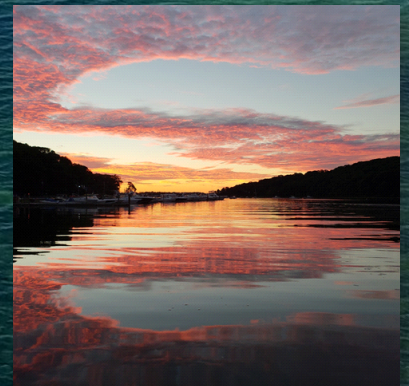


2017/2018 Annual Water Quality Report Water Quality Monitoring Program



This 2017/2018 *Annual Water Quality Report* was produced in 2020. It presents and describes data and observations that were recorded by the Friends of the Bay Water Quality Monitoring Program during the 2017 and 2018 monitoring seasons as well as information regarding other activities and accomplishments since 2017.

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 preserve, protect 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.

Major Initiatives and Accomplishments

In 2018, Friends of the Bay (FOB) joined the board of the Coalition Against an UnSound Crossing, which was instrumental in influencing the governor to drop his proposal to build a tunnel from Long Island to Westchester—FOB’s executive director was a founder and was elected president of the board of the Coalition. FOB began an active campaign against the tunnel in 2016. Also in 2018, FOB welcomed five new members to the Board of Trustees. FOB revived its Speaker Series; talks were offered on a variety of topics, ranging from bay-friendly homes to the conservation legacy of Theodore Roosevelt, all at little to no cost to attendees. In 2018, Friends of the Bay participated in the Unified Water study—the Save the Sound Program—marking the second year of FOB’s involvement since the project’s inception in 2017. Friends of the Bay also continued to support the Community Shellfish Garden, started in 2017 in collaboration with the Oyster Bay/Cold Spring Harbor Protection Committee, the Village of Laurel Hollow, the Cornell Cooperative Extension, the Town of Oyster Bay, the Town of Huntington, and the North Oyster Bay Baymen’s Association. The project aims to utilize historically significant, naturally-filtering oysters to increase awareness of the importance of water quality in the estuary.

Friends of the Bay contributed funds for the creation of a fishway to restore fish passage at Beaver Lake Dam in Mill Neck in 2017. Friends of the Bay was part of a group working with The Nature



Conservancy to create the project, which took place in August, 2017 and reopened fish habitat that had been blocked for nearly a century. The project will allow migratory river herring access to vital freshwater spawning habitat.

Fourteen municipalities within the watershed joined together beginning in January 2010 in order to help protect and enhance the water quality of Oyster Bay and Cold Spring Harbor and their tributaries in the most cost-efficient and effective manner. In August 2012, these fourteen municipalities signed an Intermunicipal Agreement that officially formed the Oyster Bay/Cold Spring Harbor Protection Committee (OB/CSH PC). Friends of the Bay is a non-voting member of the Protection Committee. OB/CSH PC seeks to be a model of suburban watershed protection for the nation and improve the health of Long Island Sound so that it meets all water quality standards necessary to support swimming, shellfishing, and other recreational, natural, and commercial uses. 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.)

A 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 evaluate changes in the watershed and help direct watershed management planning.

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 2013 issue. (This was the sixth 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 History

FOB was formed in 1987 by a group of engaged citizens concerned with the proposed development of the Jakobsen Shipyard site on Oyster Bay's western waterfront. Friends of the Bay successfully led a broad-based community effort to replace high-impact commercial development with an environmentally friendly, publicly accessible recreational complex accommodating passive use, community sailing, rowing, fishing, boat launching, maritime preservation and marine education.

Since our founding, we have grown into a powerful voice representing approximately 3,000 members. *The New York Times* has identified Friends of the Bay as one of the most effective environmental organizations around Long Island Sound. In 1997, we received the prestigious Walter B. Jones Memorial and National Oceanic and Atmospheric Administration Excellence Award for Coastal and Resource Management as the “Non-Governmental Organization of the Year”.

Today, FOB continues to monitor water quality in the estuary, while actively advocating for policies and programs to maintain and improve water quality and habitat throughout the watershed. Consistent with the priorities established in the Watershed Action Plan, FOB has been integral to the founding and function of the Oyster Bay/Cold Spring Harbor Watershed Protection Committee, formed by inter-municipal agreement among 14 of the 18 local government entities having jurisdiction over portions of the watershed.

Table of Contents

2017/2018 Annual Water Quality Report Water Quality Monitoring Program Friends of the Bay

Acknowledgements	vii
Executive Summary	viii
1 Introduction	1
2 Watershed Management	3
3 Monitoring Program	3
3.1 Open Water Body Monitoring.....	3
3.1.1 Monitoring Locations.....	4
3.1.2 Monitoring Methods	4
3.1.3 Quality Assurance and Quality Control	5
3.2 Stream and Outfall Monitoring Program	6
4 Results, Analysis, and Discussion	7
4.1 Open Water Body Monitoring.....	7
4.1.1 Physical Parameters	8
4.1.2 Bacteria	11
4.1.2.1 Cold Spring Harbor Results.....	17
4.1.2.2 Oyster Bay Harbor Results	20
4.1.2.3 Mill Neck Creek Results.....	23
4.1.3 Nutrient Enrichment by Nitrogen	26
4.1.3.1 The Nitrogen Cycle	26
4.1.3.2 Nitrogen Criteria and Standards.....	27
4.1.3.3 Monitoring Results.....	28
4.1.4 Dissolved Oxygen.....	28
4.2 Stream and Outfall Monitoring	36Error! Bookmark not defined.
5 Program Recommendations	36
5.1 Proposed Short-Term Changes	36
5.2 Potential Future Changes.....	36
6 Conclusions	38
7 References.....	40

Table of Contents

2017/2018 Annual Water Quality Report Water Quality Monitoring Program Friends of the Bay

Tables		Page
1	NYS Coliform Bacteria Standards.....	11
2	NYS Coliform Bacteria Standards, Effective 2004	11
3	Comparison of 2017 Monitoring Results to State Shellfishing Standards.....	14
4	Comparison of 2018 Monitoring Results to State Shellfishing Standards.....	14
5	Effect of Dissolved Oxygen Concentrations on Selected Organisms (LISS, 1994)	29
Figures		Page
1	Physical Conditions in the Oyster Bay/Cold Spring Harbor Estuary for Ten Monitoring Seasons	8
2	2017 Secchi Disk Results, Averaged Locationally	10
3	2018 Secchi Disk Results, Averaged Locationally	10
4	Seasonal Geomeans of Fecal Coliform Data by Location	16
5	Seasonal Geomeans of Enterococci Data by Location	16
6	Precipitation Monthly Totals, Long Island, 2017	17
7	Precipitation Monthly Totals, Long Island, 2018	17
8	30-Day Running Geometric Mean of 2017 Cold Spring Harbor Fecal Coliform Samples	18
9	30-Day Running Geometric Mean of 2017 Cold Spring Harbor Enterococci Samples	19
10	30-Day Running Geometric Mean of 2018 Cold Spring Harbor Fecal Coliform Samples	19
11	30-Day Running Geometric Mean of 2018 Cold Spring Harbor Enterococci Samples	20
12	30-Day Running Geometric Mean of 2017 Oyster Bay Harbor Fecal Coliform Samples.....	21
13	30-Day Running Geometric Mean of 2017 Oyster Bay Harbor Enterococci Samples.....	21
14	30-Day Running Geometric Mean of 2018 Oyster Bay Harbor Fecal Coliform Samples.....	22
15	30-Day Running Geometric Mean of 2018 Oyster Bay Harbor Enterococci Samples.....	22
16	30-Day Running Geometric Mean of 2017 Mill Neck Creek Fecal Coliform Samples	24
17	30-Day Running Geometric Mean of 2017 Mill Neck Creek Enterococci Samples	24
18	30-Day Running Geometric Mean of 2018 Mill Neck Creek Fecal Coliform Samples	25
19	30-Day Running Geometric Mean of 2018 Mill Neck Creek Enterococci Samples	25
20	Nitrogen Species and Processes in Marine Environments (Source: Chapra 1997).....	27
21	Dissolved Oxygen for Cold Spring Harbor Monitoring Locations, 2017	31
22	Dissolved Oxygen for Cold Spring Harbor Monitoring Locations, 2018.....	31
23	Dissolved Oxygen for Oyster Bay Harbor Monitoring Locations, 2017.....	32
24	Dissolved Oxygen for Oyster Bay Harbor Monitoring Locations, 2018.....	32
25	Dissolved Oxygen for Mill Neck Creek Monitoring Locations, 2017	33
26	Dissolved Oxygen for Mill Neck Creek Monitoring Locations, 2018	33
27	Boxplot Elements	34
28	Dissolved Oxygen at All Monitoring Locations, 2017.....	35
29	Dissolved Oxygen at All Monitoring Locations, 2018.....	35

Table of Contents

2017/2018 Annual Water Quality Report Water Quality Monitoring Program Friends of the Bay

Appendices

End of Report

- A Oyster Bay/Cold Spring Harbor Estuary Complex Fact Sheet
- B Sampling Locations Map and Description
- C Water Quality Monitoring Data Sheet
- D Tide Tables for Oyster Bay–2017 & 2018
- E 2017–2018 Open Water Body Monitoring Results

Acknowledgements

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

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 sampling boat 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.

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

Northup Grumman – Northup Grumman provided a grant to fund water quality monitoring.

Boat Captains:

Hank Kasven
Paul Hirsch
Bill Hoar

Citizen Scientists:

Pat Aitken
Darryl Bogitch
Paul DeOrsay
Terri Felske
Ken Gunther
Paul Hirsch
Ian Hnizdo
Phyllis Hoar
William Hoar
Chris Hoppner and his students

Peter Janow
Hank Kasven
Terry Kattleman
Richard Loos
Jack McCooey
Doug Nemeth
Rebecca Rilling
Susan Schecter
Matt Sonfield
Max Wang

Executive Summary

Background

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 establishes standard operating procedures and quality assurance for data collection, ensuring that data we provide is acceptable to EPA, other environmental agencies and academic researchers. The QAPP was developed in 2006 and has undergone six revisions since its approval.

FOB has been conducting routine water quality monitoring since 2000. The monitoring results are documented in annual or biennial (once every two years) water quality monitoring reports. This report describes the combined results of water quality monitoring conducted in 2017 and 2018.

2017 and 2018 Monitoring Events

During 2017 and 2018, 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.

In 2017, FOB collected samples during 22 separate monitoring events between April 10th and October 23rd (18 Mondays, 3 Tuesdays, and 1 Wednesday; 9 planned monitoring dates were cancelled for all locations due to inclement weather or boat issues). Samples were analyzed for bacteria (357 samples for fecal coliform and 355 for enterococci) and measurements were recorded for dissolved oxygen, temperature, pH, and salinity (averaging 280 measurements per variable), as well as water clarity (322 measurements).

In 2018, FOB collected samples during 18 separate monitoring events between April 23rd and October 22nd (all Mondays; 13 planned monitoring dates were cancelled for all locations due to inclement weather, boat issues, or equipment repair). Samples were analyzed for bacteria (232 samples for fecal coliform and 297 for enterococci) and measurements were taken for dissolved oxygen, temperature, pH, and salinity (averaging 275 measurements per variable), as well as water clarity (297 measurements).

FOB monitored 19 open water body locations within Cold Spring Harbor (FB-1 through FB-4), Oyster Bay Harbor (FB-5 through FB-12), and Mill Neck Creek (FB-13 through 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 not collected during the 2017 and 2018 monitoring seasons due to a lack of funding.

Note that, in July 2010, FOB added three monitoring locations in Laurel Hollow (LH-1, LH-2, and LH-3) to the open water body monitoring program at the request of the Village of Laurel Hollow and Nassau County Department of Health (NCDH). No samples were collected from these Laurel Hollow locations in 2017 or 2018.

Open Water Body Monitoring Results

Two major water quality parameters were monitored in 2017 and 2018: bacteria and dissolved oxygen. Analysis of this open water body monitoring data provides useful insights into the estuary's water quality.

Bacteria

On a seasonal average basis, Oyster Bay Harbor met state shellfish standards for fecal coliform during the 2017 and 2018 monitoring seasons (Oyster Bay Harbor is where the majority of shellfishing occurs in the estuary). The 2017 and 2018 seasonal geometric mean fecal coliform levels in Oyster Bay Harbor were among the lowest recorded since the monitoring program began. Although seasonal geometric mean fecal coliform levels in Oyster Bay Harbor were below the shellfish standard at most locations, consistent with previous years, the 30-day geometric mean fecal coliform levels at a majority (five of eight) of the stations exceeded the shellfish standard for some portion of the season in 2017. This trend is similar to previous years, as three of the eight stations had 30-day geometric means that exceeded the level at some point in the 2015 season and six of the eight stations had 30-day geometric means that exceeded the standard for a portion of the season in 2016. In 2018, however, only one station had a 30-day geometric mean fecal coliform level that exceeded the shellfish standard for a portion of the monitoring season. For enterococci, one of the eight stations at Oyster Bay Harbor exceeded the State swim standard for a portion of the season in 2017. In 2018, none of the stations exceeded this standard.

As observed in previous years, fecal indicator bacteria (fecal coliform and enterococci) levels in Cold Spring Harbor and Mill Neck Creek were higher than in Oyster Bay Harbor. Only one of the four monitoring stations in Cold Spring Harbor met the fecal coliform shellfish standard for the entirety of the 2017 and 2018 seasons. Two Cold Spring Harbor stations met both the fecal coliform and enterococci swim standard levels in 2017 and all Cold Spring Harbor stations met both these standards in 2018. Mill Neck Creek consistently has the highest levels of fecal indicator bacteria observed in the estuary complex. All Mill Neck Creek stations exceeded the fecal coliform shellfish standard in 2017 and 2018. Three of the seven stations exceeded the enterococci state swim standards in 2017 and 2018 during a portion of the monitoring seasons. Four of the Mill Neck Creek stations exceeded the fecal coliform swim standard in 2017 and one station exceeded it in 2018. The highest levels of fecal indicator bacteria generally occur at FB-15, FB-16, and FB-17, which are locations that are characterized by limited circulation or flushing during low tide or are located near "The Birches" residential subdivision.

The average bacteria levels recorded at Mill Neck Creek monitoring locations decreased significantly (approximately 74% and 77% decreases for fecal coliform and enterococci, respectively) from the 2011 to the 2018 sampling seasons. These reductions are an early indicator of the water quality improvements that have resulted from sewage infrastructure upgrades at The Birches. However, seasonal geometric mean fecal coliform and enterococci levels at many of the Mill Neck Creek monitoring stations continue to exceed their respective standards, which suggests other sources of fecal indicator bacteria to Mill

Neck Creek. Additional monitoring data is needed to further assess water quality in Mill Neck Creek and the remaining pollutant sources.

Nitrogen

Due to limited funding, nitrogen sampling did not occur in 2017 and 2018.

A \$10.6 million advanced wastewater treatment facility serving the Oyster Bay Sewer District has been fully operational since March 2006. As of the 2015-2016 Friends of the Bay Water Quality Report, the facility is achieving the 2014 nitrogen limits imposed by the New York State Department of Environmental Conservation—the upgrade reduced daily nitrogen discharges by as much as 75%.

Dissolved Oxygen

Hypoxic and anoxic conditions are likely to have occurred in the Cold Spring Harbor estuary complex during the 2017 and 2018 monitoring seasons, although no known fish kills were reported. In both years, the Cold Spring Harbor stations generally showed the greatest variability and lowest dissolved oxygen values of all stations monitored. In Cold Spring Harbor, dissolved oxygen concentrations at the bottom of the water column fell below the acute standard of 3.0 mg/l at three of four stations in 2017 and at all four stations in 2018. There were no stations in Oyster Bay Harbor or Mill Neck Creek that fell below this standard in 2017. In 2018, Oyster Bay Harbor had one station fall below this threshold; no stations at Mill Neck Creek fell below the standard. Dissolved oxygen data continue to indicate that the waters of the estuary are enriched with nutrients. Long-term reductions in nitrogen inputs should reduce the occurrence of extremely low dissolved oxygen conditions in bottom waters.

Stream and Outfall Monitoring Results

Since 2007, Friends of the Bay has implemented a stream and outfall monitoring program to establish baseline water quality conditions, identify water quality impacts from potential point and non-point pollution sources, develop 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. The monitoring program includes sampling of 10 or 11 major discharges (OBS 1-10) into the Oyster Bay/Cold Spring Harbor estuary. These discharges include streams, ponds, a formerly untreated sewage discharge (“The Birches”), and a ‘rotating’ outfall that can change for each event in an effort to identify other pollutant sources. Due to circumstances beyond the control of Friends of the Bay, stream and outfall monitoring was not conducted in 2017 or 2018.

Water Quality and Watershed Management

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, and dissolved oxygen).

Friends of the Bay will continue to work with citizen scientists, government agencies, and other non-governmental organizations in future monitoring seasons. Together, FOB and its partners will continue to improve and enhance the monitoring program, with the ultimate objective of protecting and improving the quality of water in the Oyster Bay/Cold Spring Harbor estuary complex.

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 watershed¹. *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
- 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.

The FOB Water Quality Monitoring Program was initiated to continue data collection efforts that were originally established by the Nassau County Department of Health that were terminated due to county budget cuts. This program was developed in cooperation with the United States Environmental Protection Agency (EPA), New York State Department of Environmental Conservation (NYSDEC), local governments and other volunteer monitoring groups around Long Island Sound. Friends of the Bay considers this program a necessary component in the effort to preserve the Oyster Bay/Cold Spring

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.

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:

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 Creek⁵.
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. Act as a watchdog for 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. Friends of the Bay citizen scientists participate in collecting samples, recording data, and related activities. Individually, they bring intellectual curiosity, diverse backgrounds and skills, and a passion for the environment. They come from as far as the south shore of Long Island and as close as Bayville and Oyster Bay. Friends of the Bay's Water Quality Monitoring Program is also made possible by supporting members, businesses, and other partners including the Nassau County Department of Health, Frank M. Flower & Sons, Inc., Bridge Marina, Northrup Grumman, and Oyster Bay Marine Center.

The program monitors a number of water quality parameters in the estuary including water temperature, pH, clarity, salinity, dissolved oxygen, 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.⁶ 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, and waterways contained within the Oyster Bay National Wildlife Refuge in addition to cooperative efforts on environmental education, interpretation, and outreach projects.

⁵ *Pathogen Total Maximum Daily Loads for Shellfish Waters in Oyster Bay Harbor and Mill Neck Creek*. NYSDEC (2003). In November 2018, NYSDEC withdrew the pathogen TMDLs for Shellfish Waters in Oyster Bay Harbor and Mill Neck Creek, with DEC stating "the withdrawal was necessary because recent data has shown that implementation of the TMDLs would not have caused water quality standards to be achieved." Oyster Bay and Mill Neck Creek will be included in Part 2c (*Multiple Segment/Categorical Waterbody Segments due to Shellfishing Restrictions*) of the New York 2018 Section 303(d) list of impaired/TMDL waters.

⁶ 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.)

This Annual Water Quality Report summarizes the data collected during the 2017 and 2018 monitoring seasons. This report was produced in 2019 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 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.

The 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 recommends continuation of the ongoing water quality monitoring program 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, and dissolved oxygen).

3 Monitoring Program

3.1 Open Water Body Monitoring

Every Monday⁷ morning from April through October 2017 and 2018, Friends of the Bay staff and citizen scientists collected data on water quality and ambient conditions at 19 open water body sites throughout the estuary complex. The parameters measured by Friends of the Bay included dissolved oxygen, salinity, water temperature, pH, water clarity, and enterococci and coliform bacteria.

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-

⁷ Monitoring is conducted on Tuesday or Wednesday when Monday is a holiday. Some monitoring events could not be carried out due to weather or other circumstances (see details below).

place and a handheld data-logger 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 enterococci and coliform bacteria measurement were also collected by Friends of the Bay and analyzed by the Nassau County Department of Health (NCDH).

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 was approved by the EPA in May 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-1 through FB-4 in Cold Spring Harbor, FB-5 through FB-12 in Oyster Bay Harbor, and FB-13 through FB-19 in Mill Neck Creek. A map identifying the approximate location of each site and a table of coordinates (latitude/longitude) for each station are included in *Appendix B*.

The Oyster Bay/Cold Spring Harbor estuary station locations and identifiers were revised in 2003—this should be taken into consideration when comparing results from 2003 through 2018 to results presented in the 2002 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 using the Hydrolab Quanta data-logger and multiparameter sonde. At each station, 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 (depth permitting). 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 Hydrolab 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 depth at which the disk becomes completely obscured is recorded. The disk is then raised and the point at which the disk becomes visible again is recorded. 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 SM-18-20 9222 D method (Membrane Filter Technique for Members of the Coliform Group: 9222 D. Fecal Coliform Membrane Filter Procedure. 9222G. MF Partition Procedures) for testing for fecal coliform and EPA Method 1600 (EPA Method 1600: Enterococci in Water by Membrane Filtration Using membrane-Enterococcus Indoxyl- β -D-Glucoside Agar [mEI], 2002) for enterococci. 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.
- **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 Quality 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—the document has been revised six times since its approval. 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. Friends of the Bay continued to follow procedures outlined in the QAPP during the 2017 and 2018 monitoring seasons. 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.

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, develop 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.

Friends of the Bay was unable to conduct stream and outfall monitoring in 2017 or 2018.

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 on 22 monitoring dates from April through October, 2017 (18 Mondays, 3 Tuesdays, 1 Wednesday; samples were not collected for 9 planned monitoring dates due to weather or other unsuitable sampling conditions) and 18 monitoring dates from April through October, 2018 (all Mondays; 13 planned monitoring dates were cancelled for all locations due to weather, boat or equipment issues, or other unsuitable sampling conditions). Four sites are located in Cold Spring Harbor (FB-1 through FB-4), eight are located in Oyster Bay Harbor (FB-5 through FB-12), and seven (FB-13 through FB-19) are located in Mill Neck Creek. There are three locations in Laurel Hollow that have been sampled in past years, although sampling has not been conducted since 2011. Data collected during the 2017 and 2018 monitoring seasons were 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 both as a whole, and in terms of the three primary water bodies (not including Laurel Brook) that comprise the estuary: Cold Spring Harbor, Oyster Bay Harbor, and Mill Neck Creek.

These major water bodies are distinguished by hydrographic separations and differ in terms of physical characteristics, land use, watershed features, and tidal influence (see Monitoring Locations Map in *Appendix B* and Tide Charts 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 were 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 Laurel Hollow sites (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 have been the source; however, the moorings in the area

are for very small vessels—most without onboard sanitary facilities. The NCDH concluded that the exceedances were most likely caused by the Canada geese that frequent the open lawn areas upstream of the beach. Monitoring at these sites has not occurred since 2011.

4.1.1 Physical Parameters

4.1.1.1 Temperature and Precipitation

Salinity, water temperature, pH, air temperature, and water clarity were measured at each open water body sampling station throughout the 2017 and 2018 monitoring seasons. These physical parameters can impact environmental and ecological conditions within the estuary. *Figure 1* shows average air temperature and total rainfall for the sampling season (April through October) in Long Island from 2000 through 2018.⁸

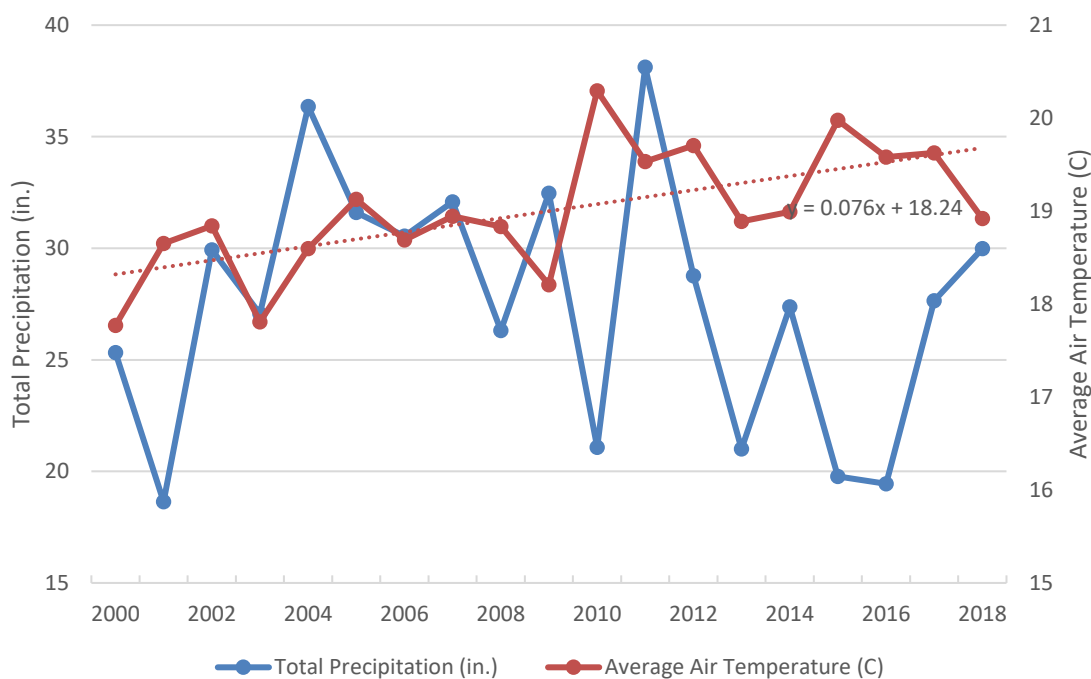


Figure 1. Physical conditions on Long Island, 2000 – 2018 (April through October). A linear trend in air temperature is shown and is positive over the period of study.

From 2000 to 2018, the average total precipitation during the monitoring season (April through October) was 27.6 inches. The total precipitation during the 2017 monitoring season was very close to this average, at 27.7 in 2017. The total was slightly higher in 2018 at 30.0 inches. Total precipitation during these two monitoring seasons was markedly higher than in the previous two monitoring seasons, where in both 2015 and 2016 the total precipitation was 19.8 and 19.4 inches, respectively, making them the two driest seasons since 2001 (18.8 inches).

⁸ Temperature data from the National Weather Service for JFK International Airport in Queens, New York. Precipitation data from the NOAA National Centers for Environmental Information for the station at JFK International Airport in Queens, New York.

The average seasonal air temperature in Long Island was approximately 19.0 degrees Celsius across the 19-season period, ranging from a low of 17.8 in 2001 to a high of 20.3 in 2010. The average air temperatures during the 2017 and 2018 monitoring seasons were 19.0 and 19.6 degrees Celsius, respectively. The 2017 season was the fourth warmest since the program's inception. As depicted in Figure 1, there has been a positive linear increase in air temperature during the monitoring season since 2000.

4.1.1.2 Water Clarity

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 (the range was 2.9 to 0.4 m in 2017 and 8.4 to 0.2 m in 2018).

Figures 2 and 3 present 2017 and 2018 Secchi disk depth results, respectively, as averaged for Cold Spring Harbor, Oyster Bay Harbor, and Mill Neck Creek. Average Secchi disk depths (in meters) in 2017 for these areas were 1.2, 3.6, and 1.0, and in 2018 were 1.4, 1.5, and 1.1, respectively. As was the case in past years, Mill Neck Creek had lower water clarity than Oyster Bay Harbor and Cold Spring Harbor, possibly a result of increased biological activity due to its 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 2017 or 2018 data, although the lowest clarity levels seem to occur during early through later summer (May through August) at all locations. Although the cause has not been studied in detail, it is likely caused by algal growth fueled by nitrogen inputs to the Bay. See *Appendix E* for additional physical data.

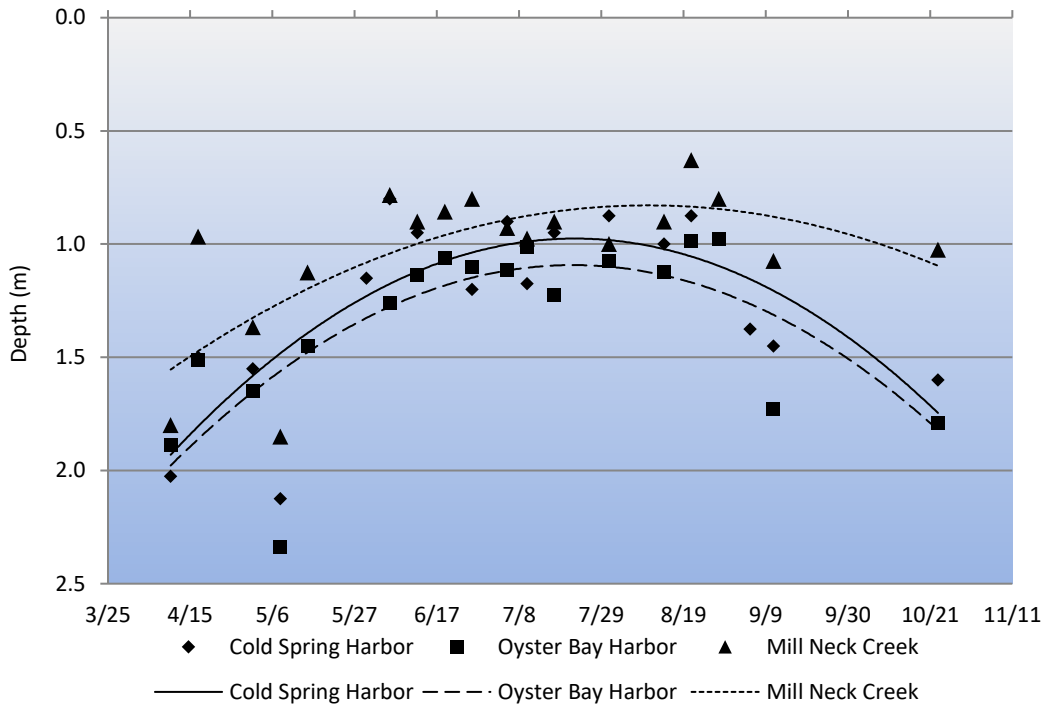


Figure 2. 2017 Secchi disk results, averaged locationally, with trend lines

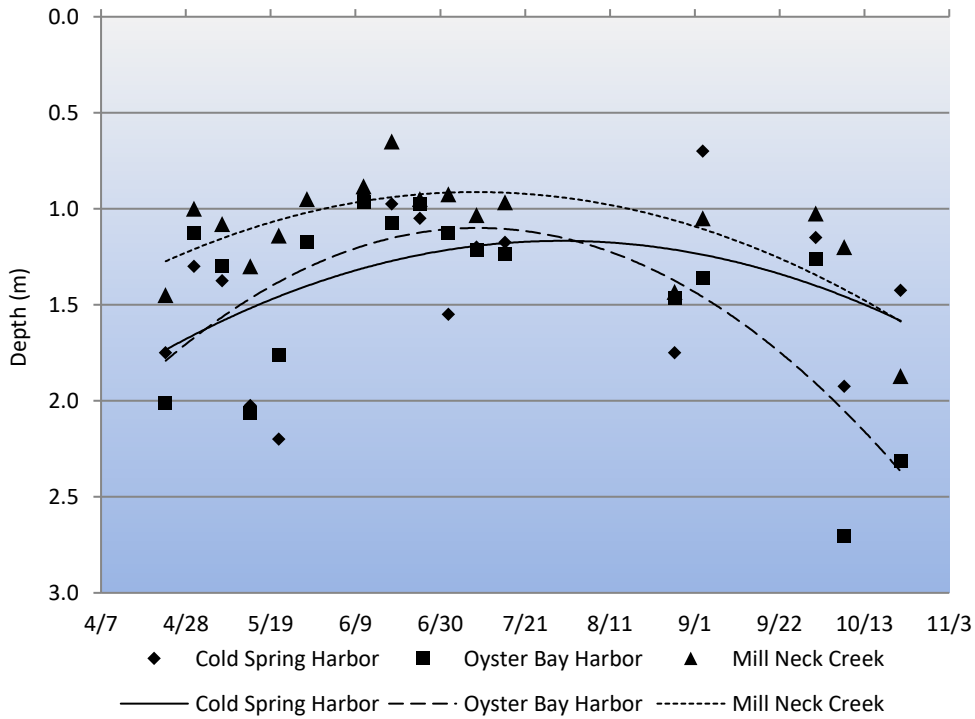


Figure 3. 2018 Secchi disk results, averaged locationally, with trend lines

4.1.2 Bacteria

Bacteria are widespread in the environment. Certain types can be used to indicate the possible presence of human pathogens. Common fecal 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 must meet the most stringent bacteriological criteria.

Coliform bacteria levels are reported as logarithmic averages 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 monitoring data during the 22 weeks monitored in 2017 (9 dates were cancelled completely for all locations due to inclement weather, and all stations may not have been sampled during each event due to site/tidal conditions) and during the 18 weeks monitored in 2018 (13 dates were cancelled completely for all locations due to inclement weather, and all stations may not have been sampled during each event due to site/tidal conditions). The completeness of monitoring runs, calculated by dividing the number of runs performed (22, 18) by the number of possible runs (31, 31) and expressed as a percent, is 71% for 2017 and 58% for 2018.

Table 1 summarizes shellfish standards for fecal coliform bacteria that are enforced by New York State (NYS). In 2004, revised beach closure standards were implemented that are based on measured levels of enterococci, an alternate indicator bacteria, and fecal coliform. The 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 nineteen (19) locations during the 2017 and 2018 monitoring seasons. Fecal coliform has been measured by Friends of the Bay since the inception of the monitoring program, while enterococci has been measured since 2004.⁹

Tables 3 and 4 present 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* and *Table 4* indicate that the seasonal geometric mean and/or the 90th percentile value at that station exceeded the State standard. Although only fecal coliform data and not total coliform were collected in 2017 and 2018, in earlier years of the monitoring program, fecal coliform exceedances were generally accompanied by exceedances in total coliform as well.

In 2017 and/or 2018, seasonal geometric mean fecal coliform bacteria levels exceeded the shellfish standards for fecal coliform at FB-1, FB-2, FB-3, FB-7, FB-10, and FB-13 through FB-19. FB-1, FB-2, and FB-3 are located in Cold Spring Harbor; FB-7 is located in the center of Oyster Bay Cove; FB-10 is located near Beekman Creek; and FB-13 through FB-19 are located in Mill Neck Creek). Despite these exceedances, these results are encouraging, since the majority of stations (six of eight stations) in Oyster Bay Harbor (FB-5 through FB-12) met the shellfish standards—Oyster Bay Harbor is where the majority of shellfishing occurs in the estuary. Data from the 2017-2018 seasons follow a similar trend to data from previous years, where the same stations exceeded either the seasonal geometric mean or 90th percentile for fecal coliform shellfishing standards.

⁹ The NCDH laboratory, which performs bacterial analysis for Friends of the Bay, changed analysis methods between the 2004 and 2005 seasons. The earlier method resulted in elevated values compared to the later method. As such, data from 2004 is not comparable to data from later years and not included in this report.

Table 3. Comparison of 2017 Monitoring Results to State Shellfishing Standards

Fecal Coliform			
Station	Seasonal Geomean	90th Percentile	Location
FB-1	29	230	CSH
FB-2	39	320	CSH
FB-3	12	75	CSH
FB-4	2	11	OBH
FB-5	2	6	OBH
FB-6	2	6	OBH
FB-7	19	100	OBH
FB-8	7	33	OBH
FB-9	3	23	OBH
FB-10	17	84	OBH
FB-11	2	11	OBH
FB-12	3	14	OBH
FB-13	14	74	MNC
FB-14	24	201	MNC
FB-15	42	350	MNC
FB-16	22	71	MNC
FB-17	69	290	MNC
FB-18	7	51	MNC
FB-19	14	76	MNC
Shellfish Standard	14	43	

Table 4. Comparison of 2018 Monitoring Results to State Shellfishing Standards

Fecal Coliform			
Station	Seasonal Geomean	90th Percentile	Location
FB-1	37	184	CSH
FB-2	29	136	CSH
FB-3	9	58	CSH
FB-4	3	13	CSH
FB-5	2	20	OBH
FB-6	2	5	OBH
FB-7	10	50	OBH
FB-8	5	20	OBH
FB-9	4	17	OBH
FB-10	9	112	OBH
FB-11	2	10	OBH
FB-12	3	15	OBH
FB-13	12	71	MNC
FB-14	31	148	MNC
FB-15	54	211	MNC
FB-16	31	150	MNC
FB-17	124	520	MNC
FB-18	10	47	MNC
FB-19	12	70	MNC
Shellfish Standard	14	43	

In 1983, NYSDEC 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. As of April 2011, sewage infrastructure upgrades were completed, and all the homes in “The Birches” residential subdivision were connected to the Glen Cove sewage treatment plant.

The average bacteria levels recorded at Mill Neck Creek monitoring locations have decreased significantly from the 2011 sampling season to 2018 (74% and 77% for fecal coliform and enterococci, respectively). These reductions are an early indicator of potential water quality improvements resulting from the sewage infrastructure upgrades. However, seasonal geometric mean fecal coliform levels at the Mill Neck Creek monitoring stations continue to exceed the fecal coliform standard, which suggests other sources of fecal indicator bacteria to Mill Neck Creek. Additional monitoring data is needed to further assess water quality in Mill Neck Creek and the remaining pollutant sources.

Figure 4 and *Figure 5* present seasonal geometric means (i.e., May through October) for fecal coliform and enterococci, respectively, for each of the estuary’s embayments. From 2017 to 2018, seasonal geometric mean levels of fecal coliform remained constant for Cold Spring Harbor, decreased in Oyster Bay Harbor, and increased in Mill Neck Creek. The seasonal fecal coliform geometric means for Cold Spring Harbor and Oyster Bay Harbor remained below the State shellfish standard for fecal bacteria in 2017 and 2018, while this threshold was exceeded in both years in Mill Neck Creek. The geometric mean levels for Oyster Bay Harbor and Mill Neck Creek have remained relatively constant in recent years, with greater fluctuations in Cold Spring Harbor, although the past two monitoring seasons may indicate a leveling-off of this trend.

From 2017 to 2018, the seasonal geometric mean for enterococci increased for Cold Spring Harbor, stayed the same for Oyster Bay Harbor, and decreased in Mill Neck Creek. The seasonal geometric mean has remained relatively constant in Oyster Bay Harbor since 2013, with greater fluctuations in Cold Spring Harbor and Mill Neck Creek. Enterococci seasonal geometric means at Mill Neck Creek in 2017 and 2018 were the lowest recorded since monitoring of the parameter began in 2005.

Although the shellfish and swimming standards are included on the figures below for reference, the locationally-averaged geometric means cannot be used to directly assess compliance with the standards—instead, the 30-day running geometric means should be used.

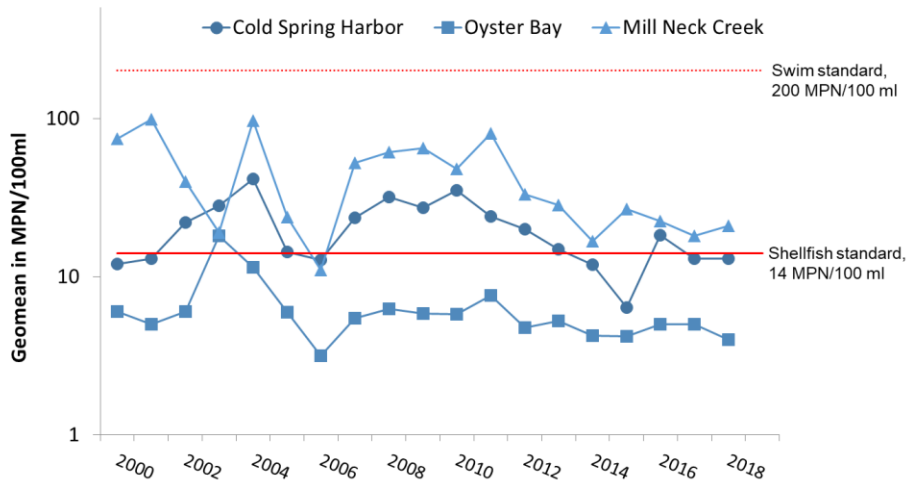


Figure 4. Seasonal geomeans of fecal coliform data by location, 2000-2018

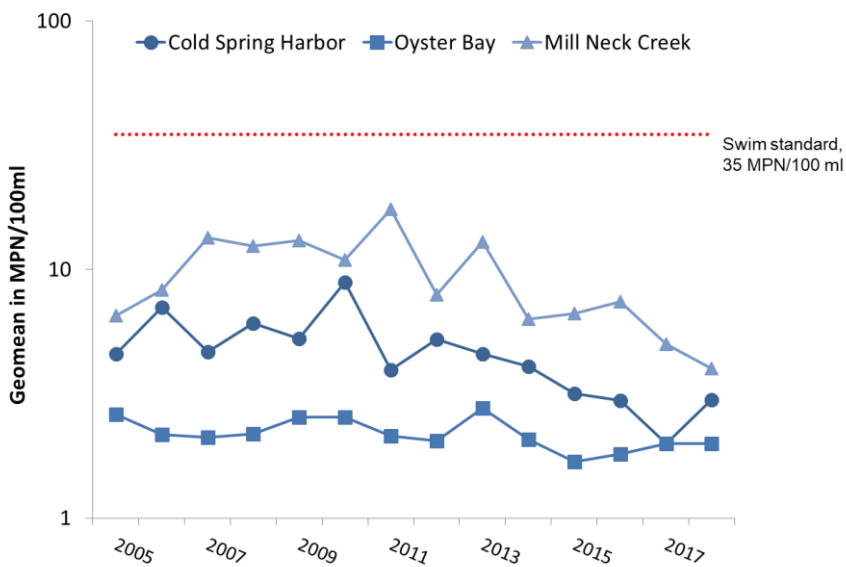


Figure 5. Seasonal geomeans of enterococci data by location, 2005-2018

Figure 6 and *Figure 7* present total monthly precipitation as recorded at a NOAA precipitation station on Long Island during the 2017 and 2018 sampling seasons. In 2017, the monthly precipitation ranged from a low of 2.20 inches in September to a high of 5.83 inches in April, with a monthly average of 3.95 inches. In 2018, the monthly precipitation ranged from a low of 3.30 inches in April to a high of 5.99 inches in September, with a slightly higher average monthly precipitation than the previous year, at 4.28 inches. The distribution of precipitation through the monitoring season is important because stormwater runoff can transport bacteria pollution to receiving waters. See *Appendix E* for additional bacteria data.

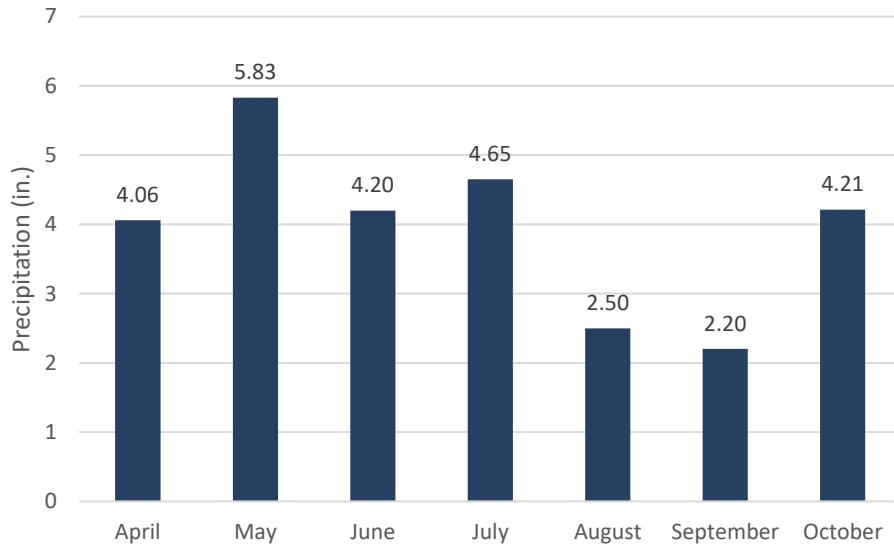


Figure 6. Precipitation monthly totals, Long Island, 2017

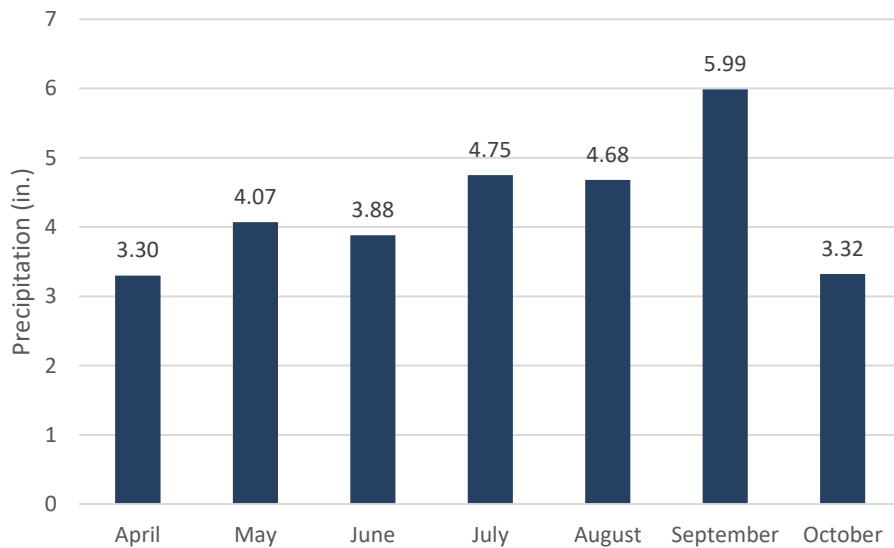


Figure 7. Precipitation monthly totals, Long Island, 2018

4.1.2.1 Cold Spring Harbor Results

Four stations were monitored for fecal coliform and enterococci bacteria in Cold Spring Harbor in 2017 and 2018. *Figure 8* through *Figure 11* present the 2017 and 2018 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—as a result, some breaks in the line graph are present.

The compliance of the 30-day geometric means for fecal coliform bacteria for shellfishing standards are consistent with the seasonal geometric means presented in *Table 3*; only station FB-4 met the fecal

coliform NYS shellfish geometric mean standard (14 MPN/100 ml) for the entirety of the 2017 season. In 2018, station FB-4 was again the only station to meet the standard for the entirety of the season. Stations FB-1, FB-2, and FB-3 exceeded the standard for a majority of the 2017 season. In 2018, stations FB-1 and FB-2 again exceeded the standard for a majority of the season, while FB-3 exceeded the standard for a small portion of it.

In 2017, FB-1 exceeded the fecal coliform geometric mean swim standard (200 MPN/100 ml) in early July, while FB-2 exceeded the standard parts of June through July. This standard was not exceeded by any station in 2018. For enterococci, in 2017, station FB-1, FB-2, and FB-3 exceeded the geometric swim standard levels (35 MPN/100 ml) in mid-October. This standard was not exceeded by any station in 2018.

