City of New York
Department of Environmental Protection
Bureau of Wastewater Treatment

Floatables Monitoring Program Progress Report

(Presented as an Addendum to the CSO BMP Annual Report)

March 2018

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FLOATABLES MONITORING PROGRAM
ANNUAL REPORT

INTRODUCTION

The New York City Department of Environmental Protection (NYC DEP) has been tasked through its State Pollutant Discharge Elimination System (SPDES) permit requirements to implement and maintain a floatables control program as well as a monitoring program to provide a means to assess and measure the effectiveness of the programs. These control and monitoring programs are embodied in the City-Wide Comprehensive CSO Floatables Plan Modified Facility Planning Report (Floatables Plan, July 2005) inclusive of Addendum 1 – Pilot Floatables Monitoring Program Workplan (December 2005).

The floatables plan contains a conceptual framework for the monitoring of floatables conditions in New York Harbor water and a work plan for a pilot program that was implemented over the course of 2006 and 2007 to develop and test the monitoring methodology envisioned in the framework. Since 2008, the floatables monitoring program has completed its sixth year of full scale program.

The floatables monitoring program is based on observations of the presence/absence of floatables from monitoring sites throughout the harbor. It has developed a number of methods to assess floatables control programs. The monitoring data was used to prioritize; and three sites with persistent "Poor" ratings were selected for more comprehensive site-specific investigations. These site-specific studies were performed by contractors in 2009 and 2010. NYC DEP Harbor Water Quality Survey (HWQS) continued the study in 2011 going forward.

Based on the monitoring and investigation data, this report could lead to short term or long term remediation and modifications to the CSO Long Term Control Plan (LTCP) waterbody/watershed plans, if monitored floatables trends indicate impairment of waters relative to their intended uses.

At NYSDEC's request, NYC DEP agreed to add a public participation component to the program. Since summer 2007, it has been achieved through the participation of the New York City Beach Floatables Survey Program (Survey Program); and the Survey Program volunteers have begun to provide monitoring data. The CSO BMP Annual Reports include this Floatables Monitoring Program Annual Report.

Since 2006, the program has been grown to monitor most of NYC's regional waters and their near shores and shorelines. NYC DEP Harbor Water Quality Survey and Volunteer Survey Program monitoring stations increased from 25 sites in 2006 to 123 sites in 2017. Ratings also increased from approximately 3,500 to 5,769. Over the long term, variations in monitoring sites and locations will likely occur as public participation volunteer interest varies, shoreline cleanup sites change, and HWQS sites change; floatables monitoring at PCM sites will continue to be added as forthcoming LTCP element construction is completed.

RATING SYSTEM

Standard Photographs

Floatables conditions were photographed during HWQS cruises and the intensive landside monitoring in November and December 2006. Standardized photographs were selected for the five (5) floatables condition rating sheet (see below)

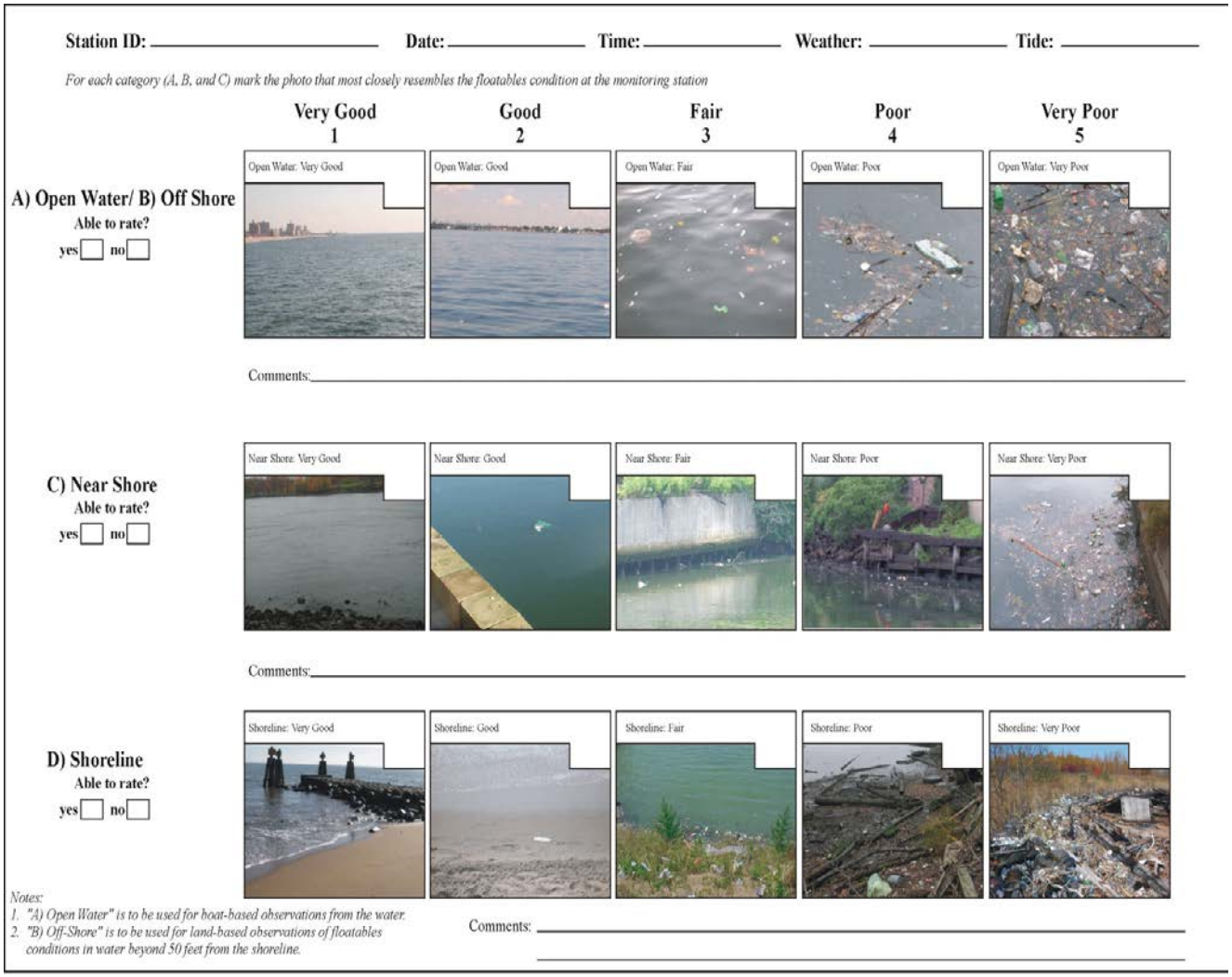


Figure 1. Floatables condition rating sheet.

The photographs also have been arranged into three (3) rating categories. These represent conditions encountered throughout the monitoring program. The rating categories are:

A) Open Water,

B) Near Shore, and

D) Shoreline

A set of photographs displayed in the next four pages provides the range of conditions found throughout the floatable monitoring sites. Although most are self-explanatory, several notable points relating to the complex nature of floatables conditions deserve emphasis, as follows.

- Very Good, Good or Not Rated site examples: Note the upland (i.e., above the high tide line) debris from non-CSO sources that may contribute to less than good ratings.

- Variable Site Examples: Note the upland conditions that show potential floatable debris from non-CSO sources. In addition, note the variability of waterborne debris in the photographs from the same sites.

- Very Poor Site Examples: Note both the illegal dumping conditions and the variability of waterborne debris in the open water.

- Variable Shoreline Examples: Note the variability in shoreline characteristics between sites and tidal conditions.

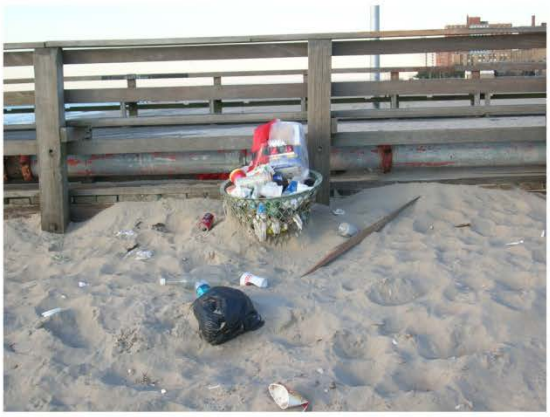
The objective of creating the photo library was to obtain photographs of all five rating conditions from “no floatables present” (i.e., very good) to “floatables present and extremely dense” (i.e., very poor) that could be easily associated with such conditions found throughout the Harbor for Open Water, Near Shore, and Shoreline area.

N9-L1 - Coney Island - Off Shore, Near Shore and Shoreline Rating - Very Good

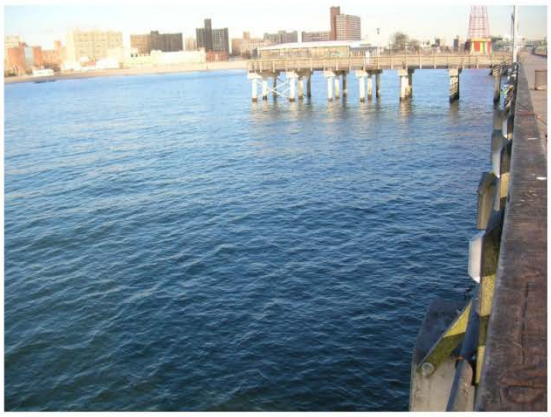
N9-L1 - Coney Island - Shoreline Rating - Good

E4-L - Astoria Park - Off Shore and Near Shore Shoreline - Very Good Shoreline - Good

N9-L1 - Coney Island - Upland Condition - Not Rated



N9-L1 - Coney Island - Upland Condition - Not Rated



N9-L2 - Coney Island - Off Shore Rating - Very Good

Figure 2. Very Good, Good or Not Rated site examples


NC2 - Newtown Creek - Off Shore Rating - Fair


NC2 - Newtown Creek - Off Shore Rating - Very Good


NC2 - Newtown Creek - Upland Conditions - Not Rated


NC3-L2 - Newtown Creek - Near Shore Rating - Very Good


NC3-L2 - Newtown Creek - Off Shore Rating - Very Good


NC3-L2 - Newtown Creek - Near Shore Rating - Poor

Figure 3. Variable site examples

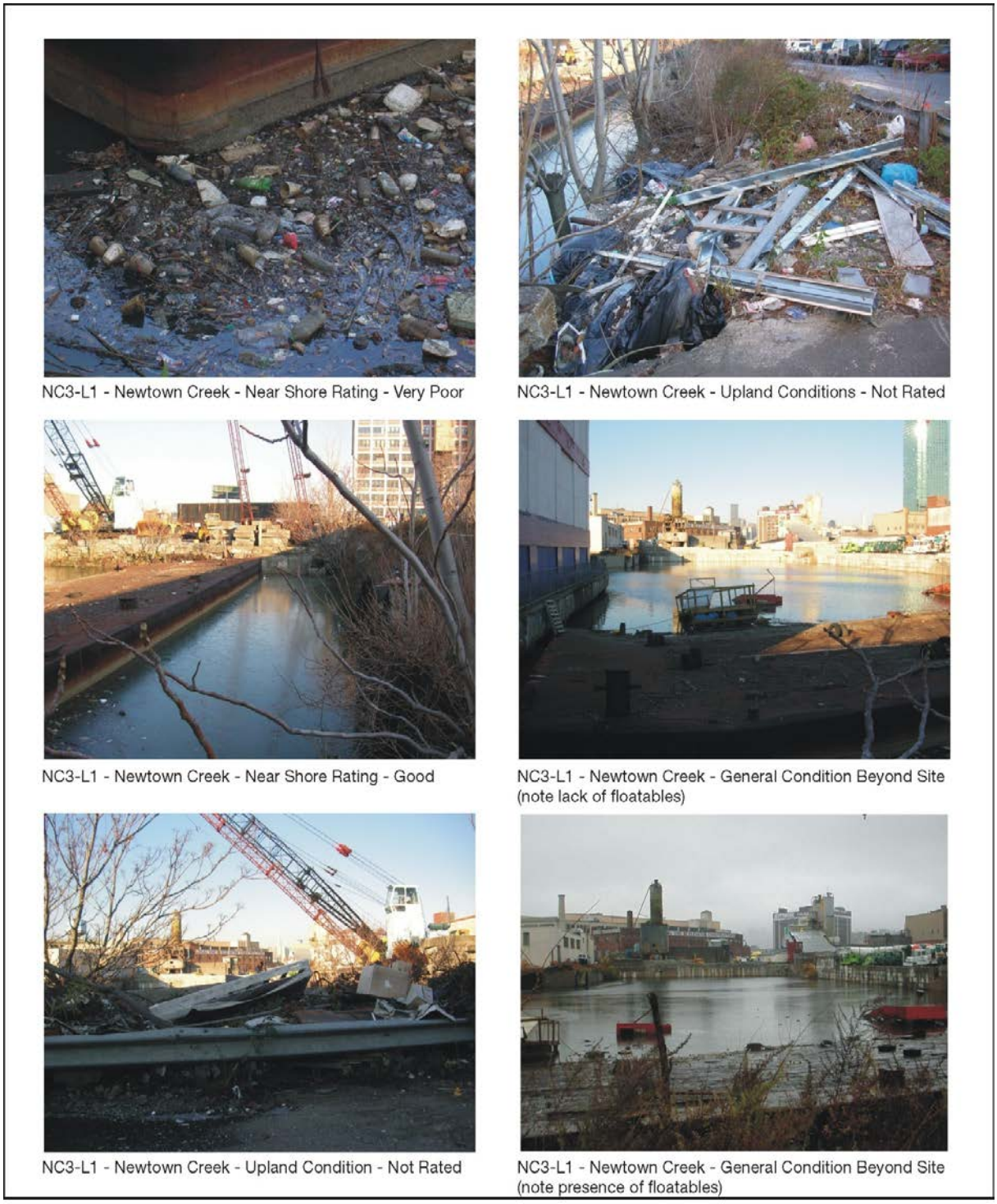


Figure 4. Newtown Creek rating examples.

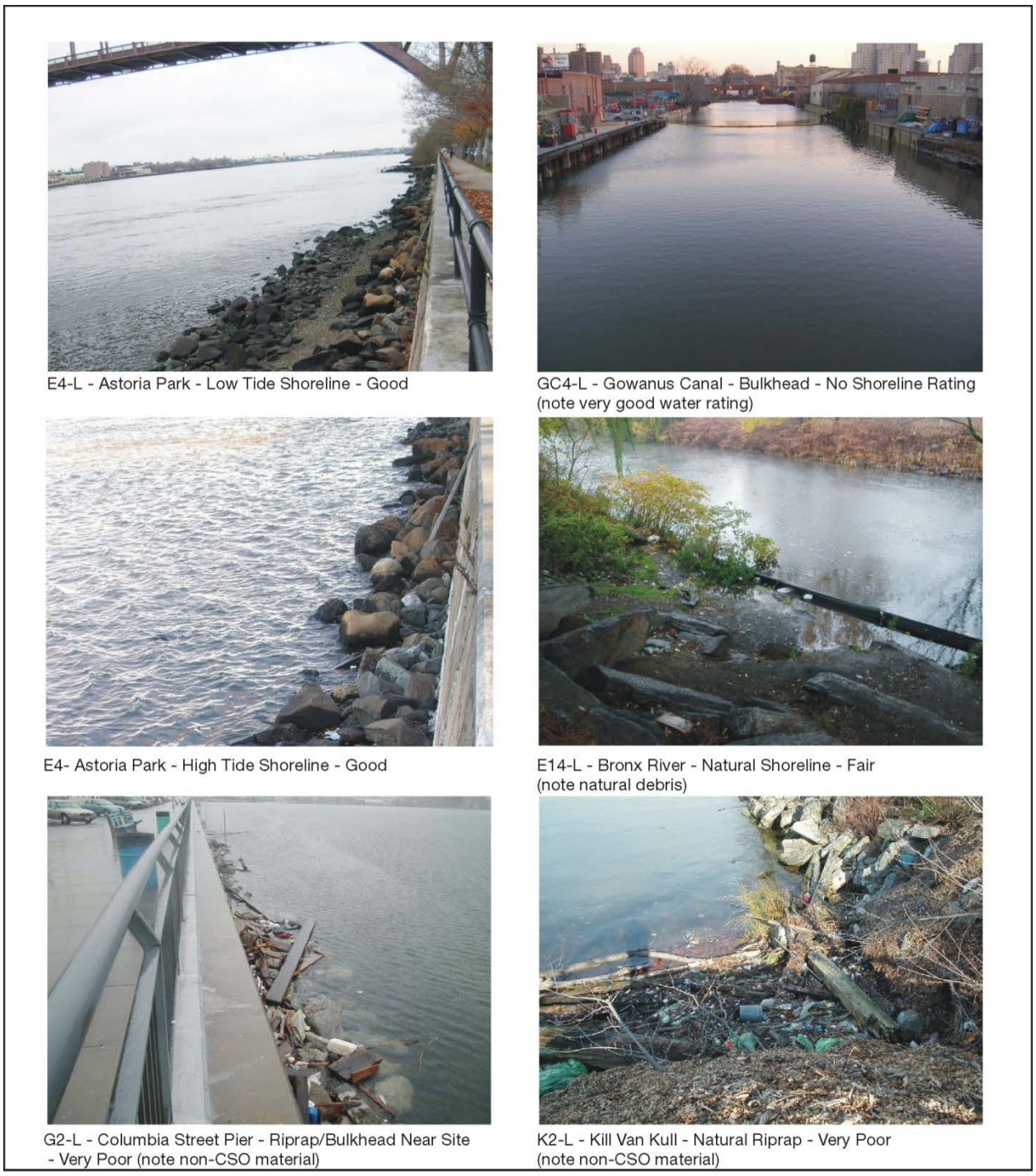


Figure 5. Variable shoreline examples.

Numeric Rating System

A numeric rating system (see table below) was set up for the floatables monitoring program to evaluate floatables conditions among monitoring stations. Monitoring fieldwork confirmed several complexities about Harbor-wide monitoring, such as tide dependent categories (e.g., some sites may have a rip rap or sand shoreline during low tide and no shoreline when the water rises against the bulk head at high tide), and differences from site to site (e.g., sand vs. rip rap shorelines, width of shorelines). These complexities plus the complexities inherent in an assessment method used by multiple organizations (e.g., HWQS and public participation groups) led to the need for a simple, percent-based ranking of sites. Therefore, sites were ranked based on their percentage of good vs. poor ratings per total number of the ratings in a given time period.

Table 1. Sample Floatables Condition Ratings.

Score(1)	Rating(2)	Rating Description
1	Very Good	No floatables present
2	Good	Floatables present but diffuse
3	Fair	Floatables present in moderate density
4	Poor	Floatables present and dense
5	Very Poor	Floatables present and extremely dense

(1) The intent of this table is to show the "best to worst" gradients for floatables condition ratings.
(2) Each monitoring site included scores and ratings for up to three categories:
1) Open Water or Off Shore dependent upon vessel-based or land-based observations,
2) Near Shore, and
3) Shoreline - areas with only one or two of the categories, the missing categories were not rated.

DATA COLLECTION OPERATIONS

The floatables monitoring program reached its tenth year for the full-scale survey; and there were 123 total monitoring stations around NYC's five boroughs in 2017. This was a successful effort made by NYC DEP Harbor Water Quality Survey and the NYC Beach Floatables Survey Program. Floatables Conditions Monitoring Stations Maps can be found in Appendix 2 and Fig. 6 below.

According to the full-scale floatables monitoring plan, NYC DEP HWQS conducted one (1) visit per station every week during bathing season (from Jun. to Oct.), one (1) to two (2) visits per station every month during off-season (Nov. to May). NYC Beach Floatable Survey program samples intensively during the summer months with intermittent to no sampling in the winter.

Site specific investigations have been performed since 2008. Based on the ratings from 2016, "poor" and "very poor" sites were evaluated and three sites were selected (Newtown Creek, the mouth of Paerdegat Basin and Inwood Marina, Hudson River). Sampling here was performed in the summer of 2017. Details for the investigations are presented in section 'Site Specific Investigation Study'.

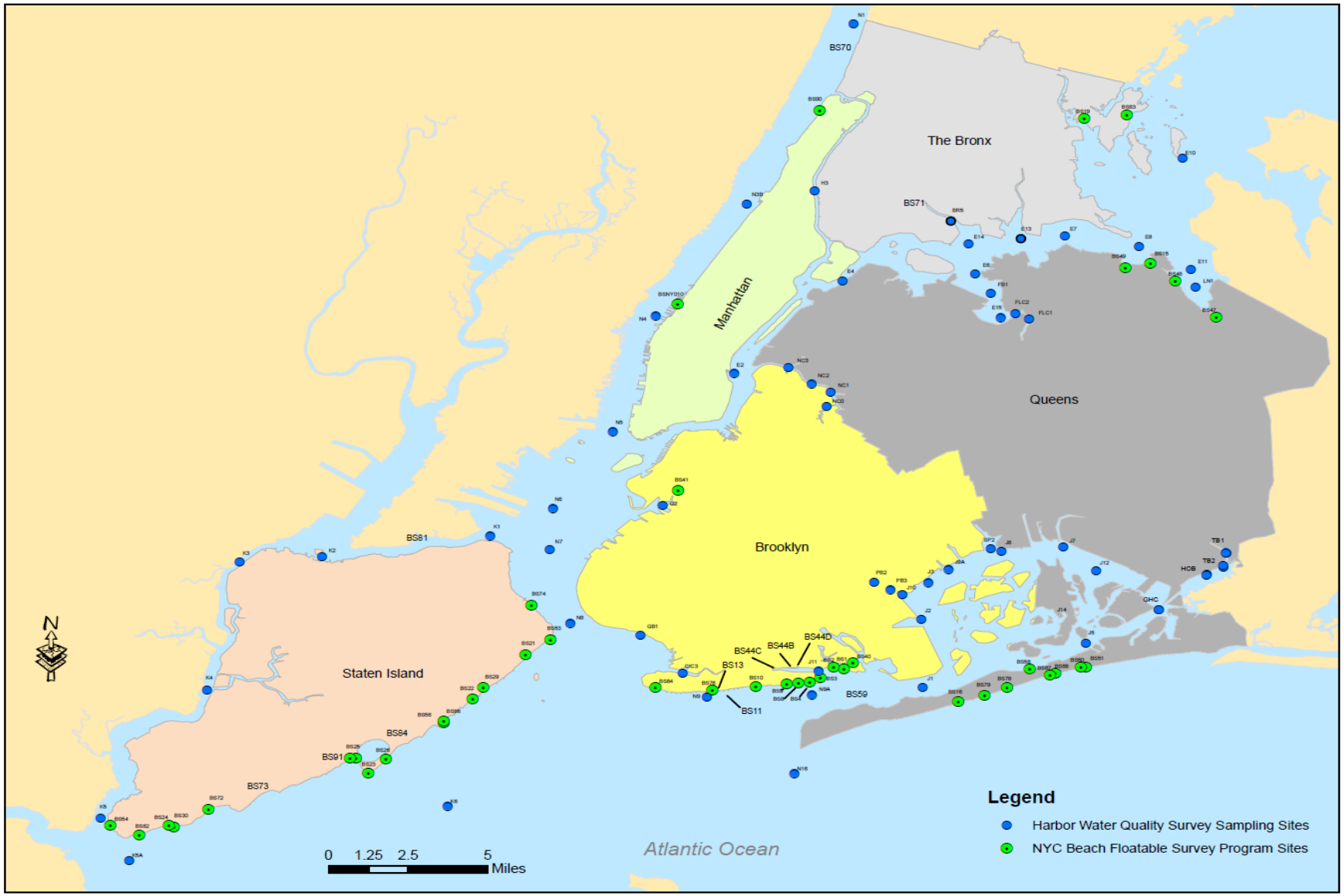


Figure 6. Floatables condition monitoring stations map.

