and in severe conditions, death of large populations of fish and other species. LISS summarized the effects of different oxygen impairment levels on some organisms of the Long Island Sound. An excerpt of these findings is presented in *Table 4*.

Table 4. Effect of Dissolved Oxygen Concentrations on Selected Organisms. (LISS, 1994)

Dissolved oxygen concentrations above the pycnoline (top of the water column)	
4-5 mg/l	Suitable for many species and life stages, may result in limited biological consequences
3-4 mg/l	25-50% mortality of larval lobsters (based on 4-day long experiments)
2-3 mg/l	50-95% mortality of larval lobsters (based on 4-day long experiments)

Dissolved oxygen concentrations below the pycnoline (bottom of the water column)	
4-5 mg/l	Protective for most biological consequences
3-4 mg/l	Protective for many biological consequences, reduced growth of juvenile Am. Lobster, grass shrimp, summer flounder (12-day experiments)
2-3 mg/l	Impaired finfish habitat (reduced abundance), mortality of larval grass shrimp and mud crabs (12-day experiments)
1-2 mg/l	Impaired lobster and finfish habitat, 10-90% mortality of some non-larval species (4-day experiments)
0-1 mg/l	Many severe consequences, even at short exposures

In bodies of water, oxygen is replenished from the atmosphere and by plant and algal photosynthesis. While aquatic plants and algae produce oxygen during the day, throughout the night photosynthesis does not occur, and consumption of oxygen by bacteria through decay of dead biomass consumes residual oxygen. Thus, the lowest levels of the daily cycle occur in the early morning hours. Several other factors influence the amount of dissolved oxygen found in a particular body of water:

- **Water temperature** - cooler water holds more oxygen; therefore, warm summer waters can be particularly stressful for marine organisms.
- **Salinity** - with increasing salinity the capacity of water to hold oxygen diminishes.
- **Water turbidity** - poor water clarity prevents sunlight from reaching oxygen-producing aquatic plants lower in the water column.
- **Nutrients** - excess nutrients can cause an algal bloom which blocks sunlight from aquatic vegetation lower in the water column. When algae dies and sinks to the bottom, the bacteria involved in decay of the plant material consume a significant amount of dissolved oxygen.
- **Mixing of the waters** - stagnant waters and waters that are stratified hinder transport of oxygen into lower levels of the water column.

Previously, DO levels above 5.0 ppm were considered healthy; DO levels below 5.0 ppm were considered to cause various adverse impacts (related to growth, reproduction, and survival of 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 Oyster Bay/Cold Spring Harbor Estuary, 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 (as defined by the formula below).

$$DO_i = \frac{13.0}{2.80 + 1.84e^{-0.1t_i}}$$

where DO_i = DO concentration in mg/l between 3.0 - 4.8 mg/l and t_i = time in days. This equation is applied by dividing the DO range of 3.0 - 4.8 mg/l into a number of equal intervals. DO_i is the lower bound of each interval (i) and t_i is the allowable number of days that the DO concentration can be within that interval. The actual number of days that the measured DO concentration falls within each interval (i) is divided by the allowable number of days that the DO can fall within interval (t_i). The sum of the quotients of all intervals (i …n) cannot exceed 1.0:

i.e., $$\sum_{i=1}^{n} \frac{t_i(actual)}{t_i(allowed)} < 1.0$$

The DO concentration shall not fall below the acute standard of 3.0 mg/l at any time.

The **acute** DO standard is 3.0 ppm, meaning that the estuary is considered impaired if DO measurements ever fall below this level. For DO concentrations that are equal to or greater than 3.0 ppm and less than 4.8 ppm, the growth and abundance of certain marine species will be affected. The impact of hypoxia on marine life depends on the duration and area over which low DO levels occur; water temperature, salinity, and distribution and behavioral patterns of resident species also play a role in how marine organisms react to hypoxic conditions.

Friends of the Bay monitored dissolved oxygen (DO) levels at the top and bottom of the water column at 19 open water body sites (increased to 22 in July) in the Oyster Bay estuary. *Figure 15* presents DO data collected at the bottom of the water column throughout the 2010 season.

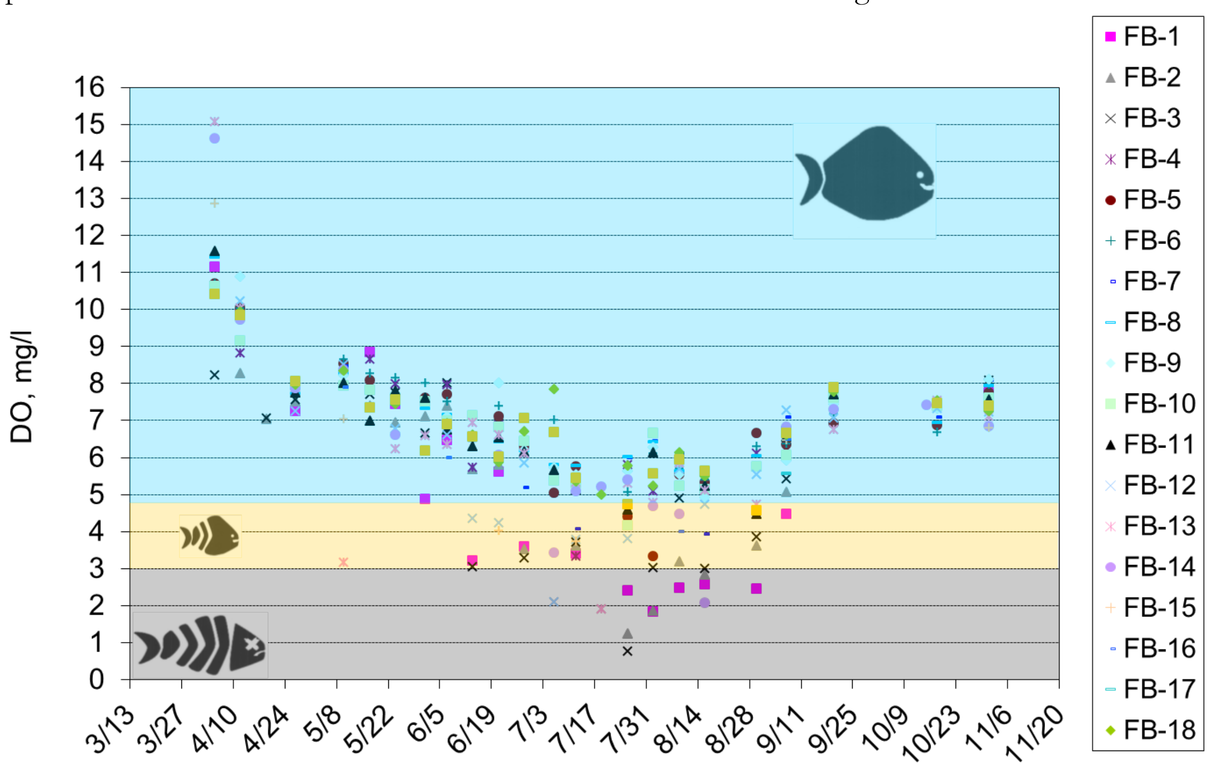

Figure 15. Dissolved oxygen time series plot for all monitoring locations, 2010.

The 2010 data follows these general trends observed in past years, with the highest DO values occurring in the spring, levels declining through the early summer, and then rising again in late summer and into the fall. The DO level at the bottom of the water column fell below 3.0 mg/l (acute standard) at stations FB-1 (5 times), FB-2 (3 times), FB-3 (1 times), FB-12 (1 time), FB-13 (1 time), and FB-14 (1 time) in 2010. As shown in *Figure 15*, a DO value of 0.76 mg/l was recorded in July at FB-3, which appears to be an anomaly as it is abnormally low when compared to other readings on the same date at other locations and all reading taken during the season at FB-3.

While hypoxic and anoxic conditions are likely to have occurred in the Oyster Bay/Cold Spring Harbor estuary complex, based on past experience and trends in the data, it is important to remember that no fish kills were reported. The existing ecological community has likely adapted to low DO levels, and actual DO levels are not believed to have deviated beyond typical ranges. Low dissolved oxygen levels are a symptom of over-enrichment by nutrients and not a problem that can be solved directly. Reducing nutrient inputs from the surrounding watershed into the estuary would likely improve water quality and could reduce the occurrence of low DO levels. See *Appendix E* for additional dissolved oxygen data.

4.2 Stream and Outfall Monitoring

The Friends of the Bay stream and outfall monitoring program is intended to identify potential upland sources of pollutants and causes of water quality impacts in the Oyster Bay, Cold Spring Harbor, and Mill Neck Creek estuary complex.

The monitoring program includes a "rotating" stormwater or wastewater outfall monitoring location that can change from event to event in an effort to identify pollutant sources given limited resources. Additionally, one monitoring location is upstream of the Mill River discharge to the estuary. This location was selected to examine changes in pollutant contributions within the Mill River watershed. The reach between the upstream and downstream monitoring locations includes an apartment complex, numerous residences, Mill Pond, and freshwater wetlands.

Stream and pond discharge monitoring locations include:

- OBS-2, Beaver Lake Outflow
- OBS-3, Beekman Creek
- OBS-5, Mill River Outflow
- OBS-6, White's Creek
- OBS-7, Tiffany Creek
- OBS-8, DeForest Pond Outflow
- OBS-9, St. John's Pond Outflow

Paired upstream and downstream locations include:

- OBS-4, Upper Mill River
- OBS-5, Mill River Outflow

Wastewater and stormwater discharge monitoring locations include:

- OBS-1, The Birches sewage outfall
- OBS-10, Rotating Outfall

Samples collected at these stations were monitored for dissolved oxygen, specific conductivity, pH, temperature, *E.coli*, fecal coliform, ammonia as N, nitrate as N, TKN, phosphorus as P, BOD, COD, TSS, turbidity, hardness as $CaCO_3$, lead, copper, zinc, magnesium, calcium, and alkalinity as $CaCO_3$ as well as the qualitative parameters of odor, color, particulates, and floatables.

Although stream and outfall monitoring has been conducted as five discrete events over four years, some initial observations can be made. In summer 2010, DO measurements at OBS-8 were very low. These are the lowest observed values of all the stations, but also coincide with summertime measurements. In general, stations OBS-1, OBS-8 and OBS-10 have lower DO values. Overall, DO values have remained fairly consistent over the sampling period since 2007 and are in the range of 6-14 mg/L.

Higher *E.coli* and fecal coliform concentrations were observed in the June and December 2010 samples at almost all locations. It is unclear if these observations reflect the start of a pattern toward elevated bacteria levels or if they simply reflect conditions during those two sampling events. Continued monitoring is necessary to further evaluate the presence of potential trends.

pH values remain relatively consistent and within a desirable range. Specific conductivity measurements remain relatively consistent over time and at all stations. Notably, elevated concentrations were observed at OBS-6 in all sampling events except for December 2008 and December 2010, suggesting some seasonal influence at that station. In general, more numerous ammonia levels above the reporting limit were observed in 2010 compared to earlier years. However, the maximum reported ammonia concentration was lower in 2010 compared to other years. Nitrate levels were consistently elevated at The Birches (OBS -1), and the highest metals values were observed at that station in 2008 and 2010. Additional data will help to further identify potential pollutions sources and monitor conditions at the streams and outfalls. Results and preliminary plots of the available monitoring data are included in *Appendix F*.

5 Program Recommendations

5.1 Proposed Changes to Monitoring Procedures

1) <u>Add one open water body location for monitoring stratification within the water column</u>. Prior to 2003, FOB recorded DO at 1-meter intervals throughout the water column. This practice ceased in 2003 due to the excessive number of measurements being recorded each week. However, stratification data can be useful in tracking conditions within the estuary. FOB should consider measuring DO profiles at one of the deep monitoring locations to track the development of stratification throughout the season. If temperature and salinity profiles were also recorded at that location, then the

pycnoline (depth interval of steep density gradients) could be tracked via the halocline (depth interval of steep salinity gradients) and thermocline (depth interval of steep temperature gradients).

2) Focus study of pollution problems in CSH and MNC. A focused study of the Cold Spring Harbor inner harbor area and Beaver Lake and Oak Neck Creek in Mill Neck Creek area could provide more insight into pollution sources in these areas of concern. Perhaps a partnership with a research, educational organization, or local municipality would provide necessary insight into the design of such a study.
3) Substitute an alternative monitoring location for "The Birches" Outfall in Stream and Outfall Program. Since this discharge has been eliminated, it no longer warrants monitoring. Other outfalls of concern or another 'rotating' outfall could be monitored instead.

5.2 Continue Partnerships

Friends of the Bay citizen scientists fulfill a multitude of roles by participating in sample collection, data recording and boat operations. Individually they bring intellectual curiosity, diverse skills and compassion for the environment to the program. All the individuals listed in the acknowledgements use their volunteering opportunity to get involved in protecting the estuary. Friends of the Bay citizen scientists have diverse backgrounds and hometowns. They come from as far as the south shore of Long Island and Huntington Harbor, and as close as Bayville and Oyster Bay. All are united in their intellectual curiosity and compassion for the environment.

Friends of the Bay's Water Quality Monitoring Program was made possible by supporting members, businesses and citizen scientists. Partnerships with the Nassau County Department of Health, Analytical Chemists Laboratory, LLC, Frank M. Flower & Sons, Inc., and on boat-citizen scientists were invaluable this monitoring season.

Friends of the Bay has been assisted in water quality monitoring efforts by students and teachers from Locust Valley High School. During the 2010 season, seven (7) students, supervised by their teacher, participated in monitoring during July and August.

5.3 Look to the Future

To further refine the understanding of Cold Spring Harbor, Oyster Bay Harbor, and Mill Neck Creek, Friends of the Bay is considering the following additions to the program:

- **Improve Understanding of Estuary and Watershed Conditions** – As stated in the Watershed Action Plan. Friends of the Bay would like to:
  - Continue the current Friends of the Bay citizen water quality monitoring program at the in-harbor monitoring locations to continue collecting baseline water quality information and to assess the effectiveness of plan implementation over time.
  - Continue the current Friends of the Bay stream and outfall monitoring program, focusing on priority outfalls and discharges to the estuary complex.

- Although many users of the harbor have a working knowledge of the various types of marine habitats within portions of the estuary complex, information is limited regarding the actual quality and distribution of benthic (i.e., bottom-dwelling) communities and habitats throughout Oyster Bay/Cold Spring Harbor. A benthic habitat mapping survey is recommended to identify and assess the quality of benthic habitats and biological communities, including those habitats and biological communities that are threatened, missing, or have been extirpated by human activity. This type of information would be used to identify and guide restoration projects such as a shellfish sanctuary, eelgrass restoration, and restoration of diamondback terrapin nesting areas.
- Current efforts at improving water quality concentrate on reducing pathogen loads to the estuary complex, based on the pathogen Total Maximum Daily Load (TMDL) that was developed for portions of Oyster Bay and Mill Neck Creek. While pathogens are a major threat to water quality, as well as to recreation and the shellfish industry, they are just one of many. Water quality monitoring data collected by Friends of the Bay indicates that low dissolved oxygen and elevated nitrogen concentrations are common in areas of the estuary complex during the summer. Additionally, silt from stormwater runoff can smother otherwise productive shellfish beds and nutrients such as phosphorus can result in harmful algal blooms. Specific recommended actions to evaluate other potential water quality impairments include:
  - Coordinate with the NYSDEC regarding the potential inclusion of Oyster Bay/Cold Spring Harbor for water quality impairments other than pathogens (i.e., low dissolved oxygen, nutrients, sediment) on the next impaired waters (303d) list in 2012.
  - As a long-term project, develop a linked hydrodynamic and water quality model of the estuary complex to assess the relative influence of watershed sources and Long Island Sound circulation on the water quality of the estuary. In addition to pathogen load reductions, the model could be used to predict the affect of reduced nutrient loads from the watershed on harbor water quality, focusing on specific water quality concerns, such as dissolved oxygen. The model could also be used to predict the impact of other changes on water quality, such as increased rainfall resulting from climate change.
  - Ensure that future management efforts address the full range of water quality parameters and potential sources of water quality impairments.
- Harmful algal bloom (HAB) monitoring should be conducted within Oyster Bay/Cold Spring Harbor to address these risks and guide water quality management approaches. Specific recommendations include:
  - Coordinate with NYSDEC to expand the NYSDEC Bureau of Marine Resources Shellfisheries Section marine biotoxin monitoring program and/or the Suffolk County HABs monitoring program to Oyster Bay/Cold Spring Harbor.
  - Coordinate HABs monitoring efforts between state, county, and municipal health departments and marine monitoring efforts.
  - Incorporate periodic HAB monitoring into the Friends of the Bay water quality monitoring program and compile results in the proposed Information Resource Center.

- Coordinate with local government and university researchers regarding ongoing research findings on HABs and implement related water quality management approaches.

- **Bacteria Source Tracking** – Friends of the Bay would like to include Bacteria Source Tracking as part of its water quality monitoring program in future years. FOB continues to monitor grant opportunities to fund the collection of samples for Bacteroides as an indicator of recent human fecal pollution. The QAPP will be modified if funding is acquired to accommodate the additional sampling.
- **Apparent color** – Apparent color is an easy way to get general information about what material is dissolved or suspended in the water, and thus would be a beneficial parameter for FOB to monitor. Water with very little dissolved or suspended material appears blue in color. The presence of dissolved organic matter such as decaying plant matter can result in water color of yellow or brown. The presence of dinoflagellates can produce a reddish or deep yellow color. Water that is rich in phytoplankton and algae appears green. Runoff can result in a variety of colors including yellow, red, brown or gray.
- **Chlorophyll a and/or algal enumeration** – In addition to measuring apparent color, it would benefit the monitoring program to measure chlorophyll levels within the estuary. A chlorophyll test would measure the concentration of algae in the water column, helping to identify if algal blooms are influencing water clarity. Alternatively, algal enumeration by an experienced limnologist can identify the quantity of specific algal species that are present. Varying algal species can be an indicator of changes in a water body from year to year.

6 Conclusion

Since 2000, Friends of the Bay's Water Quality Monitoring Program has developed into a well-conceived periodic monitoring program of several important water quality parameters throughout the Oyster Bay/Cold Spring Harbor estuary complex. In 2010, four stations were monitored in Cold Spring Harbor, eight in Oyster Bay Harbor and seven in Mill Neck Creek. (In July 2010, FOB added three monitoring locations in Laurel Hollow). All waters in the Oyster Bay estuary need protection. However, based on bacterial and nitrogen monitoring results, additional management efforts should be focused on areas of concern such as Cold Spring Harbor, Mill Neck Creek/Beaver Lake and Oak Neck Creek.

Three major water quality parameters were monitored in 2010: bacteria, dissolved oxygen and nitrogen. Analysis of this season's open water body data provided many useful insights into the estuary's water quality.

In 2010, open water body bacterial levels were lower than 2004, when fecal coliform concentrations were unusually high, and higher than the lows measured in 2005 and 2006. Levels were similar to 2007 and 2008 records. As observed in previous years, bacteria levels in Mill Neck Creek and Cold Spring Harbor were generally higher than in Oyster Bay Harbor. None of the locations in Mill Neck Creek met the State shellfishing standard for fecal coliform in 2010 on a geometric mean basis for the entire season (although levels were below the limit at some stations in the early and late portion of the monitoring season). Additionally FB-1, FB-2, FB-3, FB-7, FB-8, FB-9 and FB-10 within Cold Spring Harbor and Oyster Bay Harbor did not meet the same State shellfishing standard for fecal coliform during portions of the 2010 monitoring season.

The ninth year of nitrogen monitoring shows an increase in total nitrogen levels in the estuary. In 2010 there was a moderate rebound from a sharp decrease recorded in 2009. Prior to 2009 monitoring showed an increasing trend first observed in 2004 (although the dataset was somewhat limited in that year) and continuing in 2005 through 2008. None of the monitoring locations would have met the nitrogen standard for salt water that New York State applies to the Peconic Bay estuary (standard violation at total nitrogen (TN) > 0.5 mg/l), if that standard were to be applied to Oyster Bay as well. The cause of these increased levels is unclear and warrants additional study.

A $10.6 million advanced wastewater treatment facility serving the Oyster Bay Sewer District (OBSD) went online in December 2005. Microorganisms used to seed the plant were delivered in mid-January 2006, and the plant was fully operational in March 2006. The facility, a Sequencing Batch Reactor, is achieving the 2014 nitrogen limits imposed by the New York State Department of Environmental Conservation. The upgrade has reduced daily nitrogen discharges by as much as 75%.

With the completion of this plant the Friends of the Bay nitrogen data collected in 2002 through 2010 and subsequent years will provide a valuable baseline in evaluating the effect of reduced nitrogen loading on the estuary. The upgrade represents an important improvement in infrastructure available to the public, which should improve estuary water quality.

Dissolved oxygen data was collected throughout the Oyster Bay estuary during the monitoring season. In 2010 as well as in past years, DO trends indicate that the waters of the estuary are enriched with nutrients, since dissolved oxygen levels decrease steadily from spring through late summer, and then begin to increase in late summer. Nutrient enrichment can result from inadequately treated sewage discharges, polluted stormwater runoff, over-fertilization of lawns and gardens, agricultural runoff, and atmospheric deposition of air pollutants. Long-term reductions in nitrogen inputs should reduce the occurrence of extremely low DO conditions in the bottom of the harbor.

Friends of the Bay also continues to conduct a stream and outfall monitoring program. This monitoring program, initiated in 2007, includes the sampling of 10 major discharges (OBS 1-10) into the Oyster Bay/Cold Spring Harbor estuary. Although stream and outfall monitoring has only been conducted as five discrete events over four years, some initial observations can be made. Overall, DO values have remained fairly consistent over the sampling period since 2007 and are in the range of 6-14 mg/L. Higher *E.coli* and fecal coliform concentrations were observed in the June and December 2010 samples at almost all locations but more monitoring is required to determine if there is a pattern. pH values remain relatively consistent and within a desirable range. Specific conductivity measurements remain relatively consistent over time and at all stations. In general, more ammonia levels above the reporting limit were reported in 2010 compared to earlier years. However, the maximum reported ammonia concentration was lower in 2010 compared to other years. Nitrate levels were consistently elevated at The Birches (OBS -1) and the highest metals values were observed at that station in 2008 and 2010. Additional data will help to further identify potential pollutions sources and monitor conditions at the streams and outfalls.

In June 2011, Friends of the Bay completed a Watershed Action Plan for the Oyster Bay/Cold Spring Harbor Estuary and surrounding watershed. The Watershed Action Plan is a comprehensive management plan to protect and restore water resource conditions throughout the Oyster Bay/Cold Spring Harbor Watershed. The plan recommends continuation of the ongoing monitoring programs to monitor changes in harbor conditions as a result of changing watershed conditions and implementation of plan recommendations. Additional data collection is also recommended to refine the current understanding of water quality impairments in the estuary complex, particularly pollutants for which previous monitoring results have demonstrated the potential for water quality impairment but which are not currently identified by NYSDEC as a listed cause of impairment (e.g., sediment, nutrients, dissolved oxygen).

Friends of the Bay looks forward to working with citizen scientists, government agencies, and fellow not-for-profit organizations in future monitoring seasons. Together, FOB and its partners will continue to improve and expand their monitoring efforts. These efforts will provide a link to show how investment in water quality protection is improving the quality of water in Mill Neck Creek, Oyster Bay Harbor and Cold Spring Harbor.

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Appendix A

Oyster Bay/Cold Spring Harbor Estuary Complex Fact Sheet

Friends of the Bay
Working to keep the oyster in Oyster Bay
Post Office Box 564 ● Oyster Bay, NY 11771

Oyster Bay/Cold Spring Harbor Estuary Complex

Background Information

Located on the north shore of Long Island, the Oyster Bay/Cold Spring Harbor Estuary Complex – approximately 6,000 acres in size – is recognized as a vital natural, economic, cultural, historical and recreational resource.

And there is so much more to know about the Oyster Bay/Cold Spring Harbor Estuary Complex:

- The Oyster Bay/Cold Spring Harbor Estuary Complex is an embayment of Long Island Sound. (In 1987, the Sound was officially designated an Estuary of National Significance under the National Estuary Program.)

- The U.S. Fish & Wildlife Service maintains a National Wildlife Refuge (NWR) within the Oyster Bay/Cold Spring Harbor Estuary Complex. In fact, the Oyster Bay NWR – which encompasses part of Cold Spring Harbor – is the largest of the Long Island Complex's eight refuges. The NWR consists of 3,209 acres of bay bottom, saltmarsh, and a small freshwater wetland. Nationally, Oyster Bay NWR is one of the few bay bottom Refuges owned and managed by the U.S. Fish and Wildlife Service.[1]

  The Oyster Bay NWR – which was established in 1968 via land donation from the Town of Oyster Bay and several local villages under the Migratory Bird Conservation Act – consists of high quality marine habitats that support a variety of aquatic-dependent wildlife. The refuge's waters and marshes surround Sagamore Hill National Historic Site, home of Theodore Roosevelt - father of the National Wildlife Refuge System.[2]

  Subtidal (underwater up to mean high tide line) habitats are abundant with marine invertebrates, shellfish and finfish.[3] The Refuge is located off of the Long Island Sound and the sheltered nature of the bay makes it extremely attractive as winter habitat for a variety of waterfowl species, especially diving ducks.[4]

  In 2005, Defenders of Wildlife included the Oyster Bay NWR on their list of the ten most endangered Refuges in the country. The *Refuges at Risk: America's Ten Most Endangered National Wildlife Refuges 2005* report explains that the Oyster Bay NWR has become threatened by polluted stormwater runoff; non-sustainable development; habitat destruction; and human sewage associated with failing sewer infrastructure, inadequate on-site septic systems, and boat discharge.

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[1] http://refuges.fws.gov/profiles/WildHabitat.cfm?ID=52563
[2] http://refuges.fws.gov/profiles/index.cfm?id=52563
[3] http://refuges.fws.gov/profiles/index.cfm?id=52563
[4] http://refuges.fws.gov/profiles/WildHabitat.cfm?ID=52563

- For almost two decades there have been three State-designated Significant Coastal Fish and Wildlife Habitats within the Oyster Bay/Cold Spring Harbor Estuary: Cold Spring Harbor, Oyster Bay Harbor, and Mill Neck Creek Wetlands (these habitat designations date back to 1987).[5] The New York State Department of State recently concluded a review involving proposed revisions to 25 designated Significant Coastal Fish and Wildlife Habitats (SCFWH) on the North Shore in Nassau and Suffolk counties. The habitat designations went into effect on October 15, 2005. Among the 25 habitats that have been revised are areas that fall within the OB/CSH Estuary. The three Habitats will now be consolidated into two: 1) Mill Neck Creek, Beaver Brook, and Frost Creek and 2) Oyster Bay and Cold Spring Harbor. [See end of document for more info regarding SCF&W Habitat areas.]

- OB/CSH Fish and Wildlife Facts:
  - More than 126 bird species have been documented at the Oyster Bay National Wildlife Refuge, including 23 species of waterfowl.[6]
  - Oyster Bay National Wildlife Refuge has the heaviest winter waterfowl use of any of the Long Island National Wildlife Refuges.[7]
  - According to the U.S. Fish and Wildlife Service (USFWS), species that rely on this ecosystem include Federal and State designated endangered and threatened species such as the bald eagle, peregrine falcon, osprey, northern harrier, and least tern.[8]
  - The northern diamondback terrapin is common at the Oyster Bay National Wildlife Refuge, particularly in the Frost Creek and Mill Neck Creek sections. The Refuge is considered to have one of the largest populations of diamondback terrapins on Long Island.[9]
  - The Harbor Complex hosts a productive marine finfishery. Oyster Bay has been designated by the National Marine Fisheries Service (NMFS) as Essential Fish Habitat (EFH) for 15 species of finfish across multiple life stages. The harbor serves as a nursery and feeding ground from early spring to late fall for these species and, as a result, contributes to the abundance of fisheries resources that are of regional significance.[10]

- New York State's 1999 Long Island Sound Coastal Management Program, prepared by the NYS Department of State, identifies the Oyster Bay-Cold Spring Harbor area as a Regionally Important Natural Area.[11] [See end of document for more info regarding RINA.]

- The Oyster Bay/Cold Spring Harbor Estuary Complex is also considered one of the most important shellfish producing areas in New York State. The majority of Oyster Bay is certified for commercial shellfish harvest, with economically important shellfisheries including oyster (*Crassotrea virginica*) and hard clam (*Mercinaria mercinaria*). The waters of Oyster Bay are classified SA - the highest and best water quality determination for shellfishing. This is an unusual distinction given the harbor complex's proximity to New York City and the fact that harbors to the west have been closed for more than 30 years.

- The F.M. Flower & Sons, Inc., along with more than 90 licensed independent commercial baymen (45 of which are full-time baymen), annually harvests up to 90% of New York State's oyster crop[12] and 33% of hard clams[13] from the heart of the Oyster Bay National Wildlife Refuge.