During the 2017 and 2018 seasons, no fecal coliform samples exceeded the 1,000 MPN/100 ml single sample swimming standard. The 104 MPN/100 ml single sample swim standard for enterococci was exceeded once at FB-17 in 2017. In 2018, it was exceeded once at FB-1 (146 MPN/100 ml) and once at FB-17 (110 MPN/100 ml). These results would have resulted in beach closures. See *Appendix E* for bacteria data.

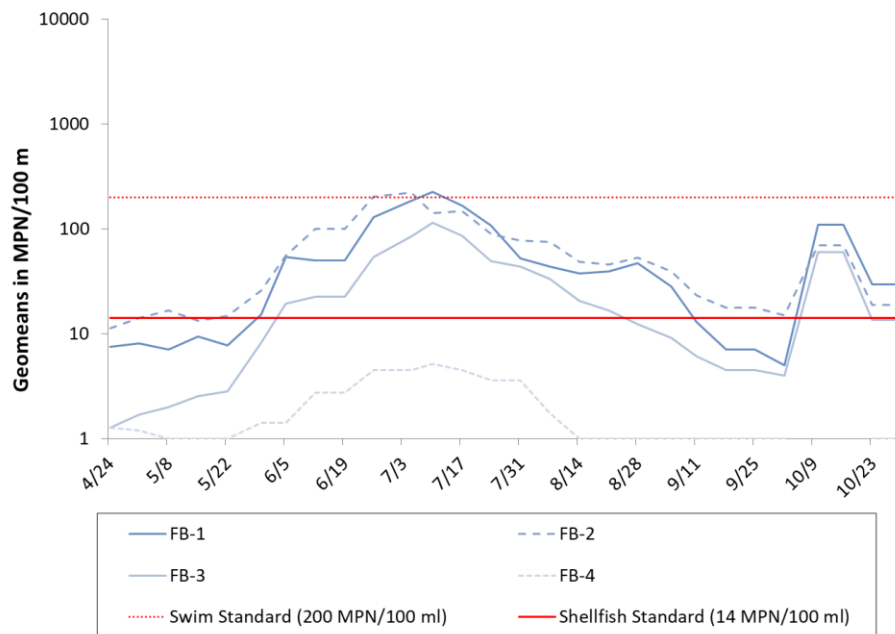


Figure 8. 30-day running geometric mean of 2017 Cold Spring Harbor fecal coliform samples

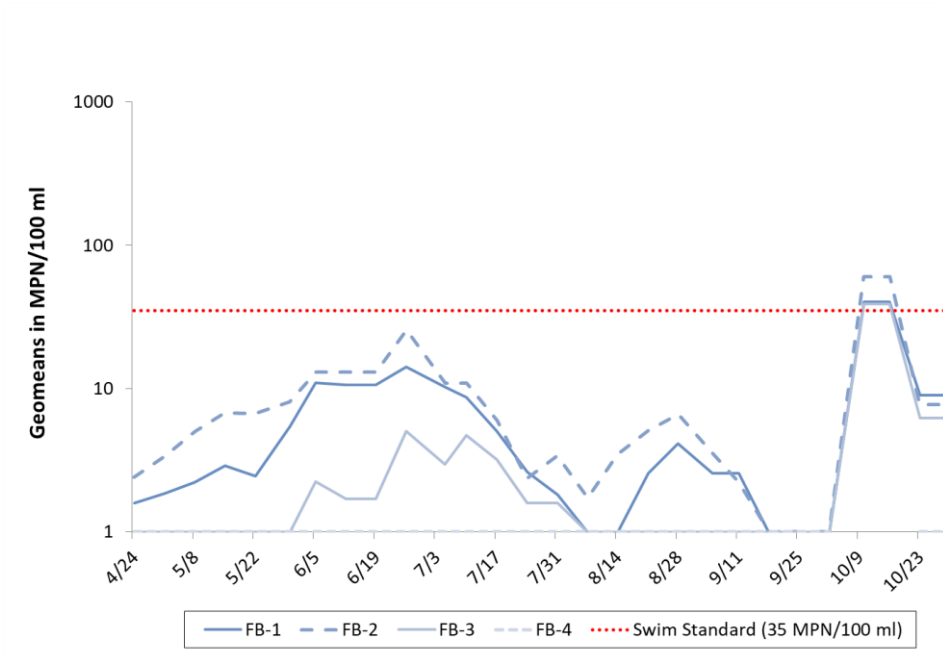


Figure 9. 30-day running geometric mean of 2017 Cold Spring Harbor enterococci samples

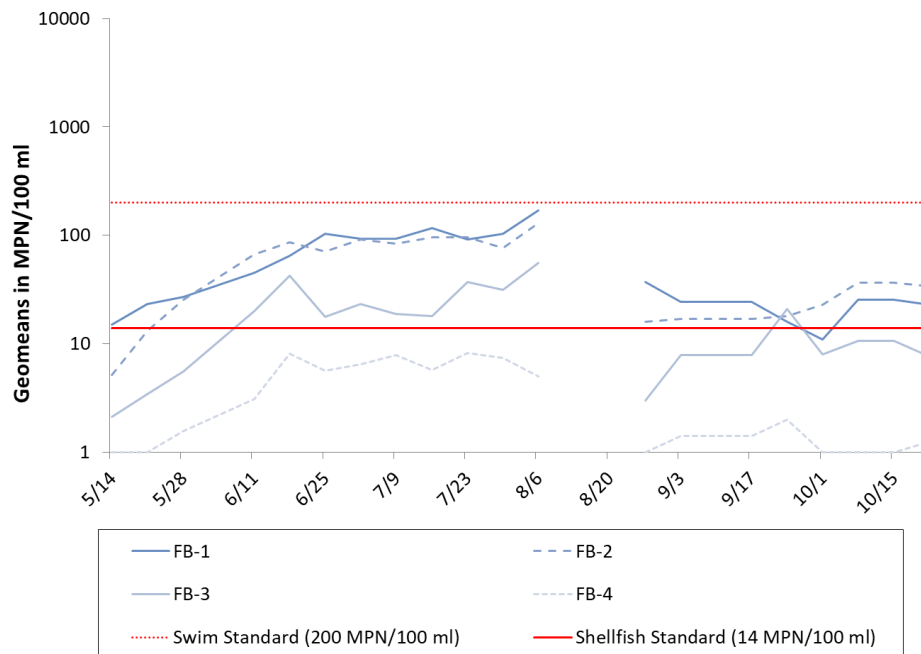


Figure 10. 30-day running geometric mean of 2018 Cold Spring Harbor fecal coliform samples

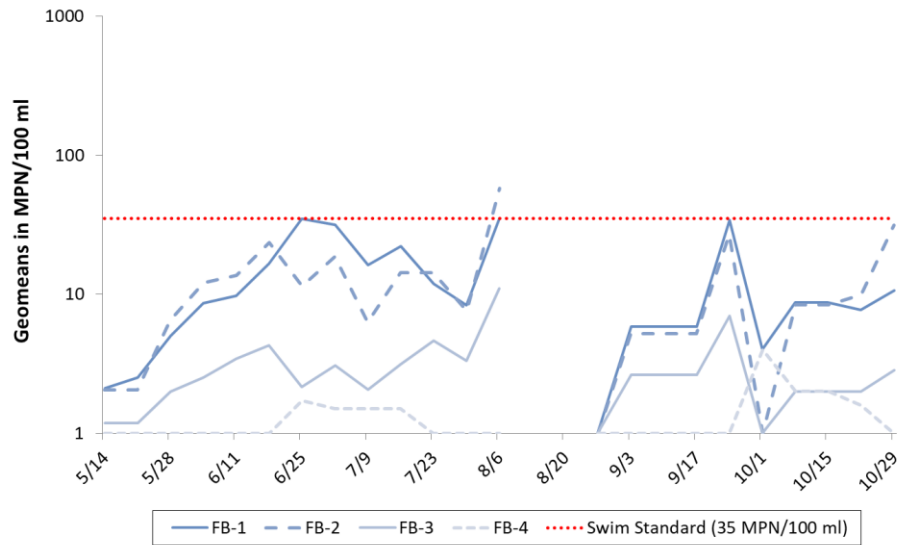


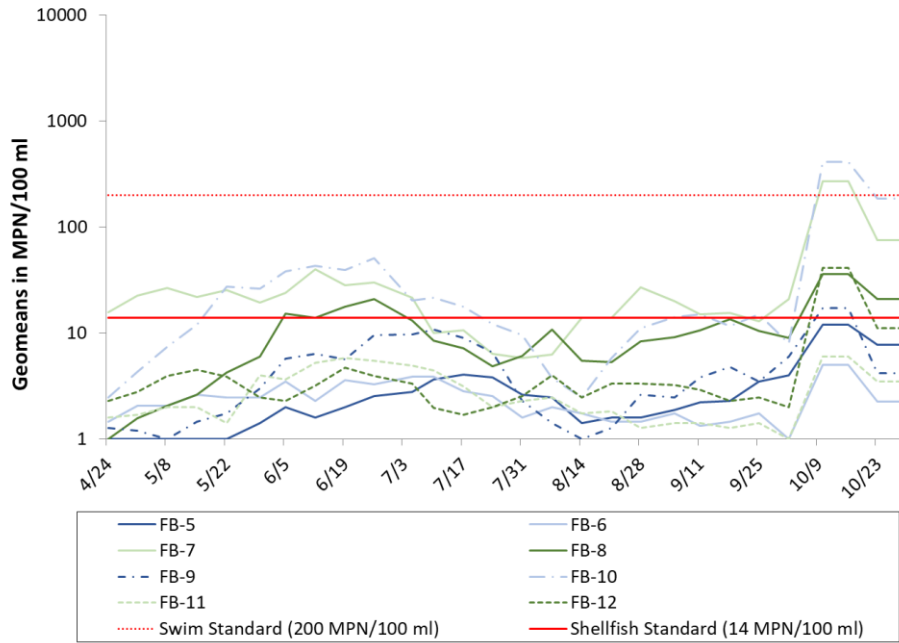
Figure 11. 30-day running geometric mean of 2018 Cold Spring Harbor enterococci samples

4.1.2.2 Oyster Bay Harbor Results

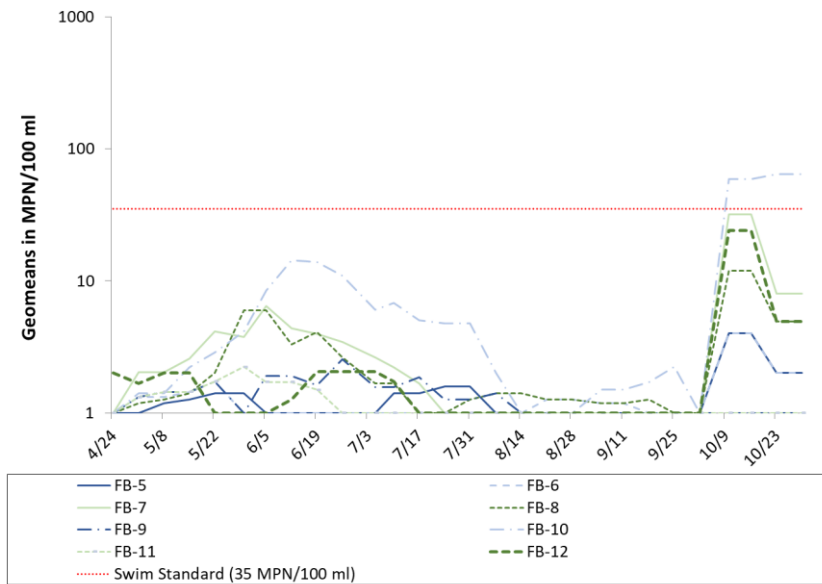
Eight stations were monitored for fecal coliform and enterococci bacteria in Oyster Bay Harbor in 2017 and 2018, as depicted in *Figures 12-15*. As shown, the fecal coliform geometric means at several stations did not meet the geometric mean standard for shellfishing for the 2017 and 2018 seasons. In 2017, four of the eight stations exceeded the standard during a portion of the season (FB-7, FB-8, FB-10, and FB-12). In 2018, only one station (FB-10) exceeded the standard during a portion of the season.

The 30-day fecal coliform geometric mean standard for swimming (200 MPN/100 ml) was exceeded at FB-7 and FB-10 during October 2017. In 2017, the running 30-day enterococci geometric mean standard for swimming (35 MPN/100 ml) was exceeded in October at FB-10. In 2018, the running 30-day enterococci geometric mean standard (35 MPN/100 ml) and the 30-day fecal coliform geometric mean standard (200 MPN/100 ml) were met at all stations for the length of the sampling season.

In 2017 and 2018, neither the single sample swimming standard of 1,000 MPN/100 ml for fecal coliform nor the 104 MPN/100 ml enterococci swimming standard were exceeded. See *Appendix E* for bacteria data.



**Figure 12. 30-day running geometric mean of 2017
Oyster Bay Harbor fecal coliform samples**



**Figure 13. 30-day running geometric mean of 2017
Oyster Bay Harbor enterococci samples**

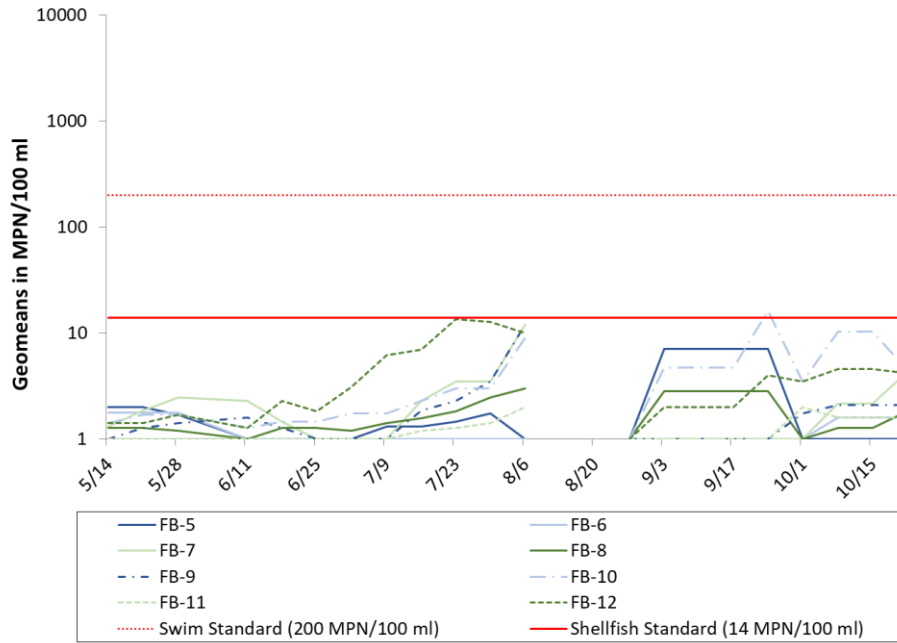


Figure 14. 30-day running geometric mean of 2018 Oyster Bay Harbor fecal coliform samples

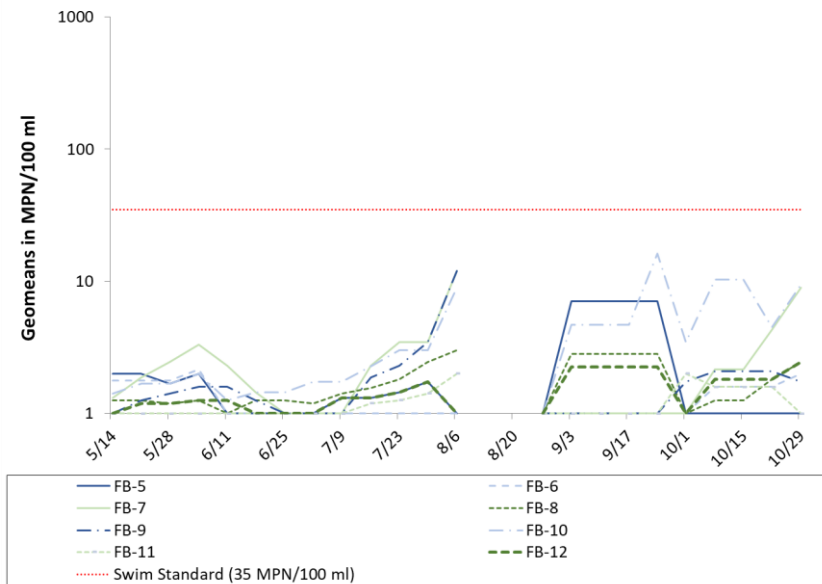


Figure 15. 30-day running geometric mean of 2018 Oyster Bay Harbor enterococci samples

4.1.2.3 Mill Neck Creek Results

Seven stations were monitored in Mill Neck Creek for fecal coliform and enterococci, and monthly geometric means were calculated for the data. *Figure 16* through *Figure 19* present the results of this analysis. FB-15, FB-16, and FB-17 are difficult to monitor due to low tidal conditions preventing access; FB-15, FB-16, and FB-17 were only successfully sampled on 45%, 45%, and 41% of the monitoring events during 2017, respectively, and 74, 47%, and 21% of the monitoring events during 2018, respectively. Therefore, the analysis is based on a much smaller data set for the geometric means.

None of the Mill Neck Creek locations met the fecal coliform geometric mean shellfishing standards (14 MPN/100 ml) for the 2017 monitoring season. In 2018, only one station (FB-18) met this standard. In 2017, two stations (FB-16 and FB-18) met the swim standard of 100 MPN/100 ml. In 2018, four stations (FB-13, FB-16, FB-18, and FB-19) met this standard. In 2017, the enterococci swim standard (35 MPN/100 ml) was exceeded by five stations (FB-13, FB-14, FB-15, FB-16, and FB-17). In 2018, four stations (FB-14, FB-15, FB-16, and FB-17) exceeded this standard.

The single sample fecal coliform standard (1,000 MPN/100 ml) was not exceeded in 2017 or 2018. In 2017 and 2018, FB-17 exceeded the single sample enterococci swimming standard (104 MPN/100 ml) once each season. See *Appendix E* for bacteria data.

The highest levels of fecal coliform and enterococci generally occur at FB-15, FB-16, and FB-17. It is notable that FB-15 is located in tidal flats with limited circulation or flushing during low tide, FB-17 is the closest station to “The Birches” residential subdivision (described previously), and FB-16 is at the northern-most tidal location sampled in Mill Neck Creek (second closest to “The Birches”). As indicated previously, the average bacteria levels recorded at Mill Neck Creek monitoring locations decreased significantly (about 70% and 60% for fecal coliform and enterococci, respectively) from the 2011 to the 2018 sampling seasons. These reductions are an indicator that water quality is continuing to improve following the sewage infrastructure upgrades. However, seasonal geometric mean fecal coliform and enterococci levels at many of the Mill Neck Creek monitoring stations continue to exceed their respective standards, which suggest other sources of fecal indicator bacteria to Mill Neck Creek. Additional monitoring data is needed to further assess water quality in Mill Neck Creek and the remaining pollutant sources.

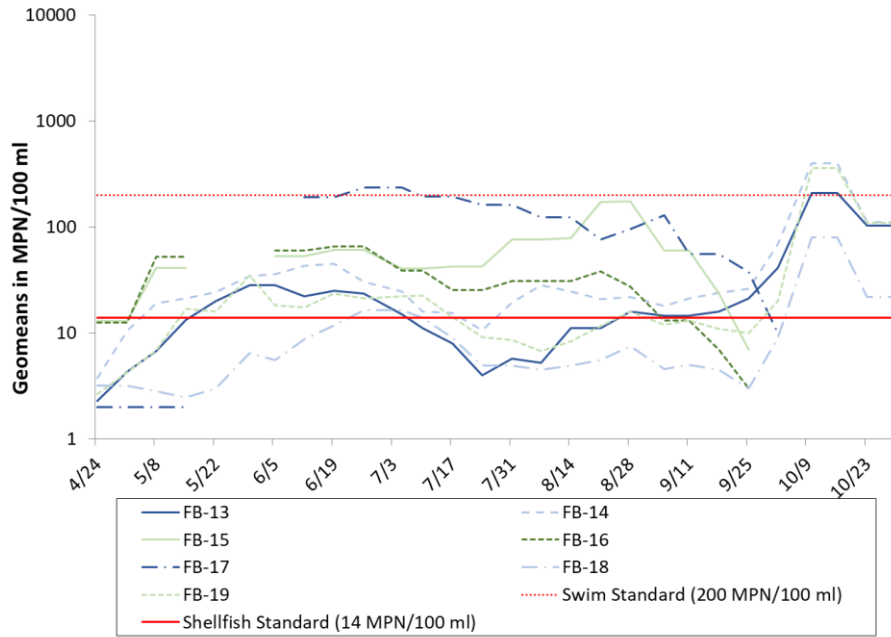


Figure 16. 30-day running geometric mean of 2017 Mill Neck Creek fecal coliform samples

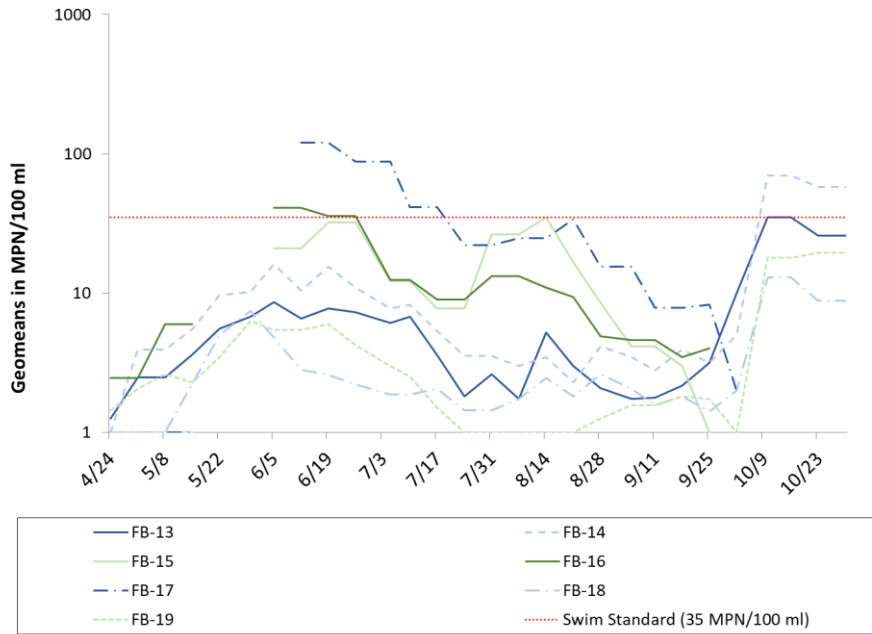


Figure 17. 30-day running geometric mean of 2017 Mill Neck Creek enterococci samples

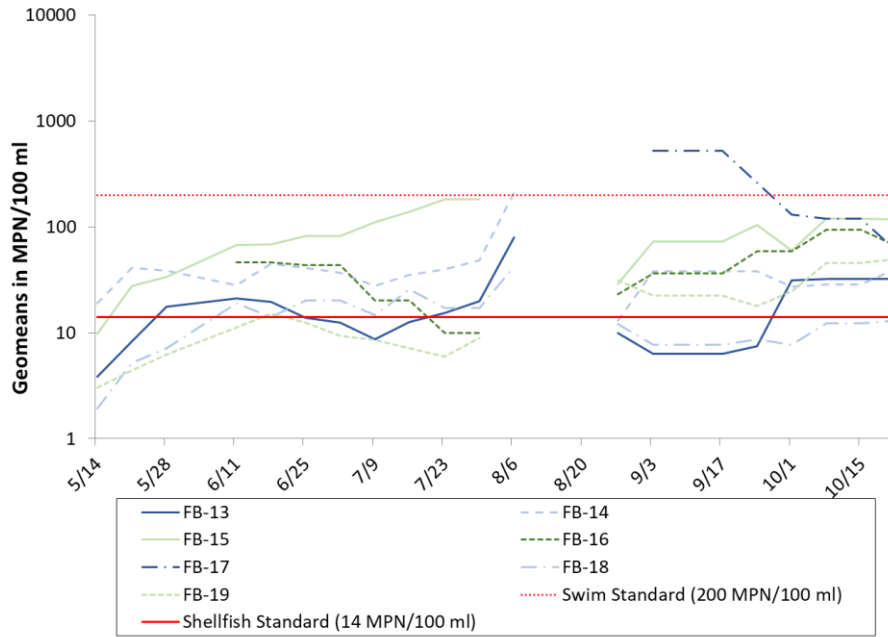


Figure 18. 30-day running geometric mean of 2018 Mill Neck Creek fecal coliform samples

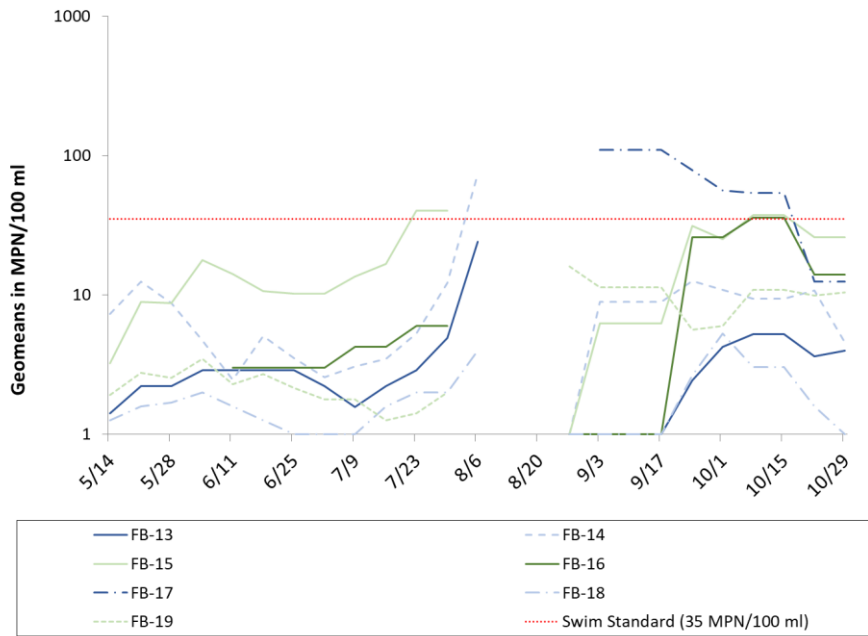


Figure 19. 30-day running geometric mean of 2018 Mill Neck Creek enterococci samples

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 marine organisms. 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 has monitored nitrogen in the estuary since nitrogen is typically the “limiting” nutrient in the marine environment.

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.

Bacteria consume oxygen while decomposing dead phytoplankton. 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.

Four nitrogen species are common in marine waters: ammonia, nitrate, nitrite and organic nitrogen. *Figure 20* presents a schematic of the interrelationships between these species, showing the processes that impact nitrogen in the marine environment.

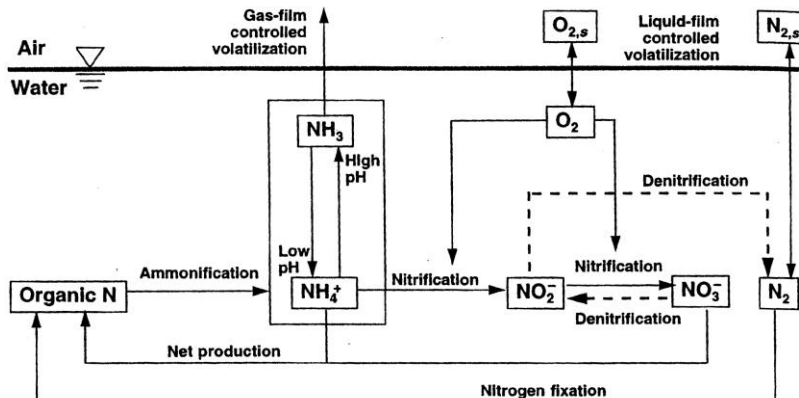


Figure 20. Nitrogen species and processes in marine environments
(Source: Chapra 1997)

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. The criteria are influenced by pH, salinity, and temperature. 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 revised aquatic life standard for ammonia level in marine waters in 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 $\mu\text{g}/\text{L}$ (0.035 mg/l). The acute ammonia standard is 230 $\mu\text{g}/\text{L}$ (0.23 mg/l), meaning that the estuary is considered impaired if measurements exceed this level.

In addition, the NYSDEC 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 (NYSDEC, 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).

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 Oyster Bay Sewer District (OBSD) to reduce nitrogen discharged to Oyster Bay from the treatment plant by 63.8 percent in three 5-year increments by August 2014. With the intent of reducing nitrogen discharges into Oyster Bay and Long Island Sound, the OBSD upgraded its plant in 2006 to provide advanced treatment for nitrogen removal. The OBSD advanced treatment facility is achieving the 2014 nitrogen limits imposed by the 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. Due to lack of available funding, nitrogen sampling has not occurred since 2016.

4.1.4 Dissolved Oxygen

All aquatic life larger than bacteria depends on oxygen availability in the water column. Low levels of oxygen have multiple effects on the marine ecosystem such as changes in 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 Long Island Sound. An excerpt of these findings is presented in *Table 5*. 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 during the months of July, August and September.

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.

Table 5. Effect of Dissolved Oxygen Concentrations on Selected Organisms (LISS, 1994)

Dissolved oxygen concentrations above the pycnocline (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 pycnocline (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

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 revised dissolved oxygen standard was implemented by NYSDEC in 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 allowed (as defined by the equation 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 ($i \dots n$) cannot exceed 1.0:

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

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 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.

In 2017 and 2018, Friends of the Bay monitored dissolved oxygen (DO) levels at the top and bottom of the water column at 19 open water body sites in the estuary. Dissolved oxygen concentrations at the top of the water column averaged 6.78 mg/l in 2017 (ranging from 2.31 to 12.56 mg/l) and 6.91 mg/l in 2018 (ranging from 2.54 to 15.47 mg/l). At a depth of one meter below the surface, DO averaged 6.86 mg/l in 2017 (ranging from 2.67 to 12.06 mg/l) and 6.75 in 2018 (ranging from 2.7 to 15.76). DO averaged 3.32 mg/l at the bottom of the water column in 2017 (ranging from 2.06 to 11.96) and 6.64 in 2018 (ranging from 2.05 to 17.22 mg/l). The 2017 and 2018 data follow the general trends observed in past years, with the highest dissolved oxygen values occurring in the spring, declining levels through the early summer, and then rising again in late summer and into the fall. *Figure 21* through *Figure 26* present DO data collected at the bottom of the water column throughout the 2017 and 2018 seasons.

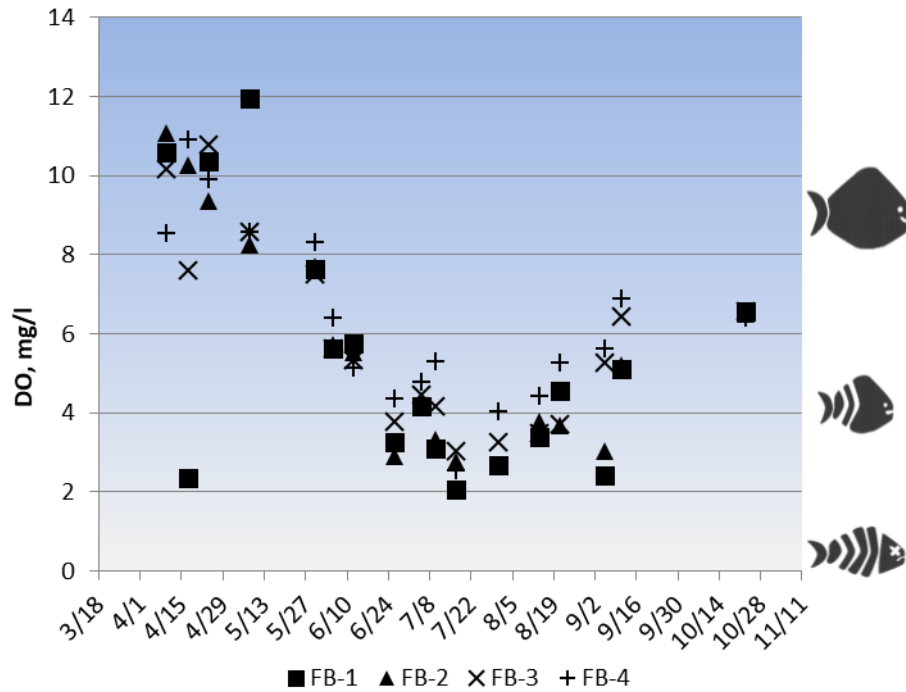


Figure 21. Dissolved oxygen for Cold Spring Harbor monitoring locations, 2017

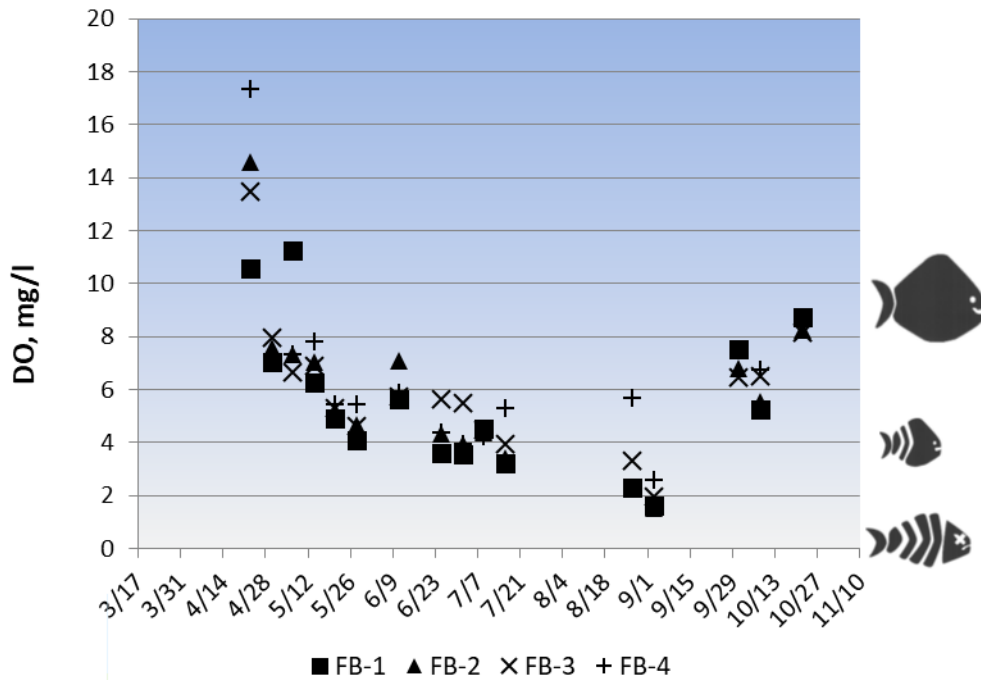


Figure 22. Dissolved oxygen for Cold Spring Harbor monitoring locations, 2018

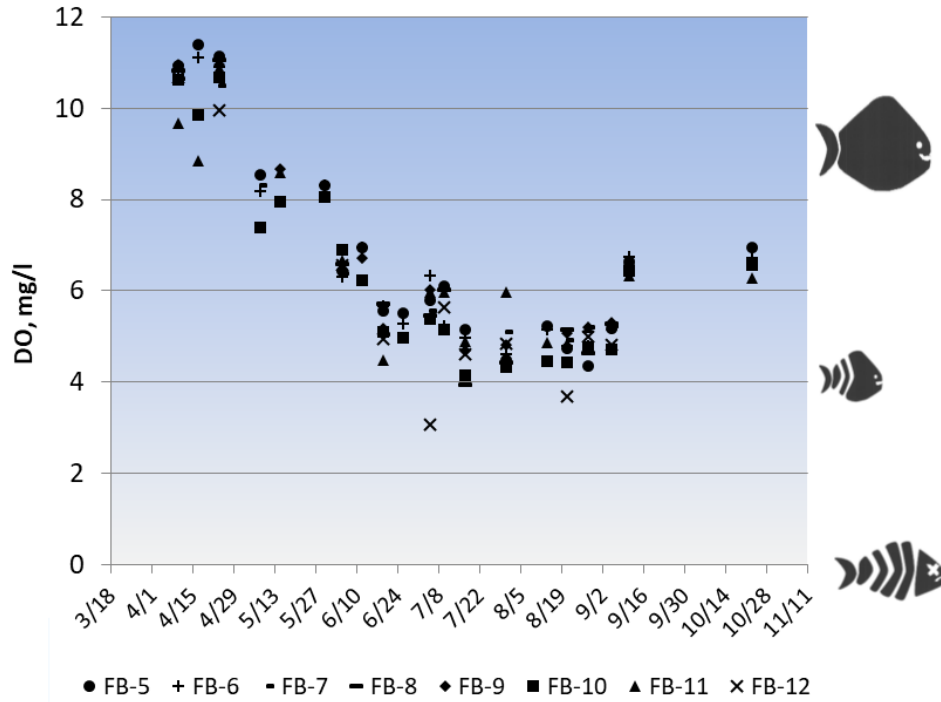


Figure 23. Dissolved oxygen for Oyster Bay Harbor monitoring locations, 2017

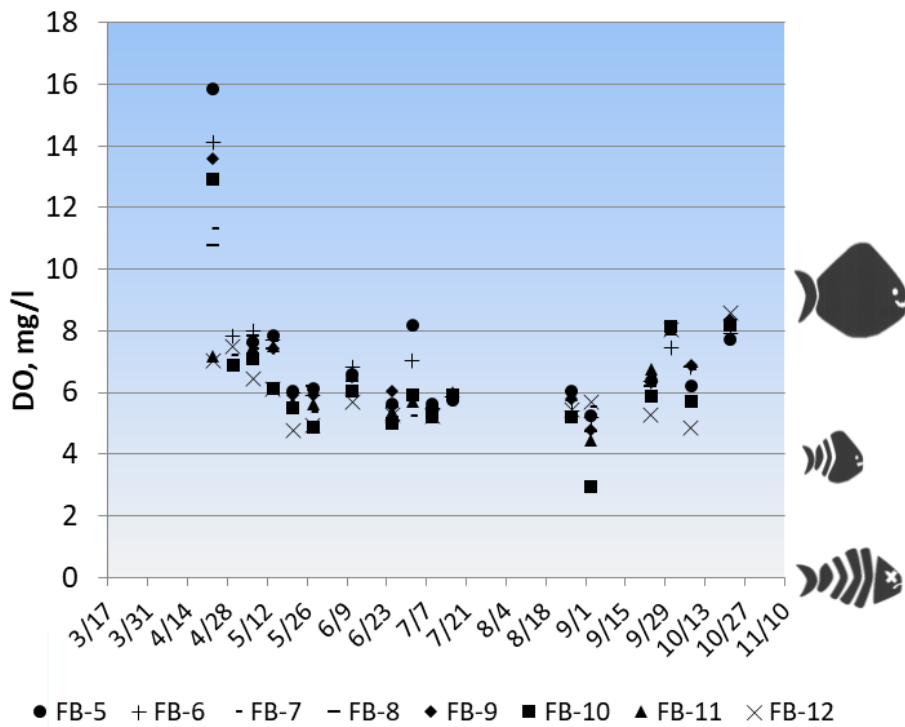


Figure 24. Dissolved oxygen for Oyster Bay Harbor monitoring locations, 2018

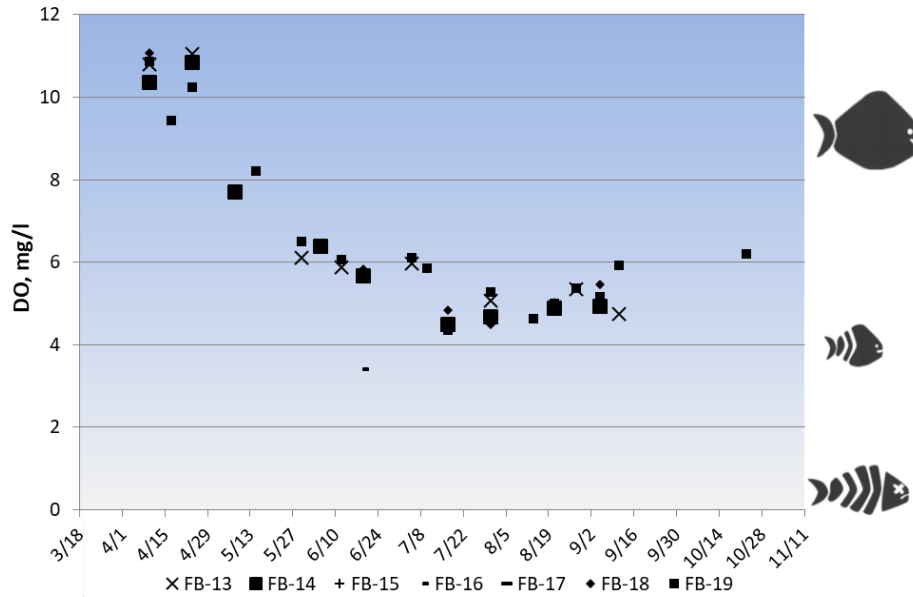


Figure 25. Dissolved oxygen for Mill Neck Creek monitoring locations, 2017

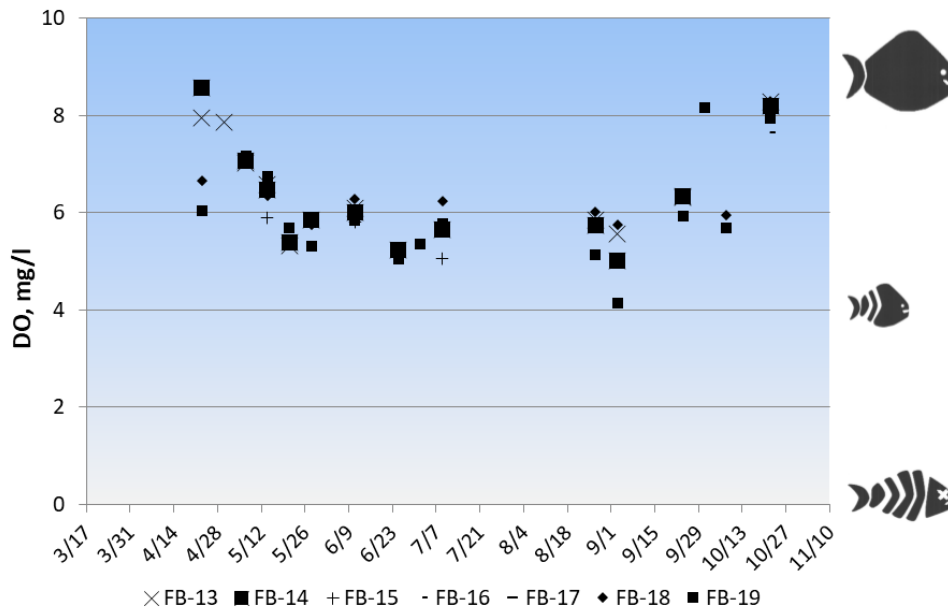


Figure 26. Dissolved oxygen for Mill Neck Creek monitoring locations, 2018

Figure 28 and Figure 29 present boxplots to graphically summarize the DO data collected at the bottom of the water column throughout the 2017 and 2018 seasons. Note that not all monitoring stations are represented in the boxplots as there was insufficient data for some stations. Boxplots provide a succinct,

graphical summary of water quality data to allow comparison of water quality conditions at different monitoring stations; each plot consists of a box, “whiskers”, and outliers. As shown in *Figure 27*, the top of the box is the 75th percentile, the bottom of the box is the 25th percentile, the line dividing the box is the median value (50th percentile), and the diamond is the average. The vertical lines, or “whiskers” above and below the box represent the minimum and maximum values of the observed data.

The mean and median DO values in 2017 and 2018 were similar to those in previous years. In 2017, measured DO values (0.5 m from the bottom) were lower overall than 2018—in 2017 the mean was 6.32 mg/l and the median was 5.63 mg/l, while in 2018, the mean was 6.64 mg/l and the median was 6.18 mg/l). In both years, the Cold Spring Harbor stations (FB-1, FB-2, FB-3, and FB-4) generally showed the greatest variability and lowest DO values of all stations monitored. In 2017, DO concentrations fell below the acute standard of 3.0 mg/l at stations FB-1, FB-2, FB-3, and FB-4. DO levels fell below the acute standard at FB-1, FB-2, FB-3, FB-12, and FB-10 in 2018.

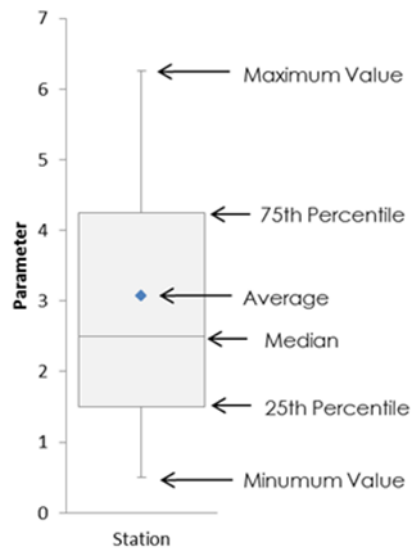


Figure 27. Boxplot Elements

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 note 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.