DATA MANAGEMENT AND ACTION TRIGGERS

The Floatables Monitoring Program data management and reports prior to 2010 had been performed by HydroQual, and the NYC DEP thereafter. An analysis of the data gathered to date can be found in section “Floatables Condition Rating Data Summary”.

Floatables Condition Rating data has been tracked per site for up to three rating categories (i.e., Open Water, Near Shore, and Shoreline) as well as date and time. Significant comments, for instance, the presence of large amounts of waterborne leaves or the occurrence of a beach cleaning, have also been collected.

MONITORING/REMEDIATION FLOW CHART

A flow chart or pathway was presented below for monitoring information to be used to effect investigations into improving floatables conditions in New York Harbor. Descriptions of each flow chart element are provided here.

Ongoing Monitoring Phase

Floatables monitoring has been conducted on an ongoing basis throughout 2017. The annual progress reports have been presented since 2006. Likewise, data collection and compilation for floatables control program elements continue to be collected on a regularly scheduled basis as described in the Floatables Plan and the CSO BMP Annual Reports.

Immediate Action Triggered – Level I Remediation

If the HWQS staff observes dangerous conditions that could adversely affect human health or navigation or create operational problems for Departmental programs during floatables monitoring, the staff has been provided with contact information so that the appropriate authorities are alerted of the situation. For example, observed illegal-dumping instances will be relayed to the New York City Department of Sanitation (DSNY) Police and/or the Department of Small Business Services (DSBS) Dockmasters, both of which have illegal dumping enforcement responsibilities. Other situations that may require immediate action could be observed failures or maintenance issues at IFCP facilities or the observation of large floatables slicks or objects. In these cases, the HWQS staff would contact the IFCP contractor or the United States Army Corps of Engineers (USACE) for dispatching of the appropriate maintenance crews and/or skimmer vessels to rectify the situation. Other agencies, such as the United States Coast Guard (USCG) or the New York City Fire Department (FDNY) Marine Division may also be contacted, as appropriate.

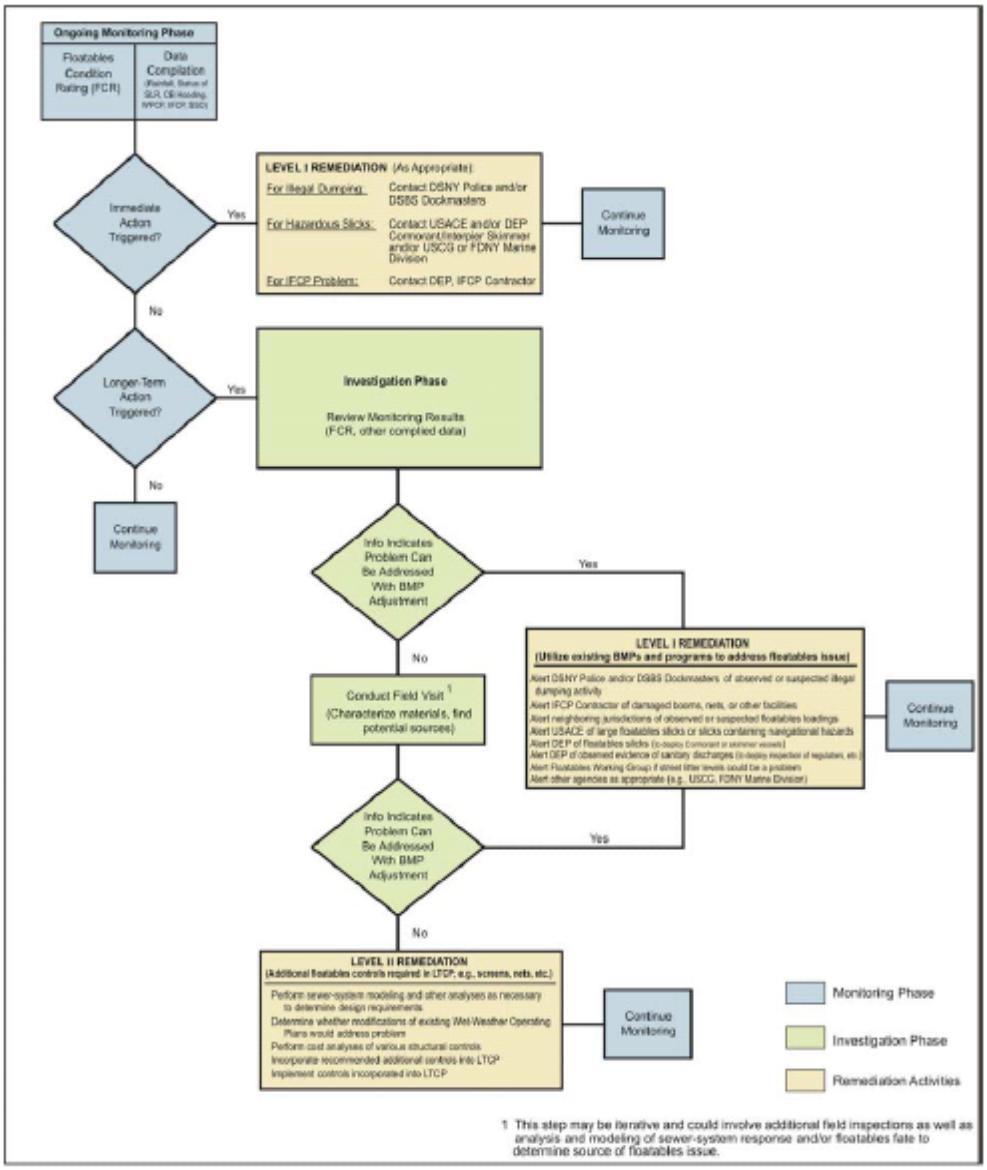


Figure 7. Pilot floatables monitoring program monitoring/remediation flow chart.

Longer Term Action Triggered – Investigation Phase & Level I Remediation

The information presented in the workplan is reiterated to summarize the objectives of the site-specific investigations and the Level I remediation activities of the program.

In those cases where condition ratings indicated that floatables are present and dense on a persistent basis, investigations into the nature of the floatables in the affected area were conducted contingent upon the action triggers established during the pilot program. The investigation phase revolved around floatables material characterization, the investigation of floatables sources, the existence of control programs in the vicinity of monitoring sites with consistently poor ratings over time, and/or the need to adjust or improve one of the various elements of existing control programs (i.e., CSO

BMPs). The investigation phase was iterative and involved a combination of field inspections and an analysis of sewer system characteristics and floatables fate.

Level I remediation activities could also be triggered by the investigation phase. Such activities may include the following.

- Alert DSNY Sanitation Police or DSBS Dockmasters of observed or suspected illegal dumping activity;
- Alert IFCP contractor of damaged booms, nets, or other IFCP facilities;
- Alert neighboring jurisdictions of observed or suspected floatables loadings;
- Alert USACE, or other agencies such as the USCG or the FDNY Marine Division, when appropriate, of large floatables slicks or slicks containing navigational hazards;
- Alert DEP of floatables slicks (to deploy skimmer vessels);
- Alert DEP of observed evidence of sanitary sewer discharges (to deploy inspection of regulators, etc.); and/or
- Alert Street Litter Working Group (a.k.a. Floatables Working Group / Keep New York Beautiful) if street litter levels could be a problem

Longer Term Action Triggered – Investigation Phase and Level II Remediation

Longer term actions are not applicable at this stage of the program; however, the following information has been reiterated to emphasize the connection of the floatables monitoring program and the LTCP. The objectives set forth in the Floatables Plan provide a metric for the LTCP performance, and the floatables monitoring will be conducted in conjunction with post-construction compliance monitoring with regard to staffing, timing and location of monitoring sites.

In those cases where the investigation of persistently poor floatables conditions does not indicate that adjustments to existing CSO BMPs or control programs will have a positive effect, additional investigation into floatables sources and control alternatives may be part of the Citywide Long Term Control Plan for Combined Sewer Overflows (LTCP). Several actions may be considered appropriate in order to address such conditions, as follows.

- Perform sewer-system modeling and other analyses as necessary to determine design requirements;
- Determine whether modifications of existing Wet-Weather Operating Plans would address problem;
- Perform cost analyses of various structural controls;
- Incorporate recommended additional controls into LTCP and/or New York City Department of Environmental Protection Floatables Plan;

• Implement controls incorporated into LTCP.

The following descriptions provide additional information concerning how the floatables monitoring data have been incorporated into the LTCP.

The floatables monitoring program included data analysis and action triggers based on the implementation of analysis results that prompted investigative actions within priority areas with persistent, poor floatables condition ratings. The investigation activities essentially tracked the floatables to their sources in these priority areas and assisted in the identification of important site-specific physical circumstances that contributed to the floatables conditions. The program investigative activities are intended to lead toward recommendations for improved control, if necessary. In some cases, it is anticipated that the floatables monitoring information may lead to the utilization of existing BMPs and/or programs (e.g., catch basin maintenance, skimmer vessel deployment) to address floatables issues (Level I Remediation). The Floatables Monitoring Program also links the investigative activities to the LTCP development process (Level II Remediation). Furthermore, the monitoring program is linked to LTCP activities through the following evaluation and reporting mechanisms.

• **City-Wide Comprehensive CSO Floatables Plan Modified Facility Planning Report (Floatables Plan):** The Floatables Monitoring Program is part of the Floatables Plan, and it is intended to augment the host of Floatables Plan evaluation and progress reporting mechanisms.

• **CSO LTCP Progress Reporting**

- **Annual CSO BMP Report:** The Annual CSO BMP Report, due April 1st of each year as stipulated in each WPCP SPDES permit, requires progress reporting on the implementation and operation of floatables control activities under BMP 7 - Control of Floatable and Settleable Solids. The Floatables Plan incorporates floatables monitoring activities into the CSO BMP Annual Report.

• **Waterbody/Watershed Plans:** Waterbody/watershed plans incorporate the Floatables Plan and its evaluation and reporting mechanisms, including the CSO BMP Annual Report and the CSO Order on Consent Quarterly Progress Reports, and the authors of the plans utilize these tools to help identify and address floatables issues in a given waterbody. Implementation of the Waterbody/Watershed Facility Plan provides both sewer system performance benefits and water-quality benefits, especially those components of the Plan that reduce CSO discharges. In addition, the waterbody/watershed plans establish annual performance evaluation and reporting procedures to ascertain attainment of plan objectives. Floatables monitoring data was used as applicable in the waterbody/watershed plans to measure the effectiveness of the programs implemented by the City to reduce the presence of floatables in the City's waterbodies. These programs included catch basin hooding, control booms at key CSO outfalls, and skimmer boats to collect floatables. Further observations made under the floatables monitoring program will improve the understanding of the extent of floatables in the City's waterbodies, allowing more definitive conclusions to be made.

An example of the integration of the Floatables Monitoring Program into the LTCP

Waterbody/Watershed Plan is provided below as excerpted from the draft LTCP Open Waters Waterbody/Watershed Report. The excerpt is based on the 2006 pilot program data.

A floatables monitoring program was developed as part of the City-Wide CSO Plan for Floatables Abatement (Floatables Plan), which is part of the LTCP Waterbody/Watershed Facility Plan. A key part of the Floatables Plan included a new floatables monitoring program to evaluate the effectiveness of Plan elements and provide for actions to address the short- and long-term floatables control requirements. Using data gathered [in] 2006, the floatables monitoring program identified sites with persistent poor floatables condition ratings and the three sites . . . with the most persistently poor ratings were investigated with much greater detail. Monitoring at these sites ranked the observed floatables on a five-point scale (very poor; poor; fair; good; very good). Three categories of observations were made; observations along the shoreline; observations near the shoreline; and observations away from the shoreline. For observations along the shoreline, most sites had 50 percent or more of their ratings as no higher than fair. Observations near the shore generally showed 100 percent of their ratings falling into the good or very good categories. Observations away from the shore indicated that there were no ratings lower than fair. Overall, the results of the monitoring program show these sites to be free of floatables. In the case of Site K2, where poorer floatables conditions were found, the source of floatables could not be attributed to CSOs. New York City has implemented several control programs designed to reduce the presence of floatables in the City's waterbodies, including catch basin hooding, floatables monitoring, control booms at key CSO outfalls, and skimmer boats to collect floatables. The low incidence of floatables in the sites monitored by the pilot floatables monitoring program is consistent with these improved controls that have been implemented by the City.

Another example of how the LTCP is integrating floatables controls into the planning process can be found in the Newtown Creek Waterbody/Watershed Plan (June 2007). The Newtown Creek plan addresses the floatables conditions observed as part of the monitoring program. The plan contains recommendations for potential floatables control (e.g., in-line or end-of-pipe netting and/or boom installation) at or around the four largest annual average volume CSOs in Dutch Kills (i.e., the outfall near NC3-L1), Maspeth Creek, East Branch, and English Kills. These potential controls would improve the floatables conditions at the NC3-L1 and NC3-L2 monitoring stations as well as in the rest of the waterbody. In addition, sewer system modifications such as regulator improvements and the construction of a CSO storage tunnel, will maximize the flow to the WPCP, reduce overflow to the head of Dutch Kills and throughout Newtown Creek, and likely result in a positive impact on floatables conditions. Finally, the waterbody/watershed plan includes recommendations for the use of skimmer vessels to both service any future floatables nets/booms and to skim the open water of Newtown Creek as needed.

• **Post Construction Monitoring:** Post-construction monitoring protocols are being fully developed under the City-wide LTCP to assure adequate coverage and a technically sound sampling program. Post-construction monitoring will be performed per CSO Control Policy requirements and receiving water will be monitored per HWQS protocols. Monitoring data will be used to assess compliance, to optimize facility performance, and to trigger adaptive management alternatives.

• **LTCP Updates / Continuous Improvement:** The LTCP process, although intended to result in specific facility construction and operations modifications, was also designed with

"continuous improvement" in mind, whereby changing conditions can be addressed by updated plans over the course of coming decades. For instance, post construction monitoring programs implemented for early plan elements, such as the Flushing CSO Retention Facility, may provide useful data to inform the design of other plan elements. Likewise, public participation in the LTCP process also allows it to address changing public perception/needs as appropriate during the course of the process. And finally, floatables monitoring information will be used in part to address floatables issues that may arise. And, like the Waterbody/Watershed Plans, the Floatables Plan and its evaluation and reporting mechanisms, including the Annual CSO BMP Report and the CSO Order on Consent Quarterly Progress Reports, are utilized to inform the LTCP process as are the Waterbody/Watershed Plan evaluation and reporting procedures.

FLOATABLES MONITORING PROGRAM SCHEDULE

To aid the review of the program schedule, please see the following table which presents the original completion dates for each task as approved in April 2006 as well as the new expected completion dates and current status as of March 2016.

Table 2. Floatables Monitoring Program Completion Dates

Task	Original Completion Date (April 2006)	New Completion Date	Status
Pilot Program Setup Tasks	January 2007	January 2007 No change	Completed – schedule met
Action Trigger & Investigation Process Development	March 2007	March 2007 No change	Completed – schedule met
Pilot Program Operation / Implementation Tasks	July 2007	July 2007 No change	Completed – schedule met
Pilot Program Evaluation / Adjustment	Ongoing	Ongoing No change	Completed – schedule met
Final Floatables Condition Rating System	July 2007	July 2007 No change	Completed – schedule met. Minor updates in 2008 to distinguish between water and land-based observations.
Public Participation Component Commencement	September 2006	April 2007	Complete – schedule met
Public Participation Component Ongoing Activities	Ongoing (as feasible)	Ongoing No change	2007-2010 Activities Complete
Pilot Program Interim Progress Report	December 2006	December 2006 No change	Accepted by NYSDEC
Pilot Program Progress Report	April 1, 2007 (part of ongoing CSO BMP annual report)	April 1, 2007 No change	Accepted by NYSDEC

Transition to Full Scale Program	February 2008	February 2008 No change	Completed – schedule met
Progress Report	April 1 each year (part of ongoing CSO BMP annual report)	April 1	Submission dates: April 2008 Each March 2009-2018

FLOATABLES CONDITION RATING DATA SUMMARY

FLOATABLES CONDITION RATING INTRODUCTION

The following data summary provides an explanation of how the floatables monitoring data has been used to rank sites in order to prioritize areas for the investigative phases of the program. Due to the complexities of floatables monitoring, the rating field work has been intentionally kept simple, and the resulting data analysis mirrors this simplicity by showing the count of each rating for each site as a percent of the total number of ratings. Using this simple comparison, the three sites with the highest percent poor ratings were targeted for investigations as described in the Pilot Floatables Monitoring Program Work plan. Sites selected for investigation each year are all mutually disjoint within a five year span, regardless of persistent poor ratings.

The data analysis below has been completed for the entire set of data collected during the full-scale floatables monitoring program from January 1 through December 31, 2017, including the Harbor Water Quality Survey (HWQS) data and the New York City Beach Floatables Survey Program (Survey Program) data. Figure 6 shows the program monitoring station locations (see Appendix 2 for more detail).

2-Point Site Specific Ratings

The simplest way to view the floatables monitoring data is to combine like ratings so that only two categories are used for ranking purposes. To this end, Figures 9 and 10 display a 2-point rating comparison, “good vs. poor.” The 5-point rating system data has been combined as follows for these figures.

- **Good** – The “good” ratings (shown in green in Figures 9 and 10) comprise the “good” and “very good” ratings from the data compiled to date as based on the Floatables Monitoring Program rating scale.

- **Poor** – The “poor” ratings (shown in red in Figures 9 through 10) comprise the “fair,” “poor,” and “very poor” ratings from the data compiled to date as based on the Floatables Monitoring Program rating scale

Combining the ratings in this way simplifies the site prioritization by reducing the amount of data categories that have to be considered, plus, any issues of subjectivity and rating inconsistency among

the monitoring staff are de-emphasized. In this 2 point system percentages of good or poor ratings are examined. Note that when comparing Figures 9 and 10, total number of observations (n) varies much more in the public participation program. The DEP open water and near shore data set has an n > 20 for all stations except for N16 which often cannot be sampled due to adverse sea conditions.

Generally, open water ratings are better than near shore ratings which are better than shoreline ratings (Figs. 9 and 10). Shoreline ratings are most likely the poorest due to the concentration of debris that washes up after each tidal cycle and the possible addition of litter from upland sources. Only 30 of the 692 open water public participation ratings were poor (4.3%) and only 39 of the 1462 NYC DEP open water ratings (2.7%) (Table 3). Near shore public participation ratings were considered poor 9% of the time and the DEP ratings here were only 1.2% poor. Only in the shoreline ratings do we see a marked increase in poor ratings; 20.1% and 22.9% for the public participation program and DEP ratings respectively. The combined ratings reflect the same trend and are similar to combined ratings from 2016 (Fig. 8).

For open water rating categories, the majority of all sites had at least 80% good ratings (Figs.9a and 10a). The volunteer Gowanus Canal site was the worst rated open water site in 2017 (33% “poor”) though it was not rated as poorly in the nearshore and shoreline categories. Many of the poorest sites are in tributaries and flow restrictive waterways such as Newtown Creek, Coney Island Creek, Bergen Basin, etc. (Fig. 10).

Kingsborough Community College Seawall had zero good ratings in the shoreline (Fig. 9c). Sites in Coney Island Creek, Great Kills, Bergen Basin and Kill Van Kull were very poorly rated based on DEP and public participation data (CIC3, Great Kills Playground, BB2 and K1). Areas with good tidal flow and public beaches that may be kept clean during the summer tend to have good ratings (N9, Crescent Beach, Orchard Beach). However, Penny Beach (BS61) did have poor shoreline ratings.

Table 3. Total ratings of Good or Poor in each rating category for the public participation and NYC DEP monitoring programs.

	Open Water			**Near Shore**			**Shoreline**		
	Good ratings	Poor ratings	Percent Poor	Good ratings	Poor ratings	Percent Poor	Good ratings	Poor ratings	Percent Poor
Public Participation	662	30	4.3	629	62	9.0	551	139	20.1
NYC DEP	1423	39	2.7	1444	18	1.2	595	177	22.9
Combined Ratings	2085	69	3.2	2073	80	3.7	1146	316	21.6

5-Point Site Specific Ratings

Figures 11 and 12 show the 5-point rating scales for all sites and categories. This is the scale used by all personnel in the field at the time of rating and, although it can appear a bit confusing, it is useful in further breaking down the rating scale. One striking observation of these figures is the predominance of "very good" ratings in the open water and near shore categories, especially in the DEP monitoring sites. Shoreline ratings look very different and follow the trends described above in the 2-point rating section. In all of the 5,769 ratings there were only 58 very poor ratings and 96 poor ratings (combined less than 3%).

COMPARISON: 2009 TO 2017

Table 4 displays the "worst" sites based on the 2-point rating scale from 2009 to 2017. BS41 (Gowanus Canal), BS49 (Little Neck Bay, Queens), Newtown Creek (NC0-3), Coney Island Creek (CIC3), Bergen Basin (BB2) and BS57 (Arthur Kill) are ubiquitously poorly rated sites. The evidence suggests that poor sites remain so from year to year and are often located in restricted waterways. Future comparisons and tracking of sites will shed more light on these patterns.

Site specific investigation sites are typically chosen as the worst of the near shore category (Table 4), excluding previously sampled locations. BS22 (Miller Field) and BS84 (Great Kills) are eligible for sampling. Of the three tied stations, BS91 (Crescent Harbor) was selected as it had the largest number of ratings.