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[5] http://www.nyswaterfronts.com/waterfront_natural_narratives.asp
[6] http://refuges.fws.gov/profiles/WildHabitat.cfm?ID=52563
[7] http://refuges.fws.gov/profiles/WildHabitat.cfm?ID=52563
[8] http://refuges.fws.gov/profiles/WildHabitat.cfm?ID=52563
[9] http://refuges.fws.gov/profiles/WildHabitat.cfm?ID=52563
[10] National Marine Fisheries Service and Mid-Atlantic Fishery Management Council. 2000. *Guide to Essential Fish Habitat Designations in the Northeastern United States.* http://www.nero.noaa.gov/hcd/webintro.html
[11] http://www.nyswaterfronts.com/downloads/pdfs/lis_cmp/Chap6.pdf
[12] http://refuges.fws.gov/profiles/index.cfm?id=52563
[13] 2004 New York Annual Shellfish Landings, New York State Department of Environmental Conservation

- A section of the surrounding watershed is located within the Oyster Bay Special Groundwater Protection Area – a Critical Environmental Area[14] – on the spine of the deep flow water recharge area. Virtually all of Long Island's drinking water is drawn from a system of underground reservoirs or aquifers. The Island's drinking water system was designated as the nation's first Sole Source Aquifer, requiring special protection. The Oyster Bay Special Groundwater Protection Area is one of two such state-designated areas in Nassau County designed for the purpose of maintaining open space to recharge the aquifer.

- The Harbor Complex is home to the Cold Spring Harbor Fish Hatchery & Aquarium. The Hatchery is proud to have the largest living collection of New York State freshwater reptiles, fish and amphibians which are housed in the Julia F. Fairchild Building, the Walter L. Ross II Aquarium Building and in eight outdoor ponds. Brook, Brown and Rainbow trout are raised to stock private ponds.

- Renowned for its maritime legacy, Oyster Bay has been designated a "historic maritime area" by New York State.

What is a Significant Coastal Fish & Wildlife Habitat?

The New York State Department of Environmental Conservation evaluates the significance of coastal fish and wildlife habitats, and following a recommendation from the DEC, the Department of State designates and maps specific areas.

A habitat is designated "significant" if it serves one or more of the following functions: (a) the habitat is essential to the survival of a large portion of a particular fish or wildlife population; (b) the habitat supports populations of species which are endangered, threatened or of special concern; (c) the habitat supports populations having significant commercial, recreational, or educational value; and (d) the habitat exemplifies a habitat type which is not commonly found in the state or in a coastal region.

In addition, the significance of certain habitats increases to the extent they could not be replaced if destroyed.

What is a Regionally Important Natural Area?

Regionally important natural areas are defined geographic areas within the Long Island Sound coastal boundary and generally are composed of a variety of smaller, natural ecological communities that together form a landscape of environmental, social, and economic value to the people of New York. A regionally important natural area would meet the following three conditions:

1) The area contains significant natural resources.
2) The resources are at risk.
3) Additional management measures are needed to preserve or improve the significant resources, or sustain their use.

[14] http://www.dec.state.ny.us/website/dcs/seqr/cea/ To be designated as a CEA, an area must have an exceptional or unique character with respect to one or more of the following: a benefit or threat to human health; a natural setting (e.g., fish and wildlife habitat, forest and vegetation, open space and areas of important aesthetic or scenic quality); agricultural, social, cultural, historic, archaeological, recreational, or educational values; or an inherent ecological, geological or hydrological sensitivity to change that may be adversely affected by any change. Following designation, the potential impact of any Type I or Unlisted Action on the environmental characteristics of the CEA is a relevant area of environmental concern and must be evaluated in the determination of significance prepared pursuant to Section 617.7 of SEQR.

Additional information:

- Use impairments in Oyster Bay Harbor, Mill Neck Creek, Cold Spring Harbor and its tributaries are identified in the 2000 Atlantic Ocean/Long Island Sound Basin Waterbody Inventory and Priority Waterbodies List (PWL).[15] The use impairments include shellfishing, public bathing, fish consumption, habitat/hydrology, aquatic life, and recreation. (The use impairment of shellfishing is reinforced by the following facts: 1) Oyster Bay Harbor, Mill Neck Creek and its tidal tributaries are among the 69 water bodies, in the New York State 2002 303(d) list, impaired for shellfish harvesting[16] (SEE BELOW) and 2) The NYS DEC has decertified all shellfish harvesting areas in Mill Neck Creek and some shellfish harvesting areas in Oyster Bay.)

- According to *Pathogen Total Maximum Daily Loads for Shellfish Waters in Oyster Bay Harbor and Mill Neck Creek*, a September 2003 report[17] by the New York State Department of Environmental Conservation, "urban storm water is…the major source of pathogens (approx. 88% of total) to the Harbor." The report also points out that "the waters support a large recreational environment for boating which represents the second largest source of pathogens (approx. 11% of total) to these bodies."

- Oyster Bay Harbor, Mill Neck Creek, and its tidal tributaries are among the 69 water bodies listed in the New York State's 2002 303(d) as impaired for shellfish harvesting. The New York State Department of Environmental Conservation, with the cooperation and technical assistance of the U.S. Environmental Protection Agency (USEPA), along with their contractors Battelle and HydroQual, has completed the total maximum daily loads (TMDL) for pathogens in the shellfish waters for Oyster Bay Harbor and Mill Neck Creek. In accordance with USEPA's Water Quality Planning and Management Regulations (40 CFR, Part 30), TMDLs need to be developed to achieve the applicable water quality standards. Oyster Bay Harbor needed to be broken down into several distinct areas where individual TMDLs have been developed. Once implemented, these TMDLs are expected to achieve the targeted reductions in pathogen loads from point and non-point sources with the ultimate goal of achieving the water quality standards for shellfish harvesting. In management zone OBH-2 a 10% pathogen load reduction is mandated and in management zone OBH-3 an 89% pathogen load reduction is mandated. In the other management zones, it is necessary to ensure no increase in pathogen discharges.[18]

  Further, the TMDL indicates that pollution from marinas and boat mooring areas should be reduced using appropriate mitigation techniques such as:
    - Public awareness campaigns on illicit dumping of wastewater,
    - Enhancement of public toilet facilities near the shore and,
    - Expansion of current pump-out programs including the mobile and on-shore pump out facilities.

[15] 2000 Atlantic Ocean/Long Island Sound Basin Waterbody Inventory and Priority Waterbodies List (PWL), New York State Department of Environmental Conservation.

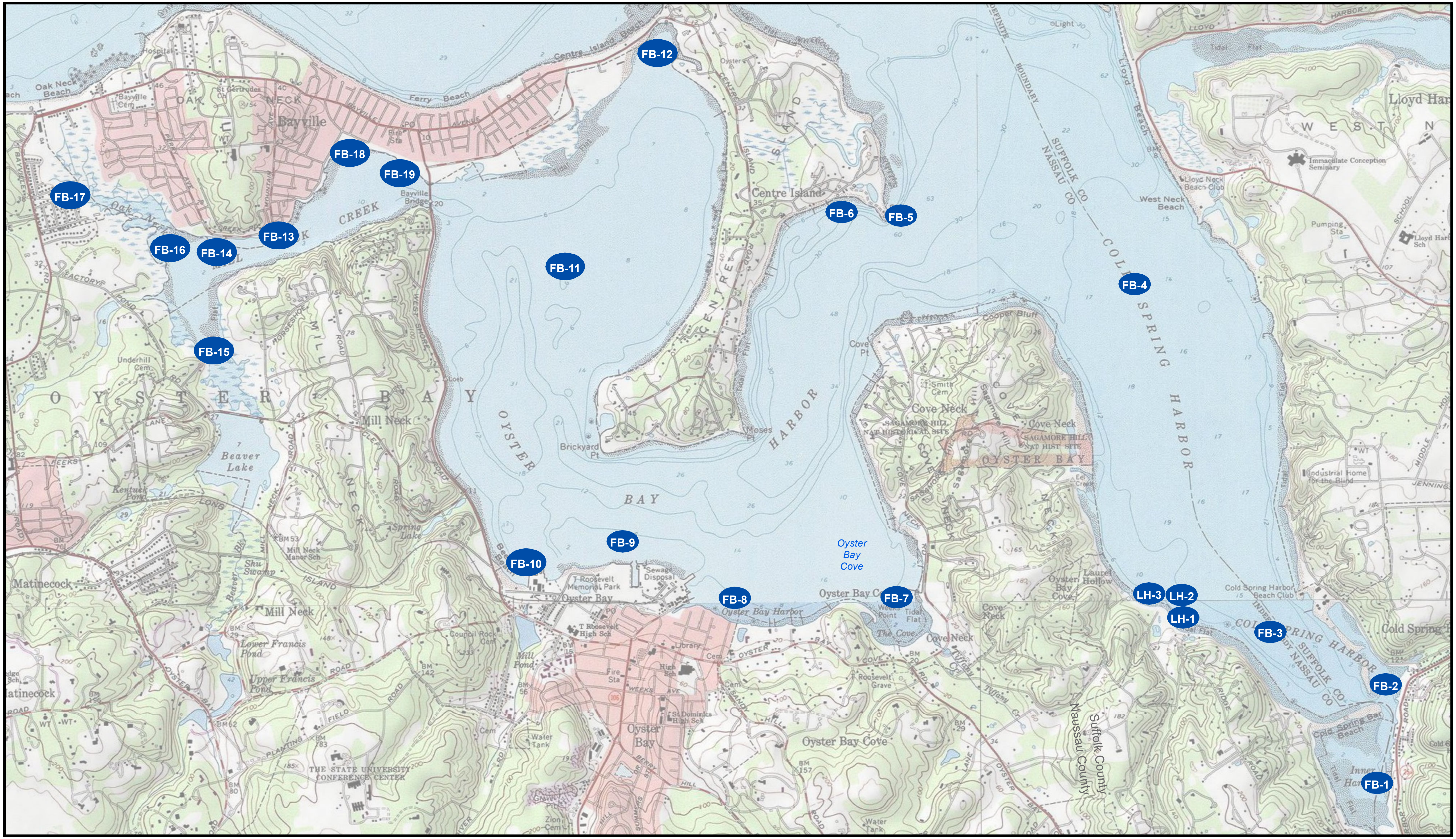
[16] *Pathogen Total Maximum Daily Loads For Shellfish Waters in Oyster Bay Harbor and Mill Neck Creek*, New York State Department of Environmental Conservation (September 2003) http://www.dec.state.ny.us/website/dow/oystbay.pdf

[17] *Pathogen Total Maximum Daily Loads For Shellfish Waters in Oyster Bay Harbor and Mill Neck Creek*, New York State Department of Environmental Conservation (September 2003) http://www.dec.state.ny.us/website/dow/oystbay.pdf

[18] *Pathogen Total Maximum Daily Loads For Shellfish Waters in Oyster Bay Harbor and Mill Neck Creek*, New York State Department of Environmental Conservation (September 2003) http://www.dec.state.ny.us/website/dow/oystbay.pdf

Appendix B

Sampling Locations Map and Description



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Miles

Friends of the Bay

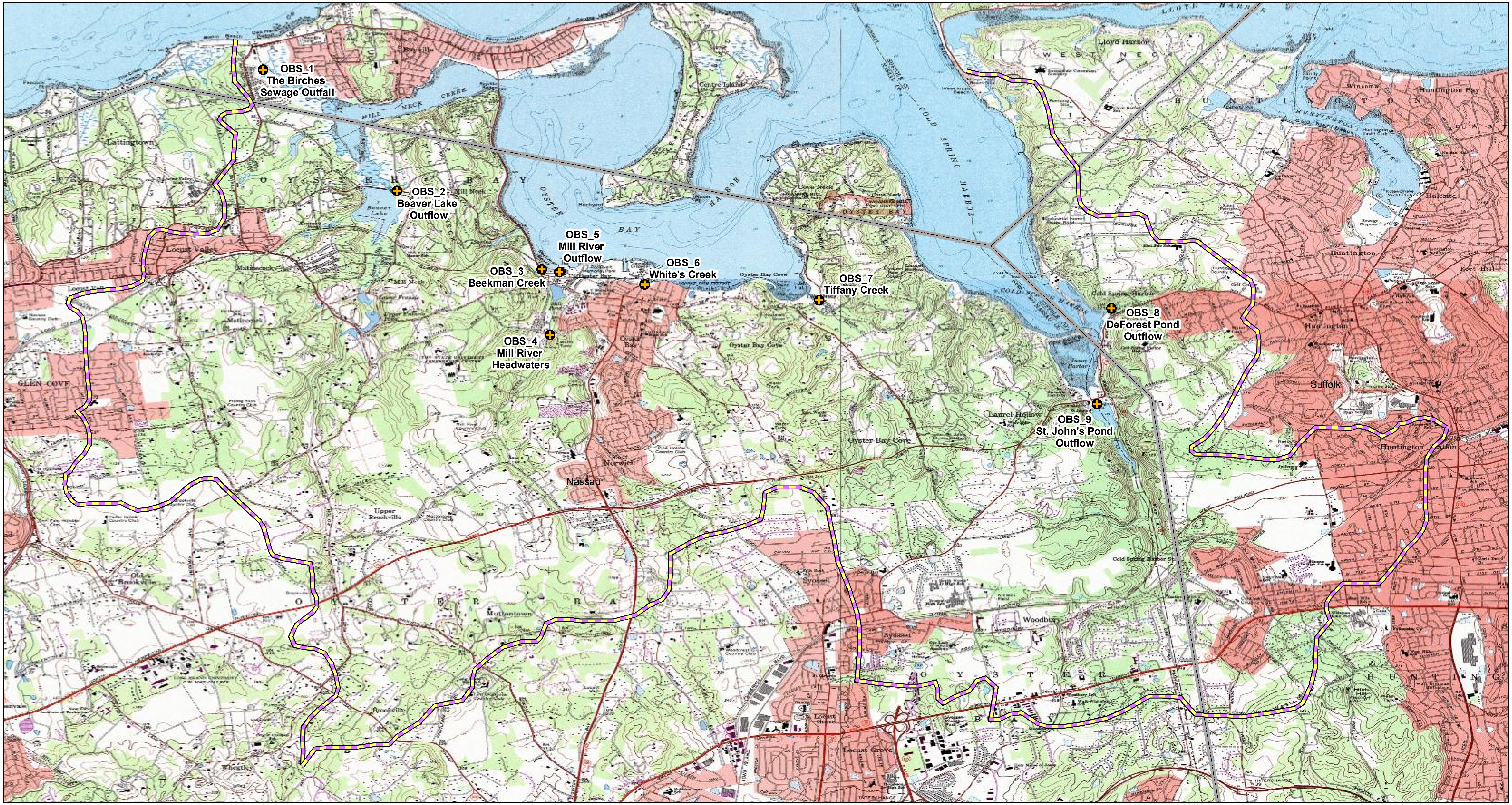
FUSS & O'NEILL

Friends of the Bay
Water Quality Monitoring Locations

Data Sources:
Friends of the Bay; USGS Topo Maps © 2011 National Geographic Society;
Document Path: J:\GIS\P2005\1349\B10\MonitoringLocations.mxd

Sampling Locations in Cold Spring Harbor, Oyster Bay Harbor, Mill Neck Creek, and Laurel Hollow

	Site ID	Site Name	Site Description	Latitude	Longitude
Cold Spring Harbor	FB-1	South Cold Spring Harbor Cove	50 yards off last dock in Cold Spring Harbor, just south of Whalers Yacht Club Slips	40°51’45” N	73°27’51” W
	FB-2	CSH Cove North Mooring Field	Cove just north-east of Powell’s Marina, east of large sand bar and small mooring field	40°52’09” N	73°27’48” W
	FB-3	CSH South	200 yards west of Cold Spring Harbor mooring field; mid channel between Mobil Oil Terminal and orange brick house	40°52’22” N	73°28’25” W
	FB-4	CSH North	Center of CSH, south-east of Plum Point; just north of Charles Wang’s dock	40°53’47” N	73°29’08” W
Oyster Bay Harbor	FB-5	Plum Point	Off Plum Point, 110 yards south of Red Nun “4”	40°54’04” N	73°30’23” W
	FB-6	Seawanhaka Yacht Club PSTP outfall	Out fall is located at pink buoy. Station 200 years off boat yard dock	40°54’05” N	73°30’42” W
	FB-7	Oyster Bay Cove	Center of cove 100 yards south-west of Mr. Yampole’s pier	40°52’31” N	73°30’25” W
	FB-8	Whites Creek and OB-STP outfall	100 yards east of Commander Oil dock	40°52’31” N	73°31’17” W
	FB-9	Roosevelt Beach	Approx. 200 yards offshore and in line with flagpole at Roosevelt Park	40°52’45” N	73°31’53” W
	FB-10	Beekman Beach and Mill Pond outfall	Mid Channel between mooring field and finger piers, 100 yards off shore	40°52’40” N	73°32’24” W
	FB-11	West Harbor	Midway between east and west shores, off large white house on North western shore	40°53’52” N	73°32’11” W
	FB-12	Turtle Cove	110 yards west of canal	40°54’44” N	73°31’41 W
Mill Neck Creek	FB-13	Mill Neck Creek-East	Mill Neck Creek, south of yellow house and wall	40°54’00” N	73°33’43” W
	FB-14	Mill Neck Creek -West	Confluence of Oak Neck Creek and Mill Neck Creek	40°53’56” N	73°34’03” W
	FB-15	Mill Neck Creek-South	As far south towards Beaver Dam in Oak Neck Creek as tidal stage allows	40°53’32” N	73°34’04” W
	FB-16	Mill Neck Creek-North	As far North in Mill Neck Creek as tidal stage allows to steel pillared dock	40°53’57” N	73°34’18” W
	FB-17	The Birches STP	North-west most channel past steel pillared dock in Mill Neck Creek	40°54’10” N	73°34’50” W
	FB-18	Mill Neck Cove	North most point which tide will allow	40°54’20” N	73°33’20” W
	FB-19	Flowers Oyster Hatchery	10 feet south of warning buoy marking shellfish racks	40°54’15” N	73°33’04” W
Laurel Hollow	LH-1	Flowers Oyster Hatchery-South	Southern end of public beach, at outfall pipe	40°52’27” N	73°28’53” W
	LH-2	Flowers Oyster Hatchery-Central	Near end of rock jetty	40°52’31” N	73°28’57” W
	LH-3	Flowers Oyster Hatchery-North	Northern end of public beach	40°52’32” N	73°29’04” W



Friends of the Bay
Oyster Bay/Cold Spring Harbor Watershed
Stream and Outfall Monitoring Locations

0 0.5 1 1.5 2 Miles

FUSS & O'NEILL *Disciplines to Deliver*

Friends of the Bay *Working to keep the oyster in Oyster Bay*

Legend

Monitoring Locations | Watershed_Bnd | County Line

N W E S

Stream and Outfall Sampling Locations in Mill Neck Creek, Oyster Bay, and Cold Spring Harbor

Site ID	Site Location	Site Description	Coordinates
OBS – 1	The Birches Sewage Outfall	Adjacent to end of pipe, accessible from Meleny Road	40º54'17" N 73º34'57" W
OBS – 2	Beaver Lake Outflow	South side of Robert De Graff Causeway upstream of and adjacent to waterfall	40º53'15"N 73º33'48" W
OBS – 3	Beekman Creek	West Side of West Shore Road	40º52'34" N 73º32'34" W
OBS – 4	Upper Mill River	South Side of Glen Cove Road adjacent to apartments	40º52'01" N 73º32'29" W
OBS – 5	Mill River Outflow	Mill River upstream of Beekman Creek culvert and tidal influence	40º52'27" N 73º32'25" W
OBS – 6	White's Creek	Adjacent to South Street upstream of tidal influence, near Commander Oil Terminal	40º52'27" N 73º31'41" W
OBS – 7	Tiffany Creek	North side of Cove Neck Road	40º52'19" N 73º30'11" W
OBS – 8	DeForest Pond Outflow	North of intersection of Shore Road and Spring Street in Cold Spring Harbor	40º52'14" N 73º27'41" W
OBS – 9	St. John's Pond Outflow	South of road on top of dam adjacent to fish hatchery, south of Route 25A and west of Lawrence Hill Road	40º51'25" N 73º27'48" W
OBS – 10	Rotating Outfall	Select 1 outfall during each wet weather event, and 1 outfall where discharge is occurring during a dry weather event.	Varies

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Appendix C

Water Quality Monitoring Data Sheet

Friends of the Bay

Volunteer Water Quality Monitoring Data Sheet

DATE: ____________________________

CAPTAIN: ___________________________ FIELD SAMPLING LEADER: _______________________________

SAMPLERS: _____________________________________ ______________________________________

STATION: ________ Time (2400): _____________ Air Temp (C°) __________

GPS Reading: 40°_____________ 73°_____________

☐ Bacteria Sample ☐ Duplicate

☐ Nitrogen Sample ☐ Duplicate

☐ DO Sample Collected ☐ DO Sample Preserved

☐ Rainfall in previous 24 hours: 0= none 1= light 2= moderate 3= heavy

WATER & WEATHER CONDITIONS

	Tidal Stage	1=high slack 2 = ebbing/falling 3= low slack 4 = flooding/rising
	Water Color	1 = brown 2 = red brown 3 = green 4 = yellow brown 5 = green brown
	Surface conditions	1= algal bloom 2 = oil slick 3 = foam 4 =dead fish 5 = debris 6=Other: ____
	Wave Height	0 = no waves 1= slight movement 2= light chop small waves on shore 3= moderate chop 4 = white caps 5 = swells
	Cloud Cover	0 = no clouds, 1 = <25%, 2 =25-50%, 3 =50-75%, 4 = 75-100%
	Wind Speed	0= no wind 1= <5mph 2= 5-10mph 3= 10-15mph 4= 15-20mph 5= 20-25mph 6= >25mph
	Wind Direction	1= North 2= Northeast 3= East 4= Southeast 5= South 6= Southwest 7= West 8= Northwest
	Weather	1 = fair 2 = partly cloudy 3 = cloudy 4 = rain 5 = snow 6 = fog

FIELD MEASUREMENTS

Depth (m)	Temperature °C	Dissolved Oxygen (mg/l)	Salinity (ppt)	pH
0.5				
1.0				
______ (0.5 m above bottom)				
Bottom =				

SECCHI DEPTH

	Initials:	Initials:
Descending-Disappearance	(m)	(m)
Ascending - Reappearance	(m)	(m)
Average	(m)	(m)
Hit bottom before disappearing?	Yes No	Yes No
Angle		
Average of Two Readings	(m)	

COMMENTS

____

____

____

____

Appendix D

Tide Table for Oyster Bay – 2010

TOWN OF OYSTER BAY

2010

NORTH SHORE HIGH TIDE TABLE

OYSTER BAY HARBOR

John Venditto
Town Supervisor
www.oysterbaytown.com

Date of NEW MOON ____________
Date of FULL MOON ____________

KEEP OUR WATERWAYS CLEAN

**Free Dockside Pumpout at Roosevelt & Tappen Marinas*
** Free Pumpout Vessel Service - call on Marine Channel 9*

Commissioner Neil O. Bergin
Department of Environmental Resources
(516) 677-5811

	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
1	11:18	11:53	12:22	12:44	11:36	11:59	1:21	1:52	1:43	2:18	2:51	3:24	3:05	3:33	3:57	4:16	5:05	5:19	5:41	5:59	7:23	7:49	6:58	7:30
2		12:10	1:12	1:35		12:25	2:08	2:41	2:30	3:05	3:37	4:10	3:49	4:16	4:44	5:02	6:04	6:21	6:44	7:05	8:20	8:49	7:54	8:28
3	12:44	1:02	2:02	2:28	12:46	1:14	2:56	3:31	3:18	3:54	4:26	4:58	4:35	5:01	5:37	5:54	7:07	7:26	7:46	8:09	9:15	9:45	8:47	9:21
4	1:35	1:56	2:54	3:24	1:35	2:04	3:47	4:24	4:09	4:46	5:16	5:47	5:24	5:48	6:34	6:51	8:08	8:29	8:43	9:08	10:06	10:37	9:38	10:12
5	2:28	2:51	3:50	4:22	2:24	2:57	4:42	5:20	5:04	5:40	6:10	6:37	6:17	6:38	7:35	7:51	9:06	9:28	9:37	10:03	10:56	11:28	10:27	11:01
6	3:24	3:49	4:48	5:25	3:18	3:53	5:41	6:19	6:00	6:34	7:04	7:27	7:13	7:30	8:34	8:51	10:01	10:23	10:28	10:56	11:44		11:15	11:47
7	4:21	4:51	5:50	6:28	4:15	4:53	6:43	7:18	6:57	7:27	7:58	8:16	8:10	8:24	9:31	9:48	10:52	11:16	11:18	11:46	**12:17	11:33		12:01
8	5:20	5:53	6:52	7:30	5:17	5:56	7:43	8:14	7:53	8:17	8:51	9:05	9:06	9:18	10:25	10:43	11:42			12:06	12:06	12:21	12:33	12:47
9	6:20	6:56	7:51	8:25	6:21	6:58	8:39	9:04	8:45	9:04	9:42	9:52	10:00	10:11	11:17	11:35	12:07	12:31	12:36	12:54	12:54	1:10	1:18	1:33
10	7:18	7:55	8:45	9:14	7:22	7:54	9:28	9:49	9:34	9:48	10:31	10:38	10:51	11:03		12:07	12:57	1:20	1:26	1:44	1:44	2:01	2:04	2:21
11	8:14	8:49	9:32	9:58	8:17	8:43	10:13	10:30	10:20	10:30	11:18	11:25	11:42	11:55	12:27	12:56	1:47	2:10	2:17	2:34	2:36	2:54	2:51	3:10
12	9:05	9:37	10:14	10:37	9:05	9:27	10:55	11:08	11:03	11:10		12:05		12:31	1:18	1:46	2:39	3:01	3:09	3:28	3:29	3:49	3:40	4:01
13	9:51	10:21	10:53	11:14	9:47	10:07	11:35	11:44	11:46	11:51	12:13	12:53	12:45	1:20	2:09	2:36	3:33	3:56	4:04	4:25	4:24	4:47	4:30	4:55
14	10:34	11:01	11:30	11:49	* 11:27	11:43		12:14		12:29	1:02	1:41	1:37	2:11	3:02	3:29	4:31	4:54	5:03	5:26	5:19	5:44	5:22	5:50
15	11:14	11:40		12:05		12:04	12:20	12:52	12:33	1:13	1:52	2:31	2:29	3:02	3:57	4:23	5:32	5:57	6:03	6:27	6:12	6:39	6:13	6:45
16	11:52		12:23	12:41	12:18	12:40	12:57	1:32	1:18	1:59	2:45	3:23	3:23	3:55	4:55	5:22	6:35	7:00	7:02	7:27	7:03	7:30	7:03	7:38
17	12:17	12:30	12:57	1:18	12:52	1:16	1:36	2:15	2:06	2:47	3:40	4:18	4:19	4:50	5:57	6:23	7:36	8:01	7:57	8:21	7:49	8:18	7:52	8:28
18	12:53	1:07	1:32	1:57	1:25	1:54	2:20	3:01	2:57	3:40	4:38	5:14	5:17	5:47	7:00	7:25	8:33	8:56	8:46	9:10	8:33	9:03	8:39	9:15
19	1:30	1:45	2:09	2:40	2:01	2:33	3:09	3:53	3:53	4:36	5:38	6:11	6:19	6:46	8:02	8:25	9:23	9:44	9:31	9:55	9:14	9:46	9:24	10:01
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24	5:16	5:59	6:56	7:38	6:28	7:13	8:22	8:52	9:02	9:24	10:32	10:46	11:02	11:16	11:57		12:23	12:34	12:33	12:38	12:34	12:41	1:02	1:16
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26	7:19	8:02	8:59	9:31	8:41	9:15	10:17	10:36	10:50	11:04		12:07		12:25	12:50	1:08	1:36	1:44	1:53	1:58	2:10	2:23	2:43	3:04
27	8:19	8:59	9:54	10:22	9:41	10:09	11:08	11:25	11:39	11:51	12:18	12:50	12:38	1:04	1:27	1:43	2:16	2:22	2:38	2:44	3:04	3:21	3:38	4:03
28	9:17	9:52	10:46	11:11	10:36	10:59	11:57			12:26	1:00	1:31	1:17	1:41	2:04	2:18	2:58	3:05	3:27	3:37	4:01	4:23	4:36	5:06
29	10:11	10:43			11:27	11:48	12:11	12:45	12:36	1:11	1:42	2:12	1:55	2:18	2:42	2:55	3:46	3:56	4:22	4:37	5:01	5:26	5:36	6:10
30	11:03	11:33				12:16	12:57	1:31	1:21	1:55	2:23	2:52	2:34	2:55	3:24	3:36	4:41	4:54	5:22	5:41	6:00	6:30	6:36	7:13
31	11:54				12:34	1:04			2:06	2:39			3:14	3:34	4:11	4:24			6:23	6:46			7:36	8:12

* Start Daylight Savings Time
March 14th

** Start Eastern Standard Time
November 7th

Fro Bayville Bridge minus 13 min.
For Northport Bay minus 12 min.
For Cold Spring Harbor minus 14 min.