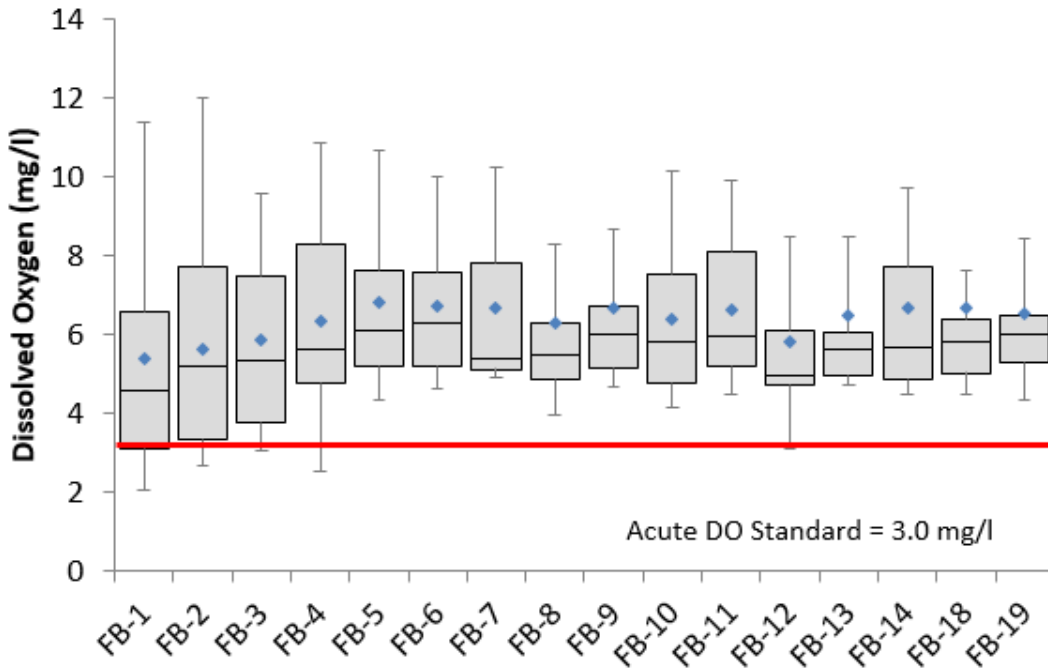


Figure 28. Dissolved oxygen at all monitoring locations, 2017

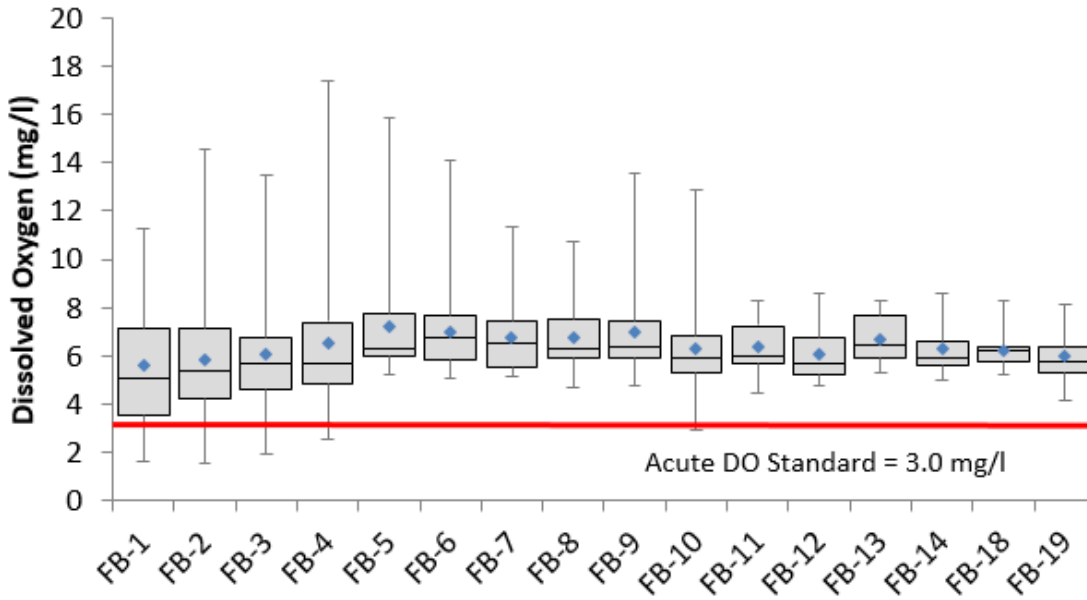


Figure 29. Dissolved oxygen at all monitoring locations, 2018

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 Harbor, Cold Spring Harbor, and Mill Neck Creek estuary complex. No samples were collected during the 2017 and 2018 sampling seasons following upgrades to septic systems near previous monitoring stations. Analysis and discussion of data collected up until 2014 monitoring data can be found in the previous Water Quality Reports.

5 Program Recommendations

5.1 Proposed Short-Term Changes

- **Measure DO Profiles** – Prior to 2003, FOB recorded DO at one-meter intervals throughout the water column. This practice ceased in 2003 due to the excessive number of measurements 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 open water monitoring locations to track the development of stratification throughout the season. If temperature and salinity profiles were also recorded at that location, then the pycnocline (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).

5.2 Potential Future Changes

To further refine the understanding of water quality in Cold Spring Harbor, Oyster Bay Harbor, and Mill Neck Creek, Friends of the Bay is considering the following additions to the monitoring 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.
 - Resume the Friends of the Bay stream and outfall monitoring program, as funding allows, focusing on priority outfalls and discharges to the estuary complex. Both dry- and wet-weather sampling is useful in identifying pollutant sources.
 - 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 focus on reducing pathogen loads to the estuary complex, based on the pathogen loading in Oyster Bay and Mill Neck Creek (the NYSDEC recently revoked Total Maximum Daily Load (TMDL) requirements for five waterbodies in these areas) 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, sediment from stormwater runoff can smother otherwise productive shellfish beds, and contain nutrients such as phosphorus which can result in harmful algal blooms. Specific recommended actions to evaluate other water quality issues include:
 - Coordinate with 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) during future listing of impaired waters (303d list).
 - Coordinate with NYSDEC regarding the potential revised TMDL for Oyster Bay and Mill Neck Creek.
 - 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 effect 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.
- Additional study of the Cold Spring Harbor inner harbor area and the Beaver Lake and Oak Neck Creek areas in Mill Neck Creek is recommended to further assess potential pollution sources in these areas.
- **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.
- **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 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 Conclusions

Analysis of the 2017 and 2018 water quality monitoring data provides the following insights:

- On a seasonal average basis, Oyster Bay Harbor met the State shellfish standards for fecal coliform in 2017 and 2018. Oyster Bay Harbor is where the majority of shellfishing occurs in the estuary. The 2017 seasonal geometric mean fecal coliform levels in Oyster Bay Harbor were among the lowest recorded since monitoring began. The 2017 and 2018 seasonal geometric mean fecal coliform levels were also under the State shellfish standards for Cold Spring Harbor. In contrast, seasonal average levels in Mill Neck Creek exceeded this standard in both 2017 and 2018, although the past two monitoring seasons continue to show a decline in the seasonal geometric mean since the program's inception in 2000.
- Although seasonal geometric mean fecal coliform levels in Oyster Bay Harbor were below the shellfish standard at most locations, consistent with previous years, the 30-day geometric mean fecal coliform levels at most of the stations exceeded the shellfish standard for a portion of the season in 2017 (five of eight stations). In 2018, however, only one station exceeded this standard. For comparison, during the 2015 and 2016 monitoring seasons, the 30-day geometric mean fecal coliform concentrations exceeded the shellfish standard for fecal coliform for four and six of the eight stations, respectively.
- As observed in previous years, fecal indicator bacteria levels in Cold Spring Harbor and Mill Neck Creek were higher than in Oyster Bay Harbor. Only one of the four monitoring stations in Cold Spring Harbor met the fecal coliform shellfish standard for the entirety of the 2017 and 2018 seasons, although two stations and all four stations met the fecal State swim standard in 2017 and 2018, respectively. In 2017, only one station met the enterococci swim standard, although in 2018, all four stations met this standard. Mill Neck Creek consistently has the highest levels of fecal indicator bacteria observed in the estuary complex. The highest levels generally occur at FB-15, FB-16, and FB-17, which are locations that are characterized by limited circulation or flushing during low tide or are located near "The Birches" residential subdivision.
- The average bacteria levels recorded at Mill Neck Creek monitoring locations decreased significantly (about 74% and 77% for fecal coliform and enterococci, respectively) from the 2011 sampling season to the 2018 sampling season, which is a continuation of the trend seen in the 2015-2016 monitoring seasons. These reductions are an indicator of the water quality improvements that have resulted from sewage infrastructure upgrades at The Birches. However, seasonal geometric mean fecal coliform and enterococci levels at many of the Mill Neck Creek monitoring stations continue to exceed their respective standards, which suggest other sources of fecal indicator bacteria to Mill Neck Creek. This could be the result of stormwater pollution. Additional monitoring data is needed to further assess water quality in Mill Neck Creek and the remaining pollutant sources.
- Nitrogen monitoring did not occur due to funding challenges. Since nitrogen plays an important ecosystem role in the estuary, its monitoring is important and should be restarted if feasible.

- A \$10.6 million advanced wastewater treatment facility serving the Oyster Bay Sewer District has been fully operational since March 2006. The facility 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%. Nitrogen monitoring can provide valuable information for evaluating the effects of reduced nitrogen loading on estuary water quality.
- Hypoxic and anoxic conditions are likely to have occurred in the Oyster Bay/Cold Spring Harbor estuary complex during the 2017 and 2018 monitoring seasons, although no fish kills were reported. In both years, the Cold Spring Harbor stations (FB-1, FB-2, FB-3, and FB-4) generally showed the greatest variability and lowest dissolved oxygen values of all stations monitored. Dissolved oxygen concentrations at the bottom of the water column fell below the acute standard of 3.0 mg/l in 2017 and 2018 at most of the Cold Spring Harbor monitoring stations, although it did not drop below this standard for any stations at Oyster Bay Harbor or Mill Neck Creek for these years. Dissolved oxygen data continue to indicate that the waters of the estuary are enriched with nutrients. Long-term reductions in nitrogen inputs should reduce the occurrence of extremely low dissolved oxygen conditions in bottom waters.
- Stream and outfall monitoring was discontinued in 2015. Friends of the Bay will seek to resume stream and stormwater outfall monitoring in 2020 to further assess point and nonpoint source pollutant contributions and sources in the watershed.
- As recommended in the 2011 Watershed Action Plan, ongoing water quality monitoring is essential for evaluating changes in harbor water quality as a result of land use activities in the watershed and implementation of the watershed 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, and dissolved oxygen).
- Friends of the Bay will continue to work with citizen scientists, government agencies, and other non-governmental organizations in future monitoring seasons. Together, FOB and its partners will continue to improve and enhance the monitoring program, with the ultimate objective of protecting and improving the quality of water in the Oyster Bay/Cold Spring Harbor estuary complex.

7 References

Chapra, Steven C. (1997) *Surface Water Quality Modeling*. McGraw-Hill, Inc. New York, NY.

Comprehensive Conservation and Management Plan: Peconic Estuary Program, September 1999 Suffolk County Department of Health Services. Office of ecology. Peconic Estuary Program Office. Walter Davydiak. Chapter 3, pp. 8-12, 64-65.

EPA Region 1 (2006) *Long Island Sound Study at EPA New England* <<http://www.epa.gov/boston/eco/lis/epane.html>>

LISS – Long Island Sound Study. The Comprehensive Conservation and Management Plan. 1994. Published by NYS Department of Environmental Conservation, The Connecticut Department of Environmental Conservation, The EPA Long Island Sound Office.
pp.11-40.

New York Sea Grant Extension. (1990). *Pathogens: Long Island Sound Study Fact Sheet #12*, Stony Brook, NY. 4 pp.

The National Research Council. (2000). *Clean Coastal Waters: Understanding and reducing the Effects of Nutrient Pollution*, National Academy Press Washington D.C. pp. 67-83, 242-246



Appendix A

Oyster Bay/Cold Spring Harbor Estuary Complex Fact Sheet



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. (Since 2005,

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>

both Oyster Bay and Long Island Sound have been declared "no discharge zones." Discharge of sewage from boats is now illegal.)

- 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 (*Crassostrea 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

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

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 licensed independent commercial baymen, annually harvest roughly one-half of New York State's oyster crop¹² and one-half of NY's hard clams¹³ from the heart of the Oyster Bay National Wildlife Refuge.
- A section of the surrounding watershed is located within the Oyster Bay Special Groundwater Protection Area – a Critical Environmental Area¹⁴ – 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.

¹² <http://refuges.fws.gov/profiles/index.cfm?id=52563>

¹³ 2013 New York Annual Shellfish Landings, New York State Department of Environmental Conservation

¹⁴ <http://www.dec.state.ny.us/website/dcs/seqr/cea/>

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

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 harvesting¹⁶ (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 report¹⁷ 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.” (Note that boat discharges have now been banned in Oyster Bay and throughout the Sound.)

❖ 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

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>

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:

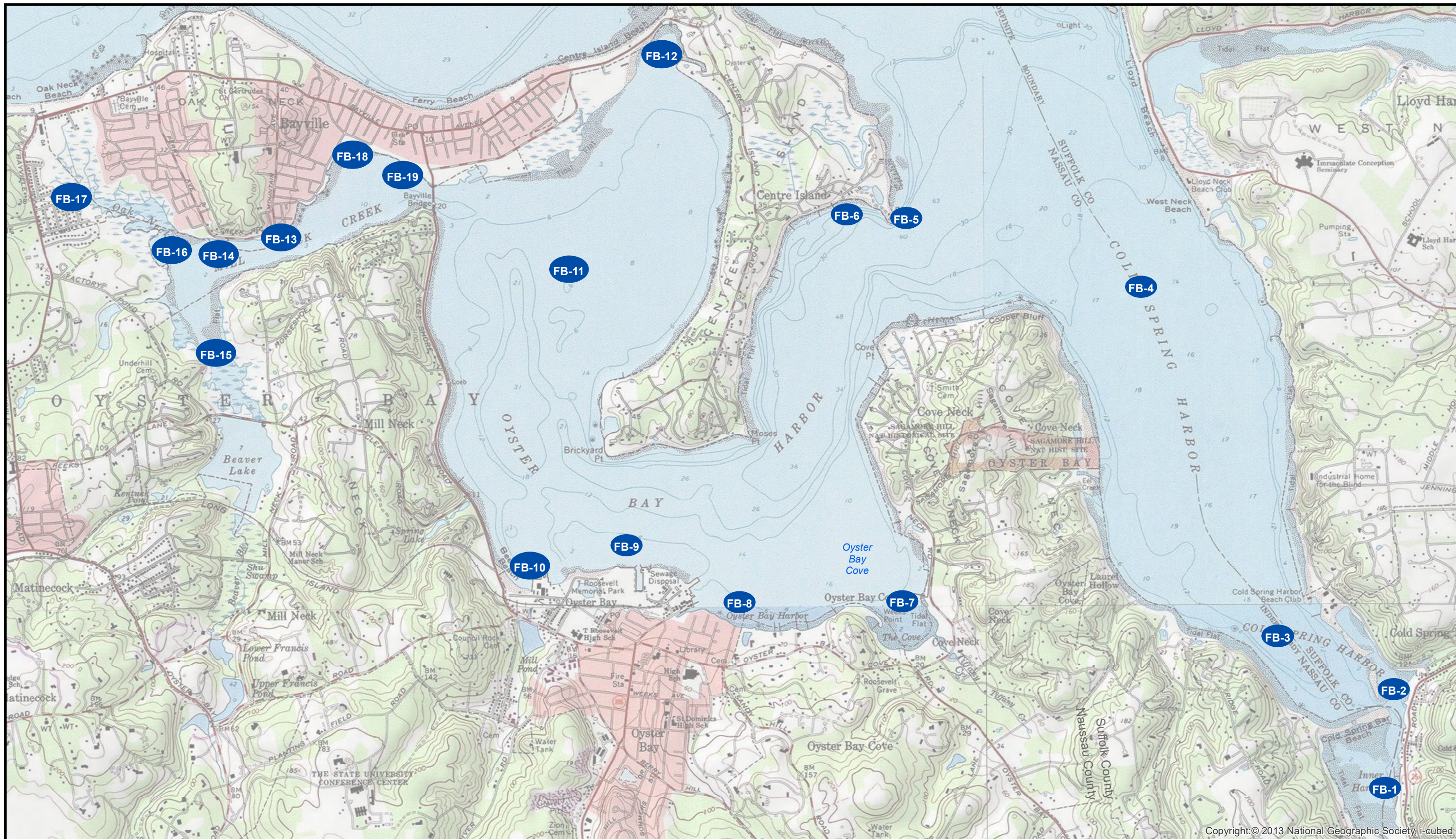
- Public awareness campaigns on illicit dumping of wastewater,
- Enhancement of public toilet facilities near the shore and,
- Expansion of current pump-out programs including the mobile and on-shore pump out facilities.

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



Copyright © 2013 National Geographic Society, i-cubed



Friends of the Bay Water Quality Monitoring Locations



Data Sources:
 Friends of the Bay; USGS Topo Maps © 2011 National Geographic Society;
 Document Path: K:\P2005\1349\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 yards 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

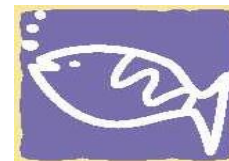


Appendix C

Water Quality Monitoring Data Sheets

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: _____
Cloud Cover	0 = no clouds, 1 = <25%, 2 =25-50%, 3 =50-75%, 4 = 75-100%
Wind Direction	1= North 2= Northeast 3= East 4= Southeast 5= South 6= Southwest 7= West 8= Northwest
Wind Speed	0= no wind 1= <5mph 2= 5-10mph 3= 10-15mph 4= 15-20mph 5= 20-25mph 6= >25mph

	Weather	1 = fair 2 = partly cloudy 3 = cloudy 4 = rain 5 = snow 6 = fog
	Wave Height	0 = no waves 1= slight movement 2= light chop small waves on shore 3= moderate chop 4 = white caps 5 = swells

FIELD MEASUREMENTS Site # _____

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:
Hit bottom before disappearing?	Yes No	Yes No
Angle		
Average of Two Readings	(m)	

COMMENTS



Appendix D

Tide Tables for Oyster Bay – 2017 & 2018

Not the place you expected to see? Try <https://tideslegacy.mobilegeographics.com>.

Oyster Bay Harbor, Oyster Bay, New York 40.8667° N, 73.5167° W

January 2017

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Sun 01	1:01 AM EST 7.1 ft	7:12 AM EST 0.2 ft	1:11 PM EST 7.6 ft	7:42 PM EST -0.4 ft			7:18 AM EST	4:37 PM EST	9:23 AM EST	8:11 PM EST
Mon 02	1:42 AM EST 7.1 ft	7:56 AM EST 0.3 ft	1:55 PM EST 7.5 ft	8:26 PM EST -0.3 ft			7:18 AM EST	4:38 PM EST	10:00 AM EST	9:14 PM EST
Tue 03	2:27 AM EST 7.2 ft	8:46 AM EST 0.3 ft	2:44 PM EST 7.4 ft	9:13 PM EST -0.2 ft			7:18 AM EST	4:38 PM EST	10:34 AM EST	10:18 PM EST
Wed 04	3:16 AM EST 7.2 ft	9:40 AM EST 0.3 ft	3:38 PM EST 7.2 ft	10:05 PM EST -0.1 ft			7:18 AM EST	4:39 PM EST	11:07 AM EST	11:23 PM EST
Thu 05	4:09 AM EST 7.3 ft	10:39 AM EST 0.2 ft	4:37 PM EST 7.0 ft	11:01 PM EST -0.0 ft		First Quarter	7:18 AM EST	4:40 PM EST	11:40 AM EST	
Fri 06	5:06 AM EST 7.5 ft	11:42 AM EST 0.1 ft	5:39 PM EST 6.9 ft				7:18 AM EST	4:41 PM EST	12:15 PM EST	12:30 AM EST
Sat 07		12:00 AM EST 0.0 ft	6:06 AM EST 7.7 ft	12:46 PM EST -0.1 ft	6:42 PM EST 6.9 ft		7:18 AM EST	4:42 PM EST	12:53 PM EST	1:39 AM EST
Sun 08		1:00 AM EST -0.1 ft	7:07 AM EST 8.0 ft	1:48 PM EST -0.4 ft	7:44 PM EST 7.1 ft		7:18 AM EST	4:43 PM EST	1:35 PM EST	2:48 AM EST
Mon 09		2:00 AM EST -0.2 ft	8:06 AM EST 8.2 ft	2:47 PM EST -0.8 ft	8:43 PM EST 7.3 ft		7:18 AM EST	4:44 PM EST	2:23 PM EST	3:58 AM EST
Tue 10		2:57 AM EST -0.5 ft	9:03 AM EST 8.5 ft	3:43 PM EST -1.0 ft	9:39 PM EST 7.5 ft		7:17 AM EST	4:45 PM EST	3:18 PM EST	5:06 AM EST
Wed 11		3:53 AM EST -0.6 ft	9:58 AM EST 8.6 ft	4:36 PM EST -1.2 ft	10:32 PM EST 7.7 ft		7:17 AM EST	4:46 PM EST	4:18 PM EST	6:09 AM EST
Thu 12		4:46 AM EST -0.8 ft	10:50 AM EST 8.7 ft	5:26 PM EST -1.2 ft	11:23 PM EST 7.8 ft	Full Moon	7:17 AM EST	4:47 PM EST	5:23 PM EST	7:06 AM EST
Fri 13		5:38 AM EST -0.8 ft	11:41 AM EST 8.6 ft	6:15 PM EST -1.2 ft			7:17 AM EST	4:49 PM EST	6:29 PM EST	7:55 AM EST
Sat 14	12:12 AM EST 7.9 ft	6:28 AM EST -0.7 ft	12:30 PM EST 8.3 ft	7:02 PM EST -1.0 ft			7:16 AM EST	4:50 PM EST	7:35 PM EST	8:38 AM EST
Sun 15	1:01 AM EST 7.8 ft	7:19 AM EST -0.5 ft	1:19 PM EST 8.0 ft	7:49 PM EST -0.7 ft			7:16 AM EST	4:51 PM EST	8:39 PM EST	9:16 AM EST
Mon 16	1:49 AM EST 7.6 ft	8:09 AM EST -0.2 ft	2:08 PM EST 7.5 ft	8:36 PM EST -0.3 ft			7:15 AM EST	4:52 PM EST	9:41 PM EST	9:50 AM EST
Tue 17	2:38 AM EST 7.4 ft	9:00 AM EST 0.1 ft	2:59 PM EST 7.1 ft	9:24 PM EST 0.1 ft			7:15 AM EST	4:53 PM EST	10:41 PM EST	10:21 AM EST
Wed 18	3:28 AM EST 7.2 ft	9:54 AM EST 0.4 ft	3:51 PM EST 6.7 ft	10:13 PM EST 0.4 ft			7:15 AM EST	4:54 PM EST	11:40 PM EST	10:51 AM EST
Thu 19	4:20 AM EST 7.0 ft	10:49 AM EST 0.6 ft	4:46 PM EST 6.3 ft	11:05 PM EST 0.7 ft		Last Quarter	7:14 AM EST	4:55 PM EST		11:20 AM EST
Fri 20	5:13 AM EST 6.9 ft	11:45 AM EST 0.7 ft	5:43 PM EST 6.1 ft	11:58 PM EST 0.8 ft			7:13 AM EST	4:57 PM EST	12:37 AM EST	11:50 AM EST
Sat 21	6:08 AM EST 6.8 ft	12:42 PM EST 0.7 ft	6:40 PM EST 6.1 ft				7:13 AM EST	4:58 PM EST	1:33 AM EST	12:23 PM EST

Sun 22		12:52 AM EST 0.9 ft	7:01 AM EST 6.9 ft	1:36 PM EST 0.6 ft	7:34 PM EST 6.1 ft		7:12 AM EST	4:59 PM EST	2:29 AM EST	12:58 PM EST
Mon 23		1:45 AM EST 0.8 ft	7:53 AM EST 7.0 ft	2:26 PM EST 0.4 ft	8:26 PM EST 6.3 ft		7:11 AM EST	5:00 PM EST	3:23 AM EST	1:37 PM EST
Tue 24		2:34 AM EST 0.7 ft	8:41 AM EST 7.1 ft	3:12 PM EST 0.2 ft	9:12 PM EST 6.5 ft		7:11 AM EST	5:01 PM EST	4:17 AM EST	2:21 PM EST
Wed 25		3:21 AM EST 0.5 ft	9:26 AM EST 7.3 ft	3:55 PM EST -0.1 ft	9:56 PM EST 6.8 ft		7:10 AM EST	5:03 PM EST	5:08 AM EST	3:09 PM EST
Thu 26		4:05 AM EST 0.3 ft	10:09 AM EST 7.5 ft	4:37 PM EST -0.3 ft	10:38 PM EST 7.0 ft		7:09 AM EST	5:04 PM EST	5:56 AM EST	4:03 PM EST
Fri 27		4:47 AM EST 0.1 ft	10:49 AM EST 7.7 ft	5:17 PM EST -0.5 ft	11:17 PM EST 7.2 ft	New Moon	7:08 AM EST	5:05 PM EST	6:41 AM EST	5:01 PM EST
Sat 28		5:28 AM EST -0.1 ft	11:29 AM EST 7.8 ft	5:56 PM EST -0.6 ft	11:56 PM EST 7.4 ft		7:07 AM EST	5:06 PM EST	7:22 AM EST	6:02 PM EST
Sun 29		6:09 AM EST -0.2 ft	12:09 PM EST 7.9 ft	6:36 PM EST -0.7 ft			7:06 AM EST	5:07 PM EST	8:00 AM EST	7:05 PM EST
Mon 30	12:36 AM EST 7.5 ft	6:52 AM EST -0.3 ft	12:51 PM EST 7.9 ft	7:17 PM EST -0.7 ft			7:06 AM EST	5:09 PM EST	8:36 AM EST	8:10 PM EST
Tue 31	1:17 AM EST 7.6 ft	7:37 AM EST -0.3 ft	1:35 PM EST 7.8 ft	8:01 PM EST -0.6 ft			7:05 AM EST	5:10 PM EST	9:10 AM EST	9:16 PM EST

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

February 2017

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Wed 01	2:02 AM EST 7.7 ft	8:26 AM EST -0.3 ft	2:24 PM EST 7.6 ft	8:48 PM EST -0.4 ft			7:04 AM EST	5:11 PM EST	9:44 AM EST	10:23 PM EST
Thu 02	2:50 AM EST 7.7 ft	9:19 AM EST -0.2 ft	3:17 PM EST 7.3 ft	9:39 PM EST -0.2 ft			7:03 AM EST	5:12 PM EST	10:18 AM EST	11:30 PM EST
Fri 03	3:43 AM EST 7.7 ft	10:18 AM EST -0.1 ft	4:15 PM EST 7.0 ft	10:36 PM EST -0.0 ft		First Quarter	7:02 AM EST	5:14 PM EST	10:54 AM EST	
Sat 04	4:41 AM EST 7.6 ft	11:22 AM EST -0.0 ft	5:19 PM EST 6.8 ft	11:38 PM EST 0.1 ft			7:01 AM EST	5:15 PM EST	11:33 AM EST	12:38 AM EST
Sun 05	5:45 AM EST 7.6 ft	12:28 PM EST -0.1 ft	6:24 PM EST 6.8 ft				7:00 AM EST	5:16 PM EST	12:18 PM EST	1:46 AM EST
Mon 06		12:42 AM EST 0.1 ft	6:49 AM EST 7.7 ft	1:32 PM EST -0.3 ft	7:29 PM EST 6.9 ft		6:58 AM EST	5:17 PM EST	1:08 PM EST	2:52 AM EST
Tue 07		1:45 AM EST -0.0 ft	7:52 AM EST 7.9 ft	2:33 PM EST -0.5 ft	8:30 PM EST 7.1 ft		6:57 AM EST	5:19 PM EST	2:04 PM EST	3:55 AM EST
Wed 08		2:46 AM EST -0.2 ft	8:51 AM EST 8.1 ft	3:29 PM EST -0.7 ft	9:26 PM EST 7.4 ft		6:56 AM EST	5:20 PM EST	3:05 PM EST	4:53 AM EST
Thu 09		3:42 AM EST -0.5 ft	9:47 AM EST 8.2 ft	4:21 PM EST -0.9 ft	10:17 PM EST 7.7 ft		6:55 AM EST	5:21 PM EST	4:09 PM EST	5:45 AM EST
Fri 10		4:34 AM EST -0.7 ft	10:37 AM EST 8.3 ft	5:09 PM EST -1.0 ft	11:06 PM EST 7.9 ft	Full Moon	6:54 AM EST	5:22 PM EST	5:15 PM EST	6:30 AM EST
Sat 11		5:23 AM EST -0.7 ft	11:26 AM EST 8.3 ft	5:54 PM EST -0.9 ft	11:52 PM EST 8.0 ft		6:53 AM EST	5:24 PM EST	6:20 PM EST	7:10 AM EST
Sun 12		6:10 AM EST -0.7 ft	12:11 PM EST 8.1 ft	6:37 PM EST -0.8 ft			6:51 AM EST	5:25 PM EST	7:24 PM EST	7:46 AM EST
Mon 13	12:36 AM EST 7.9 ft	6:56 AM EST -0.6 ft	12:56 PM EST 7.8 ft	7:19 PM EST -0.5 ft			6:50 AM EST	5:26 PM EST	8:26 PM EST	8:19 AM EST
Tue 14	1:19 AM EST 7.8 ft	7:41 AM EST -0.3 ft	1:40 PM EST 7.5 ft	8:01 PM EST -0.2 ft			6:49 AM EST	5:27 PM EST	9:26 PM EST	8:50 AM EST
Wed 15	2:02 AM EST 7.6 ft	8:26 AM EST -0.0 ft	2:25 PM EST 7.1 ft	8:43 PM EST 0.2 ft			6:47 AM EST	5:28 PM EST	10:24 PM EST	9:19 AM EST
Thu 16	2:47 AM EST 7.3 ft	9:13 AM EST 0.3 ft	3:12 PM EST 6.7 ft	9:28 PM EST 0.5 ft			6:46 AM EST	5:30 PM EST	11:21 PM EST	9:50 AM EST
Fri 17	3:34 AM EST 7.1 ft	10:03 AM EST 0.5 ft	4:03 PM EST 6.3 ft	10:17 PM EST 0.8 ft			6:45 AM EST	5:31 PM EST		10:21 AM EST
Sat 18	4:24 AM EST 6.8 ft	10:57 AM EST 0.8 ft	4:58 PM EST 6.1 ft	11:10 PM EST 1.1 ft		Last Quarter	6:43 AM EST	5:32 PM EST	12:18 AM EST	10:55 AM EST
Sun 19	5:19 AM EST 6.7 ft	11:53 AM EST 0.9 ft	5:55 PM EST 6.0 ft				6:42 AM EST	5:33 PM EST	1:13 AM EST	11:33 AM EST
Mon 20		12:07 AM EST 1.2 ft	6:16 AM EST 6.6 ft	12:51 PM EST 0.8 ft	6:52 PM EST 6.1 ft		6:41 AM EST	5:34 PM EST	2:06 AM EST	12:14 PM EST
Tue 21		1:04 AM EST 1.1 ft	7:12 AM EST 6.7 ft	1:45 PM EST 0.7 ft	7:47 PM EST 6.3 ft		6:39 AM EST	5:36 PM EST	2:58 AM EST	1:00 PM EST
Wed 22		1:59 AM EST 0.9 ft	8:06 AM EST 6.9 ft	2:36 PM EST 0.4 ft	8:38 PM EST 6.6 ft		6:38 AM EST	5:37 PM EST	3:48 AM EST	1:51 PM EST

Thu 23		2:50 AM EST 0.6 ft	8:55 AM EST 7.2 ft	3:22 PM EST 0.1 ft	9:24 PM EST 6.9 ft		6:36 AM EST	5:38 PM EST	4:34 AM EST	2:47 PM EST
Fri 24		3:36 AM EST 0.3 ft	9:40 AM EST 7.5 ft	4:06 PM EST -0.2 ft	10:07 PM EST 7.2 ft		6:35 AM EST	5:39 PM EST	5:17 AM EST	3:47 PM EST
Sat 25		4:21 AM EST -0.0 ft	10:23 AM EST 7.8 ft	4:48 PM EST -0.5 ft	10:48 PM EST 7.6 ft		6:33 AM EST	5:40 PM EST	5:57 AM EST	4:51 PM EST
Sun 26		5:04 AM EST -0.4 ft	11:05 AM EST 8.0 ft	5:29 PM EST -0.7 ft	11:28 PM EST 7.9 ft	New Moon	6:32 AM EST	5:41 PM EST	6:34 AM EST	5:56 PM EST
Mon 27		5:47 AM EST -0.6 ft	11:47 AM EST 8.1 ft	6:10 PM EST -0.8 ft			6:30 AM EST	5:43 PM EST	7:09 AM EST	7:03 PM EST
Tue 28	12:09 AM EST 8.1 ft	6:32 AM EST -0.7 ft	12:31 PM EST 8.1 ft	6:52 PM EST -0.8 ft			6:29 AM EST	5:44 PM EST	7:44 AM EST	8:12 PM EST

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

March 2017

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Wed 01	12:52 AM EST 8.3 ft	7:18 AM EST -0.8 ft	1:17 PM EST 8.0 ft	7:37 PM EST -0.7 ft			6:27 AM EST	5:45 PM EST	8:19 AM EST	9:20 PM EST
Thu 02	1:38 AM EST 8.3 ft	8:08 AM EST -0.7 ft	2:06 PM EST 7.8 ft	8:25 PM EST -0.5 ft			6:26 AM EST	5:46 PM EST	8:55 AM EST	10:29 PM EST
Fri 03	2:27 AM EST 8.2 ft	9:02 AM EST -0.5 ft	3:00 PM EST 7.5 ft	9:18 PM EST -0.2 ft			6:24 AM EST	5:47 PM EST	9:34 AM EST	11:38 PM EST
Sat 04	3:21 AM EST 8.0 ft	10:01 AM EST -0.2 ft	3:59 PM EST 7.1 ft	10:17 PM EST 0.1 ft			6:23 AM EST	5:48 PM EST	10:17 AM EST	
Sun 05	4:22 AM EST 7.8 ft	11:05 AM EST -0.0 ft	5:03 PM EST 6.9 ft	11:21 PM EST 0.3 ft		First Quarter	6:21 AM EST	5:49 PM EST	11:04 AM EST	12:45 AM EST
Mon 06	5:27 AM EST 7.6 ft	12:11 PM EST 0.0 ft	6:10 PM EST 6.8 ft				6:20 AM EST	5:51 PM EST	11:57 AM EST	1:48 AM EST
Tue 07		12:28 AM EST 0.4 ft	6:35 AM EST 7.5 ft	1:17 PM EST -0.0 ft	7:15 PM EST 7.0 ft		6:18 AM EST	5:52 PM EST	12:55 PM EST	2:47 AM EST
Wed 08		1:34 AM EST 0.2 ft	7:40 AM EST 7.6 ft	2:18 PM EST -0.2 ft	8:16 PM EST 7.2 ft		6:16 AM EST	5:53 PM EST	1:57 PM EST	3:39 AM EST
Thu 09		2:35 AM EST 0.0 ft	8:40 AM EST 7.8 ft	3:13 PM EST -0.4 ft	9:11 PM EST 7.6 ft		6:15 AM EST	5:54 PM EST	3:01 PM EST	4:26 AM EST
Fri 10		3:31 AM EST -0.3 ft	9:34 AM EST 7.9 ft	4:03 PM EST -0.5 ft	10:01 PM EST 7.8 ft		6:13 AM EST	5:55 PM EST	4:05 PM EST	5:07 AM EST
Sat 11		4:21 AM EST -0.5 ft	10:23 AM EST 8.0 ft	4:48 PM EST -0.6 ft	10:46 PM EST 8.0 ft		6:11 AM EST	5:56 PM EST	5:08 PM EST	5:43 AM EST
Sun 12		6:07 AM EDT -0.6 ft	12:08 PM EDT 8.0 ft	6:30 PM EDT -0.5 ft		Full Moon	7:10 AM EDT	6:57 PM EDT	7:11 PM EDT	7:17 AM EDT
Mon 13	12:28 AM EDT 8.1 ft	6:51 AM EDT -0.6 ft	12:50 PM EDT 7.9 ft	7:10 PM EDT -0.4 ft			7:08 AM EDT	6:58 PM EDT	8:12 PM EDT	7:48 AM EDT
Tue 14	1:09 AM EDT 8.1 ft	7:32 AM EDT -0.5 ft	1:31 PM EDT 7.7 ft	7:48 PM EDT -0.2 ft			7:07 AM EDT	7:00 PM EDT	9:11 PM EDT	8:18 AM EDT
Wed 15	1:48 AM EDT 8.0 ft	8:13 AM EDT -0.3 ft	2:12 PM EDT 7.4 ft	8:26 PM EDT 0.1 ft			7:05 AM EDT	7:01 PM EDT	10:09 PM EDT	8:49 AM EDT
Thu 16	2:27 AM EDT 7.8 ft	8:53 AM EDT -0.1 ft	2:54 PM EDT 7.1 ft	9:05 PM EDT 0.4 ft			7:03 AM EDT	7:02 PM EDT	11:07 PM EDT	9:20 AM EDT
Fri 17	3:08 AM EDT 7.5 ft	9:36 AM EDT 0.2 ft	3:37 PM EDT 6.8 ft	9:47 PM EDT 0.7 ft			7:02 AM EDT	7:03 PM EDT		9:53 AM EDT
Sat 18	3:52 AM EDT 7.2 ft	10:21 AM EDT 0.5 ft	4:24 PM EDT 6.5 ft	10:34 PM EDT 1.0 ft			7:00 AM EDT	7:04 PM EDT	12:03 AM EDT	10:29 AM EDT
Sun 19	4:39 AM EDT 6.9 ft	11:12 AM EDT 0.8 ft	5:15 PM EDT 6.3 ft	11:26 PM EDT 1.3 ft			6:58 AM EDT	7:05 PM EDT	12:57 AM EDT	11:08 AM EDT
Mon 20	5:32 AM EDT 6.7 ft	12:06 PM EDT 1.0 ft	6:11 PM EDT 6.2 ft			Last Quarter	6:57 AM EDT	7:06 PM EDT	1:49 AM EDT	11:52 AM EDT
Tue 21		12:23 AM EDT 1.4 ft	6:29 AM EDT 6.6 ft	1:04 PM EDT 1.0 ft	7:09 PM EDT 6.2 ft		6:55 AM EDT	7:07 PM EDT	2:39 AM EDT	12:40 PM EDT
Wed 22		1:23 AM EDT 1.3 ft	7:28 AM EDT 6.6 ft	2:00 PM EDT 0.9 ft	8:05 PM EDT 6.4 ft		6:53 AM EDT	7:08 PM EDT	3:26 AM EDT	1:33 PM EDT

Thu 23		2:21 AM EDT 1.1 ft	8:25 AM EDT 6.9 ft	2:54 PM EDT 0.6 ft	8:58 PM EDT 6.8 ft		6:52 AM EDT	7:09 PM EDT	4:10 AM EDT	2:31 PM EDT
Fri 24		3:15 AM EDT 0.7 ft	9:18 AM EDT 7.2 ft	3:44 PM EDT 0.3 ft	9:47 PM EDT 7.2 ft		6:50 AM EDT	7:10 PM EDT	4:50 AM EDT	3:32 PM EDT
Sat 25		4:05 AM EDT 0.3 ft	10:07 AM EDT 7.5 ft	4:31 PM EDT -0.1 ft	10:32 PM EDT 7.7 ft		6:48 AM EDT	7:11 PM EDT	5:29 AM EDT	4:36 PM EDT
Sun 26		4:53 AM EDT -0.1 ft	10:54 AM EDT 7.9 ft	5:15 PM EDT -0.4 ft	11:16 PM EDT 8.1 ft		6:47 AM EDT	7:13 PM EDT	6:05 AM EDT	5:43 PM EDT
Mon 27		5:39 AM EDT -0.5 ft	11:39 AM EDT 8.2 ft	5:59 PM EDT -0.6 ft	11:59 PM EDT 8.5 ft	New Moon	6:45 AM EDT	7:14 PM EDT	6:40 AM EDT	6:52 PM EDT
Tue 28		6:25 AM EDT -0.9 ft	12:25 PM EDT 8.3 ft	6:43 PM EDT -0.8 ft			6:43 AM EDT	7:15 PM EDT	7:15 AM EDT	8:03 PM EDT
Wed 29	12:43 AM EDT 8.7 ft	7:12 AM EDT -1.0 ft	1:11 PM EDT 8.3 ft	7:28 PM EDT -0.8 ft			6:42 AM EDT	7:16 PM EDT	7:51 AM EDT	9:14 PM EDT
Thu 30	1:28 AM EDT 8.9 ft	8:00 AM EDT -1.1 ft	2:00 PM EDT 8.2 ft	8:15 PM EDT -0.6 ft			6:40 AM EDT	7:17 PM EDT	8:30 AM EDT	10:26 PM EDT
Fri 31	2:16 AM EDT 8.8 ft	8:51 AM EDT -0.9 ft	2:51 PM EDT 8.0 ft	9:06 PM EDT -0.4 ft			6:38 AM EDT	7:18 PM EDT	9:13 AM EDT	11:35 PM EDT

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

April 2017

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Sat 01	3:08 AM EDT 8.6 ft	9:46 AM EDT -0.6 ft	3:45 PM EDT 7.7 ft	10:01 PM EDT -0.0 ft			6:37 AM EDT	7:19 PM EDT	10:00 AM EDT	
Sun 02	4:04 AM EDT 8.2 ft	10:45 AM EDT -0.3 ft	4:45 PM EDT 7.4 ft	11:02 PM EDT 0.3 ft			6:35 AM EDT	7:20 PM EDT	10:53 AM EDT	12:42 AM EDT
Mon 03	5:06 AM EDT 7.9 ft	11:49 AM EDT -0.0 ft	5:49 PM EDT 7.2 ft			First Quarter	6:33 AM EDT	7:21 PM EDT	11:50 AM EDT	1:43 AM EDT
Tue 04		12:08 AM EDT 0.5 ft	6:12 AM EDT 7.6 ft	12:54 PM EDT 0.2 ft	6:55 PM EDT 7.1 ft		6:32 AM EDT	7:22 PM EDT	12:51 PM EDT	2:38 AM EDT
Wed 05		1:16 AM EDT 0.6 ft	7:20 AM EDT 7.5 ft	1:58 PM EDT 0.2 ft	7:59 PM EDT 7.3 ft		6:30 AM EDT	7:23 PM EDT	1:53 PM EDT	3:25 AM EDT
Thu 06		2:22 AM EDT 0.4 ft	8:25 AM EDT 7.5 ft	2:58 PM EDT 0.1 ft	8:59 PM EDT 7.5 ft		6:28 AM EDT	7:24 PM EDT	2:56 PM EDT	4:07 AM EDT
Fri 07		3:22 AM EDT 0.2 ft	9:24 AM EDT 7.6 ft	3:52 PM EDT -0.0 ft	9:52 PM EDT 7.8 ft		6:27 AM EDT	7:25 PM EDT	3:59 PM EDT	4:45 AM EDT
Sat 08		4:16 AM EDT -0.0 ft	10:17 AM EDT 7.7 ft	4:40 PM EDT -0.1 ft	10:40 PM EDT 8.0 ft		6:25 AM EDT	7:26 PM EDT	5:01 PM EDT	5:18 AM EDT
Sun 09		5:04 AM EDT -0.2 ft	11:04 AM EDT 7.7 ft	5:24 PM EDT -0.1 ft	11:23 PM EDT 8.2 ft		6:24 AM EDT	7:27 PM EDT	6:01 PM EDT	5:49 AM EDT
Mon 10		5:48 AM EDT -0.3 ft	11:47 AM EDT 7.7 ft	6:03 PM EDT -0.0 ft			6:22 AM EDT	7:28 PM EDT	7:01 PM EDT	6:19 AM EDT
Tue 11	12:03 AM EDT 8.2 ft	6:29 AM EDT -0.4 ft	12:28 PM EDT 7.7 ft	6:41 PM EDT 0.1 ft		Full Moon	6:20 AM EDT	7:29 PM EDT	7:59 PM EDT	6:49 AM EDT
Wed 12	12:41 AM EDT 8.2 ft	7:08 AM EDT -0.3 ft	1:07 PM EDT 7.6 ft	7:18 PM EDT 0.3 ft			6:19 AM EDT	7:30 PM EDT	8:57 PM EDT	7:19 AM EDT
Thu 13	1:18 AM EDT 8.1 ft	7:46 AM EDT -0.2 ft	1:46 PM EDT 7.4 ft	7:54 PM EDT 0.5 ft			6:17 AM EDT	7:31 PM EDT	9:54 PM EDT	7:52 AM EDT
Fri 14	1:55 AM EDT 7.9 ft	8:24 AM EDT 0.0 ft	2:25 PM EDT 7.2 ft	8:33 PM EDT 0.7 ft			6:16 AM EDT	7:32 PM EDT	10:49 PM EDT	8:26 AM EDT
Sat 15	2:34 AM EDT 7.7 ft	9:04 AM EDT 0.2 ft	3:07 PM EDT 7.0 ft	9:13 PM EDT 1.0 ft			6:14 AM EDT	7:33 PM EDT	11:42 PM EDT	9:04 AM EDT
Sun 16	3:15 AM EDT 7.4 ft	9:46 AM EDT 0.5 ft	3:51 PM EDT 6.8 ft	9:58 PM EDT 1.2 ft			6:13 AM EDT	7:35 PM EDT		9:46 AM EDT
Mon 17	4:00 AM EDT 7.1 ft	10:33 AM EDT 0.7 ft	4:39 PM EDT 6.6 ft	10:48 PM EDT 1.4 ft			6:11 AM EDT	7:36 PM EDT	12:33 AM EDT	10:32 AM EDT
Tue 18	4:50 AM EDT 6.9 ft	11:24 AM EDT 0.9 ft	5:31 PM EDT 6.5 ft	11:44 PM EDT 1.4 ft			6:10 AM EDT	7:37 PM EDT	1:21 AM EDT	11:23 AM EDT
Wed 19	5:46 AM EDT 6.8 ft	12:20 PM EDT 0.9 ft	6:26 PM EDT 6.6 ft			Last Quarter	6:08 AM EDT	7:38 PM EDT	2:05 AM EDT	12:17 PM EDT
Thu 20		12:43 AM EDT 1.4 ft	6:44 AM EDT 6.8 ft	1:16 PM EDT 0.9 ft	7:22 PM EDT 6.8 ft		6:07 AM EDT	7:39 PM EDT	2:46 AM EDT	1:16 PM EDT
Fri 21		1:42 AM EDT 1.1 ft	7:43 AM EDT 7.0 ft	2:11 PM EDT 0.6 ft	8:17 PM EDT 7.2 ft		6:05 AM EDT	7:40 PM EDT	3:24 AM EDT	2:17 PM EDT
Sat 22		2:39 AM EDT 0.8 ft	8:39 AM EDT 7.2 ft	3:03 PM EDT 0.4 ft	9:08 PM EDT 7.6 ft		6:04 AM EDT	7:41 PM EDT	4:00 AM EDT	3:22 PM EDT