Table 4. Comparison of the three sites with the highest % of poor ratings in each category in 2009 to 2017. Ratings are from the 2-point rating scale. Stations with less than four observations were not considered. Repeating stations are in bold type.

"Worst" Sites: 2009 to 2017

	Open Water	Near Shore	Shoreline
2009	**BS41**, BS54, BSNY010	**BS41**, BS54, **BS57**	**BS49**, BS54, **BS57**
2010	BS15, BS24, **BS41**	BS24, **BS41**, **BS57**	**BS49**, BS53, **BS57**
2011	**BS41**, BS71, **BSNY010**	**BS41**, **BS49, BS57**	**BS41, BS49**, BS62
2012	**BS41**, BS44B, **BS49**	BS23, **BS41**, **BS49**	BB2, **BS49**,**BS41**
2013	BS82, **BS15**, BS1	BS48, BS88, **BS49**	**BB2, BS41, BS49**
2014	BS29, CIC3, K2	NC3, **BS23**, BS84	**BB2,** CIC3**, BS49**
2015	**BS84**, BS44C, BS44D	**BS41,** BS44C, BS44D	**BS15,** BS3, EJ3
2016	**CIC3**, **NC0,** BS61	BS90, **CIC3, NC0**	**BB2, CIC3,** BS3
2017	**BS41, BS54, BS84**	**BS84,** BS22, (BS93,BS95,BS91)*	**BB2, CIC3, BS3**

***Three way tie**

SUMMARY

Sites in Bergen Basin (BB2, BB4), Sheepshead Bay (KCC Seawall), Newtown Creek (NC0), Coney Island Creek (CIC3), Great Kills (BS84), Flushing Bay (FB1) and East Jamaica Bay (TB1) were considered the major problem sites in 2017 in terms of Shoreline ratings (Figures 9c & 10c). On the other hand some sites that have been poor in the past appear to have made a rebound in 2017. Among them are Thurston Basin mouth (TB2) and Penny Beach open water (BS60). When examining the whole data set there is an overwhelming number of sites rated "good" in the offshore and near shore zones. Areas with consistently poor ratings can be focused on and examined.

The past year's poor ratings have decreased slightly from 2016. The combined shoreline ratings were 21.6% poor. Over the years the combined shoreline poor rating percentage has increased from 16.5% to 21.8% to 33.3% in 2012, then settling down to 29.2% in 2013 and decreasing again from 2014 to 2017. Figure 8 breaks down the combined ratings to Public Participation and DEP monitoring sites but the trend is similar. Patterns in the occurrence of floatable trash at rating sites can be attributed to a combination of rainfall, city clean-up efforts and the propensity for the public to litter. At some sites it is apparent that something as simple as a regularly maintained trash receptacle could cut down on floatables.

A report prepared by Robert Gans, director of the Volunteer Floatable Program, for the NYC DEP discusses trends in the program's surveys noting that sites were generally clean and total beach litter density was 304 items/1000ft² (up from 235 items/1000ft² in 2016) as measured on select beaches throughout the city (total beach footage surveyed was 131,400 ft²). Litter is also categorized by material with plastics being the majority litter type found in these density counts and the highest densities prevalent on Bronx county beaches. The program continually reevaluates sites and adds new locations based on public use and perceived litter and floatable problems.

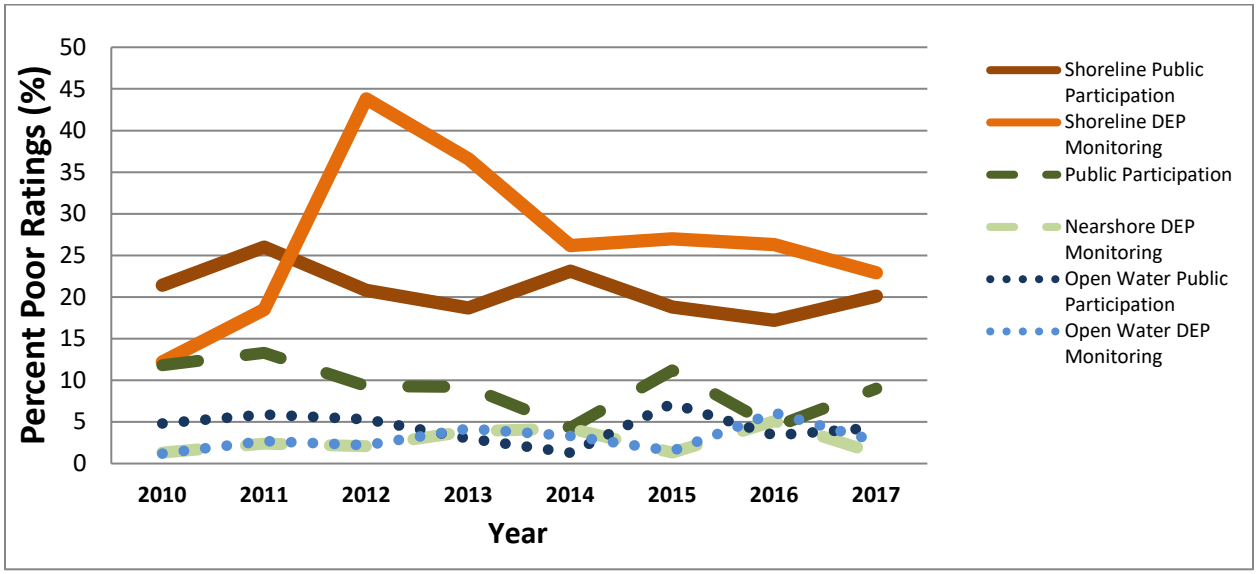


Figure 8. Percent poor ratings for all Public Participation and DEP sites from 2010 to 2017 in all three sampling zones based on 2-point ratings.

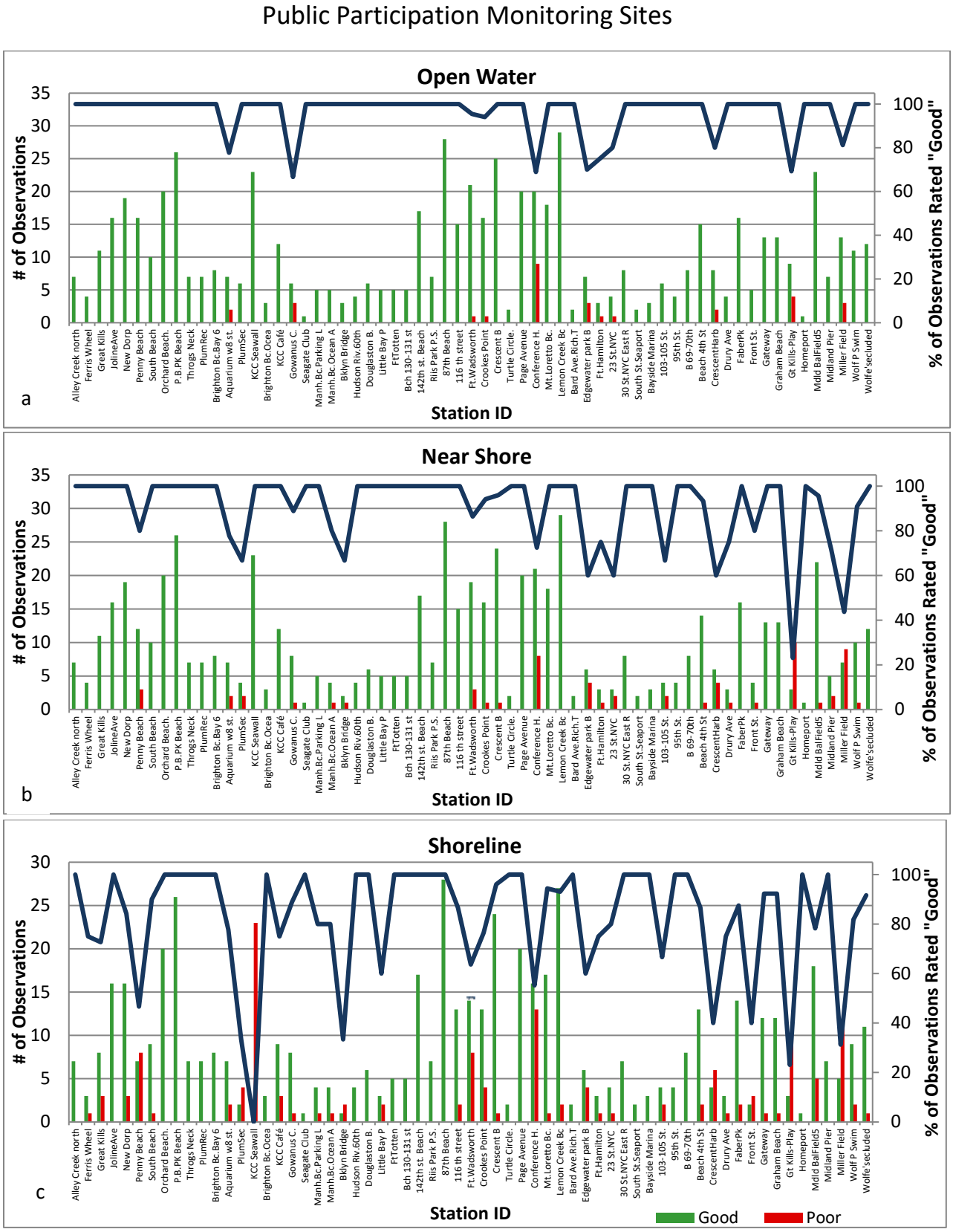


Figure 9a-c. A 2-point rating system for the 3 categories of public participation monitoring. Total observations in 2017 were rated as “Good” or “Poor” and tallied.

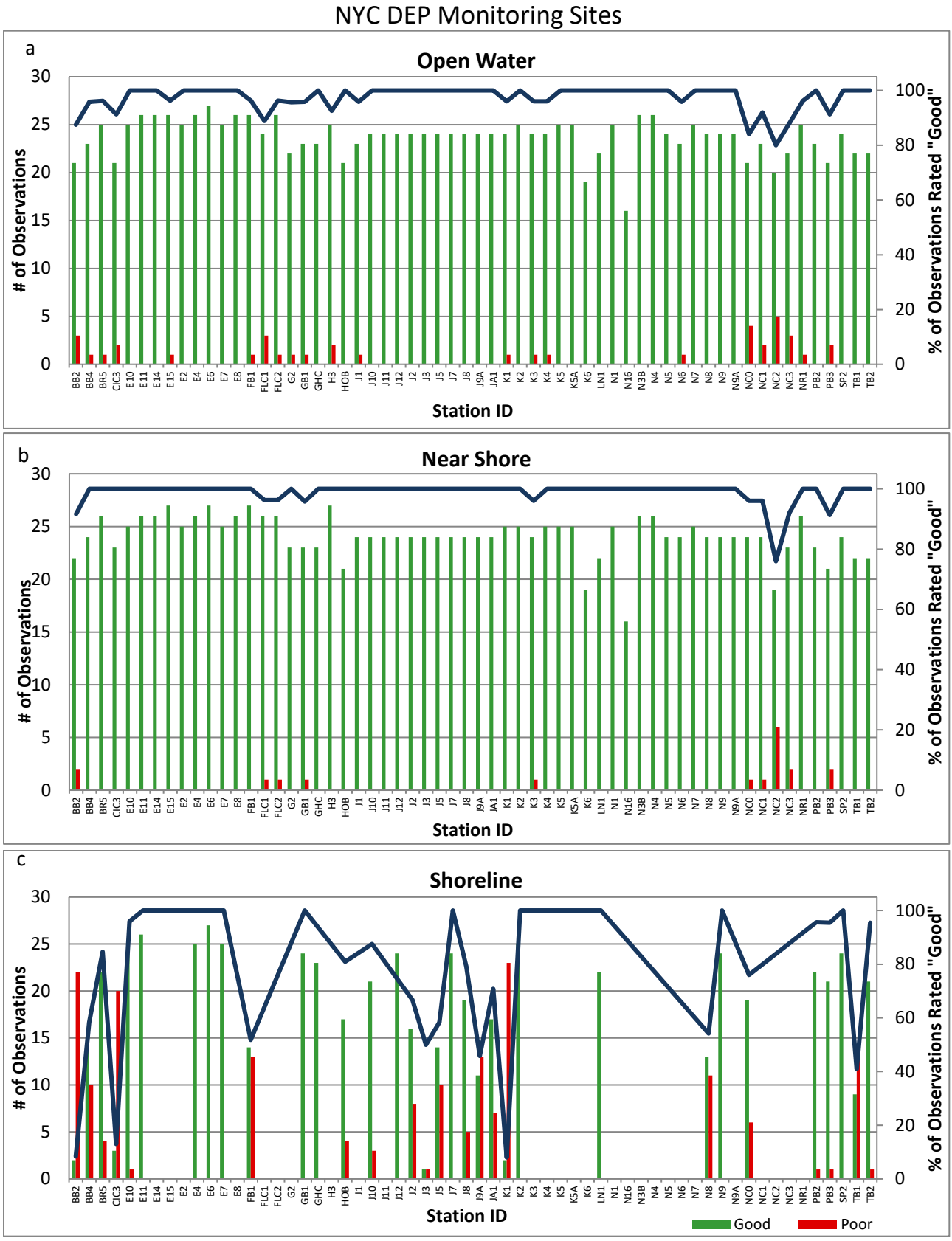


Figure 10a-c. A 2-point rating system for the 3 categories of NYC DEP monitoring. Total observations in 2017 were rated as "Good" or "Poor" and tallied. Some sites in the shoreline category received no ratings due to permanent bulkheads or shore was too far from the boat to view.

Public Participation Monitoring Sites

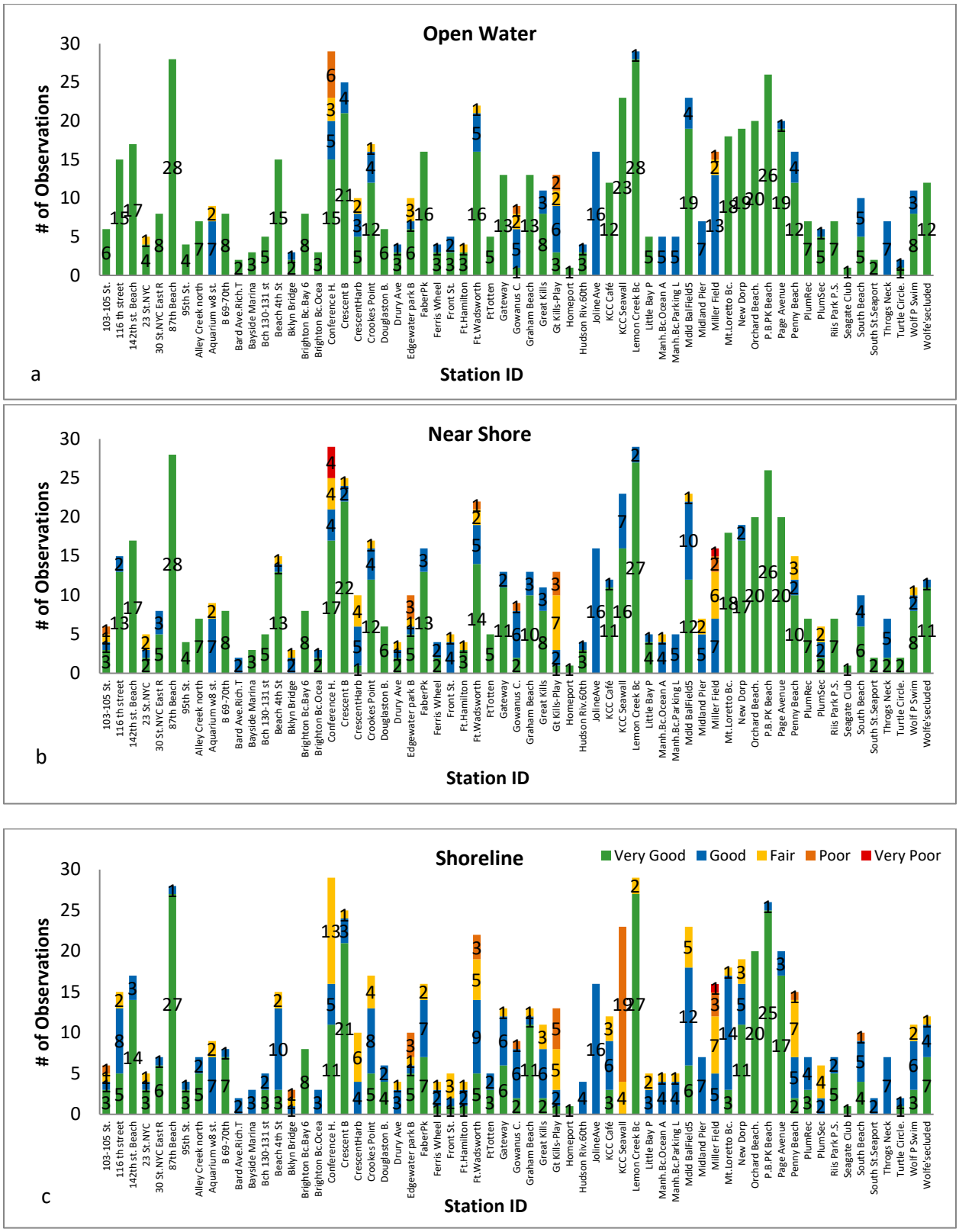


Figure 11a-c. A 5-point rating system for the 3 categories of public participation monitoring.

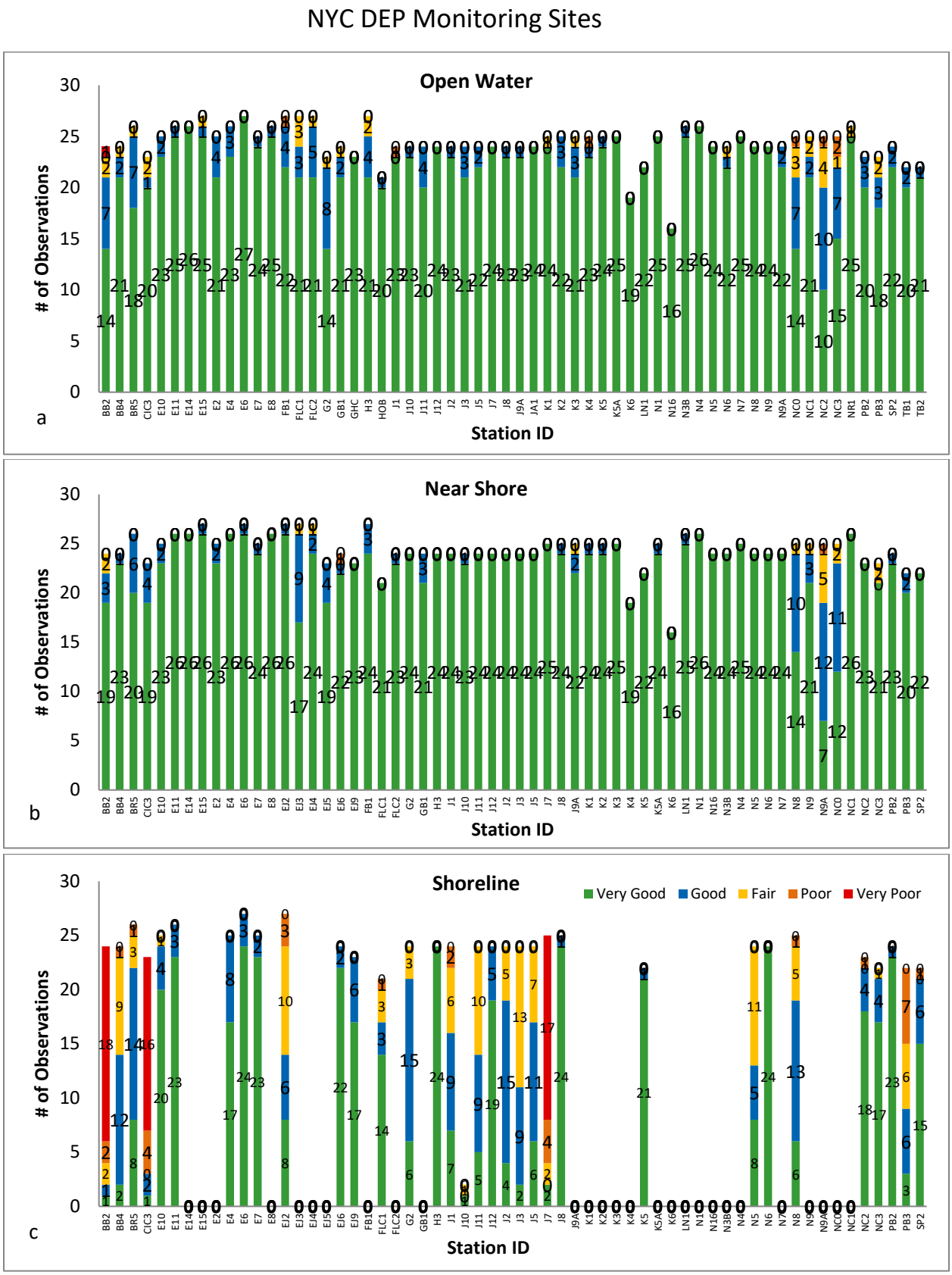


Figure 12a-c. A 5-point rating system for the 3 categories of NYC DEP monitoring. Some sites in the shoreline category received no ratings due to permanent bulkheads or the shore was too far from the boat to view.

RAINFALL ANALYSIS

As part of the floatables monitoring program, additional screening level data analyses were conducted in order to get a sense of how the floatables condition ratings could be used. Given the variable nature of the sites involved and the somewhat subjective nature of the rating system, the floatables condition ratings were never intended to do any more than provide a systematic manner in which to help prioritize areas of New York Harbor with regard to floatables control planning purposes. However, investigating the data to see if any patterns exist has been useful in providing insight into the results of the site specific investigations and other portions of the program.

This section summarizes findings based on monitoring data from 2017 with regard to the association of ratings with monthly rainfall totals. Figure 13 shows the percentage of each rating category in each month. Rainfall totals are displayed in the background. Rainfall remained at more moderate totals after the record breaking totals in 2011. In 2017, it generally appears that the percentage of "Very Good" ratings decreased and "Fair" ratings increased in the early summer when there was a very rainy May. Because of the relatively small numbers of Poor and Very Poor ratings it is difficult to detect any predictive trend in these data.