For Bridgeport minus 7 min.
For Orient Point minus 1 hour, 15 min.
For Glen Cove Hempstead Harbor minus 48 min.

Tide Estimates supplied to the Town of Oyster Bay by National Oceanic & Atmospheric Administration

FUSS & O'NEILL

Appendix E

2010 Open Water Body Monitoring Results

Friends of the Bay 2010 Water Quality Data - **Site 1, Cold Spring Cove South**

	Date	H20 Temp TOP (0.5m) (°C)	H20 Temp 1.0 m (°C)	H20 Temp 0.5 m from BTM (°C)	Salinity TOP (0.5m) (ppt)	Salinity 1.0 m (ppt)	Salinity 0.5 m from BTM (ppt)	pH Top (0.5m)	pH 1.0 m	pH 0.5 m from BTM	DO TOP (0.5m) (ppm)	DO 1 m (ppm)	DO 0.5 m from BTM (ppm)	Secchi (m)	Depth (m)	Air Temp (°C)	H2O Temp BTM monthly AVG (°C)	Fecal Coliform Bacteria (CFU/100ml)	Enterococci (CFU/100 ml)	Ammonia (NH3) (mg/l)	Nitrate/Nitrite (NO3-NO2) (mg/l)	Total Kjeldahl Nitrogen (TKN) (mg/l)	Organic Nitrogen (N) (mg/l)	Total Nitrogen (mg/l)	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 1	4/5/2010	11.32		10.33	22.5		22.93	8.72		8.67	11.35		11.15	1.6	1.7	12.00		13	9	0.20	0.489	2.59	2.39	3.08	0	2	5	6	0	0	1	8	1
Site 1	4/12/2010	12.35	11.98	11.61	22.54	22.54	22.99	8.92	8.89	8.83	11.03	10.54	9.86	1.2	4.7	12.60		36	18						0	4	4	6	0	0	0		1
Site 1	4/19/2010	10.13			19.91			8.21			7.6			2.0		9.70		140	18						0	2	3	6	2	0	2	1	1
Site 1	4/27/2010	11.48	11.43	11.45	25.04	26.14	26.69	10.52	10.49	10.46	7.77	7.50	7.25	1.4	3.8	11.10		380	700						3	4	5	6	1	4	1	1	3
Site 1	5/10/2010	Sites 1-4 not done due to high wind																															
Site 1	5/17/2010	14.92	15.20	15.18	23.45	24.93	25.62	10.56	10.50	10.43	8.78	8.21	8.85	1.3	2.4	13.60		34	15						0	2	5	6	0	0	0		1
Site 1	5/24/2010	15.26	14.74	13.86	26.39	26.93	26.94	10.62	10.58	10.43	8.10	7.52	7.44	1.3	4.6	21.70		400	14						1	2		6	0	4	1	2	3
Site 1	6/1/2010	16.57	17.71	16.42	25.22	26.85	27.78	10.38	10.50	10.36	7.66	7.99	4.87	1.1	4.6	23.90		490	46						0	2	4	6	1	2	1	5	1
Site 1	6/7/2010	19.19	19.93	19.39	24.97	25.96	27.06	10.82	10.77	10.34	9.40	8.87	6.46	0.8	4.6	18.10		260	20	<.05	<.035	3.27	3.27	3.27	0	2	5	6	0	0	2	1	1
Site 1	6/14/2010	18.04	17.78	16.54	19.47	26.26	28.35	10.05	10.08	9.75	7.63	7.04	3.21	1.1	4.7	20.70		2200	840						0	3	1	1	1	4	1	2	3
Site 1	6/21/2010	22.23	21.83	18.98	25.43	26.73	28.32	8.41	8.37	7.81	8.65	6.82	5.61	1.0	4.5	27.60		930	21						3	2	3	6	0	0	0		3
Site 1	6/28/2010	22.81	21.75	20.41	26.33	27.65	28.81	7.35	8.03	7.72	8.15	5.85	3.58	0.9	4.8	30.00		46	12						0	4	5	1	0	0	2	6	1
Site 1	7/6/2010	Sites 1-4 not done due to extreme heat																															
Site 1	7/12/2010	22.84	22.70	21.72	27.77	28.48	27.52	8.13	8.05	7.85	6.35	5.61	3.41	1.2	4.6	30.50		640	75						0	3	5	6	0	3	0		1
Site 1	7/19/2010	Sites 1-12 & 19 not done due to dangerous weather. Heavy downpours, funnel cloud observed forming over Bayville. *Sample contaminated with rainwater.																															
Site 1 **	7/26/2010	25.93	26.39	25.80	24.34	25.14	26.53	7.79	7.82	7.66	5.81	4.72	2.41	0.9	4.1	23.10		2470	380	<.05	0.111	3.96	3.96	4.07	3	4	5	6	0	0	0		1
Site 1	8/2/2010	24.21	24.33	22.22	26.56	27.04	28.32	8.49	7.88	7.63	4.37	3.77	1.84	1.1	6.4	24.10		**Lab Error**	22						0	2	4	6	0	1	1	8	1
Site 1	8/9/2010	24.18	24.12	23.83	29.92	30.06	30.70	6.33	6.29	6.20	3.37	3.19	2.48	1.2	6.7	26.30		1020	>60						0	4	1	6	0	0	1	6	1
Site 1	8/16/2010	22.87	22.88	22.70	29.64	30.29	31.01	6.38	6.29	6.18	3.33	2.79	2.58	0.9	3.9	25.20		160	39						1	2	5	6	0	4	1	6	3
Site 1	8/23/2010	Run cancelled due to small craft advisories.																															
Site 1	8/30/2010	23.72	23.68	22.71	28.96	29.31	30.64	6.91	6.71	6.2	7.46	6.57	2.45	1.0	4.1	21.60		380	60						0	2	4	6	0	0	0		1
Site 1	9/7/2010	22.90	23.00	23.37	29.86	30.08	30.75	6.75	6.72	6.66	5.18	4.82	4.46	1.4	6.0	21.20		240	52						0	4	5	1	1	0	2	6	1
Site 1	9/13/2010	Run cancelled due to inclement weather.																															
Site 1	9/20/2010	Sites 1-4 not done due to high wind																															
Site 1	9/27/2010	Run cancelled due to inclement weather.																															
Site 1	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 1	10/12/2010	Run cancelled - no captain.																															
Site 1	10/18/2010	Sites 1-4 not done due to wind and tide.																															
Site 1	11/1/2010	9.89	10.35	12.76	25.92	26.49	29.55	7.35	7.33	7.29	8.32	7.99	7.75	1.3	3.1	6.80		26	20	0.151	0.383	0.536	0.385	0.919	0	2	3	6	2	0	3	8	1

** **Effective 7/26/10, used new Quanta**

	Friends of the Bay 2010 Water Quality Data - **Site 2, Cold Spring Cove North**																																
	Date	**H20 Temp TOP (0.5m) (°C)**	**H20 Temp 1.0 m (°C)**	**H20 Temp 0.5 m from BTM (°C)**	**Salinity TOP (0.5m) (ppt)**	**Salinity 1.0 m (ppt)**	**Salinity 0.5 m from BTM (ppt)**	**pH Top (0.5m)**	**pH 1.0 m**	**pH 0.5 m from BTM**	**DO TOP (0.5m) (ppm)**	**DO 1 m (ppm)**	**DO 0.5 m from BTM (ppm)**	**Secchi (m)**	**Depth (m)**	**Air Temp (°C)**	**H2O Temp BTM monthly AVG (°C)**	**Fecal Coliform Bacteria (CFU/100ml)**	**Enterococci (CFU/100 ml)**	**Ammonia (NH3) (mg/l)**	**Nitrate/Nitrite (NO3-NO2) (mg/l)**	**Total Kjeldahl Nitrogen (TKN) (mg/l)**	**Organic Nitrogen (N) (mg/l)**	**Total Nitrogen (mg/l)**	**Rainfall in 24 hours**	**Tidal Stage**	**Water Color**	**Surface Conditions**	**Wave Height**	**Cloud Cover**	**Wind Speed**	**Wind Direction**	**Weather**
Site 2	4/5/2010	9.97	10.09	8.82	22.59	23.11	23.61	8.66	8.68	8.64	11.01	11.12	10.58	1.70	5.40	12.00		8	3	<.05	0.079	3.08	3.08	3.16	0	2	5	6	0	1	1	2	1
Site 2	4/12/2010	12.04	12.25	11.45	22.47	22.66	22.91	8.94	8.93	8.81	10.84	10.54	8.28	1.20	6.00	11.80		9.00	3						0	4	4	6	0	0	0		1
Site 2	4/19/2010	10.63	10.67	10.93	21.93	22.54	23.28	8.29	8.31	8.35	7.25	7.91	7.04	2.00	4.90	11.40		13	13						0	2	3	6	2	0	2	1	1
Site 2	4/27/2010	11.50	11.49	11.42	25.45	25.86	26.35	10.50	10.48	10.42	7.85	7.73	7.51	1.70	3.10	11.80		320.00	430						3	4	5	6	1	4	0		3
Site 2	5/10/2010	Sites 1-4 not done due to high wind																															
Site 2	5/17/2010	14.71	14.82	13.73	24.08	25.13	26.95	10.47	10.46	10.38	7.99	7.78	7.40	1.80	4.10	17.50		84	19						0	2	5	6	0	0	0		1
Site 2	5/24/2010	15.67	15.28	13.93	19.57	26.74	27.59	10.69	10.69	10.49	6.00	7.32	6.95	0.90	4.70	18.60		26	5						1	2	5	6	0	4	1	2	3
Site 2	6/1/2010	18.24	18.08	16.50	26.00	26.56	27.64	10.61	10.56	10.39	8.42	7.87	7.10	1.10	4.40	25.30		60	24						0	2	5	6	1	2	1	5	1
Site 2	6/7/2010	19.31	19.29	19.60	26.07	26.35	27.21	10.52	10.50	10.49	8.32	7.86	7.40	1.00	4.50	17.50		100	17	<.05	0.064	3.41	3.41	3.47	0.000	2.000	5.000	6.000	2.000	0.000	1.000	8.000	1.000
Site 2	6/14/2010	17.19	17.49	16.91	26.69	27.11	28.22	10.10	10.12	9.84	6.60	6.72	5.67	1.00	4.60	20.50		70	47						0	3	1	1	1	4	1	1	3
Site 2	6/21/2010	20.00	19.39	18.92	27.78	27.98	28.32	8.04	7.39	7.89	6.12	5.75	5.81	1.20	4.60	27.10		700	30						3	2	3	6	0	0	0		1
Site 2	6/28/2010	22.32	22.19	20.31	25.98	26.12	28.88	8.38	8.27	7.95	8.26	7.17	3.51	1.00	4.50	32.00		136	17						0	4	4	1	0	0	1	6	1
Site 2	7/6/2010	Sites 1-4 not done due to extreme heat																							0	3	5	6	0	3	0		1
Site 2	7/12/2010	22.27	22.21	21.76	27.54	28.52	29.52	8.04	7.97	7.84	4.92	4.58	3.62	1.20	5.80	27.40		520	32						0	3	5	6	0	3	0		1
Site 2	7/19/2010	Sites 1-12 & 19 not done due to dangerous weather. Heavy downpours, funnel cloud observed forming over Bayville. *Sample contaminated with rainwater.																															
**Site 2 ** **	7/26/2010	25.55	25.86	24.48	23.98	25.77	27.34	7.95	7.91	7.52	5.80	6.22	1.24	1.10	5.20	24.60		920	240	<.05	0.107	3.90	3.90	4.01	3	4	5	6	0	0	2	8	1
Site 2	8/2/2010	22.95	23.14	22.39	27.49	27.49	28.19	7.72	7.71	7.63	2.67	3.20	1.86	1.40	5.80	25.40		**Lab Error**	14						0	2	4	6	0	1	1	5	1
Site 2	8/9/2010	24.12	23.98	23.89	29.99	30.05	30.63	6.36	6.32	6.13	3.62	3.55	3.18	1.10	6.90	27.40		680	>60						0	4	1	6	0	0	1	6	1
Site 2	8/16/2010	22.65	22.68	22.69	29.48	30.28	31.00	6.44	6.38	6.22	4.09	3.56	2.84	1.10	3.70	26.10		120	46						1	2	5	6	0	4	1	6	3
Site 2	8/23/2010	Run cancelled due to small craft advisories																															
Site 2	8/30/2010	22.73	22.77	22.69	28..78	29.63	30.72	6.65	6.34	5.90	5.85	4.65	3.61	0.90	4.00	21.90		145	32	<.05	0.065	2.88	2.88	2.94	0	2	4	6	0	0	0		1
Site 2	9/7/2010	22.39	23.06	23.31	29.05	30.30	30.75	6.78	6.71	6.63	5.20	4.94	5.07	1.30	7.00	23.60		310	51						0	4	5	1	1	0	2	6	1
Site 2	9/13/2010	Run cancelled due to inclement weather.																															
Site 2	9/20/2010	Sites 1-4 not done due to high wind																															
Site 2	9/27/2010	Run cancelled due to inclement weather.																															
Site 2	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 2	10/12/2010	Run cancelled - no captain.																															
Site 2	10/18/2010	Sites 1-4 not done due to wind and tide.																															
Site 2	11/1/2010	12.74	12.78	12.73	29.77	29.91	30.05	7.32	7.32	7.33	7.82	7.78	7.80	3.00	3.50	6.80		8	5	<.05	0.296	0.494	0.494	0.790	0	2	3	6	2	0	2	8	1
**	**Effective 7/26/10, used new Quanta**																																

Friends of the Bay 2010 Water Quality Data - **Site 3, Cold Spring Harbor South**

	Date	H20 Temp TOP (0.5m) (°C)	H20 Temp 1.0 m (°C)	H20 Temp 0.5 m from BTM (°C)	Salinity TOP (0.5m) (ppt)	Salinity 1.0 m (ppt)	Salinity 0.5 m from BTM (ppt)	pH Top (0.5m)	pH 1.0 m	pH 0.5 m from BTM	DO TOP (0.5m) (ppm)	DO 1 m (ppm)	DO 0.5 m from BTM (ppm)	Secchi (m)	Depth (m)	Air Temp (°C)	H2O Temp BTM monthly AVG (°C)	Fecal Coliform Bacteria (CFU/100ml)	Enterococci (CFU/100 ml)	Ammonia (NH3) (mg/l)	Nitrate/Nitrite (NO3-NO2) (mg/l)	Total Kjeldahl Nitrogen (TKN) (mg/l)	Organic Nitrogen (N) (mg/l)	Total Nitrogen (mg/l)	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 3	4/5/2010	11.26	11.33	8.46	23.11	23.25	23.61	8.72	8.71	8.55	11.15	10.74	8.23	2.40	4.40	19.00		<1	1	<.05	0.086	3.15	3.15	3.24	0	2	4	6	0	1	1	8	1
Site 3	4/12/2010	12.17	12.08	11.83	22.66	23.01	22.20	8.98	9.00	8.98	11.41	11.16	9.98	1.30	4.60	16.30		4	<1						0	4	4	6	0	0	0		1
Site 3	4/19/2010	10.35	10.35	10.01	22.73	23.35	23.81	8.37	8.37	8.45	7.37	7.47	7.05	1.90	4.00	10.20		5	8						0	4	3	6	2	0	2	1	1
Site 3	4/27/2010	11.22	11.26	10.7	25.85	26.41	27.56	10.59	10.59	10.51	8.20	7.99	7.55	2.00	4.70	11.60		26	8						3	4	5	6	1	4	0		3
Site 3	5/10/2010	Sites 1-4 not done due to high wind																															
Site 3	5/17/2010	14.61	13.89	12.95	26.08	26.15	27.61	10.57	10.62	10.52	8.05	8.17	7.70	1.70	3.70	17.20		23	3						0	2		6	0	1	0		1
Site 3	5/24/2010	15.43	15.12	13.83	26.82	27.08	24.73	10.86	10.84	10.57	9.55	9.15	7.75	1.40	4.50	17.70		13	5						1	2	5	6	0	4	1	2	3
Site 3	6/1/2010	1.70	17.40	16.24	27.13	27.18	27.98	10.63	10.57	10.43	7.89	7.45	6.66	1.10	4.50	26.50		41	2						0	2	5	6	1	1	1	5	1
Site 3	6/7/2010	20.20	20.22	20.14	27.59	27.59	27.59	10.62	10.61	10.60	8.50	8.22	8.02	1.30	4.60	17.20		5	<1	<.05	<.035	3.04	3.04	3.04	0	2	5	6	2	1	0	1	1
Site 3	6/14/2010	17.75	17.34	15.98	27.91	28.03	28.81	10.29	10.12	9.85	6.75	6.13	3.04	1.10	4.60	18.90		53	9						0	3	1	1	1	4	1	2	3
Site 3	6/21/2010	20.67	20.19	19.15	27.22	27.95	28.68	8.19	8.19	8.08	7.37	7.08	6.92	1.30	4.60	26.40		440	4						3	2	3	6	0	0	0		1
Site 3	6/28/2010	21.15	20.06	18.81	28.56	28.91	29.45	8.10	7.98	7.77	5.84	4.26	3.27	1.20	4.50	30.80		48	4						0	4	5	1	0	0	1	6	1
Site 3	7/6/2010	Sites 1-4 not done due to extreme heat																															
Site 3	7/12/2010	22.55	22.54	21.14	29.19	28.15	30.00	8.15	8.10	7.88	5.47	4.18	3.72	1.40	4.50	27.40		28	3						0	3	5	6	0	3	0		1
Site 3	7/19/2010	Sites 1-12 & 19 not done due to dangerous weather. Heavy downpours, funnel cloud observed forming over Bayville. *Sample contaminated with rainwater.																															
Site 3 **	7/26/2010	26.00	25.60	23.76	26.40	26.74	27.38	7.81	7.72	7.50	4.89	3.43	0.76	1.20	4.40	23.20		370	49	<.05	<.035	4.17	4.17	4.17	3	4	5	6	1	0	1	8	1
Site 3	8/2/2010	23.77	23.60	21.42	27.38	27.81	28.50	8.16	7.95	2.64	4.45	4.30	3.01	1.10	5.20	25.50		**Lab Error**	5														
Site 3	8/9/2010	24.10	24.08	23.52	30.42	30.56	31.19	6.54	6.52	6.44	4.99	4.89	4.90	1.30	6.00	27.40		480	>60						0	4	1	6	0	0	1	6	1
Site 3	8/16/2010	22.90	22.78	22.59	30.94	31.16	31.51	6.44	6.40	6.28	3.99	2.90	2.99	1.30	3.80	25.90		150	24						1	2	5	6	0	4	1	6	3
Site 3	8/23/2010	Run cancelled due to small craft advisories																															
Site 3	8/30/2010	23.13	22.92	22.63	30.16	30.37	31.22	6.61	6.38	6.21	4.97	3.90	3.85	1.00	4.30	24.00		40	6	0.176	<.035	4.23	4.05	4.23	0	2	4	6	0	0	1	8	1
Site 3	9/7/2010	23.00	23.06	23.12	30.66	30.81	30.95	6.80	6.79	6.75	5.51	5.50	5.42	1.40	6.10	22.10		110	36						0	4	4	1	1	0	2	6	1
Site 3	9/13/2010	Run cancelled due to inclement weather.																															
Site 3	9/20/2010	Sites 1-4 not done due to high wind																															
Site 3	9/27/2010	Run cancelled due to inclement weather.																															
Site 3	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 3	10/12/2010	Run cancelled - no captain.																															
Site 3	10/18/2010	Sites 1-4 not done due to wind and tide.																															
Site 3	11/1/2010	12.88	12.92	12.93	31.13	31.06	31.28	7.38	7.39	7.38	8.04	8.06	8.08	1.00	3.50	6.20		4	2	0.117	0.224	0.355		0.579	0	2	3	6	3	0	3	8	1

** **Effective 7/26/10, used new Quanta**

7/26/10 DO 0.5 m from BTM reading abnormally low when compared to other readings on the same date at other locations and all reading taken during the season at FB-3

	Friends of the Bay 2010 Water Quality Data - **Site 4, Cold Spring Harbor North**																																
	Date	**H20 Temp TOP (0.5m) (°C)**	**H20 Temp 1.0 m (°C)**	**H20 Temp 0.5 m from BTM (°C)**	**Salinity TOP (0.5m) (ppt)**	**Salinity 1.0 m (ppt)**	**Salinity 0.5 m from BTM (ppt)**	**pH Top (0.5m)**	**pH 1.0 m**	**pH 0.5 m from BTM**	**DO TOP (0.5m) (ppm)**	**DO 1 m (ppm)**	**DO 0.5 m from BTM (ppm)**	**Secchi (m)**	**Depth (m)**	**Air Temp (°C)**	**H2O Temp BTM monthly AVG (°C)**	**Fecal Coliform Bacteria (CFU/100ml)**	**Enterococci (CFU/100 ml)**	**Ammonia (NH3) (mg/l)**	**Nitrate/Nitrite (NO3-NO2) (mg/l)**	**Total Kjeldahl Nitrogen (TKN) (mg/l)**	**Organic Nitrogen (N) (mg/l)**	**Total Nitrogen (mg/l)**	**Rainfall in 24 hours**	**Tidal Stage**	**Water Color**	**Surface Conditions**	**Wave Height**	**Cloud Cover**	**Wind Speed**	**Wind Direction**	**Weather**
Site 4	4/5/2010	9.67	9.71	8.51	27.09	23.1	23.8	8.73	8.71	8.68	11.39	11.27	10.53	1.80	4.70	17.00		2	<1	<.05	<.035	2.68	2.68	2.68	0	2	5	6	0	1	1	8	1
Site 4	4/12/2010	11.55	11.53	10.67	23.04	23.19	23.35	9.03	9.02	8.76	11.42	9.63	8.82	1.70	5.40	13.70		<1	<1						0	4	4	1	0	0	0		1
Site 4	4/19/2010			9.66											4.20	10.30		2	<1						0	4	3	6	2	0	2	1	1
Site 4	4/27/2010	10.74	10.38	9.44	27.21	27.47	27.83	10.64	10.63	10.62	8.18	8.50	7.93	2.10	3.50	10.74		5	2						3	4	5	6	0	4	0		3
Site 4	5/10/2010	Sites 1-4 not done due to high wind																															
Site 4	5/17/2010	14.57	14.2	13.98	26.5	26.7	27.67	10.08	10.71	10.68	8.55	8.75	8.65	2.00	2.30	14.50		5	1						0	2	5	6	0	0	0		1
Site 4	5/24/2010	14.95	14.78	13.08	27.78	27.7	28.24	10.86	10.81	10.66	8.09	8.13	7.99	1.90	4.50	16.30		1	1						1	2		6	1	4	2	2	3
Site 4	6/1/2010	18.74	18.68	15.43	27.67	27.67	28.36	10.74	10.72	10.59	8.47	8.20	7.50	1.20	4.70	25.80		<1	<1						0	2	5	6	1	2	1	5	2
Site 4	6/7/2010	20.05	20.05	19.69	27.94	27.94	28.14	10.63	10.62	10.59	8.47	8.25	7.97	1.50	4.30	16.80		1	<1	<.05	<.035	3.33	3.33	3.33	0	2	5	6	2	0	2	1	1
Site 4	6/14/2010	18.47	18.43	15.91	28.44	28.44	28.95	10.48	10.18	9.93	8.24	7.47	5.74	1.30	3.50	18.80		9	1						1	4	1	1	1	4	1	2	3
Site 4	6/21/2010	21.83	21.28	19.20	28.27	28.42	28.76	8.20	8.17	8.08	7.46	6.82	6.88	1.90	4.80	27.00		12	<1						3	2	3	6	0	0	0		1
Site 4	6/28/2010	22.25	21.8	18.18	28.54	28.66	29.97	8.41	8.37	8.29	8.10	7.69	6.12		4.10	31.00		1	7						0	4	4	1	0	0	2	6	1
Site 4	7/6/2010	Sites 1-4 not done due to extreme h																															
Site 4	7/12/2010	23.75	23.48	21.13	29.46	28.78	28.92	6.93	6.89	6.41	7.22	6.36	3.33	1.60	4.50	27.50		12	<1						0	4	5	6	0	3	0		1
Site 4	7/19/2010	Sites 1-12 & 19 not done due to dangerous weather. Heavy downpours, funnel cloud observed forming over Bayville. *Sample contaminated with rainwater.																															
Site 4 **	7/26/2010	25.49	25.52	24.36	27.38	27.31	27.75	8.24	8.24	7.90	5.95	6.87	5.80	1.40	5.50	22.70		3	<1	<.05	<.035	3.52	3.52	3.52	3	4	5	6	1	0	1	8	1
Site 4	8/2/2010	23.76	23.68	20.86	27.67	27.73	28.69	8.26	8.19	7.86	6.32	4.77	5.08	1.40	5.50	24.90		**Lab Error**	<1						0	2	4	6	0	1	1	5	1
Site 4	8/9/2010	24.33	24.2	23.27	30.94	30.93	31.25	6.67	6.64	6.53	5.87	5.58	5.23	1.40	6.60	27.10		1	1						0	4	5	6	0	0	1	6	1
Site 4	8/16/2010	22.95	22.92	22.77	31.38	31.31	31.37	6.78	6.74	6.65	6.19	5.86	5.60	1.20	3.70	24.70		3	<1						1	2	5	6	1	4	1	6	3
Site 4	8/23/2010	Run cancelled due to small craft advisories																															
Site 4	8/30/2010	23.64	23.82	22.86	30.62	30.84	31.45	7.11	6.99	6.56	8.08	6.91	6.10	1.60	4.00	24.20		1	<1	<.05	0.037	2.05	2.05	2.08	0	2	4	6	1	0	2	8	1
Site 4	9/7/2010	23.25	23.25	23.20	31.25	31.25	31.39	6.91	6.9	6.83	6.47	6.42	6.26	1.80	6.20	24.90		4	<1						0	4	5	6	1	0	2	6	1
Site 4	9/13/2010	Run cancelled due to inclement weather.																															
Site 4	9/20/2010	Sites 1-4 not done due to high wind																															
Site 4	9/27/2010	Run cancelled due to inclement weather.																															
Site 4	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 4	10/12/2010	Run cancelled - no captain.																															
Site 4	10/18/2010	Sites 1-4 not done due to wind and tide.																															
Site 4	11/1/2010	13.31	13.32	13.32	31.58	31.58	31.58	7.39	7.4	7.39	7.97	7.99	8.02	1.50	4.00	6.90		1	<1	0.060	0.191	0.328		0.519	0	2	3	6	4	0	3	8	1
**	**Effective 7/26/10, used new Quanta**																																