Sun 23		3:33 AM EDT 0.3 ft	9:33 AM EDT 7.6 ft	3:53 PM EDT 0.0 ft	9:56 PM EDT 8.1 ft		6:02 AM EDT	7:42 PM EDT	4:35 AM EDT	4:29 PM EDT
Mon 24		4:24 AM EDT -0.2 ft	10:24 AM EDT 7.9 ft	4:41 PM EDT -0.3 ft	10:44 PM EDT 8.6 ft		6:01 AM EDT	7:43 PM EDT	5:09 AM EDT	5:39 PM EDT
Tue 25		5:14 AM EDT -0.7 ft	11:13 AM EDT 8.2 ft	5:29 PM EDT -0.5 ft	11:30 PM EDT 9.0 ft		6:00 AM EDT	7:44 PM EDT	5:45 AM EDT	6:50 PM EDT
Wed 26		6:03 AM EDT -1.0 ft	12:02 PM EDT 8.3 ft	6:16 PM EDT -0.6 ft		New Moon	5:58 AM EDT	7:45 PM EDT	6:23 AM EDT	8:04 PM EDT
Thu 27	12:18 AM EDT 9.2 ft	6:52 AM EDT -1.2 ft	12:51 PM EDT 8.4 ft	7:05 PM EDT -0.6 ft			5:57 AM EDT	7:46 PM EDT	7:04 AM EDT	9:17 PM EDT
Fri 28	1:07 AM EDT 9.3 ft	7:43 AM EDT -1.2 ft	1:42 PM EDT 8.3 ft	7:55 PM EDT -0.5 ft			5:56 AM EDT	7:47 PM EDT	7:51 AM EDT	10:28 PM EDT
Sat 29	1:57 AM EDT 9.1 ft	8:35 AM EDT -1.0 ft	2:35 PM EDT 8.1 ft	8:49 PM EDT -0.2 ft			5:54 AM EDT	7:48 PM EDT	8:43 AM EDT	11:34 PM EDT
Sun 30	2:51 AM EDT 8.8 ft	9:31 AM EDT -0.7 ft	3:31 PM EDT 7.9 ft	9:46 PM EDT 0.1 ft			5:53 AM EDT	7:49 PM EDT	9:40 AM EDT	

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

May 2017

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Mon 01	3:49 AM EDT 8.4 ft	10:29 AM EDT -0.3 ft	4:30 PM EDT 7.7 ft	10:48 PM EDT 0.4 ft			5:52 AM EDT	7:50 PM EDT	10:42 AM EDT	12:33 AM EDT
Tue 02	4:50 AM EDT 8.0 ft	11:30 AM EDT -0.0 ft	5:32 PM EDT 7.5 ft	11:54 PM EDT 0.6 ft		First Quarter	5:50 AM EDT	7:51 PM EDT	11:45 AM EDT	1:24 AM EDT
Wed 03	5:55 AM EDT 7.6 ft	12:33 PM EDT 0.2 ft	6:36 PM EDT 7.5 ft				5:49 AM EDT	7:52 PM EDT	12:49 PM EDT	2:09 AM EDT
Thu 04		1:00 AM EDT 0.6 ft	7:01 AM EDT 7.4 ft	1:34 PM EDT 0.3 ft	7:38 PM EDT 7.6 ft		5:48 AM EDT	7:53 PM EDT	1:53 PM EDT	2:47 AM EDT
Fri 05		2:04 AM EDT 0.6 ft	8:04 AM EDT 7.3 ft	2:31 PM EDT 0.3 ft	8:35 PM EDT 7.7 ft		5:47 AM EDT	7:55 PM EDT	2:54 PM EDT	3:22 AM EDT
Sat 06		3:03 AM EDT 0.4 ft	9:01 AM EDT 7.3 ft	3:24 PM EDT 0.3 ft	9:27 PM EDT 7.9 ft		5:45 AM EDT	7:56 PM EDT	3:55 PM EDT	3:53 AM EDT
Sun 07		3:56 AM EDT 0.2 ft	9:54 AM EDT 7.4 ft	4:11 PM EDT 0.3 ft	10:13 PM EDT 8.1 ft		5:44 AM EDT	7:57 PM EDT	4:54 PM EDT	4:23 AM EDT
Mon 08		4:43 AM EDT 0.0 ft	10:41 AM EDT 7.4 ft	4:54 PM EDT 0.4 ft	10:56 PM EDT 8.2 ft		5:43 AM EDT	7:58 PM EDT	5:52 PM EDT	4:52 AM EDT
Tue 09		5:26 AM EDT -0.1 ft	11:23 AM EDT 7.4 ft	5:34 PM EDT 0.4 ft	11:35 PM EDT 8.2 ft		5:42 AM EDT	7:59 PM EDT	6:50 PM EDT	5:22 AM EDT
Wed 10		6:05 AM EDT -0.1 ft	12:04 PM EDT 7.4 ft	6:12 PM EDT 0.5 ft		Full Moon	5:41 AM EDT	8:00 PM EDT	7:47 PM EDT	5:53 AM EDT
Thu 11	12:14 AM EDT 8.2 ft	6:44 AM EDT -0.1 ft	12:43 PM EDT 7.4 ft	6:50 PM EDT 0.6 ft			5:40 AM EDT	8:01 PM EDT	8:43 PM EDT	6:26 AM EDT
Fri 12	12:50 AM EDT 8.1 ft	7:21 AM EDT -0.0 ft	1:22 PM EDT 7.3 ft	7:27 PM EDT 0.8 ft			5:39 AM EDT	8:02 PM EDT	9:37 PM EDT	7:03 AM EDT
Sat 13	1:28 AM EDT 7.9 ft	7:58 AM EDT 0.1 ft	2:00 PM EDT 7.2 ft	8:05 PM EDT 0.9 ft			5:38 AM EDT	8:03 PM EDT	10:29 PM EDT	7:43 AM EDT
Sun 14	2:06 AM EDT 7.8 ft	8:37 AM EDT 0.2 ft	2:41 PM EDT 7.1 ft	8:46 PM EDT 1.1 ft			5:37 AM EDT	8:04 PM EDT	11:18 PM EDT	8:27 AM EDT
Mon 15	2:46 AM EDT 7.6 ft	9:17 AM EDT 0.4 ft	3:22 PM EDT 7.0 ft	9:30 PM EDT 1.2 ft			5:36 AM EDT	8:05 PM EDT		9:16 AM EDT
Tue 16	3:29 AM EDT 7.4 ft	10:01 AM EDT 0.5 ft	4:07 PM EDT 6.9 ft	10:18 PM EDT 1.3 ft			5:35 AM EDT	8:05 PM EDT	12:03 AM EDT	10:09 AM EDT
Wed 17	4:16 AM EDT 7.2 ft	10:49 AM EDT 0.7 ft	4:56 PM EDT 6.9 ft	11:11 PM EDT 1.3 ft			5:34 AM EDT	8:06 PM EDT	12:44 AM EDT	11:05 AM EDT
Thu 18	5:08 AM EDT 7.1 ft	11:41 AM EDT 0.7 ft	5:48 PM EDT 7.0 ft			Last Quarter	5:33 AM EDT	8:07 PM EDT	1:23 AM EDT	12:04 PM EDT
Fri 19		12:08 AM EDT 1.2 ft	6:05 AM EDT 7.1 ft	12:35 PM EDT 0.7 ft	6:42 PM EDT 7.2 ft		5:32 AM EDT	8:08 PM EDT	1:58 AM EDT	1:05 PM EDT
Sat 20		1:06 AM EDT 1.0 ft	7:04 AM EDT 7.1 ft	1:30 PM EDT 0.6 ft	7:36 PM EDT 7.6 ft		5:32 AM EDT	8:09 PM EDT	2:32 AM EDT	2:10 PM EDT
Sun 21		2:05 AM EDT 0.7 ft	8:02 AM EDT 7.3 ft	2:24 PM EDT 0.4 ft	8:29 PM EDT 8.0 ft		5:31 AM EDT	8:10 PM EDT	3:06 AM EDT	3:16 PM EDT
Mon 22		3:02 AM EDT 0.2 ft	8:59 AM EDT 7.5 ft	3:17 PM EDT 0.1 ft	9:22 PM EDT 8.4 ft		5:30 AM EDT	8:11 PM EDT	3:40 AM EDT	4:25 PM EDT

Tue 23		3:57 AM EDT -0.3 ft	9:55 AM EDT 7.8 ft	4:09 PM EDT -0.1 ft	10:13 PM EDT 8.9 ft		5:29 AM EDT	8:12 PM EDT	4:15 AM EDT	5:37 PM EDT
Wed 24		4:50 AM EDT -0.7 ft	10:48 AM EDT 8.0 ft	5:01 PM EDT -0.3 ft	11:04 PM EDT 9.2 ft		5:29 AM EDT	8:13 PM EDT	4:54 AM EDT	6:50 PM EDT
Thu 25		5:42 AM EDT -1.0 ft	11:40 AM EDT 8.2 ft	5:52 PM EDT -0.4 ft	11:56 PM EDT 9.4 ft	New Moon	5:28 AM EDT	8:14 PM EDT	5:38 AM EDT	8:04 PM EDT
Fri 26		6:34 AM EDT -1.2 ft	12:32 PM EDT 8.3 ft	6:44 PM EDT -0.5 ft			5:27 AM EDT	8:15 PM EDT	6:27 AM EDT	9:15 PM EDT
Sat 27	12:47 AM EDT 9.4 ft	7:26 AM EDT -1.1 ft	1:25 PM EDT 8.3 ft	7:38 PM EDT -0.4 ft			5:27 AM EDT	8:15 PM EDT	7:24 AM EDT	10:20 PM EDT
Sun 28	1:40 AM EDT 9.2 ft	8:19 AM EDT -1.0 ft	2:19 PM EDT 8.2 ft	8:33 PM EDT -0.2 ft			5:26 AM EDT	8:16 PM EDT	8:26 AM EDT	11:17 PM EDT
Mon 29	2:35 AM EDT 8.9 ft	9:14 AM EDT -0.7 ft	3:14 PM EDT 8.1 ft	9:31 PM EDT 0.1 ft			5:25 AM EDT	8:17 PM EDT	9:31 AM EDT	
Tue 30	3:32 AM EDT 8.4 ft	10:10 AM EDT -0.4 ft	4:12 PM EDT 7.9 ft	10:31 PM EDT 0.3 ft			5:25 AM EDT	8:18 PM EDT	10:37 AM EDT	12:06 AM EDT
Wed 31	4:31 AM EDT 8.0 ft	11:07 AM EDT -0.1 ft	5:11 PM EDT 7.8 ft	11:34 PM EDT 0.5 ft			5:25 AM EDT	8:19 PM EDT	11:43 AM EDT	12:48 AM EDT

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

June 2017

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Thu 01	5:33 AM EDT 7.6 ft	12:05 PM EDT 0.2 ft	6:10 PM EDT 7.7 ft			First Quarter	5:24 AM EDT	8:19 PM EDT	12:46 PM EDT	1:24 AM EDT
Fri 02		12:37 AM EDT 0.7 ft	6:34 AM EDT 7.3 ft	1:03 PM EDT 0.4 ft	7:09 PM EDT 7.7 ft		5:24 AM EDT	8:20 PM EDT	1:48 PM EDT	1:57 AM EDT
Sat 03		1:39 AM EDT 0.7 ft	7:35 AM EDT 7.1 ft	1:58 PM EDT 0.6 ft	8:04 PM EDT 7.8 ft		5:23 AM EDT	8:21 PM EDT	2:48 PM EDT	2:27 AM EDT
Sun 04		2:36 AM EDT 0.6 ft	8:32 AM EDT 7.0 ft	2:50 PM EDT 0.7 ft	8:56 PM EDT 7.9 ft		5:23 AM EDT	8:21 PM EDT	3:47 PM EDT	2:56 AM EDT
Mon 05		3:29 AM EDT 0.4 ft	9:25 AM EDT 7.0 ft	3:38 PM EDT 0.7 ft	9:43 PM EDT 8.0 ft		5:23 AM EDT	8:22 PM EDT	4:44 PM EDT	3:25 AM EDT
Tue 06		4:16 AM EDT 0.3 ft	10:13 AM EDT 7.1 ft	4:23 PM EDT 0.8 ft	10:27 PM EDT 8.0 ft		5:22 AM EDT	8:23 PM EDT	5:41 PM EDT	3:56 AM EDT
Wed 07		5:00 AM EDT 0.2 ft	10:57 AM EDT 7.1 ft	5:04 PM EDT 0.8 ft	11:07 PM EDT 8.0 ft		5:22 AM EDT	8:23 PM EDT	6:37 PM EDT	4:28 AM EDT
Thu 08		5:40 AM EDT 0.1 ft	11:39 AM EDT 7.2 ft	5:45 PM EDT 0.8 ft	11:47 PM EDT 8.0 ft		5:22 AM EDT	8:24 PM EDT	7:32 PM EDT	5:03 AM EDT
Fri 09		6:18 AM EDT 0.1 ft	12:19 PM EDT 7.2 ft	6:24 PM EDT 0.8 ft		Full Moon	5:21 AM EDT	8:24 PM EDT	8:25 PM EDT	5:42 AM EDT
Sat 10	12:25 AM EDT 8.0 ft	6:56 AM EDT 0.1 ft	12:58 PM EDT 7.2 ft	7:02 PM EDT 0.9 ft			5:21 AM EDT	8:25 PM EDT	9:15 PM EDT	6:25 AM EDT
Sun 11	1:03 AM EDT 7.9 ft	7:34 AM EDT 0.1 ft	1:37 PM EDT 7.2 ft	7:42 PM EDT 0.9 ft			5:21 AM EDT	8:25 PM EDT	10:02 PM EDT	7:12 AM EDT
Mon 12	1:42 AM EDT 7.8 ft	8:12 AM EDT 0.2 ft	2:16 PM EDT 7.2 ft	8:22 PM EDT 1.0 ft			5:21 AM EDT	8:26 PM EDT	10:45 PM EDT	8:03 AM EDT
Tue 13	2:21 AM EDT 7.7 ft	8:52 AM EDT 0.2 ft	2:56 PM EDT 7.2 ft	9:05 PM EDT 1.0 ft			5:21 AM EDT	8:26 PM EDT	11:24 PM EDT	8:58 AM EDT
Wed 14	3:03 AM EDT 7.6 ft	9:34 AM EDT 0.3 ft	3:39 PM EDT 7.2 ft	9:51 PM EDT 1.1 ft			5:21 AM EDT	8:27 PM EDT		9:56 AM EDT
Thu 15	3:48 AM EDT 7.5 ft	10:19 AM EDT 0.4 ft	4:24 PM EDT 7.3 ft	10:42 PM EDT 1.1 ft			5:21 AM EDT	8:27 PM EDT	12:00 AM EDT	10:56 AM EDT
Fri 16	4:38 AM EDT 7.4 ft	11:07 AM EDT 0.4 ft	5:13 PM EDT 7.4 ft	11:37 PM EDT 1.0 ft			5:21 AM EDT	8:27 PM EDT	12:34 AM EDT	11:58 AM EDT
Sat 17	5:32 AM EDT 7.3 ft	11:59 AM EDT 0.5 ft	6:06 PM EDT 7.6 ft			Last Quarter	5:21 AM EDT	8:28 PM EDT	1:07 AM EDT	1:01 PM EDT
Sun 18		12:35 AM EDT 0.8 ft	6:30 AM EDT 7.2 ft	12:53 PM EDT 0.4 ft	7:00 PM EDT 7.9 ft		5:21 AM EDT	8:28 PM EDT	1:39 AM EDT	2:07 PM EDT
Mon 19		1:35 AM EDT 0.5 ft	7:31 AM EDT 7.3 ft	1:50 PM EDT 0.3 ft	7:56 PM EDT 8.2 ft		5:22 AM EDT	8:28 PM EDT	2:12 AM EDT	3:15 PM EDT
Tue 20		2:34 AM EDT 0.1 ft	8:30 AM EDT 7.4 ft	2:46 PM EDT 0.2 ft	8:53 PM EDT 8.6 ft		5:22 AM EDT	8:29 PM EDT	2:48 AM EDT	4:26 PM EDT
Wed 21		3:33 AM EDT -0.3 ft	9:29 AM EDT 7.6 ft	3:42 PM EDT 0.0 ft	9:48 PM EDT 8.9 ft		5:22 AM EDT	8:29 PM EDT	3:27 AM EDT	5:38 PM EDT
Thu 22		4:29 AM EDT -0.6 ft	10:26 AM EDT 7.8 ft	4:37 PM EDT -0.2 ft	10:43 PM EDT 9.2 ft		5:22 AM EDT	8:29 PM EDT	4:13 AM EDT	6:50 PM EDT

Fri 23		5:23 AM EDT -0.9 ft	11:21 AM EDT 8.0 ft	5:32 PM EDT -0.3 ft	11:37 PM EDT 9.3 ft	New Moon	5:22 AM EDT	8:29 PM EDT	5:05 AM EDT	7:59 PM EDT
Sat 24		6:17 AM EDT -1.0 ft	12:14 PM EDT 8.2 ft	6:27 PM EDT -0.4 ft			5:23 AM EDT	8:29 PM EDT	6:05 AM EDT	9:01 PM EDT
Sun 25	12:31 AM EDT 9.3 ft	7:09 AM EDT -1.0 ft	1:08 PM EDT 8.3 ft	7:21 PM EDT -0.4 ft			5:23 AM EDT	8:29 PM EDT	7:10 AM EDT	9:56 PM EDT
Mon 26	1:24 AM EDT 9.1 ft	8:01 AM EDT -0.9 ft	2:01 PM EDT 8.3 ft	8:16 PM EDT -0.2 ft			5:23 AM EDT	8:29 PM EDT	8:18 AM EDT	10:42 PM EDT
Tue 27	2:18 AM EDT 8.8 ft	8:53 AM EDT -0.7 ft	2:54 PM EDT 8.2 ft	9:12 PM EDT 0.0 ft			5:24 AM EDT	8:29 PM EDT	9:26 AM EDT	11:23 PM EDT
Wed 28	3:12 AM EDT 8.4 ft	9:46 AM EDT -0.4 ft	3:48 PM EDT 8.1 ft	10:09 PM EDT 0.3 ft			5:24 AM EDT	8:29 PM EDT	10:33 AM EDT	11:58 PM EDT
Thu 29	4:08 AM EDT 7.9 ft	10:38 AM EDT -0.0 ft	4:43 PM EDT 8.0 ft	11:08 PM EDT 0.5 ft			5:25 AM EDT	8:29 PM EDT	11:37 AM EDT	
Fri 30	5:04 AM EDT 7.5 ft	11:32 AM EDT 0.3 ft	5:38 PM EDT 7.8 ft			First Quarter	5:25 AM EDT	8:29 PM EDT	12:39 PM EDT	12:30 AM EDT

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

July 2017

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Sat 01		12:07 AM EDT 0.7 ft	6:02 AM EDT 7.1 ft	12:26 PM EDT 0.6 ft	6:33 PM EDT 7.7 ft		5:26 AM EDT	8:29 PM EDT	1:39 PM EDT	1:00 AM EDT
Sun 02		1:06 AM EDT 0.8 ft	7:00 AM EDT 6.9 ft	1:20 PM EDT 0.8 ft	7:28 PM EDT 7.7 ft		5:26 AM EDT	8:29 PM EDT	2:37 PM EDT	1:29 AM EDT
Mon 03		2:02 AM EDT 0.8 ft	7:57 AM EDT 6.8 ft	2:12 PM EDT 1.0 ft	8:20 PM EDT 7.7 ft		5:27 AM EDT	8:29 PM EDT	3:35 PM EDT	1:59 AM EDT
Tue 04		2:55 AM EDT 0.7 ft	8:51 AM EDT 6.7 ft	3:02 PM EDT 1.0 ft	9:09 PM EDT 7.7 ft		5:27 AM EDT	8:28 PM EDT	4:31 PM EDT	2:30 AM EDT
Wed 05		3:45 AM EDT 0.6 ft	9:41 AM EDT 6.8 ft	3:49 PM EDT 1.0 ft	9:56 PM EDT 7.8 ft		5:28 AM EDT	8:28 PM EDT	5:26 PM EDT	3:04 AM EDT
Thu 06		4:30 AM EDT 0.5 ft	10:28 AM EDT 6.9 ft	4:34 PM EDT 1.0 ft	10:39 PM EDT 7.8 ft		5:29 AM EDT	8:28 PM EDT	6:20 PM EDT	3:41 AM EDT
Fri 07		5:12 AM EDT 0.3 ft	11:11 AM EDT 7.1 ft	5:17 PM EDT 0.9 ft	11:21 PM EDT 7.9 ft		5:29 AM EDT	8:28 PM EDT	7:12 PM EDT	4:23 AM EDT
Sat 08		5:52 AM EDT 0.2 ft	11:53 AM EDT 7.2 ft	5:58 PM EDT 0.9 ft			5:30 AM EDT	8:27 PM EDT	8:00 PM EDT	5:08 AM EDT
Sun 09	12:01 AM EDT 7.9 ft	6:31 AM EDT 0.1 ft	12:32 PM EDT 7.3 ft	6:38 PM EDT 0.8 ft		Full Moon	5:31 AM EDT	8:27 PM EDT	8:44 PM EDT	5:59 AM EDT
Mon 10	12:40 AM EDT 7.9 ft	7:09 AM EDT 0.1 ft	1:11 PM EDT 7.4 ft	7:19 PM EDT 0.8 ft			5:31 AM EDT	8:26 PM EDT	9:25 PM EDT	6:53 AM EDT
Tue 11	1:18 AM EDT 7.9 ft	7:47 AM EDT 0.0 ft	1:50 PM EDT 7.4 ft	7:59 PM EDT 0.8 ft			5:32 AM EDT	8:26 PM EDT	10:03 PM EDT	7:50 AM EDT
Wed 12	1:57 AM EDT 7.9 ft	8:26 AM EDT 0.0 ft	2:29 PM EDT 7.5 ft	8:42 PM EDT 0.7 ft			5:33 AM EDT	8:25 PM EDT	10:37 PM EDT	8:50 AM EDT
Thu 13	2:39 AM EDT 7.8 ft	9:07 AM EDT 0.1 ft	3:10 PM EDT 7.6 ft	9:27 PM EDT 0.7 ft			5:33 AM EDT	8:25 PM EDT	11:10 PM EDT	9:51 AM EDT
Fri 14	3:23 AM EDT 7.7 ft	9:51 AM EDT 0.1 ft	3:54 PM EDT 7.7 ft	10:16 PM EDT 0.7 ft			5:34 AM EDT	8:24 PM EDT	11:41 PM EDT	10:53 AM EDT
Sat 15	4:12 AM EDT 7.6 ft	10:37 AM EDT 0.2 ft	4:42 PM EDT 7.8 ft	11:10 PM EDT 0.6 ft			5:35 AM EDT	8:24 PM EDT		11:57 AM EDT
Sun 16	5:06 AM EDT 7.4 ft	11:29 AM EDT 0.3 ft	5:35 PM EDT 7.9 ft			Last Quarter	5:36 AM EDT	8:23 PM EDT	12:14 AM EDT	1:03 PM EDT
Mon 17		12:09 AM EDT 0.5 ft	6:04 AM EDT 7.3 ft	12:24 PM EDT 0.4 ft	6:31 PM EDT 8.1 ft		5:37 AM EDT	8:22 PM EDT	12:47 AM EDT	2:10 PM EDT
Tue 18		1:10 AM EDT 0.4 ft	7:06 AM EDT 7.2 ft	1:22 PM EDT 0.4 ft	7:30 PM EDT 8.3 ft		5:37 AM EDT	8:22 PM EDT	1:23 AM EDT	3:19 PM EDT
Wed 19		2:12 AM EDT 0.1 ft	8:08 AM EDT 7.3 ft	2:22 PM EDT 0.3 ft	8:30 PM EDT 8.6 ft		5:38 AM EDT	8:21 PM EDT	2:05 AM EDT	4:29 PM EDT
Thu 20		3:13 AM EDT -0.1 ft	9:09 AM EDT 7.5 ft	3:22 PM EDT 0.1 ft	9:29 PM EDT 8.8 ft		5:39 AM EDT	8:20 PM EDT	2:52 AM EDT	5:38 PM EDT
Fri 21		4:11 AM EDT -0.4 ft	10:07 AM EDT 7.7 ft	4:20 PM EDT -0.1 ft	10:27 PM EDT 9.0 ft		5:40 AM EDT	8:20 PM EDT	3:46 AM EDT	6:42 PM EDT
Sat 22		5:07 AM EDT -0.7 ft	11:03 AM EDT 8.0 ft	5:17 PM EDT -0.2 ft	11:22 PM EDT 9.1 ft		5:41 AM EDT	8:19 PM EDT	4:48 AM EDT	7:41 PM EDT

Sun 23		6:00 AM EDT -0.8 ft	11:57 AM EDT 8.2 ft	6:11 PM EDT -0.3 ft		New Moon	5:42 AM EDT	8:18 PM EDT	5:54 AM EDT	8:31 PM EDT
Mon 24	12:15 AM EDT 9.1 ft	6:50 AM EDT -0.8 ft	12:49 PM EDT 8.4 ft	7:05 PM EDT -0.4 ft			5:43 AM EDT	8:17 PM EDT	7:04 AM EDT	9:16 PM EDT
Tue 25	1:07 AM EDT 8.9 ft	7:40 AM EDT -0.7 ft	1:39 PM EDT 8.4 ft	7:57 PM EDT -0.2 ft			5:44 AM EDT	8:16 PM EDT	8:12 AM EDT	9:54 PM EDT
Wed 26	1:58 AM EDT 8.6 ft	8:28 AM EDT -0.5 ft	2:29 PM EDT 8.3 ft	8:49 PM EDT -0.0 ft			5:44 AM EDT	8:15 PM EDT	9:20 AM EDT	10:28 PM EDT
Thu 27	2:48 AM EDT 8.3 ft	9:17 AM EDT -0.2 ft	3:19 PM EDT 8.2 ft	9:42 PM EDT 0.2 ft			5:45 AM EDT	8:14 PM EDT	10:24 AM EDT	11:00 PM EDT
Fri 28	3:40 AM EDT 7.8 ft	10:05 AM EDT 0.1 ft	4:09 PM EDT 8.0 ft	10:36 PM EDT 0.5 ft			5:46 AM EDT	8:13 PM EDT	11:27 AM EDT	11:30 PM EDT
Sat 29	4:32 AM EDT 7.4 ft	10:54 AM EDT 0.5 ft	5:00 PM EDT 7.8 ft	11:30 PM EDT 0.8 ft			5:47 AM EDT	8:12 PM EDT	12:27 PM EDT	
Sun 30	5:26 AM EDT 7.0 ft	11:46 AM EDT 0.8 ft	5:53 PM EDT 7.6 ft			First Quarter	5:48 AM EDT	8:11 PM EDT	1:25 PM EDT	12:00 AM EDT
Mon 31		12:27 AM EDT 0.9 ft	6:22 AM EDT 6.7 ft	12:38 PM EDT 1.1 ft	6:47 PM EDT 7.5 ft		5:49 AM EDT	8:10 PM EDT	2:23 PM EDT	12:31 AM EDT

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

August 2017

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Tue 01		1:23 AM EDT 1.0 ft	7:19 AM EDT 6.6 ft	1:32 PM EDT 1.2 ft	7:41 PM EDT 7.4 ft		5:50 AM EDT	8:09 PM EDT	3:19 PM EDT	1:04 AM EDT
Wed 02		2:17 AM EDT 1.0 ft	8:14 AM EDT 6.6 ft	2:25 PM EDT 1.3 ft	8:34 PM EDT 7.4 ft		5:51 AM EDT	8:08 PM EDT	4:13 PM EDT	1:40 AM EDT
Thu 03		3:08 AM EDT 0.9 ft	9:07 AM EDT 6.7 ft	3:16 PM EDT 1.2 ft	9:23 PM EDT 7.5 ft		5:52 AM EDT	8:07 PM EDT	5:06 PM EDT	2:20 AM EDT
Fri 04		3:56 AM EDT 0.7 ft	9:56 AM EDT 6.9 ft	4:04 PM EDT 1.1 ft	10:10 PM EDT 7.7 ft		5:53 AM EDT	8:06 PM EDT	5:55 PM EDT	3:04 AM EDT
Sat 05		4:40 AM EDT 0.5 ft	10:41 AM EDT 7.1 ft	4:49 PM EDT 0.9 ft	10:54 PM EDT 7.8 ft		5:54 AM EDT	8:05 PM EDT	6:42 PM EDT	3:53 AM EDT
Sun 06		5:22 AM EDT 0.3 ft	11:23 AM EDT 7.3 ft	5:32 PM EDT 0.8 ft	11:35 PM EDT 7.9 ft		5:55 AM EDT	8:03 PM EDT	7:24 PM EDT	4:46 AM EDT
Mon 07		6:02 AM EDT 0.1 ft	12:04 PM EDT 7.5 ft	6:13 PM EDT 0.6 ft		Full Moon	5:56 AM EDT	8:02 PM EDT	8:03 PM EDT	5:43 AM EDT
Tue 08	12:14 AM EDT 8.0 ft	6:40 AM EDT -0.0 ft	12:42 PM EDT 7.7 ft	6:54 PM EDT 0.5 ft			5:57 AM EDT	8:01 PM EDT	8:39 PM EDT	6:42 AM EDT
Wed 09	12:54 AM EDT 8.1 ft	7:19 AM EDT -0.1 ft	1:21 PM EDT 7.8 ft	7:35 PM EDT 0.4 ft			5:58 AM EDT	7:59 PM EDT	9:13 PM EDT	7:43 AM EDT
Thu 10	1:34 AM EDT 8.1 ft	7:59 AM EDT -0.1 ft	2:00 PM EDT 7.9 ft	8:18 PM EDT 0.3 ft			5:59 AM EDT	7:58 PM EDT	9:45 PM EDT	8:46 AM EDT
Fri 11	2:16 AM EDT 8.0 ft	8:40 AM EDT -0.1 ft	2:41 PM EDT 8.0 ft	9:04 PM EDT 0.3 ft			6:00 AM EDT	7:57 PM EDT	10:17 PM EDT	9:50 AM EDT
Sat 12	3:01 AM EDT 7.9 ft	9:23 AM EDT 0.0 ft	3:26 PM EDT 8.1 ft	9:54 PM EDT 0.3 ft			6:01 AM EDT	7:56 PM EDT	10:49 PM EDT	10:56 AM EDT
Sun 13	3:50 AM EDT 7.7 ft	10:11 AM EDT 0.2 ft	4:15 PM EDT 8.1 ft	10:49 PM EDT 0.4 ft			6:02 AM EDT	7:54 PM EDT	11:24 PM EDT	12:02 PM EDT
Mon 14	4:45 AM EDT 7.5 ft	11:04 AM EDT 0.4 ft	5:09 PM EDT 8.2 ft	11:49 PM EDT 0.4 ft		Last Quarter	6:03 AM EDT	7:53 PM EDT		1:09 PM EDT
Tue 15	5:44 AM EDT 7.3 ft	12:02 PM EDT 0.5 ft	6:09 PM EDT 8.2 ft				6:04 AM EDT	7:52 PM EDT	12:03 AM EDT	2:17 PM EDT
Wed 16		12:52 AM EDT 0.4 ft	6:48 AM EDT 7.2 ft	1:04 PM EDT 0.6 ft	7:12 PM EDT 8.2 ft		6:05 AM EDT	7:50 PM EDT	12:46 AM EDT	3:24 PM EDT
Thu 17		1:56 AM EDT 0.2 ft	7:52 AM EDT 7.3 ft	2:08 PM EDT 0.5 ft	8:15 PM EDT 8.4 ft		6:06 AM EDT	7:49 PM EDT	1:36 AM EDT	4:28 PM EDT
Fri 18		2:58 AM EDT 0.0 ft	8:54 AM EDT 7.5 ft	3:10 PM EDT 0.3 ft	9:16 PM EDT 8.6 ft		6:07 AM EDT	7:47 PM EDT	2:33 AM EDT	5:28 PM EDT
Sat 19		3:56 AM EDT -0.2 ft	9:53 AM EDT 7.8 ft	4:09 PM EDT 0.0 ft	10:14 PM EDT 8.7 ft		6:08 AM EDT	7:46 PM EDT	3:36 AM EDT	6:21 PM EDT
Sun 20		4:50 AM EDT -0.4 ft	10:47 AM EDT 8.1 ft	5:04 PM EDT -0.2 ft	11:08 PM EDT 8.8 ft		6:09 AM EDT	7:44 PM EDT	4:43 AM EDT	7:07 PM EDT
Mon 21		5:41 AM EDT -0.6 ft	11:39 AM EDT 8.3 ft	5:57 PM EDT -0.3 ft	11:59 PM EDT 8.8 ft	New Moon	6:10 AM EDT	7:43 PM EDT	5:51 AM EDT	7:48 PM EDT
Tue 22		6:29 AM EDT -0.6 ft	12:27 PM EDT 8.5 ft	6:47 PM EDT -0.3 ft			6:11 AM EDT	7:41 PM EDT	6:59 AM EDT	8:24 PM EDT

Wed 23	12:48 AM EDT 8.7 ft	7:15 AM EDT -0.5 ft	1:14 PM EDT 8.5 ft	7:36 PM EDT -0.2 ft			6:12 AM EDT	7:40 PM EDT	8:06 AM EDT	8:57 PM EDT
Thu 24	1:35 AM EDT 8.4 ft	7:59 AM EDT -0.3 ft	2:00 PM EDT 8.4 ft	8:23 PM EDT -0.0 ft			6:13 AM EDT	7:38 PM EDT	9:10 AM EDT	9:29 PM EDT
Fri 25	2:22 AM EDT 8.1 ft	8:44 AM EDT 0.1 ft	2:46 PM EDT 8.2 ft	9:11 PM EDT 0.2 ft			6:14 AM EDT	7:37 PM EDT	10:12 AM EDT	9:59 PM EDT
Sat 26	3:09 AM EDT 7.7 ft	9:28 AM EDT 0.4 ft	3:32 PM EDT 8.0 ft	10:00 PM EDT 0.5 ft			6:15 AM EDT	7:35 PM EDT	11:13 AM EDT	10:30 PM EDT
Sun 27	3:57 AM EDT 7.3 ft	10:14 AM EDT 0.8 ft	4:20 PM EDT 7.7 ft	10:51 PM EDT 0.8 ft			6:16 AM EDT	7:33 PM EDT	12:12 PM EDT	11:03 PM EDT
Mon 28	4:49 AM EDT 6.9 ft	11:03 AM EDT 1.1 ft	5:11 PM EDT 7.5 ft	11:44 PM EDT 1.1 ft			6:17 AM EDT	7:32 PM EDT	1:09 PM EDT	11:38 PM EDT
Tue 29	5:43 AM EDT 6.6 ft	11:56 AM EDT 1.4 ft	6:05 PM EDT 7.3 ft			First Quarter	6:18 AM EDT	7:30 PM EDT	2:04 PM EDT	
Wed 30		12:40 AM EDT 1.2 ft	6:39 AM EDT 6.5 ft	12:52 PM EDT 1.5 ft	7:00 PM EDT 7.2 ft		6:19 AM EDT	7:29 PM EDT	2:58 PM EDT	12:16 AM EDT
Thu 31		1:36 AM EDT 1.2 ft	7:36 AM EDT 6.5 ft	1:48 PM EDT 1.5 ft	7:56 PM EDT 7.2 ft		6:20 AM EDT	7:27 PM EDT	3:48 PM EDT	12:58 AM EDT

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

September 2017

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Fri 01		2:29 AM EDT 1.1 ft	8:30 AM EDT 6.7 ft	2:42 PM EDT 1.3 ft	8:49 PM EDT 7.3 ft		6:21 AM EDT	7:25 PM EDT	4:36 PM EDT	1:45 AM EDT
Sat 02		3:19 AM EDT 0.9 ft	9:21 AM EDT 6.9 ft	3:33 PM EDT 1.1 ft	9:38 PM EDT 7.5 ft		6:22 AM EDT	7:24 PM EDT	5:20 PM EDT	2:36 AM EDT
Sun 03		4:05 AM EDT 0.6 ft	10:07 AM EDT 7.2 ft	4:19 PM EDT 0.8 ft	10:23 PM EDT 7.7 ft		6:23 AM EDT	7:22 PM EDT	6:00 PM EDT	3:32 AM EDT
Mon 04		4:48 AM EDT 0.3 ft	10:50 AM EDT 7.5 ft	5:03 PM EDT 0.6 ft	11:05 PM EDT 8.0 ft		6:24 AM EDT	7:21 PM EDT	6:38 PM EDT	4:30 AM EDT
Tue 05		5:29 AM EDT 0.1 ft	11:31 AM EDT 7.8 ft	5:46 PM EDT 0.3 ft	11:47 PM EDT 8.1 ft		6:25 AM EDT	7:19 PM EDT	7:12 PM EDT	5:32 AM EDT
Wed 06		6:09 AM EDT -0.1 ft	12:10 PM EDT 8.1 ft	6:28 PM EDT 0.1 ft		Full Moon	6:26 AM EDT	7:17 PM EDT	7:46 PM EDT	6:35 AM EDT
Thu 07	12:28 AM EDT 8.3 ft	6:49 AM EDT -0.2 ft	12:50 PM EDT 8.3 ft	7:11 PM EDT -0.0 ft			6:27 AM EDT	7:16 PM EDT	8:18 PM EDT	7:40 AM EDT
Fri 08	1:10 AM EDT 8.3 ft	7:30 AM EDT -0.2 ft	1:30 PM EDT 8.4 ft	7:55 PM EDT -0.1 ft			6:27 AM EDT	7:14 PM EDT	8:51 PM EDT	8:46 AM EDT
Sat 09	1:53 AM EDT 8.2 ft	8:12 AM EDT -0.1 ft	2:14 PM EDT 8.5 ft	8:43 PM EDT -0.1 ft			6:28 AM EDT	7:12 PM EDT	9:26 PM EDT	9:53 AM EDT
Sun 10	2:41 AM EDT 8.0 ft	8:58 AM EDT 0.0 ft	3:00 PM EDT 8.5 ft	9:34 PM EDT 0.0 ft			6:29 AM EDT	7:11 PM EDT	10:03 PM EDT	11:01 AM EDT
Mon 11	3:32 AM EDT 7.8 ft	9:49 AM EDT 0.2 ft	3:52 PM EDT 8.4 ft	10:31 PM EDT 0.2 ft			6:30 AM EDT	7:09 PM EDT	10:45 PM EDT	12:09 PM EDT
Tue 12	4:28 AM EDT 7.5 ft	10:45 AM EDT 0.5 ft	4:50 PM EDT 8.2 ft	11:32 PM EDT 0.3 ft			6:31 AM EDT	7:07 PM EDT	11:32 PM EDT	1:17 PM EDT
Wed 13	5:30 AM EDT 7.3 ft	11:47 AM EDT 0.6 ft	5:53 PM EDT 8.1 ft			Last Quarter	6:32 AM EDT	7:06 PM EDT		2:21 PM EDT
Thu 14		12:37 AM EDT 0.4 ft	6:34 AM EDT 7.2 ft	12:52 PM EDT 0.7 ft	6:59 PM EDT 8.1 ft		6:33 AM EDT	7:04 PM EDT	12:26 AM EDT	3:21 PM EDT
Fri 15		1:42 AM EDT 0.3 ft	7:39 AM EDT 7.4 ft	1:58 PM EDT 0.6 ft	8:04 PM EDT 8.1 ft		6:34 AM EDT	7:02 PM EDT	1:25 AM EDT	4:14 PM EDT
Sat 16		2:44 AM EDT 0.1 ft	8:41 AM EDT 7.6 ft	3:00 PM EDT 0.3 ft	9:05 PM EDT 8.3 ft		6:35 AM EDT	7:01 PM EDT	2:29 AM EDT	5:02 PM EDT
Sun 17		3:41 AM EDT -0.1 ft	9:39 AM EDT 7.9 ft	3:58 PM EDT 0.1 ft	10:02 PM EDT 8.4 ft		6:36 AM EDT	6:59 PM EDT	3:35 AM EDT	5:44 PM EDT
Mon 18		4:33 AM EDT -0.2 ft	10:31 AM EDT 8.2 ft	4:52 PM EDT -0.2 ft	10:53 PM EDT 8.5 ft		6:37 AM EDT	6:57 PM EDT	4:42 AM EDT	6:21 PM EDT
Tue 19		5:21 AM EDT -0.3 ft	11:19 AM EDT 8.5 ft	5:41 PM EDT -0.3 ft	11:42 PM EDT 8.5 ft		6:38 AM EDT	6:55 PM EDT	5:48 AM EDT	6:55 PM EDT
Wed 20		6:05 AM EDT -0.3 ft	12:04 PM EDT 8.6 ft	6:28 PM EDT -0.3 ft		New Moon	6:39 AM EDT	6:54 PM EDT	6:53 AM EDT	7:27 PM EDT
Thu 21	12:27 AM EDT 8.3 ft	6:48 AM EDT -0.2 ft	12:47 PM EDT 8.6 ft	7:12 PM EDT -0.2 ft			6:40 AM EDT	6:52 PM EDT	7:57 AM EDT	7:58 PM EDT
Fri 22	1:11 AM EDT 8.1 ft	7:29 AM EDT 0.1 ft	1:29 PM EDT 8.4 ft	7:56 PM EDT -0.0 ft			6:41 AM EDT	6:50 PM EDT	8:59 AM EDT	8:28 PM EDT

Sat 23	1:54 AM EDT 7.8 ft	8:09 AM EDT 0.4 ft	2:11 PM EDT 8.2 ft	8:39 PM EDT 0.2 ft			6:42 AM EDT	6:49 PM EDT	9:59 AM EDT	9:00 PM EDT
Sun 24	2:38 AM EDT 7.5 ft	8:51 AM EDT 0.7 ft	2:54 PM EDT 7.9 ft	9:24 PM EDT 0.5 ft			6:43 AM EDT	6:47 PM EDT	10:57 AM EDT	9:35 PM EDT
Mon 25	3:23 AM EDT 7.1 ft	9:35 AM EDT 1.0 ft	3:39 PM EDT 7.6 ft	10:11 PM EDT 0.8 ft			6:44 AM EDT	6:45 PM EDT	11:54 AM EDT	10:12 PM EDT
Tue 26	4:12 AM EDT 6.8 ft	10:22 AM EDT 1.3 ft	4:28 PM EDT 7.3 ft	11:02 PM EDT 1.1 ft			6:45 AM EDT	6:44 PM EDT	12:48 PM EDT	10:52 PM EDT
Wed 27	5:04 AM EDT 6.6 ft	11:15 AM EDT 1.5 ft	5:21 PM EDT 7.1 ft	11:56 PM EDT 1.2 ft		First Quarter	6:46 AM EDT	6:42 PM EDT	1:40 PM EDT	11:37 PM EDT
Thu 28	5:59 AM EDT 6.5 ft	12:11 PM EDT 1.6 ft	6:18 PM EDT 7.0 ft				6:47 AM EDT	6:40 PM EDT	2:29 PM EDT	
Fri 29		12:52 AM EDT 1.3 ft	6:56 AM EDT 6.6 ft	1:09 PM EDT 1.6 ft	7:16 PM EDT 7.0 ft		6:48 AM EDT	6:38 PM EDT	3:14 PM EDT	12:26 AM EDT
Sat 30		1:46 AM EDT 1.1 ft	7:51 AM EDT 6.8 ft	2:06 PM EDT 1.4 ft	8:11 PM EDT 7.1 ft		6:49 AM EDT	6:37 PM EDT	3:55 PM EDT	1:19 AM EDT

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

October 2017

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Sun 01		2:38 AM EDT 0.9 ft	8:42 AM EDT 7.1 ft	2:58 PM EDT 1.1 ft	9:01 PM EDT 7.4 ft		6:50 AM EDT	6:35 PM EDT	4:34 PM EDT	2:16 AM EDT
Mon 02		3:26 AM EDT 0.6 ft	9:30 AM EDT 7.4 ft	3:47 PM EDT 0.7 ft	9:49 PM EDT 7.7 ft		6:52 AM EDT	6:33 PM EDT	5:09 PM EDT	3:16 AM EDT
Tue 03		4:11 AM EDT 0.3 ft	10:14 AM EDT 7.8 ft	4:33 PM EDT 0.3 ft	10:34 PM EDT 7.9 ft		6:53 AM EDT	6:32 PM EDT	5:43 PM EDT	4:19 AM EDT
Wed 04		4:54 AM EDT 0.0 ft	10:56 AM EDT 8.2 ft	5:18 PM EDT -0.0 ft	11:18 PM EDT 8.2 ft		6:54 AM EDT	6:30 PM EDT	6:16 PM EDT	5:23 AM EDT
Thu 05		5:36 AM EDT -0.2 ft	11:37 AM EDT 8.5 ft	6:02 PM EDT -0.3 ft		Full Moon	6:55 AM EDT	6:29 PM EDT	6:49 PM EDT	6:30 AM EDT
Fri 06	12:01 AM EDT 8.3 ft	6:18 AM EDT -0.3 ft	12:19 PM EDT 8.7 ft	6:47 PM EDT -0.5 ft			6:56 AM EDT	6:27 PM EDT	7:24 PM EDT	7:39 AM EDT
Sat 07	12:46 AM EDT 8.3 ft	7:02 AM EDT -0.3 ft	1:02 PM EDT 8.9 ft	7:34 PM EDT -0.6 ft			6:57 AM EDT	6:25 PM EDT	8:01 PM EDT	8:48 AM EDT
Sun 08	1:32 AM EDT 8.2 ft	7:47 AM EDT -0.2 ft	1:49 PM EDT 8.9 ft	8:23 PM EDT -0.5 ft			6:58 AM EDT	6:24 PM EDT	8:42 PM EDT	9:59 AM EDT
Mon 09	2:22 AM EDT 8.1 ft	8:37 AM EDT -0.1 ft	2:39 PM EDT 8.7 ft	9:17 PM EDT -0.3 ft			6:59 AM EDT	6:22 PM EDT	9:29 PM EDT	11:08 AM EDT
Tue 10	3:15 AM EDT 7.8 ft	9:30 AM EDT 0.2 ft	3:33 PM EDT 8.5 ft	10:15 PM EDT -0.1 ft			7:00 AM EDT	6:20 PM EDT	10:21 PM EDT	12:15 PM EDT
Wed 11	4:14 AM EDT 7.5 ft	10:30 AM EDT 0.5 ft	4:34 PM EDT 8.2 ft	11:17 PM EDT 0.2 ft			7:01 AM EDT	6:19 PM EDT	11:19 PM EDT	1:17 PM EDT
Thu 12	5:16 AM EDT 7.4 ft	11:35 AM EDT 0.6 ft	5:39 PM EDT 7.9 ft			Last Quarter	7:02 AM EDT	6:17 PM EDT		2:12 PM EDT
Fri 13		12:22 AM EDT 0.3 ft	6:22 AM EDT 7.3 ft	12:42 PM EDT 0.7 ft	6:46 PM EDT 7.8 ft		7:03 AM EDT	6:16 PM EDT	12:21 AM EDT	3:01 PM EDT
Sat 14		1:26 AM EDT 0.3 ft	7:26 AM EDT 7.5 ft	1:48 PM EDT 0.5 ft	7:52 PM EDT 7.8 ft		7:04 AM EDT	6:14 PM EDT	1:26 AM EDT	3:44 PM EDT
Sun 15		2:27 AM EDT 0.2 ft	8:27 AM EDT 7.7 ft	2:50 PM EDT 0.3 ft	8:52 PM EDT 7.9 ft		7:05 AM EDT	6:13 PM EDT	2:32 AM EDT	4:22 PM EDT
Mon 16		3:22 AM EDT 0.0 ft	9:22 AM EDT 8.0 ft	3:46 PM EDT 0.0 ft	9:47 PM EDT 8.0 ft		7:06 AM EDT	6:11 PM EDT	3:37 AM EDT	4:55 PM EDT
Tue 17		4:12 AM EDT -0.1 ft	10:12 AM EDT 8.3 ft	4:37 PM EDT -0.2 ft	10:37 PM EDT 8.0 ft		7:07 AM EDT	6:10 PM EDT	4:41 AM EDT	5:27 PM EDT
Wed 18		4:58 AM EDT -0.1 ft	10:58 AM EDT 8.5 ft	5:24 PM EDT -0.3 ft	11:22 PM EDT 8.0 ft		7:08 AM EDT	6:08 PM EDT	5:44 AM EDT	5:57 PM EDT
Thu 19		5:40 AM EDT -0.0 ft	11:40 AM EDT 8.5 ft	6:07 PM EDT -0.3 ft		New Moon	7:09 AM EDT	6:07 PM EDT	6:46 AM EDT	6:28 PM EDT
Fri 20	12:05 AM EDT 7.9 ft	6:20 AM EDT 0.1 ft	12:20 PM EDT 8.4 ft	6:49 PM EDT -0.2 ft			7:11 AM EDT	6:05 PM EDT	7:47 AM EDT	6:59 PM EDT
Sat 21	12:47 AM EDT 7.7 ft	6:59 AM EDT 0.3 ft	1:00 PM EDT 8.3 ft	7:29 PM EDT -0.1 ft			7:12 AM EDT	6:04 PM EDT	8:46 AM EDT	7:32 PM EDT
Sun 22	1:27 AM EDT 7.5 ft	7:38 AM EDT 0.6 ft	1:39 PM EDT 8.1 ft	8:09 PM EDT 0.2 ft			7:13 AM EDT	6:02 PM EDT	9:44 AM EDT	8:08 PM EDT