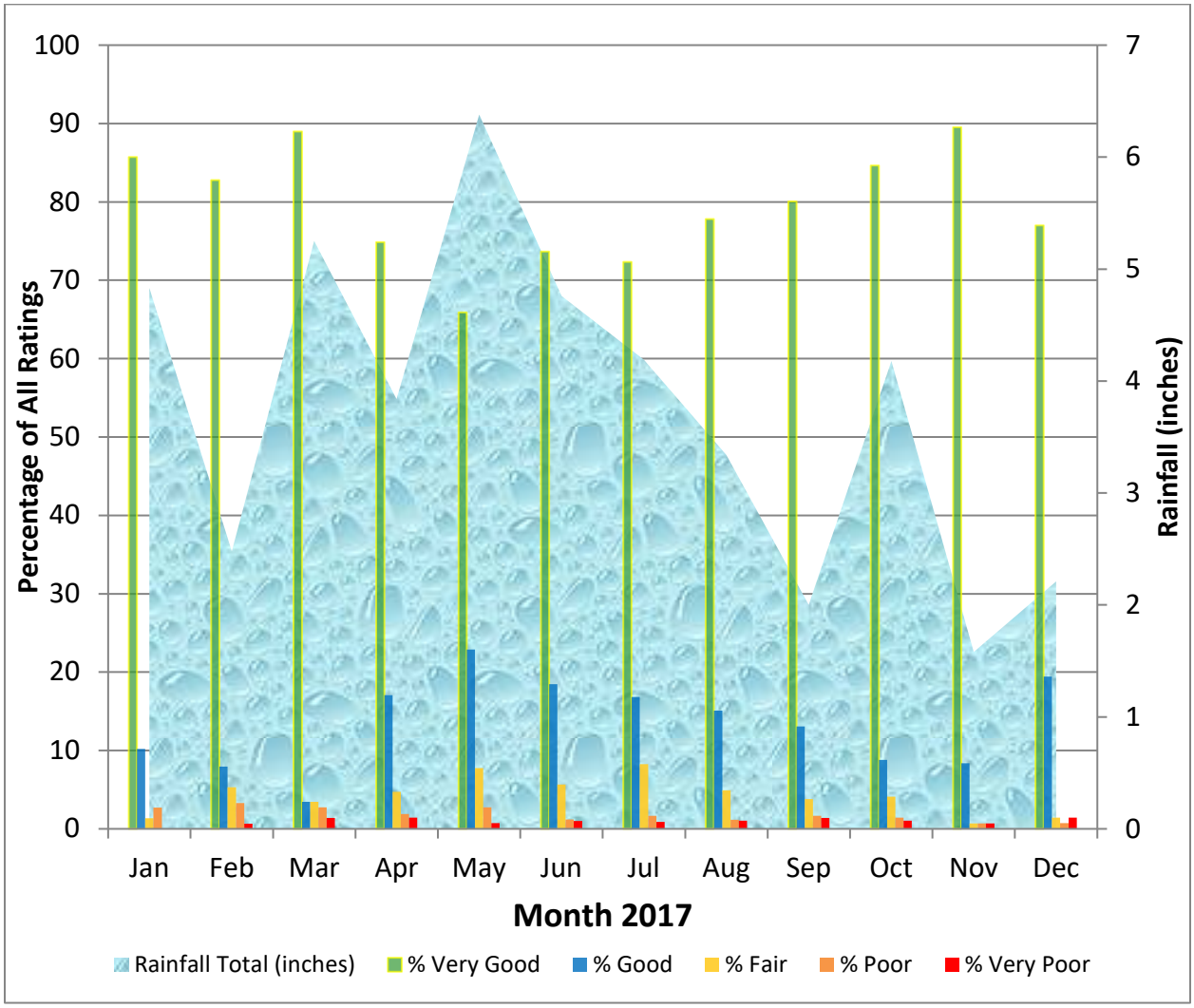


Figure 13. Monthly ratings and rainfall comparison. Rainfall data are from N.O.A.A. online weather data (Central Park Area, http://www.weather.gov/okx/CentralParkHistorical).

SITE SPECIFIC INVESTIGATION STUDY

INTRODUCTION

As part of the Floatables Monitoring Program, site-specific investigations were conducted for the monitoring sites that had the most persistent poor floatables condition ratings based on monitoring data collected in 2016 (i.e., NC2 midway point in Newtown Creek, BS90 Inwood Marina and PB3 mouth of Paerdegat Basin see Figure 14). To date, the investigations have included document and database reviews and field observations during dry- and wet-weather. The overarching goal of this year's site specific investigations was to gain insight into the sources of floatables and other debris at the selected sites in order to inform planning within the framework of the City-wide Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP). The investigations were able to provide a step toward this goal and initial findings have confirmed that the floatables conditions at each site were impacted by several types of debris from several types of sources.

Summarized progress information, investigation methods, and findings are presented in the following sections with the purpose of describing the approach the New York City Department of Environmental Protection (NYCDEP) has taken to advance this portion of the floatables monitoring program. In addition, general methods for conducting the investigations as well as compiled data and information gathered as a result of the investigations are provided.

In the sections that follow, the classification of CSO vs. non-CSO debris is addressed by describing the use of material characterization and source inference to make this distinction, and also recognizing the overlap of debris sources that adds to the complexity of this issue.

Figure 14. The 3 sites selected for the site specific investigation study in 2017.

OBJECTIVES

The objectives of the site-specific investigations include the following near-term goals:

- **Study area characterization, including proximal floatable control programs:** The characterization of the study area surrounding the selected monitoring site was intended to identify traits that may influence debris, such as land use; CSO and litter control mechanisms and practices; sewer system components; and CSO and storm outfall locations, physical characteristics, and drainage areas.
- **Floatable and debris materials characterization:** By categorizing and enumerating the discarded material found at a site, the influence of the different types of material on the floatables condition rating in the Off Shore, Near Shore, Shoreline and Upland areas and the influence on upland conditions was generally determined with regard to relative magnitude. Because the condition ratings as well as the general aesthetics of an area are affected by the presence of all types of discarded material, not just waterborne floatables, debris ranging from sunken, derelict pier pilings to upland litter were included in the material characterizations.
- **Investigation of floatables and debris sources:** Following from the debris and study area characterizations, a sense of debris sources and their relative degrees of influence was reasonably determined through inference. Although not necessarily definitive due to overlapping sources (e.g., street litter from CSO outfalls or shoreline littering) and the lack of observed active deposition (e.g., illegal dumping caught in the act), source identification of this sort may help to prioritize further investigations and/or rule out certain sources.

Other, longer term objectives of the program include:

- **Correlation of rating trends to floatables control programs where applicable:** Using the information gained in the study area and material characterizations and the material source investigations, an association of floatables rating trends to control programs may be made in some, but not all, cases. Additional work will be necessary to complete this objective.

- **Initiation of appropriate remediation planning where feasible:** The information developed through the achievement of the near-term goals was fed into the LTCP in order to help inform control program planning, as necessary and appropriate.

METHODS

The site investigations conducted to date focused on the three near term objectives listed above. Methods for each are described below.

Study Area Characterization, Including Proximal Floatable Control Programs

Data reviews were conducted for study areas surrounding each of the study sites. Reviews included the following information and were conducted for the primary area immediately adjacent to the sites and for the secondary study area encompassed by the regulated combined sewage drainage area(s) that contribute flow to the waterbody. Data sources included readily accessible data and documents produced by the New York City Department of City Planning and GIS databases maintained as part of the New York City Department of Environmental Protection CSO LTCP project.

- Land use
- Zoning
- Sewer system components (e.g., regulators, outfalls, catch basins)
- Sewer system characteristics (e.g. combined, separate, direct drainage)
- Lot ownership (primary study area only)
- General character

Site characterization data was confirmed, in general, as part of field investigations, and additional information was noted such as the general cleanliness of the primary study area with regard to litter.

Floatables and Debris Material Characterizations

Materials characterizations were conducted in the field by observing, counting, and categorizing debris items within the count area. Descriptions of the count area and the categorization of items are provided below.

Count Area Delineation

The delineation for each count area for each site was determined by what could reasonably be seen and identified from the monitoring site landside vantage point. Given the variability of the sites with regard to existence of shoreline and bulkhead areas, readily available access to the sites, access to the shoreline area, and the existence of view obstructions, this “line of sight” delineation proved most useful for the objectives at hand. Standard delineations, such as sampling uniform grids across all the sites were considered during the pilot phase, but found impractical. Delineations are represented in Figures 15-17.

Material Categorization

Item counts were initially categorized in the field by material type according to a data sheet adapted from the International Coastal Cleanup (ICC). The ICC is a yearly event sponsored by the Ocean Conservancy where volunteers count and remove trash and debris from beaches worldwide, including many in New York City. The ICC data sheets and categorization system are widely recognized and were selected for use to allow for future data comparisons with ICC events, if warranted.

ICC major categories used on the site investigation field data sheet included Shoreline/Recreational Activities/Street Litter, Ocean/Waterway Activities, Dumping Activities, and Medical/Personal Hygiene. In addition, two new categories, Natural Material and Derelict Pier/Bulkhead Material, were added during 2007. Most items within each category were terms from the ICC data sheet. Some terms were modified forms of the ICC terms, and others were terms that were added to the lists, based on observations from preliminary site visits in February 2007. These changes in ICC terms were made in order to put the data collection into the context of the floatables monitoring program.

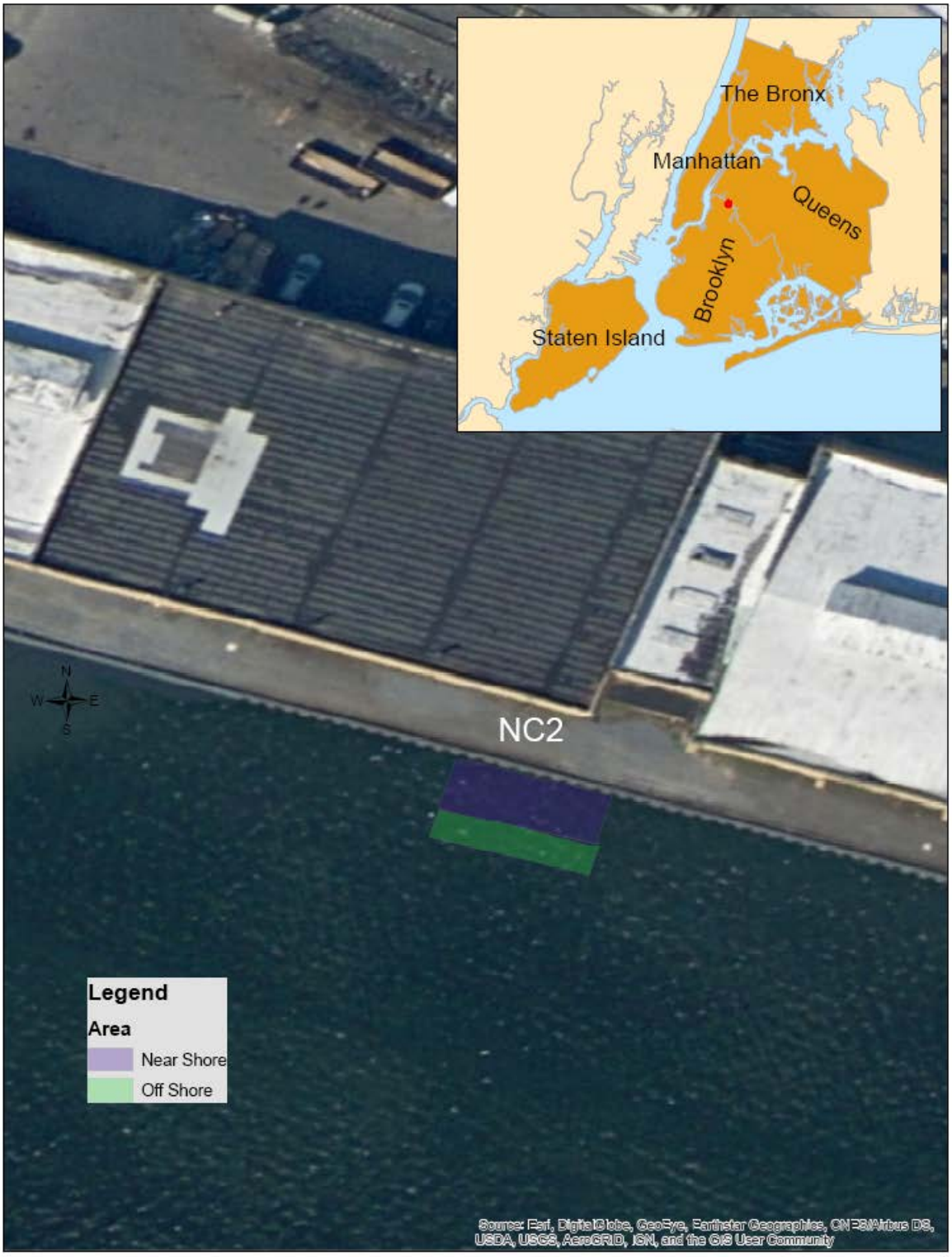


Figure 15. Debris sample zones at Newtown Creek, Queens (NC2).

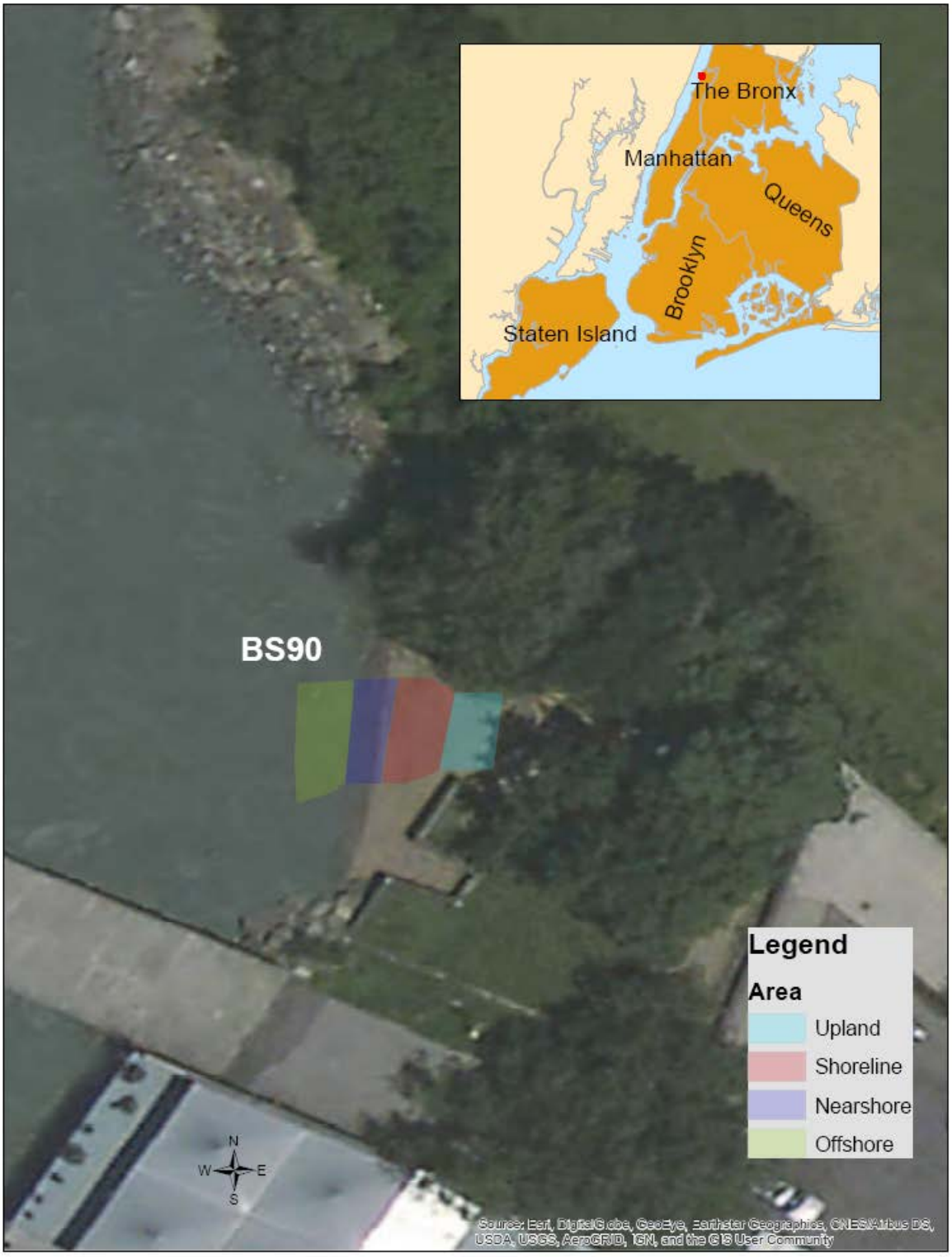


Figure 16. Debris sample zones at Inwood Marina on the Hudson River, Manhattan (BS90).

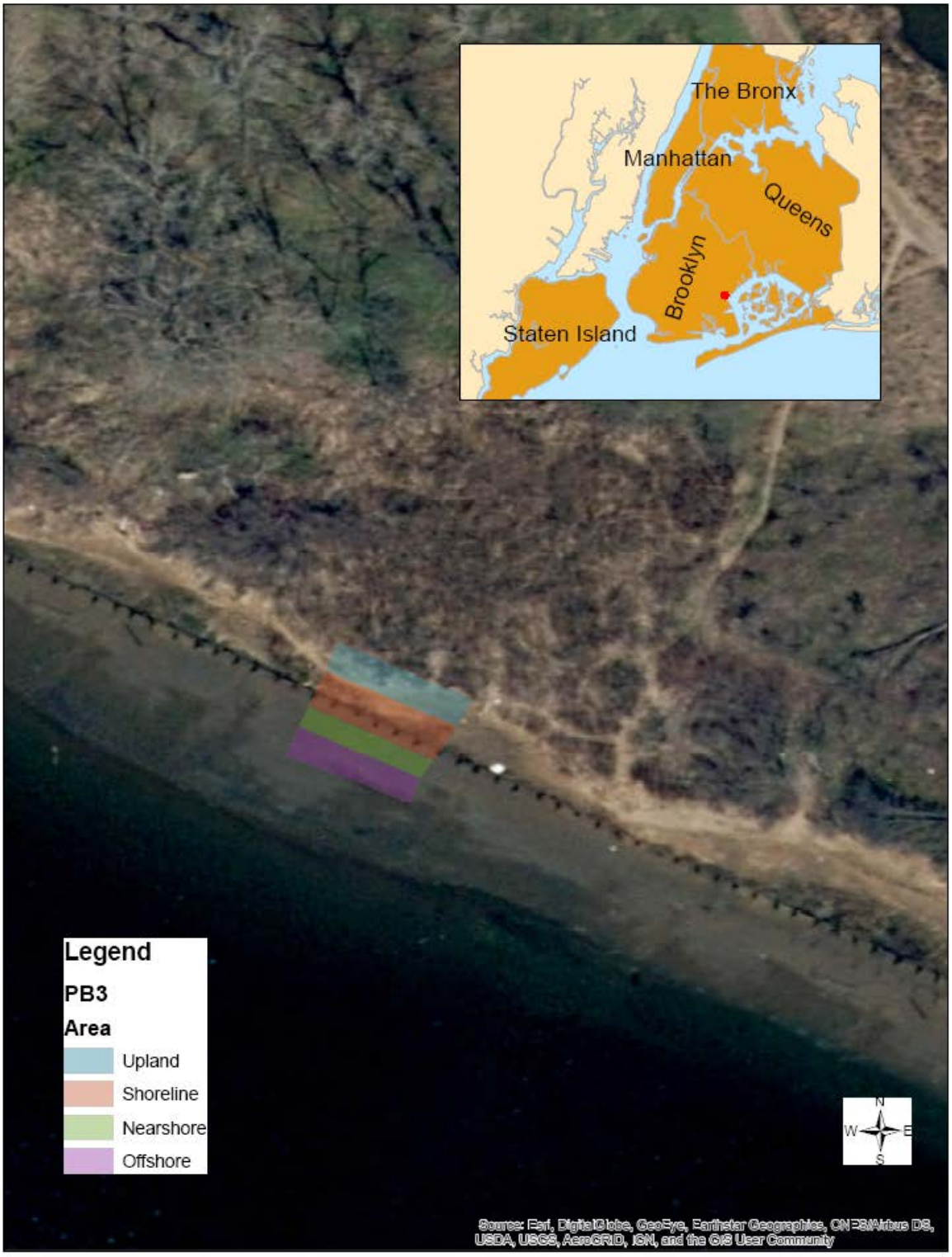


Figure 17. Debris sample zones at Paerdegat Basin, Jamaica Bay (PB3).

The following bullet points summarize the count categories and provide alternative names in parenthesis that are more relevant to the context of this study.

Shoreline, Recreational Activities & Street Litter: This category includes debris characteristic of municipal solid waste items generally found on streets in sidewalk litter baskets. The category comprises numerous items such as food wrappers, beverage containers, newspapers, and household items. The ICC category of Smoking-Related Activities, cigarette butts and cigarette packaging, was added to this category.

- **Ocean/Waterway Activities (i.e., Marine/Boating Activities):** Items such as nets, line, buoys, and fishing gear were included in this category.

- **Dumping Activities (i.e., Construction and Demolition Debris (C&D) and Automotive Items):** Discarded building materials, such as dry wall, block, stone, siding, metal conduit, plumbing, and used lumber were considered part of this category along with tires, axles, doors, spark plugs, batteries, and other car parts. Full, 30+ gallon trash bags were also part of this category.

- **Medical/Personal Hygiene:** Items such as condoms, tampon applicators, syringes, and diapers were included in this category.

- **Derelict Pier and Bulkhead Material:** Debris, such as planks and pilings, that were likely to have originated from the decay of wooden piers and bulkheads comprise this category.

- **Natural Material**: Debris such as seaweed, grasses, leaves, sticks, logs and other natural items comprise this category.

Item counts were also categorized by location according to the three of the four floatables condition rating system categories, Off Shore, Near Shore, and Shoreline. An Upland category was also included. The Open Water category was excluded (water-based survey); the site specific investigations were done from land-based observations. A section on the data sheet also included areas for the user to record certain data about the tide and weather at each site, including the tide stage, time, temperature, precipitation, and wind direction.

Investigation of Floatables and Debris Sources

In order to associate materials with sources, field observers inferred a material's source from its characteristics and/or its location. Although related to the item categories based on the ICC data sheets, this source categorization was deemed necessary due to the overlap of sources for certain materials, most notably street litter. For instance, the hypothetical waterborne beverage bottle vs. an upland beverage bottle share similar characteristics as street litter, but their sources could be different.

The possible sources of each material category are described below. It is noted that many of these sources may overlap – different source categories may contain some of the same items.

- **CSO Discharge:** The presence of floatables comprised of items characteristic of Street Litter (i.e., Shoreline and Recreational Activities) and Medical/Personal Hygiene items were considered to suggest CSO discharge as a potential source.