Friends of the Bay 2010 Water Quality Data - **Site 5, Plum Point**

	Date	H20 Temp TOP (0.5m) (°C)	H20 Temp 1.0 m (°C)	H20 Temp 0.5 m from BTM (°C)	Salinity TOP (0.5m) (ppt)	Salinity 1.0 m (ppt)	Salinity 0.5 m from BTM (ppt)	pH Top (0.5m)	pH 1.0 m	pH 0.5 m from BTM	DO TOP (0.5m) (ppm)	DO 1 m (ppm)	DO 0.5 m from BTM (ppm)	Secchi (m)	Depth (m)	Air Temp (°C)	H2O Temp BTM monthly AVG (°C)	Fecal Coliform Bacteria (CFU/100ml)	Enterococci (CFU/100 ml)	Ammonia (NH3) (mg/l)	Nitrate/Nitrite (NO3-NO2) (mg/l)	Total Kjeldahl Nitrogen (TKN) (mg/l)	Organic Nitrogen (N) (mg/l)	Total Nitrogen (mg/l)	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 5	4/5/2010	9.85	9.82	9.37	23.19	23.18	23.5	8.72	8.72	8.65	11.43	11.29	10.7	1.5	10.0	12.0		1	<1	<.05	<.035	3.4	3.4	3.4	0	2	5	6	0	1	1	2	1
Site 5	4/12/2010	10.55	10.52	10.00	23.08	23.08	23.53	8.98	8.96	8.82	10.94	10.69	10.03	1.80		14.6		<1	2						0	4	4	6	0	0	0	1	
Site 5	4/19/2010													2.2		10.5		<1	<1						0	4	3	6	2	0	2	1	1
Site 5	4/27/2010	10.21	10.15	9.97	27.46	27.53	27.59	10.63	10.62	10.61	8.13	8.10	8.04	2.2	4.5	10.2									3	4	5	6	0	4	0		3
Site 5	5/10/2010	12.70	12.69	12.66	27.24	27.24	27.24	10.76	10.75	10.75	8.56	8.56	8.53	1.6	4.5	8.7		1	<1	<.05	<.035	2.14	2.14	2.14	0	4	5	6	2	0	2	8	1
Site 5	5/17/2010	13.73	13.63	13.30	27.65	27.64	27.76	10.67	10.65	10.45	8.31	8.30	8.09	1.8		17.2		<1	<1						0	2	5	6	0	1	0		1
Site 5	5/24/2010	14.31	13.93	13.86	27.96	28.07	28.13	10.67	10.65	10.36	8.25	8.10	7.61	1.4	4.1	16.3		3	<1						1	2	5	6	1	4	2	4	3
Site 5	6/1/2010	18.44	18.44	17.00	27.87	27.80	28.09	10.58	10.58	10.52	7.69	7.66	7.60	1.3	4.0	25.6		3	<1						0	2	5	6	1	3	1	5	2
Site 5	6/7/2010	19.12	19.14	19.02	28.25	28.26	28.31	10.55	10.58	10.57	7.66	8.00	7.70	1.6	4.0	17.8		3	2	<.05	<.035	2.98	2.98	2.98	0	2	5	6	1	0	1	8	1
Site 5	6/14/2010	17.88	17.88	17.13	28.62	28.62	28.73	10.28	10.28	10.27	6.97	7.00	7.10	1.3	5.0	19.4		8	4						1	4	4	1	1	4	1	2	3
Site 5	6/21/2010	21.10	19.30	19.03	28.78	28.77	28.82	8.14	8.12	8.11	6.99	6.99	7.11	1.8	4.7	31.2		40	1						3	2	3	6	0	0	0		1
Site 5	6/28/2010	21.63	21.76	20.58	29.02	29.07	29.30	8.10	8.16	8.13	6.57	6.34	6.31	1.4	5.0	30.1		3	4						0	4		6	1	0	2	6	1
Site 5	7/6/2010	22.94	22.82	20.55	29.50	29.64	29.90	8.51	8.48	8.12	8.10	7.45	5.04	1.7	4.5	30.0		1	<1						0	1	5	6	0	0	0		1
Site 5	7/12/2010	23.14	23.12	25.02	29.84	29.94	29.94				8.63	5.74	5.75	1.8	4.5	28.1		<1	<1						0	4	5	6	0	3	0		1
Site 5	7/19/2010	Sites 1-12 & 19 not done due to dangerous weather. Heavy downpours, funnel cloud observed forming over Bayville. *Sample contaminated with rainwater.																															
Site 5 **	7/26/2010	25.07	25.00	23.90	27.50	27.50	27.82	8.05	8.05	7.88	6.37	6.15	4.40	1.7	16.7	23.8		3	3	<.05	<.035	3.67	3.67	3.67	3	4	4	6	1	0	1	8	1
Site 5	8/2/2010	23.61	23.60	21.49	29.95	27.95	28.50	8.12	8.12	7.84	5.94	5.76	3.33	1.5	17.8	24.8		**Lab Error**	<1						0	2	4	6	0	2	1	5	1
Site 5	8/9/2010	23.96	23.83	23.50	31.13	31.20	31.12	6.62	6.61	6.59	5.62	5.59	5.55	1.4	18.6	27.1		1	<1						0	4	5	6	0	0	1	6	1
Site 5	8/16/2010	23.03	23.02	23.02	31.39	31.38	31.38	6.58	6.58	6.57	5.24	5.31	5.33	1.4	10.0	24.7		6	<1						1	2	5	6	1	4	1	6	3
Site 5	8/23/2010	Run cancelled due to small craft advisories																															
Site 5	8/30/2010	23.27	23.21	23.17	31.10	31.10	31.10	6.77	6.73	6.59	6.72	6.67	6.66	1.3	5.0	24.4		3	<1	,.05	0.068	1.93	1.93	1.99	0	2	4	6	0	0	2	8	1
Site 5	9/7/2010	23.21	23.22	23.20	31.47	31.47	31.47	6.83	6.82	6.80	6.05	6.20	6.35	1.9	1.5	23.5		2	<1						0	4	5	6	1	0	2	6	1
Site 5	9/13/2010	Run cancelled due to inclement weather.																															
Site 5	9/20/2010	20.91	20.91	20.91	32.00	32.01	31.93	7.04	7.23	7.03	6.88	6.86	6.91	1.8	4.0	16.8		<1	<1						0	4	3	6	4	0	3	1	1
Site 5	9/27/2010	Run cancelled due to inclement weather.																															
Site 5	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 5	10/12/2010	Run cancelled - no captain.																															
Site 5	10/18/2010	16.90	16.85	16.75	31.52	31.52	31.44	6.81	6.84		7.17	7.16	6.87	3.00	4.0	10.7		<1	1						0	1	5	6	1	3	2	1	2
Site 5	11/1/2010	13.97	13.85	13.86	31.82	31.89	31.90	7.40	7.40	7.29	7.87	7.85	7.76	3.0	4.0	6.7		1	1	0.129	0.190	0.616	0.487	0.806	0	2	3	6	4	0	3	8	1

** **Effective 7/26/10, used new Quanta**

Friends of the Bay 2010 Water Quality Data - **Site 6, Seawanhaka Yacht Club PSTP outfall**

	Date	H20 Temp TOP (0.5m) (°C)	H20 Temp 1.0 m (°C)	H20 Temp 0.5 m from BTM (°C)	Salinity TOP (0.5m) (ppt)	Salinity 1.0 m (ppt)	Salinity 0.5 m from BTM (ppt)	pH Top (0.5m)	pH 1.0 m	pH 0.5 m from BTM	DO TOP (0.5m) (ppm)	DO 1 m (ppm)	DO 0.5 m from BTM (ppm)	Secchi (m)	Depth (m)	Air Temp (°C)	H2O Temp BTM monthly AVG (°C)	Fecal Coliform Bacteria (CFU/100ml)	Enterococci (CFU/100 ml)	Ammonia (NH3) (mg/l)	Nitrate/Nitrite (NO3-NO2) (mg/l)	Total Kjeldahl Nitrogen (TKN) (mg/l)	Organic Nitrogen (N) (mg/l)	Total Nitrogen (mg/l)	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 6	4/5/2010	9.62	9.59	9.53	23.18	23.24	23.37	8.71	8.7	8.69	11.31	11.24	10.69	1.8	4.5	21.0		<1	<1	<.05	<.035	3.46	3.46	3.46	0	2	5	6	0	1	0		1
Site 6	4/12/2010	10.88	10.81	10.39	23.10	23.16	23.28	8.95	8.94	8.89	10.57	10.48	10.04	1.5	5.00	16.6		<1	<1						0	4	5	6	0	0	0		1
Site 6	4/19/2010													2.1		11.1		<1	<1						0	4	3	6	0	0	1	1	1
Site 6	4/27/2010	10.90	10.79	10.35	27.15	27.21	27.40	10.61	10.61	10.60	8.00	7.94	7.91	2.1	4.50	10.9		340	4						3	4	5	6	0	4	0		3
Site 6	5/10/2010	12.67	12.64	12.43	27.17	27.17	27.23	10.78	10.76	10.77	8.54	8.60	8.64	1.4	7.60	8.2		<1	<1	<.05	<.035	2.53	2.53	2.53	0	4	5	6	2	0	2	8	1
Site 6	5/17/2010	13.94	13.82	13.80	27.66	27.65	27.65	10.67	10.67	10.64	8.32	8.32	8.26	1.9	3.70	17.9		2	<1						0	2	5	6	0	0	0		1
Site 6	5/24/2010	14.84	14.82	14.24	27.89	27.84	27.95	10.73	10.73	10.65	8.88	8.41	8.16	1.9	4.30	16.9		3	<1						1	2	55	6	1	4	1	4	3
Site 6	6/1/2010	18.50	18.46	18.33	27.87	27.87	27.87	10.60	10.60	10.61	7.87	7.94	8.01	1.3	4.30	25.3		3	<1						0	2	5	6	1	3	1	5	2
Site 6	6/7/2010	19.14	19.09	18.96	28.18	28.18	28.18	10.62	10.60	10.58	8.00	7.80	7.50	1.5	4.5	17.1		5	1	<.05	<.035	3.62	3.62	3.62	0	2	5	6	1	0	1	8	1
Site 6	6/14/2010	18.31	18.21	16.97	28.50	28.85	28.79	10.28	10.26	10.23	6.77	6.72	6.45	1.3	4.5	19.4		2	<1						0	4	4	1	1	4	1	1	3
Site 6	6/21/2010	20.57	20.38	19.63	28.69	28.67	28.71	8.16	8.17	8.07	7.00	7.47	7.40	1.9	4.9	38.8		3	<1						3	2	3	6	0	0	0		1
Site 6	6/28/2010	22.01	21.96	21.89	29.03	29.03	29.13	8.16	8.15	8.15	6.77	6.57	6.51	1.5	3.8	30.0		<1	<1						0	4	4	6	2	0	2	7	1
Site 6	7/6/2010	23.86	23.09	22.72	29.47	29.65	29.63	8.45	8.43	8.38	7.44	7.51	7.00	2.0	2.5	29.2		45	1						0	1	5	6	0	0	0		1
Site 6	7/12/2010	23.15	23.10	23.00	29.93	29.94	29.94	6.77	6.77	6.78	5.61	5.58	5.50	1.4	4.5	28.1		2	<1						0	4	5	6	0	3	0		1
Site 6	7/19/2010	Sites 1-12 & 19 not done due to dangerous weather. Heavy downpours, funnel cloud observed forming over Bayville. *Sample contaminated with rainwater.																															
**Site 6 ** **	7/26/2010	24.67	24.69	24.31	27.56	27.56	27.62	7.99	8.00	7.96	6.33	5.45	5.06	1.9	5.7	23.0		2	2	<.05	<.035	2.71	2.71	2.71	3	4	4	6	1	0	1	8	1
Site 6	8/2/2010	23.87	23.91	23.60	27.82	27.82	27.88	8.16	8.17	8.14	6.39	6.67	6.12	1.4	4.9	25.0		**Lab Error**	1						0	2	3	6	0	1	2	8	1
Site 6	8/9/2010	24.28	24.26	23.79	30.93	30.93	31.06	6.67	6.63	6.51	5.85	5.75	5.71	1.2	6.6	28.6		4	<1						0	4	5	6	0	0	1	6	1
Site 6	8/16/2010	22.95	22.95	22.95	31.45	31.50	31.38	6.57	6.57	6.54	5.30	5.37	5.40	1.4	4.0	24.8		3	<1						1	2	5	6	1	4	1	6	4
Site 6	8/23/2010	Run cancelled due to small craft advisories																															
Site 6	8/30/2010	23.25	23.22	23.15	31.10	31.10	31.17	6.69	6.63	6.33	6.30	6.24	6.31	1.6	4.0	25.7		<1	1	<.05	0.084	1.82	1.82	1.9	0	2	4	6	0	0	1	8	1
Site 6	9/7/2010	23.33	23.31	23.31	31.33	31.33	31.33	6.83	6.82	6.78	6.16	6.16	6.36	1.9	7.6	23.0		14	1						0	4	5	6	1	0	2	6	1
Site 6	9/13/2010	Run cancelled due to inclement weather.																															
Site 6	9/20/2010	20.89	20.88	20.89	32.00	32.00	32.00	7.08	7.08	7.08	7.05	7.07	7.18	1.7	4.0	17.3		<1	<1						0	4	3	6	4	0	2	1	1
Site 6	9/27/2010	Run cancelled due to inclement weather.																															
Site 6	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 6	10/12/2010	Run cancelled - no captain.																															
Site 6	10/18/2010	15.43	15.44	15.43	31.42	31.42	31.42	7.21	7.21	7.21	6.65	6.66	6.69	2.0	4.3	11.9		2	1						0	1	5	6	1	3	3	5	2
Site 6	11/1/2010	13.81	13.81	13.73	31.75	31.75	31.82	7.40	7.39	7.38	7.93	7.92	7.96	3.0	3.5	8.2		3	1	0.155	0.182	0.680	0.525	0.862	0	2	3	6	2	0	2	8	1

**** Effective 7/26/10, used new Quanta**

Friends of the Bay 2010 Water Quality Data - **Site 7, Oyster Bay Cove**

	Date	H20 Temp TOP (0.5m) (°C)	H20 Temp 1.0 m (°C)	H20 Temp 0.5 m from BTM (°C)	Salinity TOP (0.5m) (ppt)	Salinity 1.0 m (ppt)	Salinity 0.5 m from BTM (ppt)	pH Top (0.5m)	pH 1.0 m	pH 0.5 m from BTM	DO TOP (0.5m) (ppm)	DO 1 m (ppm)	DO 0.5 m from BTM (ppm)	Secchi (m)	Depth (m)	Air Temp (°C)	H2O Temp BTM monthly AVG (°C)	Fecal Coliform Bacteria (CFU/100ml)	Enterococci (CFU/100 ml)	Ammonia (NH3) (mg/l)	Nitrate/Nitrite (NO3-NO2) (mg/l)	Total Kjeldahl Nitrogen (TKN) (mg/l)	Organic Nitrogen (N) (mg/l)	Total Nitrogen (mg/l)	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 7	4/5/2010	11.33			23.39			8.71			11.11			2	1	19.0		6	<1	<.05	<.035	1.83	1.83	1.83	0	2	5	6	1	1	1	5	1
Site 7	4/12/2010	11.80	11.68	11.44	23.20	23.26	23.26	8.96	8.95	8.91	10.14	10.16	9.89	1.30	2.10	12.1		3	1						0	4	5	6	0	0	0		1
Site 7	4/19/2010													2.00		11.4		36	22						0	2	3	6	2	0	1	1	1
Site 7	4/27/2010	11.28	11.50	11.47	24.68	26.56	26.78	10.61	10.64	10.57	8.17	8.14	8.04	2.10	3.10	11.3		530	370						3	4	5	6	0	4	0		3
Site 7	5/10/2010	11.98	12.00	12.42	26.28	26.80	27.02	10.67	10.65	10.65	8.59	8.51	8.47	1.20	3.00	9.5		36	7	<.05	0.059	1.99	1.99	2.05	0	4	5	6	2	0	2	8	1
Site 7	5/17/2010	13.92	13.66		27.66	27.66		10.49	10.12		5.70	5.20		1.70	1.80	12.3		29	5						0	2	5	6	0	0	0		1
Site 7	5/24/2010	15.85	15.56	15.25	27.47	27.60	27.72	10.70	10.66	10.51	8.21	8.01	7.68	2.00	5.10	17.6		280	4						1	2	5	6	0	4	1	2	3
Site 7	6/1/2010	18.59			27.80			10.47			7.40			0.90	1.20	27.4		15	6						0	2	5	6	1	3	1	4	2
Site 7	6/7/2010	20.24	20.23	19.89	27.21	27.88	27.86	10.51	10.50	10.41	7.52	7.80	7.10	1.00	3.60	18.2		11	10	<.05	<.035	2.32	2.32	2.32	0	2	5	6	1	0	1	8	1
Site 7	6/14/2010	18.53	18.46		28.30	28.32		10.26	10.19		6.96	6.65		1.30	2.00	20.1		110	47						0	4	4	1	0	4	0	0	3
Site 7	6/21/2010	21.83	20.73	20.33	28.30	28.40	28.60	8.08	8.07	8.05	7.02	6.81	6.75	1.80	2.60	25.6		43	2						3	2	3	6	0	0	0		1
Site 7	6/28/2010	22.49	22.08	21.45	28.16	28.89	28.60	8.05	8.08	7.53	6.03	5.92	5.19	1.50	2.40	30.6		7	9						0	4	4	6	1	0	1	2	1
Site 7	7/6/2010	23.70	23.50		28.90	29.24		8.30	8.28		6.55	6.22		1.30	1.30	30.1		52	7						0	1	5	6	0	0	0		1
Site 7	7/12/2010	23.99	23.52	23.20	29.83	29.83	29.94	6.76	6.72	6.65	8.65	4.89	4.07	1.40	2.20	27.4		18	2						0	4	5	6	0	3	1	6	1
Site 7	7/19/2010	Sites 1-12 & 19 not done due to dangerous weather. Heavy downpours, funnel cloud observed forming over Bayville. *Sample contaminated with rainwater.																															
Site 7 **	7/26/2010	25.35	25.34	25.41	27.23	27.23	27.23	7.97	7.97	7.89	6.23	5.67	5.98	1.50	2.30	23.7		18	5	<.05	<.035	3.20	3.20	3.20	3	4	3	6	0	0	1	8	1
Site 7	8/2/2010	23.86		23.57	27.60		28.02	8.09		7.89	8.13		6.45	1.30	1.70	25.2		**Lab Error**	2						0	2	3	6	0	2	1	5	1
Site 7	8/9/2010	24.92	24.80	24.59	30.75	30.74	30.88	6.70	6.67	6.56	6.57	6.36	6.11	1.30	2.70	27.2		2	<1						0	4	5	6	0	0	1	6	1
Site 7	8/16/2010	23.14	23.90	23.02	31.17	31.24	31.31	6.42	6.30	6.18	5.02	4.74	3.93	1.30	1.90	25.1		560	190						1	2	5	6	1	4	2	6	3
Site 7	8/23/2010	Run cancelled due to small craft advisories																															
Site 7	8/30/2010	23.37	23.32	23.30	30.97	31.11	31.18	6.70	6.67	6.62	6.01	5.99	5.83	0.90	1.9	25.0		12	1	<.05	<.035	2.09	2.09	2.09	0	2	4	6	0	0	1	8	1
Site 7	9/7/2010	23.12	23.10	23.10	31.03	31.03	31.10	6.98	6.97	6.94	7.20	7.02	7.08	1.4	2.9	23.2		10	2						0	4	5	6	1	0	2	6	1
Site 7	9/13/2010	Run cancelled due to inclement weather.																															
Site 7	9/20/2010	20.56	20.57	20.59	31.41	31.41	31.48	7.22	7.20	7.19	8.04	8.01	7.92	1.40	2.3	16.8		9	3						0	4	3	6	2	0	2	1	1
Site 7	9/27/2010	Run cancelled due to inclement weather.																															
Site 7	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 7	10/12/2010	Run cancelled - no captain.																															
Site 7	10/18/2010	14.54	14.56	14.57	30.65	30.65	30.73	7.72	7.72	7.21	7.09	7.11	7.09	2.20	2.8	12.2		5	2						0	1	5	6	2	3	3	8	2
Site 7	11/1/2010	11.03	11.02	11.11	30.52	30.52	30.66	7.39	7.38	7.69	8.18	8.16	8.08	1.80	2.2	8.5		22	15	0.086	0.198	0.829	0.743	1.030	0	2	3	6	2	0	2	8	1
**	**Effective 7/26/10, used new Quanta**																																

Friends of the Bay 2010 Water Quality Data - **Site 8, Oyster Bay STP at White's Creek**

	Date	H20 Temp TOP (0.5m) (°C)	H20 Temp 1.0 m (°C)	H20 Temp 0.5 m from BTM (°C)	Salinity TOP (0.5m) (ppt)	Salinity 1.0 m (ppt)	Salinity 0.5 m from BTM (ppt)	pH Top (0.5m)	pH 1.0 m	pH 0.5 m from BTM	DO TOP (0.5m) (ppm)	DO 1 m (ppm)	DO 0.5 m from BTM (ppm)	Secchi (m)	Depth (m)	Air Temp (°C)	H2O Temp BTM monthly AVG (°C)	Fecal Coliform Bacteria (CFU/100ml)	Enterococci (CFU/100 ml)	Ammonia (NH3) (mg/l)	Nitrate/Nitrite (NO3-NO2) (mg/l)	Total Kjeldahl Nitrogen (TKN) (mg/l)	Organic Nitrogen (N) (mg/l)	Total Nitrogen (mg/l)	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 8	4/5/2010	10.87		10.39	23.17		22.34	8.75		8.74	11.33		11.41	2	1.7	20.0		1	<1	<.05	0.036	2.00	2.00	2.04	0	2	5	6	1	1	1	4	1
Site 8	4/12/2010	11.52	11.51	11.00	23.20	23.19	23.26	8.95	8.94	8.90	10.41	10.15	9.75	1.50	2.80	12.8		<1	1						0	4	5	6	0	0	0		1
Site 8	4/19/2010													2.3		10.2		3	2						0	2	3	6	2	0	2	1	1
Site 8	4/27/2010	11.51	11.50	11.29	26.56	26.83	26.96	10.62	10.63	10.51	8.08	7.78	7.73	1.9	4.5	11.5		5	380						3	4	5	6	0	4	0		3
Site 8	5/10/2010	12.48	12.48	12.63	26.74	26.74	27.03	10.67	10.64	10.64	8.35	8.32	8.28	1.50	3.7	7.5		3	3	<.05	0.038	1.83	1.83	1.87	0	4	5	6	2	0	2	8	1
Site 8	5/17/2010	14.18	14.19		26.48	27.51		10.51	10.36		8.50	7.98		1.90	1.6	20.0		6	3						0	2	5	6	0	0	0		1
Site 8	5/24/2010	15.74	15.37	14.87	27.11	27.60	27.84	10.65	10.62	10.50	7.93	7.75	7.44	2.00	3.4	15.9		29	4						1	1	5	6	0	6	1	2	3
Site 8	6/1/2010	18.78	18.73	18.13	27.67	27.67	27.85	10.58	10.55	10.48	7.79	8.51	7.32	1.20	2.4	26.5		9	5						0	2	5	6	0	3	1	5	2
Site 8	6/7/2010	19.47	19.43	19.46	27.63	26.22	27.92	10.43	10.43	10.42	7.03	7.19	7.16	1.00	3.4	17.7		bottle cracked, no test		<.05	<.035	2.27	2.27	2.27	0	1	5	6	0	0	1	8	1
Site 8	6/14/2010	18.65	18.62		28.09	28.23		10.34	10.31		7.35	7.70		1.00	1.7	19.9		34	7						0	4	5	1	0	4	0	0	3
Site 8	6/21/2010	21.41	20.74	21.02	28.29	28.47	28.65	8.06	8.05	7.92	6.80	6.82	6.42	1.30	3.0	26.0		36	1						3	2	3	6	0	0	1	8	1
Site 8	6/28/2010	21.95	21.95	21.23	29.02	29.02	29.14	8.19	8.19	8.04	6.86	6.86	6.18	1.60	2.3	31.0		2	4						0	4	5	6	2	0	2	7	1
Site 8	7/6/2010	22.82	22.76	22.83	28.49	28.57	29.21	8.26	8.26	8.24	6.39	6.54	5.81	1.30	2.8	30.4		<1	<1						0	1	5	1	0	0	0		1
Site 8	7/12/2010	23.92	23.16	23.43	29.84	29.89	29.88	6.74	6.76	6.76	5.84	5.79	5.77	1.40	2.3	28.6		27	3						0	4	5	6	0	4	1	6	1
Site 8	7/19/2010	Sites 1-12 & 19 not done due to dangerous weather. Heavy downpours, funnel cloud observed forming over Bayville. *Sample contaminated with rainwater.																															
Site 8 **	7/26/2010	25.25	25.23	25.23	27.23	27.23	27.30	8.00	8.00	7.90	5.94	5.68	6.01	1.60	2.6	23.8		24	6	<.05	<.035	5.14	5.14	5.14	3	4	5	6	0	0	1	8	1
Site 8	8/2/2010	23.94		23.73	27.82		27.82	8.11		8.09	6.03		6.42	1.20	1.8	26.9		**Lab Error**	<1						0	2	3	6	0	2	1	4	1
Site 8	8/9/2010	24.75	24.75	24.46	30.74	30.81	30.82	6.67	6.62	6.52	6.13	5.90	5.63	1.10	3.7	27.3		15	1						0	4	5	6	0	0	1	6	1
Site 8	8/16/2010	23.13	22.03	22.98	31.24	31.46	31.46	6.50	6.46	6.28	5.00	4.87	5.19	1.30	2.2	25.1		42	17						1	2	5	6	1	4	1	6	3
Site 8	8/23/2010	Run cancelled due to small craft advisories																															
Site 8	8/30/2010	23.32	23.27	23.20	31.04	31.11	31.11	6.70	6.63	6.49	6.22	6.11	6.03	1.40	2.4	25.9		3	<1	<.05	0.082	1.00	1.00	1.08	0	2	4	6	1	0	1	8	1
Site 8	9/7/2010	23.22	23.21	23.24	31.10	31.10	31.18	6.91	6.91	6.83	6.74	6.79	6.80	1.80	3.5	23.5		9	<1						0	4	5	6	1	0	3	6	1
Site 8	9/13/2010	Run cancelled due to inclement weather.																															
Site 8	9/20/2010	20.66	20.67	20.66	31.63	31.56	31.56	7.17	7.17	7.16	7.79	7.74	7.69	1.40	3.0	16.5		2	<1						0	4	3	6	2	0	2	1	1
Site 8	9/27/2010	Run cancelled due to inclement weather.																															
Site 8	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 8	10/12/2010	Run cancelled - no captain.																															
Site 8	10/18/2010	14.76	14.76	14.97	30.88	30.88	31.03	7.19	7.19	7.14	7.12	7.09	6.94	2.20	3.8	12.1		13	109						0	1	5	6	1	3	2	8	2
Site 8	11/1/2010	12.77		12.92	30.90		31.20	7.36		7.36	8.01		7.94	2.00	1.6	6.3		2	6	0.122	0.205	0.579	0.457	0.784	0	2	3	6	2	0	2		1

**** Effective 7/26/10, used new Quanta**

Friends of the Bay 2010 Water Quality Data - **Site 9, Roosevelt Beach**

	Date	H20 Temp TOP (0.5m) (°C)	H20 Temp 1.0 m (°C)	H20 Temp 0.5 m from BTM (°C)	Salinity TOP (0.5m) (ppt)	Salinity 1.0 m (ppt)	Salinity 0.5 m from BTM (ppt)	pH Top (0.5m)	pH 1.0 m	pH 0.5 m from BTM	DO TOP (0.5m) (ppm)	DO 1 m (ppm)	DO 0.5 m from BTM (ppm)	Secchi (m)	Depth (m)	Air Temp (°C)	H2O Temp BTM monthly AVG (°C)	Fecal Coliform Bacteria (CFU/100ml)	Enterococci (CFU/100 ml)	Ammonia (NH3) (mg/l)	Nitrate/Nitrite (NO3-NO2) (mg/l)	Total Kjeldahl Nitrogen (TKN) (mg/l)	Organic Nitrogen (N) (mg/l)	Total Nitrogen (mg/l)	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 9	4/5/2010	10.38			23.34			8.68			10.67			2	1.2	24.0		<1	<1	<.05	<.035	2.03	2.03	2.03	0	2	5	6	1	1	2	4	1
Site 9	4/12/2010	11.17	11.12	11.11	23.24	23.24	23.24	8.23	8.93	8.93	10.06	10.58	10.89	1.40	2.40	14.1		5	1						0	4		6	0	1	0		1
Site 9	4/19/2010													2		11.2		1	<1						0	2	3	6	2	0	3	1	1
Site 9	4/27/2010	11.28	11.24	11.18	26.89	27.03	27.03	10.64	10.63	10.61	7.95	7.98	7.95	2.00	3.70	11.3		4	5						3	4	5	6	0	4	0		3
Site 9	5/10/2010	12.84	12.85	12.86	27.11	27.11	27.11	10.65	10.67	10.67	8.33	8.29	8.23	1.50	2.70	7.5		1	<1	<.05	<.035	2.11	2.11	2.11	0	4	5	6	2	0	2	8	1
Site 9	5/17/2010	13.99			27.45			10.10			7.63				1.0	23.1		5	3						0	2	5	6	0	0	0		1
Site 9	5/24/2010	16.34	16.34	15.44	27.35	27.36	27.46	10.60	10.56	10.35	8.10	7.83	7.73	1.7	2.7	15.3		2	<1						1	1	5	6	1	4	1	2	4
Site 9	6/1/2010	19.00	18.79		27.68	27.75		10.59	10.50		7.65	7.69		1.0	1.8	29.8		5	<1						0	2	5	6	0	3	1	5	2
Site 9	6/7/2010	20.35	20.35	19.85	27.81	27.81	27.86	10.46	10.44	10.36	7.52	7.19	7.10	1.2	2.7	17.5		1	<1	<.05	<.035	2.09	2.09	2.09	0	1	5	6	1	0	1	8	1
Site 9	6/14/2010	18.96	18.96		28.24	28.24		10.28	10.28		7.08	7.09		1.0	2.0	21.0		41	24						0	4	4	1	0	4	0	0	3
Site 9	6/21/2010	21.81	21.23	20.51	6.77	6.61	6.65	28.30	28.35	28.46	8.08	8.04	8.00	1.2	2.7	26.3		13	3						3	2	3	6	1	0	1	8	1
Site 9	6/28/2010	21.82	21.52	21.43	28.95	28.88	29.80	8.14	8.12	8.09	6.58	6.40	6.20	1.4	2.3	33.0		8	4						0	4	4	6	2	0	2	6	1
Site 9	7/6/2010	25.38	24.80	23.00	29.10	29.15	29.15	8.63	8.43	8.17	8.19	6.83	5.73	0.5	3.2	28.5		48	12						0	2	1	1	0	0	0		1
Site 9	7/12/2010	23.80	23.41	23.28	29.83	29.84	29.95	6.73	6.73	6.72	5.62	5.54	5.54	1.3	3.7	26.2		8	1						0	4	5	6	0	4	1	6	1
Site 9	7/19/2010	Sites 1-12 & 19 not done due to dangerous weather. Heavy downpours, funnel cloud observed forming over Bayville. *Sample contaminated with rainwater.																															
Site 9 **	7/26/2010	24.90	24.79	24.79	27.50	27.10	27.57	7.96	7.97	7.96	6.23	5.74	5.63	1.3	2.90	24.2		14	2	<.05	<.035	3.54	3.54	3.54	3	4	5	6	1	0	2	8	1
Site 9	8/2/2010	24.33		23.96	27.83		27.82	8.11		8.07	6.20		6.28	1.1	1.50	27.2		**Lab Error**	<1						0	2	3	6	0	2	2	6	1
Site 9	8/9/2010	24.60	24.49	24.44	30.81	30.88	30.94	6.62	6.57	6.49	5.85	5.62	5.54	1.3	3.50	28.8		5	1						0	4	5	6	0	0	1	8	1
Site 9	8/16/2010	23.19	23.19	23.19	31.13	31.32	31.39	6.49	6.49	6.48	4.78	4.86	4.92	1.0	2.40	25.5		51	26						1	2	5	6	0	4	1	6	3
Site 9	8/23/2010	Run cancelled due to small craft advisories																															
Site 9	8/30/2010	23.23		23.19	31.03		31.03	6.62		6.60	5.75		5.75	1.1	1.50	25.3		4	<1	<.05	0.092	1.00	1.00	1.09	0	2	4	6	2	0	2	8	1
Site 9	9/7/2010	23.35	23.34	23.33	31.25	31.25	31.33	6.85	6.84	6.80	6.11	5.90	5.91	1.8	3.60	25.6		3	<1						0	4	5	6	2	0	2	6	1
Site 9	9/13/2010	Run cancelled due to inclement weather.																															
Site 9	9/20/2010	20.68	20.70	20.71	31.56	31.56	31.63	7.11	7.11	7.09	7.59	7.52	7.43	1.5	2.90	16.8		6	<1						0	4	3	6	3	0	3	8	1
Site 9	9/27/2010	Run cancelled due to inclement weather.																															
Site 9	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 9	10/12/2010	Run cancelled - no captain.																															
Site 9	10/18/2010	14.81	15.02	16.03	31.03	31.18	31.18	7.17	7.16	7.01	7.21	7.31	7.33	2.6	3.80	12.2		4	<1						0	1	5	6	2	2	2	8	2
Site 9	11/1/2010	12.97	12.96	12.96	31.20	31.20	31.20	7.26	7.26	7.35	8.14	8.13	8.11	2.0	3.00	7.4		1	2	0.162	0.169	0.488	0.326	0.657	0	2	3	6	2	0	2	8	1