Mon 23	2:09 AM EDT 7.3 ft	8:17 AM EDT 0.8 ft	2:19 PM EDT 7.8 ft	8:50 PM EDT 0.4 ft			7:14 AM EDT	6:01 PM EDT	10:40 AM EDT	8:47 PM EDT
Tue 24	2:52 AM EDT 7.0 ft	8:59 AM EDT 1.1 ft	3:03 PM EDT 7.5 ft	9:34 PM EDT 0.7 ft			7:15 AM EDT	6:00 PM EDT	11:33 AM EDT	9:30 PM EDT
Wed 25	3:37 AM EDT 6.8 ft	9:45 AM EDT 1.3 ft	3:49 PM EDT 7.2 ft	10:21 PM EDT 0.9 ft			7:16 AM EDT	5:58 PM EDT	12:23 PM EDT	10:17 PM EDT
Thu 26	4:26 AM EDT 6.6 ft	10:36 AM EDT 1.5 ft	4:40 PM EDT 7.0 ft	11:13 PM EDT 1.0 ft			7:18 AM EDT	5:57 PM EDT	1:09 PM EDT	11:08 PM EDT
Fri 27	5:19 AM EDT 6.6 ft	11:32 AM EDT 1.5 ft	5:35 PM EDT 6.8 ft			First Quarter	7:19 AM EDT	5:56 PM EDT	1:51 PM EDT	
Sat 28		12:07 AM EDT 1.1 ft	6:14 AM EDT 6.6 ft	12:30 PM EDT 1.5 ft	6:32 PM EDT 6.8 ft		7:20 AM EDT	5:54 PM EDT	2:30 PM EDT	12:03 AM EDT
Sun 29		1:02 AM EDT 1.0 ft	7:09 AM EDT 6.8 ft	1:27 PM EDT 1.3 ft	7:29 PM EDT 6.9 ft		7:21 AM EDT	5:53 PM EDT	3:06 PM EDT	1:00 AM EDT
Mon 30		1:55 AM EDT 0.8 ft	8:01 AM EDT 7.1 ft	2:22 PM EDT 0.9 ft	8:22 PM EDT 7.2 ft		7:22 AM EDT	5:52 PM EDT	3:40 PM EDT	2:01 AM EDT
Tue 31		2:45 AM EDT 0.5 ft	8:50 AM EDT 7.5 ft	3:13 PM EDT 0.5 ft	9:13 PM EDT 7.5 ft		7:23 AM EDT	5:50 PM EDT	4:13 PM EDT	3:03 AM EDT

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

November 2017

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Wed 01		3:32 AM EDT 0.2 ft	9:36 AM EDT 8.0 ft	4:02 PM EDT 0.0 ft	10:01 PM EDT 7.8 ft		7:25 AM EDT	5:49 PM EDT	4:45 PM EDT	4:09 AM EDT
Thu 02		4:18 AM EDT -0.1 ft	10:21 AM EDT 8.4 ft	4:50 PM EDT -0.4 ft	10:49 PM EDT 8.0 ft		7:26 AM EDT	5:48 PM EDT	5:19 PM EDT	5:16 AM EDT
Fri 03		5:04 AM EDT -0.3 ft	11:06 AM EDT 8.8 ft	5:37 PM EDT -0.7 ft	11:36 PM EDT 8.2 ft		7:27 AM EDT	5:47 PM EDT	5:55 PM EDT	6:26 AM EDT
Sat 04		5:49 AM EDT -0.5 ft	11:51 AM EDT 9.0 ft	6:25 PM EDT -0.9 ft		Full Moon	7:28 AM EDT	5:46 PM EDT	6:35 PM EDT	7:38 AM EDT
Sun 05	12:23 AM EDT 8.2 ft	5:36 AM EST -0.5 ft	11:39 AM EST 9.1 ft	6:14 PM EST -1.0 ft			6:29 AM EST	4:45 PM EST	6:20 PM EST	7:51 AM EST
Mon 06	12:13 AM EST 8.2 ft	6:25 AM EST -0.4 ft	12:28 PM EST 9.1 ft	7:06 PM EST -0.9 ft			6:30 AM EST	4:44 PM EST	7:12 PM EST	9:02 AM EST
Tue 07	1:05 AM EST 8.0 ft	7:18 AM EST -0.2 ft	1:21 PM EST 8.8 ft	8:00 PM EST -0.7 ft			6:32 AM EST	4:42 PM EST	8:10 PM EST	10:08 AM EST
Wed 08	2:00 AM EST 7.8 ft	8:15 AM EST 0.0 ft	2:18 PM EST 8.5 ft	8:58 PM EST -0.4 ft			6:33 AM EST	4:41 PM EST	9:12 PM EST	11:08 AM EST
Thu 09	2:58 AM EST 7.6 ft	9:16 AM EST 0.3 ft	3:19 PM EST 8.1 ft	10:00 PM EST -0.1 ft			6:34 AM EST	4:40 PM EST	10:18 PM EST	12:01 PM EST
Fri 10	4:01 AM EST 7.5 ft	10:21 AM EST 0.4 ft	4:24 PM EST 7.7 ft	11:03 PM EST 0.1 ft		Last Quarter	6:35 AM EST	4:39 PM EST	11:24 PM EST	12:45 PM EST
Sat 11	5:05 AM EST 7.5 ft	11:28 AM EST 0.5 ft	5:30 PM EST 7.5 ft				6:36 AM EST	4:38 PM EST		1:25 PM EST
Sun 12		12:05 AM EST 0.1 ft	6:08 AM EST 7.6 ft	12:34 PM EST 0.4 ft	6:34 PM EST 7.4 ft		6:38 AM EST	4:38 PM EST	12:30 AM EST	1:59 PM EST
Mon 13		1:04 AM EST 0.1 ft	7:07 AM EST 7.8 ft	1:35 PM EST 0.2 ft	7:34 PM EST 7.4 ft		6:39 AM EST	4:37 PM EST	1:34 AM EST	2:31 PM EST
Tue 14		1:58 AM EST 0.1 ft	8:01 AM EST 8.0 ft	2:30 PM EST 0.0 ft	8:28 PM EST 7.5 ft		6:40 AM EST	4:36 PM EST	2:36 AM EST	3:01 PM EST
Wed 15		2:47 AM EST 0.1 ft	8:50 AM EST 8.1 ft	3:19 PM EST -0.2 ft	9:17 PM EST 7.5 ft		6:41 AM EST	4:35 PM EST	3:38 AM EST	3:30 PM EST
Thu 16		3:32 AM EST 0.1 ft	9:34 AM EST 8.2 ft	4:04 PM EST -0.3 ft	10:02 PM EST 7.5 ft		6:42 AM EST	4:34 PM EST	4:38 AM EST	4:00 PM EST
Fri 17		4:14 AM EST 0.2 ft	10:16 AM EST 8.2 ft	4:46 PM EST -0.3 ft	10:44 PM EST 7.4 ft		6:43 AM EST	4:33 PM EST	5:37 AM EST	4:32 PM EST
Sat 18		4:54 AM EST 0.3 ft	10:55 AM EST 8.2 ft	5:26 PM EST -0.2 ft	11:24 PM EST 7.3 ft	New Moon	6:45 AM EST	4:33 PM EST	6:36 AM EST	5:06 PM EST
Sun 19		5:32 AM EST 0.4 ft	11:33 AM EST 8.0 ft	6:04 PM EST -0.1 ft			6:46 AM EST	4:32 PM EST	7:32 AM EST	5:44 PM EST
Mon 20	12:03 AM EST 7.2 ft	6:10 AM EST 0.6 ft	12:12 PM EST 7.8 ft	6:42 PM EST 0.0 ft			6:47 AM EST	4:31 PM EST	8:27 AM EST	6:25 PM EST
Tue 21	12:43 AM EST 7.1 ft	6:49 AM EST 0.7 ft	12:51 PM EST 7.6 ft	7:21 PM EST 0.2 ft			6:48 AM EST	4:31 PM EST	9:19 AM EST	7:11 PM EST
Wed 22	1:24 AM EST 6.9 ft	7:30 AM EST 0.9 ft	1:31 PM EST 7.4 ft	8:02 PM EST 0.4 ft			6:49 AM EST	4:30 PM EST	10:06 AM EST	8:00 PM EST

Thu 23	2:06 AM EST 6.8 ft	8:14 AM EST 1.1 ft	2:15 PM EST 7.2 ft	8:46 PM EST 0.5 ft			6:50 AM EST	4:29 PM EST	10:50 AM EST	8:53 PM EST
Fri 24	2:51 AM EST 6.7 ft	9:02 AM EST 1.2 ft	3:02 PM EST 6.9 ft	9:33 PM EST 0.7 ft			6:52 AM EST	4:29 PM EST	11:29 AM EST	9:49 PM EST
Sat 25	3:40 AM EST 6.6 ft	9:54 AM EST 1.2 ft	3:54 PM EST 6.8 ft	10:24 PM EST 0.7 ft			6:53 AM EST	4:28 PM EST	12:06 PM EST	10:47 PM EST
Sun 26	4:31 AM EST 6.7 ft	10:50 AM EST 1.2 ft	4:49 PM EST 6.7 ft	11:17 PM EST 0.7 ft		First Quarter	6:54 AM EST	4:28 PM EST	12:39 PM EST	11:47 PM EST
Mon 27	5:24 AM EST 6.9 ft	11:48 AM EST 1.0 ft	5:46 PM EST 6.8 ft				6:55 AM EST	4:28 PM EST	1:11 PM EST	
Tue 28		12:11 AM EST 0.5 ft	6:18 AM EST 7.2 ft	12:45 PM EST 0.7 ft	6:42 PM EST 6.9 ft		6:56 AM EST	4:27 PM EST	1:42 PM EST	12:49 AM EST
Wed 29		1:03 AM EST 0.3 ft	7:09 AM EST 7.6 ft	1:40 PM EST 0.2 ft	7:37 PM EST 7.2 ft		6:57 AM EST	4:27 PM EST	2:14 PM EST	1:54 AM EST
Thu 30		1:55 AM EST 0.1 ft	8:00 AM EST 8.0 ft	2:33 PM EST -0.2 ft	8:30 PM EST 7.4 ft		6:58 AM EST	4:27 PM EST	2:48 PM EST	3:01 AM EST

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

December 2017

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Fri 01		2:45 AM EST -0.2 ft	8:49 AM EST 8.4 ft	3:24 PM EST -0.7 ft	9:22 PM EST 7.7 ft		6:59 AM EST	4:26 PM EST	3:25 PM EST	4:11 AM EST
Sat 02		3:35 AM EST -0.5 ft	9:39 AM EST 8.8 ft	4:15 PM EST -1.0 ft	10:13 PM EST 7.9 ft		7:00 AM EST	4:26 PM EST	4:07 PM EST	5:24 AM EST
Sun 03		4:25 AM EST -0.6 ft	10:29 AM EST 9.1 ft	5:06 PM EST -1.2 ft	11:04 PM EST 8.0 ft	Full Moon	7:01 AM EST	4:26 PM EST	4:56 PM EST	6:37 AM EST
Mon 04		5:15 AM EST -0.7 ft	11:19 AM EST 9.1 ft	5:57 PM EST -1.3 ft	11:55 PM EST 8.1 ft		7:02 AM EST	4:26 PM EST	5:52 PM EST	7:48 AM EST
Tue 05		6:08 AM EST -0.7 ft	12:11 PM EST 9.0 ft	6:49 PM EST -1.2 ft			7:03 AM EST	4:26 PM EST	6:55 PM EST	8:54 AM EST
Wed 06	12:48 AM EST 8.0 ft	7:02 AM EST -0.6 ft	1:05 PM EST 8.8 ft	7:43 PM EST -1.0 ft			7:04 AM EST	4:26 PM EST	8:03 PM EST	9:53 AM EST
Thu 07	1:43 AM EST 7.9 ft	7:59 AM EST -0.3 ft	2:01 PM EST 8.4 ft	8:39 PM EST -0.7 ft			7:05 AM EST	4:25 PM EST	9:11 PM EST	10:42 AM EST
Fri 08	2:40 AM EST 7.7 ft	8:59 AM EST -0.1 ft	3:01 PM EST 7.9 ft	9:37 PM EST -0.4 ft			7:06 AM EST	4:25 PM EST	10:20 PM EST	11:25 AM EST
Sat 09	3:40 AM EST 7.6 ft	10:03 AM EST 0.1 ft	4:03 PM EST 7.5 ft	10:37 PM EST -0.1 ft			7:06 AM EST	4:26 PM EST	11:26 PM EST	12:02 PM EST
Sun 10	4:41 AM EST 7.5 ft	11:07 AM EST 0.3 ft	5:06 PM EST 7.2 ft	11:36 PM EST 0.1 ft		Last Quarter	7:07 AM EST	4:26 PM EST		12:35 PM EST
Mon 11	5:41 AM EST 7.5 ft	12:11 PM EST 0.3 ft	6:09 PM EST 7.0 ft				7:08 AM EST	4:26 PM EST	12:29 AM EST	1:05 PM EST
Tue 12		12:34 AM EST 0.2 ft	6:40 AM EST 7.6 ft	1:12 PM EST 0.2 ft	7:09 PM EST 6.9 ft		7:09 AM EST	4:26 PM EST	1:31 AM EST	1:35 PM EST
Wed 13		1:29 AM EST 0.2 ft	7:34 AM EST 7.7 ft	2:07 PM EST 0.1 ft	8:04 PM EST 6.9 ft		7:10 AM EST	4:26 PM EST	2:32 AM EST	2:04 PM EST
Thu 14		2:19 AM EST 0.3 ft	8:24 AM EST 7.7 ft	2:57 PM EST -0.1 ft	8:53 PM EST 6.9 ft		7:10 AM EST	4:26 PM EST	3:31 AM EST	2:35 PM EST
Fri 15		3:06 AM EST 0.3 ft	9:09 AM EST 7.8 ft	3:43 PM EST -0.2 ft	9:39 PM EST 7.0 ft		7:11 AM EST	4:27 PM EST	4:29 AM EST	3:07 PM EST
Sat 16		3:49 AM EST 0.3 ft	9:52 AM EST 7.8 ft	4:24 PM EST -0.2 ft	10:22 PM EST 7.0 ft		7:12 AM EST	4:27 PM EST	5:26 AM EST	3:43 PM EST
Sun 17		4:30 AM EST 0.3 ft	10:32 AM EST 7.8 ft	5:03 PM EST -0.3 ft	11:02 PM EST 7.0 ft		7:12 AM EST	4:27 PM EST	6:21 AM EST	4:23 PM EST
Mon 18		5:09 AM EST 0.4 ft	11:11 AM EST 7.7 ft	5:41 PM EST -0.2 ft	11:41 PM EST 7.0 ft	New Moon	7:13 AM EST	4:28 PM EST	7:14 AM EST	5:07 PM EST
Tue 19		5:47 AM EST 0.4 ft	11:49 AM EST 7.6 ft	6:18 PM EST -0.2 ft			7:14 AM EST	4:28 PM EST	8:04 AM EST	5:55 PM EST
Wed 20	12:19 AM EST 7.0 ft	6:26 AM EST 0.5 ft	12:27 PM EST 7.5 ft	6:56 PM EST -0.1 ft			7:14 AM EST	4:28 PM EST	8:49 AM EST	6:47 PM EST
Thu 21	12:58 AM EST 6.9 ft	7:05 AM EST 0.6 ft	1:06 PM EST 7.4 ft	7:34 PM EST -0.0 ft			7:15 AM EST	4:29 PM EST	9:30 AM EST	7:42 PM EST
Fri 22	1:37 AM EST 6.9 ft	7:47 AM EST 0.7 ft	1:46 PM EST 7.2 ft	8:15 PM EST 0.1 ft			7:15 AM EST	4:29 PM EST	10:07 AM EST	8:39 PM EST

Sat 23	2:19 AM EST 6.8 ft	8:31 AM EST 0.7 ft	2:29 PM EST 7.0 ft	8:58 PM EST 0.2 ft			7:16 AM EST	4:30 PM EST	10:41 AM EST	9:37 PM EST
Sun 24	3:02 AM EST 6.8 ft	9:19 AM EST 0.8 ft	3:17 PM EST 6.9 ft	9:45 PM EST 0.3 ft			7:16 AM EST	4:31 PM EST	11:13 AM EST	10:37 PM EST
Mon 25	3:50 AM EST 6.9 ft	10:12 AM EST 0.8 ft	4:10 PM EST 6.8 ft	10:35 PM EST 0.3 ft			7:16 AM EST	4:31 PM EST	11:43 AM EST	11:39 PM EST
Tue 26	4:41 AM EST 7.0 ft	11:09 AM EST 0.6 ft	5:06 PM EST 6.7 ft	11:29 PM EST 0.3 ft		First Quarter	7:17 AM EST	4:32 PM EST	12:14 PM EST	
Wed 27	5:35 AM EST 7.2 ft	12:09 PM EST 0.4 ft	6:05 PM EST 6.7 ft				7:17 AM EST	4:33 PM EST	12:45 PM EST	12:43 AM EST
Thu 28		12:25 AM EST 0.2 ft	6:31 AM EST 7.5 ft	1:08 PM EST 0.0 ft	7:05 PM EST 6.9 ft		7:17 AM EST	4:33 PM EST	1:18 PM EST	1:49 AM EST
Fri 29		1:21 AM EST 0.0 ft	7:27 AM EST 7.9 ft	2:06 PM EST -0.4 ft	8:03 PM EST 7.1 ft		7:18 AM EST	4:34 PM EST	1:56 PM EST	2:58 AM EST
Sat 30		2:17 AM EST -0.2 ft	8:22 AM EST 8.3 ft	3:02 PM EST -0.8 ft	8:59 PM EST 7.4 ft		7:18 AM EST	4:35 PM EST	2:40 PM EST	4:09 AM EST
Sun 31		3:11 AM EST -0.5 ft	9:17 AM EST 8.7 ft	3:56 PM EST -1.1 ft	9:55 PM EST 7.6 ft		7:18 AM EST	4:36 PM EST	3:32 PM EST	5:21 AM EST

NOT FOR NAVIGATION

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. The author and the publisher each assume no liability for damages arising from use of these predictions. They are not certified to be correct, and they do not incorporate the effects of tropical storms, El Niño, seismic events, subsidence, uplift, or changes in global sea level.

Web pages copyright © 2005-2019 Mobile Geographics LLC

Not the place you expected to see? Try <https://tideslegacy.mobilegeographics.com>.

Oyster Bay Harbor, Oyster Bay, New York 40.8667° N, 73.5167° W

January 2018

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Mon 01		4:06 AM EST -0.7 ft	10:11 AM EST 8.9 ft	4:51 PM EST -1.3 ft	10:48 PM EST 7.8 ft	Full Moon	7:18 AM EST	4:36 PM EST	4:31 PM EST	6:30 AM EST
Tue 02		5:00 AM EST -0.8 ft	11:05 AM EST 9.0 ft	5:43 PM EST -1.4 ft	11:40 PM EST 7.9 ft		7:18 AM EST	4:37 PM EST	5:38 PM EST	7:34 AM EST
Wed 03		5:54 AM EST -0.9 ft	11:58 AM EST 8.9 ft	6:34 PM EST -1.4 ft			7:18 AM EST	4:38 PM EST	6:48 PM EST	8:30 AM EST
Thu 04	12:32 AM EST 8.0 ft	6:48 AM EST -0.8 ft	12:51 PM EST 8.6 ft	7:26 PM EST -1.2 ft			7:18 AM EST	4:39 PM EST	8:00 PM EST	9:18 AM EST
Fri 05	1:25 AM EST 7.9 ft	7:43 AM EST -0.6 ft	1:45 PM EST 8.3 ft	8:19 PM EST -0.9 ft			7:18 AM EST	4:40 PM EST	9:10 PM EST	9:59 AM EST
Sat 06	2:20 AM EST 7.8 ft	8:41 AM EST -0.4 ft	2:41 PM EST 7.8 ft	9:12 PM EST -0.6 ft			7:18 AM EST	4:41 PM EST	10:17 PM EST	10:35 AM EST
Sun 07	3:15 AM EST 7.7 ft	9:40 AM EST -0.1 ft	3:38 PM EST 7.3 ft	10:07 PM EST -0.2 ft			7:18 AM EST	4:42 PM EST	11:22 PM EST	11:07 AM EST
Mon 08	4:12 AM EST 7.5 ft	10:40 AM EST 0.1 ft	4:38 PM EST 6.9 ft	11:03 PM EST 0.1 ft		Last Quarter	7:18 AM EST	4:43 PM EST		11:38 AM EST
Tue 09	5:10 AM EST 7.4 ft	11:42 AM EST 0.3 ft	5:38 PM EST 6.6 ft				7:18 AM EST	4:44 PM EST	12:24 AM EST	12:08 PM EST
Wed 10		12:00 AM EST 0.3 ft	6:07 AM EST 7.3 ft	12:42 PM EST 0.3 ft	6:37 PM EST 6.5 ft		7:18 AM EST	4:45 PM EST	1:24 AM EST	12:38 PM EST
Thu 11		12:55 AM EST 0.5 ft	7:02 AM EST 7.3 ft	1:38 PM EST 0.2 ft	7:34 PM EST 6.4 ft		7:17 AM EST	4:46 PM EST	2:23 AM EST	1:10 PM EST
Fri 12		1:48 AM EST 0.5 ft	7:54 AM EST 7.3 ft	2:30 PM EST 0.1 ft	8:26 PM EST 6.5 ft		7:17 AM EST	4:47 PM EST	3:20 AM EST	1:44 PM EST
Sat 13		2:37 AM EST 0.5 ft	8:43 AM EST 7.4 ft	3:17 PM EST 0.0 ft	9:14 PM EST 6.6 ft		7:17 AM EST	4:48 PM EST	4:16 AM EST	2:22 PM EST
Sun 14		3:23 AM EST 0.5 ft	9:27 AM EST 7.4 ft	3:59 PM EST -0.1 ft	9:58 PM EST 6.7 ft		7:16 AM EST	4:49 PM EST	5:10 AM EST	3:05 PM EST
Mon 15		4:06 AM EST 0.4 ft	10:09 AM EST 7.5 ft	4:39 PM EST -0.2 ft	10:38 PM EST 6.8 ft		7:16 AM EST	4:50 PM EST	6:00 AM EST	3:51 PM EST
Tue 16		4:46 AM EST 0.3 ft	10:49 AM EST 7.5 ft	5:17 PM EST -0.2 ft	11:17 PM EST 6.9 ft	New Moon	7:15 AM EST	4:52 PM EST	6:47 AM EST	4:42 PM EST
Wed 17		5:25 AM EST 0.3 ft	11:27 AM EST 7.5 ft	5:54 PM EST -0.3 ft	11:55 PM EST 7.0 ft		7:15 AM EST	4:53 PM EST	7:30 AM EST	5:36 PM EST
Thu 18		6:03 AM EST 0.2 ft	12:05 PM EST 7.5 ft	6:30 PM EST -0.3 ft			7:15 AM EST	4:54 PM EST	8:08 AM EST	6:33 PM EST
Fri 19	12:32 AM EST 7.0 ft	6:42 AM EST 0.2 ft	12:42 PM EST 7.4 ft	7:08 PM EST -0.3 ft			7:14 AM EST	4:55 PM EST	8:44 AM EST	7:31 PM EST
Sat 20	1:09 AM EST 7.1 ft	7:21 AM EST 0.3 ft	1:21 PM EST 7.3 ft	7:46 PM EST -0.2 ft			7:13 AM EST	4:56 PM EST	9:16 AM EST	8:31 PM EST
Sun 21	1:47 AM EST 7.1 ft	8:04 AM EST 0.3 ft	2:02 PM EST 7.2 ft	8:27 PM EST -0.1 ft			7:13 AM EST	4:57 PM EST	9:47 AM EST	9:31 PM EST

Mon 22	2:28 AM EST 7.1 ft	8:49 AM EST 0.3 ft	2:47 PM EST 7.0 ft	9:10 PM EST 0.0 ft			7:12 AM EST	4:59 PM EST	10:16 AM EST	10:33 PM EST
Tue 23	3:14 AM EST 7.1 ft	9:41 AM EST 0.4 ft	3:38 PM EST 6.8 ft	9:59 PM EST 0.2 ft			7:11 AM EST	5:00 PM EST	10:47 AM EST	11:37 PM EST
Wed 24	4:04 AM EST 7.2 ft	10:37 AM EST 0.3 ft	4:34 PM EST 6.6 ft	10:54 PM EST 0.3 ft		First Quarter	7:11 AM EST	5:01 PM EST	11:18 AM EST	
Thu 25	4:59 AM EST 7.3 ft	11:39 AM EST 0.2 ft	5:36 PM EST 6.6 ft	11:53 PM EST 0.3 ft			7:10 AM EST	5:02 PM EST	11:53 AM EST	12:42 AM EST
Fri 26	5:59 AM EST 7.5 ft	12:43 PM EST 0.0 ft	6:40 PM EST 6.6 ft				7:09 AM EST	5:03 PM EST	12:32 PM EST	1:49 AM EST
Sat 27		12:54 AM EST 0.2 ft	7:01 AM EST 7.7 ft	1:45 PM EST -0.3 ft	7:42 PM EST 6.8 ft		7:08 AM EST	5:05 PM EST	1:18 PM EST	2:58 AM EST
Sun 28		1:56 AM EST -0.0 ft	8:02 AM EST 8.1 ft	2:45 PM EST -0.6 ft	8:42 PM EST 7.1 ft		7:08 AM EST	5:06 PM EST	2:11 PM EST	4:07 AM EST
Mon 29		2:55 AM EST -0.3 ft	9:01 AM EST 8.4 ft	3:42 PM EST -1.0 ft	9:38 PM EST 7.5 ft		7:07 AM EST	5:07 PM EST	3:13 PM EST	5:12 AM EST
Tue 30		3:52 AM EST -0.7 ft	9:57 AM EST 8.6 ft	4:35 PM EST -1.2 ft	10:32 PM EST 7.8 ft		7:06 AM EST	5:08 PM EST	4:21 PM EST	6:12 AM EST
Wed 31		4:47 AM EST -0.9 ft	10:51 AM EST 8.8 ft	5:26 PM EST -1.4 ft	11:23 PM EST 8.1 ft	Full Moon	7:05 AM EST	5:10 PM EST	5:32 PM EST	7:04 AM EST

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

February 2018

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Thu 01		5:40 AM EST -1.1 ft	11:43 AM EST 8.7 ft	6:15 PM EST -1.4 ft			7:04 AM EST	5:11 PM EST	6:45 PM EST	7:50 AM EST
Fri 02	12:13 AM EST 8.2 ft	6:32 AM EST -1.1 ft	12:34 PM EST 8.5 ft	7:04 PM EST -1.2 ft			7:03 AM EST	5:12 PM EST	7:56 PM EST	8:29 AM EST
Sat 03	1:03 AM EST 8.2 ft	7:24 AM EST -0.9 ft	1:25 PM EST 8.2 ft	7:52 PM EST -0.9 ft			7:02 AM EST	5:13 PM EST	9:04 PM EST	9:04 AM EST
Sun 04	1:53 AM EST 8.1 ft	8:17 AM EST -0.6 ft	2:15 PM EST 7.7 ft	8:40 PM EST -0.5 ft			7:01 AM EST	5:15 PM EST	10:09 PM EST	9:37 AM EST
Mon 05	2:43 AM EST 7.8 ft	9:10 AM EST -0.3 ft	3:08 PM EST 7.2 ft	9:31 PM EST -0.1 ft			7:00 AM EST	5:16 PM EST	11:12 PM EST	10:08 AM EST
Tue 06	3:35 AM EST 7.5 ft	10:06 AM EST 0.1 ft	4:03 PM EST 6.8 ft	10:23 PM EST 0.3 ft			6:59 AM EST	5:17 PM EST		10:38 AM EST
Wed 07	4:29 AM EST 7.2 ft	11:03 AM EST 0.4 ft	5:00 PM EST 6.4 ft	11:18 PM EST 0.6 ft		Last Quarter	6:58 AM EST	5:18 PM EST	12:13 AM EST	11:10 AM EST
Thu 08	5:26 AM EST 7.0 ft	12:03 PM EST 0.5 ft	6:00 PM EST 6.2 ft				6:56 AM EST	5:20 PM EST	1:12 AM EST	11:44 AM EST
Fri 09		12:16 AM EST 0.9 ft	6:23 AM EST 6.9 ft	1:01 PM EST 0.6 ft	6:59 PM EST 6.2 ft		6:55 AM EST	5:21 PM EST	2:09 AM EST	12:21 PM EST
Sat 10		1:12 AM EST 0.9 ft	7:19 AM EST 6.9 ft	1:55 PM EST 0.5 ft	7:54 PM EST 6.3 ft		6:54 AM EST	5:22 PM EST	3:03 AM EST	1:02 PM EST
Sun 11		2:06 AM EST 0.8 ft	8:12 AM EST 6.9 ft	2:45 PM EST 0.4 ft	8:44 PM EST 6.4 ft		6:53 AM EST	5:23 PM EST	3:55 AM EST	1:47 PM EST
Mon 12		2:55 AM EST 0.7 ft	9:01 AM EST 7.1 ft	3:30 PM EST 0.2 ft	9:30 PM EST 6.7 ft		6:52 AM EST	5:24 PM EST	4:43 AM EST	2:36 PM EST
Tue 13		3:41 AM EST 0.5 ft	9:45 AM EST 7.2 ft	4:11 PM EST 0.0 ft	10:12 PM EST 6.9 ft		6:50 AM EST	5:26 PM EST	5:28 AM EST	3:29 PM EST
Wed 14		4:23 AM EST 0.3 ft	10:26 AM EST 7.4 ft	4:50 PM EST -0.2 ft	10:51 PM EST 7.1 ft		6:49 AM EST	5:27 PM EST	6:08 AM EST	4:25 PM EST
Thu 15		5:02 AM EST 0.1 ft	11:04 AM EST 7.5 ft	5:27 PM EST -0.3 ft	11:28 PM EST 7.3 ft	New Moon	6:48 AM EST	5:28 PM EST	6:45 AM EST	5:24 PM EST
Fri 16		5:41 AM EST -0.0 ft	11:42 AM EST 7.6 ft	6:03 PM EST -0.4 ft			6:46 AM EST	5:29 PM EST	7:18 AM EST	6:24 PM EST
Sat 17	12:04 AM EST 7.4 ft	6:19 AM EST -0.1 ft	12:19 PM EST 7.6 ft	6:40 PM EST -0.4 ft			6:45 AM EST	5:31 PM EST	7:50 AM EST	7:25 PM EST
Sun 18	12:40 AM EST 7.5 ft	6:59 AM EST -0.1 ft	12:58 PM EST 7.6 ft	7:18 PM EST -0.3 ft			6:44 AM EST	5:32 PM EST	8:20 AM EST	8:27 PM EST
Mon 19	1:18 AM EST 7.6 ft	7:40 AM EST -0.1 ft	1:39 PM EST 7.4 ft	7:58 PM EST -0.2 ft			6:42 AM EST	5:33 PM EST	8:50 AM EST	9:30 PM EST
Tue 20	1:58 AM EST 7.6 ft	8:25 AM EST -0.1 ft	2:23 PM EST 7.2 ft	8:41 PM EST -0.0 ft			6:41 AM EST	5:34 PM EST	9:21 AM EST	10:34 PM EST
Wed 21	2:43 AM EST 7.6 ft	9:16 AM EST -0.0 ft	3:14 PM EST 7.0 ft	9:31 PM EST 0.2 ft			6:39 AM EST	5:35 PM EST	9:54 AM EST	11:40 PM EST
Thu 22	3:34 AM EST 7.5 ft	10:12 AM EST 0.1 ft	4:11 PM EST 6.8 ft	10:27 PM EST 0.4 ft			6:38 AM EST	5:37 PM EST	10:30 AM EST	

Fri 23	4:31 AM EST 7.5 ft	11:15 AM EST 0.2 ft	5:13 PM EST 6.6 ft	11:29 PM EST 0.5 ft		First Quarter	6:36 AM EST	5:38 PM EST	11:12 AM EST	12:47 AM EST
Sat 24	5:35 AM EST 7.5 ft	12:21 PM EST 0.1 ft	6:19 PM EST 6.6 ft				6:35 AM EST	5:39 PM EST	12:01 PM EST	1:53 AM EST
Sun 25		12:35 AM EST 0.4 ft	6:42 AM EST 7.6 ft	1:27 PM EST -0.1 ft	7:24 PM EST 6.8 ft		6:34 AM EST	5:40 PM EST	12:57 PM EST	2:57 AM EST
Mon 26		1:41 AM EST 0.2 ft	7:47 AM EST 7.9 ft	2:28 PM EST -0.4 ft	8:26 PM EST 7.2 ft		6:32 AM EST	5:41 PM EST	2:00 PM EST	3:57 AM EST
Tue 27		2:43 AM EST -0.2 ft	8:48 AM EST 8.1 ft	3:25 PM EST -0.7 ft	9:22 PM EST 7.6 ft		6:31 AM EST	5:42 PM EST	3:08 PM EST	4:52 AM EST
Wed 28		3:40 AM EST -0.6 ft	9:45 AM EST 8.4 ft	4:18 PM EST -1.0 ft	10:15 PM EST 8.0 ft		6:29 AM EST	5:44 PM EST	4:19 PM EST	5:39 AM EST

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

March 2018

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Thu 01		4:34 AM EST -0.9 ft	10:37 AM EST 8.5 ft	5:07 PM EST -1.1 ft	11:05 PM EST 8.3 ft	Full Moon	6:28 AM EST	5:45 PM EST	5:30 PM EST	6:21 AM EST
Fri 02		5:25 AM EST -1.0 ft	11:27 AM EST 8.5 ft	5:53 PM EST -1.1 ft	11:52 PM EST 8.4 ft		6:26 AM EST	5:46 PM EST	6:40 PM EST	6:58 AM EST
Sat 03		6:14 AM EST -1.1 ft	12:15 PM EST 8.4 ft	6:38 PM EST -0.9 ft			6:25 AM EST	5:47 PM EST	7:49 PM EST	7:32 AM EST
Sun 04	12:38 AM EST 8.4 ft	7:02 AM EST -0.9 ft	1:02 PM EST 8.1 ft	7:23 PM EST -0.6 ft			6:23 AM EST	5:48 PM EST	8:54 PM EST	8:04 AM EST
Mon 05	1:23 AM EST 8.3 ft	7:50 AM EST -0.6 ft	1:49 PM EST 7.7 ft	8:07 PM EST -0.2 ft			6:22 AM EST	5:49 PM EST	9:58 PM EST	8:36 AM EST
Tue 06	2:09 AM EST 8.0 ft	8:39 AM EST -0.2 ft	2:37 PM EST 7.2 ft	8:53 PM EST 0.2 ft			6:20 AM EST	5:50 PM EST	10:59 PM EST	9:08 AM EST
Wed 07	2:57 AM EST 7.6 ft	9:29 AM EST 0.1 ft	3:28 PM EST 6.8 ft	9:43 PM EST 0.6 ft			6:18 AM EST	5:51 PM EST	11:58 PM EST	9:41 AM EST
Thu 08	3:47 AM EST 7.2 ft	10:22 AM EST 0.5 ft	4:22 PM EST 6.4 ft	10:36 PM EST 1.0 ft			6:17 AM EST	5:53 PM EST		10:18 AM EST
Fri 09	4:42 AM EST 6.9 ft	11:18 AM EST 0.8 ft	5:19 PM EST 6.2 ft	11:33 PM EST 1.2 ft		Last Quarter	6:15 AM EST	5:54 PM EST	12:54 AM EST	10:57 AM EST
Sat 10	5:40 AM EST 6.7 ft	12:16 PM EST 0.9 ft	6:18 PM EST 6.2 ft				6:14 AM EST	5:55 PM EST	1:48 AM EST	11:41 AM EST
Sun 11		12:33 AM EST 1.3 ft	7:39 AM EDT 6.6 ft	2:13 PM EDT 0.9 ft	8:16 PM EDT 6.3 ft		7:12 AM EDT	6:56 PM EDT	3:38 AM EDT	1:29 PM EDT
Mon 12		2:30 AM EDT 1.1 ft	8:36 AM EDT 6.7 ft	3:06 PM EDT 0.7 ft	9:08 PM EDT 6.5 ft		7:10 AM EDT	6:57 PM EDT	4:24 AM EDT	2:20 PM EDT
Tue 13		3:23 AM EDT 0.9 ft	9:28 AM EDT 6.9 ft	3:53 PM EDT 0.5 ft	9:56 PM EDT 6.8 ft		7:09 AM EDT	6:58 PM EDT	5:05 AM EDT	3:15 PM EDT
Wed 14		4:11 AM EDT 0.6 ft	10:14 AM EDT 7.1 ft	4:37 PM EDT 0.3 ft	10:40 PM EDT 7.1 ft		7:07 AM EDT	6:59 PM EDT	5:43 AM EDT	4:13 PM EDT
Thu 15		4:55 AM EDT 0.3 ft	10:57 AM EDT 7.4 ft	5:17 PM EDT 0.0 ft	11:19 PM EDT 7.4 ft		7:05 AM EDT	7:00 PM EDT	6:18 AM EDT	5:13 PM EDT
Fri 16		5:36 AM EDT 0.1 ft	11:37 AM EDT 7.6 ft	5:56 PM EDT -0.2 ft	11:57 PM EDT 7.7 ft		7:04 AM EDT	7:01 PM EDT	6:50 AM EDT	6:14 PM EDT
Sat 17		6:16 AM EDT -0.2 ft	12:16 PM EDT 7.7 ft	6:34 PM EDT -0.3 ft		New Moon	7:02 AM EDT	7:03 PM EDT	7:21 AM EDT	7:17 PM EDT
Sun 18	12:34 AM EDT 7.9 ft	6:56 AM EDT -0.4 ft	12:55 PM EDT 7.8 ft	7:12 PM EDT -0.4 ft			7:00 AM EDT	7:04 PM EDT	7:52 AM EDT	8:21 PM EDT
Mon 19	1:11 AM EDT 8.1 ft	7:36 AM EDT -0.5 ft	1:36 PM EDT 7.8 ft	7:51 PM EDT -0.3 ft			6:59 AM EDT	7:05 PM EDT	8:22 AM EDT	9:26 PM EDT
Tue 20	1:50 AM EDT 8.1 ft	8:19 AM EDT -0.5 ft	2:18 PM EDT 7.7 ft	8:33 PM EDT -0.2 ft			6:57 AM EDT	7:06 PM EDT	8:55 AM EDT	10:33 PM EDT
Wed 21	2:32 AM EDT 8.1 ft	9:06 AM EDT -0.4 ft	3:05 PM EDT 7.5 ft	9:18 PM EDT 0.0 ft			6:55 AM EDT	7:07 PM EDT	9:31 AM EDT	11:40 PM EDT
Thu 22	3:19 AM EDT 8.1 ft	9:57 AM EDT -0.2 ft	3:56 PM EDT 7.2 ft	10:10 PM EDT 0.3 ft			6:54 AM EDT	7:08 PM EDT	10:11 AM EDT	

Fri 23	4:12 AM EDT 7.9 ft	10:54 AM EDT -0.0 ft	4:54 PM EDT 7.0 ft	11:09 PM EDT 0.5 ft			6:52 AM EDT	7:09 PM EDT	10:57 AM EDT	12:46 AM EDT
Sat 24	5:12 AM EDT 7.7 ft	11:58 AM EDT 0.2 ft	5:58 PM EDT 6.8 ft			First Quarter	6:50 AM EDT	7:10 PM EDT	11:50 AM EDT	1:51 AM EDT
Sun 25		12:15 AM EDT 0.6 ft	6:19 AM EDT 7.6 ft	1:05 PM EDT 0.2 ft	7:04 PM EDT 6.9 ft		6:49 AM EDT	7:11 PM EDT	12:49 PM EDT	2:51 AM EDT
Mon 26		1:23 AM EDT 0.6 ft	7:28 AM EDT 7.6 ft	2:10 PM EDT 0.1 ft	8:10 PM EDT 7.1 ft		6:47 AM EDT	7:12 PM EDT	1:54 PM EDT	3:46 AM EDT
Tue 27		2:30 AM EDT 0.3 ft	8:34 AM EDT 7.7 ft	3:11 PM EDT -0.1 ft	9:10 PM EDT 7.5 ft		6:45 AM EDT	7:13 PM EDT	3:02 PM EDT	4:34 AM EDT
Wed 28		3:32 AM EDT -0.1 ft	9:35 AM EDT 8.0 ft	4:07 PM EDT -0.4 ft	10:06 PM EDT 7.9 ft		6:44 AM EDT	7:14 PM EDT	4:11 PM EDT	5:16 AM EDT
Thu 29		4:28 AM EDT -0.4 ft	10:31 AM EDT 8.2 ft	4:58 PM EDT -0.6 ft	10:57 PM EDT 8.3 ft		6:42 AM EDT	7:15 PM EDT	5:20 PM EDT	5:54 AM EDT
Fri 30		5:21 AM EDT -0.7 ft	11:21 AM EDT 8.3 ft	5:45 PM EDT -0.7 ft	11:44 PM EDT 8.5 ft		6:40 AM EDT	7:16 PM EDT	6:29 PM EDT	6:28 AM EDT
Sat 31		6:09 AM EDT -0.9 ft	12:09 PM EDT 8.3 ft	6:29 PM EDT -0.6 ft		Full Moon	6:39 AM EDT	7:18 PM EDT	7:35 PM EDT	7:01 AM EDT

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

April 2018

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Sun 01	12:28 AM EDT 8.6 ft	6:55 AM EDT -0.9 ft	12:54 PM EDT 8.1 ft	7:11 PM EDT -0.4 ft			6:37 AM EDT	7:19 PM EDT	8:40 PM EDT	7:32 AM EDT
Mon 02	1:11 AM EDT 8.6 ft	7:39 AM EDT -0.7 ft	1:38 PM EDT 7.9 ft	7:53 PM EDT -0.1 ft			6:35 AM EDT	7:20 PM EDT	9:43 PM EDT	8:04 AM EDT
Tue 03	1:53 AM EDT 8.4 ft	8:23 AM EDT -0.5 ft	2:22 PM EDT 7.6 ft	8:35 PM EDT 0.2 ft			6:34 AM EDT	7:21 PM EDT	10:45 PM EDT	8:37 AM EDT
Wed 04	2:36 AM EDT 8.0 ft	9:07 AM EDT -0.1 ft	3:07 PM EDT 7.2 ft	9:18 PM EDT 0.6 ft			6:32 AM EDT	7:22 PM EDT	11:43 PM EDT	9:13 AM EDT
Thu 05	3:20 AM EDT 7.7 ft	9:53 AM EDT 0.3 ft	3:54 PM EDT 6.9 ft	10:04 PM EDT 1.0 ft			6:30 AM EDT	7:23 PM EDT		9:51 AM EDT
Fri 06	4:08 AM EDT 7.3 ft	10:41 AM EDT 0.6 ft	4:45 PM EDT 6.6 ft	10:56 PM EDT 1.3 ft			6:29 AM EDT	7:24 PM EDT	12:39 AM EDT	10:34 AM EDT
Sat 07	4:59 AM EDT 6.9 ft	11:34 AM EDT 0.9 ft	5:39 PM EDT 6.4 ft	11:52 PM EDT 1.5 ft			6:27 AM EDT	7:25 PM EDT	1:31 AM EDT	11:20 AM EDT
Sun 08	5:56 AM EDT 6.7 ft	12:30 PM EDT 1.1 ft	6:36 PM EDT 6.4 ft			Last Quarter	6:26 AM EDT	7:26 PM EDT	2:19 AM EDT	12:10 PM EDT
Mon 09		12:51 AM EDT 1.5 ft	6:55 AM EDT 6.6 ft	1:26 PM EDT 1.1 ft	7:33 PM EDT 6.5 ft		6:24 AM EDT	7:27 PM EDT	3:02 AM EDT	1:04 PM EDT
Tue 10		1:50 AM EDT 1.4 ft	7:54 AM EDT 6.6 ft	2:20 PM EDT 1.0 ft	8:27 PM EDT 6.7 ft		6:22 AM EDT	7:28 PM EDT	3:41 AM EDT	2:00 PM EDT
Wed 11		2:45 AM EDT 1.1 ft	8:48 AM EDT 6.8 ft	3:10 PM EDT 0.7 ft	9:16 PM EDT 7.1 ft		6:21 AM EDT	7:29 PM EDT	4:16 AM EDT	2:59 PM EDT
Thu 12		3:36 AM EDT 0.8 ft	9:37 AM EDT 7.1 ft	3:56 PM EDT 0.5 ft	10:01 PM EDT 7.4 ft		6:19 AM EDT	7:30 PM EDT	4:50 AM EDT	4:00 PM EDT
Fri 13		4:22 AM EDT 0.4 ft	10:23 AM EDT 7.3 ft	4:39 PM EDT 0.2 ft	10:43 PM EDT 7.8 ft		6:18 AM EDT	7:31 PM EDT	5:21 AM EDT	5:02 PM EDT
Sat 14		5:06 AM EDT 0.0 ft	11:06 AM EDT 7.6 ft	5:21 PM EDT -0.0 ft	11:23 PM EDT 8.1 ft		6:16 AM EDT	7:32 PM EDT	5:51 AM EDT	6:06 PM EDT
Sun 15		5:49 AM EDT -0.3 ft	11:48 AM EDT 7.8 ft	6:01 PM EDT -0.1 ft		New Moon	6:15 AM EDT	7:33 PM EDT	6:22 AM EDT	7:12 PM EDT
Mon 16	12:02 AM EDT 8.4 ft	6:31 AM EDT -0.5 ft	12:30 PM EDT 7.9 ft	6:43 PM EDT -0.2 ft			6:13 AM EDT	7:34 PM EDT	6:54 AM EDT	8:19 PM EDT
Tue 17	12:43 AM EDT 8.6 ft	7:15 AM EDT -0.7 ft	1:14 PM EDT 7.9 ft	7:26 PM EDT -0.2 ft			6:12 AM EDT	7:35 PM EDT	7:29 AM EDT	9:28 PM EDT
Wed 18	1:26 AM EDT 8.7 ft	8:01 AM EDT -0.7 ft	2:00 PM EDT 7.8 ft	8:11 PM EDT -0.1 ft			6:10 AM EDT	7:36 PM EDT	8:08 AM EDT	10:37 PM EDT
Thu 19	2:11 AM EDT 8.6 ft	8:50 AM EDT -0.6 ft	2:50 PM EDT 7.7 ft	9:01 PM EDT 0.1 ft			6:09 AM EDT	7:37 PM EDT	8:53 AM EDT	11:45 PM EDT
Fri 20	3:02 AM EDT 8.4 ft	9:43 AM EDT -0.4 ft	3:43 PM EDT 7.5 ft	9:56 PM EDT 0.4 ft			6:07 AM EDT	7:39 PM EDT	9:45 AM EDT	
Sat 21	3:58 AM EDT 8.2 ft	10:41 AM EDT -0.1 ft	4:42 PM EDT 7.3 ft	10:58 PM EDT 0.6 ft			6:06 AM EDT	7:40 PM EDT	10:43 AM EDT	12:47 AM EDT
Sun 22	5:00 AM EDT 7.9 ft	11:43 AM EDT 0.1 ft	5:45 PM EDT 7.2 ft			First Quarter	6:04 AM EDT	7:41 PM EDT	11:46 AM EDT	1:44 AM EDT