- **Illegal Dumping:** Items characteristic of bulk Street Litter, bulk Natural Material, C&D, and Automotive (i.e., Dumping Activities) items have been associated with illegal dumping. Depending upon the site, illegal dumping influences waterbodies through the direct dumping of material into the waterbody (e.g., a tire thrown over a bulkhead) and possibly through the wind dispersal of items from land to the water.

- **On-Land Littering:** Items characteristic of Street Litter, Marine Litter, and Medical/Personal Hygiene products have the potential to enter waterbodies through direct human deposition onto the shoreline and/or into the water and through possible wind or runoff dispersal of lighter items deposited upland. On land littering also includes items discharged by stormwater outfalls in the case of water borne debris.

- **Marine Dumping/Littering:** Items characteristic of Street Litter, Marine Litter and Medical/Personal Hygiene products have the potential to enter waterbodies through direct deposition from boats or marinas.

- **Natural Deposition:** Natural materials, such as tree limbs, leaves, and reeds, have the potential to be deposited in the water or on shore as a result of natural activities including storms, deciduous leaf cycles, and seasonal plant life cycles.

- **Pier/Bulkhead Decay:** Derelict Pier and Bulkhead Debris including such items as waterlogged planks and pier pilings have been inferred to have been deposited as a result of pier and bulkhead decay.

In order to simplify the source categorization, especially given the overlapping sources, these categories of items were further classified during data compilation and analysis as Possible CSO, Non-CSO, or Unknown. Possible CSO includes items in the Street Litter and Medical/Personal Hygiene categories. Non-CSO Material includes items in the Illegal Dumping, On-Land Littering, Marine Dumping/Littering, Natural Deposition, and Pier/Bulkhead Decay categories.

SITE CHARACTERIZATION RESULTS

Midway Newtown Creek (NC2)

This site is approximately the midway point of the Newtown Creek (between the Kosciuszko and Greenpoint Ave. bridges) in Queens. The creek here is bulkheaded and the majority of the surrounding area is industrial and commercial use (Fig. 19). Figure 20 shows many CSOs along the creek as well as the plant outfall. Floatables that are in creek can often remain for many tidal cycles as the water is not easily flushed out.

Figure 18. Newtown Creek (NC2) sampling zones. Left: near shore zone. Right: offshore zone.

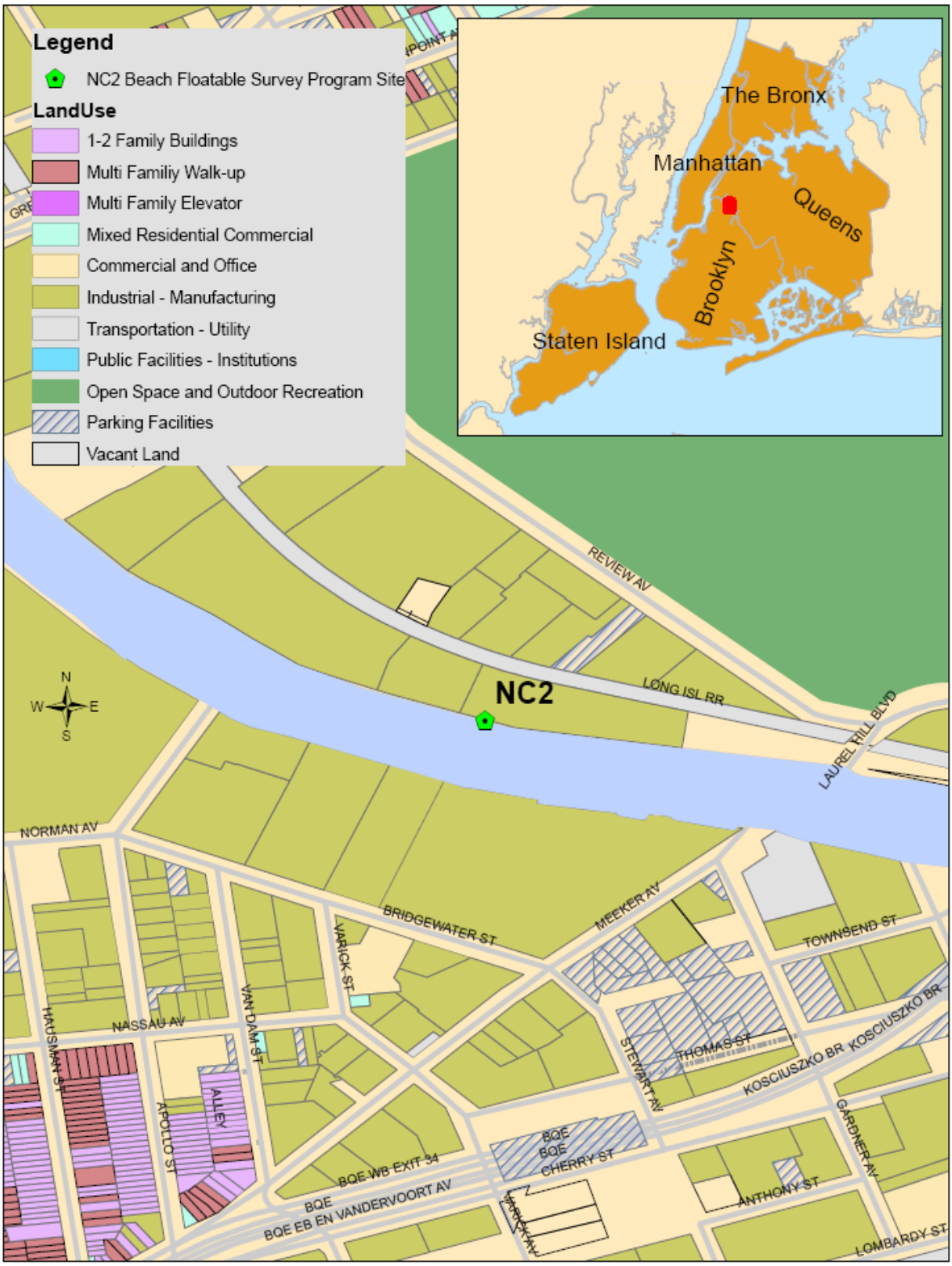


Figure 19. Land use map of the Newtown Creek (NC2) area.

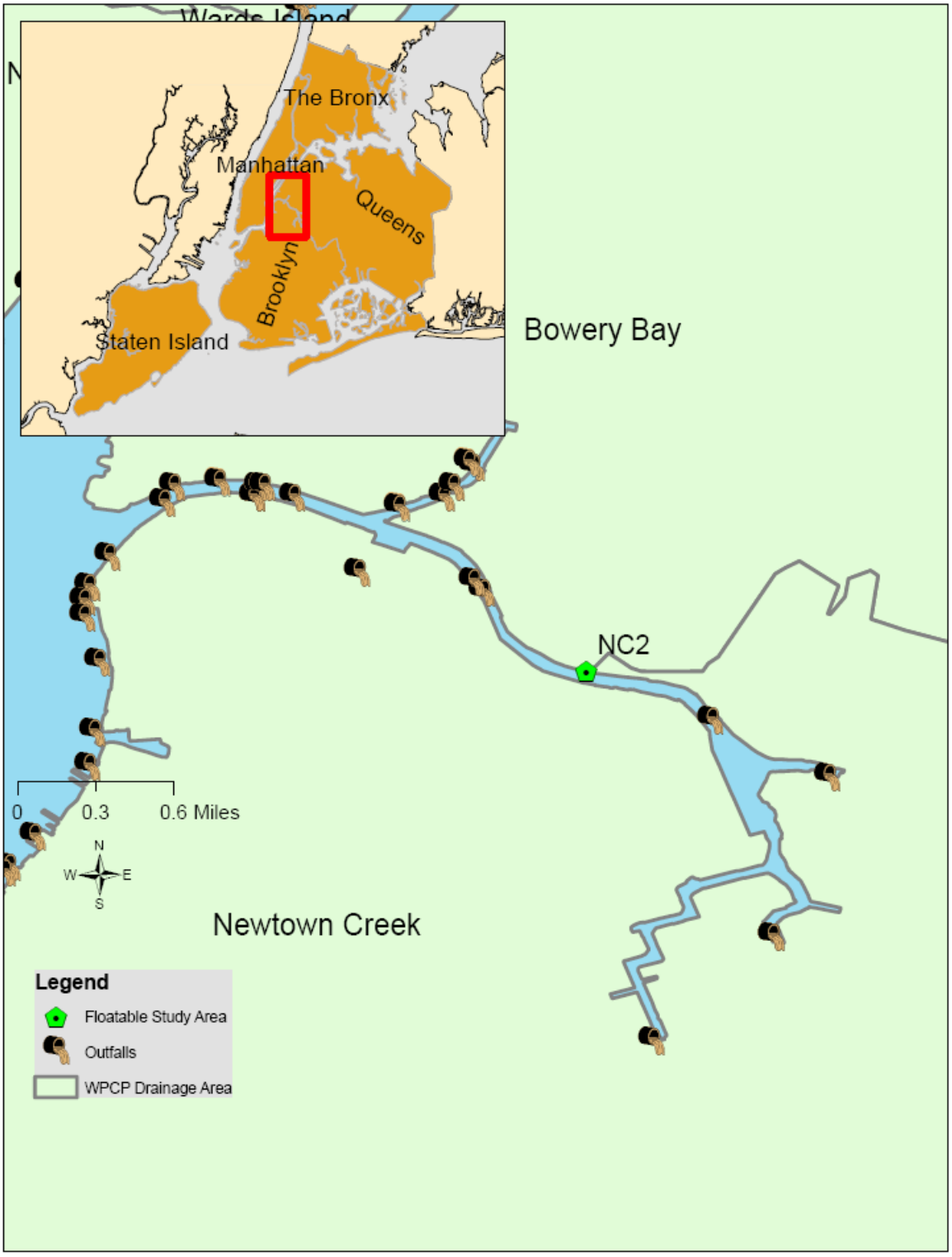


Figure 20. Drainage Area map of the Newtown Creek (NC2) area. The site drains to Bowery Bay Plant.

Inwood Marina, Hudson River (BS90)

This area is a small boat ramp with benches next to a restaurant at the end of Dyckman St. in Inwood, Manhattan. Surrounding this area is city park land with residential buildings beyond that (Fig. 22). There is a large CSO pipe directly adjacent to the sample site (Figs. 21 & 23). There are also many CSOs in the Harlem River which feeds into the Hudson north of Inwood.

Figure 21. Inwood Marina sampling zones. Top: near shore zone. Bottom left: shoreline and upland zones. Bottom right: CSO sign.

Figure 22. Land use map for Inwood Marina (BS90).

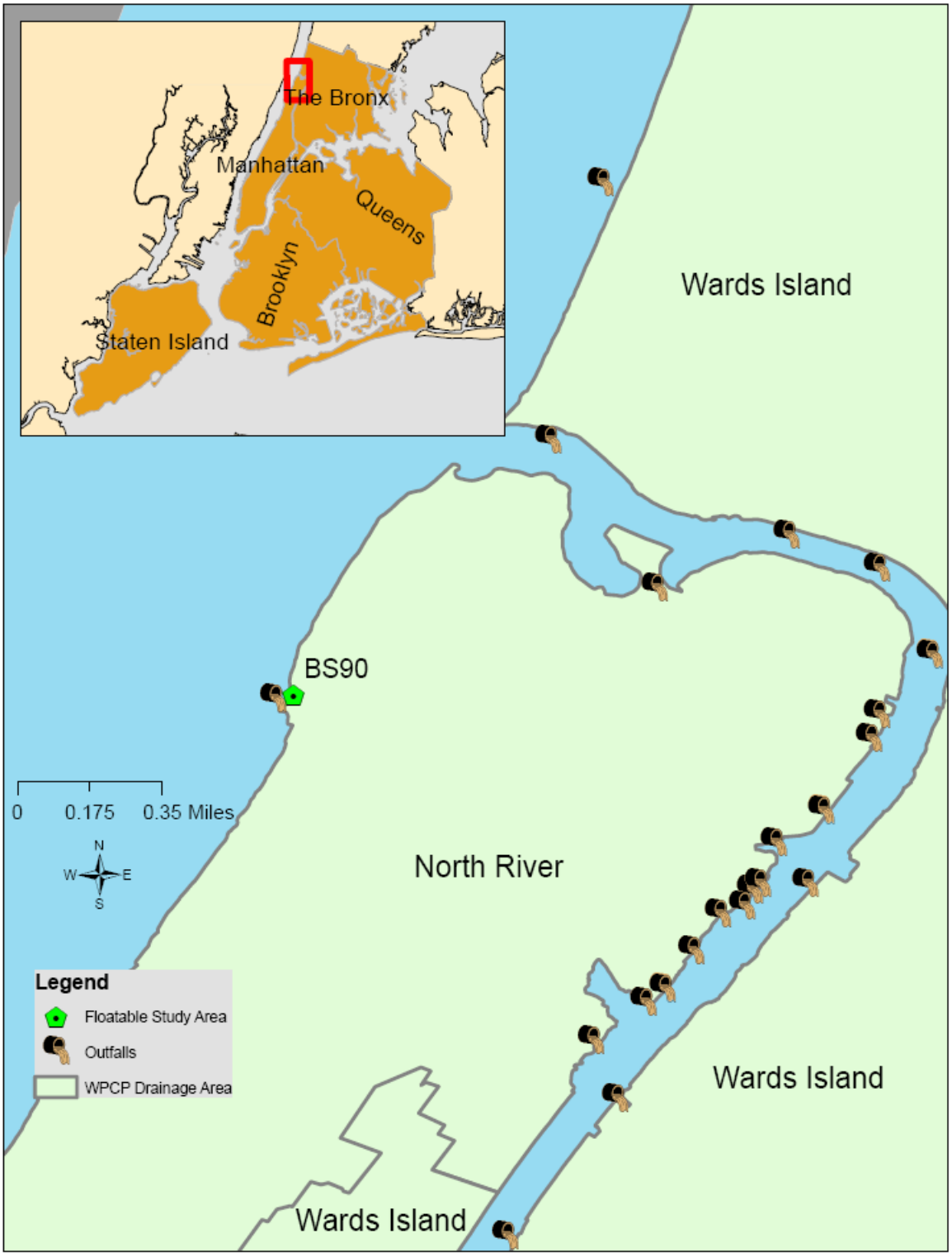


Figure 23. Drainage Area map of Inwood Marina (BS90). The site drains to North River Wastewater Treatment Plant.

Paerdegat Basin, Jamaica Bay (PB3)

This site is just to the north of the Belt Parkway where it crosses Paerdegat Basin. The shoreline is accessible via Canarsie Park, Brooklyn. The site is surrounded immediately by the park to the northeast with residential areas beyond (Fig. 25). There are 2 CSOs at the head of the basin and the area drains to the Coney Island WPCP (Fig. 26).

Figure 24. Paerdegat Basin sampling zones. From top-left clockwise: shoreline, shoreline and upland zone, upland zone detail, nearshore bulkhead.

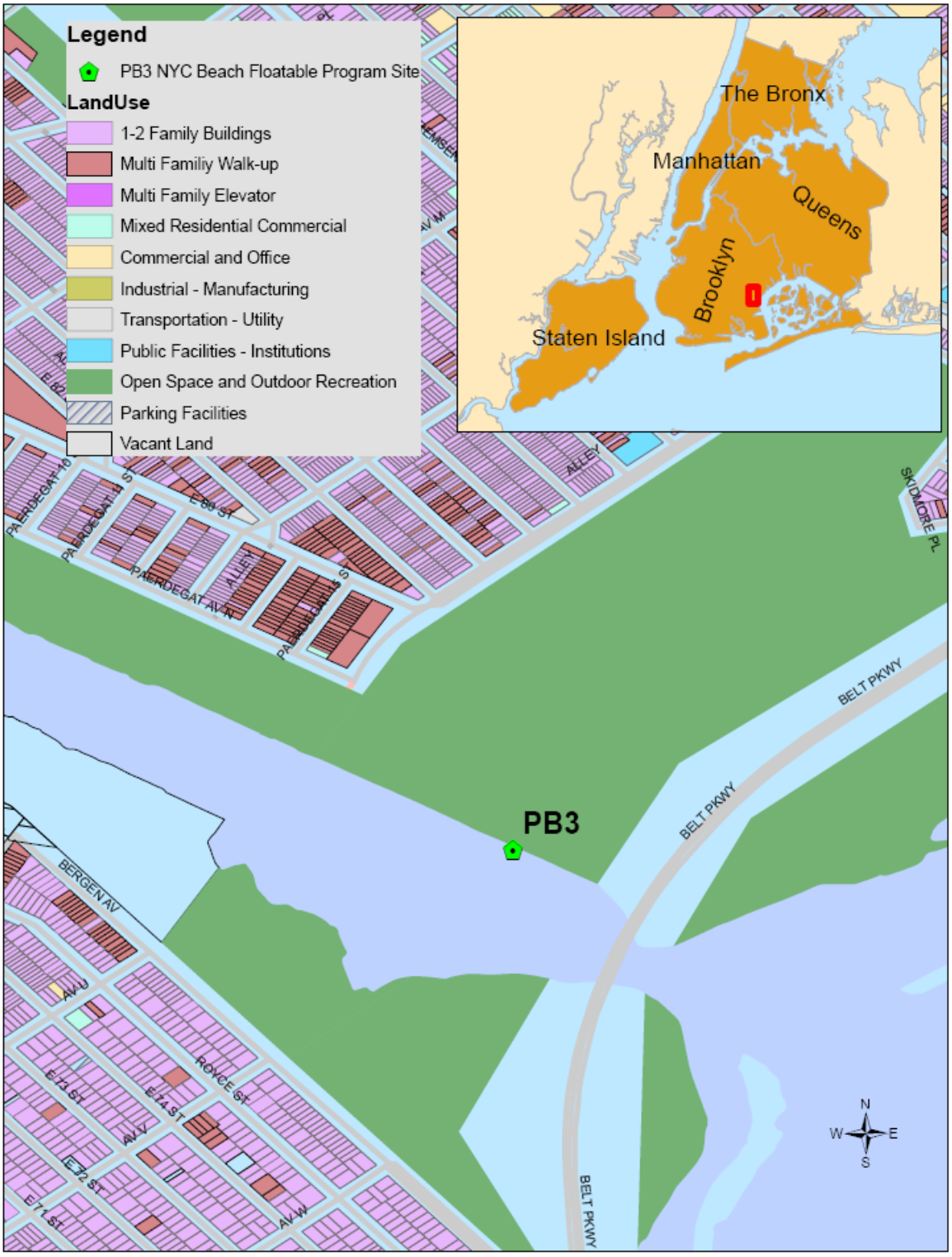


Figure 25. Land use map of the Paerdegat Basin (PB3) area.

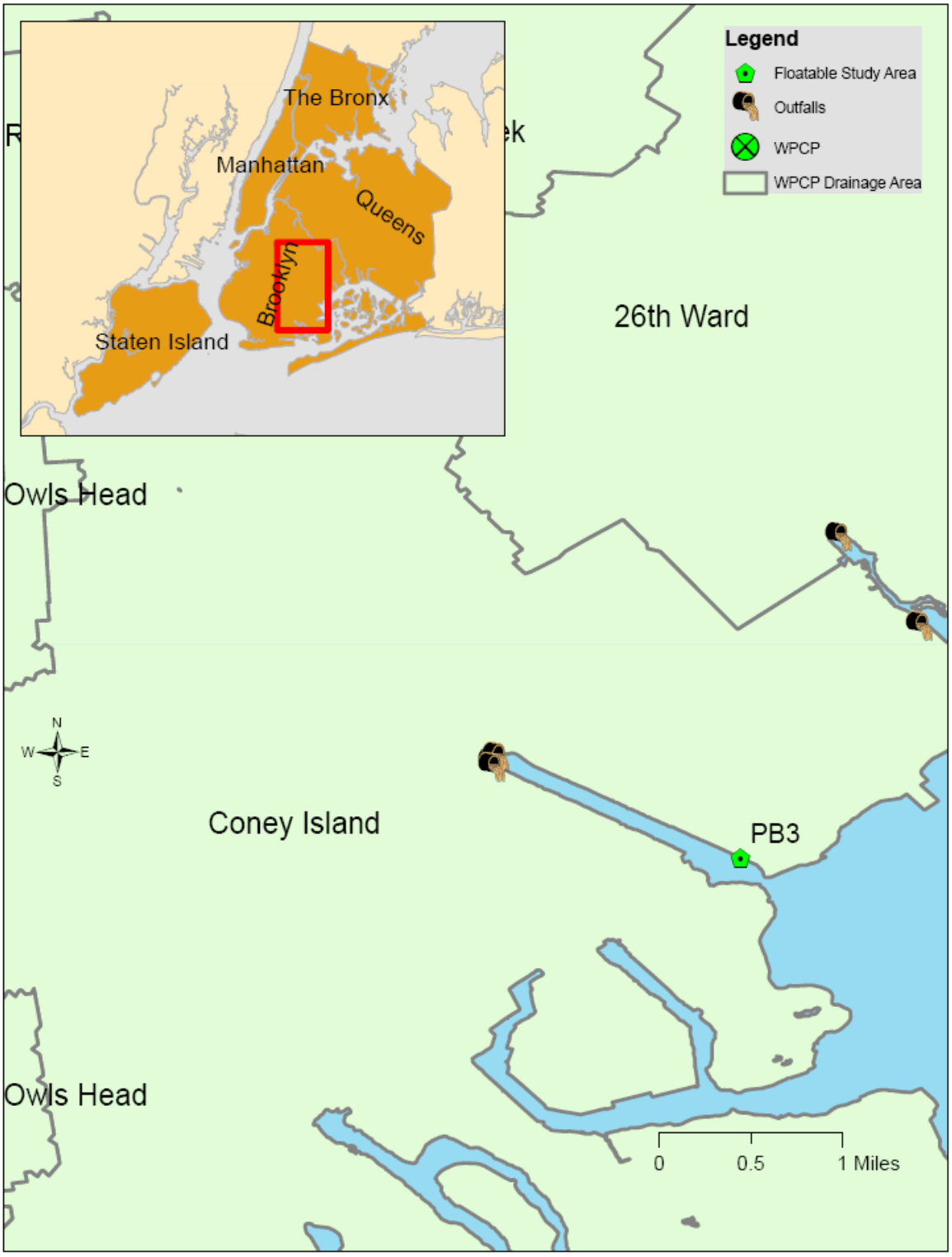


Figure 26. Drainage area map of the Paerdegat Basin (PB3) area. The site lies in the Coney Island WWTP drainage basin.