**** Effective 7/26/10, used new Quanta**

Friends of the Bay 2010 Water Quality Data - **Site 10, Beekman Beach**

	Date	H20 Temp TOP (0.5m) (°C)	H20 Temp 1.0 m (°C)	H20 Temp 0.5 m from BTM (°C)	Salinity TOP (0.5m) (ppt)	Salinity 1.0 m (ppt)	Salinity 0.5 m from BTM (ppt)	pH Top (0.5m)	pH 1.0 m	pH 0.5 m from BTM	DO TOP (0.5m) (ppm)	DO 1 m (ppm)	DO 0.5 m from BTM (ppm)	Secchi (m)	Depth (m)	Air Temp (°C)	H2O Temp BTM monthly AVG (°C)	Fecal Coliform Bacteria (CFU/100ml)	Enterococci (CFU/100 ml)	Ammonia (NH3) (mg/l)	Nitrate/Nitrite (NO3-NO2) (mg/l)	Total Kjeldahl Nitrogen (TKN) (mg/l)	Organic Nitrogen (N) (mg/l)	Total Nitrogen (mg/l)	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 10	4/5/2010	11.08	10.93	10.26	23.23	23.23	23.47	8.75	8.77	8.61	11.39	10.3	10.62	2.2	3	21.0		2	<1	<.05	0.942	1.08	1.08	2.02	0	2	5	6	1	1	2	4	1
Site 10	4/12/2010	11.83	11.78	11.54	23.00	23.27	23.26	8.94	8.95	8.89	10.39	10.16	9.15	1.50	3.50	15.6		100	3						0	4		6	0	0	1	8	1
Site 10	4/19/2010													2.50		11.3		1	1						0	2	3	6	2	0	2	1	1
Site 10	4/27/2010	11.86	11.83	11.70	26.51	26.50	26.57	10.63	10.62	10.61	8.10	8.04	7.98	2.2	4.90	11.9		37	18						3	4	5	6	0	4	0		3
Site 10	5/10/2010	12.83	13.07	13.28	26.77	26.84	26.99	10.59	10.60	10.63	7.97	7.85	7.95	1.60	4.30	7.5		330	80	0.064	1.03	1.13	1.07	2.16	0	4	5	6	2	0	2	2	1
Site 10	5/17/2010	14.43	14.42	14.26	27.27	27.33	27.39	10.69	10.65	10.58	8.06	7.96	7.82	1.9	2.9	26.5		21	6						0	2	5	6	0	0	0		1
Site 10	5/24/2010	16.49	15.76	15.30	23.11	27.35	27.65	10.59	10.57	10.33	8.34	7.75	7.61	1.7	4.60	15.8		17	2						1	1	5	6	0	4	1	2	4
Site 10	6/1/2010	20.01	19.87	19.51	27.37	27.58	27.57	10.67	10.68	10.57	8.18	8.14	7.50	1.2	3.30	27.9		30	30						0	2	5	6	0	3	1	5	2
Site 10	6/7/2010	19.99	20.16	19.60	27.23	27.66	27.99	10.43	10.41	10.32	7.40	6.89	6.99	1.1	4.40	16.4		25	7	<.05	<.035	3.40	3.40	3.40	0	1	5	6	0	0	1	1	1
Site 10	6/14/2010	19.46	19.42	19.31	27.84	27.89	28.12	10.34	10.35	10.31	7.70	7.55	7.12	1.1	4.3	21.3		61	29						0	4	4	1	0	4	0	0	3
Site 10	6/21/2010	22.26	22.10	20.10	27.58	28.11	28.57	8.08	8.06	7.90	6.13	6.57	6.81	1.2	4.9	30.0		70	10						3	2	3	6	0	0	1	8	1
Site 10	6/28/2010	23.28	23.08	22.56	28.28	28.64	28.91	8.20	8.20	8.08	7.19	6.81	6.44	1.5	4.6	35.0		20	25						0	4	5	6	1	0	1	7	1
Site 10	7/6/2010	24.88	24.83	22.60	29.15	29.22	29.41	8.42	8.44	8.14	7.10	7.24	5.37	1.2	5.0	31.2		110	80						0	1	3	6	0	0	0		1
Site 10	7/12/2010	24.93	24.57	23.99	29.65	29.71	29.76	6.79	6.46	6.64	6.37	5.88	5.30	1.2	4.5	25.6		18	2						0	4	5	6	0	4	1	6	1
Site 10	7/19/2010	Sites 1-12 & 19 not done due to dangerous weather. Heavy downpours, funnel cloud observed forming over Bayville. *Sample contaminated with rainwater.																															
Site 10 **	7/26/2010	25.39	25.40	25.08	27.36	27.23	27.36	7.99	7.99	7.74	5.40	5.80	4.15	1.4	5.5	24.2		580	270	<.05	0.307	4.78	4.78	5.09	3	4	5	6	0	0	1	8	1
Site 10	8/2/2010	24.36	24.41	24.00	27.62	27.76	27.75	8.20	8.18	8.10	6.52	6.52	6.66	1.3	4.0	27.9		**Lab Error**	54						0	2	3	6	0	2	1	6	2
Site 10	8/9/2010	25.43	25.15	24.52	30.47	30.61	30.73	6.71	6.61	6.40	6.40	5.64	5.24	1.2	4.3	28.3		9	<1						0	4	5	6	0	0	1	8	1
Site 10	8/16/2010	23.21	23.20	23.13	31.18	31.25	31.39	6.50	6.49	6.43	5.06	5.10	5.14	1.4	4.0	24.7		35	17						1	2	5	6	0	3	1	6	3
Site 10	8/23/2010	Run cancelled due to small craft advisories																															
Site 10	8/30/2010	23.54	23.42	23.17	29.67	30.68	31.03	6.74	6.72	6.65	6.48	6.20	5.76	1.8	3.5	26.0		**Vessel cracked**		<.05	0.122	1.49	1.49	1.61	0	2	4	6	2	0	2	8	1
Site 10	9/7/2010	23.50	23.41	23.28	31.12	31.11	31.18	6.85	6.83	6.80	6.22	6.16	6.06	1.8	4.3	24.6		6	<1						0	4	5	6	1	0	2	6	1
Site 10	9/13/2010	Run cancelled due to inclement weather.																															
Site 10	9/20/2010	20.01	20.15	20.66	28.20	30.66	31.41	7.01	7.03	7.08	7.25	7.54	7.60	0.9	6.6	16.7		320	7						0	4	3	6	3	0	3	8	1
Site 10	9/27/2010	Run cancelled due to inclement weather.																															
Site 10	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 10	10/12/2010	Run cancelled - no captain.																															
Site 10	10/18/2010	14.92	14.90	16.07	30.82	30.89	31.19	7.24	7.15	7.03	7.15	7.32	7.40	2.9	3.8	12.2		36	162						0	1	5	6	2	3	2	8	2
Site 10	11/1/2010	11.88	12.88	12.91	30.68	30.97	31.22	7.34	7.36	7.37	7.81	7.74	7.60	2.0	3.5	6.1		160	87	0.118	0.238	0.829	0.711	1.070	0	2	3	6	2	0	2	8	1
******	**Effective 7/26/10, used new Quanta**																																

Friends of the Bay 2010 Water Quality Data - **Site 11, West Harbor**

	Date	H20 Temp TOP (0.5m) (°C)	H20 Temp 1.0 m (°C)	H20 Temp 0.5 m from BTM (°C)	Salinity TOP (0.5m) (ppt)	Salinity 1.0 m (ppt)	Salinity 0.5 m from BTM (ppt)	pH Top (0.5m)	pH 1.0 m	pH 0.5 m from BTM	DO TOP (0.5m) (ppm)	DO 1 m (ppm)	DO 0.5 m from BTM (ppm)	Secchi (m)	Depth (m)	Air Temp (°C)	H2O Temp BTM monthly AVG (°C)	Fecal Coliform Bacteria (CFU/100ml)	Enterococci (CFU/100 ml)	Ammonia (NH3) (mg/l)	Nitrate/Nitrite (NO3-NO2) (mg/l)	Total Kjeldahl Nitrogen (TKN) (mg/l)	Organic Nitrogen (N) (mg/l)	Total Nitrogen (mg/l)	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 11	4/5/2010	11.30	11.26	10.45	22.98	23.04	23.35	8.76	8.80	8.85	11.69	12.30	11.57	1.60	1.90	21.00		2	<1	<.05	<.035	1.85	1.85	1.85	0	2	5	6	0	1	0		1
Site 11	4/12/2010	11.57	11.57	11.53	23.26	23.26	23.26	8.93	8.92	8.87	10.27	10.15	9.96	1.40	3.30	13.30		3	<1						0	4	5	6	0	1	1	8	1
Site 11	4/19/2010													2.00		15.00		1	<1						0	2	3	6	2	1	1	1	1
Site 11	4/27/2010	11.92	11.91	11.86	26.58	26.78	26.78	10.64	10.64	10.61	8.00	7.95	7.75	1.90	4.00	11.92		6	2						3	4	5	6	0	4	0		2
Site 11	5/10/2010	12.78	12.80	12.80	27.55	27.18	27.11	10.69	10.67	10.67	8.50	8.28	8.00	1.40	4.00	7.50		<1	<1	<.05	<.035	2.12	2.12	2.12	0	4		6	2	0	2	8	1
Site 11	5/17/2010	15.11	14.52	14.21	27.29	27.28	27.46	10.70	10.83	10.19	7.58	7.12	6.99	2.00	2.40	18.80		2	<1						0	2	5	6	0	0	0		1
Site 11	5/24/2010	15.60	15.49	15.16	27.60	27.60	27.79	10.61	10.59	10.42	8.24	8.05	7.80	1.60	4.90	15.60		2	<1						1	4	5	6	1	4	1	2	3
Site 11	6/1/2010	20.69	20.75	18.90	27.33	27.33	27.33	10.55	10.54	10.50	8.20	8.04	7.60	1.00	2.40	25.70		4	2						0	2	5	6	1	3	1	5	3
Site 11	6/7/2010	19.72	19.72	18.86	28.07	28.07	28.18	10.45	10.45	10.37	7.40	7.72	6.74	1.40	4.00	17.80		<1	9	<.05	<.035	2.59	2.59	2.59	0	1	5	6	0	0	1	8	1
Site 11	6/14/2010	19.51	19.50	18.89	28.06	28.13	28.24	10.23	10.22	10.17	6.87	6.75	6.30	1.10	3.30	20.40		20	10						0	4	4	1	0	4	0	3	3
Site 11	6/21/2010	22.99	22.27	20.08	28.14	28.61	28.58	8.14	8.10	8.03	7.18	6.88	6.53	1.40	4.20	27.10		5	<1						3	2	3	6	0	0	1	8	1
Site 11	6/28/2010	23.78	23.71	23.05	28.67	28.67	28.66	8.18	8.16	7.66	7.31	6.86	6.16	1.00	3.50	31.60		<1	8						0	4	4	6	2	0	2	6	1
Site 11	7/6/2010	26.25	25.70	23.30	29.28	29.19	29.44	8.55	8.50	8.17	8.67	7.84	5.66	1.30	4.00	36.00		<1	<1						0	2	3	6	0	0	0		1
Site 11	7/12/2010	24.30	24.11	24.07	29.97	29.84	29.84	6.71	6.68	6.66	5.43	5.37	5.12	1.20	3.60	26.80		5	<1						0	4	3	6	0		1	8	1
Site 11	7/19/2010	Sites 1-12 & 19 not done due to dangerous weather. Heavy downpours, funnel cloud observed forming over Bayville. *Sample contaminated with rainwater.																															
**Site 11 ** **	7/26/2010	25.42	25.44	25.36	27.31	27.38	26.38	7.88	7.89	7.48	4.95	5.14	4.58	1.30	3.70	23.90		7	3	<.05	<.035	5.95	5.95	5.95	3	4	3	6	0	0	1	8	1
Site 11	8/2/2010	25.36	25.33	25.82	27.45	27.45	27.51	8.22	8.22	8.14	7.02	7.05	6.13	1.50	2.60	24.70		**Lab Error**	<1						0	2	3	6	0	2	2	2	2
Site 11	8/9/2010	24.97	24.58	24.47	30.81	30.81	30.87	6.62	6.58	6.49	6.09	5.87	5.99	1.30	4.30	29.10		3	<1						0	4	5	6	0	0	1	8	1
Site 11	8/16/2010	27.82	23.81	23.72	31.06	30.99	31.19	6.51	6.50	6.44	5.53	5.43	5.24	1.50	3.00	24.30		<1	<1						1	2	5	6	1	4	2	6	3
Site 11	8/23/2010	Run cancelled due to small craft advisories																															
Site 11	8/30/2010	23.39	23.38	23.11	30.60	30.60	30.66	6.67	6.66	6.54	5.82	5.49	4.47	1.20	3.00	26.00		8	3	<.05	0.080	1.26	1.26	1.34	0	2	4	6	2	0	2	8	1
Site 11	9/7/2010	23.44	23.43	23.40	31.26	31.26	31.19	6.85	6.84	6.73	6.52	6.52	6.57	1.50	4.40	24.00		11	<1						0	4	5	6	4	0	3	6	1
Site 11	9/13/2010	Run cancelled due to inclement weather.																															
Site 11	9/20/2010	20.80	20.79	20.81	31.53	31.49	31.49	7.09	7.09	7.09	7.66	7.70	7.71	1.70	2.50	18.40		3	<1						0	4	3	6	4	0	3	1	1
Site 11	9/27/2010	Run cancelled due to inclement weather.																															
Site 11	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 11	10/12/2010	Run cancelled - no captain.																															
Site 11	10/18/2010	14.89	14.59	14.91	31.10	31.10	31.10	7.19	7.19	7.18	7.39	7.44	7.51	2.40	4.00	12.00		5	2						0	1	5	6	2	3	4	8	2
Site 11	11/1/2010	12.45	12.46	12.48	31.10	31.10	31.19	7.35	7.35	7.36	7.75	7.61	7.55	2.00	2.80	6.70		4	2	0.198	0.167	0.490		0.657	0	2	3	6	0	0	1	8	1
**	**Effective 7/26/10, used new Quanta**																																

Friends of the Bay 2010 Water Quality Data - **Site 12, Turtle Cove**

	Date	H20 Temp TOP (0.5m) (°C)	H20 Temp 1.0 m (°C)	H20 Temp 0.5 m from BTM (°C)	Salinity TOP (0.5m) (ppt)	Salinity 1.0 m (ppt)	Salinity 0.5 m from BTM (ppt)	pH Top (0.5m)	pH 1.0 m	pH 0.5 m from BTM	DO TOP (0.5m) (ppm)	DO 1 m (ppm)	DO 0.5 m from BTM (ppm)	Secchi (m)	Depth (m)	Air Temp (°C)	H2O Temp BTM monthly AVG (°C)	Fecal Coliform Bacteria (CFU/100ml)	Enterococci (CFU/100 ml)	Ammonia (NH3) (mg/l)	Nitrate/Nitrite (NO3-NO2) (mg/l)	Total Kjeldahl Nitrogen (TKN) (mg/l)	Organic Nitrogen (N) (mg/l)	Total Nitrogen (mg/l)	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 12	4/5/2010	11.20	10.08		23.31	23.47		8.78	8.77		10.92	10.68		1.3	1.3	16.00		1	<1	<.05	<.035	1.60	1.60	1.60	0	2	5	6	8	1	1	2	1
Site 12	4/12/2010	12.23	12.22	12.12	10.47	23.29	23.28	8.97	8.97	8.92	10.47	10.47	10.22	1.4	2.8	14.40		1	3						0	4	5	6	0	1	0		1
Site 12	4/19/2010													1.5		12.40		6	<1						0	2	3	6	1	1	2	1	1
Site 12	4/27/2010	12.20	12.14	12.12	26.87	26.72	26.87	10.55	10.54	10.51	7.32	7.32	7.26	1.8	3.6	12.20		9	5						3	4	5	6	0	4	0		2
Site 12	5/10/2010	11.45		11.92	27.07		26.99	10.22		10.75	8.48		8.52	1.7	1.7	7.50		<1	<1	<.05	<.035	2.09	2.09	2.09	0	4	5	6	2	0	3	8	1
Site 12	5/17/2010	14.66	14.63		27.28	27.27		10.59	10.45		6.63	6.81		0.7	1.6	14.66		2	1						0	2	5	6	0	1	0		1
Site 12	5/24/2010	16.03	16.51	16.44	27.43	27.43	27.42	10.39	10.34	9.93	6.99	6.82	6.78	1.4	3.6	16.53		<2	2						1	4	5	6	0	4	1	2	3
Site 12	6/1/2010	21.51	21.47		27.58	27.58		10.55	10.55		7.36	7.2		1.2	1.8	26.20		5	1						0	4	5	6	1	4	1	5	2
Site 12	6/7/2010	20.37		20.31	27.88		27.95	10.36		10.32	7.62		6.6	1.2	1.8	17.30		1	<1	<.05	<.035	2.42	2.42	2.42	0	1	5	6	0	0	1	8	1
Site 12	6/14/2010	19.46	19.30	18.68	28.27	28.26	28.37	10.17	9.86	9.74	6.35	5.51	4.36	1.4	2.3	20.70		17	13						0	4	4	1	0	4	0	0	3
Site 12	6/21/2010	23.27	22.49	21.12	27.81	28.90	28.34	7.77	7.98	6.63	6.5	5.41	4.23	1.4	3.3	25.40		5	<1						3	2	3	6	0	0	0	0	1
Site 12	6/28/2010	25.01	25.01	24.92	28.65	28.65	28.65	7.88	8.28	7.62	6	6.35	5.85	1.3	2.3	35.00		5	49						0	4	5	6	1	0	1	8	1
Site 12	7/6/2010	27.10		25.40	29.32		29.70	8.19		7.6	5.7		2.1	1.5	1.8	36.00		4	<1						0	2	4	6	0	0	0		1
Site 12	7/12/2010	25.86	25.93	24.91	29.85	29.78	29.73	6.76	6.73	6.48	6.32	5.69	3.78	1.3		26.80		5	<1						0	4	3	6	0	3	1	6	1
Site 12	7/19/2010	Sites 1-12 & 19 not done due to dangerous weather. Heavy downpours, funnel cloud observed forming over Bayville. *Sample contaminated with rainwater.																															
**Site 12 ** **	7/26/2010	25.82	25.85	25.82	26.97	27.04	26.96	7.76	7.74	7.74	4.91	4.65	3.80	1.1	2.8	24.60		11	1	0.119	<.035	5.35	5.23	5.35	3	4	5	6	0	0	1	8	1
Site 12	8/2/2010	25.66			27.61			8.01			6.4			1.1	1.1	25.00		Lab Error	<1						0	2	3	6	0	2	2	8	2
Site 12	8/9/2010	25.79	25.62	25.32	30.57	30.56	30.55	6.66	6.57	6.40	6.20	5.48	5.67	1.3	3.7	28.20		1	<1						0	4	5	6	0	0	1	8	1
Site 12	8/16/2010	23.89	23.79	23.78	30.77	30.69	30.69	6.40	6.43	6.40	5.04	5.03	4.73	1.4	2.3	24.10		2	1						1	2	5	6	1	4	2	6	3
Site 12	8/23/2010	Run cancelled due to small craft advisories																															
Site 12	8/30/2010	23.83		23.71	30.77		30.82	6.69		6.65	5.47		5.55	0.9	1.8	26.50		<1	<1	<.05	0.045	1.50	1.50	1.54	0	2	4	6	2	0	2	8	1
Site 12	9/7/2010	22.86	22.83	22.78	31.09	31.09	31.08	7.07	7.06	7.05	7.45	7.35	7.27	1.5	3.8	23.80		1	1						0	4	5	6	4	0	3	6	1
Site 12	9/13/2010	Run cancelled due to inclement weather.																															
Site 12	9/20/2010	20.48	20.46	20.45	31.19	31.19	31.18	7.12	7.10	7.09	7.25	7.22	7.05	1.6	3.4	16.70		1	4						0	4	3	6	3	0	3	8	1
Site 12	9/27/2010	Run cancelled due to inclement weather.																															
Site 12	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 12	10/12/2010	Run cancelled - no captain.																															
Site 12	10/18/2010	14.16	14.20	14.10	30.99	31.00	30.90	7.19	7.18	7.15	7.35	7.35	7.32	2.7	3.8	11.90		5	1						0	2	5	6	2	3	3	8	2
Site 12	11/1/2010	11.78	11.75	11.54	31.20	31.20	31.19	7.35	7.35	7.36	7.50	7.41	7.22	1.4	2.7	6.40		2	3	0.114	0.155	0.750	0.636	0.905	0	2	3	6	0	0	1	8	1

** **Effective 7/26/10, used new Quanta**

Friends of the Bay 2010 Water Quality Data - **Site 13, Mill Neck Creek East**

	Date	H20 Temp TOP (0.5m) (^oC)	H20 Temp 1.0 m (^oC)	H20 Temp 0.5 m from BTM (^oC)	Salinity TOP (0.5m) (ppt)	Salinity 1.0 m (ppt)	Salinity 0.5 m from BTM (ppt)	pH Top (0.5m)	pH 1.0 m	pH 0.5 m from BTM	DO TOP (0.5m) (ppm)	DO 1 m (ppm)	DO 0.5 m from BTM (ppm)	Secchi (m)	Depth (m)	Air Temp (^oC)	H2O Temp BTM monthly AVG (^oC)	Fecal Coliform Bacteria (CFU/100ml)	Enterococci (CFU/100 ml)	Ammonia (NH3) (mg/l)	Nitrate/Nitrite (NO3-NO2) (mg/l)	Total Kjeldahl Nitrogen (TKN) (mg/l)	Organic Nitrogen (N) (mg/l)	Total Nitrogen (mg/l)	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 13	4/5/2010	10.99	11	10.94	23.1	23.1	23.14	8.63	8.64	8.63	14.9	15.07	15.07	1.2	2.5	13.00		9	9	<.05	0.109	1.83	1.83	1.94	0	2	4	6	0	0	0		1
Site 13	4/12/2010	11.18	11.78	11.76	22.93	23	23.06	8.92	8.92	8.92	10.14	10.09	10.02	1.4	2.00	14.30		3	1						0	4	5	6	0	1	1	7	1
Site 13	4/19/2010													2.0											0	2	3	6	0	2	1	1	1
Site 13	4/27/2010	11.95	11.95	11.95	26.09	26.09	26.04	10.61	10.61	10.61	7.86	7.90	7.88	1.9	2.00	11.95		15	10						3	4	5	6	0	3	0		2
Site 13	5/10/2010	12.90	12.88	12.14	26.84	26.83	26.90	10.76	10.73	10.54	7.37	6.76	3.17	1.4	2.90	9.60		<1	<1	<.05	<.035	2.90	2.90	2.90	0	2	5	6	2	0	2	8	1
Site 13	5/17/2010	15.57	15.25		26.19	26.33		10.48	10.44		5.67	5.78		1.3	1.40	22.00		180	22						0	2	5	6	0	1	0		1
Site 13	5/24/2010	17.06	17.01	16.87	26.96	27.10	27.16	10.52	10.53	10.42	7.60	7.37	6.22	1.5	3.40	17.06		5	1						1	4	5	6	0	4	1	4	4
Site 13	6/1/2010	21.94	21.71	20.57	25.61	25.89	27.18	10.33	10.37	10.37	7.14	7.46	6.59	0.9	2.40	26.40		80	7						0	2	5	6	1	2	1	5	2
Site 13	6/7/2010	21.81	21.13	20.18	27.31	27.37	27.80	10.44	10.39	10.35	7.17	7.07	6.35	1.1	2.70	21.90		23	<1	<.05	<.035	2.25	2.25	2.25	0	2	5	6	0	0	1	7	1
Site 13	6/14/2010	19.60	19.58	19.47	27.85	28.06	28.13	10.16	10.19	10.19	6.67	7.23	6.94	0.9	3.10	20.20		150	73						0	4	4	1	0	4	0	0	3
Site 13	6/21/2010	21.93	21.71	21.65	28.09	28.16	28.15	7.87	7.91	7.91	6.77	6.62	6.61	1.3	2.30	27.00		12	<1						3	1	3	6	0	0	1	7	1
Site 13	6/28/2010	24.27	24.22	23.85	28.26	28.26	28.31	7.97	7.96	7.94	6.25	6.14	6.10	1.0	3.00	32.00		22	3						0	4	5	6	2	0	2	6	1
Site 13	7/6/2010	26.55	25.09		28.33	29.09		8.22	8.15		6.08	5.81		0.8	1.30	34.08		47	7						0	2		6	0	0	0		1
Site 13	7/12/2010	24.87	24.83	24.79	29.53	29.53	29.53	6.67	6.67	6.65	5.37	5.37	5.33	1.1	3.60	31.40		38	10						0	4	4	6	0	3	0		1
Site 13	7/19/2010	25.90	25.88	25.80	29.41	29.48	29.48	6.30	6.30	6.20	3.60	2.50	1.90	1.2		26.80		200	9						3	2	5	1	0	4	0		3
Site 13 **	7/26/2010	25.54	25.51	25.46	27.02	27.10	27.09	7.86	7.88	7.82	5.91	5.71	5.29	1.3	3.60	25.20		41	3	<.05	<.035	3.32	3.32	3.32	3	4	5	6	0	0	1	2	1
Site 13	8/2/2010	24.91		24.88	26.57		26.64	7.96		7.83	5.02		4.78	0.8	1.40	24.70		**Lab Error**	37						0	2	1	6	0	1	1	8	1
Site 13	8/9/2010	25.29	25.28	25.18	30.48	30.47	30.47	6.57	6.55	6.44	6.01	5.94	5.84	1.0	4.40	28.10		17	3						0	4	5	6	0	0	1	1	1
Site 13	8/16/2010	23.88	23.88	23.91	30.48	30.90	30.77	6.40	6.40	6.41	4.89	4.99	5.11	0.8	3.20	24.30		500	190						1	2	5	6	1	4	1	6	3
Site 13	8/23/2010	Run cancelled due to small craft advisories																															
Site 13	8/30/2010	24.22	23.52	23.33	29.92	30.25	30.46	6.62	6.52	6.49	5.67	4.84	4.74	1.4	2.40	30.00		11	2	<.05	0.119	1.56	1.56	1.68	0	4	4	6	0	0	0		1
Site 13	9/7/2010	23.18	23.17	23.16	30.88	30.88	30.88	6.86	6.85	6.76	6.77	6.72	6.73	1.5	4.40	24.30		5	1						0	4	5	6	4	0	4	6	1
Site 13	9/13/2010	Run cancelled due to inclement weather.																															
Site 13	9/20/2010	20.78	20.74	20.67	31.20	31.20	31.20	7.14	7.13	7.07	7.53	7.32	6.75	1.4	3.6	18.30		11	1						0	1	3	6	1	0	2	2	1
Site 13	9/27/2010	Run cancelled due to inclement weather.																															
Site 13	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 13	10/12/2010	Run cancelled - no captain.																															
Site 13	10/18/2010	14.59	14.58	14.53	30.87	30.87	30.87	7.21	7.21	7.18	7.42	7.48	7.53	2.6	4.3	12.60		15	8						0	2	5	6	1	1	2	7	1
Site 13	11/1/2010	12.79	12.80	12.81	31.19	31.19	31.19	7.28	7.28	7.27	7.06	7.02	7.11	1.8	1.8	6.20		16	5	0.131	0.171	0.971	0.840	1.140	0	1	5	6	0	0	1	8	1