Mon 23		12:04 AM EDT 0.7 ft	6:06 AM EDT 7.6 ft	12:48 PM EDT 0.2 ft	6:50 PM EDT 7.3 ft		6:03 AM EDT	7:42 PM EDT	12:52 PM EDT	2:34 AM EDT
Tue 24		1:12 AM EDT 0.6 ft	7:14 AM EDT 7.6 ft	1:51 PM EDT 0.2 ft	7:54 PM EDT 7.5 ft		6:01 AM EDT	7:43 PM EDT	2:00 PM EDT	3:17 AM EDT
Wed 25		2:18 AM EDT 0.4 ft	8:20 AM EDT 7.6 ft	2:51 PM EDT 0.1 ft	8:53 PM EDT 7.9 ft		6:00 AM EDT	7:44 PM EDT	3:08 PM EDT	3:55 AM EDT
Thu 26		3:19 AM EDT 0.1 ft	9:19 AM EDT 7.7 ft	3:45 PM EDT -0.1 ft	9:47 PM EDT 8.2 ft		5:59 AM EDT	7:45 PM EDT	4:15 PM EDT	4:29 AM EDT
Fri 27		4:14 AM EDT -0.2 ft	10:14 AM EDT 7.8 ft	4:34 PM EDT -0.2 ft	10:36 PM EDT 8.4 ft		5:57 AM EDT	7:46 PM EDT	5:21 PM EDT	5:01 AM EDT
Sat 28		5:05 AM EDT -0.5 ft	11:03 AM EDT 7.9 ft	5:20 PM EDT -0.2 ft	11:21 PM EDT 8.6 ft		5:56 AM EDT	7:47 PM EDT	6:26 PM EDT	5:32 AM EDT
Sun 29		5:51 AM EDT -0.6 ft	11:49 AM EDT 7.9 ft	6:03 PM EDT -0.1 ft		Full Moon	5:54 AM EDT	7:48 PM EDT	7:29 PM EDT	6:02 AM EDT
Mon 30	12:04 AM EDT 8.6 ft	6:35 AM EDT -0.6 ft	12:33 PM EDT 7.8 ft	6:45 PM EDT 0.1 ft			5:53 AM EDT	7:49 PM EDT	8:31 PM EDT	6:34 AM EDT

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

May 2018

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Tue 01	12:45 AM EDT 8.5 ft	7:16 AM EDT -0.4 ft	1:15 PM EDT 7.6 ft	7:25 PM EDT 0.4 ft			5:52 AM EDT	7:50 PM EDT	9:31 PM EDT	7:09 AM EDT
Wed 02	1:25 AM EDT 8.3 ft	7:57 AM EDT -0.2 ft	1:57 PM EDT 7.4 ft	8:05 PM EDT 0.6 ft			5:51 AM EDT	7:51 PM EDT	10:29 PM EDT	7:46 AM EDT
Thu 03	2:06 AM EDT 8.0 ft	8:38 AM EDT 0.0 ft	2:39 PM EDT 7.2 ft	8:47 PM EDT 0.9 ft			5:49 AM EDT	7:52 PM EDT	11:23 PM EDT	8:27 AM EDT
Fri 04	2:48 AM EDT 7.7 ft	9:20 AM EDT 0.3 ft	3:24 PM EDT 7.0 ft	9:31 PM EDT 1.1 ft			5:48 AM EDT	7:53 PM EDT		9:12 AM EDT
Sat 05	3:33 AM EDT 7.4 ft	10:05 AM EDT 0.6 ft	4:11 PM EDT 6.8 ft	10:20 PM EDT 1.4 ft			5:47 AM EDT	7:54 PM EDT	12:13 AM EDT	10:01 AM EDT
Sun 06	4:21 AM EDT 7.1 ft	10:53 AM EDT 0.9 ft	5:00 PM EDT 6.7 ft	11:13 PM EDT 1.5 ft			5:46 AM EDT	7:55 PM EDT	12:58 AM EDT	10:53 AM EDT
Mon 07	5:14 AM EDT 6.8 ft	11:45 AM EDT 1.0 ft	5:54 PM EDT 6.7 ft			Last Quarter	5:45 AM EDT	7:56 PM EDT	1:39 AM EDT	11:48 AM EDT
Tue 08		12:10 AM EDT 1.5 ft	6:10 AM EDT 6.7 ft	12:38 PM EDT 1.1 ft	6:48 PM EDT 6.8 ft		5:43 AM EDT	7:57 PM EDT	2:15 AM EDT	12:45 PM EDT
Wed 09		1:07 AM EDT 1.4 ft	7:07 AM EDT 6.7 ft	1:31 PM EDT 1.0 ft	7:40 PM EDT 7.0 ft		5:42 AM EDT	7:59 PM EDT	2:49 AM EDT	1:44 PM EDT
Thu 10		2:03 AM EDT 1.2 ft	8:03 AM EDT 6.8 ft	2:23 PM EDT 0.8 ft	8:31 PM EDT 7.3 ft		5:41 AM EDT	7:59 PM EDT	3:20 AM EDT	2:45 PM EDT
Fri 11		2:56 AM EDT 0.8 ft	8:55 AM EDT 7.0 ft	3:12 PM EDT 0.6 ft	9:18 PM EDT 7.7 ft		5:40 AM EDT	8:00 PM EDT	3:50 AM EDT	3:48 PM EDT
Sat 12		3:46 AM EDT 0.4 ft	9:45 AM EDT 7.3 ft	3:59 PM EDT 0.4 ft	10:03 PM EDT 8.1 ft		5:39 AM EDT	8:01 PM EDT	4:20 AM EDT	4:53 PM EDT
Sun 13		4:34 AM EDT 0.0 ft	10:33 AM EDT 7.5 ft	4:44 PM EDT 0.2 ft	10:47 PM EDT 8.4 ft		5:38 AM EDT	8:02 PM EDT	4:51 AM EDT	6:00 PM EDT
Mon 14		5:21 AM EDT -0.4 ft	11:19 AM EDT 7.7 ft	5:30 PM EDT 0.0 ft	11:32 PM EDT 8.7 ft		5:37 AM EDT	8:03 PM EDT	5:24 AM EDT	7:09 PM EDT
Tue 15		6:07 AM EDT -0.7 ft	12:06 PM EDT 7.9 ft	6:16 PM EDT -0.1 ft		New Moon	5:36 AM EDT	8:04 PM EDT	6:02 AM EDT	8:20 PM EDT
Wed 16	12:17 AM EDT 8.9 ft	6:55 AM EDT -0.8 ft	12:54 PM EDT 8.0 ft	7:03 PM EDT -0.1 ft			5:35 AM EDT	8:05 PM EDT	6:45 AM EDT	9:30 PM EDT
Thu 17	1:05 AM EDT 9.0 ft	7:44 AM EDT -0.8 ft	1:43 PM EDT 8.0 ft	7:54 PM EDT -0.0 ft			5:34 AM EDT	8:06 PM EDT	7:35 AM EDT	10:38 PM EDT
Fri 18	1:55 AM EDT 8.9 ft	8:35 AM EDT -0.7 ft	2:35 PM EDT 7.9 ft	8:47 PM EDT 0.1 ft			5:33 AM EDT	8:07 PM EDT	8:32 AM EDT	11:39 PM EDT
Sat 19	2:48 AM EDT 8.7 ft	9:30 AM EDT -0.5 ft	3:30 PM EDT 7.8 ft	9:45 PM EDT 0.3 ft			5:33 AM EDT	8:08 PM EDT	9:36 AM EDT	
Sun 20	3:46 AM EDT 8.4 ft	10:27 AM EDT -0.3 ft	4:29 PM EDT 7.7 ft	10:47 PM EDT 0.5 ft			5:32 AM EDT	8:09 PM EDT	10:43 AM EDT	12:32 AM EDT
Mon 21	4:48 AM EDT 8.0 ft	11:27 AM EDT -0.1 ft	5:30 PM EDT 7.7 ft	11:52 PM EDT 0.5 ft		First Quarter	5:31 AM EDT	8:10 PM EDT	11:52 AM EDT	1:18 AM EDT
Tue 22	5:52 AM EDT 7.7 ft	12:28 PM EDT 0.1 ft	6:32 PM EDT 7.7 ft				5:30 AM EDT	8:11 PM EDT	1:00 PM EDT	1:58 AM EDT

Wed 23		12:58 AM EDT 0.5 ft	6:57 AM EDT 7.5 ft	1:28 PM EDT 0.2 ft	7:33 PM EDT 7.9 ft		5:29 AM EDT	8:12 PM EDT	2:07 PM EDT	2:33 AM EDT
Thu 24		2:02 AM EDT 0.4 ft	8:00 AM EDT 7.4 ft	2:26 PM EDT 0.2 ft	8:31 PM EDT 8.1 ft		5:29 AM EDT	8:13 PM EDT	3:13 PM EDT	3:05 AM EDT
Fri 25		3:02 AM EDT 0.2 ft	8:59 AM EDT 7.4 ft	3:19 PM EDT 0.2 ft	9:24 PM EDT 8.3 ft		5:28 AM EDT	8:13 PM EDT	4:16 PM EDT	3:35 AM EDT
Sat 26		3:56 AM EDT -0.0 ft	9:53 AM EDT 7.5 ft	4:09 PM EDT 0.3 ft	10:12 PM EDT 8.4 ft		5:27 AM EDT	8:14 PM EDT	5:19 PM EDT	4:05 AM EDT
Sun 27		4:46 AM EDT -0.2 ft	10:42 AM EDT 7.5 ft	4:55 PM EDT 0.3 ft	10:57 PM EDT 8.4 ft		5:27 AM EDT	8:15 PM EDT	6:21 PM EDT	4:36 AM EDT
Mon 28		5:31 AM EDT -0.2 ft	11:28 AM EDT 7.5 ft	5:38 PM EDT 0.4 ft	11:39 PM EDT 8.4 ft		5:26 AM EDT	8:16 PM EDT	7:22 PM EDT	5:08 AM EDT
Tue 29		6:13 AM EDT -0.2 ft	12:11 PM EDT 7.5 ft	6:19 PM EDT 0.6 ft		Full Moon	5:26 AM EDT	8:17 PM EDT	8:20 PM EDT	5:44 AM EDT
Wed 30	12:20 AM EDT 8.3 ft	6:54 AM EDT -0.2 ft	12:53 PM EDT 7.4 ft	6:59 PM EDT 0.7 ft			5:25 AM EDT	8:18 PM EDT	9:16 PM EDT	6:23 AM EDT
Thu 31	1:00 AM EDT 8.1 ft	7:33 AM EDT -0.0 ft	1:33 PM EDT 7.3 ft	7:39 PM EDT 0.9 ft			5:25 AM EDT	8:18 PM EDT	10:08 PM EDT	7:06 AM EDT

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

June 2018

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Fri 01	1:40 AM EDT 7.9 ft	8:11 AM EDT 0.2 ft	2:14 PM EDT 7.2 ft	8:20 PM EDT 1.0 ft			5:24 AM EDT	8:19 PM EDT	10:55 PM EDT	7:53 AM EDT
Sat 02	2:20 AM EDT 7.7 ft	8:51 AM EDT 0.3 ft	2:56 PM EDT 7.1 ft	9:03 PM EDT 1.2 ft			5:24 AM EDT	8:20 PM EDT	11:37 PM EDT	8:44 AM EDT
Sun 03	3:03 AM EDT 7.5 ft	9:33 AM EDT 0.5 ft	3:39 PM EDT 7.0 ft	9:48 PM EDT 1.3 ft			5:23 AM EDT	8:20 PM EDT		9:39 AM EDT
Mon 04	3:48 AM EDT 7.2 ft	10:17 AM EDT 0.7 ft	4:24 PM EDT 7.0 ft	10:37 PM EDT 1.4 ft			5:23 AM EDT	8:21 PM EDT	12:15 AM EDT	10:35 AM EDT
Tue 05	4:36 AM EDT 7.0 ft	11:04 AM EDT 0.8 ft	5:13 PM EDT 7.0 ft	11:30 PM EDT 1.4 ft			5:23 AM EDT	8:22 PM EDT	12:49 AM EDT	11:33 AM EDT
Wed 06	5:27 AM EDT 6.9 ft	11:53 AM EDT 0.9 ft	6:03 PM EDT 7.1 ft			Last Quarter	5:22 AM EDT	8:22 PM EDT	1:21 AM EDT	12:32 PM EDT
Thu 07		12:25 AM EDT 1.3 ft	6:22 AM EDT 6.8 ft	12:44 PM EDT 0.9 ft	6:54 PM EDT 7.3 ft		5:22 AM EDT	8:23 PM EDT	1:50 AM EDT	1:32 PM EDT
Fri 08		1:21 AM EDT 1.1 ft	7:18 AM EDT 6.8 ft	1:36 PM EDT 0.8 ft	7:45 PM EDT 7.6 ft		5:22 AM EDT	8:24 PM EDT	2:19 AM EDT	2:34 PM EDT
Sat 09		2:17 AM EDT 0.8 ft	8:13 AM EDT 7.0 ft	2:28 PM EDT 0.7 ft	8:35 PM EDT 7.9 ft		5:21 AM EDT	8:24 PM EDT	2:49 AM EDT	3:39 PM EDT
Sun 10		3:10 AM EDT 0.4 ft	9:08 AM EDT 7.2 ft	3:19 PM EDT 0.5 ft	9:25 PM EDT 8.3 ft		5:21 AM EDT	8:25 PM EDT	3:20 AM EDT	4:46 PM EDT
Mon 11		4:03 AM EDT -0.0 ft	10:00 AM EDT 7.4 ft	4:10 PM EDT 0.3 ft	10:15 PM EDT 8.6 ft		5:21 AM EDT	8:25 PM EDT	3:55 AM EDT	5:56 PM EDT
Tue 12		4:54 AM EDT -0.4 ft	10:52 AM EDT 7.6 ft	5:01 PM EDT 0.1 ft	11:05 PM EDT 8.9 ft		5:21 AM EDT	8:26 PM EDT	4:35 AM EDT	7:08 PM EDT
Wed 13		5:45 AM EDT -0.7 ft	11:43 AM EDT 7.9 ft	5:52 PM EDT -0.1 ft	11:55 PM EDT 9.1 ft	New Moon	5:21 AM EDT	8:26 PM EDT	5:22 AM EDT	8:18 PM EDT
Thu 14		6:36 AM EDT -0.9 ft	12:34 PM EDT 8.0 ft	6:44 PM EDT -0.2 ft			5:21 AM EDT	8:27 PM EDT	6:16 AM EDT	9:24 PM EDT
Fri 15	12:47 AM EDT 9.2 ft	7:27 AM EDT -0.9 ft	1:26 PM EDT 8.1 ft	7:38 PM EDT -0.2 ft			5:21 AM EDT	8:27 PM EDT	7:19 AM EDT	10:24 PM EDT
Sat 16	1:40 AM EDT 9.1 ft	8:20 AM EDT -0.9 ft	2:20 PM EDT 8.1 ft	8:34 PM EDT -0.1 ft			5:21 AM EDT	8:27 PM EDT	8:27 AM EDT	11:15 PM EDT
Sun 17	2:35 AM EDT 8.8 ft	9:14 AM EDT -0.7 ft	3:15 PM EDT 8.1 ft	9:32 PM EDT 0.0 ft			5:21 AM EDT	8:28 PM EDT	9:38 AM EDT	11:58 PM EDT
Mon 18	3:32 AM EDT 8.5 ft	10:09 AM EDT -0.5 ft	4:12 PM EDT 8.1 ft	10:33 PM EDT 0.2 ft			5:21 AM EDT	8:28 PM EDT	10:49 AM EDT	
Tue 19	4:32 AM EDT 8.1 ft	11:06 AM EDT -0.2 ft	5:10 PM EDT 8.0 ft	11:35 PM EDT 0.4 ft			5:21 AM EDT	8:28 PM EDT	11:58 AM EDT	12:36 AM EDT
Wed 20	5:33 AM EDT 7.7 ft	12:04 PM EDT 0.0 ft	6:09 PM EDT 8.0 ft			First Quarter	5:22 AM EDT	8:29 PM EDT	1:05 PM EDT	1:09 AM EDT
Thu 21		12:39 AM EDT 0.4 ft	6:35 AM EDT 7.4 ft	1:01 PM EDT 0.2 ft	7:08 PM EDT 8.1 ft		5:22 AM EDT	8:29 PM EDT	2:10 PM EDT	1:40 AM EDT
Fri 22		1:41 AM EDT 0.4 ft	7:36 AM EDT 7.2 ft	1:58 PM EDT 0.4 ft	8:05 PM EDT 8.1 ft		5:22 AM EDT	8:29 PM EDT	3:13 PM EDT	2:09 AM EDT

Sat 23		2:40 AM EDT 0.3 ft	8:35 AM EDT 7.1 ft	2:51 PM EDT 0.5 ft	8:58 PM EDT 8.1 ft		5:22 AM EDT	8:29 PM EDT	4:14 PM EDT	2:39 AM EDT
Sun 24		3:34 AM EDT 0.2 ft	9:29 AM EDT 7.1 ft	3:42 PM EDT 0.6 ft	9:47 PM EDT 8.2 ft		5:23 AM EDT	8:29 PM EDT	5:15 PM EDT	3:11 AM EDT
Mon 25		4:24 AM EDT 0.1 ft	10:19 AM EDT 7.1 ft	4:29 PM EDT 0.7 ft	10:33 PM EDT 8.1 ft		5:23 AM EDT	8:29 PM EDT	6:13 PM EDT	3:45 AM EDT
Tue 26		5:09 AM EDT 0.1 ft	11:05 AM EDT 7.2 ft	5:13 PM EDT 0.8 ft	11:16 PM EDT 8.1 ft		5:23 AM EDT	8:29 PM EDT	7:10 PM EDT	4:22 AM EDT
Wed 27		5:51 AM EDT 0.1 ft	11:49 AM EDT 7.2 ft	5:55 PM EDT 0.8 ft	11:57 PM EDT 8.0 ft		5:24 AM EDT	8:29 PM EDT	8:03 PM EDT	5:03 AM EDT
Thu 28		6:30 AM EDT 0.1 ft	12:30 PM EDT 7.2 ft	6:36 PM EDT 0.9 ft		Full Moon	5:24 AM EDT	8:29 PM EDT	8:52 PM EDT	5:49 AM EDT
Fri 29	12:37 AM EDT 8.0 ft	7:08 AM EDT 0.1 ft	1:09 PM EDT 7.3 ft	7:15 PM EDT 0.9 ft			5:25 AM EDT	8:29 PM EDT	9:36 PM EDT	6:39 AM EDT
Sat 30	1:16 AM EDT 7.8 ft	7:46 AM EDT 0.2 ft	1:48 PM EDT 7.3 ft	7:55 PM EDT 0.9 ft			5:25 AM EDT	8:29 PM EDT	10:15 PM EDT	7:32 AM EDT

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

July 2018

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Sun 01	1:56 AM EDT 7.7 ft	8:24 AM EDT 0.3 ft	2:28 PM EDT 7.3 ft	8:36 PM EDT 1.0 ft			5:25 AM EDT	8:29 PM EDT	10:51 PM EDT	8:27 AM EDT
Mon 02	2:35 AM EDT 7.6 ft	9:02 AM EDT 0.4 ft	3:08 PM EDT 7.3 ft	9:19 PM EDT 1.1 ft			5:26 AM EDT	8:29 PM EDT	11:23 PM EDT	9:24 AM EDT
Tue 03	3:17 AM EDT 7.4 ft	9:43 AM EDT 0.5 ft	3:49 PM EDT 7.3 ft	10:04 PM EDT 1.1 ft			5:26 AM EDT	8:29 PM EDT	11:53 PM EDT	10:22 AM EDT
Wed 04	4:01 AM EDT 7.2 ft	10:26 AM EDT 0.6 ft	4:33 PM EDT 7.3 ft	10:54 PM EDT 1.1 ft			5:27 AM EDT	8:29 PM EDT		11:21 AM EDT
Thu 05	4:49 AM EDT 7.1 ft	11:12 AM EDT 0.7 ft	5:20 PM EDT 7.4 ft	11:46 PM EDT 1.1 ft			5:28 AM EDT	8:28 PM EDT	12:21 AM EDT	12:22 PM EDT
Fri 06	5:42 AM EDT 6.9 ft	12:02 PM EDT 0.7 ft	6:10 PM EDT 7.5 ft			Last Quarter	5:28 AM EDT	8:28 PM EDT	12:50 AM EDT	1:24 PM EDT
Sat 07		12:43 AM EDT 0.9 ft	6:38 AM EDT 6.9 ft	12:55 PM EDT 0.7 ft	7:03 PM EDT 7.8 ft		5:29 AM EDT	8:28 PM EDT	1:19 AM EDT	2:28 PM EDT
Sun 08		1:41 AM EDT 0.7 ft	7:36 AM EDT 6.9 ft	1:50 PM EDT 0.7 ft	7:57 PM EDT 8.0 ft		5:30 AM EDT	8:27 PM EDT	1:51 AM EDT	3:34 PM EDT
Mon 09		2:38 AM EDT 0.3 ft	8:35 AM EDT 7.1 ft	2:46 PM EDT 0.5 ft	8:53 PM EDT 8.4 ft		5:30 AM EDT	8:27 PM EDT	2:27 AM EDT	4:44 PM EDT
Tue 10		3:35 AM EDT -0.0 ft	9:32 AM EDT 7.3 ft	3:42 PM EDT 0.3 ft	9:48 PM EDT 8.7 ft		5:31 AM EDT	8:27 PM EDT	3:09 AM EDT	5:54 PM EDT
Wed 11		4:30 AM EDT -0.4 ft	10:28 AM EDT 7.6 ft	4:37 PM EDT 0.1 ft	10:43 PM EDT 9.0 ft		5:32 AM EDT	8:26 PM EDT	3:59 AM EDT	7:02 PM EDT
Thu 12		5:24 AM EDT -0.7 ft	11:22 AM EDT 7.9 ft	5:33 PM EDT -0.2 ft	11:37 PM EDT 9.2 ft	New Moon	5:33 AM EDT	8:26 PM EDT	4:58 AM EDT	8:06 PM EDT
Fri 13		6:17 AM EDT -0.9 ft	12:15 PM EDT 8.1 ft	6:27 PM EDT -0.3 ft			5:33 AM EDT	8:25 PM EDT	6:04 AM EDT	9:03 PM EDT
Sat 14	12:31 AM EDT 9.2 ft	7:09 AM EDT -1.0 ft	1:08 PM EDT 8.3 ft	7:23 PM EDT -0.4 ft			5:34 AM EDT	8:24 PM EDT	7:16 AM EDT	9:51 PM EDT
Sun 15	1:25 AM EDT 9.1 ft	8:01 AM EDT -0.9 ft	2:01 PM EDT 8.4 ft	8:18 PM EDT -0.4 ft			5:35 AM EDT	8:24 PM EDT	8:29 AM EDT	10:32 PM EDT
Mon 16	2:19 AM EDT 8.9 ft	8:53 AM EDT -0.8 ft	2:54 PM EDT 8.5 ft	9:15 PM EDT -0.2 ft			5:36 AM EDT	8:23 PM EDT	9:42 AM EDT	11:09 PM EDT
Tue 17	3:14 AM EDT 8.5 ft	9:46 AM EDT -0.5 ft	3:49 PM EDT 8.4 ft	10:13 PM EDT 0.0 ft			5:36 AM EDT	8:23 PM EDT	10:52 AM EDT	11:41 PM EDT
Wed 18	4:11 AM EDT 8.1 ft	10:39 AM EDT -0.2 ft	4:44 PM EDT 8.3 ft	11:13 PM EDT 0.2 ft			5:37 AM EDT	8:22 PM EDT	12:00 PM EDT	
Thu 19	5:09 AM EDT 7.6 ft	11:34 AM EDT 0.1 ft	5:41 PM EDT 8.1 ft			First Quarter	5:38 AM EDT	8:21 PM EDT	1:05 PM EDT	12:12 AM EDT
Fri 20		12:13 AM EDT 0.4 ft	6:09 AM EDT 7.2 ft	12:30 PM EDT 0.5 ft	6:38 PM EDT 8.0 ft		5:39 AM EDT	8:20 PM EDT	2:07 PM EDT	12:42 AM EDT
Sat 21		1:14 AM EDT 0.5 ft	7:09 AM EDT 7.0 ft	1:27 PM EDT 0.7 ft	7:35 PM EDT 7.9 ft		5:40 AM EDT	8:20 PM EDT	3:08 PM EDT	1:14 AM EDT
Sun 22		2:12 AM EDT 0.6 ft	8:07 AM EDT 6.9 ft	2:22 PM EDT 0.9 ft	8:29 PM EDT 7.8 ft		5:41 AM EDT	8:19 PM EDT	4:08 PM EDT	1:47 AM EDT

Mon 23		3:07 AM EDT 0.5 ft	9:03 AM EDT 6.9 ft	3:14 PM EDT 1.0 ft	9:20 PM EDT 7.8 ft		5:42 AM EDT	8:18 PM EDT	5:05 PM EDT	2:23 AM EDT
Tue 24		3:58 AM EDT 0.4 ft	9:54 AM EDT 6.9 ft	4:04 PM EDT 1.0 ft	10:08 PM EDT 7.8 ft		5:42 AM EDT	8:17 PM EDT	5:59 PM EDT	3:02 AM EDT
Wed 25		4:43 AM EDT 0.4 ft	10:41 AM EDT 7.1 ft	4:49 PM EDT 0.9 ft	10:53 PM EDT 7.9 ft		5:43 AM EDT	8:16 PM EDT	6:49 PM EDT	3:46 AM EDT
Thu 26		5:25 AM EDT 0.3 ft	11:24 AM EDT 7.2 ft	5:32 PM EDT 0.9 ft	11:35 PM EDT 7.9 ft		5:44 AM EDT	8:15 PM EDT	7:35 PM EDT	4:35 AM EDT
Fri 27		6:04 AM EDT 0.3 ft	12:04 PM EDT 7.3 ft	6:13 PM EDT 0.8 ft		Full Moon	5:45 AM EDT	8:14 PM EDT	8:16 PM EDT	5:27 AM EDT
Sat 28	12:14 AM EDT 7.9 ft	6:42 AM EDT 0.2 ft	12:43 PM EDT 7.4 ft	6:52 PM EDT 0.8 ft			5:46 AM EDT	8:13 PM EDT	8:52 PM EDT	6:22 AM EDT
Sun 29	12:53 AM EDT 7.8 ft	7:18 AM EDT 0.2 ft	1:20 PM EDT 7.5 ft	7:31 PM EDT 0.8 ft			5:47 AM EDT	8:12 PM EDT	9:26 PM EDT	7:18 AM EDT
Mon 30	1:31 AM EDT 7.8 ft	7:55 AM EDT 0.2 ft	1:58 PM EDT 7.5 ft	8:10 PM EDT 0.8 ft			5:48 AM EDT	8:11 PM EDT	9:56 PM EDT	8:16 AM EDT
Tue 31	2:09 AM EDT 7.7 ft	8:32 AM EDT 0.3 ft	2:35 PM EDT 7.5 ft	8:51 PM EDT 0.8 ft			5:49 AM EDT	8:10 PM EDT	10:25 PM EDT	9:15 AM EDT

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

August 2018

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Wed 01	2:48 AM EDT 7.5 ft	9:10 AM EDT 0.3 ft	3:14 PM EDT 7.6 ft	9:34 PM EDT 0.8 ft			5:50 AM EDT	8:09 PM EDT	10:53 PM EDT	10:14 AM EDT
Thu 02	3:30 AM EDT 7.4 ft	9:51 AM EDT 0.5 ft	3:56 PM EDT 7.6 ft	10:21 PM EDT 0.8 ft			5:51 AM EDT	8:08 PM EDT	11:21 PM EDT	11:15 AM EDT
Fri 03	4:17 AM EDT 7.2 ft	10:36 AM EDT 0.6 ft	4:41 PM EDT 7.7 ft	11:13 PM EDT 0.8 ft			5:52 AM EDT	8:07 PM EDT	11:51 PM EDT	12:17 PM EDT
Sat 04	5:09 AM EDT 7.1 ft	11:26 AM EDT 0.7 ft	5:32 PM EDT 7.8 ft			Last Quarter	5:53 AM EDT	8:06 PM EDT		1:20 PM EDT
Sun 05		12:10 AM EDT 0.7 ft	6:06 AM EDT 6.9 ft	12:21 PM EDT 0.8 ft	6:28 PM EDT 7.9 ft		5:54 AM EDT	8:05 PM EDT	12:24 AM EDT	2:26 PM EDT
Mon 06		1:11 AM EDT 0.6 ft	7:07 AM EDT 6.9 ft	1:20 PM EDT 0.8 ft	7:28 PM EDT 8.1 ft		5:55 AM EDT	8:04 PM EDT	1:02 AM EDT	3:34 PM EDT
Tue 07		2:12 AM EDT 0.4 ft	8:09 AM EDT 7.1 ft	2:21 PM EDT 0.6 ft	8:28 PM EDT 8.3 ft		5:56 AM EDT	8:02 PM EDT	1:47 AM EDT	4:42 PM EDT
Wed 08		3:13 AM EDT 0.0 ft	9:09 AM EDT 7.3 ft	3:22 PM EDT 0.3 ft	9:28 PM EDT 8.6 ft		5:57 AM EDT	8:01 PM EDT	2:39 AM EDT	5:46 PM EDT
Thu 09		4:10 AM EDT -0.3 ft	10:07 AM EDT 7.7 ft	4:20 PM EDT 0.0 ft	10:26 PM EDT 8.9 ft		5:58 AM EDT	8:00 PM EDT	3:41 AM EDT	6:46 PM EDT
Fri 10		5:05 AM EDT -0.6 ft	11:02 AM EDT 8.1 ft	5:17 PM EDT -0.3 ft	11:22 PM EDT 9.1 ft		5:59 AM EDT	7:58 PM EDT	4:49 AM EDT	7:38 PM EDT
Sat 11		5:58 AM EDT -0.8 ft	11:55 AM EDT 8.4 ft	6:12 PM EDT -0.5 ft		New Moon	6:00 AM EDT	7:57 PM EDT	6:03 AM EDT	8:24 PM EDT
Sun 12	12:15 AM EDT 9.2 ft	6:48 AM EDT -0.9 ft	12:47 PM EDT 8.6 ft	7:06 PM EDT -0.6 ft			6:01 AM EDT	7:56 PM EDT	7:17 AM EDT	9:03 PM EDT
Mon 13	1:08 AM EDT 9.0 ft	7:38 AM EDT -0.9 ft	1:38 PM EDT 8.7 ft	7:59 PM EDT -0.5 ft			6:02 AM EDT	7:54 PM EDT	8:31 AM EDT	9:39 PM EDT
Tue 14	2:00 AM EDT 8.8 ft	8:28 AM EDT -0.7 ft	2:29 PM EDT 8.7 ft	8:53 PM EDT -0.3 ft			6:03 AM EDT	7:53 PM EDT	9:42 AM EDT	10:11 PM EDT
Wed 15	2:52 AM EDT 8.4 ft	9:17 AM EDT -0.4 ft	3:21 PM EDT 8.6 ft	9:48 PM EDT -0.1 ft			6:04 AM EDT	7:52 PM EDT	10:50 AM EDT	10:42 PM EDT
Thu 16	3:45 AM EDT 7.9 ft	10:08 AM EDT 0.0 ft	4:13 PM EDT 8.3 ft	10:45 PM EDT 0.2 ft			6:05 AM EDT	7:50 PM EDT	11:55 AM EDT	11:14 PM EDT
Fri 17	4:41 AM EDT 7.5 ft	11:01 AM EDT 0.4 ft	5:08 PM EDT 8.0 ft	11:43 PM EDT 0.5 ft			6:06 AM EDT	7:49 PM EDT	12:59 PM EDT	11:47 PM EDT
Sat 18	5:38 AM EDT 7.1 ft	11:57 AM EDT 0.8 ft	6:04 PM EDT 7.8 ft			First Quarter	6:07 AM EDT	7:48 PM EDT	2:00 PM EDT	
Sun 19		12:42 AM EDT 0.7 ft	6:38 AM EDT 6.8 ft	12:54 PM EDT 1.1 ft	7:01 PM EDT 7.6 ft		6:08 AM EDT	7:46 PM EDT	2:58 PM EDT	12:22 AM EDT
Mon 20		1:40 AM EDT 0.8 ft	7:37 AM EDT 6.7 ft	1:51 PM EDT 1.2 ft	7:58 PM EDT 7.5 ft		6:09 AM EDT	7:45 PM EDT	3:54 PM EDT	1:01 AM EDT
Tue 21		2:36 AM EDT 0.8 ft	8:33 AM EDT 6.8 ft	2:46 PM EDT 1.2 ft	8:52 PM EDT 7.5 ft		6:10 AM EDT	7:43 PM EDT	4:45 PM EDT	1:44 AM EDT
Wed 22		3:27 AM EDT 0.8 ft	9:25 AM EDT 6.9 ft	3:37 PM EDT 1.1 ft	9:42 PM EDT 7.6 ft		6:11 AM EDT	7:42 PM EDT	5:33 PM EDT	2:31 AM EDT

Thu 23		4:13 AM EDT 0.6 ft	10:12 AM EDT 7.1 ft	4:24 PM EDT 1.0 ft	10:27 PM EDT 7.7 ft		6:12 AM EDT	7:40 PM EDT	6:15 PM EDT	3:21 AM EDT
Fri 24		4:55 AM EDT 0.5 ft	10:55 AM EDT 7.3 ft	5:07 PM EDT 0.8 ft	11:10 PM EDT 7.8 ft		6:12 AM EDT	7:39 PM EDT	6:53 PM EDT	4:15 AM EDT
Sat 25		5:34 AM EDT 0.4 ft	11:35 AM EDT 7.5 ft	5:47 PM EDT 0.7 ft	11:49 PM EDT 7.8 ft		6:13 AM EDT	7:37 PM EDT	7:28 PM EDT	5:12 AM EDT
Sun 26		6:11 AM EDT 0.2 ft	12:14 PM EDT 7.6 ft	6:26 PM EDT 0.6 ft		Full Moon	6:14 AM EDT	7:35 PM EDT	7:59 PM EDT	6:10 AM EDT
Mon 27	12:27 AM EDT 7.9 ft	6:48 AM EDT 0.2 ft	12:50 PM EDT 7.8 ft	7:05 PM EDT 0.5 ft			6:15 AM EDT	7:34 PM EDT	8:28 PM EDT	7:09 AM EDT
Tue 28	1:04 AM EDT 7.9 ft	7:24 AM EDT 0.2 ft	1:26 PM EDT 7.8 ft	7:43 PM EDT 0.5 ft			6:16 AM EDT	7:32 PM EDT	8:56 PM EDT	8:08 AM EDT
Wed 29	1:42 AM EDT 7.8 ft	8:00 AM EDT 0.2 ft	2:02 PM EDT 7.9 ft	8:24 PM EDT 0.5 ft			6:17 AM EDT	7:31 PM EDT	9:25 PM EDT	9:09 AM EDT
Thu 30	2:21 AM EDT 7.7 ft	8:39 AM EDT 0.3 ft	2:40 PM EDT 7.9 ft	9:06 PM EDT 0.5 ft			6:18 AM EDT	7:29 PM EDT	9:54 PM EDT	10:10 AM EDT
Fri 31	3:04 AM EDT 7.5 ft	9:20 AM EDT 0.5 ft	3:22 PM EDT 7.9 ft	9:53 PM EDT 0.5 ft			6:19 AM EDT	7:28 PM EDT	10:25 PM EDT	11:13 AM EDT

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

September 2018

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Sat 01	3:51 AM EDT 7.3 ft	10:06 AM EDT 0.7 ft	4:09 PM EDT 7.9 ft	10:46 PM EDT 0.6 ft			6:20 AM EDT	7:26 PM EDT	11:01 PM EDT	12:17 PM EDT
Sun 02	4:44 AM EDT 7.1 ft	10:58 AM EDT 0.8 ft	5:03 PM EDT 7.9 ft	11:45 PM EDT 0.6 ft		Last Quarter	6:21 AM EDT	7:24 PM EDT	11:41 PM EDT	1:22 PM EDT
Mon 03	5:43 AM EDT 7.0 ft	11:57 AM EDT 0.9 ft	6:03 PM EDT 7.9 ft				6:22 AM EDT	7:23 PM EDT		2:28 PM EDT
Tue 04		12:49 AM EDT 0.6 ft	6:46 AM EDT 7.0 ft	1:00 PM EDT 0.9 ft	7:07 PM EDT 8.0 ft		6:23 AM EDT	7:21 PM EDT	12:29 AM EDT	3:32 PM EDT
Wed 05		1:53 AM EDT 0.4 ft	7:50 AM EDT 7.2 ft	2:05 PM EDT 0.7 ft	8:12 PM EDT 8.2 ft		6:24 AM EDT	7:19 PM EDT	1:25 AM EDT	4:32 PM EDT
Thu 06		2:54 AM EDT 0.1 ft	8:52 AM EDT 7.5 ft	3:08 PM EDT 0.3 ft	9:14 PM EDT 8.5 ft		6:25 AM EDT	7:18 PM EDT	2:28 AM EDT	5:26 PM EDT
Fri 07		3:52 AM EDT -0.2 ft	9:49 AM EDT 7.9 ft	4:07 PM EDT -0.1 ft	10:12 PM EDT 8.8 ft		6:26 AM EDT	7:16 PM EDT	3:38 AM EDT	6:13 PM EDT
Sat 08		4:46 AM EDT -0.5 ft	10:44 AM EDT 8.3 ft	5:03 PM EDT -0.4 ft	11:06 PM EDT 8.9 ft		6:27 AM EDT	7:14 PM EDT	4:51 AM EDT	6:55 PM EDT
Sun 09		5:37 AM EDT -0.7 ft	11:35 AM EDT 8.7 ft	5:57 PM EDT -0.6 ft	11:58 PM EDT 9.0 ft	New Moon	6:28 AM EDT	7:13 PM EDT	6:05 AM EDT	7:32 PM EDT
Mon 10		6:25 AM EDT -0.8 ft	12:25 PM EDT 8.9 ft	6:48 PM EDT -0.7 ft			6:29 AM EDT	7:11 PM EDT	7:18 AM EDT	8:06 PM EDT
Tue 11	12:48 AM EDT 8.8 ft	7:13 AM EDT -0.7 ft	1:13 PM EDT 9.0 ft	7:39 PM EDT -0.6 ft			6:30 AM EDT	7:09 PM EDT	8:29 AM EDT	8:39 PM EDT
Wed 12	1:38 AM EDT 8.5 ft	7:59 AM EDT -0.4 ft	2:01 PM EDT 8.8 ft	8:29 PM EDT -0.4 ft			6:31 AM EDT	7:08 PM EDT	9:37 AM EDT	9:11 PM EDT
Thu 13	2:27 AM EDT 8.2 ft	8:46 AM EDT -0.1 ft	2:49 PM EDT 8.6 ft	9:20 PM EDT -0.0 ft			6:32 AM EDT	7:06 PM EDT	10:44 AM EDT	9:44 PM EDT
Fri 14	3:18 AM EDT 7.7 ft	9:35 AM EDT 0.4 ft	3:39 PM EDT 8.2 ft	10:13 PM EDT 0.3 ft			6:33 AM EDT	7:04 PM EDT	11:47 AM EDT	10:19 PM EDT
Sat 15	4:10 AM EDT 7.3 ft	10:26 AM EDT 0.8 ft	4:31 PM EDT 7.8 ft	11:07 PM EDT 0.7 ft			6:34 AM EDT	7:03 PM EDT	12:48 PM EDT	10:57 PM EDT
Sun 16	5:05 AM EDT 6.9 ft	11:21 AM EDT 1.2 ft	5:26 PM EDT 7.5 ft			First Quarter	6:35 AM EDT	7:01 PM EDT	1:46 PM EDT	11:39 PM EDT
Mon 17		12:04 AM EDT 1.0 ft	6:03 AM EDT 6.7 ft	12:18 PM EDT 1.4 ft	6:25 PM EDT 7.3 ft		6:36 AM EDT	6:59 PM EDT	2:40 PM EDT	
Tue 18		1:02 AM EDT 1.1 ft	7:02 AM EDT 6.6 ft	1:17 PM EDT 1.5 ft	7:23 PM EDT 7.2 ft		6:37 AM EDT	6:58 PM EDT	3:29 PM EDT	12:25 AM EDT
Wed 19		1:58 AM EDT 1.1 ft	7:59 AM EDT 6.7 ft	2:14 PM EDT 1.4 ft	8:19 PM EDT 7.2 ft		6:38 AM EDT	6:56 PM EDT	4:13 PM EDT	1:14 AM EDT
Thu 20		2:50 AM EDT 1.0 ft	8:51 AM EDT 6.9 ft	3:06 PM EDT 1.2 ft	9:11 PM EDT 7.3 ft		6:39 AM EDT	6:54 PM EDT	4:53 PM EDT	2:08 AM EDT
Fri 21		3:37 AM EDT 0.8 ft	9:39 AM EDT 7.2 ft	3:54 PM EDT 0.9 ft	9:57 PM EDT 7.5 ft		6:40 AM EDT	6:52 PM EDT	5:28 PM EDT	3:03 AM EDT
Sat 22		4:20 AM EDT 0.6 ft	10:22 AM EDT 7.5 ft	4:38 PM EDT 0.7 ft	10:40 PM EDT 7.7 ft		6:41 AM EDT	6:51 PM EDT	6:01 PM EDT	4:01 AM EDT

Sun 23		5:00 AM EDT 0.4 ft	11:03 AM EDT 7.7 ft	5:19 PM EDT 0.5 ft	11:20 PM EDT 7.8 ft		6:42 AM EDT	6:49 PM EDT	6:31 PM EDT	5:00 AM EDT
Mon 24		5:38 AM EDT 0.2 ft	11:40 AM EDT 7.9 ft	5:59 PM EDT 0.3 ft	11:59 PM EDT 7.9 ft	Full Moon	6:43 AM EDT	6:47 PM EDT	6:59 PM EDT	6:00 AM EDT
Tue 25		6:15 AM EDT 0.2 ft	12:17 PM EDT 8.1 ft	6:38 PM EDT 0.2 ft			6:44 AM EDT	6:46 PM EDT	7:28 PM EDT	7:01 AM EDT
Wed 26	12:37 AM EDT 7.9 ft	6:52 AM EDT 0.1 ft	12:53 PM EDT 8.2 ft	7:17 PM EDT 0.1 ft			6:45 AM EDT	6:44 PM EDT	7:56 PM EDT	8:03 AM EDT
Thu 27	1:16 AM EDT 7.8 ft	7:30 AM EDT 0.2 ft	1:30 PM EDT 8.2 ft	7:58 PM EDT 0.1 ft			6:46 AM EDT	6:42 PM EDT	8:27 PM EDT	9:06 AM EDT
Fri 28	1:57 AM EDT 7.7 ft	8:10 AM EDT 0.3 ft	2:10 PM EDT 8.2 ft	8:43 PM EDT 0.1 ft			6:47 AM EDT	6:41 PM EDT	9:01 PM EDT	10:11 AM EDT
Sat 29	2:41 AM EDT 7.6 ft	8:54 AM EDT 0.5 ft	2:54 PM EDT 8.2 ft	9:32 PM EDT 0.2 ft			6:48 AM EDT	6:39 PM EDT	9:40 PM EDT	11:16 AM EDT
Sun 30	3:30 AM EDT 7.4 ft	9:43 AM EDT 0.7 ft	3:44 PM EDT 8.1 ft	10:26 PM EDT 0.4 ft			6:49 AM EDT	6:37 PM EDT	10:25 PM EDT	12:22 PM EDT