OBSERVATION NOTES

June 30, 2017 Conditions

All three sites were visited between 8:30am and 11:30pm. The temperature was in the high 70's °F to low 80's °F throughout the morning. There was no precipitation and light winds from the NW. The tide was low and ebbing in Newtown Creek and flooding in the Hudson River at the time of sampling Inwood Marina. There was a lot of clamshells at PB3 and much broken glass at Inwood Marina (BS90).

July 28, 2017 Conditions

All three sites were visited between 9am and 11:30am and the temperature was in the high 70's F with no precipitation at the time. Winds were out of the northeast and the tide was low and flooding in Newtown Creek and high at Paerdegat Basin. Again, there was a lot of broken glass on the shoreline at Inwood Marina.

October 30, 2017 Conditions

All three sites were visited between 10:00am and 12:15am and the temperature was in the low to high 50's °F with no precipitation and winds out of the WNW. The tide was low and ebbing in Newtown Creek and low and flooding at Paerdegat Basin. 3.03 inches of rain was recorded at Central Park on 10/29/17. These samples would be a good indication of possible combined sewer overflow effects on floatable debris.

MATERIAL COUNTS AND DISCUSSION

Tables 5-13 are the field sheets for each site on each sampling date. These sheets show the individual counts of debris items at the site specific zones. Figures 27-29 then associate a possible source to these debris items.

Midway into Newtown Creek (NC2)

Figure 27 summarizes the debris count sources at the Newtown Creek site in 2017. There was very little debris here, mostly natural deposition and some litter. Since the site is bulk-headed with no shoreline zone, floatable debris does not remain after the tide moves it. All of the debris here lies in the near shore zone (Fig. 27a). The rain event on 10/30/17 appeared to result in more natural debris most likely from runoff.

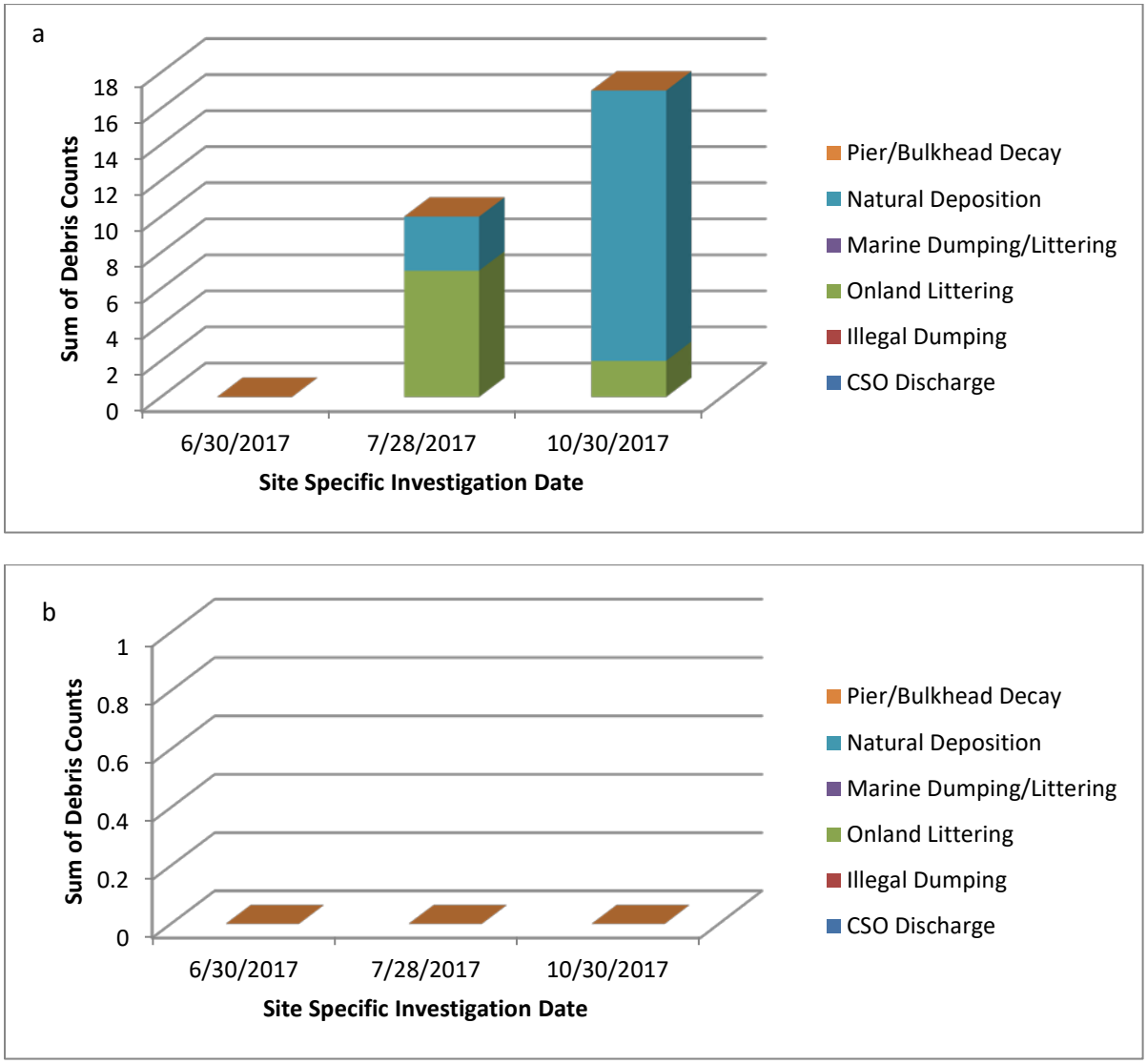
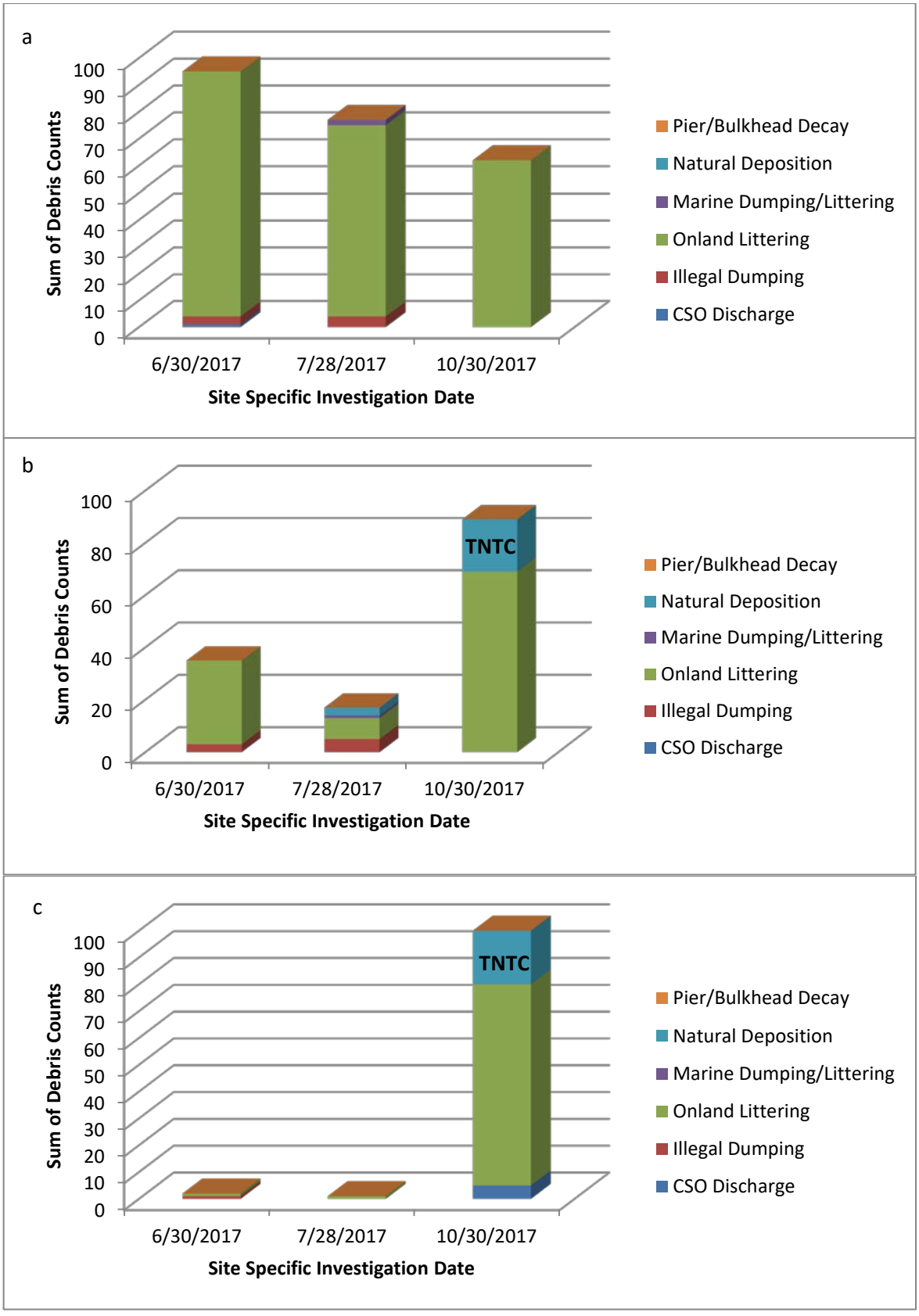


Figure 27. Newtown Creek debris source counts in the near shore (a) and offshore (b) zones. 10/30/17 was a wet weather sampling day.

Inwood Marina on the Hudson River (BS90)

Figure 28 summarizes the debris count sources at Inwood Marina in 2017. Being that the area is visited often by the public, the majority of all debris here originated from onland littering, with a couple instances of natural debris counts being too numerous to count. The upland zone contained the most debris (Fig. 28a) with the nearshore and offshore zones only resulting in debris counts after the rain event on 10/30. This event coincided with high instances of natural deposition and some evidence of CSO discharge (Fig. 28c).


a
Sum of Debris Counts
100
90
80
70
60
50
40
30
20
10
0
6/30/2017
7/28/2017
10/30/2017
Site Specific Investigation Date
Pier/Bulkhead Decay
Natural Deposition
Marine Dumping/Littering
Onland Littering
Illegal Dumping
CSO Discharge
b
Sum of Debris Counts
100
80
60
40
20
0
TNTC
6/30/2017
7/28/2017
10/30/2017
Site Specific Investigation Date
Pier/Bulkhead Decay
Natural Deposition
Marine Dumping/Littering
Onland Littering
Illegal Dumping
CSO Discharge
c
Sum of Debris Counts
100
90
80
70
60
50
40
30
20
10
0
TNTC
6/30/2017
7/28/2017
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Site Specific Investigation Date
Pier/Bulkhead Decay
Natural Deposition
Marine Dumping/Littering
Onland Littering
Illegal Dumping
CSO Discharge

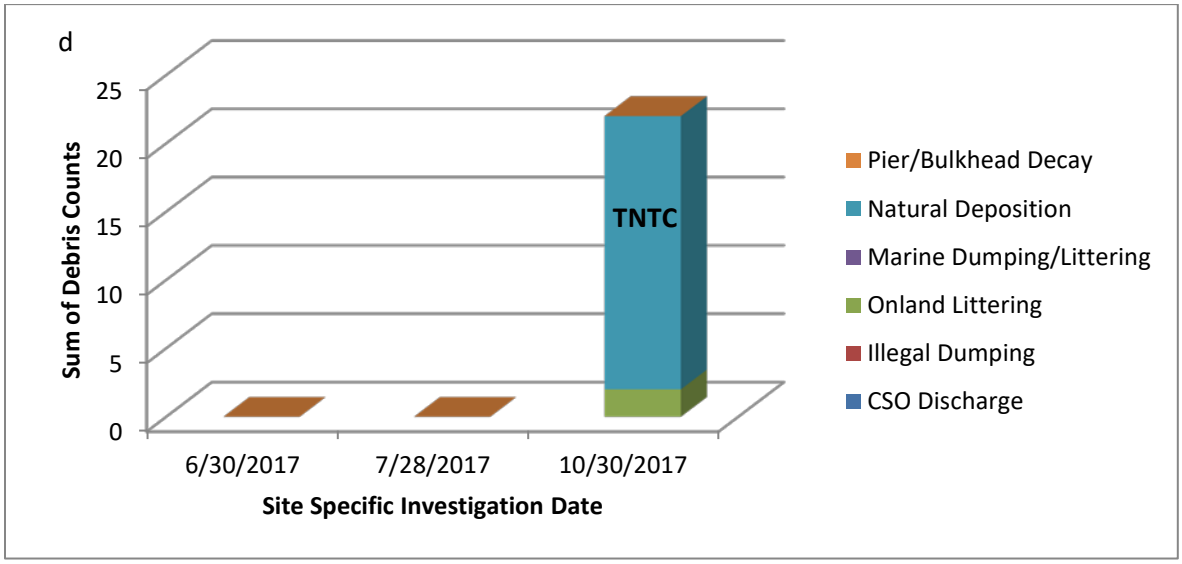

Figure 28. Inwood Marina debris source counts in the upland (a), shoreline (b), near shore (c) and offshore (d) zones. 10/30/17 was a wet weather sampling day.

Mouth of Paerdegat Basin (PB3)

Much of the debris at this site is from onland littering with some evidence of illegal dumping (Fig. 29). Although there was heavy rain prior to the sampling on 10/30/17, there does not appear to be a notable increase in debris or a shift in the sources. Most of the debris was sampled in the upland zone (Fig. 29a). This area seems to be popular for fishing and possibly illegal camping. There is a bulkhead here that can be submerged during very high tides which acts to capture floating debris.

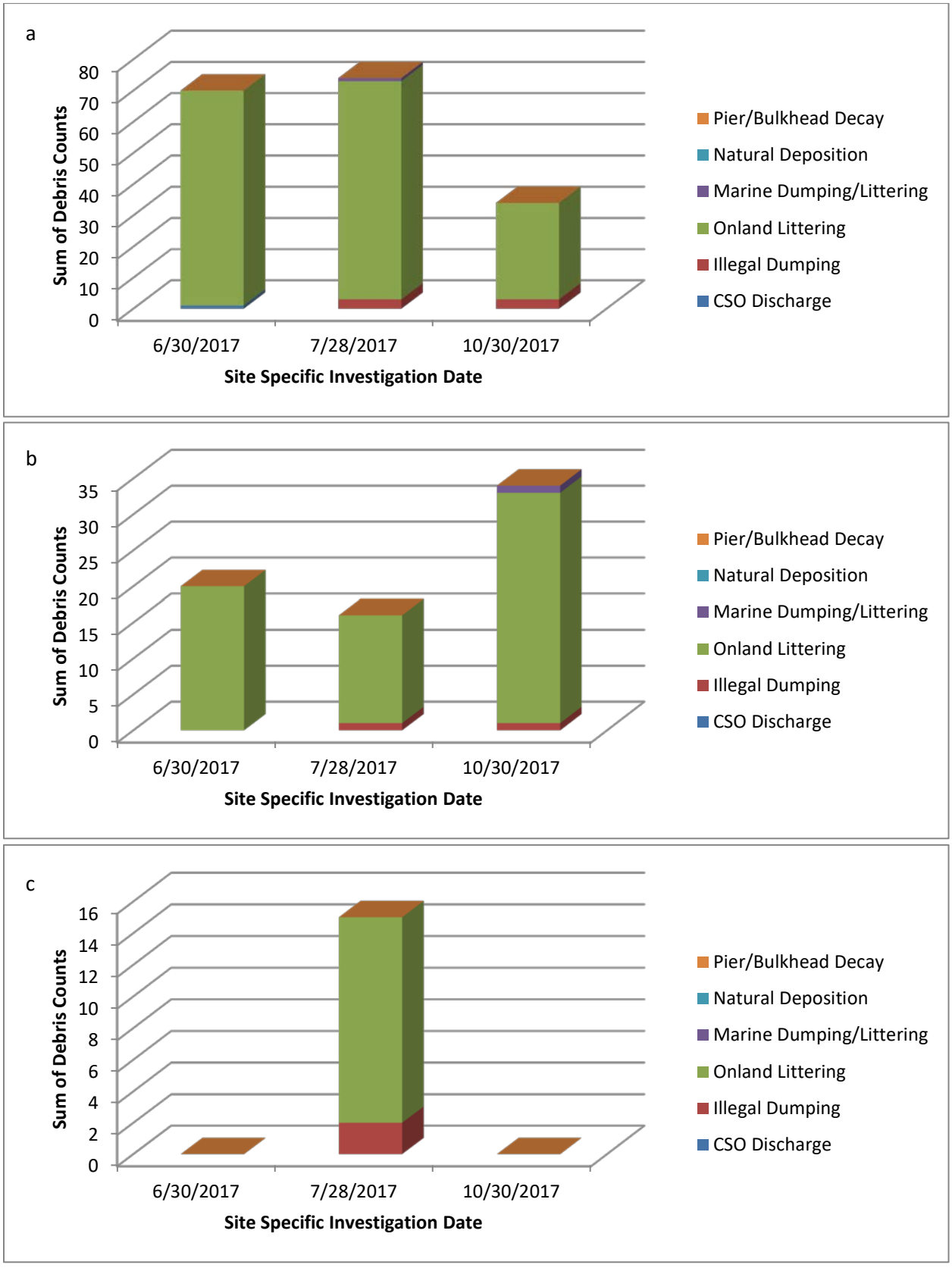

Figure 29. Paerdegat Basin debris counts in the upland (a), shoreline (b), near shore zones (c). There were no debris recorded in the offshore zone.

Table 5. Newtown Creek (NC0)
6/30/17 Debris Count Data

Item Description	Category	Upland	Shoreline	Near Shore	Off Shore
Bait Containers/Packaging *	Ocean/Waterway Activities				
Bleach Bottles	Ocean/Waterway Activities				
Buoys/Floats *	Ocean/Waterway Activities				
Crab/Lobster/Fish Traps *	Ocean/Waterway Activities				
Crates *	Ocean/Waterway Activities				
Fishing Line *	Ocean/Waterway Activities				
Fishing Lures/Light Sticks *	Ocean/Waterway Activities				
Fishing Nets *	Ocean/Waterway Activities				
Light Bulbs/Tubes	Ocean/Waterway Activities				
Oil/Lube Bottles *	Ocean/Waterway Activities				
Other ^	Ocean/Waterway Activities				
Pallets *	Ocean/Waterway Activities				
Plastic Sheeting/Tarps *	Ocean/Waterway Activities				
Rope *	Ocean/Waterway Activities				
Strapping Bands	Ocean/Waterway Activities				
Condoms *	Medical/Personal Hygiene				
Diapers *	Medical/Personal Hygiene				
Other ^	Medical/Personal Hygiene				
Syringes *	Medical/Personal Hygiene				
Tampons/Tampon Applicators *	Medical/Personal Hygiene				
Derelict Piers/Bulkheads ^	Derelict Pier and Bulkhead Material				
Derelict Pier/Bulkhead Debris ^	Derelict Pier and Bulkhead Material				
Derelict Vessel ^	Derelict Pier and Bulkhead Material				
Other ^	Derelict Pier and Bulkhead Material				
55-Gallon Drums *	Dumping Activities				
Appliances *	Dumping Activities				
Batteries *	Dumping Activities				
Building/C&D Materials #	Dumping Activities				
Cars/Car Parts *	Dumping Activities				
Landscaping Debris ^	Dumping Activities				
Other ^	Dumping Activities				
Tires *	Dumping Activities				
Trash Bags (Full) ^	Dumping Activities				
Animal Related Material ^	Natural Material				
Grass/Reeds ^	Natural Material				
Leaves ^	Natural Material				
Other ^	Natural Material				
Woody Material (Sticks/Branches) ^	Natural Material				
Bags/Plastic Film #	Shoreline and Recreational Activities				
Balloons *	Shoreline and Recreational Activities				
Beverage Bottles (Glass) *	Shoreline and Recreational Activities				
Beverage Bottles (Plastic) #	Shoreline and Recreational Activities				
Beverage Cans *	Shoreline and Recreational Activities				
Caps/Lids*	Shoreline and Recreational Activities				
Cigar Tips/Cigarette Filters #	Shoreline and Recreational Activities				
Cigarette Lighters *	Shoreline and Recreational Activities				
Cigarette Packaging *	Shoreline and Recreational Activities				
Clothes ^	Shoreline and Recreational Activities				
Corrugated Cardboard ^	Shoreline and Recreational Activities				
Cups/Plates/Forks/Knives/Spoons *	Shoreline and Recreational Activities				
Food Wrappers/Containers *	Shoreline and Recreational Activities				
Household Supplies ^	Shoreline and Recreational Activities				
Lottery Tickets #	Shoreline and Recreational Activities				
Newspaper/Magazines ^	Shoreline and Recreational Activities				
Other ^	Shoreline and Recreational Activities				
Paper ^	Shoreline and Recreational Activities				
Polystyrene Food/Beverage Containers ^	Shoreline and Recreational Activities				
Six-Pack Holders *	Shoreline and Recreational Activities				
Straws/Stirrers *	Shoreline and Recreational Activities				
Toys *	Shoreline and Recreational Activities				
TOTAL		**0**	**0**	**0**	**0**