**** Effective 7/26/10, used new Quanta**

Friends of the Bay 2010 Water Quality Data - **Site 14, Mill Neck Creek West**

	Date	H20 Temp TOP (0.5m) (°C)	H20 Temp 1.0 m (°C)	H20 Temp 0.5 m from BTM (°C)	Salinity TOP (0.5m) (ppt)	Salinity 1.0 m (ppt)	Salinity 0.5 m from BTM (ppt)	pH Top (0.5m)	pH 1.0 m	pH 0.5 m from BTM	DO TOP (0.5m) (ppm)	DO 1 m (ppm)	DO 0.5 m from BTM (ppm)	Secchi (m)	Depth (m)	Air Temp (°C)	H2O Temp BTM monthly AVG (°C)	Fecal Coliform Bacteria (CFU/100ml)	Enterococci (CFU/100 ml)	Ammonia (NH3) (mg/l)	Nitrate/Nitrite (NO3-NO2) (mg/l)	Total Kjeldahl Nitrogen (TKN) (mg/l)	Organic Nitrogen (N) (mg/l)	Total Nitrogen (mg/l)	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 14	4/5/2010	12.38	12.29	11.24	22.21	22.24	22.97	8.59	8.58	8.60	14.94	14.86	14.62	1.10	1.90	12.00		32	4	<.05	0.112	1.97	1.97	2.08	0	2	4	6	0	0	0		1
Site 14	4/12/2010	11.74	11.75	11.72	22.93	22.99	23.06	8.92	8.92	8.91	10.19	10.04	9.71	1.40	2.20	15.40		1	<1						0	4	4	6	0	1	0		1
Site 14	4/19/2010													1.60		14.30		22	12						0	4	3	6	1	2	1	1	1
Site 14	4/27/2010	12.09	11.94	11.92	25.27	26.03	26.16	10.60	10.62	10.61	7.98	7.98	7.86	1.80	3.80	12.09		150	200						3	4	5	6	0	3	0		2
Site 14	5/10/2010	12.62	12.61	12.67	26.61	26.54	26.61	10.71	10.77	10.72	8.40	8.40	8.37	1.50	2.30	9.70		3	<1	<.05	<.035	3.33	3.33	3.33	0	2	5	6	2	0	2	8	1
Site 14	5/17/2010	15.21	15.21		26.04	26.24		10.43	10.79		5.73	6.04		1.30	1.40			220	52						0	2	5	6	0	1	0		1
Site 14	5/24/2010	17.13	17.00	16.97	26.56	27.03	27.03	10.40	10.35	9.90	7.57	7.50	6.61	1.10	2.60	17.13		6	6						1	4	5	6	0	4	1	4	4
Site 14	6/1/2010	22.46	21.74		25.49	26.59		10.22	10.12		6.33	6.83		0.40	1.50	28.00		110	11						0	4	5	6	2	2	1	5	2
Site 14	6/7/2010	21.39			27.29			10.12			6.80			0.90	1.30	19.50		17	<1	<.05	<.035	2.47	2.47	2.47	0	2	5	6	0	0	1	1	1
Site 14	6/14/2010	20.16	20.10		27.31	27.45		10.02	10.01		6.01	5.75		0.70	1.90	22.20		86	41						0	4	4	1	0	4	0	0	3
Site 14	6/21/2010	22.49	22.10	21.82	27.83	27.90	28.09	7.80	7.82	7.81	5.85	5.97	6.05	1.30	2.40	27.90		90	5						3	1	3	6	0	0	1	7	1
Site 14	6/28/2010	24.54	24.52		28.20	28.80		7.93	7.68		6.16	5.37		1.00	1.40	36.00		57	36						0	4	5	6	1	0	1	7	1
Site 14	7/6/2010	26.57	26.55	25.29	28.35	28.35	29.02	7.93	7.91	7.95	5.04	5.16	3.42	0.80	2.20	36.10		67	4						0	2	3	6	0	0	0		1
Site 14	7/12/2010	24.95	24.85	24.74	29.52	29.59	29.58	6.67	6.65	6.74	5.45	5.34	5.08	1.00	3.00	32.60		43	3						0	4	4	6	0	3	1	8	1
Site 14	7/19/2010	26.25	26.00	25.90	29.00	29.27	23.64	6.30	6.30	6.30	5.00	5.30	5.20	0.90	2.10	27.70		800	26						3	2	5	1	0	4	0		3
Site 14 **	7/26/2010	25.59	25.54	25.45	26.95	26.95	27.09	7.88	7.86	7.82	5.75	5.47	5.39	1.40	2.60	24.40		50	9	<.05	<.035	3.70	3.70	3.70	3	4	4	6	1	0	1	8	1
Site 14	8/2/2010	24.84		24.90	26.43		26.57	7.93		7.88	5.33		4.68	0.30	1.50	24.50		**Lab Error**	57						0	2	1	6	0	1	1	8	1
Site 14	8/9/2010	25.70	25.38	25.06	30.41	30.41	26.29	6.55	6.41	6.05	5.55	4.59	4.46	1.10	2.70	28.40		56	10						0	4	5	6	0	0	1		1
Site 14	8/16/2010	23.63		23.83	29.39		30.26	6.20		6.10	2.14		2.07	0.90	1.60	24.10		260	140						1	2	5	6	0	4	1	6	3
Site 14	8/23/2010	Run cancelled due to small craft advisories																															
Site 14	8/30/2010	23.85			29.47			6.51			3.32			0.30	0.70	27.00		28	<1	<.05	0.080	1.96	1.96	2.04	0	4	4	6	1	0	2	8	1
Site 14	9/7/2010	23.22	23.24	23.19	30.89	30.89	30.88	6.89	6.88	6.86	6.81	6.76	6.81	1.50	2.60	25.40		4	1						0	4	5	6	4	0	2	6	1
Site 14	9/13/2010	Run cancelled due to inclement weather.																															
Site 14	9/20/2010	20.85	20.79	20.69	31.06	31.06	31.20	7.17	7.15	7.04	7.86	7.72	7.30	1.50	2.40	19.00		6	<1						0	4	3	6	0	0	1	8	1
Site 14	9/27/2010	Run cancelled due to inclement weather.																															
Site 14	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 14	10/12/2010	Run cancelled - no captain.																															
Site 14	10/15/2010	14.34	14.38	14.59	30.57	30.57	30.73	7.18	7.17	7.07	7.42	7.43	7.42	2.60	2.60	12.10		17	6						0	2	5	6	1	2	2	8	2
Site 14	11/1/2010	12.57	12.26	12.40	31.11	30.95	31.11	7.26	7.27	7.24	7.02	7.08	6.85	2.10	2.50	5.10		16	5	0.149	0.172	0.878	0.729	1.050	0	1	5	6	0	0	1	8	1
**	**Effective 7/26/10, used new Quanta**																																

	Friends of the Bay 2010 Water Quality Data - **Site 15, Mill Neck Creek South**																																
	Date	**H20 Temp TOP (0.5m) (°C)**	**H20 Temp 1.0 m (°C)**	**H20 Temp 0.5 m from BTM (°C)**	**Salinity TOP (0.5m) (ppt)**	**Salinity 1.0 m (ppt)**	**Salinity 0.5 m from BTM (ppt)**	**pH Top (0.5m)**	**pH 1.0 m**	**pH 0.5 m from BTM**	**DO TOP (0.5m) (ppm)**	**DO 1 m (ppm)**	**DO 0.5 m from BTM (ppm)**	**Secchi (m)**	**Depth (m)**	**Air Temp (°C)**	**H2O Temp BTM monthly AVG (°C)**	**Fecal Coliform Bacteria (CFU/100ml)**	**Enterococci (CFU/100 ml)**	**Ammonia (NH3) (mg/l)**	**Nitrate/Nitrite (NO3-NO2) (mg/l)**	**Total Kjeldahl Nitrogen (TKN) (mg/l)**	**Organic Nitrogen (N) (mg/l)**	**Total Nitrogen (mg/l)**	**Rainfall in 24 hours**	**Tidal Stage**	**Water Color**	**Surface Conditions**	**Wave Height**	**Cloud Cover**	**Wind Speed**	**Wind Direction**	**Weather**
Site 15	4/5/2010			11.96			22.08			8.50			12.85	0.80	0.80	13.00		11	7	<.05	0.39	1.34	1.34	1.73	0	2	4	6	0	0	0		1
Site 15	4/12/2010	12.55			22.41			8.76			9.04			0.80	1.10	17.90		22	10						0	4	4	6	0	1	0		1
Site 15	4/19/2010																																
Site 15	4/27/2010	11.99	12.02		22.42	22.87		10.35	10.30		7.20	7.29		1.30	1.30	11.99		460	880						3	4	5	6	0	4	0		2
Site 15	5/10/2010	10.16	11.12	11.46	25.60	25.11	25.11	11.10	10.53	10.21	9.06	6.17	7.04	0.40	1.90	9.30		26	6	0.055	0.30	2.48	2.43	2.78	0	1	5	6	2	0	2	8	1
Site 15	5/17/2010																																
Site 15	5/24/2010	17.73	17.93		22.05	23.50		9.63	9.38		6.08	6.19		1.50	1.60	17.73		330	72						1	1	5	6	0	4	0		4
Site 15	6/1/2010	site not done due to tidal conditions																															
Site 15	6/7/2010	21.80			17.47			10.34			8.20				0.90	19.00		390	36	<.05	<.036	2.55	2.55	2.55	0	2	5	6	0	0	1	1	1
Site 15	6/14/2010	not done																															
Site 15	6/21/2010	22.90	22.88	22.11	27.08	27.28	27.41	7.48	7.49	7.48	3.96	3.90	4.02	0.50	1.90	25.30		330	29						3	1	3	6	0	0	1	8	1
Site 15	6/28/2010	site not done due to tidal conditions																															
Site 15	7/6/2010	26.93			28.28			7.71			3.85			0.50	0.80	35.00		180	5						0	2	3	6	0	0	0		1
Site 15	7/12/2010	27.05	26.25	26.20	27.51	29.52	28.70	6.35	6.36	6.32	4.02	3.80	3.73	0.50	2.00	29.70		440	40						0	4	4	6	0	4	1	8	4
Site 15	7/19/2010	26.70	26.80		28.60	28.70		6.00	6.00		2.00	1.50		0.60	1.20	28.20		1100	230						3	2	5	1	0	3	0		2
Site 15 **	7/26/2010	26.47	26.52		25.07	25.21		7.90	8.01		6.61	6.37		0.30	1.50	25.70		820	130	0.055	<.035	3.10	3.04	3.10	3	4	5	6	0	0	1	8	1
Site 15	8/2/2010	Sites 15-17 not done due to tidal conditions.																															
Site 15	8/9/2010	25.90		25.74	29.41		29.77	6.40		6.17	5.80		5.89	0.40	1.70	28.80		1030	>60						0	4	4	6	0	0	1	6	1
Site 15	8/16/2010	Sites 15 & 17 not done due to tidal conditions.																															
Site 15	8/23/2010	Run cancelled due to small craft advisories																															
Site 15	8/30/2010	No samples taken for sites 15 through 17																															
Site 15	9/7/2010	22.93	22.91	22.96	26.28	30.08	30.29	6.80	6.77	6.66	6.53	6.26	6.46	0.80	2.00	25.40		380	57						0	1	4	1	1	0	2	6	1
Site 15	9/13/2010	Run cancelled due to inclement weather.																															
Site 15	9/20/2010	19.73			27.57			6.94			6.72			0.50	1.10	19.00		540	54						0	4	3	6	2	0	2	8	1
Site 15	9/27/2010	Run cancelled due to inclement weather.																															
Site 15	10/14/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 15	10/12/2010	Run cancelled - no captain.																															
Site 15	10/18/2010	13.38	13.79		28.26	28.98		7.05	6.52		6.28	5.56		0.80	1.40	12.60		145	38						0	2	5	6	2	1	1	8	1
Site 15	11/1/2010	6.11		10.14	29.56		28.92	7.32		6.99	8.55		6.79	0.30	1.90	2.20		500	410	0.207	0.578	1.190	0.980	1.760	0	1	5	6	0	0	1	8	1
**	**Effective 7/26/10, used new Quanta**																																

Friends of the Bay 2010 Water Quality Data - **Site 16, Mill Neck Creek North**

	Date	H20 Temp TOP (0.5m) (°C)	H20 Temp 1.0 m (°C)	H20 Temp 0.5 m from BTM (°C)	Salinity TOP (0.5m) (ppt)	Salinity 1.0 m (ppt)	Salinity 0.5 m from BTM (ppt)	pH Top (0.5m)	pH 1.0 m	pH 0.5 m from BTM	DO TOP (0.5m) (ppm)	DO 1 m (ppm)	DO 0.5 m from BTM (ppm)	Secchi (m)	Depth (m)	Air Temp (°C)	H2O Temp BTM monthly AVG (°C)	Fecal Coliform Bacteria (CFU/100ml)	Enterococci (CFU/100 ml)	Ammonia (NH3) (mg/l)	Nitrate/Nitrite (NO3-NO2) (mg/l)	Total Kjeldahl Nitrogen (TKN) (mg/l)	Organic Nitrogen (N) (mg/l)	Total Nitrogen (mg/l)	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 16	4/5/2010	No samples taken																															
Site 16	4/12/2010	12.53			22.41			8.88			9.66			1.10	1.20	14.60		40	18						0	4	5	6	0	1	0		1
Site 16	4/19/2010																																
Site 16	4/27/2010	12.09	12.06		24.24	24.24		10.38	10.22		7.41	7.40		1.40	2.00	13.90		190	90						3	4	5	6	0	4	0		2
Site 16	5/10/2010	11.78		11.88	25.60		25.60	10.58		10.56	7.96		7.89	1.30	1.40	9.90		8	<1	0.051	0.055	2.65	2.60	2.70	0	1	5	6	1	0	2	8	1
Site 16	5/17/2010																																
Site 16	5/24/2010	17.83	17.82		24.13	24.87		10.05	8.85		6.62	6.05		0.80	1.50	16.60		290	190						1	4	5	6	0	4	0		4
Site 16	6/1/2010	site not done due to tidal conditions /saline readings suspect																															
Site 16	6/7/2010			20.60			25.70			9.88			6.00	0.90	0.90	20.40		67	21	<.05	0.060	2.69	2.69	2.75	0	2	5	6	0	0	1	1	1
Site 16	6/14/2010	not done																															
Site 16	6/21/2010	22.84	22.79		26.85	27.42		7.47	7.48		4.03	4.35		0.90	1.90	25.40		400	44						3	1	3	6	0	0	1	8	1
Site 16	6/28/2010	site not done due to tidal conditions /saline readings suspect																															
Site 16	7/6/2010	site not done due to tidal conditions/saline readings suspect																															
Site 16	7/12/2010	26.43			28.28			6.13			1.12			0.60	1.30	31.40		610	14						0	4	4	3	0	4	0		2
Site 16	7/19/2010	26.00			27.97			5.86			3.10			0.80	1.10	28.90		340	56						3	2	5	6	0	2	0		2
**Site 16 ** **	7/26/2010	26.53			25.71			7.85			5.78			0.40	1.20	24.80		270	48	0.149	0.040	3.55	3.40	3.59	3	4	1	3	0	0	0		1
Site 16	8/2/2010	Sites 15-17 not done due to tidal conditions.																															
Site 16	8/9/2010	25.64		25.27	30.06		30.18	6.32		6.15	3.92		4.00	0.80	1.70	29.10		220	>60						0	4	4	6	0	0	1	6	1
Site 16	8/16/2010	23.49			29.33			5.47			1.95			0.70	0.70	24.20		140	130						1	2	5	6	0	4	0		3
Site 16	8/23/2010	Run cancelled due to small craft advisories																															
Site 16	8/30/2010	No samples taken for sites 15 through 17																															
Site 16	9/7/2010	23.12	23.12	23.11	30.52	30.59	30.59	6.82	6.80	6.76	6.51	6.52	6.50	1.60	1.90	26.00		160	27						0	4	4	1	1	0	2	6	1
Site 16	9/13/2010	Run cancelled due to inclement weather.																															
Site 16	9/20/2010	20.67	20.68		30.26	30.26		7.02	7.01		7.33	7.30		1.30	1.50	17.80		34	13						0	4	3	6	1	0	2	8	1
Site 16	9/27/2010	Run cancelled due to inclement weather.																															
Site 16	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 16	10/12/2010	Run cancelled - no captain.																															
Site 16	10/18/2010	13.60	13.60		29.40	29.47		6.95	6.92		7.24	7.20		1.30	1.50	11.80		22							0	2	5	6	1	3	1	8	2
Site 16	11/1/2010	10.48	10.48		29.92	29.92		7.16	7.14		5.86	6.27		1.00	1.50	3.00		20	31	0.186	0.185	0.816	0.630	1.000	0	1	5	6	0	0	1	8	1

**** Effective 7/26/10, used new Quanta**

Friends of the Bay 2010 Water Quality Data - **Site 17, The Birches STP**

	Date	H20 Temp TOP (0.5m) (°C)	H20 Temp 1.0 m (°C)	H20 Temp 0.5 m from BTM (°C)	Salinity TOP (0.5m) (ppt)	Salinity 1.0 m (ppt)	Salinity 0.5 m from BTM (ppt)	pH Top (0.5m)	pH 1.0 m	pH 0.5 m from BTM	DO TOP (0.5m) (ppm)	DO 1 m (ppm)	DO 0.5 m from BTM (ppm)	Secchi (m)	Depth (m)	Air Temp (°C)	H2O Temp BTM monthly AVG (°C)	Fecal Coliform Bacteria (CFU/100ml)	Enterococci (CFU/100 ml)	Ammonia (NH3) (mg/l)	Nitrate/Nitrite (NO3-NO2) (mg/l)	Total Kjeldahl Nitrogen (TKN) (mg/l)	Organic Nitrogen (N) (mg/l)	Total Nitrogen (mg/l)	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 17	4/5/2010	No samples taken																															
Site 17	4/12/2010	12.42			22.21			8.81			9.41			1.00	1.00	14.70		15	3						0	4	5	6	0	1	0		1
Site 17	4/19/2010																																
Site 17	4/27/2010	12.03			22.29			10.24			7.50			0.50	0.50	14.80		130	150						3	4	5	6	0	4	0		2
Site 17	5/10/2010	11.31			25.51			10.34			7.86			1.10	1.10	11.50		27	12	0.055	0.126	2.47	2.42	2.60	0	1	5	6	1	0	2	8	1
Site 17	5/17/2010																																
Site 17	5/24/2010	17.58			22.60			9.98			6.42				1.20	16.70		520	210						1	4	4	6	0	4	0		3
Site 17	6/1/2010	site not done due to tidal conditions/saline readings suspect																															
Site 17	6/7/2010	20.52			25.70			9.82			5.66			0.60	0.60	19.70		63	8	<.05	<.035	3.64	3.64	3.64	0	2	5	6	0	0	0		1
Site 17	6/14/2010	not done																															
Site 17	6/21/2010	22.95	22.85		26.92	27.20		7.23	7.23		4.08	4.92		1.10	1.30	29.00		640	100						3								
Site 17	6/28/2010																																
Site 17	7/6/2010	site not done due to tidal conditions/saline readings suspect																															
Site 17	7/12/2010	26.70	26.55		28.28	28.36		6.31	6.19		4.36	3.84			1.40	27.70		680	29						0	4	5	6	0	4	0		2
Site 17	7/19/2010	26.30			28.13			5.60			3.22			0.80	1.10	27.20		240	38						3	2	5	6	0	2	0		2
Site 17 **	7/26/2010	26.58			25.28			7.59			3.38			0.50	0.90	25.30		540	39	<.05	0.036	3.35	3.35	3.39	3	4	1	3	0	0	0		1
Site 17	8/2/2010	Sites 15-17 not done due to tidal conditions.																															
Site 17	8/9/2010	25.75		25.65	29.70		29.84	6.43		6.20	5.80		5.90	0.90	1.60	29.40		340	47						0	4	4	6	0	0	1	6	1
Site 17	8/16/2010	Sites 15 & 17 not done due to tidal conditions.																															
Site 17	8/23/2010	Run cancelled due to small craft advisories																															
Site 17	8/30/2010	No samples taken for sites 15 through 17																															
Site 17	9/7/2010	22.84		22.77	29.93		30.14	6.67		6.59	5.76		5.56	0.90	1.50	27.60		190	25						0	4	4	1	0	0	2	6	1
Site 17	9/13/2010	Run cancelled due to inclement weather.																															
Site 17	9/20/2010	20.57			30.11			7.00			7.14			0.90	1.00	18.40		33	3						0	4	3	6	1	0	2	1	1
Site 17	9/27/2010	Run cancelled due to inclement weather.																															
Site 17	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 17	10/12/2010	Run cancelled - no captain.																															
Site 17	10/18/2010	13.34			29.09			7.05			7.57			1.20	1.00	11.70		45							0	2	5	6	0	2	1	8	2
Site 17	11/1/2010	9.75			29.88			7.11			6.79			1.00	1.00	3.70		24	16	0.219	0.185	0.917	0.698	1.100	0	1	5	6	0	0	1	8	1
**	**Effective 7/26/10, used new Quanta**																																

Friends of the Bay 2010 Water Quality Data - **Site 18, Mill Neck Cove**

	Date	H20 Temp TOP (0.5m) (°C)	H20 Temp 1.0 m (°C)	H20 Temp 0.5 m from BTM (°C)	Salinity TOP (0.5m) (ppt)	Salinity 1.0 m (ppt)	Salinity 0.5 m from BTM (ppt)	pH Top (0.5m)	pH 1.0 m	pH 0.5 m from BTM	DO TOP (0.5m) (ppm)	DO 1 m (ppm)	DO 0.5 m from BTM (ppm)	Secchi (m)	Depth (m)	Air Temp (°C)	H2O Temp BTM monthly AVG (°C)	Fecal Coliform Bacteria (CFU/100ml)	Enterococci (CFU/100 ml)	Ammonia (NH3) (mg/l)	Nitrate/Nitrite (NO3-NO2) (mg/l)	Total Kjeldahl Nitrogen (TKN) (mg/l)	Organic Nitrogen (N) (mg/l)	Total Nitrogen (mg/l)	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 18	4/5/2010	10.86	10.78		23.16	23.16		8.68	8.67		15.50	14.80		1.8	1.40	15.00		20	9	<.05	0.214	2.20	2.20	2.41	0	2	4	6	0	0	0		1
Site 18	4/12/2010	11.30	11.83	11.81	23.07	23.13	23.13	8.94	8.94	8.68	10.22	10.17	9.93	1.4	2.40	15.50		1	<2						0	4	5	6	0	1			1
Site 18	4/19/2010													1.1		15.40		5	<1						0	4	3	6	0	3	1	1	2
Site 18	4/27/2010	11.02	11.98	11.96	26.10	26.23	26.30	10.66	10.66	10.66	8.08	8.04	7.97	1.9	2.60	16.30		20	5						3	4		6	0	4	0		2
Site 18	5/10/2010	12.95	12.95	12.85	26.91	26.91	26.90	10.75	10.75	10.74	8.38	8.36	8.34	1.6	2.90	9.90		1	<1	<.050	<.035	3.41	3.41	3.41	0	2	5	6	1	0	1	8	1
Site 18	5/17/2010	15.25			26.35			10.40			7.17			1	1.30	30.20		69	13						0	2	5	6	0	0	0		1
Site 18	5/24/2010	17.04	17.03	16.79	26.96	27.03	27.23	10.52	10.51	10.32	7.76	7.79	7.43	1.4	3.20	15.70		<1	3						1	4	5	6	1	4	1	2	4
Site 18	6/1/2010	site not done due to tidal conditions																															
Site 18	6/7/2010	20.64		20.16	27.90		27.94	10.44		10.30	7.19		6.92	0.9	1.90	24.40		4	1	0.057	<.035	2.48	2.42	2.48	0	2	5	6	0	0	1	7	1
Site 18	6/14/2010	20.42	20.00	19.54	26.89	27.58	27.99	10.08	10.13	10.14	6.51	6.50	6.60	1.1	2.20	19.30	440	125							0	4	4	1	0	4	0	0	3
Site 18	6/21/2010	22.33	21.93	21.64	27.97	28.10	28.22	7.92	7.94	7.87	6.34	6.24	5.87	1.1	3.20	26.30		22	2						3	2	3	6	0	0	1	6	1
Site 18	6/28/2010	25.37	24.93	24.90	27.94	28.07	28.07	8.01	8.01	8.00	6.97	6.81	6.71	1.1	2.10	34.10		56	8						0	4	5	6	2	0	2	6	1
Site 18	7/6/2010	25.60	25.20	25.13	28.97	29.09	29.08	8.24	8.40	8.37	7.70	7.88	7.84	0.7	2.00	34.00		5	5						0	2	2	1	0	0	0		1
Site 18	7/12/2010	24.87	24.83	24.74	29.51	29.50	29.65	6.69	6.69	6.65	5.68	5.60	5.34	1.2	3.20	29.50		33	3						0	4	5	6	0	4	0		2
Site 18	7/19/2010	25.83	25.80	25.76	29.41	29.48	29.55	6.40	6.40	6.30	5.65	5.64	5.00	1.20	2.50	26.80		118	5						3	2	3	1	0	4	0		3
Site 18 **	7/26/2010	25.52	25.46	25.49	26.95	26.95	27.02	7.87	7.84	7.82	5.02	4.97	5.78	1.30	2.70	24.40		76	2	0.124	<.035	2.57	2.45	2.57	3	4	3	6	1	0	1	8	1
Site 18	8/2/2010	25.02		25.04	27.29		27.36	8.01		7.98	5.46		5.23	1.10	1.80	27.30		**Lab Error**	2						0	2	4	6	0	1	1	8	1
Site 18	8/9/2010	25.38	25.39	25.22	30.55	30.55	30.40	6.59	6.55	6.23	6.19	6.08	6.13	1.00	3.30	29.60		8	1						0	4	4	6	0	0	1	7	1
Site 18	8/16/2010	23.79	23.82	23.85	30.55	30.70	30.70	6.47	6.47	6.44	5.56	5.65	5.50	1.30	2.00	24.20		56	22						1	2	5	6	1	4	1	6	3
Site 18	8/23/2010	Run cancelled due to small craft advisories																															
Site 18	8/30/2010	24.00	23.89		30.20	30.26		6.59	6.54		5.35	4.83		0.60	1.40	28.00		4	<1	<.05	0.09	1.00	1.00	1.09	0	4	4	6	0	0	1	8	1
Site 18	9/7/2010	23.33	23.32	23.22	30.96	30.96	30.96	6.92	6.91	6.86	6.86	6.76	6.61	1.60	3.40	26.20		8	<1						0	1	4	1	2	0	2	6	1
Site 18	9/13/2010	Run cancelled due to inclement weather.																															
Site 18	9/20/2010	20.79	20.78	20.74	31.20	31.20	31.20	7.19	7.18	7.15	8.03	7.97	7.78	1.70	3.20	18.40		6	<1						0	1	3	6	2	0	2	2	1
Site 18	9/27/2010	Run cancelled due to inclement weather.																															
Site 18	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 18	10/12/2010	Run cancelled - no captain.																															
Site 18	10/18/2010	14.57	14.64	14.64	30.80	30.87	30.87	7.25	7.25	7.24	7.40	7.48	7.54	1.70	2.90	19.00		21							0	2	5	6	0	0	1	8	1
Site 18	11/1/2010	12.57	12.65	12.70	31.17	31.18	31.18	7.30	7.30	7.31	7.27	7.27	7.26	2.00	2.00	6.30		13	9	0.117	0.169	1.280	1.160	1.450	0	2	5	6	0	0	1	8	1
**	**Effective 7/26/10, used new Quanta**																																