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

October 2018

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Mon 01	4:25 AM EDT 7.2 ft	10:39 AM EDT 0.9 ft	4:42 PM EDT 7.9 ft	11:27 PM EDT 0.5 ft			6:50 AM EDT	6:36 PM EDT	11:17 PM EDT	1:26 PM EDT
Tue 02	5:26 AM EDT 7.1 ft	11:42 AM EDT 0.9 ft	5:46 PM EDT 7.9 ft			Last Quarter	6:51 AM EDT	6:34 PM EDT		2:26 PM EDT
Wed 03		12:32 AM EDT 0.5 ft	6:31 AM EDT 7.1 ft	12:48 PM EDT 0.9 ft	6:53 PM EDT 7.9 ft		6:52 AM EDT	6:32 PM EDT	12:16 AM EDT	3:20 PM EDT
Thu 04		1:36 AM EDT 0.4 ft	7:35 AM EDT 7.3 ft	1:54 PM EDT 0.6 ft	7:59 PM EDT 8.0 ft		6:53 AM EDT	6:31 PM EDT	1:22 AM EDT	4:08 PM EDT
Fri 05		2:37 AM EDT 0.1 ft	8:37 AM EDT 7.7 ft	2:57 PM EDT 0.2 ft	9:01 PM EDT 8.3 ft		6:54 AM EDT	6:29 PM EDT	2:32 AM EDT	4:50 PM EDT
Sat 06		3:34 AM EDT -0.2 ft	9:33 AM EDT 8.1 ft	3:55 PM EDT -0.2 ft	9:58 PM EDT 8.5 ft		6:55 AM EDT	6:27 PM EDT	3:43 AM EDT	5:28 PM EDT
Sun 07		4:26 AM EDT -0.4 ft	10:25 AM EDT 8.6 ft	4:50 PM EDT -0.5 ft	10:50 PM EDT 8.6 ft		6:56 AM EDT	6:26 PM EDT	4:55 AM EDT	6:02 PM EDT
Mon 08		5:14 AM EDT -0.5 ft	11:15 AM EDT 8.8 ft	5:41 PM EDT -0.7 ft	11:40 PM EDT 8.6 ft	New Moon	6:58 AM EDT	6:24 PM EDT	6:06 AM EDT	6:35 PM EDT
Tue 09		6:01 AM EDT -0.5 ft	12:01 PM EDT 9.0 ft	6:29 PM EDT -0.7 ft			6:59 AM EDT	6:22 PM EDT	7:16 AM EDT	7:06 PM EDT
Wed 10	12:28 AM EDT 8.4 ft	6:46 AM EDT -0.4 ft	12:47 PM EDT 8.9 ft	7:17 PM EDT -0.6 ft			7:00 AM EDT	6:21 PM EDT	8:24 AM EDT	7:39 PM EDT
Thu 11	1:15 AM EDT 8.2 ft	7:31 AM EDT -0.1 ft	1:32 PM EDT 8.7 ft	8:03 PM EDT -0.4 ft			7:01 AM EDT	6:19 PM EDT	9:30 AM EDT	8:14 PM EDT
Fri 12	2:01 AM EDT 7.8 ft	8:15 AM EDT 0.3 ft	2:18 PM EDT 8.4 ft	8:50 PM EDT -0.0 ft			7:02 AM EDT	6:18 PM EDT	10:34 AM EDT	8:51 PM EDT
Sat 13	2:49 AM EDT 7.5 ft	9:01 AM EDT 0.7 ft	3:04 PM EDT 8.0 ft	9:39 PM EDT 0.4 ft			7:03 AM EDT	6:16 PM EDT	11:35 AM EDT	9:32 PM EDT
Sun 14	3:38 AM EDT 7.1 ft	9:50 AM EDT 1.0 ft	3:54 PM EDT 7.6 ft	10:30 PM EDT 0.7 ft			7:04 AM EDT	6:15 PM EDT	12:31 PM EDT	10:17 PM EDT
Mon 15	4:31 AM EDT 6.8 ft	10:43 AM EDT 1.3 ft	4:47 PM EDT 7.2 ft	11:24 PM EDT 1.0 ft			7:05 AM EDT	6:13 PM EDT	1:23 PM EDT	11:05 PM EDT
Tue 16	5:26 AM EDT 6.6 ft	11:40 AM EDT 1.5 ft	5:45 PM EDT 7.0 ft			First Quarter	7:06 AM EDT	6:12 PM EDT	2:10 PM EDT	11:58 PM EDT
Wed 17		12:19 AM EDT 1.2 ft	6:23 AM EDT 6.6 ft	12:39 PM EDT 1.6 ft	6:44 PM EDT 6.9 ft		7:07 AM EDT	6:10 PM EDT	2:51 PM EDT	
Thu 18		1:15 AM EDT 1.2 ft	7:20 AM EDT 6.7 ft	1:37 PM EDT 1.4 ft	7:40 PM EDT 6.9 ft		7:08 AM EDT	6:09 PM EDT	3:28 PM EDT	12:53 AM EDT
Fri 19		2:07 AM EDT 1.0 ft	8:12 AM EDT 6.9 ft	2:31 PM EDT 1.2 ft	8:33 PM EDT 7.0 ft		7:09 AM EDT	6:07 PM EDT	4:01 PM EDT	1:49 AM EDT
Sat 20		2:55 AM EDT 0.8 ft	9:01 AM EDT 7.2 ft	3:20 PM EDT 0.9 ft	9:21 PM EDT 7.2 ft		7:10 AM EDT	6:06 PM EDT	4:32 PM EDT	2:48 AM EDT
Sun 21		3:40 AM EDT 0.6 ft	9:45 AM EDT 7.6 ft	4:06 PM EDT 0.6 ft	10:06 PM EDT 7.4 ft		7:12 AM EDT	6:04 PM EDT	5:00 PM EDT	3:47 AM EDT
Mon 22		4:21 AM EDT 0.4 ft	10:26 AM EDT 7.9 ft	4:48 PM EDT 0.3 ft	10:48 PM EDT 7.6 ft		7:13 AM EDT	6:03 PM EDT	5:29 PM EDT	4:48 AM EDT

Tue 23		5:01 AM EDT 0.2 ft	11:05 AM EDT 8.1 ft	5:30 PM EDT 0.0 ft	11:28 PM EDT 7.7 ft		7:14 AM EDT	6:01 PM EDT	5:57 PM EDT	5:50 AM EDT
Wed 24		5:41 AM EDT 0.1 ft	11:43 AM EDT 8.3 ft	6:11 PM EDT -0.2 ft		Full Moon	7:15 AM EDT	6:00 PM EDT	6:27 PM EDT	6:54 AM EDT
Thu 25	12:09 AM EDT 7.8 ft	6:20 AM EDT 0.0 ft	12:22 PM EDT 8.5 ft	6:52 PM EDT -0.3 ft			7:16 AM EDT	5:59 PM EDT	7:01 PM EDT	8:00 AM EDT
Fri 26	12:51 AM EDT 7.8 ft	7:02 AM EDT 0.1 ft	1:02 PM EDT 8.5 ft	7:36 PM EDT -0.4 ft			7:17 AM EDT	5:57 PM EDT	7:38 PM EDT	9:07 AM EDT
Sat 27	1:35 AM EDT 7.7 ft	7:45 AM EDT 0.2 ft	1:45 PM EDT 8.5 ft	8:23 PM EDT -0.3 ft			7:18 AM EDT	5:56 PM EDT	8:22 PM EDT	10:14 AM EDT
Sun 28	2:22 AM EDT 7.6 ft	8:32 AM EDT 0.3 ft	2:33 PM EDT 8.4 ft	9:14 PM EDT -0.1 ft			7:20 AM EDT	5:55 PM EDT	9:12 PM EDT	11:20 AM EDT
Mon 29	3:14 AM EDT 7.4 ft	9:25 AM EDT 0.5 ft	3:27 PM EDT 8.1 ft	10:11 PM EDT 0.1 ft			7:21 AM EDT	5:53 PM EDT	10:10 PM EDT	12:22 PM EDT
Tue 30	4:11 AM EDT 7.2 ft	10:25 AM EDT 0.7 ft	4:27 PM EDT 7.9 ft	11:12 PM EDT 0.2 ft			7:22 AM EDT	5:52 PM EDT	11:13 PM EDT	1:18 PM EDT
Wed 31	5:13 AM EDT 7.2 ft	11:30 AM EDT 0.8 ft	5:33 PM EDT 7.7 ft			Last Quarter	7:23 AM EDT	5:51 PM EDT		2:08 PM EDT

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

November 2018

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Thu 01		12:16 AM EDT 0.3 ft	6:17 AM EDT 7.3 ft	12:38 PM EDT 0.7 ft	6:40 PM EDT 7.7 ft		7:24 AM EDT	5:50 PM EDT	12:21 AM EDT	2:50 PM EDT
Fri 02		1:19 AM EDT 0.2 ft	7:20 AM EDT 7.5 ft	1:44 PM EDT 0.4 ft	7:46 PM EDT 7.7 ft		7:25 AM EDT	5:48 PM EDT	1:31 AM EDT	3:28 PM EDT
Sat 03		2:18 AM EDT 0.0 ft	8:20 AM EDT 7.9 ft	2:46 PM EDT 0.1 ft	8:46 PM EDT 7.9 ft		7:27 AM EDT	5:47 PM EDT	2:41 AM EDT	4:02 PM EDT
Sun 04		2:13 AM EST -0.2 ft	8:16 AM EST 8.2 ft	2:43 PM EST -0.3 ft	8:42 PM EST 8.0 ft		6:28 AM EST	4:46 PM EST	2:50 AM EST	3:34 PM EST
Mon 05		3:04 AM EST -0.3 ft	9:06 AM EST 8.6 ft	3:36 PM EST -0.5 ft	9:34 PM EST 8.0 ft		6:29 AM EST	4:45 PM EST	3:59 AM EST	4:05 PM EST
Tue 06		3:52 AM EST -0.3 ft	9:54 AM EST 8.7 ft	4:25 PM EST -0.7 ft	10:22 PM EST 8.0 ft		6:30 AM EST	4:44 PM EST	5:06 AM EST	4:36 PM EST
Wed 07		4:38 AM EST -0.3 ft	10:39 AM EST 8.8 ft	5:11 PM EST -0.7 ft	11:08 PM EST 7.9 ft	New Moon	6:31 AM EST	4:43 PM EST	6:13 AM EST	5:09 PM EST
Thu 08		5:21 AM EST -0.1 ft	11:23 AM EST 8.7 ft	5:55 PM EST -0.6 ft	11:53 PM EST 7.7 ft		6:33 AM EST	4:42 PM EST	7:18 AM EST	5:45 PM EST
Fri 09		6:04 AM EST 0.1 ft	12:05 PM EST 8.4 ft	6:38 PM EST -0.3 ft			6:34 AM EST	4:41 PM EST	8:20 AM EST	6:24 PM EST
Sat 10	12:37 AM EST 7.5 ft	6:47 AM EST 0.4 ft	12:48 PM EST 8.1 ft	7:22 PM EST -0.1 ft			6:35 AM EST	4:40 PM EST	9:20 AM EST	7:08 PM EST
Sun 11	1:21 AM EST 7.2 ft	7:30 AM EST 0.7 ft	1:33 PM EST 7.8 ft	8:06 PM EST 0.3 ft			6:36 AM EST	4:39 PM EST	10:15 AM EST	7:55 PM EST
Mon 12	2:07 AM EST 7.0 ft	8:17 AM EST 1.0 ft	2:19 PM EST 7.4 ft	8:53 PM EST 0.6 ft			6:37 AM EST	4:38 PM EST	11:04 AM EST	8:47 PM EST
Tue 13	2:56 AM EST 6.7 ft	9:06 AM EST 1.2 ft	3:09 PM EST 7.0 ft	9:42 PM EST 0.8 ft			6:38 AM EST	4:37 PM EST	11:48 AM EST	9:41 PM EST
Wed 14	3:47 AM EST 6.6 ft	10:00 AM EST 1.4 ft	4:03 PM EST 6.8 ft	10:34 PM EST 1.0 ft			6:40 AM EST	4:36 PM EST	12:26 PM EST	10:37 PM EST
Thu 15	4:41 AM EST 6.6 ft	10:57 AM EST 1.4 ft	4:59 PM EST 6.6 ft	11:27 PM EST 1.0 ft		First Quarter	6:41 AM EST	4:35 PM EST	1:01 PM EST	11:35 PM EST
Fri 16	5:35 AM EST 6.7 ft	11:55 AM EST 1.3 ft	5:56 PM EST 6.6 ft				6:42 AM EST	4:34 PM EST	1:32 PM EST	
Sat 17		12:19 AM EST 0.9 ft	6:28 AM EST 6.9 ft	12:50 PM EST 1.1 ft	6:50 PM EST 6.7 ft		6:43 AM EST	4:34 PM EST	2:01 PM EST	12:33 AM EST
Sun 18		1:09 AM EST 0.8 ft	7:17 AM EST 7.2 ft	1:42 PM EST 0.8 ft	7:41 PM EST 6.9 ft		6:44 AM EST	4:33 PM EST	2:29 PM EST	1:33 AM EST
Mon 19		1:56 AM EST 0.6 ft	8:03 AM EST 7.5 ft	2:30 PM EST 0.4 ft	8:28 PM EST 7.1 ft		6:45 AM EST	4:32 PM EST	2:57 PM EST	2:34 AM EST
Tue 20		2:41 AM EST 0.3 ft	8:47 AM EST 7.8 ft	3:16 PM EST 0.1 ft	9:14 PM EST 7.3 ft		6:47 AM EST	4:31 PM EST	3:26 PM EST	3:37 AM EST
Wed 21		3:25 AM EST 0.1 ft	9:29 AM EST 8.1 ft	4:00 PM EST -0.3 ft	9:59 PM EST 7.5 ft		6:48 AM EST	4:31 PM EST	3:57 PM EST	4:42 AM EST
Thu 22		4:08 AM EST -0.0 ft	10:11 AM EST 8.4 ft	4:45 PM EST -0.6 ft	10:43 PM EST 7.6 ft		6:49 AM EST	4:30 PM EST	4:33 PM EST	5:49 AM EST

Fri 23		4:52 AM EST -0.1 ft	10:54 AM EST 8.6 ft	5:30 PM EST -0.7 ft	11:28 PM EST 7.7 ft	Full Moon	6:50 AM EST	4:30 PM EST	5:15 PM EST	6:58 AM EST
Sat 24		5:37 AM EST -0.2 ft	11:39 AM EST 8.7 ft	6:17 PM EST -0.8 ft			6:51 AM EST	4:29 PM EST	6:04 PM EST	8:07 AM EST
Sun 25	12:15 AM EST 7.7 ft	6:25 AM EST -0.1 ft	12:27 PM EST 8.6 ft	7:06 PM EST -0.7 ft			6:53 AM EST	4:29 PM EST	7:00 PM EST	9:13 AM EST
Mon 26	1:05 AM EST 7.6 ft	7:17 AM EST -0.0 ft	1:18 PM EST 8.5 ft	7:59 PM EST -0.6 ft			6:53 AM EST	4:28 PM EST	8:04 PM EST	10:14 AM EST
Tue 27	1:58 AM EST 7.5 ft	8:12 AM EST 0.1 ft	2:14 PM EST 8.2 ft	8:55 PM EST -0.4 ft			6:54 AM EST	4:28 PM EST	9:12 PM EST	11:07 AM EST
Wed 28	2:56 AM EST 7.4 ft	9:13 AM EST 0.3 ft	3:14 PM EST 7.9 ft	9:54 PM EST -0.2 ft			6:56 AM EST	4:27 PM EST	10:22 PM EST	11:52 AM EST
Thu 29	3:56 AM EST 7.4 ft	10:17 AM EST 0.4 ft	4:18 PM EST 7.6 ft	10:56 PM EST -0.1 ft		Last Quarter	6:57 AM EST	4:27 PM EST	11:32 PM EST	12:31 PM EST
Fri 30	4:59 AM EST 7.5 ft	11:24 AM EST 0.3 ft	5:24 PM EST 7.4 ft	11:57 PM EST -0.0 ft			6:58 AM EST	4:27 PM EST		1:06 PM EST

Oyster Bay Harbor, Oyster Bay, New York

40.8667° N, 73.5167° W

December 2018

Day	High	Low	High	Low	High	Phase	Sunrise	Sunset	Moonrise	Moonset
Sat 01	6:01 AM EST 7.6 ft	12:29 PM EST 0.2 ft	6:28 PM EST 7.3 ft				6:59 AM EST	4:26 PM EST	12:41 AM EST	1:38 PM EST
Sun 02		12:56 AM EST -0.1 ft	7:01 AM EST 7.9 ft	1:31 PM EST -0.1 ft	7:29 PM EST 7.3 ft		7:00 AM EST	4:26 PM EST	1:48 AM EST	2:08 PM EST
Mon 03		1:51 AM EST -0.1 ft	7:56 AM EST 8.1 ft	2:28 PM EST -0.3 ft	8:25 PM EST 7.4 ft		7:01 AM EST	4:26 PM EST	2:55 AM EST	2:38 PM EST
Tue 04		2:43 AM EST -0.1 ft	8:47 AM EST 8.3 ft	3:20 PM EST -0.5 ft	9:17 PM EST 7.4 ft		7:02 AM EST	4:26 PM EST	4:00 AM EST	3:09 PM EST
Wed 05		3:31 AM EST -0.1 ft	9:34 AM EST 8.4 ft	4:08 PM EST -0.6 ft	10:05 PM EST 7.4 ft		7:03 AM EST	4:26 PM EST	5:05 AM EST	3:43 PM EST
Thu 06		4:17 AM EST -0.1 ft	10:19 AM EST 8.3 ft	4:53 PM EST -0.6 ft	10:49 PM EST 7.4 ft		7:04 AM EST	4:26 PM EST	6:08 AM EST	4:20 PM EST
Fri 07		5:00 AM EST 0.1 ft	11:01 AM EST 8.2 ft	5:35 PM EST -0.5 ft	11:32 PM EST 7.3 ft	New Moon	7:04 AM EST	4:25 PM EST	7:09 AM EST	5:01 PM EST
Sat 08		5:41 AM EST 0.2 ft	11:43 AM EST 8.0 ft	6:15 PM EST -0.4 ft			7:05 AM EST	4:25 PM EST	8:06 AM EST	5:47 PM EST
Sun 09	12:14 AM EST 7.2 ft	6:22 AM EST 0.4 ft	12:23 PM EST 7.8 ft	6:55 PM EST -0.2 ft			7:06 AM EST	4:26 PM EST	8:58 AM EST	6:37 PM EST
Mon 10	12:55 AM EST 7.0 ft	7:04 AM EST 0.6 ft	1:05 PM EST 7.5 ft	7:36 PM EST 0.1 ft			7:07 AM EST	4:26 PM EST	9:44 AM EST	7:30 PM EST
Tue 11	1:37 AM EST 6.9 ft	7:46 AM EST 0.8 ft	1:48 PM EST 7.3 ft	8:18 PM EST 0.3 ft			7:08 AM EST	4:26 PM EST	10:25 AM EST	8:26 PM EST
Wed 12	2:21 AM EST 6.8 ft	8:32 AM EST 0.9 ft	2:34 PM EST 7.0 ft	9:02 PM EST 0.5 ft			7:09 AM EST	4:26 PM EST	11:01 AM EST	9:23 PM EST
Thu 13	3:07 AM EST 6.7 ft	9:21 AM EST 1.1 ft	3:22 PM EST 6.7 ft	9:48 PM EST 0.6 ft			7:09 AM EST	4:26 PM EST	11:33 AM EST	10:21 PM EST
Fri 14	3:56 AM EST 6.6 ft	10:14 AM EST 1.1 ft	4:13 PM EST 6.5 ft	10:37 PM EST 0.7 ft			7:10 AM EST	4:26 PM EST	12:02 PM EST	11:19 PM EST
Sat 15	4:47 AM EST 6.7 ft	11:09 AM EST 1.1 ft	5:08 PM EST 6.4 ft	11:28 PM EST 0.7 ft		First Quarter	7:11 AM EST	4:27 PM EST	12:30 PM EST	
Sun 16	5:38 AM EST 6.8 ft	12:05 PM EST 0.9 ft	6:03 PM EST 6.4 ft				7:12 AM EST	4:27 PM EST	12:57 PM EST	12:18 AM EST
Mon 17		12:20 AM EST 0.7 ft	6:29 AM EST 7.0 ft	1:00 PM EST 0.7 ft	6:57 PM EST 6.5 ft		7:12 AM EST	4:27 PM EST	1:24 PM EST	1:19 AM EST
Tue 18		1:11 AM EST 0.5 ft	7:19 AM EST 7.3 ft	1:52 PM EST 0.3 ft	7:50 PM EST 6.7 ft		7:13 AM EST	4:28 PM EST	1:54 PM EST	2:21 AM EST
Wed 19		2:01 AM EST 0.3 ft	8:08 AM EST 7.7 ft	2:43 PM EST -0.1 ft	8:41 PM EST 6.9 ft		7:13 AM EST	4:28 PM EST	2:27 PM EST	3:27 AM EST
Thu 20		2:51 AM EST 0.1 ft	8:56 AM EST 8.0 ft	3:32 PM EST -0.5 ft	9:30 PM EST 7.2 ft		7:14 AM EST	4:28 PM EST	3:05 PM EST	4:35 AM EST
Fri 21		3:39 AM EST -0.1 ft	9:44 AM EST 8.4 ft	4:21 PM EST -0.8 ft	10:19 PM EST 7.4 ft		7:15 AM EST	4:29 PM EST	3:50 PM EST	5:44 AM EST
Sat 22		4:28 AM EST -0.3 ft	10:32 AM EST 8.6 ft	5:10 PM EST -1.0 ft	11:08 PM EST 7.6 ft	Full Moon	7:15 AM EST	4:29 PM EST	4:44 PM EST	6:53 AM EST

Sun 23		5:18 AM EST -0.5 ft	11:21 AM EST 8.7 ft	5:59 PM EST -1.2 ft	11:58 PM EST 7.7 ft		7:16 AM EST	4:30 PM EST	5:46 PM EST	7:59 AM EST
Mon 24		6:09 AM EST -0.6 ft	12:12 PM EST 8.7 ft	6:50 PM EST -1.1 ft			7:16 AM EST	4:30 PM EST	6:55 PM EST	8:57 AM EST
Tue 25	12:49 AM EST 7.8 ft	7:02 AM EST -0.5 ft	1:05 PM EST 8.5 ft	7:42 PM EST -1.0 ft			7:16 AM EST	4:31 PM EST	8:08 PM EST	9:48 AM EST
Wed 26	1:42 AM EST 7.8 ft	7:58 AM EST -0.4 ft	2:00 PM EST 8.2 ft	8:36 PM EST -0.8 ft			7:17 AM EST	4:32 PM EST	9:20 PM EST	10:31 AM EST
Thu 27	2:37 AM EST 7.7 ft	8:58 AM EST -0.2 ft	2:59 PM EST 7.9 ft	9:33 PM EST -0.6 ft			7:17 AM EST	4:32 PM EST	10:31 PM EST	11:09 AM EST
Fri 28	3:36 AM EST 7.6 ft	10:00 AM EST -0.1 ft	4:00 PM EST 7.5 ft	10:31 PM EST -0.3 ft			7:17 AM EST	4:33 PM EST	11:40 PM EST	11:42 AM EST
Sat 29	4:36 AM EST 7.6 ft	11:05 AM EST 0.0 ft	5:03 PM EST 7.1 ft	11:31 PM EST -0.1 ft		Last Quarter	7:18 AM EST	4:34 PM EST		12:12 PM EST
Sun 30	5:37 AM EST 7.6 ft	12:10 PM EST 0.0 ft	6:06 PM EST 6.9 ft				7:18 AM EST	4:35 PM EST	12:48 AM EST	12:42 PM EST
Mon 31		12:30 AM EST 0.0 ft	6:37 AM EST 7.7 ft	1:12 PM EST -0.1 ft	7:08 PM EST 6.8 ft		7:18 AM EST	4:35 PM EST	1:52 AM EST	1:12 PM EST

NOT FOR NAVIGATION

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. The author and the publisher each assume no liability for damages arising from use of these predictions. They are not certified to be correct, and they do not incorporate the effects of tropical storms, El Niño, seismic events, subsidence, uplift, or changes in global sea level.

Web pages copyright © 2005-2019 Mobile Geographics LLC



Appendix E

2017-2018 Open Water Body Monitoring Results

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	
1	Friends of the Bay 2017 Water Quality Data - Site 4, Cold Spring Harbor North																																			
2	Date	Time	H2O Temp TOP (0.5m)	H2O Temp 1.0 m	H2O Temp 0.5 m from BTM	Salinity TOP	Salinity 1.0 m	Salinity BTM	PH Top	PH 1.0 m	Ph .5 m from BTM	Top DO	DO 1.0 m	BTM DO	Secchi	Depth (meters)	Air Temp	H2O Temp BTM monthly AVG	Fecal Coliform Bacteria	Enterococci	Ammonia (NH3)	Nitrate (NO3)	Nitrite (NO2)	Organic Nitrogen (N)	Total Nitrogen	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather		
3	Site 4	4/3/2017	no sample																																	
4	Site 4	4/10/2017	8:44	7.19	6.85	6.81	26.73	26.79	26.85	9.55	9.51	9.50	10.70	10.64	8.53	2.4	5.9	12.9		2	<1							4	3	0	0	1	1	5	1	
5	Site 4	4/17/2017	8:40	11.66	11.67	8.83	25.80	25.80	26.21	9.71	9.70	9.58	12.56	12.06	10.92	1.6	5.2	15.8		<1	<1															
6	Site 4	4/24/2017	8:35	9.72	9.52	9.28	25.4	26.38	25.37	9.72	9.69	9.66	11.63	11.41	9.91		6.7	13.3		1	<1					0	2	4	5	8	0	3	1	4	3	
7	Site 4	5/1/2017	8:55	12.29	12.31	11.43	36.94	37.06	37.14								2.3	5.8	9.9		<1	<1						2		6	1	4	1	2	386	
8	Site 4	5/8/2017	8:20	12.55	12.55	12.49	26.39	26.36	26.38				8.58	8.56	8.56	2.6	5.9	9.6		<1	<1							4	3	1	2	0	2	8	1	
9	Site 4	5/15/2017	high wind																																	
10	Site 4	5/22/2017	no sample																																	
11	Site 4	5/30/2017	Tu	9:06	15.47	15.46	14.49	24.03	24.03	24.16			8.88	8.61	8.31	1.7	5	14.2		2	<1						3	2	3	1	1	4	1	4	3	
12	Site 4	6/5/2017	10:06	17.22	17.1	15.78	25.57	25.63	25.99	7.94	7.95	7.86	7.1	7.01	6.41	1.0	8.8	15.1		1	<1							2	5	6	2	4	1	3	3	
13	Site 4	6/12/2017	8:02	19.51	19.22	17.24	25.38	25.43	25.78	8.09	8.10	7.72	8.44	8.42	5.15	1.2	4.4	26.9		10	<1							3	3	1	0	0	0	0	1	
14	Site 4	6/19/2017	bad weather																																	
15	Site 4	6/26/2017	00829	21.52	21.50	19.39	25.17	25.10	25.89	8.01	8.00	7.62	7.13	6.99	4.35	1.7	2.3	22.6		9	<1					3	3	4	6	2	0	0	8	1		
16	Site 4	7/5/2017	00816	23.04	23.01	17.78	25.72	25.72	26.43	8.13	8.13	7.65	8.67	8.17	4.78	0.9	6.5	23.2		1	<1					0	4	1	6	2	1	1	2	1		
17	Site 4	7/10/2017	00827	22.33	22.33	20.90	25.7	25.77	26.2	8.11	8.16	7.74	8.24	7.69	5.29	1.4	4.8	26.3		15	<1					0	3	3	6	0	0	0	3	1		
18	Site 4	7/17/2017	01018	23.90	23.59	20.76	25.96	26.10	26.48	8.05	8.04	7.39	7.86	6.42	2.53	0.8	5.2	27.1		3	<1					0	2	3	6	0	2	1	1	1		
19	Site 4	7/24/2017	no sample																																	
20	Site 4	7/31/2017	01014	22.92	22.66	21.74	26.07	26.13	26.45	7.94	7.85	7.59	7.10	6.55	4.05	1.3	5.6	23.0		1	1					0	2	3	6	0	0	0	0	1		
21	Site 4	8/7/2017	no sample																																	
22	Site 4	8/14/2017	00953	24.18	24.07	23.14	26.12	26.19	26.43	7.97	7.96	7.61	7.17	6.04	4.41	1.4	4.7	24.0		<1	<1					0	2	3	6	1	3	1	2	2		
23	Site 4	8/21/2017	00832	24.47	24.43	24.24	26.06	26.46	26.49	7.87	7.84	7.69	6.41	6.32	5.28	1.2	5.6	25.6		1	<1					0	4	3	6	0	2	0	0	1		
24	Site 4	8/28/2017	no sample																																	
25	Site 4	9/5/17Tu	00833	21.48	21.48	21.38	26.65	26.65	26.79	7.82	7.82	7.73	6.12	6.14	5.63	1.9	5.7	23.3		1	<1					0	4	3	6	1	3	1	6	3		
26	Site 4	9/11/2017	00958	20.51	20.61	20.95	26.19	26.27	26.7	8.2	8.17	7.88	8.80	8.70	6.89	2.0	4.7	19.5		<1	<1						3	5	6	2	2	1	8	1		
27	Site 4	9/18/2017	no sample																																	
28	Site 4	9/25/2017	no sample																																	
29	Site 4	10/2/2017	no sample																																	
30	Site 4	10/10/17Tu	8:09	21.32													24.20															1		2		
31	Site 4	10/16/2017	no sample																																	
32	Site 4	10/23/2017	9:20	18.14	18.14	18.48	26.94	26.94	27.24	8.15	8.15	8.04	7.47	7.33	6.40	2.4	4.7	29.08		<1	<1					0.000	4	4	6.000	2.000	1.000	1.000	4.000	1.000		
33	Site 4	10/30/2017	no sample																																	

Friends of the Bay 2018 Water Quality Data - Site 1, Cold Spring Cove South																																					
	Date	Time	H2O Temp TOP (0.5m)	H2O Temp 1.0 m	H2O Temp 0.5 m from BTM	Salinity TOP	Salinity 1.0	Salinity BTM	PH Top	PH 1.0	Ph .5 m from BTM	Top DO	DO 1.0	BTM DO	Secchi	Depth (meters)	Air Temp (°C)	H2O Temp BTM monthly AVG	Fecal Coliform Bacteria	Enterococci	Ammonia (NH3)	Nitrate NO3	Nitrite (NO2)	Total Kjeldahl Nitrogen (TKN)	Organic Nitrogen (N)	Total Nitrogen	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Condition	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather		
Site 1	4/2/2018		NO MONITOR - SNOW																																		
Site 1	4/9/2018		Boat not available																																		
Site 1	4/16/2018		Boat not available																																		
Site 1	4/23/2018	01028	9.33	9.10	8.38	21.82	23.42	24.74	8.53	9.10	8.51	13.88	12.10	10.56	1.3	3.0	12.00		4	<1							0	2	5	6	1	0	1	3	1		
Site 1	4/30/2018	00810	10.70	10.77	10.72	23.77	24.25	24.66	8.50	8.48	8.38	8.01	7.68	7.05	1.4	3.6	9.60		34	<1								3	3	4	6	2	4	2	1	1	
Site 1	5/7/2018	01100	14.62	absent	14.70	22.83	absent	23.45	8.98	absent	8.86	11.63	absent	11.25	1.2	1.3	20.80		6	<1								1	3	1	6	1	3	1	8	3	
Site 1	5/14/2018	00820	13.84	13.8	12.72	24.73	24.73	25.23	8.39	8.34	8.10	7.42	7.26	6.25	1.5	4.4	13.80		62	20							2	4	1		0	4	0		3		
Site 1	5/21/2018	01005	16.12	16.10	14.44	22.96	23.58	24.90	8.12	8.11	8.14	5.42	5.44	4.93	2.4	3.4	18.70		24	2							1	2	3	6	1	1	1	8	1		
Site 1	5/28/2018	00758	16.13	15.88	14.20	23.78	24.45	25.30	7.95	7.89	7.63	5.05	4.77	4.10	1.200	4.5	20.1		60	16							1	4	5	6	1	4	1	1	2		
Site 1	6/4/2018		bad weather																																		
Site 1	6/11/2018	00810	18.52	18.42	18.14	23.67	24.08	24.83	8.44	8.31	7.98	7.45	6.64	5.62	0.8	5.5	16.20		64	29							0	4	5	6	1	4	0	n/a		3	
Site 1	6/18/2018	00957	20.39	20.28	19.08	21.59	21.65	22.17	8.44	8.34	8.14	32.42	32.52	33.06	1.1	3.3	26.6		72	10							0	2	5	6	1	1	1	5	1		
Site 1	6/25/2018	00807	19.26	18.86	17.90	24.04	24.44	25.25	8.13	8.03	7.84	6.12	5.20	3.59	1.0	4.8	20.70		240	146							2	4	3	6	1	1	1	1	0		
Site 1	7/2/2018	00742	23.20	22.62	21.43	23.97	24.37	25.03	8.39	7.98	7.55	7.67	7.27	3.55	1.30	3.7	25.0		70	24							0	2	5	6	0	0	0	n/a		1	
Site 1	7/9/2018	01004	22.46	20.45	20.44	24.30	25.98	25.99	8.20	8.00	7.91	4.66	3.88	4.51	0.9	5.3	25.40		64	2							0	2	5	6	0	0	1	6	1		
Site 1	7/16/2018	00803	22.01	21.94	21.73	24.98	25.12	25.61	8.01	7.66	7.23	5.26	4.83	3.23	0.9	3.6	25.50		170	35							1	2	3	6	0	0	0	n/a		1	
Site 1	7/23/2018		bad weather																																		
Site 1	7/30/2018		Boat and quanta needed repair																																		
Site 1	8/6/2018		Boat and quanta needed repair																																		
Site 1	8/13/2018		Quanta need repair																																		
Site 1	8/20/2018		Bad weather																																		
Site 1	8/27/2018	00733	23.70	23.66	22.86	26.22	25.89	24.06	7.45	7.43	7.4	2.7	2.67	2.32	1.6	3.7	22.60		37	<1							0	3	3	6	0	3	0	n/a		2	
Site 1	9/3/2018	01010	25.70	25.25	24.46	26.25	26.59	26.98	8.49	8.15	7.68	n/a	6.23	1.64	0.2	4.4	28.00		16	34							0	2	2	1	1	1	0	0	n/a		1
Site 1	9/10/2018		bad weather																																		
Site 1	9/17/2018		boat repair																																		
Site 1	9/24/2018		unaccessible																																		
Site 1	10/1/2018	01040	20.95	20.91	20.82	25.71	25.85	26.48	8.72	8.71	8.52	8.86	8.89	7.5	1.1	4.0	22.60		11	4							0	3	1	1	1	3	1	6	3		
Site 1	10/8/2018	00757	20.48	20.80	20.97	26.05	26.56	26.63	8.11	8.08	7.91	5.24	5.25	5.27	1.7	4.1	21.50		60	19							1	4	5	6	0	4	0	n/a		3	
Site 1	10/15/2018		bad weather																																		
Site 1	10/22/2018	00740	12.71	12.72	12.92	25.58	25.65	26.42	8.41	8.38	8.24	8.26	8.29	8.73	1.2	5.7	3.00		18	6							0	4	5	6	1	1	1	6	2		
Site 1	10/29/2018		bad weather																																		

18 Water Quality Data - Site 3, Cold Spring Harbor South																																		
	Date	Time	H2O Temp TOP (0.5m)	H2O Temp 1.0 m	H2O Temp 0.5 m from BTM	Salinity TOP (0.5 m)	Salinity 1.0 m	Salinity BTM	PH Top	PH 1.0 m	Ph .5 m from BTM	Top DO	DO 1.0 m	BTM DO	Secchi	Depth (meters)	Air Temp	H2O Temp BTM monthly AVG	Fecal Coliform Bacteria	Enterococci	Ammonia (NH3)	Nitrate (NO3)	Nitrite (NO2)	Organic Nitrogen (N)	Total Nitrogen	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 3	4/2/2018	NO MONITOR - SNOW																																
Site 3	4/9/2018	Boat not available																																
Site 3	4/16/2018	Boat not available																																
Site 3	4/23/2018	01010	8.80	8.36	7.78	24.63	24.81	25.06	8.58	8.60	8.62	15.76	15.68	13.46	1.6	5.0	11.1		<1	<1						0	2	5	6	1	0	1	3	1
Site 3	4/30/2018	00845	10.30	10.31	10.22	24.770	24.94	25.040	8.54	8.53	8.54	7.99	8.03	7.98	1.4	4.9	8.0		4	<1						3	3	4	6	3	3	3	1	2
Site 3	5/7/2018	01039	14.05	13.35	12.71	24.46	24.78	25.23	8.76	8.77	8.42	9.78	9.24	6.67	1.3	4.3	19.9		<1	<1						1,000	2	1	6	1	3	1	8	3
Site 3	5/14/2018	00850	13.48	13.23	10.91	25.05	25.19	25.70	8.50	8.49	8.31	7.85	8.02	6.91	2.0	5.7	13.2		5.0	2.0						2	4	1		0	4	0	3	3
Site 3	5/21/2018	00947	15.52	15.34	13.07	24.73	24.72	25.39	8.20	8.18	8.21	5.58	5.62	5.29	2.1	4.3	17.9		7	<1						1	2	3	6	1	1	1	8	1
Site 3	5/28/2018	00815	15.02	14.36	12.72	25.14	25.31	25.71	8.11	8.07	8.05	5.19	5.1	4.63	1.20	4.5	20.5		28	8						1	4	5	absent	absent	4	absent	absent	3
Site 3	6/4/2018	bad weather																																
Site 3	6/11/2018	00834	18.72	18.74	18.02	24.58	24.72	25.18	8.54	8.53	8.31	7.63	7.47	5.73	0.9	6.4	18.0		42	5						0	4	5	6	1	4	0	n/a	3
Site 3	6/18/2018	00940	20.33	18.89	17.84	22	22.11	22.62	8.4	8.38	8.12	32.46	32.92	33.63	0.8	4.5	26.4		66	2						0	2	5	6	1	1	1	5	2
Site 3	6/25/2018	00836	19.00	18.94	18.53	25.5	25.57	25.54	8.34	8.36	8.17	6.64	6.58	5.65	1.1	6.0	21.7		2	1						2	4	4	6	2	1	1	8	1
Site 3	7/2/2018	00803	22.44	22.60	21.24	24.93	25.28	25.51	8.40	8.43	8.12	7.25	7.71	5.50	1.5	4.4	26.3		52	9						0	2	5	6	0	0	0	n/a	1
Site 3	7/9/2018	00951	21.75	19.88	19.79	25.63	26.17	26.16	8.32	8.08	8.11	5.12	3.60	4.48	1.3	6.3	25.7		18	<1						0	2	5	6	0	0	0	n/a	1
Site 3	7/16/2018	00823	21.92	21.86	21.35	25.61	25.61	26.22	8.10	8.03	7.82	5.26	5.03	3.94	1.2	4.1	25.3		56	11						1	3	3	6	0	0	0	n/a	1
Site 3	7/23/2018	bad weather																																
Site 3	7/30/2018	Boat and quanta needed repair																																
Site 3	8/6/2018	Boat and quanta needed repair																																
Site 3	8/13/2018	Quanta need repair																																
Site 3	8/20/2018	Bad weather																																
Site 3	8/27/2018	00758	23.61	23.70	23.82	26.81	26.81	26.74	7.66	7.66	7.67	3.61	3.58	3.33	1.8	4.5	23.90		3	<1					0	3	1	6	0	3	0	n/a	2	
Site 3	9/3/2018	00955	25.34	25.35	24.09	27.16	27.45	28.03	8.38	8.32	7.70	7.92	7.47	1.97	0.4	5.3	27.90		21	7						0	2	5	1	1	0	0	n/a	1
Site 3	9/10/2018	bad weather																																
Site 3	9/17/2018	boat repair																																
Site 3	9/24/2018	unaccessible																																
Site 3	10/1/2018	01018	20.96	20.78	20.98	26.98	26.91	27.84	8.67	8.64	8.42	8.28	7.86	6.44	1.2	4.8	23.20		8	1						0	3	5	6	1	2	1	6	3
Site 3	10/8/2018	00819	20.75	20.90	21.14	26.83	27.05	27.7	8.35	8.33	8.22	6.10	6.18	6.50	2.1	5.1	21.00		14	4						1	4	5	6	0	4	0	n/a	3
Site 3	10/15/2018	bad weather																																
Site 3	10/22/2018	00803	13.31	13.40	13.49	26.99	27.00	27.28	8.78	8.77	8.66	8.40	8.42	8.16	1.5	6.3	4.10		4	2						0	4	5	6	1	2	1	6	2
Site 3	10/29/2018	bad weather																																

Friends of the Bay 2018 Water Quality Data - Site 4, Cold Spring Harbor North																																			
	Date	Time	H2O Temp TOP (0.5m)	H2O Temp 1.0 m	H2O Temp 0.5 m from BTM	Salinity TOP	Salinity 1.0 m	Salinity BTM	PH Top	PH 1.0 m	Ph 5 m from BTM	Top DO	DO 1.0 m	BTM DO	Secchi	Depth (meters)	Air Temp	H2O Temp BTM monthly AVG	Fecal Coliform Bacteria	Enterococci	Ammonia (NH3)	Nitrate (NO3)	Nitrite (NO2)	Organic Nitrogen (N)	Total Nitrogen	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather	
Site 4	4/2/2018		NO MONITOR - SNOW																																
Site 4	4/5/2018		Boat not available																																
Site 4	4/16/2018		Boat not available																																
Site 4	4/23/2018		01000	8.99	8.94	7.54	24.71	24.78	25.11	8.57	8.56	8.52	14.82	17.22	17.36	2.2	5.5	10.9		<1	<1					0	2	5	6	1	0	1	3	1	
Site 4	4/30/2018		no samples																																
Site 4	5/7/2018		01022	13.92	13.69	11.52	25.15	25.2	25.72	8.76	8.72	8.45	8.82	8.75	7.35	1.9	5.2	18.2		1	<1					1,000	2	1	6	1	3	1	8	3	
Site 4	5/14/2018		00900	13.65	13.12	10.54	25.13	25.25	25.82	8.54	8.54	8.4	8.2	8.15	7.79	3	6.6	13.2		<1	<1					2	4	1		0	4	0	n/a	3	
Site 4	5/21/2018		00940	14.98	14.85	12.52	24.99	25.05	25.5	8.29	8.27	8.22	6.13	6.11	5.45	2.5	5.1	17.9		<1	<1					1	2	3	6	1	1	1	1	8	1
Site 4	5/28/2018		00825	16.53	16.21	12.70	24.77	24.97	25.78	8.38	8.35	8.25	6.68	6.28	5.42	1.2	5.4	20.1		6	1					1	4	5	6	1	4	1	n/a	3	
Site 4	6/4/2018		bad weather																																
Site 4	6/11/2018		00847	19.14	18.96	16.02	25.08	25.08	25.31	8.67	8.61	8.29	8.26	7.17	5.9	1.1	7	16.4		5	<1					0	4	5	6	1	4	1	3	3	
Site 4	6/18/2018		00829	19.92	19.75	17.17	22.4	22.4	22.8	8.6	8.53	8.16	32.56	32.59	34.03	1.1	4.8	26		18	1					0	2	5	6	1	1	1	5	2	
Site 4	6/25/2018		00847	18.81	18.53	17.42	26.63	25.69	25.95	8.30	8.24	8.07	6.17	5.99	4.39	1.3	6.6	21.8		2	5					2	4	4	6	1	1	1	8	1	
Site 4	7/2/2018		00812	22.52	23.54	20.12	25.11	25.17	25.75	8.55	8.49	7.95	8.12	7.72	3.92	2.1	5.0	25.1		10	<1					0	2	5	6	0	0	0	n/a	1	
Site 4	7/9/2018		00943	22.4	18.8	18.68	25.77	26.4	26.51	8.53	8.07	8.1	6.68	3.85	4.23	1.4	6.8	24.5		11	<1					0	2	3	6	1	0	1	7	1	
Site 4	7/16/2018		00833	22.51	22.57	21.40	26.2	26.13	26.37	8.40	8.45	8.14	6.78	6.72	5.31	1.5	9.7	25.3		5	<1					1	3	3	6	0	0	0	n/a	1	
Site 4	7/23/2018		bad weather																																
Site 4	7/30/2018		Boat and quanta needed repair																																
Site 4	8/6/2018		Boat and quanta needed repair																																
Site 4	8/13/2018		Quanta need repair																																
Site 4	8/20/2018		Bad weather																																
Site 4	8/27/2018		00813	24.2	24.2	24.21	27.33	27.19	26.62	8.06	8.04	7.97	6.13	6.17	5.70	1.8	5.1	24.8		<1	<1					0	4	1	6	0	3	0	n/a	2	
Site 4	9/3/2018		00945	25.74	25.7	23.87	27.68	27.6	28.25	8.5	8.46	7.79	8.99	8.53	2.59	1.1	5.1	30.0		2	<1					0	2	5	6	1	0	0	n/a	1	
Site 4	9/10/2018		bad weather																																
Site 4	9/17/2018		boat repair																																
Site 4	9/24/2018		unaccessible																																
Site 4	10/1/2018		01009	20.71	20.70	20.95	27.59	27.19	28.05	8.78	8.77	8.55	9.18	8.99	7.47	1.2	5.2	22.00		<1	4					0	3	5	6	1	2	1	6	2	
Site 4	10/8/2018		00826	20.73	20.73	20.99	27.33	27.33	27.7	8.5	8.48	8.37	7.2	6.92	6.75	2.3	5.7	21.00		1	1					1	4	5	6	0	4	0	n/a	3	
Site 4	10/15/2018		bad weather																																
Site 4	10/22/2018		00812	14.16	14.1	14.05	27.31	27.24	27.31	8.78	8.76	8.7	8.41	8.46	8.61	1.6	6.7	5.30		2	<1					0	4	5	6	1	2	1	6	2	
Site 4	10/29/2018		bad weather																																