Table 6. Inwood Marina, Hudson River (BS90)
6/30/17 Debris Count Data

Item Description	Category	Upland	Shoreline	Near Shore	Off Shore
Bait Containers/Packaging *	Ocean/Waterway Activities				
Bleach Bottles	Ocean/Waterway Activities				
Buoys/Floats *	Ocean/Waterway Activities				
Crab/Lobster/Fish Traps *	Ocean/Waterway Activities				
Crates *	Ocean/Waterway Activities				
Fishing Line *	Ocean/Waterway Activities				
Fishing Lures/Light Sticks *	Ocean/Waterway Activities				
Fishing Nets *	Ocean/Waterway Activities				
Light Bulbs/Tubes	Ocean/Waterway Activities				
Oil/Lube Bottles *	Ocean/Waterway Activities				
Other ^	Ocean/Waterway Activities				
Pallets *	Ocean/Waterway Activities				
Plastic Sheeting/Tarps *	Ocean/Waterway Activities				
Rope *	Ocean/Waterway Activities				
Strapping Bands	Ocean/Waterway Activities				
Condoms *	Medical/Personal Hygiene				
Diapers *	Medical/Personal Hygiene				
Other ^	Medical/Personal Hygiene				
Syringes *	Medical/Personal Hygiene				
Tampons/Tampon Applicators *	Medical/Personal Hygiene	1			
Derelict Piers/Bulkheads ^	Derelict Pier and Bulkhead Material				
Derelict Pier/Bulkhead Debris ^	Derelict Pier and Bulkhead Material				
Derelict Vessel ^	Derelict Pier and Bulkhead Material				
Other ^	Derelict Pier and Bulkhead Material				
55-Gallon Drums *	Dumping Activities				
Appliances *	Dumping Activities				
Batteries *	Dumping Activities				
Building/C&D Materials #	Dumping Activities	3	3	1	
Cars/Car Parts *	Dumping Activities				
Landscaping Debris ^	Dumping Activities				
Other ^	Dumping Activities				
Tires *	Dumping Activities				
Trash Bags (Full) ^	Dumping Activities				
Animal Related Material ^	Natural Material				
Grass/Reeds ^	Natural Material				
Leaves ^	Natural Material				
Other ^	Natural Material				
Woody Material (Sticks/Branches) ^	Natural Material				
Bags/Plastic Film #	Shoreline and Recreational Activities	7			
Balloons *	Shoreline and Recreational Activities				
Beverage Bottles (Glass) *	Shoreline and Recreational Activities	9	10		
Beverage Bottles (Plastic) #	Shoreline and Recreational Activities	8	1		
Beverage Cans *	Shoreline and Recreational Activities	1			
Caps/Lids*	Shoreline and Recreational Activities	3	6		
Cigar Tips/Cigarette Filters #	Shoreline and Recreational Activities	2			
Cigarette Lighters *	Shoreline and Recreational Activities				
Cigarette Packaging *	Shoreline and Recreational Activities				
Clothes ^	Shoreline and Recreational Activities	2			
Corrugated Cardboard ^	Shoreline and Recreational Activities	1			
Cups/Plates/Forks/Knives/Spoons *	Shoreline and Recreational Activities	3			
Food Wrappers/Containers *	Shoreline and Recreational Activities	17	3		
Household Supplies ^	Shoreline and Recreational Activities	4	3		
Lottery Tickets #	Shoreline and Recreational Activities				
Newspaper/Magazines ^	Shoreline and Recreational Activities	2			
Other ^	Shoreline and Recreational Activities				
Paper ^	Shoreline and Recreational Activities	7	2	1	
Polystyrene Food/Beverage Containers ^	Shoreline and Recreational Activities	7	2		
Six-Pack Holders *	Shoreline and Recreational Activities				
Straws/Stirrers *	Shoreline and Recreational Activities	17	4		
Toys *	Shoreline and Recreational Activities	1	1		
TOTAL		**95**	**35**	**2**	**0**

Table 7. Paerdegat Basin (PB3)
6/30/17 Debris Count Data

Item Description	Category	Upland	Shoreline	Near Shore	Off Shore
Bait Containers/Packaging *	Ocean/Waterway Activities				
Bleach Bottles	Ocean/Waterway Activities				
Buoys/Floats *	Ocean/Waterway Activities				
Crab/Lobster/Fish Traps *	Ocean/Waterway Activities				
Crates *	Ocean/Waterway Activities				
Fishing Line *	Ocean/Waterway Activities				
Fishing Lures/Light Sticks *	Ocean/Waterway Activities				
Fishing Nets *	Ocean/Waterway Activities				
Light Bulbs/Tubes	Ocean/Waterway Activities				
Oil/Lube Bottles *	Ocean/Waterway Activities				
Other ^	Ocean/Waterway Activities				
Pallets *	Ocean/Waterway Activities				
Plastic Sheeting/Tarps *	Ocean/Waterway Activities				
Rope *	Ocean/Waterway Activities				
Strapping Bands	Ocean/Waterway Activities				
Condoms *	Medical/Personal Hygiene				
Diapers *	Medical/Personal Hygiene				
Other ^	Medical/Personal Hygiene				
Syringes *	Medical/Personal Hygiene				
Tampons/Tampon Applicators *	Medical/Personal Hygiene	1			
Derelict Piers/Bulkheads ^	Derelict Pier and Bulkhead Material				
Derelict Pier/Bulkhead Debris ^	Derelict Pier and Bulkhead Material				
Derelict Vessel ^	Derelict Pier and Bulkhead Material				
Other ^	Derelict Pier and Bulkhead Material				
55-Gallon Drums *	Dumping Activities				
Appliances *	Dumping Activities				
Batteries *	Dumping Activities				
Building/C&D Materials #	Dumping Activities				
Cars/Car Parts *	Dumping Activities				
Landscaping Debris ^	Dumping Activities				
Other ^	Dumping Activities				
Tires *	Dumping Activities				
Trash Bags (Full) ^	Dumping Activities				
Animal Related Material ^	Natural Material				
Grass/Reeds ^	Natural Material				
Leaves ^	Natural Material				
Other ^	Natural Material				
Woody Material (Sticks/Branches) ^	Natural Material				
Bags/Plastic Film #	Shoreline and Recreational Activities	13	4		
Balloons *	Shoreline and Recreational Activities				
Beverage Bottles (Glass) *	Shoreline and Recreational Activities		1		
Beverage Bottles (Plastic) #	Shoreline and Recreational Activities	4	1		
Beverage Cans *	Shoreline and Recreational Activities		1		
Caps/Lids*	Shoreline and Recreational Activities	23			
Cigar Tips/Cigarette Filters #	Shoreline and Recreational Activities				
Cigarette Lighters *	Shoreline and Recreational Activities				
Cigarette Packaging *	Shoreline and Recreational Activities	1			
Clothes ^	Shoreline and Recreational Activities				
Corrugated Cardboard ^	Shoreline and Recreational Activities				
Cups/Plates/Forks/Knives/Spoons *	Shoreline and Recreational Activities	4	1		
Food Wrappers/Containers *	Shoreline and Recreational Activities	13	9		
Household Supplies ^	Shoreline and Recreational Activities	4			
Lottery Tickets #	Shoreline and Recreational Activities				
Newspaper/Magazines ^	Shoreline and Recreational Activities				
Other ^	Shoreline and Recreational Activities				
Paper ^	Shoreline and Recreational Activities				
Polystyrene Food/Beverage Containers ^	Shoreline and Recreational Activities	2			
Six-Pack Holders *	Shoreline and Recreational Activities				
Straws/Stirrers *	Shoreline and Recreational Activities	4	3		
Toys *	Shoreline and Recreational Activities	1			
TOTAL		**70**	**20**	**0**	**0**

Table 8. Newtown Creek (NC0)
7/28/17 Debris Count Data

Item Description	Category	Upland	Shoreline	Near Shore	Off Shore
Bait Containers/Packaging *	Ocean/Waterway Activities				
Bleach Bottles	Ocean/Waterway Activities				
Buoys/Floats *	Ocean/Waterway Activities				
Crab/Lobster/Fish Traps *	Ocean/Waterway Activities				
Crates *	Ocean/Waterway Activities				
Fishing Line *	Ocean/Waterway Activities				
Fishing Lures/Light Sticks *	Ocean/Waterway Activities				
Fishing Nets *	Ocean/Waterway Activities				
Light Bulbs/Tubes	Ocean/Waterway Activities				
Oil/Lube Bottles *	Ocean/Waterway Activities				
Other ^	Ocean/Waterway Activities				
Pallets *	Ocean/Waterway Activities				
Plastic Sheeting/Tarps *	Ocean/Waterway Activities				
Rope *	Ocean/Waterway Activities				
Strapping Bands	Ocean/Waterway Activities				
Condoms *	Medical/Personal Hygiene				
Diapers *	Medical/Personal Hygiene				
Other ^	Medical/Personal Hygiene				
Syringes *	Medical/Personal Hygiene				
Tampons/Tampon Applicators *	Medical/Personal Hygiene				
Derelict Piers/Bulkheads ^	Derelict Pier and Bulkhead Material				
Derelict Pier/Bulkhead Debris ^	Derelict Pier and Bulkhead Material				
Derelict Vessel ^	Derelict Pier and Bulkhead Material				
Other ^	Derelict Pier and Bulkhead Material				
55-Gallon Drums *	Dumping Activities				
Appliances *	Dumping Activities				
Batteries *	Dumping Activities				
Building/C&D Materials #	Dumping Activities				
Cars/Car Parts *	Dumping Activities				
Landscaping Debris ^	Dumping Activities				
Other ^	Dumping Activities				
Tires *	Dumping Activities				
Trash Bags (Full) ^	Dumping Activities				
Animal Related Material ^	Natural Material				
Grass/Reeds ^	Natural Material				
Leaves ^	Natural Material			3	
Other ^	Natural Material				
Woody Material (Sticks/Branches) ^	Natural Material				
Bags/Plastic Film #	Shoreline and Recreational Activities			1	
Balloons *	Shoreline and Recreational Activities				
Beverage Bottles (Glass) *	Shoreline and Recreational Activities				
Beverage Bottles (Plastic) #	Shoreline and Recreational Activities				
Beverage Cans *	Shoreline and Recreational Activities				
Caps/Lids*	Shoreline and Recreational Activities				
Cigar Tips/Cigarette Filters #	Shoreline and Recreational Activities				
Cigarette Lighters *	Shoreline and Recreational Activities				
Cigarette Packaging *	Shoreline and Recreational Activities				
Clothes ^	Shoreline and Recreational Activities				
Corrugated Cardboard ^	Shoreline and Recreational Activities				
Cups/Plates/Forks/Knives/Spoons *	Shoreline and Recreational Activities				
Food Wrappers/Containers *	Shoreline and Recreational Activities			1	
Household Supplies ^	Shoreline and Recreational Activities				
Lottery Tickets #	Shoreline and Recreational Activities				
Newspaper/Magazines ^	Shoreline and Recreational Activities				
Other ^	Shoreline and Recreational Activities			1	
Paper ^	Shoreline and Recreational Activities			2	
Polystyrene Food/Beverage Containers ^	Shoreline and Recreational Activities			2	
Six-Pack Holders *	Shoreline and Recreational Activities				
Straws/Stirrers *	Shoreline and Recreational Activities				
Toys *	Shoreline and Recreational Activities				
TOTAL		**0**	**0**	**10**	**0**

Table 9. Inwood Marina, Hudson River (BS90)
7/28/17 Debris Count Data

Item Description	Category	Upland	Shoreline	Near Shore	Off Shore
Bait Containers/Packaging *	Ocean/Waterway Activities				
Bleach Bottles	Ocean/Waterway Activities				
Buoys/Floats *	Ocean/Waterway Activities				
Crab/Lobster/Fish Traps *	Ocean/Waterway Activities				
Crates *	Ocean/Waterway Activities				
Fishing Line *	Ocean/Waterway Activities	2	1		
Fishing Lures/Light Sticks *	Ocean/Waterway Activities				
Fishing Nets *	Ocean/Waterway Activities				
Light Bulbs/Tubes	Ocean/Waterway Activities				
Oil/Lube Bottles *	Ocean/Waterway Activities				
Other ^	Ocean/Waterway Activities				
Pallets *	Ocean/Waterway Activities				
Plastic Sheeting/Tarps *	Ocean/Waterway Activities				
Rope *	Ocean/Waterway Activities				
Strapping Bands	Ocean/Waterway Activities				
Condoms *	Medical/Personal Hygiene				
Diapers *	Medical/Personal Hygiene				
Other ^	Medical/Personal Hygiene				
Syringes *	Medical/Personal Hygiene				
Tampons/Tampon Applicators *	Medical/Personal Hygiene				
Derelict Piers/Bulkheads ^	Derelict Pier and Bulkhead Material				
Derelict Pier/Bulkhead Debris ^	Derelict Pier and Bulkhead Material				
Derelict Vessel ^	Derelict Pier and Bulkhead Material				
Other ^	Derelict Pier and Bulkhead Material				
55-Gallon Drums *	Dumping Activities				
Appliances *	Dumping Activities				
Batteries *	Dumping Activities				
Building/C&D Materials #	Dumping Activities	3	5		
Cars/Car Parts *	Dumping Activities				
Landscaping Debris ^	Dumping Activities				
Other ^	Dumping Activities				
Tires *	Dumping Activities				
Trash Bags (Full) ^	Dumping Activities	1			
Animal Related Material ^	Natural Material		3		
Grass/Reeds ^	Natural Material				
Leaves ^	Natural Material				
Other ^	Natural Material				
Woody Material (Sticks/Branches) ^	Natural Material				
Bags/Plastic Film #	Shoreline and Recreational Activities	4			
Balloons *	Shoreline and Recreational Activities				
Beverage Bottles (Glass) *	Shoreline and Recreational Activities				
Beverage Bottles (Plastic) #	Shoreline and Recreational Activities	4	1		
Beverage Cans *	Shoreline and Recreational Activities	2			
Caps/Lids*	Shoreline and Recreational Activities	9	2		
Cigar Tips/Cigarette Filters #	Shoreline and Recreational Activities				
Cigarette Lighters *	Shoreline and Recreational Activities				
Cigarette Packaging *	Shoreline and Recreational Activities	2			
Clothes ^	Shoreline and Recreational Activities				
Corrugated Cardboard ^	Shoreline and Recreational Activities				
Cups/Plates/Forks/Knives/Spoons *	Shoreline and Recreational Activities	4			
Food Wrappers/Containers *	Shoreline and Recreational Activities	15	1	1	
Household Supplies ^	Shoreline and Recreational Activities	4			
Lottery Tickets #	Shoreline and Recreational Activities				
Newspaper/Magazines ^	Shoreline and Recreational Activities				
Other ^	Shoreline and Recreational Activities				
Paper ^	Shoreline and Recreational Activities	7	1		
Polystyrene Food/Beverage Containers ^	Shoreline and Recreational Activities	3			
Six-Pack Holders *	Shoreline and Recreational Activities				
Straws/Stirrers *	Shoreline and Recreational Activities	17	3		
Toys *	Shoreline and Recreational Activities				
TOTAL		**77**	**17**	**1**	**0**

Table 10. Paerdegat Basin (BS90)
7/28/17 Debris Count Data

Item Description	Category	Upland	Shoreline	Near Shore	Off Shore
Bait Containers/Packaging *	Ocean/Waterway Activities				
Bleach Bottles	Ocean/Waterway Activities				
Buoys/Floats *	Ocean/Waterway Activities				
Crab/Lobster/Fish Traps *	Ocean/Waterway Activities				
Crates *	Ocean/Waterway Activities				
Fishing Line *	Ocean/Waterway Activities				
Fishing Lures/Light Sticks *	Ocean/Waterway Activities				
Fishing Nets *	Ocean/Waterway Activities				
Light Bulbs/Tubes	Ocean/Waterway Activities				
Oil/Lube Bottles *	Ocean/Waterway Activities				
Other ^	Ocean/Waterway Activities				
Pallets *	Ocean/Waterway Activities				
Plastic Sheeting/Tarps *	Ocean/Waterway Activities				
Rope *	Ocean/Waterway Activities	1			
Strapping Bands	Ocean/Waterway Activities				
Condoms *	Medical/Personal Hygiene				
Diapers *	Medical/Personal Hygiene				
Other ^	Medical/Personal Hygiene				
Syringes *	Medical/Personal Hygiene				
Tampons/Tampon Applicators *	Medical/Personal Hygiene				
Derelict Piers/Bulkheads ^	Derelict Pier and Bulkhead Material				
Derelict Pier/Bulkhead Debris ^	Derelict Pier and Bulkhead Material				
Derelict Vessel ^	Derelict Pier and Bulkhead Material				
Other ^	Derelict Pier and Bulkhead Material				
55-Gallon Drums *	Dumping Activities				
Appliances *	Dumping Activities				
Batteries *	Dumping Activities				
Building/C&D Materials #	Dumping Activities	3	1	2	
Cars/Car Parts *	Dumping Activities				
Landscaping Debris ^	Dumping Activities				
Other ^	Dumping Activities				
Tires *	Dumping Activities				
Trash Bags (Full) ^	Dumping Activities				
Animal Related Material ^	Natural Material				
Grass/Reeds ^	Natural Material				
Leaves ^	Natural Material				
Other ^	Natural Material				
Woody Material (Sticks/Branches) ^	Natural Material				
Bags/Plastic Film #	Shoreline and Recreational Activities	28	6	4	
Balloons *	Shoreline and Recreational Activities				
Beverage Bottles (Glass) *	Shoreline and Recreational Activities	1	1		
Beverage Bottles (Plastic) #	Shoreline and Recreational Activities	4		1	
Beverage Cans *	Shoreline and Recreational Activities				
Caps/Lids*	Shoreline and Recreational Activities	8	1	1	
Cigar Tips/Cigarette Filters #	Shoreline and Recreational Activities	2			
Cigarette Lighters *	Shoreline and Recreational Activities				
Cigarette Packaging *	Shoreline and Recreational Activities				
Clothes ^	Shoreline and Recreational Activities	2		1	
Corrugated Cardboard ^	Shoreline and Recreational Activities				
Cups/Plates/Forks/Knives/Spoons *	Shoreline and Recreational Activities	2			
Food Wrappers/Containers *	Shoreline and Recreational Activities	12	4	3	
Household Supplies ^	Shoreline and Recreational Activities	1		2	
Lottery Tickets #	Shoreline and Recreational Activities				
Newspaper/Magazines ^	Shoreline and Recreational Activities				
Other ^	Shoreline and Recreational Activities	2			
Paper ^	Shoreline and Recreational Activities	6	2		
Polystyrene Food/Beverage Containers ^	Shoreline and Recreational Activities				
Six-Pack Holders *	Shoreline and Recreational Activities				
Straws/Stirrers *	Shoreline and Recreational Activities	2	1	1	
Toys *	Shoreline and Recreational Activities				
TOTAL		**74**	**16**	**15**	**0**

Table 11. Newtown Creek (NC0)
10/30/17 Debris Count Data

Item Description	Category	Upland	Shoreline	Near Shore	Off Shore
Bait Containers/Packaging *	Ocean/Waterway Activities				
Bleach Bottles	Ocean/Waterway Activities				
Buoys/Floats *	Ocean/Waterway Activities				
Crab/Lobster/Fish Traps *	Ocean/Waterway Activities				
Crates *	Ocean/Waterway Activities				
Fishing Line *	Ocean/Waterway Activities				
Fishing Lures/Light Sticks *	Ocean/Waterway Activities				
Fishing Nets *	Ocean/Waterway Activities				
Light Bulbs/Tubes	Ocean/Waterway Activities				
Oil/Lube Bottles *	Ocean/Waterway Activities				
Other ^	Ocean/Waterway Activities				
Pallets *	Ocean/Waterway Activities				
Plastic Sheeting/Tarps *	Ocean/Waterway Activities				
Rope *	Ocean/Waterway Activities				
Strapping Bands	Ocean/Waterway Activities				
Condoms *	Medical/Personal Hygiene				
Diapers *	Medical/Personal Hygiene				
Other ^	Medical/Personal Hygiene				
Syringes *	Medical/Personal Hygiene				
Tampons/Tampon Applicators *	Medical/Personal Hygiene				
Derelict Piers/Bulkheads ^	Derelict Pier and Bulkhead Material				
Derelict Pier/Bulkhead Debris ^	Derelict Pier and Bulkhead Material				
Derelict Vessel ^	Derelict Pier and Bulkhead Material				
Other ^	Derelict Pier and Bulkhead Material				
55-Gallon Drums *	Dumping Activities				
Appliances *	Dumping Activities				
Batteries *	Dumping Activities				
Building/C&D Materials #	Dumping Activities				
Cars/Car Parts *	Dumping Activities				
Landscaping Debris ^	Dumping Activities				
Other ^	Dumping Activities				
Tires *	Dumping Activities				
Trash Bags (Full) ^	Dumping Activities				
Animal Related Material ^	Natural Material				
Grass/Reeds ^	Natural Material				
Leaves ^	Natural Material			15	
Other ^	Natural Material				
Woody Material (Sticks/Branches) ^	Natural Material				
Bags/Plastic Film #	Shoreline and Recreational Activities			1	
Balloons *	Shoreline and Recreational Activities				
Beverage Bottles (Glass) *	Shoreline and Recreational Activities				
Beverage Bottles (Plastic) #	Shoreline and Recreational Activities				
Beverage Cans *	Shoreline and Recreational Activities				
Caps/Lids*	Shoreline and Recreational Activities				
Cigar Tips/Cigarette Filters #	Shoreline and Recreational Activities				
Cigarette Lighters *	Shoreline and Recreational Activities				
Cigarette Packaging *	Shoreline and Recreational Activities				
Clothes ^	Shoreline and Recreational Activities				
Corrugated Cardboard ^	Shoreline and Recreational Activities				
Cups/Plates/Forks/Knives/Spoons *	Shoreline and Recreational Activities			1	
Food Wrappers/Containers *	Shoreline and Recreational Activities				
Household Supplies ^	Shoreline and Recreational Activities				
Lottery Tickets #	Shoreline and Recreational Activities				
Newspaper/Magazines ^	Shoreline and Recreational Activities				
Other ^	Shoreline and Recreational Activities				
Paper ^	Shoreline and Recreational Activities				
Polystyrene Food/Beverage Containers ^	Shoreline and Recreational Activities				
Six-Pack Holders *	Shoreline and Recreational Activities				
Straws/Stirrers *	Shoreline and Recreational Activities				
Toys *	Shoreline and Recreational Activities				
TOTAL		**0**	**0**	**17**	**0**