Friends of the Bay 2010 Water Quality Data - **Site 19, Flowers Oyster Hatchery**

	Date	H20 Temp TOP (0.5m) (°C)	H20 Temp 1.0 m (°C)	H20 Temp 0.5 m from BTM (°C)	Salinity TOP (0.5m) (ppt)	Salinity 1.0 m (ppt)	Salinity 0.5 m from BTM (ppt)	pH Top (0.5m)	pH 1.0 m	pH 0.5 m from BTM	DO TOP (0.5m) (ppm)	DO 1 m (ppm)	DO 0.5 m from BTM (ppm)	Secchi (m)	Depth (m)	Air Temp (°C)	H2O Temp BTM monthly AVG (°C)	Fecal Coliform Bacteria (CFU/100ml)	Enterococci (CFU/100 ml)	Ammonia (NH3) (mg/l)	Nitrate/Nitrite (NO3-NO2) (mg/l)	Total Kjeldahl Nitrogen (TKN) (mg/l)	Organic Nitrogen (N) (mg/l)	Total Nitrogen (mg/l)	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 19	4/5/2010	11.90	11.72	11.20	22.40	27.79	23.10	8.74	8.75	8.72	11.47	11.42	10.40	1.20	3.00	18.00		2	<1	<.05	0.044	1.90	1.90	1.94	0	2	5	6	1	1	2	4	1
Site 19	4/12/2010	12.06	12.00	11.83	23.01	23.07	23.07	8.94	8.94	8.94	10.16	10.14	9.83		4.30	15.60		5	5						0	4	5	6	0	1	0		1
Site 19	4/19/2010													0.90				16	5						0	4	3	6	1	3	1	1	2
Site 19	4/27/2010	12.00	12.01	11.93	26.03	26.10	26.30	10.64	10.65	10.65	8.06	8.11	8.05	1.70	4.00	16.80		15	23						3	4	5	6	0	4	0		2
Site 19	5/10/2010	12.85			26.93			10.65			8.60					10.00		2	<1	<.05	<.035	2.72	2.72	2.72	0	2	5	6	1	0	2	8	1
Site 19	5/17/2010	15.78	15.69	15.06	26.24	26.53	26.73	10.12	10.13	10.45	7.50	7.51	7.34	1.70	3.30	30.80		86	13						0	2	5	6	0	0	0		1
Site 19	5/24/2010	17.03	16.95	16.91	26.96	27.03	27.09	10.53	10.53	10.39	7.78	7.77	7.57	1.50	4.50	15.90		10	4						1	4	5	6	1	4	1	2	4
Site 19	6/1/2010	21.56	21.46	20.83	26.59	26.58	27.12	10.48	10.47	10.38	7.57	7.27	6.17	1.00	3.30	30.20		20	7						0	2	5	6	0	2	1	5	2
Site 19	6/7/2010	21.28	21.25	19.92	27.64	27.57	27.93	10.48	10.46	10.32	7.52	7.35	6.90	1.10	4.40	23.10		8	<1	<.05	<.035	1.59	1.59	1.59	0	2	5	6	0	0	1	7	1
Site 19	6/14/2010	20.10	19.95	19.67	27.51	27.65	27.85	10.06	10.08	10.09	6.45	6.53	6.56	1.10	4.00	20.80		160	84						0	4	4	1	0	4	0	0	3
Site 19	6/21/2010	22.14	22.25	21.43	28.10	28.10	28.29	7.87	7.90	7.90	6.18	6.29	6.02	1.50	4.50	24.60		34	2						3	2	3	6	0	0	1		1
Site 19	6/28/2010	25.04	24.97	24.74	27.37	28.00	28.17	7.90	7.92	7.90	6.53	6.45	7.07	1.10	2.80	32.50		59	13						0	4	4	6	2	1	1	8	1
Site 19	7/6/2010	26.24	25.98	25.00	28.92	28.85	29.09	8.44	8.44	8.30	8.67	8.78	6.67	0.70	4.30	35.60		11	<1														
Site 19	7/12/2010	25.26	25.19	24.82	29.46	29.46	29.51	6.60	6.62	6.60	5.52	5.47	5.44	1.10		30.80		48	12						0	4	5	6	0	4	0		2
Site 19	7/19/2010	Sites 1-12 & 19 not done due to dangerous weather. Heavy downpours, funnel cloud observed forming over Bayville. *Sample contaminated with rainwater.																															
Site 19 **	7/26/2010	25.49	25.56	25.36	26.74	26.74	27.02	7.88	7.87	7.83	5.72	5.53	4.74	1.30	5.20	25.10		130	8	<.05	<.035	3.40	3.40	3.40	3	4	3	6	0	0	1	8	1
Site 19	8/2/2010	25.07	25.04	25.03	27.36	27.36	27.36	8.03	8.03	8.02	5.77	6.19	5.57	1.10	4.10	25.50		**Lab Error**	6						0	2	4	6	0	1	1	8	1
Site 19	8/9/2010	25.45	25.42	25.24	30.48	30.48	30.47	6.60	6.60	6.55	6.19	6.11	5.95	1.10	5.60	30.70		17	1						0	4	4	6	0	0	1	7	1
Site 19	8/16/2010	23.87	23.87	23.87	30.41	30.41	30.77	6.55	6.51	6.90	5.50	5.61	5.64	1.30	3.90	24.60		100	22						1	2	5	6	0	4	1	6	3
Site 19	8/23/2010	Run cancelled due to small craft advisories																															
Site 19	8/30/2010	23.50	23.46	23.31	30.25	30.25	30.60	6.58	6.58	6.48	5.35	5.17	4.57	0.80	3.80	29.00		16	9	<.05	0.088	1.10	1.10	1.18	0	4	5	6	1	0	1	8	1
Site 19	9/7/2010	23.26	23.21	23.25	30.89	30.89	30.96	6.90	6.89	6.86	6.75	6.71	6.65	1.70	6.00	26.20		5	<1						0	1	4	1	2	0	2	6	1
Site 19	9/13/2010	Run cancelled due to inclement weather.																															
Site 19	9/20/2010	20.80	20.79	20.77	31.13	31.20	31.20	7.19	7.20	7.18	8.06	8.07	7.89	1.60	4.00	18.30		11	1						0	1	3	6	2	0	2	8	1
Site 19	9/27/2010	Run cancelled due to inclement weather.																															
Site 19	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site 19	10/12/2010	Run cancelled - no captain.																															
Site 19	10/18/2010	14.54	14.54	14.59	30.80	30.80	30.87	7.24	7.24	7.23	7.36	7.43	7.47	2.20	4.30	15.00		44							0	2	5	6	1	1	2	8	1
Site 19	11/1/2010	12.60	12.62	12.70	31.11	31.11	31.19	7.32	7.31	7.31	7.42	7.38	7.39	1.50	3.80	4.30		8	7	0.157	0.165	1.140	0.981	1.300	0	2	5	6	0	0	1	8	1

** **Effective 7/26/10, used new Quanta**

Friends of the Bay 2010 Water Quality Data - **Laurel Hollow LH1, Flowers Oyster Hatchery**

	Date	H20 Temp TOP (0.5m) (°C)	H20 Temp 1.0 m (°C)	H20 Temp 0.5 m from BTM (°C)	Salinity TOP (0.5m) (ppt)	Salinity 1.0 m (ppt)	Salinity 0.5 m from BTM (ppt)	pH Top (0.5m)	pH 1.0 m	pH 0.5 m from BTM	DO TOP (0.5m) (ppm)	DO 1 m (ppm)	DO 0.5 m from BTM (ppm)	Secchi (m)	Depth (m)	Air Temp (°C)	H2O Temp BTM monthly AVG (°C)	Fecal Coliform Bacteria (CFU/100ml)	Enterococci (CFU/100 ml)	Ammonia (NH3) (mg/l)	Nitrate/Nitrite (NO3-NO2) (mg/l)	Total Kjeldahl Nitrogen (TKN) (mg/l)	Organic Nitrogen (N) (mg/l)	Total Nitrogen (mg/l)	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site LH1																																	
Site LH1																																	
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Site LH1	**On 7/19/10: Additional Sampling done for Nassau County - Laurel Hollow.**																																
Site LH1																																	
Site LH1																																	
Site LH1	7/19/2010	25.60	25.45	24.50	29.83	29.90	30.02	6.70	6.67	6.60	7.40	7.45	6.50	1.60	3.50	22.60		5	<1						3	2	5	6	1	4	0	1	3
Site LH1 *	7/26/2010	26.25	26.06	23.77	26.77	27.05	27.10	8.91	8.11	7.50	4.38	6.01	3.07	1.30	4.20	22.70		43	2						3	4	5	6	1	0	1	8	1
Site LH1	8/2/2010	23.46	23.65	21.46	27.53	27.95	28.29	8.11	8.09	7.66	5.01	3.59	5.50	1.50	4.30	25.60		Lab Error	<1						0	2	4	6	0	1	1	4	1
Site LH1	8/9/2010	24.16	24.01	23.35	30.85	31.00	31.18	6.62	6.51	6.25	5.23	4.66	3.84	1.10	4.30	27.10		17	4						0	4	5	6	0	0	1	6	1
Site LH1	8/16/2010	22.88	22.75	22.65	31.23	31.44	31.44	6.65	6.51	6.37	5.01	3.52	3.59	1.30	3.60	26.40		15	<1						1	2	5	6	0	4	0	6	3
Site LH1	8/23/2010	Run cancelled due to small craft advisories																															
Site LH1	8/30/2010	23.18	23.11	22.62	30.09	30.73	31.22	6.40	6.49	6.03	6.69	5.20	3.53	1.20	3.30	25.30		13	2						0	2	4	6	0	0	0		1
Site LH1	9/7/2010	22.82	22.84	23.28	30.79	30.94	31.32	6.87	6.85	6.76	5.95	5.74	5.58	1.80	5.20	23.20		4	1						0	4	4	1	0	0	1	6	1
Site LH1	9/13/2010	Run cancelled due to inclement weather.																															
Site LH1	9/20/2010	Run cancelled due to inclement weather.																															
Site LH1	9/27/2010	Run cancelled due to inclement weather.																															
Site LH1	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site LH1	10/12/2010	Run cancelled - no captain.																															
**	**Effective 7/26/10, used new Quanta**																																

	Friends of the Bay 2010 Water Quality Data - **Laurel Hollow LH2, Flowers Oyster Hatchery**																																
	Date	**H20 Temp TOP (0.5m) (°C)**	**H20 Temp 1.0 m (°C)**	**H20 Temp 0.5 m from BTM (°C)**	**Salinity TOP (0.5m) (ppt)**	**Salinity 1.0 m (ppt)**	**Salinity 0.5 m from BTM (ppt)**	**pH Top (0.5m)**	**pH 1.0 m**	**pH 0.5 m from BTM**	**DO TOP (0.5m) (ppm)**	**DO 1 m (ppm)**	**DO 0.5 m from BTM (ppm)**	**Secchi (m)**	**Depth (m)**	**Air Temp (°C)**	**H2O Temp BTM monthly AVG (°C)**	**Fecal Coliform Bacteria (CFU/100ml)**	**Enterococci (CFU/100 ml)**	**Ammonia (NH3) (mg/l)**	**Nitrate/Nitrite (NO3-NO2) (mg/l)**	**Total Kjeldahl Nitrogen (TKN) (mg/l)**	**Organic Nitrogen (N) (mg/l)**	**Total Nitrogen (mg/l)**	**Rainfall in 24 hours**	**Tidal Stage**	**Water Color**	**Surface Conditions**	**Wave Height**	**Cloud Cover**	**Wind Speed**	**Wind Direction**	**Weather**
Site LH2																																	
Site LH2																																	
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Site LH2																																	
Site LH2																																	
Site LH2																																	
Site LH2																																	
Site LH2																																	
Site LH2																																	
Site LH2	**On 7/19/10: Additional Sampling done for Nassau County - Laurel Hollow.**																																
Site LH2																																	
Site LH2																																	
Site LH2	7/19/2010	25.55	25.51	24.68	29.54	29.54	30.01	6.74	6.71	6.50	7.70	7.30	5.85	1.30	3.50	22.40		14	<1						3	2	5	1	2	4	2	1	4
Site LH2 *	7/26/2010	26.02	26.07	24.87	26.76	27.05	27.43	8.12	8.14	7.73	4.71	5.60	4.75	1.30	3.90	23.40		44	2						3	4	5	6	1	0	1	8	1
Site LH2	8/2/2010	22.91	23.54	22.23	27.60	27.77	27.98	8.03	7.94	7.72	4.54	3.52	4.97	1.40	3.30	25.50		**Lab Error**	<1														
Site LH2	8/9/2010	24.09	23.97	23.55	30.85	31.00	31.12	6.55	6.52	6.32	5.34	4.54	3.72	1.20	3.70	26.70		13	3						0	4	5	6	0	0	1	6	1
Site LH2	8/16/2010	22.75	22.76	22.70	31.30	31.44	31.44	6.52	6.55	6.39	5.61	3.89	3.55	1.40	3.00	27.30		22	2						1	2	5	6	0	4	1	6	3
Site LH2	8/23/2010	Run cancelled due to small craft advisories																															
Site LH2	8/30/2010	23.40	23.24	22.84	30.82	31.03	31.16	6.87	6.68	6.37	6.55	5.29	3.57	1.40	2.50	25.30		2	1						0	2	4	6	0	0	0		1
Site LH2	9/7/2010	23.68	23.01	23.05	30.65	31.02	31.02	6.86	6.85	6.79	5.84	5.74	5.74	1.90	3.60	23.10		**No Sample**	**No Sample**						0	4	4	1	0	0	0		1
Site LH2	9/13/2010	Run cancelled due to inclement weather.																															
Site LH2	9/20/2010	Run cancelled due to inclement weather.																															
Site LH2	9/27/2010	Run cancelled due to inclement weather.																															
Site LH2	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site LH2	10/12/2010	Run cancelled - no captain.																															
**	**Effective 7/26/10, used new Quanta**																																

	Friends of the Bay 2010 Water Quality Data - **Laurel Hollow LH3, Flowers Oyster Hatchery**																																
	Date	**H20 Temp TOP (0.5m) (°C)**	**H20 Temp 1.0 m (°C)**	**H20 Temp 0.5 m from BTM (°C)**	**Salinity TOP (0.5m) (ppt)**	**Salinity 1.0 m (ppt)**	**Salinity 0.5 m from BTM (ppt)**	**pH Top (0.5m)**	**pH 1.0 m**	**pH 0.5 m from BTM**	**DO TOP (0.5m) (ppm)**	**DO 1 m (ppm)**	**DO 0.5 m from BTM (ppm)**	**Secchi (m)**	**Depth (m)**	**Air Temp (°C)**	**H2O Temp BTM monthly AVG (°C)**	**Fecal Coliform Bacteria (CFU/100ml)**	**Enterococci (CFU/100 ml)**	**Ammonia (NH3) (mg/l)**	**Nitrate/Nitrite (NO3-NO2) (mg/l)**	**Total Kjeldahl Nitrogen (TKN) (mg/l)**	**Organic Nitrogen (N) (mg/l)**	**Total Nitrogen (mg/l)**	**Rainfall in 24 hours**	**Tidal Stage**	**Water Color**	**Surface Conditions**	**Wave Height**	**Cloud Cover**	**Wind Speed**	**Wind Direction**	**Weather**
Site LH3																																	
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Site LH3																																	
Site LH3																																	
Site LH3																																	
Site LH3																																	
Site LH3																																	
Site LH3	**On 7/19/10: Additional Sampling done for Nassau County - Laurel Hollow.**																																
Site LH3																																	
Site LH3																																	
Site LH3	7/19/2010	25.47	25.47	24.58	29.47	29.47	30.01	6.74	6.73	6.53	7.67	7.30	5.65	1.50	3.40	22.40		13	<1						3	2	5	1	2	4	2	1	4
Site LH3 *	7/26/2010	26.21	26.29	26.07	26.72	27.05	27.12	8.16	8.16	7.99	5.98	6.03	4.36	1.50	2.60	24.20		39	2						3	4	5	6	1	0	1	8	1
Site LH3	8/2/2010	23.70	23.61	22.74	27.66	27.64	27.84	8.06	7.88	7.80	4.62	4.37	3.22	1.40	3.00	25.40		**Lab Error**	1						0	2	5	6	0	1	1	4	1
Site LH3	8/9/2010	24.18	24.04	23.31	30.86	31.07	31.21	6.70	6.62	6.30	5.32	4.75	5.16	1.20	4.20	28.30		11	1						0	4	6	0	0	0	1	6	1
Site LH3	8/16/2010	22.95	22.73	22.70	31.38	31.37	31.40	6.68	6.59	6.37	4.98	3.59	3.33	1.30	3.70	28.50		3	<1						1	2	5	6	0	4	0	0	3
Site LH3	8/23/2010	Run cancelled due to small craft advisories																															
Site LH3	8/30/2010	23.23	23.10	22.66	30.67	31.03	31.22	6.92	6.70	6.44	6.72	4.93	4.15	1.10	3.50	23.00		14	<1						0	2	4	6	0	0	0		1
Site LH3	9/7/2010	22.87	22.94	23.25	30.95	30.94	31.25	6.88	6.88	6.72	5.95	5.85	5.73	1.90	4.10	23.90		**No Sample**	**No Sample**						0	4	4	1	0	0	1	6	1
Site LH3	9/13/2010	Run cancelled due to inclement weather.																															
Site LH3	9/20/2010	Run cancelled due to inclement weather.																															
Site LH3	9/27/2010	Run cancelled due to inclement weather.																															
Site LH3	10/4/2010	Run cancelled due to wind and rain; small craft advisory.																															
Site LH3	10/12/2010	Run cancelled - no captain.																															
**	**Effective 7/26/10, used new Quanta**																																

Appendix F

Stream and Outfall Monitoring Program Data and Preliminary Plots

FUSS & O'NEILL

Friends of the Bay Stream and Outfall Water Quality Monitoring Results

GENERAL							QUALITATIVE				FIELD PARAMETERS					BACTERIA		NUTRIENTS				PHYSICAL				METALS							QA/QC		HARDNESS - DEPENDENT STANDARD						NOTE
Sample ID	Location Description	Sampling Round	Wet or Dry Weather Event	Event Precipitation	Sample Collection Date	Sample Collection Time (Field Data Sheet)	Odor (0-3)	Color (0-3)	Particulate (0-3)	Floatables (0-3)	D.O., mg/L	Spec. Cond. (mS/cm)	pH	Temperature, °C	Estimated Flow Rate (cfs)	E. Coli, /100 mls.	Fecal Coliform, /100 mls.	Ammonia as N, mg/L	Nitrate as N, mg/L	TKN, mg/L	Phosphorus as P, mg/L	BOD, mg/L	COD, mg/L	TSS, mg/L	Turbidity, NTU	Hardness as CaCO3, mg/L	Lead, mg/L	Copper, mg/L	Zinc, mg/L	Magnesium, mg/L	Calcium, mg/L	Alkalinity as CaCO3, mg/L	D.O., mg/L	D.O. RPD (%)	Lead, mg/L EPA CMC (acute)	Lead, mg/L EPA CCC (chronic)	Copper, mg/L EPA CMC (acute)	Copper, mg/L EPA CCC (chronic)	Zinc, mg/L EPA CMC (acute)	Zinc, mg/L EPA CCC (chronic)	
Standard 6 NYCRR 703											4	780	6.5 - 8.5	32.2	-	-	-	TABLE	10 mg/L	10 mg/L - Nitrate	-	-	-	-	-	-	CALC	CALC	CALC	-	-	-									
Sample											8															30.00							6.5	20.7	0.0256	0.0010	0.0043	0.0032	0.0422	0.0297	
OBS-1	The Birches		dry		4/7/2010	1:15 PM	2				7.36	0.000	6.820	15.06	trickle	5	6	0.872	6.5	2.03			30.4	<10.0		132	<0.040	<0.004	<0.20						0.1312	0.0051	0.0175	0.0114	0.1483	0.1046	
OBS-2	Beaver Lake		dry		4/7/2010	12:50 PM		2	2		10.99	0.226	9.340	20.20	heavy	10	7	<0.050	0.697	1.15			20.8	11		49.6	<0.040	<0.004	<0.020						0.0449	0.0018	0.0069	0.0049	0.0647	0.0455	
OBS-3	Beekman Creek		dry		4/7/2010	2:05 PM					8.52	0.176	7.250	17.00	heavy	14	10	<0.050	2.85	0.326			10.8	<10.0		52.2	<0.040	<0.004	<0.020						0.0475	0.0019	0.0073	0.0051	0.0676	0.0476	
OBS-4	Mill River Headwaters		dry		4/7/2010	12:05 PM				1	8.40	0.229	6.740	14.49	moderate	270	145	0.06	2.57	<0.300			12.3	<10.0		57.8	<0.040	<0.004	<0.020						0.0532	0.0021	0.0080	0.0056	0.0736	0.0519	
OBS-5	Mill River Outlow		dry		4/7/2010	11:20 PM		1			8.50	0.297	7.460	16.27	heavy	47	3	0.111	1.39	0.459			20.6	<10.0		58.3	<0.040	<0.004	<0.020						0.0537	0.0021	0.0081	0.0056	0.0742	0.0522	
OBS-6	White's Creek		dry		4/7/2010	10:50 AM	2			2	10.15	1.300	7.700	13.59	dry	550	23	0.051	3.76	0.969			22.9	15		295.0	<0.040	0.006	0.031						0.3082	0.0120	0.0372	0.0226	0.2930	0.2073	
OBS-7	Tiffany Creek		dry		4/7/2010	10:30 AM					8.61	0.166	7.170	12.96	trickle	11	35	0.072	1.27	0.499			21.9	<10.0		43.9	<0.040	<0.004	<0.020						0.0392	0.0015	0.0062	0.0044	0.0583	0.0410	
OBS-8	DeForest Pond		dry		4/7/2010	9:35 AM				2	1.81	0.453	6.510	11.85	moderate	2	7	0.104	0.183	25.5			41.5	860		106.0	0.168	0.038	0.286						0.1035	0.0040	0.0142	0.0094	0.1231	0.0868	
OBS-9	St. John's Pond		dry		4/7/2010	10:00 AM					10.45	0.161	7.630	15.40	heavy	2	<1	0.06	0.864	0.559			26.1	<10.0		25.1	<0.040	<0.004	<0.020						0.0210	0.0008	0.0037	0.0027	0.0363	0.0255	
OBS-10	Rotating - Brown's Pond		dry		4/7/2010	12:20 PM				1	8.49	0.478	7.380	7.38	moderate	<1	<1	0.539	2.85	1.07			10.2	<10.0		68.8	<0.040	<0.004	<0.020						0.0645	0.0025	0.0094	0.0065	0.0854	0.0601	
Field Duplicate																																									
Reporting Limit																																									
Standard Reported																																									

X - sample cracked

Friends of the Bay Stream and Outfall Water Quality Monitoring Results

GENERAL							QUALITATIVE				FIELD PARAMETERS					BACTERIA		NUTRIENTS				PHYSICAL				METALS							QA/QC		HARDNESS - DEPENDENT STANDARD						NOTE
Sample ID	Location Description	Sampling Round	Wet or Dry Weather Event	Event Precipitation	Sample Collection Date	Sample Collection Time (Field Data Sheet)	Odor (0-3)	Color (0-3)	Particulate (0-3)	Floatables (0-3)	D.O., mg/L	Spec. Cond. (mS/cm)	pH	Temperature, °C	Estimated Flow Rate (cfs)	E. Coli, /100 mls.	Fecal Coliform, /100 mls.	Ammonia as N, mg/L	Nitrate as N, mg/L	TKN, mg/L	Phosphorus as P, mg/L	BOD, mg/L	COD, mg/L	TSS, mg/L	Turbidity, NTU	Hardness as CaCO3, mg/L	Lead, mg/L	Copper, mg/L	Zinc, mg/L	Magnesium, mg/L	Calcium, mg/L	Alkalinity as CaCO3, mg/L	D.O., mg/L	D.O. RPD (%)	Lead, mg/L EPA CMC (acute)	Lead, mg/L EPA CCC (chronic)	Copper, mg/L EPA CMC (acute)	Copper, mg/L EPA CCC (chronic)	Zinc, mg/L EPA CMC (acute)	Zinc, mg/L EPA CCC (chronic)	
Standard 6 NYCRR 703											4	780	6.5 - 8.5	32.2	-	-	-	TABLE	10 mg/L	10 mg/L - Nitrate	-	-	-	-	-	-	CALC	CALC	CALC	-	-	-									
Sample											8															30.00							6.5	20.7	0.0256	0.0010	0.0043	0.0032	0.0422	0.0297	
OBS-1	The Birches		dry		6/24/2010		1	0	0	0	6.01	0.721	6.720	19.66		3600	1500	1.83	4.85	3.44						111	<.040	0.041	0.058												
OBS-2	Beaver Lake		dry		6/24/2010		0	0	0	0	10.11	1.219	8.231	27.86		50	10	0.051	0.468	1.91						50	<.040	<.004	<.020												
OBS-3	Beekman Creek		dry		6/24/2010		0	0	0	0	9.26	0.201	6.630	14.89		62	270	<.050	3.01	0.5						53	<.040	<.004	<.020												
OBS-4	Mill River Headwaters		dry		6/24/2010		0	0	0	0	8.55	0.255	6.630	15.54		109	182	0.735	2.89	0.46						55	<.040	<.004	<.020												
OBS-5	Mill River Outlow		dry		6/24/2010		0	0	0	0	8.16	0.262	6.990	23.74				<.050	1.12	0.69						50.0	<.040	<.004	<.020												
OBS-6	White's Creek		dry		6/24/2010		0	0	0	0	7.25	24.600	6.950	19.79		6000	473	<.050	2.17	0.69						2620.0	<.040	<.006	<.020												
OBS-7	Tiffany Creek		dry		6/24/2010		0	0	0	0	6.54	0.176	7.060	22.40				<.050	1.15	0.33						62.0	<.040	<.004	<.020												
OBS-8	DeForest Pond		dry		6/24/2010		0	0	0	0	2.13	0.269	6.890	20.99		3400	4300	0.395	67	0.61						67.0	<.040	<.004	<.020												
OBS-9	St. John's Pond		dry		6/24/2010																																				
OBS-10	Rotating - Brown's Pond		dry		6/24/2010		0	0	0	0	5.51	0.547	6.830	23.25		41	40	0.452	1.89	0.63						65.0	<.040	<.004	<.020												
Field Duplicate																																									
Reporting Limit																																									
Standard Reported																																									

X - sample cracked

FUSS & O'NEILL

Friends of the Bay Stream and Outfall Water Quality Monitoring Results

GENERAL							QUALITATIVE				FIELD PARAMETERS					BACTERIA		NUTRIENTS				PHYSICAL				METALS							QA/QC		HARDNESS - DEPENDENT STANDARD						NOTE
Sample ID	Location Description	Sampling Round	Wet or Dry Weather Event	Event Precipitation	Sample Collection Date	Sample Collection Time (Field Data Sheet)	Odor (0-3)	Color (0-3)	Particulate (0-3)	Floatables (0-3)	D.O., mg/L	Spec. Cond. (mS/cm)	pH	Temperature, °C	Estimated Flow Rate (cfs)	E. Coli, /100 mls.	Fecal Coliform, /100 mls.	Ammonia as N, mg/L	Nitrate as N, mg/L	TKN, mg/L	Phosphorus as P, mg/L	BOD, mg/L	COD, mg/L	TSS, mg/L	Turbidity, NTU	Hardness as CaCO3, mg/L	Lead, mg/L	Copper, mg/L	Zinc, mg/L	Magnesium, mg/L	Calcium, mg/L	Alkalinity as CaCO3, mg/L	D.O., mg/L	D.O. RPD (%)	Lead, mg/L EPA CMC (acute)	Lead, mg/L EPA CCC (chronic)	Copper, mg/L EPA CMC (acute)	Copper, mg/L EPA CCC (chronic)	Zinc, mg/L EPA CMC (acute)	Zinc, mg/L EPA CCC (chronic)	
Standard 6 NYCRR 703											4	780	6.5 - 8.5	32.2	-	-	-	TABLE	10 mg/L	10 mg/L - Nitrate	-	-	-	-	-	-	CALC	CALC	CALC	-	-	-									
Sample											8															30.00							6.5	20.7	0.0256	0.0010	0.0043	0.0032	0.0422	0.0297	
OBS-1	The Birches		dry		12/13/2010		2	3	3	0	6.15	0.555	6.810	10.60		145	290	1.82	4.32	2.17						126	<.040	0.006	<.020												
OBS-2	Beaver Lake		dry		12/13/2010		0	1	0	0	10.66	0.162	7.240	4.80		430	3700	0.166	1.28	0.541						48	<.020	<.004	<.020												
OBS-3	Beekman Creek		dry		12/13/2010		0	0	0	0	9.76	0.196	7.250	9.57		46	84	0.117	2.73	1.83						60	<.040	<.004	<.020												
OBS-4	Mill River Headwaters		dry		12/13/2010		0	0	0	0	10.14	0.212	6.920	7.35		51	609	0.095	2.17	<.300						60	<.040	<.004	<.020												
OBS-5	Mill River Outlow		dry		12/13/2010		0	0	0	0	10.87	0.214	7.240	7.85		410	3600	0.352	1.35	0.668						54.0	<.040	<.004	<.020												
OBS-6	White's Creek		dry		12/13/2010		0	0	0		9.19	0.166	7.040	11.09		390	927	0.19	3.83	<.300						118.0	<.040	0.004	<.020												
OBS-7	Tiffany Creek		dry		12/13/2010		0	0	0	0	10.02	0.146	7.110	7.55		81	723	0.127	1	0.466						44.0	<.040	<.004	<.020												
OBS-8	DeForest Pond		dry		12/13/2010		0	0			7.19	0.281	6.660	7.62		97	1300	0.225	3.39	2.11						54.0	<.040	<.004	0.036												
OBS-9	St. John's Pond		dry		12/13/2010		0	0	0	0	11.68	0.146	7.520	3.73		100	44	0.138	1.37	<.300						34.0	<.040	<.004	0.042												
OBS-10	Rotating - Brown's Pond		dry		12/13/2010																																				
Field Duplicate																																									
Reporting Limit																																									
Standard Reported																																									