Friends of the Bay 2018 Water Quality Data - Site 6, Seawanhaka Yacht Club PSTP outfall																																			
	Date	Time	H2O Temp TOP (0.5m)	H2O Temp 1.0 m	H2O Temp 0.5 m from BTM	Salinity TOP	Salinity 1.0 m	Salinity BTM	PH Top	PH 1.0 m	Ph .5 m from BTM	Top DO	DO 1.0 m	BTM DO	Secchi	Depth (meters)	Air Temp	H2O Temp BTM monthly AVG	Fecal Coliform Bacteria	Enterococci	Ammonia (NH3)	Nitrate (NO3)	Nitrite (NO2)	Organic Nitrogen (N)	Total Nitrogen	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather	
Site 6	4/2/2018		NO MONITOR - SNOW																																
Site 6	4/9/2018		Boat not available																																
Site 6	4/16/2018		Boat not available																																
Site 6	4/23/2018	00945	8.23	8.22	7.84	25.01	24.94	25.06	8.51	8.54	8.51	13.47	14.75	14.12	2.8	5.60	10.3		3	<1						0	1	5	6	1	0	1	2	1	
Site 6	4/30/2018	00920	10.24	10.24	10.24	25.39	25.39	25.39	8.53	8.53	8.53	7.84	7.84	7.84	1.5	5.00	8.6		3	<1						3.000	4	5	6.000	2.000	4.000	2.000	8.000	3.000	1
Site 6	5/7/2018	00957	13.79	13.67	12.90	25.29	25.27	25.38	8.66	8.65	8.64	8.13	8.23	7.98	1.7	7.40	18.7		<1	<1						1.000	2	1	6.000	1.000	3.000	1.000	2.000	3.000	1
Site 6	5/14/2018	00920	12.97	12.91	11.13	25.24	25.38	25.64	8.55	8.50	8.43	7.98	7.97	7.71	2.5	6.30	13.1		1	10						2	4	5	6	0	4	0	4	1	
Site 6	5/21/2018	00925	14.60	14.52	13.75	25.23	25.10	25.28	8.25	8.25	8.26	6.05	6.08	5.98	2.4	4.7	18.6		3	<1						1	2	3	6	1	1	1	8	1	
Site 6	5/28/2018	00839	16.13	15.94	14.80	25.17	25.17	25.39	8.34	8.32	8.26	6.26	6.23	5.9	1.3	5.2	20.9		4	<1						1	4	5	6	0	4	0	n/a	3	
Site 6	6/4/2018	bad weather																																	
Site 6	6/11/2018	00906	18.54	18.48	18.29	25.27	25.2	25.19	8.49	8.5	8.52	6.87	6.89	6.82	1.1	5.1	19.8		5	<1						0	4	5	6	1	4	1	3	3	
Site 6	6/18/2018	00915	19.85	19.64	19.50	22.81	22.81	22.87	8.42	8.42	8.38	32.55	32.59	32.67	1.1	5.0	26.9		2	<1						0	2	5	6	1	1	1	6	2	
Site 6	6/25/2018	00905	18.36	18.23	17.55	25.69	25.68	25.79	8.19	8.21	8.17	5.40	5.36	5.10	1.0	7.3	22.0		1	1						2	4	4	6	2	1	1	8	1	
Site 6	7/2/2018	00828	22.95	22.94	22.80	25.51	25.58	25.64	8.44	8.43	8.43	7.09	7.22	7.01	1.4	5.2	26.3		2	<1						0	2	5	6	0	0	0	n/a	1	
Site 6	7/9/2018	00928	21.69	20.21	20.20	25.95	26.25	26.18	8.45	8.24	8.18	6.51	5.33	5.47	1.8	6.8	25.3		<1	<1						0	1	5	6	0	0	1	7	1	
Site 6	7/16/2018	00850	22.59	22.58	22.48	26.20	26.20	26.27	8.32	8.31	8.29	5.89	5.43	5.85	1.3	4.3	28.6		<1	<1						0	1	3	3	6	0	0	0	n/a	1
Site 6	7/23/2018	bad weather																																	
Site 6	7/30/2018	Boat and quanta needed repair																																	
Site 6	8/6/2018	Boat and quanta needed repair																																	
Site 6	8/13/2018	Quanta need repair																																	
Site 6	8/20/2018	Bad weather																																	
Site 6	8/27/2018	00833	24.43	24.41	24.32	27.48	27.48	27.33	8.02	7.99	7.92	5.88	5.90	5.40	1.3	5.0	25.8		1	<1						0	4	1	6	0	4	0	n/a	3	
Site 6	9/3/2018	00929	25.41	25.36	24.84	27.88	27.59	27.93	8.21	8.18	7.96	6.80	6.73	5.18	1.4	7.6	29.9		5	1						0	2	5	6	0	0	0	n/a	1	
Site 6	9/10/2018	bad weather																																	
Site 6	9/17/2018	boat repair																																	
Site 6	9/24/2018	00739	21.89	21.89	21.93	27.81	27.81	27.81	8.18	8.15	8.04	6.26	6.32	6.34	1.4	6.7	16.2		4	<1						1	4	3	6	2	3	2	2	2	
Site 6	10/1/2018	00954	20.47	20.87	20.82	27.91	27.62	27.62	8.49	8.47	8.41	7.78	7.74	7.44	1.4	4.8	22.3		2	<1						0	2	5	6	2	3	1	6	3	
Site 6	10/8/2018	00841	20.97	20.97	20.96	27.70	27.63	27.63	8.47	8.46	8.42	6.68	6.63	6.80	2.1	6.8	21.2		3	4						1	4	5	6	1	4	1	4	3	
Site 6	10/15/2018	bad weather																																	
Site 6	10/22/2018	00832	14.77	14.75	14.69	27.63	27.42	27.62	8.75	8.73	8.67	7.97	7.96	7.92	1.9	6.9	5.9		5	1						0	4	5	6	2	3	1	6	2	
Site 6	10/29/2018	bad weather																																	

Friends of the Bay 2018 Water Quality Data - Site 8, Oyster Bay STP at White's Creek																																		
	Date	Time	H2O Temp TOP (0.5m)	H2O Temp 1.0 m	H2O Temp 0.5 m from BTM	Salinity TOP	Salinity 1.0 m	Salinity BTM	PH Top	PH 1.0 m	Ph .5 m from BTM	Top DO	DO 1 m	BTM DO	Secchi	Depth (meters)	Air Temp (°C)	H2O Temp BTM monthly AVG	Fecal Coliform Bacteria	Enterococci	Ammonia (NH3)	Nitrate (NO3)	Nitrite (NO2)	Organic Nitrogen (N)	Total Nitrogen	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 8	4/2/2018		NO MONITOR - SNOW																															
Site 8	4/9/2018		Boat not available																															
Site 8	4/16/2018		Boat not available																															
Site 8	4/23/2018	00911	8.17	8.08	8.03	24.8	24.94	24.94	8.57	8.55	8.54	15.47	11.43	10.76	1.7	2.7	11.1		<1	<1						0.000	1	5	6.000	1	0	1	2	1
Site 8	4/30/2018		no samples																															
Site 8	5/7/2018	00926	14.18	13.99	13.92	25.16	25.15	25.14	8.64	8.62	8.62	7.99	7.96	7.81	1.30	1.9	18.9		1	<1						0	2	1	6	0	3	1	8	2
Site 8	5/14/2018	00951	13.84	13.82	13.52	25.14	25.14	25.13	8.48	8.49	8.46	7.44	7.43	7.42	2.00	3.4	13.3		2	2						2	4	5	0	4	0	4	0	3
Site 8	5/21/2018	00859	14.73	14.46	25.04	25.04	25.04	8.22	8.19	8.34	5.84	5.80	1.90	1.6	18.0				6	1					1	2	3	5	1	0	1	8	1	
Site 8	5/28/2018	00902	17.04	16.91	16.30	25.14	24.99	25.11	8.39	8.37	8.34	6.46	6.31	6.19	1.10	2.2	22.8		5	1					1	4	5	6	0	4	0	n/a	3	
Site 8	6/4/2018		bad weather																															
Site 8	6/11/2018	00933	19.21	19.13	19	25.02	25.08	25.08	8.48	8.48	8.38	6.99	6.73	6.36	1	3.7	20.8		1	1					0	4	5	6	1	4	1	2	3	
Site 8	6/18/2018	00850	19.57	19.24	n/a	22.67	22.66	n/a	8.40	8.41	n/a	32.71	32.73	n/a	1.10	1.5	26.1		10	2					0	2	5	6	1	1	1	5	2	
Site 8	6/25/2018	00935	19.88	19.84	19.7	25.39	25.46	25.46	8.24	8.24	8.23	5.7	5.72	5.53	0.9	3.6	21.9		9	<1					2	4	4	6	3	1	1	1	1	
Site 8	7/2/2018	00853	23.07	22.72	25.30	25.43	25.30	25.43	8.20	8.09	8.15	6.03	5.75	1.00	1.6	26.6			36	<1					0	2	5	6	absent	0	1	8	1	
Site 8	7/9/2018	00901	21.82	21.32	21.33	25.82	26.01	26.08	8.29	8.19	8.15	5.70	5.06	5.05	1.00	3.4	23.8		16	2					0	1	5	6	0	0	1	6	1	
Site 8	7/16/2018	00918	22.60	22.51	26.20	26.20	26.20	8.12	8.00		5.37	5.49	1.20	1.1	28.1			8	3					1	3	3	n/a	0	0	0	0	n/a	1	
Site 8	7/23/2018		bad weather																															
Site 8	7/30/2018		Boat and quanta needed repair																															
Site 8	8/6/2018		Boat and quanta needed repair																															
Site 8	8/13/2018		Quanta need repair																															
Site 8	8/20/2018		Bad weather																															
Site 8	8/27/2018	00902	24.39	24.39	24.39	27.41	27.41	27.55	8.00	7.99	7.93	6.09	6.23	6.02	1.10	2.1	25.3		6	<1					0	4	1	6	0	4	0	n/a	3	
Site 8	9/3/2018	00858	25.16	25.11	25.07	27.65	27.80	26.70	8.02	7.96	7.85	5.70	5.22	4.72	1.50	2.2	27.6		8	8					0	2	5	6	0	0	0	n/a	1	
Site 8	9/10/2018		bad weather																															
Site 8	9/17/2018		boat repair																															
Site 8	9/24/2018	00805	21.58	21.60	21.60	27.58	27.51	27.44	8.21	8.18	8.17	6.2	6.20	6.20	1.30	2.5	16.1		4	<1					1	4	3	6	1	3	2	2	3	
Site 8	10/1/2018	00930	20.75	20.74	n/a	27.40	26.84	n/a	8.47	8.17	n/a	8.22	8.27	n/a	1.40	1.7	22.1		7	1					0	2	4	6	1	2	1	6	2	
Site 8	10/8/2018	00909	20.86	20.88	20.90	27.41	27.41	26.84	8.44	8.44	8.4	6.77	6.85	6.84	1.90	2.9	21.6		15	2					1	4	5	6	1	4	1	4	4	3
Site 8	10/15/2018		bad weather																															
Site 8	10/22/2018	00855	13.46	13.45	13.38	27.07	27.07	27.28	8.76	8.73	8.64	8.25	8.27	8.23	2.90	3.8	5.6		5	3					0	4	5	6	1	2	1	6	2	
Site 8	10/29/2018		bad weather																															

Friends of the Bay 2018 Water Quality Data - Site 9, Roosevelt Beach																																			
	Date	Time	H2O Temp TOP (0.5m)	H2O Temp 1.0 m	H2O Temp 0.5 m from BTM	Salinity TOP	Salinity 1.0 m	Salinity BTM	PH Top	PH 1.0 m	Ph .5 m from BTM	Top DO	DO 1.0 m	BTM DO	Secchi	Depth (meters)	Air Temp	H2O Temp BTM monthly AVG	Fecal Coliform Bacteria	Enterococci	Ammonia (NH3)	Nitrate (NO3)	Nitrite (NO2)	Organic Nitrogen (N)	Total Nitrogen	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather	
Site 9	4/2/2018		NO MONITOR - SNOW																																
Site 9	4/9/2018		Boat not available																																
Site 9	4/16/2018		Boat not available																																
Site 9	4/23/2018	00901	8.19	8.22	8.11	24.81	24.88	24.94	8.55	8.55	8.56	11.46	12.25	13.59	2.10	2.70	9.9		<1	<1						0.000	1	5	6.000	1	0	1	2	1	
Site 9	4/30/2018		no samples																																
Site 9	5/7/2018	00910	14.27	14.23	14.02	25.16	25.16	25.16	8.63	8.61	8.61	7.78	7.77	7.60	1.10	1.90	18.90		<1	<1						00001	00002	00001	00006	00000	00003	00001	00008	00003	
Site 9	5/14/2018	01001	12.28	13.17	12.34	25.39	25.46	25.49	8.50	8.47	8.46	7.56	7.59	7.44	1.0	1.7	14.1		<1	<1						2	4	5		0	4	0		3	
Site 9	5/21/2018	00831	14.41	14.38	14.37	25.1	25.10	25.10	8.21	8.24	8.20	5.86	5.94	5.92	1.80	1.90	17.20		2	2						1.000	2	3	6	1	0	1	8	1	
Site 9	5/28/2018	00926	15.58	15.22	15.10	25.29	25.35	25.34	8.29	8.27	8.27	5.88	5.84	5.92	1.0	3.0	25.2		6	2						1	4	5	6	0	4	0	n/a	3	
Site 9	6/4/2018		bad weather																																
Site 9	6/11/2018	01011	19.12	19.04	18.74	25.09	25.08	25.14	8.44	8.42	8.41	6.79	6.53	6.49	1	3.5	18.9		8	<1						0	4	5	6	1	4	1	2	3	
Site 9	6/18/2018	00840	20.06	20.04	n/a	23.33	22.61	n/a	8.42	8.39	n/a	32.36	32.36	n/a	1.1	1.5	24.6		7	<1						0	2	5	6	1	1	1	6	2	
Site 9	6/25/2018	01001	20.97	20.23	18.87	25.43	25.28	25.64	8.25	8.2	8.19	5.64	5.54	6.04	1	3.6	22.4		15	1						2	4	4	6	3	1	1	1	1	
Site 9	7/2/2018	00915	23.64	23.35	25.46	25.51	25.46	25.51	8.27	8.15	8.15	6.40	6.27	6.27	1.3	1.2	26.7		8	1						0	3	3	6	1	0	1	8	1	
Site 9	7/9/2018	00852	22.82	21.32	21.24	25.78	25.94	26.01	8.33	8.23	8.20	5.75	5.31	5.22	1.4	3.3	23.8		11	<1															
Site 9	7/16/2018	00943	22.82	22.80	26.07	26.14	26.14	26.14	8.24	8.08	8.08	5.84	5.92	5.92	1.3	1.5	29.2		23	12						1	4	3	6	1	0	1	8	1	
Site 9	7/23/2018		bad weather																																
Site 9	7/30/2018		Boat and quanta needed repair																																
Site 9	8/6/2018		Boat and quanta needed repair																																
Site 9	8/13/2018		Quanta need repair																																
Site 9	8/20/2018		Bad weather																																
Site 9	8/27/2018	00928	24.37	24.36	24.36	27.19	27.26	25.70	7.94	7.91	7.86	5.97	5.84	5.81	1.2	2.20	26.2		2	<1						0	4	1	6	0	4	0	n/a	3	
Site 9	9/3/2018	00848	25.13	25.13	25.06	27.72	27.72	27.22	7.93	7.90	7.79	4.92	5.09	4.80	1.7	2.40	27.9		13	1						0	2	5	6	0	0	0	n/a	1	
Site 9	9/10/2018		bad weather																																
Site 9	9/17/2018		boat repair																																
Site 9	9/24/2018	00816	21.65	21.60	21.64	27.58	27.30	27.3	8.27	8.21	8.09	6.35	6.38	6.35	1.2	2.20	16.9		1	<1						1	4	3	6	1	2	2	2	2	
Site 9	10/1/2018	00900	20.74	20.74	n/a	27.54	27.40	n/a	8.5	8.34	n/a	8.13	8.11	n/a	1.5	1.90	23.9		7	3						0	2	5	6	1	3	1	6	2	
Site 9	10/8/2018	00940	20.94	20.95	20.97	27.48	27.27	27.6	8.42	8.39	8.31	6.79	6.85	6.87	8.4	8.39	22.2		6	3						1	4	5	6	1	4	1	7	3	
Site 9	10/15/2018		bad weather																																
Site 9	10/22/2018	00924	13.50	13.55	13.60	27.21	26.94	26.73	8.76	8.72	8.61	8.31	8.46	8.35	2.5	3.70	7.7		3	<1						0	4	5	6	1	2	1	6	2	
Site 9	10/29/2018		bad weather																																

Friends of the Bay 2018 Water Quality Data - Site 12, Turtle Cove																																			
	Date	Time	H2O Temp TOP (0.5m)	H2O Temp 1.0 m	H2O Temp 0.5 m from BTM	Salinity TOP	Salinity 1.0 m	Salinity BTM	PH Top	PH 1.0 m	Ph 5 m from BTM	Top DO	DO 1 m	BTM DO	Secchi	Depth (meters)	Air Temp	H2O Temp BTM monthly AVG	Fecal Coliform Bacteria	Enterococci	Ammonia (NH3)	Nitrate (NO3)	Nitrite (NO2)	Organic Nitrogen (N)	Total Nitrogen	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather	
Site 12	4/2/2018		NO MONITOR - SNOW																																
Site 12	4/9/2018		Boat not available																																
Site 12	4/16/2018		Boat not available																																
Site 12	4/23/2018	00833	11.44	11.35	9.48	24.83	24.83	24.80	8.49	8.49	8.52	6.98	6.78	7.03	1.9	3.0	9.8		<1	<1						0	1	5	6	1	0	1	2	1	
Site 12	4/30/2018	01035	11.11	11.11	11.09	25.22	25.23	25.22	8.51	8.50	8.50	7.50	7.51	7.50	1.2	2.9	8.3		<1	<1							0	4	4	6	2	4	3	8	3
Site 12	5/7/2018	00831	14.54	14.24	13.97	25.18	25.16	25.22	8.42	8.33	8.44	6.07	6.32	6.44	0.90	2.30	14.70		<1	1						00001	00002	00001	00006	00000	00003	00001	00008	00002	3
Site 12	5/14/2018	01028	14.69	14.65	14.60	25.25	25.18	25.25	8.25	8.23	8.17	5.93	6.19	6.12	2.1	3.5	15.2		4	1						2	4	5	6	0	4	0	1	3	
Site 12	5/21/2018	00805	16.45	16.41	16.26	24.84	24.91	24.97	8.11	8.09	8.01	5.36	5.24	4.76	1.2	2.4	16.8		<1	2						1	2	3	6	0	0	1	8	1	
Site 12	5/28/2018	00949	18.44	18.30	18.20	24.85	24.91	24.91	8.22	8.22	8.12	5.66	5.60	4.95	1.2	2.8	24.0		2	<1						1	4	5	6	0	2	0	n/a	2	
Site 12	6/4/2018		bad weather																																
Site 12	6/11/2018	01044	20.25	20.09	19.75	25.05	25.05	25.04	8.52	8.44	8.26	7.1	6.66	5.68	0.9	3.5	18.2		1	<1						0	4	5	6	1	4	2	1	3	
Site 12	6/18/2018	00814	23.61	23.61	23.58	22.66	22.66	22.59	8.33	8.30	8.22	30.28	30.32	30.30	1.2	1.6	24.4		6	<1						2	1	4	6	3	2	2	1	1	
Site 12	6/25/2018	01036	21.4	21.31	20.76	25.31	25.31	25.36	8.2	8.2	8.14	5.72	5.55	5.29	1	3.5	23.7		1	<1						2	1	4	6	3	2	2	1	1	
Site 12	7/2/2018	00945	23.27	23.30		25.58	25.31		8.04	7.90		4.99	3.67		0.8	1.5	25.8		15	<1						0	3	5	6	1	0	1	8	1	
Site 12	7/9/2018	00828	24.67	24.51	24.37	25.78	25.77	25.69	8.19	8.16	8.16	5.13	5.10	5.23	0.8	3.3	24.1		16	3						0	4	3	6	0	0	1	6	1	
Site 12	7/16/2018	01006	24.47	23.94		26.02	26.04		8.06	8.05		4.62	4.09		1.0	1.5	27.8		10	1						1	4	3	6	0	0	0	n/a	1	
Site 12	7/23/2018		bad weather																																
Site 12	7/30/2018		Boat and quanta needed repair																																
Site 12	8/6/2018		Boat and quanta needed repair																																
Site 12	8/13/2018		Quanta need repair																																
Site 12	8/20/2018		Bad weather																																
Site 12	8/27/2018	01000	25.37	27.34	25.08	27.26	27.16	25.09	8.05	8.03	7.92	5.84	5.87	5.43	1.3	2.7	26.60		<1	<1						0	4	5	6	0	4	0	n/a	3	
Site 12	9/3/2018	00823	27.11	27.08	26.60	27.44	27.44	26.21	8.21	8.20	8.04	6.76	6.80	5.71	1.0	2.8	27.50		4	5						0	2	5	6	0	0	1	1	1	
Site 12	9/10/2018		bad weather																																
Site 12	9/17/2018		boat repair																																
Site 12	9/24/2018	00850	20.90	20.89	20.80	27.34	27.2	27.4	8.32	8.32	8.22	5.58	5.27	5.29	1.7	2.8	15.50		4	<1						1	4	3	6	1	3	1	2	3	
Site 12	10/1/2018	00817	19.94	19.93	19.93	26.80	26.8	25.96	8.56	8.52	8.43	7.86	7.93	8.04	0.9	2.2	19.50		3	<1						0	2	3	6	1	4	1	6	3	
Site 12	10/8/2018	01002	20.65	20.67	20.57	27.19	27.19	26.97	8.24	8.24	8.15	4.38	4.88	4.84	1.3	3.4	22.40		8	6						1	4	5	6	1	4	1	5	3	
Site 12	10/15/2018		bad weather																																
Site 12	10/22/2018	01053	12.78	12.80	12.50	26.97	26.97	26.82	8.82	8.82	8.76	8.57	8.63	8.56	2.4	3.9	8.80		3	<1						0	4	5	6	1	2	1	6	2	
Site 12	10/29/2018		bad weather																																

Friends of the Bay 2018 Water Quality Data - Site 13, Mill Neck Creek East																																			
	Date	Time	H2O Temp TOP (0.5m)	H2O Temp 1.0 m	H2O Temp 0.5 m from BTM	Salinity TOP	Salinity 1.0 m	Salinity BTM	PH Top	PH 1.0 m	Ph .5 m from BTM	Top DO	DO 1.0 m	BTM DO	Secchi	Depth (meters)	Air Temp	H2O Temp BTM monthly AVG	Fecal Coliform Bacteria	Enterococci	Ammonia (NH3)	Nitrate (NO3)	Nitrite (NO2)	Total Kjeldahl Nitrogen (TKN)	Organic Nitrogen (N)	Total Nitrogen	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 13	4/2/2018		NO MONITOR - SNOW																																
Site 13	4/9/2018		Boat not available																																
Site 13	4/16/2018		Boat not available																																
Site 13	4/23/2018	00726	9.39	9.31	9.29	24.73	24.73	24.73	8.50	8.50	8.50	8.60	8.28	7.96		1.5	2.1	10.2		<1	<1						0	1	5	6	0	0	1	2	1
Site 13	4/30/2018	01049	11.08		11.07	25.09		25.09	8.50		8.51	7.81		7.86		1.0	1.5	8.3		<1	<1						0	4	4	6	1	4	1	8	3
Site 13	5/7/2018	00739	15.01	14.99	14.96	24.85	24.99	25.05	8.49	8.49	8.46	7.13	7.11	7.02		1.2	3.4	15.2		24	<1					1,000	2	1	6	0	4	1	2	3	
Site 13	5/14/2018	01046	14.78	14.74	14.73	24.98	24.97	25.04	8.29	8.31	8.31	6.51	6.49	6.59		1.4	2.1	15.3		9	4					2	4	5	6	0	4	0	3	3	
Site 13	5/21/2018	00722	15.50	15.41	15.40	24.72	24.73	24.59	7.92	8.05	8.04	5.06	5.26	5.32		0.9	2.2	17.9		22	6					1	2	5	6	0	0	8	1		
Site 13	5/28/2018	01004	18.11	24.63		24.63	24.69		8.28	8.27		5.97	5.93			0.9	1.50	23.3		20	<1					1	4	5	6	1	4	1	8	2	
Site 13	6/4/2018		bad weather																																
Site 13	6/11/2018	01059	19.82	19.77	19.73	24.90	24.97	24.97	8.33	8.33	8.31	6.12	6.09	6.09		0.8	1.9	19.2		21	4					0	4	5	6	0	4	2	1	3	
Site 13	6/18/2018	00722	21.88	N/A	N/A	22.46	N/A	N/A	7.74	N/A	N/A	5.31	N/A	N/A		0.8	0.8	23.5		18	6					0	2	5	6	1	1	1	6	1	
Site 13	6/25/2018	01050	20.95	20.87		25.22	25.29		8.17	8.16		4.92	5.27			1.2	2.0	23.70		7	<1				2	1	4	6	1	2	1	1	1		
Site 13	7/2/2018	01002	25.65			24.68			7.91			5.33				0.9	1.3	26.8		9	<1				0	3	5	6	0	0	0	n/a	1		
Site 13	7/9/2018	00725	23.51	23.50		25.60	25.53		8.29	8.19		5.97	5.9			0.9	2.0	23.8		5	1				0	4	3	6	1	0	0	n/a	1		
Site 13	7/16/2018	01020	24.39	24.25		24.49	25.48		7.92	7.87		4.59	4.61			1.3	1.5	27.7		80	24				1	4	5	6	0	0	0	n/a	1		
Site 13	7/23/2018		bad weather																																
Site 13	7/30/2018		Boat and quanta needed repair																																
Site 13	8/6/2018		Boat and quanta needed repair																																
Site 13	8/13/2018		Quanta need repair																																
Site 13	8/20/2018		Bad weather																																
Site 13	8/27/2018	01022	24.93	24.94	24.83	27.02	27.22	23.96	7.98	7.97	7.96	5.90	5.82	5.86		1.8	3.40	26.3		10	<1					0	4	5	6	0	4	0	n/a	3	
Site 13	9/3/2018	00730	26.06	26.07	25.95	27.26	27.19	26.97	7.77	7.66	7.19	5.56	5.59	5.57		1.2	2.00	25.9		4	<1					0	2	5	6	0	0	0	n/a	1	
Site 13	9/10/2018		bad weather																																
Site 13	9/17/2018		boat repair																																
Site 13	9/24/2018	00922	20.63	20.78	20.85	27.19	27.19	27.05	8.32	8.30	8.24	6.25	6.33	6.31		1.0	3.7	16.20		14	6					1	4	3	6	1	4	2	2	3	
Site 13	10/1/2018	00737	19.94	n/a	n/a	26.87	n/a	n/a	7.68	n/a	n/a	7.35	n/a	n/a		0.9	1.1	18.60		70	3					0	2	3	6	0	4	0	n/a	3	
Site 13	10/8/2018	01032	20.79	20.78	n/a	27.12	n/a		8.33	8.23	n/a	5.76	6.03	n/a		1.4	2.3	22.20		34	8					1	4	5	6	1	4	1	6	3	
Site 13	10/15/2018		bad weather																																
Site 13	10/22/2018	01013	12.89	12.90	12.85	27.11	26.90	27.11	8.76	8.74	8.63	8.20	8.23	8.29		2.2	2.2	8.20		14	2					0	4	5	6	1	2	2	6	2	
Site 13	10/29/2018		bad weather																																

Friends of the Bay 2018 Water Quality Data - Site 14, Mill Neck Creek West																																			
	Date	Time	H2O Temp TOP (0.5m)	H2O Temp 1.0 m	H2O Temp 0.5 m from BTM	Salinity TOP	Salinity 1.0 m	Salinity BTM	PH Top	PH 1.0 m	Ph 5 m from BTM	Top DO	DO 1.0 m	BTM DO	Secchi	Depth (meters)	Air Temp	H2O Temp BTM monthly AVG	Fecal Coliform Bacteria	Enterococci	Ammonia (NH3)	Nitrate (NO3)	Nitrite (NO2)	Organic Nitrogen (N)	Total Nitrogen	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather	
Site 14	4/2/2018		NO MONITOR - SNOW																																
Site 14	4/9/2018		Boat not available																																
Site 14	4/16/2018		Boat not available																																
Site 14	4/23/2018	00735	9.70	9.85	9.33	24.27	24.41	24.73	8.51	8.53	8.53	7.44	8.84	8.58	1.7	2.9	9.2		2	<1						0	1	5	6	0	0	1	2	1	
Site 14	4/30/2018		no samples																																
Site 14	5/7/2018	00750	15.20	14.98	15.09	24.55	24.64	24.99	8.48	8.48	8.53	7.15	7.10	7.07	1.1	2.4	15.1		132	55						1	2	1	6	0	4	1	2	3	
Site 14	5/14/2018	01051	14.96	14.79	14.73	24.85	24.98	24.97	8.28	8.31	8.25	6.48	6.51	6.47	1.2	3.1	15.5		26	7						2	4	5	6	0	4	1	4	3	
Site 14	5/21/2018	00731	16.72	16.70	15.48	23.88	23.88	24.73	8.02	8.02	8.06	5.29	5.32	5.38	1.5	2.8	16.5		20	5						1	2	5	6	0	0	0		1	
Site 14	5/28/2018	01010	18.23	18.24	18.11	24.7	24.7	24.63	8.31	8.29	8.26	6.05	6.02	5.85	0.8	2.9	24.2		33	3						1	4	5	6	0	4	1	8	2	
Site 14	6/4/2018		bad weather																																
Site 14	6/11/2018	01104	20.13	20.07	19.81	24.84	24.84	24.97	8.38	8.39	8.31	6.62	6.55	6	0.9	3.3	19.3		34	1						0	4	5	6	1	4	2	1	3	
Site 14	6/18/2018	00733	22.07	N/A	N/A	22.19	N/A	N/A	7.59	N/A	N/A	31.80	N/A	N/A	1.0	0.8	23.5		79	44						0	2	5	6	1	1	1	6	2	
Site 14	6/25/2018	01101	22.00	20.87	20.66	24.98	25.23	27.28	8.16	8.20	8.17	5.28	5.37	5.23	1.0	3.1	25.3		25	1						2	1	4	6	2	2	1	1	1	
Site 14	7/2/2018	01008	25.75			24.55			7.82			4.00			1.10	1.30	26.30		27	1						0	3	5	6	absent	0	absent	absent	1	
Site 14	7/9/2018	00733	23.53	23.51	23.52	25.53	25.53	25.53	8.21	8.22	8.18	5.85	5.84	5.65	1.1	2.1	22.30		11	2						0	4	3	absent	0	0	0	n/a	1	
Site 14	7/16/2018	01025	24.85	24.78		25.00	25.13		7.64	7.63		3.21	3.58		0.9	1.4	27.10		210	74						1	4	3	6	0	0	0	0	n/a	1
Site 14	7/23/2018		bad weather																																
Site 14	7/30/2018		Boat and quanta needed repair																																
Site 14	8/6/2018		Boat and quanta needed repair																																
Site 14	8/13/2018		Quanta need repair																																
Site 14	8/20/2018		Bad weather																																
Site 14	8/27/2018	01032	24.88	24.84	24.85	27.00	27.28	24.31	7.98	7.98	7.96	5.70	5.73	5.74	1.5	2.7	27.50		13	<1						0	4	5	6	0	4	0	n/a	3	
Site 14	9/3/2018	00740	26.28	26.29	26.09	26.98	27.13	24.14	7.81	7.81	7.84	4.97	4.90	5.02	1.1	2.7	26.50		110	80						0	2	5	6	0	0	0	0	n/a	1
Site 14	9/10/2018		bad weather																																
Site 14	9/17/2018		boat repair																																
Site 14	9/24/2018	00930	20.78	20.78	20.81	27.19	26.98	27.12	8.32	8.31	8.29	6.38	6.38	6.33	1.00	3.20	15.90		13	2						1	4	3	6	2	4	3	2	3	
Site 14	10/1/2018	00744	19.70	19.82	n/a	25.88	25.95	n/a	8.18	7.98	n/a	7.04	7.02	n/a	1.00	1.70	18.60		57	59						0	2	3	6	0	4	1	6	3	
Site 14	10/8/2018	01038	20.78	20.77	n/a	27.12	27.12	n/a	8.35	8.32	n/a	5.62	6.82	n/a	1.20	2.60	22.60		31	7						1	4	5	6	1	4	1	6	4	3
Site 14	10/15/2018		bad weather																																
Site 14	10/22/2018	01020	12.06	12.33	12.97	25.75	26.52	27.12	8.76	8.74	8.73	8.14	8.09	8.19	1.90	3.70	8.30		37	3						0	4	5	6	2	6	2	2	1	
Site 14	10/29/2018		bad weather																																

Friends of the Bay 2018 Water Quality Data - Site 16, Mill Neck Creek North																																		
	Date	Time	H2O Temp TOP (0.5m)	H2O Temp 1.0 m	H2O Temp 0.5 m from BTM	Salinity TOP	Salinity 1.0 m	Salinity BTM	PH Top	PH 1.0 m	Ph. 5 m from BTM	Top DO	DO 1.0	BTM DO	Secchi	Depth (meters)	Air Temp	H2O Temp BTM monthly AVG	Fecal Coliform Bacteria	Enterococci	Ammonia (NH3)	Nitrate (NO3)	Nitrite (NO2)	Organic Nitrogen (N)	Total Nitrogen	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather
Site 16	4/2/2018		NO MONITOR - SNOW																															
Site 16	4/9/2018		Boat not available																															
Site 16	4/16/2018		Boat not available																															
Site 16	4/23/2018	00759	10.34			23.96			8.45			6.02			1.4		10.4		4	1					0	1	5	6	0	0	1	2	1	
Site 16	4/30/2018		no samples																															
Site 16	5/7/2018		no samples																															
Site 16	5/14/2018		no samples																															
Site 16	5/21/2018		no samples																															
Site 16	5/28/2018		no samples																															
Site 16	6/4/2018		bad weather																															
Site 16	6/11/2018	01126	20.40	20.34	n/a	24.15	24.22	n/a	8.04	7.93	n/a	5.33	5.42	n/a	1.1	1.7	20.1		46	3					0	4	5	6	1	3	2	2	2	
Site 16	6/18/2018		no samples																															
Site 16	6/25/2018	01119	22.91			24.52			7.96			4.74			0.8		23.8		41	3					2	1	4	6	1	2	1	1	1	
Site 16	7/2/2018		no samples																															
Site 16	7/9/2018	00743	24.06	24.19		25.20	25.12		7.97	7.92		4.75	4.79		1.0	1.3	23.90		10	6					0	4	3	2	0	0	0	n/a	1	
Site 16	7/16/2018		no samples																															
Site 16	7/23/2018		bad weather																															
Site 16	7/30/2018		Boat and quanta needed repair																															
Site 16	8/6/2018		Boat and quanta needed repair																															
Site 16	8/13/2018		Quanta need repair																															
Site 16	8/20/2018		Bad weather																															
Site 16	8/27/2018	01055	25.33	25.21	n/a	26.38	26.66	n/a	7.75	7.74	n/a	4.29	4.32	n/a	1.1	1.6	28.80		23	1					0	4	5	6	0	3	0	n/a	3	
Site 16	9/3/2018	00794	26.45	n/a	n/a	26.49	n/a	n/a	7.32	n/a	n/a	3.07	n/a	n/a	0.9	<1	27.30		58	90°					0	2	5	6	0	0	0	n/a	1	
Site 16	9/10/2018		bad weather																															
Site 16	9/17/2018		boat repair																															
Site 16	9/24/2018	00950	19.39	19.55	n/a	25.66	25.73	n/a	4.94	5.12	n/a	8.02	7.99	n/a	0.70	1.70	15.90		59	26					1	4	3	6	1	4	2	3	3	
Site 16	10/1/2018		inaccessible																															
Site 16	10/8/2018	01053	20.65	20.65	n/a	26.76	26.69	n/a	8.2	8.15	n/a	5.07	5.32	n/a	1.10	2.30	22.70		150	49					1	4	5	6	-	4	0	n/a	3	
Site 16	10/15/2018		bad weather																															
Site 16	10/22/2018	01039	10.94	10.94	10.83	26.18	25.83	25.97	8.68	8.66	8.54	7.99	7.96	7.64	1.60	2.20	8.90		29	4					0	4	5	6	3	6	2	2	1	
Site 16	10/29/2018		bad weather																															

Friends of the Bay 2018 Water Quality Data - Site 18, Mill Neck Cove																																			
	Date	Time	H2O Temp TOP (0.5m)	H2O Temp 1.0 m	H2O Temp 0.5 m from BTM	Salinity TOP	Salinity 1.0 m	Salinity BTM	PH Top	PH 1.0 m	Ph. 5 m from BTM	Top DO	DO 1.0	BTM DO	Secchi	Depth (meters)	Air Temp	H2O Temp BTM monthly AVG	Fecal Coliform Bacteria	Enterococci	Ammonia (NH3)	Nitrate (NO3)	Nitrite (NO2)	Organic Nitrogen (N)	Total Nitrogen	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather	
Site 18	4/2/2018		NO MONITOR - SNOW																																
Site 18	4/9/2018		Boat not available																																
Site 18	4/16/2018		Boat not available																																
Site 18	4/23/2018	00814	9.25	9.24	9.20	24.72	24.72	24.72	8.57	8.56	8.55	7.22	7.22	6.67	1.5	2.8	10.7		<1	<1						0	1	5	6	1	0	1	2	1	
Site 18	4/30/2018		no samples																																
Site 18	5/7/2018	00813	14.91	14.91	14.89	24.98	25.05	25.05	8.53	8.53	8.54	7.17	7.14	7.05	1.00	2.00	14.30		<1	<1						00001	00002	00001	00006	00001	00003	00001	00006	00002	
Site 18	5/14/2018	01108	15.06	14.78	14.7	24.92	24.98	25.04	8.31	8.32	8.29	6.34	6.13	6.35	1.6	3.0	16.3		7	2						2	1	5	6	4	1	1	1	3	
Site 18	5/21/2018	00751	15.31	15.31	15.24	24.79	24.79	24.79	8.13	8.14	8.10	5.53	5.55	5.34	1.4	1.9	20.4		20	2						1	2	3	6	1	0	0	0	1	
Site 18	5/28/2018	01023	18.4	18.27	18.22	24.64	24.63	24.7	8.3	8.32	8.29	5.88	5.94	5.76	1	2.6	24.03		19	2						1	4	5	6	0	2	0	n/a	2	
Site 18	6/4/2018		bad weather																																
Site 18	6/11/2018	01142	20.04	20.01	19.94	24.91	24.91	24.97	8.42	8.38	8.35	6.46	6.45	6.29	1.00	2.50	19.5		18	<1						0	4	5	6	2	3	2	2	2	
Site 18	6/18/2018	00755	21.21	N/A	N/A	22.65	N/A	N/A	8.29	N/A	N/A	31.66	N/A	N/A	0.8	0.9	24.8		8	1						0	2	5	6	1	1	1	6	2	
Site 18	6/25/2018	01129	21.13	21.26	20.50	25.23	25.23	25.35	8.22	8.21	8.16	5.53	5.54	5.25	1.0	2.6	24.3		58	<1						2	2	4	6	3	2	2	1	1	
Site 18	7/2/2018	01077	25.78			24.83			8.08			5.68			0.7	1.2	25.5									0	3	5	6	1	0	1	3	1	
Site 18	7/9/2018	00811	23.53	23.53	23.53	25.46	25.53	25.53	8.26	8.26	8.24	6.03	6.14	6.23	1.1	2.1	24.8		7	1						0	4	3	6	1	0	1	6	1	
Site 18	7/16/2018	01035	24.47			25.63			7.98			5.27			0.7	0.8	28.5		42	4						1	4	3	6	0	0	0	n/a	1	
Site 18	7/23/2018		bad weather																																
Site 18	7/30/2018		Boat and quanta needed repair																																
Site 18	8/6/2018		Boat and quanta needed repair																																
Site 18	8/13/2018		Quanta need repair																																
Site 18	8/20/2018		Bad weather																																
Site 18	8/27/2018	01109	24.99	24.94	24.94	26.93	26.86	21.45	7.99	7.98	7.96	5.79	5.73	6.02	1.2	2.8	27.6		12	<1						0	4	5	6	0	3	0	n/a	2	
Site 18	9/3/2018	00810	26.04	26.03	26.00	27.26	27.33	25.83	7.98	7.95	7.86	5.72	5.71	5.75	1.4	2.8	29.8		5	<1						0	2	5	6	0	0	0	n/a	1	
Site 18	9/10/2018		bad weather																																
Site 18	9/17/2018		boat repair																																
Site 18	9/24/2018	00915	20.76	20.9	20.85	27.25	26.98	26.98	8.28	8.26	8.23	6.24	6.29	6.39	1	2.5	16.1		15	7						1	4	3	6	1	3	2	2	3	
Site 18	10/1/2018	00758	20.17	20.17	n/a	26.81	26.61	n/a	8.38	8.12	n/a	7.84	8.05	n/a	1.10	1.70	18.80		4	4						0	2	3	6	1	4	1	6	3	
Site 18	10/8/2018	01025	20.79	20.77	20.77	27.12	27.12	26.7	8.38	8.36	8.31	5.7	5.82	5.95	1.20	3.40	22.20		31	1						1	4	5	6	1	4	1	6	3	
Site 18	10/15/2018		bad weather																																
Site 18	10/22/2018	01059	12.87	12.86	12.83	26.76	26.76	26.41	8.76	8.73	8.54	8.18	8.23	8.30	2.50	3.20	9.10		18	<1															
Site 18	10/29/2018		bad weather																																

Friends of the Bay 2018 Water Quality Data - Site 19, Flowers Oyster Hatchery																																			
	Date	Time	H2O Temp TOP (0.5m)	H2O Temp 1.0 m	H2O Temp 0.5 m from BTM	Salinity TOP	Salinity 1.0 m	Salinity BTM	PH Top	PH 1.0 m	Ph. 5 m from BTM	Top DO	DO 1.0	BTM DO	Secchi	Depth (meters)	Air Temp	H2O Temp BTM monthly AVG	Fecal Coliform Bacteria	Enterococci	Ammonia (NH3)	Nitrate (NO3)	Nitrite (NO2)	Organic Nitrogen (N)	Total Nitrogen	Rainfall in 24 hours	Tidal Stage	Water Color	Surface Conditions	Wave Height	Cloud Cover	Wind Speed	Wind Direction	Weather	
Site 19	4/2/2018		NO MONITOR - SNOW																																
Site 19	4/9/2018		Boat not available																																
Site 19	4/16/2018		Boat not available																																
Site 19	4/23/2018	0019	9.24	9.23	9.91	24.66	24.72	24.72	8.58	8.57	8.55	7.46	7.01	6.03	1.60	4.7	9.5		2	<1						0	1	5	6	1	0	1	2	1	
Site 19	4/30/2018		no samples																																
Site 19	5/7/2018	00819	14.97	14.99	14.87	26.05	25.05	25.05	8.60	8.57	8.55	7.01	7.39	7.16	1.10	4.40	16.00		<1	<1						00001	00002	00001	00006	00001	00003	00001	00008	00002	
Site 19	5/14/2018	01113	14.88	14.83	14.57	24.84	24.98	25.11	8.3	8.2	8.35	6.42	6.56	6.74	1.1	5.54	16.9		14	7						2	1	5	6	4	1	1	1	3	
Site 19	5/21/2018	00757	15.80	15.59	15.25	24.47	24.59	24.65	8.12	8.15	8.13	5.56	5.61	5.68	1.10	4.3	18.1		6	3						1	2	3	6	1	0	1	8	1	
Site 19	5/28/2018	01026	18.43	18.37	18.16	24.50	24.57	24.63	8.3	8.29	8.25	5.91	5.85	5.92	1.100	4.9	24.4		16	2						1	4	5	6	0	2	0	n/a	2	
Site 19	6/4/2018		bad weather																																
Site 19	6/11/2018	01153	19.94	19.91	19.76	24.90	24.97	24.97	8.43	8.40	8.37	6.42	6.24	5.84	0.80	5.5	18.8		13	2						0	4	5	6	2	3	2	2	2	
Site 19	6/18/2018	00804	21.63	21.59	21.24	22.32	22.25	22.38	8.33	8.30	8.25	31.46	31.48	31.70	0.90	3.60	24.20		15	5						0	2	5	6	1	1	1	6	2	
Site 19	6/25/2018	01136	21.30	21.07	20.64	25.20	25.23	25.28	8.20	8.21	8.17	5.35	5.29	5.05	0.90	5.4	25.2		10	<1						2	2	4	6	2	2	1	1	1	
Site 19	7/2/2018	01021	25.32	24.85	24.27	24.95	25.16	25.20	8.20	8.24	8.14	6.16	6.17	5.95	1.00	3.60	28.0		4	<1						0	1	3	5	6	1	0	1	8	1
Site 19	7/9/2018	00816	23.59	22.80	22.77	25.53	25.78	25.84	8.28	8.25	8.21	6.02	5.73	5.78	1.40	5.2	24.3		9	2						0	4	3	6	1	0	1	1	6	1
Site 19	7/16/2018		no samples																																
Site 19	7/23/2018		bad weather																																
Site 19	7/30/2018		Boat and quanta needed repair																																
Site 19	8/6/2018		Boat and quanta needed repair																																
Site 19	8/13/2018		Quanta need repair																																
Site 19	8/20/2018		Bad weather																																
Site 19	8/27/2018	01012	24.97	24.96	24.77	26.72	26.86	26.07	7.88	7.88	7.88	4.87	4.97	5.13	1.70	4.6	26.1		31	16						0	4	5	6	0	3	0	n/a	2	
Site 19	9/3/2018	00815	26.09	26.08	25.84	27.33	26.26	27.54	8.02	8.01	7.92	5.84	5.81	4.13	1.00	4.7	27.8		16	8						0	2	5	6	0	0	1	8		
Site 19	9/10/2018		bad weather																																
Site 19	9/17/2018		boat repair																																
Site 19	9/24/2018	00907	20.79	20.79	20.81	26.42	26.81	27.19	8.24	8.22	8.86	5.95	5.99	5.94	1.00	4.9	16.1		20	4						1	4	3	6	1	3	1	2	3	
Site 19	10/1/2018	00805	20.07	20.00	20.23	26.74	26.38	26.67	8.47	8.43	8.32	8.07	7.95	8.16	1.10	4.1	19.2		30	9						0	2	3	6	1	4	1	6	3	
Site 19	10/8/2018	01017	20.72	20.72	20.76	26.69	26.83	27.05	8.29	8.29	8.29	5.46	5.66	5.69	1.20	5.3	22.1		160	36						1	4	5	6	0	4	1	6		
Site 19	10/15/2018		bad weather																																
Site 19	10/22/2018	01005	12.63	12.64	12.69	27.03	26.89	27.03	8.74	8.71	8.63	7.96	8.01	7.95	2.30	5.7	8.4		26	3						0	4	5	6	2	2	2	2	6	2
Site 19	10/29/2018		bad weather																																