X - sample cracked

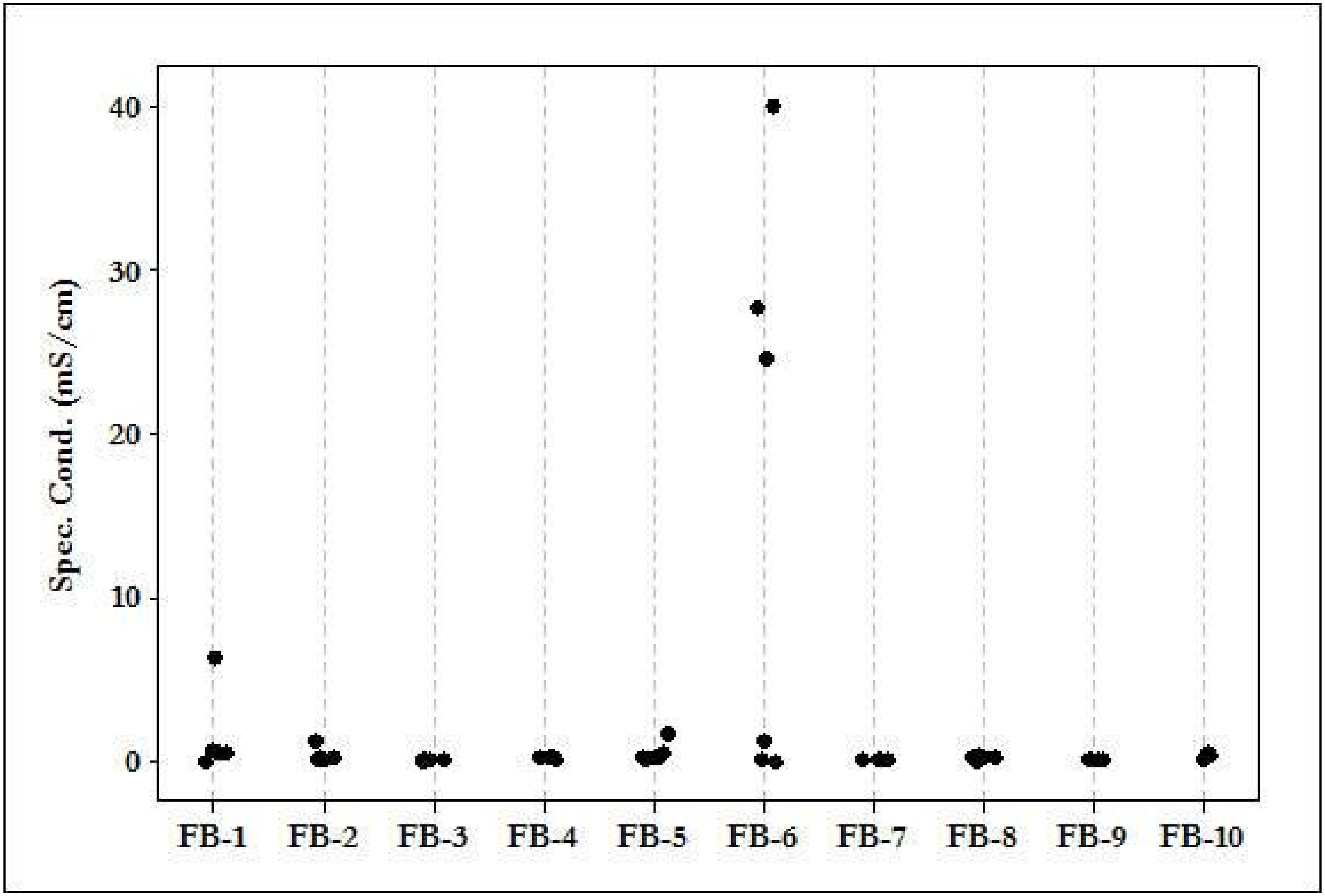

Figure 1. Specific Conductivity locational plot for all monitoring locations, 2007-2010.

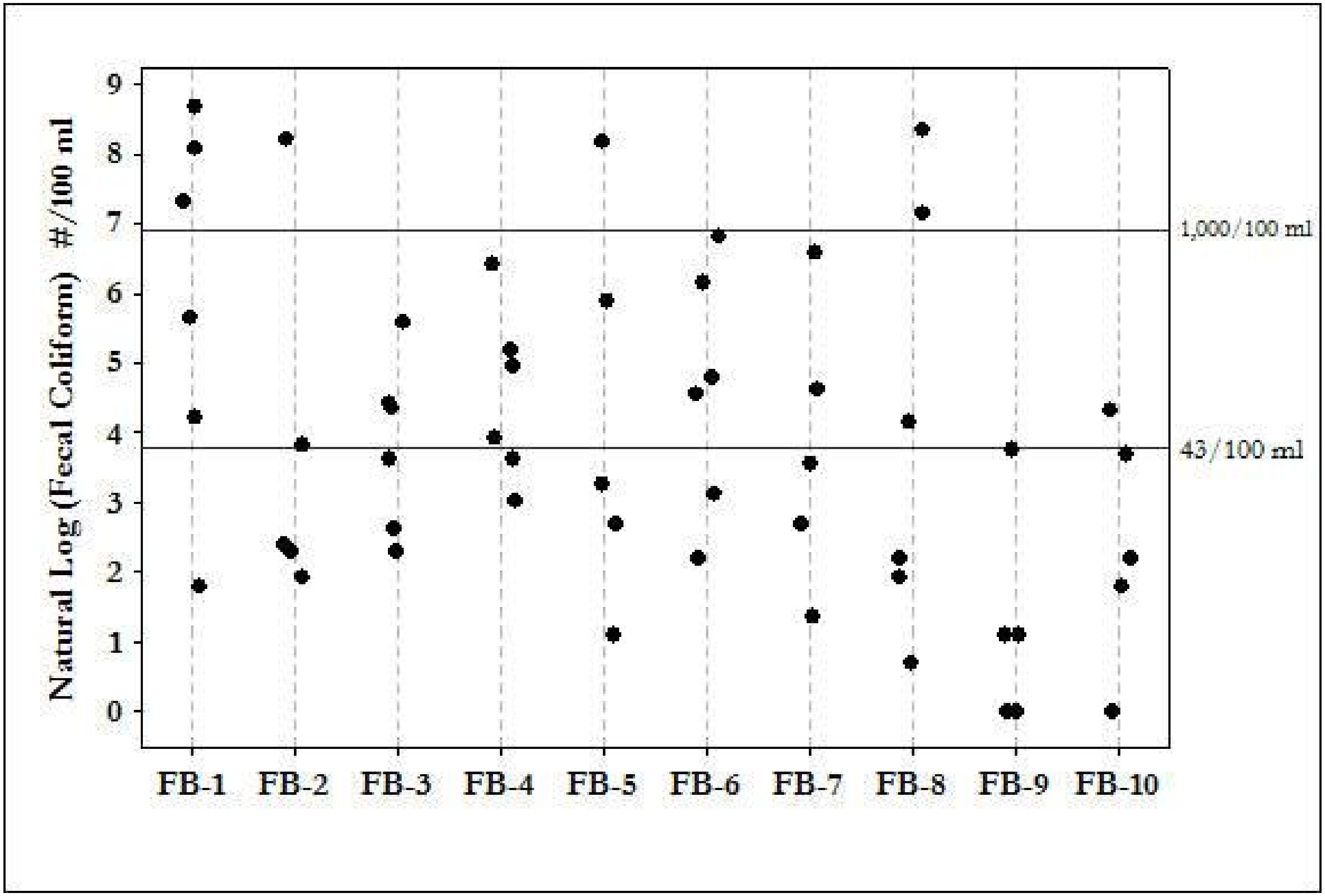

Figure 2. Fecal Coliform locational plot for all monitoring locations, 2007-2010.
(NYS Standards for Individual Samples: Shellfish = 43 MPN/100 mL; Swimming = 1,000 MPN/100 mL)

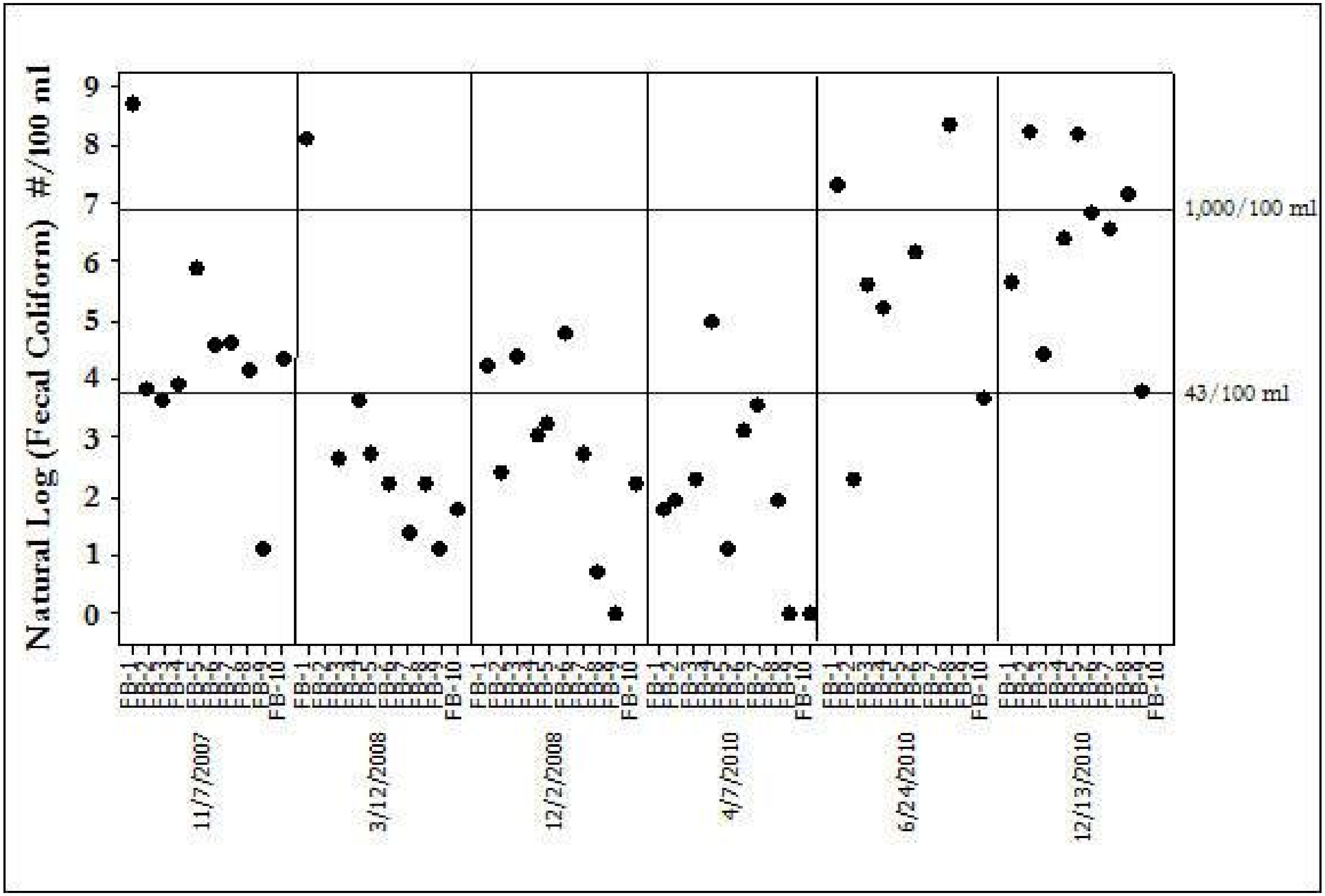

Figure 3. Fecal Coliform time series plot for all monitoring locations, 2007-2010.
(NYS Standards for Individual Samples: Shellfish = 43 MPN / 100 mL; Swimming = 1,000 MPN / 100 mL)

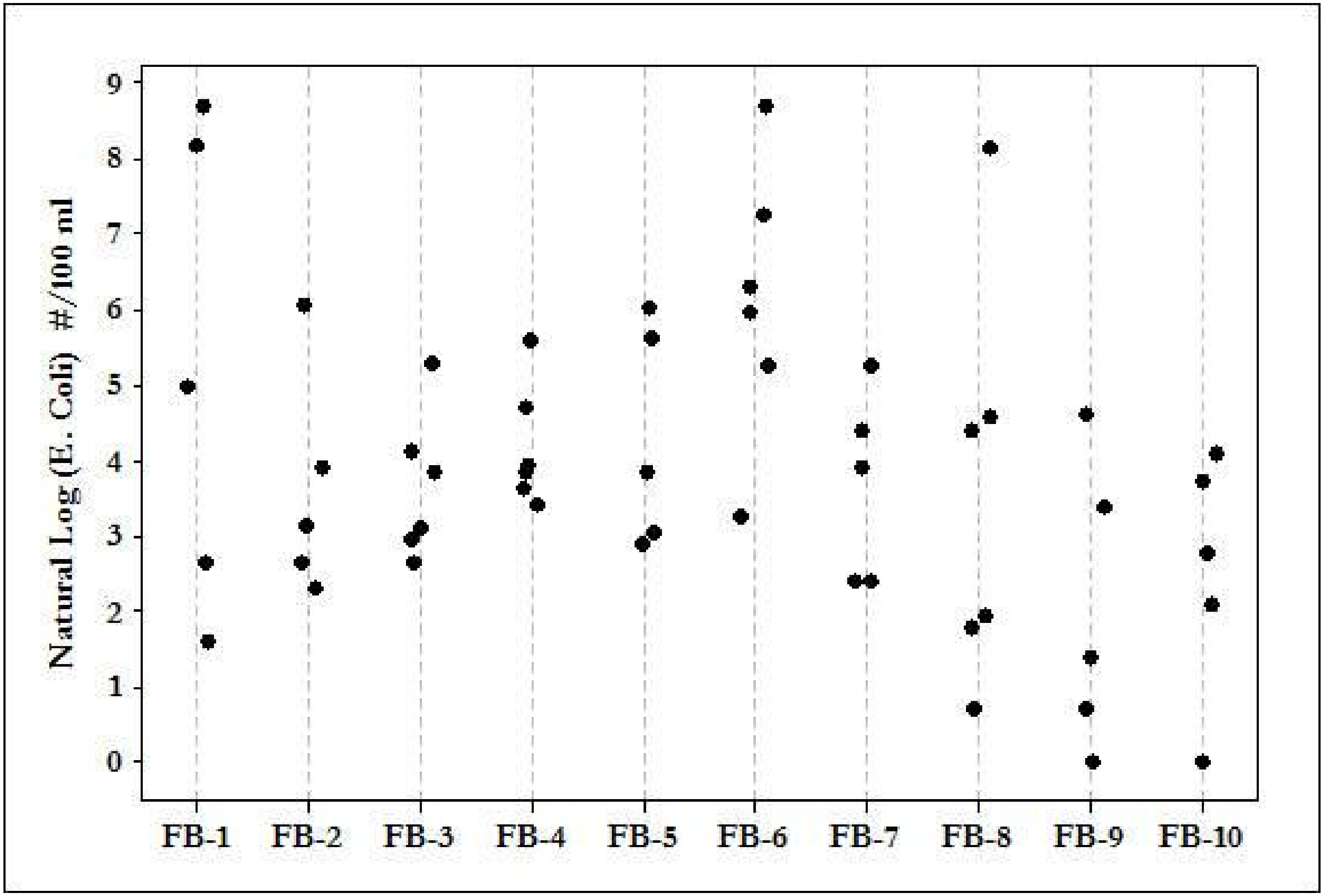

Figure 4. E. Coli locational plot for all monitoring locations, 2007-2010.

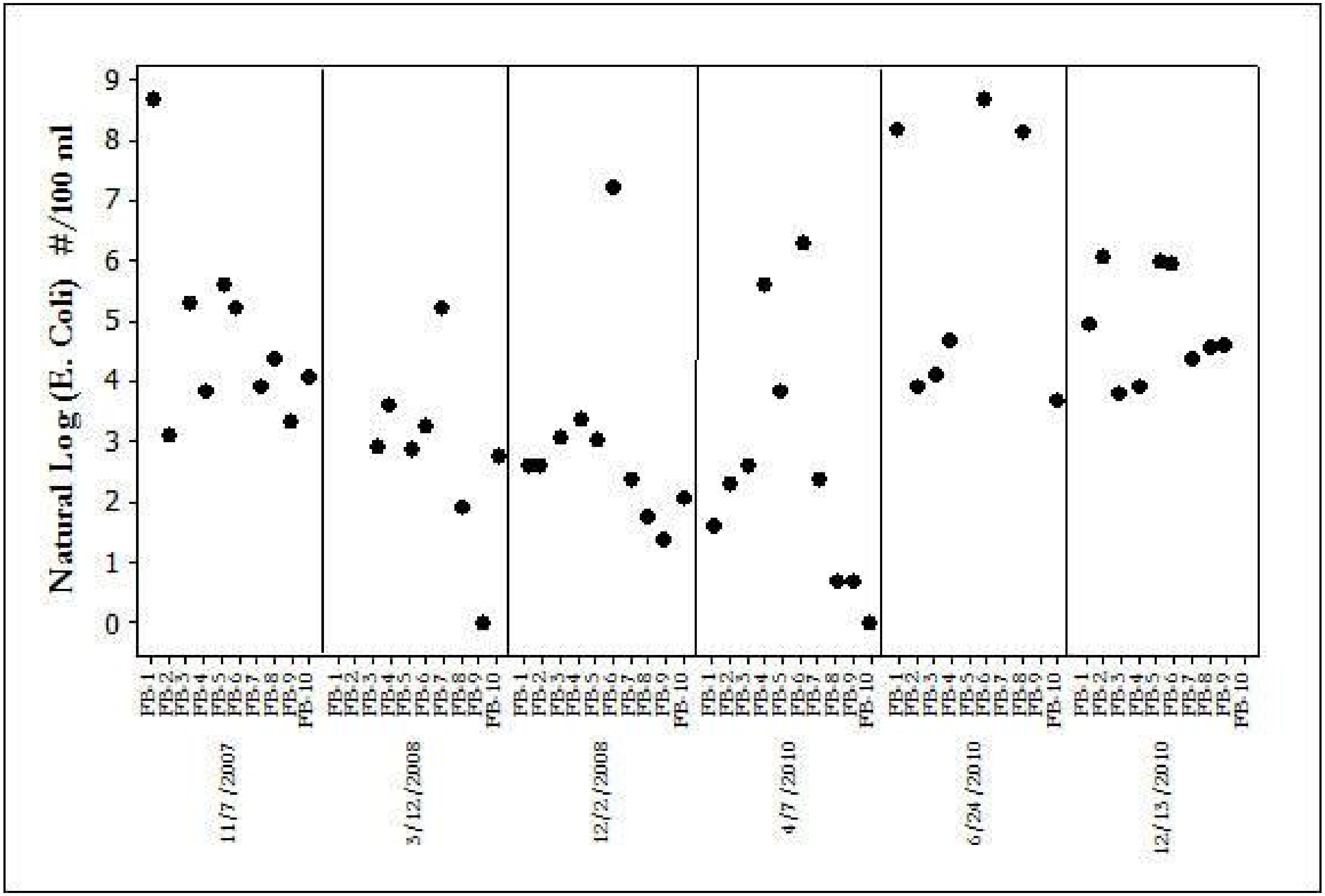

Figure 5. E. Coli time series plot for all monitoring locations, 2007-2010.

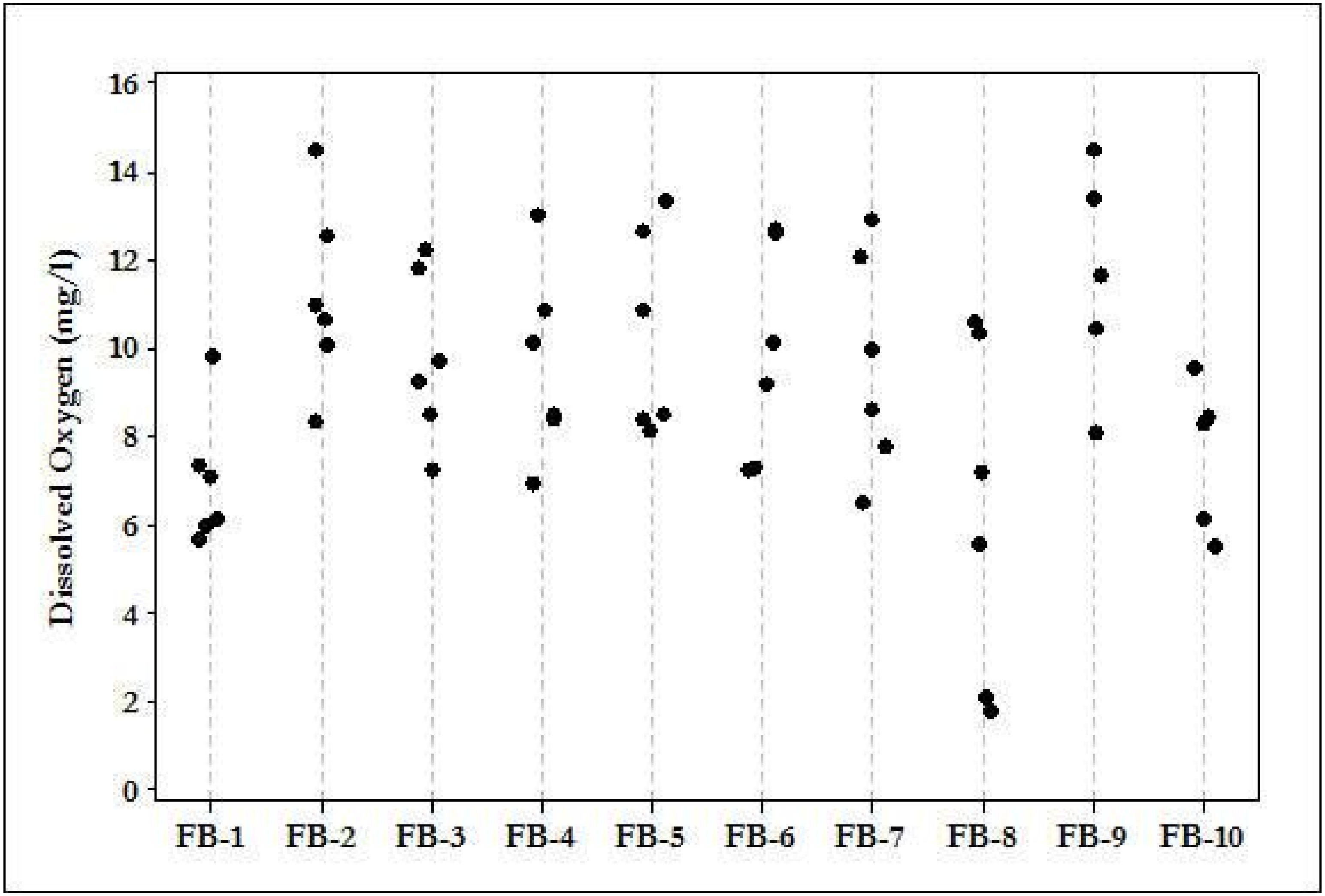

Figure 6. Dissolved oxygen locational plot for all monitoring locations, 2007-2010.

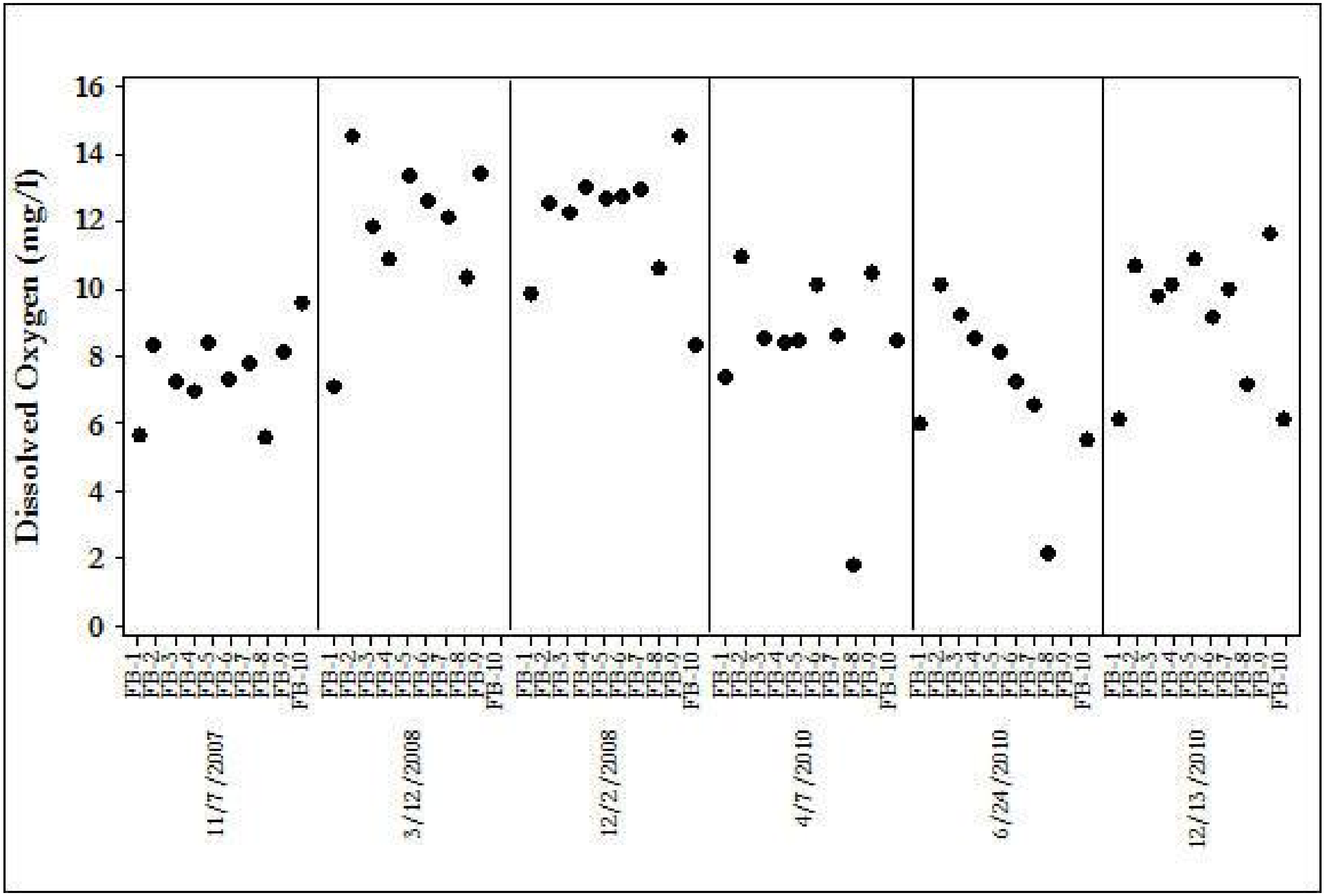

Figure 7. Dissolved oxygen time series plot for all monitoring locations, 2007-2010.