Table 12. Inwood Marina, Hudson River (BS90)
10/30/17 Debris Count Data

Item Description	Category	Upland	Shoreline	Near Shore	Off Shore
Bait Containers/Packaging *	Ocean/Waterway Activities				
Bleach Bottles	Ocean/Waterway Activities				
Buoys/Floats *	Ocean/Waterway Activities				
Crab/Lobster/Fish Traps *	Ocean/Waterway Activities				
Crates *	Ocean/Waterway Activities				
Fishing Line *	Ocean/Waterway Activities				
Fishing Lures/Light Sticks *	Ocean/Waterway Activities				
Fishing Nets *	Ocean/Waterway Activities				
Light Bulbs/Tubes	Ocean/Waterway Activities				
Oil/Lube Bottles *	Ocean/Waterway Activities				
Other ^	Ocean/Waterway Activities				
Pallets *	Ocean/Waterway Activities				
Plastic Sheeting/Tarps *	Ocean/Waterway Activities				
Rope *	Ocean/Waterway Activities				
Strapping Bands	Ocean/Waterway Activities				
Condoms *	Medical/Personal Hygiene			2	
Diapers *	Medical/Personal Hygiene				
Other ^	Medical/Personal Hygiene				
Syringes *	Medical/Personal Hygiene				
Tampons/Tampon Applicators *	Medical/Personal Hygiene			3	
Derelict Piers/Bulkheads ^	Derelict Pier and Bulkhead Material				
Derelict Pier/Bulkhead Debris ^	Derelict Pier and Bulkhead Material				
Derelict Vessel ^	Derelict Pier and Bulkhead Material				
Other ^	Derelict Pier and Bulkhead Material				
55-Gallon Drums *	Dumping Activities				
Appliances *	Dumping Activities				
Batteries *	Dumping Activities				
Building/C&D Materials #	Dumping Activities				
Cars/Car Parts *	Dumping Activities				
Landscaping Debris ^	Dumping Activities				
Other ^	Dumping Activities				
Tires *	Dumping Activities				
Trash Bags (Full) ^	Dumping Activities				
Animal Related Material ^	Natural Material				
Grass/Reeds ^	Natural Material				
Leaves ^	Natural Material		TNTC	TNTC	TNTC
Other ^	Natural Material				
Woody Material (Sticks/Branches) ^	Natural Material				
Bags/Plastic Film #	Shoreline and Recreational Activities	4	2		
Balloons *	Shoreline and Recreational Activities				
Beverage Bottles (Glass) *	Shoreline and Recreational Activities				
Beverage Bottles (Plastic) #	Shoreline and Recreational Activities	3	4		
Beverage Cans *	Shoreline and Recreational Activities				
Caps/Lids*	Shoreline and Recreational Activities	3	2	4	1
Cigar Tips/Cigarette Filters #	Shoreline and Recreational Activities				
Cigarette Lighters *	Shoreline and Recreational Activities				
Cigarette Packaging *	Shoreline and Recreational Activities	1		1	
Clothes ^	Shoreline and Recreational Activities	1			
Corrugated Cardboard ^	Shoreline and Recreational Activities			2	
Cups/Plates/Forks/Knives/Spoons *	Shoreline and Recreational Activities	9	19	3	
Food Wrappers/Containers *	Shoreline and Recreational Activities	26	32	47	
Household Supplies ^	Shoreline and Recreational Activities		1	1	
Lottery Tickets #	Shoreline and Recreational Activities				
Newspaper/Magazines ^	Shoreline and Recreational Activities				
Other ^	Shoreline and Recreational Activities	2		2	
Paper ^	Shoreline and Recreational Activities	3	4	10	
Polystyrene Food/Beverage Containers ^	Shoreline and Recreational Activities	1	1		
Six-Pack Holders *	Shoreline and Recreational Activities				
Straws/Stirrers *	Shoreline and Recreational Activities	8	4	5	1
Toys *	Shoreline and Recreational Activities	1			
TOTAL		**62**	**69**	**80**	**2**

Table 13. Paerdegat Basin (BS90)
10/30/17 Debris Count Data

Item Description	Category	Upland	Shoreline	Near Shore	Off Shore
Bait Containers/Packaging *	Ocean/Waterway Activities				
Bleach Bottles	Ocean/Waterway Activities				
Buoys/Floats *	Ocean/Waterway Activities				
Crab/Lobster/Fish Traps *	Ocean/Waterway Activities				
Crates *	Ocean/Waterway Activities				
Fishing Line *	Ocean/Waterway Activities				
Fishing Lures/Light Sticks *	Ocean/Waterway Activities				
Fishing Nets *	Ocean/Waterway Activities				
Light Bulbs/Tubes	Ocean/Waterway Activities				
Oil/Lube Bottles *	Ocean/Waterway Activities				
Other ^	Ocean/Waterway Activities				
Pallets *	Ocean/Waterway Activities				
Plastic Sheeting/Tarps *	Ocean/Waterway Activities				
Rope *	Ocean/Waterway Activities		1		
Strapping Bands	Ocean/Waterway Activities				
Condoms *	Medical/Personal Hygiene				
Diapers *	Medical/Personal Hygiene				
Other ^	Medical/Personal Hygiene				
Syringes *	Medical/Personal Hygiene				
Tampons/Tampon Applicators *	Medical/Personal Hygiene				
Derelict Piers/Bulkheads ^	Derelict Pier and Bulkhead Material				
Derelict Pier/Bulkhead Debris ^	Derelict Pier and Bulkhead Material				
Derelict Vessel ^	Derelict Pier and Bulkhead Material				
Other ^	Derelict Pier and Bulkhead Material				
55-Gallon Drums *	Dumping Activities				
Appliances *	Dumping Activities				
Batteries *	Dumping Activities				
Building/C&D Materials #	Dumping Activities	3	1		
Cars/Car Parts *	Dumping Activities				
Landscaping Debris ^	Dumping Activities				
Other ^	Dumping Activities				
Tires *	Dumping Activities				
Trash Bags (Full) ^	Dumping Activities				
Animal Related Material ^	Natural Material				
Grass/Reeds ^	Natural Material				
Leaves ^	Natural Material				
Other ^	Natural Material				
Woody Material (Sticks/Branches) ^	Natural Material				
Bags/Plastic Film #	Shoreline and Recreational Activities	6	3		
Balloons *	Shoreline and Recreational Activities				
Beverage Bottles (Glass) *	Shoreline and Recreational Activities		1		
Beverage Bottles (Plastic) #	Shoreline and Recreational Activities	1	1		
Beverage Cans *	Shoreline and Recreational Activities		1		
Caps/Lids*	Shoreline and Recreational Activities	4	2		
Cigar Tips/Cigarette Filters #	Shoreline and Recreational Activities				
Cigarette Lighters *	Shoreline and Recreational Activities				
Cigarette Packaging *	Shoreline and Recreational Activities	1	1		
Clothes ^	Shoreline and Recreational Activities	1			
Corrugated Cardboard ^	Shoreline and Recreational Activities				
Cups/Plates/Forks/Knives/Spoons *	Shoreline and Recreational Activities		1		
Food Wrappers/Containers *	Shoreline and Recreational Activities	12	15		
Household Supplies ^	Shoreline and Recreational Activities				
Lottery Tickets #	Shoreline and Recreational Activities				
Newspaper/Magazines ^	Shoreline and Recreational Activities				
Other ^	Shoreline and Recreational Activities				
Paper ^	Shoreline and Recreational Activities	1	3		
Polystyrene Food/Beverage Containers ^	Shoreline and Recreational Activities	2			
Six-Pack Holders *	Shoreline and Recreational Activities				
Straws/Stirrers *	Shoreline and Recreational Activities	3	4		
Toys *	Shoreline and Recreational Activities				
TOTAL		**34**	**34**	**0**	**0**

APPENDIX 1

RAW DATA

Raw Data available upon request

APPENDIX 2

LOCATION OF PROGRAM MONITORING STATIONS

The following list and map of floatables monitoring stations includes those stations for which ratings were conducted and data collected in 2017. The stations include all active monitoring stations for the following programs.

- Harbor Water Quality Survey (HWQS)
- Long Term Control Plan (LTCP) Post Construction Compliance Monitoring (PCM)
- New York City Beach Floatables Survey Program (Beach Survey, Public Participation sites)
- Environmental Benefit Shoreline Cleanup Program (EBS Program)

The number of monitoring sites will vary from year to year within each program, although the total number will generally increase each year through the completion of the LTCP. PCM sites will grow in number as LTCP elements come on line. Volunteer efforts are expected to be inconsistent among the entire set of sites given the variable nature of volunteer interest and participation. These active sites will change from year to year, and even month to month.

Table 1. Descriptive Locations and ID's of all floatables monitoring stations.

Primary Station ID	Secondary Station ID	Descriptive Location	Monitoring Group
BS 1	Plum Beach	Plum Beach Bath House, Rockaway Inlet, Brooklyn (Plum Beach Recreational)	NYC_BS
BS 10	Brighton Bay 6	Brighton Bay 6	NYC_BS
BS 11	Coney Island Aquarium	Coney Island Aquarium, Brooklyn	NYC_BS
BS 13	Ferris Wheel	Ferris Wheel/Stillwell Ave. Coney Island, Brooklyn	NYC_BS
BS 15	Fort Totten	Little Bay Park near Fort Totten, Little Bay, Queens	NYC_BS
BS 16	Riis Park	Riis Park, Atlantic Ocean, Queens (Police House)	NYC_BS
BS 19	Orchard Beach	Orchard Beach, Western Long Island Sound, Bronx	NYC_BS
BS 2	Plum Beach Outfall	Plum Beach Outfall, Rockaway Inlet, Brooklyn (Plum Beach Non-Recreational; Plum Beach Secluded; Jetty)	NYC_BS
BS 21	South Beach	South Beach, Lower Bay, Staten Island	NYC_BS
BS 22	New Dorp/Miller Field	Miller Field, Lower Bay, Staten Island	NYC_BS
BS 23	Crooks Point	Crooks Point, Staten Island	NYC_BS
BS 24	Tottenville - Joline Avenue	Joline Avenue, Lower Bay, Staten Island	NYC_BS
BS 25	Crescent Beach	Crescent Beach at mouth of Great Kills Harbor, Lower Bay, Staten Island	NYC_BS
BS 26	Great Kills	Great Kills Park, Lower Bay, Staten Island (Flag)	NYC_BS
BS 27	Midland Pier, Staten Island	Midland Pier, Staten Island	NYC_BS
BS 29	Turtle Circle	Midland Beach/Turtle Circle, Lower Bay, Staten Island	NYC_BS

Primary Station ID	Secondary Station ID	Descriptive Location	Monitoring Group
BS 3	Kingsborough College Secluded Area	Kingsborough Community College, Jamaica Bay, Brooklyn	NYC_BS
BS 30	Page Avenue	Page Avenue, Lower Bay, Staten Island	NYC_BS
BS 4	Kingsborough College Café	Kingsborough College Café, Jamaica Bay, Brooklyn (J. Berry Avenue)	NYC_BS
BS 40	Gerrittsen Beach	Canton Avenue, Plum Beach Channel, Brooklyn	NYC_BS
BS 41	Gowanus Canal - 9th Street	9th Street Bridge, Gowanus Canal, Brooklyn	NYC_BS
BS 44A	Shore Ave/Ocean Ave.	Shore Ave/Ocean Ave. Sheepshead Bay, Brooklyn	NYC_BS
BS 44B	Emmons Ave Holocaust Drive	Emmons Ave Holocaust Drive, Sheepshead Bay, Brooklyn	NYC_BS
BS 44C	Footbridge at Holocaust	Footbridge at Holocaust, Sheepshead Bay, Broooklyn	NYC_BS
BS 44D	Tucker Place-Emmons Ave.	Tucker Place-Emmons Ave. , Sheepshead Bay, Broooklyn	NYC_BS
BS 47	Alley Creek - N. Boulevard (north)	Northern Boulevard facing north to mouth of Alley Creek, Queens	NYC_BS
BS 48	Bayside - DPR Marina	Little Neck Bay, Queens	NYC_BS
BS 49	Little Bay	Little Bay Park near Cryders Lane, Little Neck Bay, Queens	NYC_BS
BS 50	Rockaway, Beach 87th Street	Beach 87th/86th Street, Atlantic Ocean, Queens	NYC_BS
BS 51	Rockaway, Beach 95th Street	Beach 95th Street, Atlantic Ocean, Queens	NYC_BS
BS 53	Ft. Wadsworth	Fort Wadsworth Naval Station, Lower Bay, Staten Island	NYC_BS
BS 54	Conference House	Tottenville Conference House, Staten Island	NYC_BS
BS 55	Seagate Beach Club	Seagate Beach Club, Brooklyn	NYC_BS
BS 56	Oakwood Beach	Oakwood Beach, Staten Island	NYC_BS
BS 58	Beach 116th	Beach 116th Street, Rockaway Beach, Queens	NYC_BS
BS 59	Breezy Point	Breezy Point, Rockaway, Queens	NYC_BS
BS 61	Penny Beach	Penny beach at Alice Austin House	NYC_BS
BS 62	Hunts Point	Hunts Point, Bronx	NYC_BS
BS 70	Cement Plant, Riverside Park	Cement Plant, Riverside Park, Bronx	NYC_BS
BS 71	Riverdale, Bronx	Riverdale, Bronx	NYC_BS
BS 72	Mt. Loretto	Beach at end of Sharrot Ave., Staten Island	NYC_BS
BS 73	Wolfe Pond Swimming Beach	Wolfe Pond Swimming Beach, Staten Island	NYC_BS
BS 74	Lemon Creek	WolLemon Creek, Staten island	NYC_BS
BS 76	Coney Island Bay 14	Coney Island Bay 14	NYC_BS
BS 78	Beach 129-130st.	Rockaway Beach, Queens	NYC_BS
BS 79	Beach 142nd St.	Rockaway Beach, Queens	NYC_BS
BS 8	Manhattan Beach – Parking Lot	Manhattan Beach Park, Jamaica Bay, Brooklyn (jetty)	NYC_BS
BS 81	Bard Ave	Bard Ave., Staten Island	NYC_BS
BS 82	Brighton Street	End of Brighton Street, Staten Island	NYC_BS

Primary Station ID	Secondary Station ID	Descriptive Location	Monitoring Group
BS 83	Pelham Bay Beach	Pelham Bay Beach, City island, Bronx	NYC_BS
BS 84	Great Kills	Great Kills Playground Staten Island	NYC_BS
BS 86	Cedar Grove Beach	Cedar Grove Beach, Staten Island	NYC_BS
BS 87	Beach 105th St.	Rockaway Beach, Queens	NYC_BS
BS 88	Beach 107th St.	Rockaway Beach, Queens	NYC_BS
BS 9	Manhattan Beach – Ocean Avenue	Ocean Avenue, Jamaica Bay, Brooklyn	NYC_BS
BS 90	Inwood Marina	Inwood Marina	NYC_BS
BS 91	Crescent Harbor	Crescent Harbor Staten Island	NYC_BS
BS 93	Edgewater Park, Bronx	Edgewater Park, Bronx	NYC_BS
BS 95	East River 23rd St.	East River 23rd St., Manhattan	NYC_BS
BS 103	Miller Ball Field	Miller Ball Field, Staten Island	NYC_BS
BSNYO1	Pier 66	Pier 66, Hudson River, Manhattan	NYC_BS
BB2	BB2	Head of Bergen Basin	HWQS
BB4	BB4	Mouth of Bergen basin	HWQS
BR5	BR5	Midway of Bronx River	HWQS
CIC3	CIC3	Coney Island Creek, midway, Brooklyn	HWQS
E10	E10-W	Off Hart Island, Western Long Island Sound, Bronx	HWQS
E14	E14-W	Mouth of Bronx River, Bronx	HWQS
E15	E15	Flushing Bay near world's Fair Marina, Queens	HWQS
E2	E2	Mouth of Newtown Creek, East River, Brooklyn/Queens	HWQS
E4	E4-W	Astoria Park, East River, Queens	HWQS
E6	E6	Mouth of Flushing Bay, East River, Queens	HWQS
E7	E7	East of Whitestone Bridge, East River, Queens	HWQS
E8	E8	Between Willet's Point and Throg's Point, Little Bay, Queens	HWQS
FB1	FB1	LaGuardia Airport, Flushing Bay, Queens	HWQS
FLC1	FLC1	Flushing Creek mid creek, Queens	HWQS
FLC2	FLC2	Mouth of Flushing Creek, Queens	HWQS
G2	G2-W	Gowanus Canal mouth, Brooklyn	HWQS
GB1	GB1	Gravesend Bay, Brooklyn	HWQS
GHC	GHC	Grass Hassock Channel	HWQS
H3	H3-W	Jerome Avenue, Harlem River, Manhattan/Bronx	HWQS
HOB	HOB	Head of Bay, Jamaica Bay	HWQS
J1	J1	Jamaica Bay - Rockaway Inlet near Marine Parkway Bridge, Brooklyn	HWQS
J10	J10	South of Paerdegat Basin Bridge, Brooklyn	HWQS
J11	J11	Sheepshead Bay near mouth of bay, Brooklyn	HWQS

Primary Station ID	Secondary Station ID	Descriptive Location	Monitoring Group
J12	J12-W	Eastern Jamaica Bay, Grassy Bay off of JFK airport, Queens	HWQS
J2	J2	Mouth of Mill Basin, Jamaica Bay, Brooklyn	HWQS
J3	J3-W	Canarsie Pier, Jamaica Bay, Brooklyn	HWQS
J5	J5	Near mouth of Barbadoes Basin, Jamaica Bay, Queens	HWQS
J7	J7	Mouth of Bergen Basin, Jamaica Bay, Queens	HWQS
J8	J8-W	Mouth of Spring Creek, Jamaica Bay, Brooklyn/Queens	HWQS
J9A	J9A	Beyond mouth of Fresh Creek, Jamaica Bay, Brooklyn	HWQS
K1	K1	Mouth of Kill Van Kull, Staten Island	HWQS
K2	K2-W	Kill Van Kull near Shooters Island, Staten Island	HWQS
K3	K3	Near Goethal's Bridge, Arthur Kill, Staten Island	HWQS
K4	K4	Island of Meadows, Arthur Kill, Staten Island	HWQS
K5	K5	Mouth of Arthur Kill, Staten Island	HWQS
K5A	K5A	Open water beyond Conference House Park, Raritan Bay, Staten Island	HWQS
K6	K6	Open water beyond Great Kills Park, Raritan Bay, Staten Island	HWQS
N1	N1	Westchester County border, Hudson River, Bronx	HWQS
N16	N16	Open Water beyond Breezy Point Park, New York Harbor, Queens	HWQS
N3B	N3B	South of North River WPCP, Hudson River, Manhattan	HWQS
N4	N4-W	44th Street, Hudson River, Manhattan	HWQS
N5	N5	Mouth of Hudson River at Battery, Manhattan	HWQS
N6	N6	Mid-Upper Bay	HWQS
N7	N7	Upper New York Harbor open water between northern Staten Island and Owl's Head Park Brooklyn	HWQS
N8	N8-W	Narrows, Lower Bay/ Upper Bay, Brooklyn/ Staten Island	HWQS
N9	N9-W	Coney Island Beach, Lower Bay, Brooklyn	HWQS
N9A	N9A	Coney Island outfall, Brooklyn	HWQS
NC0	NC0	Off Rewe Street, English Kills, Brooklyn	HWQS
NC1	NC1	Near Mouth of Maspeth Creek, Newtown Creek, Queens	HWQS
NC2	NC2-W	Apollo Street, Newtown Creek, Brooklyn/ Queens	HWQS
NC3	NC3-W	Mouth of Dutch Kills, Newtown Creek, Brooklyn/ Queens	HWQS
PB2	PB2	Midway of Paerdegat Basin, Brooklyn	HWQS
PB3	PB3	Mouth of Paerdegat Basin, Brooklyn	HWQS
SP2	SP2	Near mouth of Spring Creek, Brooklyn	HWQS

Primary Station ID	Secondary Station ID	Descriptive Location	Monitoring Group
TB1	TB1	Thurston Basin Head	HWQS
TB2	TB2	Thurston Basin mouth	HWQS

Monitoring Group Description:

HWQS – Harbor Water Quality Survey
NYC BS – New York City Beach Survey

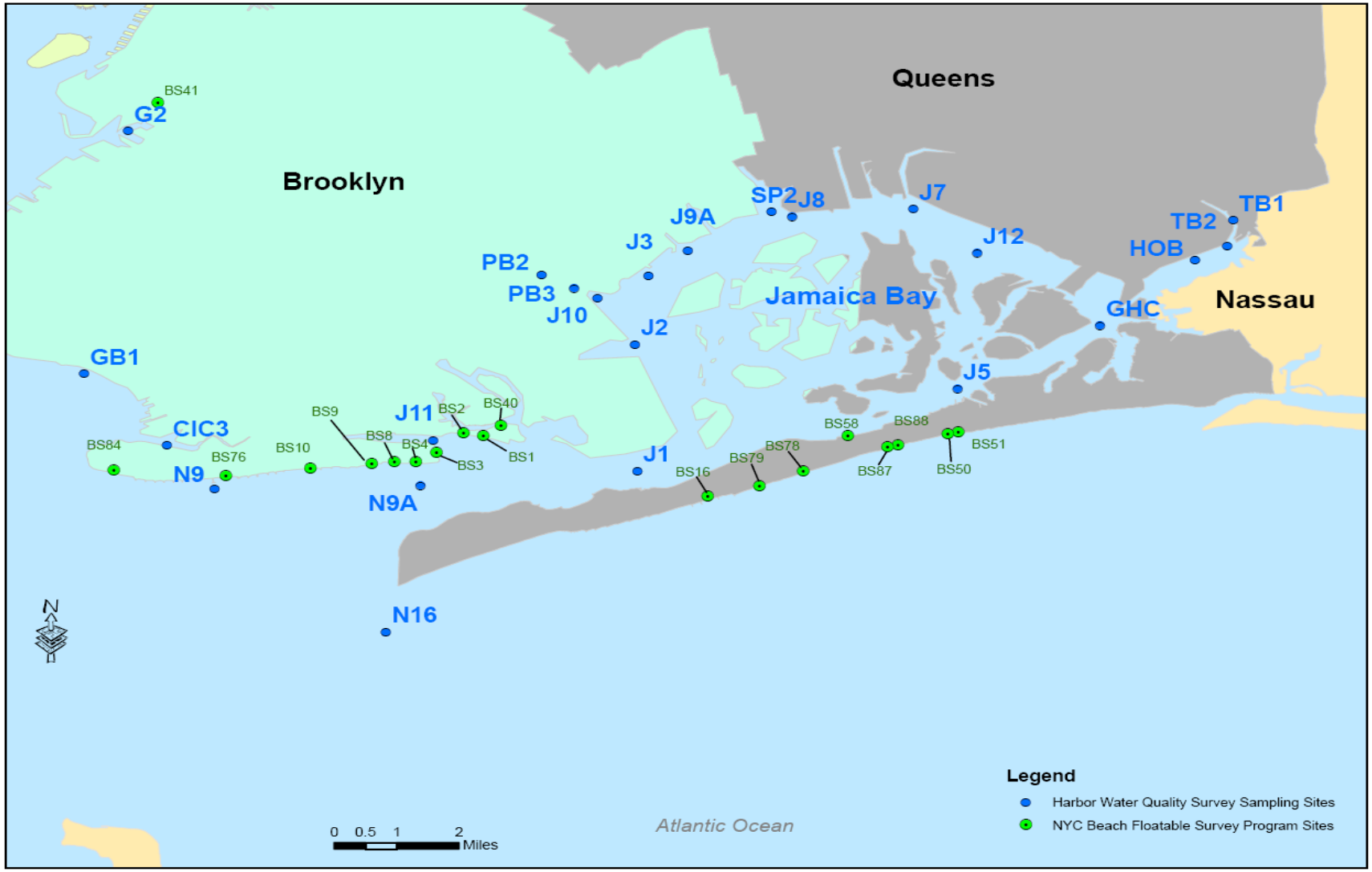

Figure 1. Detailed area of monitoring station map (Jamaica Bay).

City of New York Department of Environmental Protection
Floatables Monitoring Program
Location of Pilot Program
Monitoring Stations
March 2018

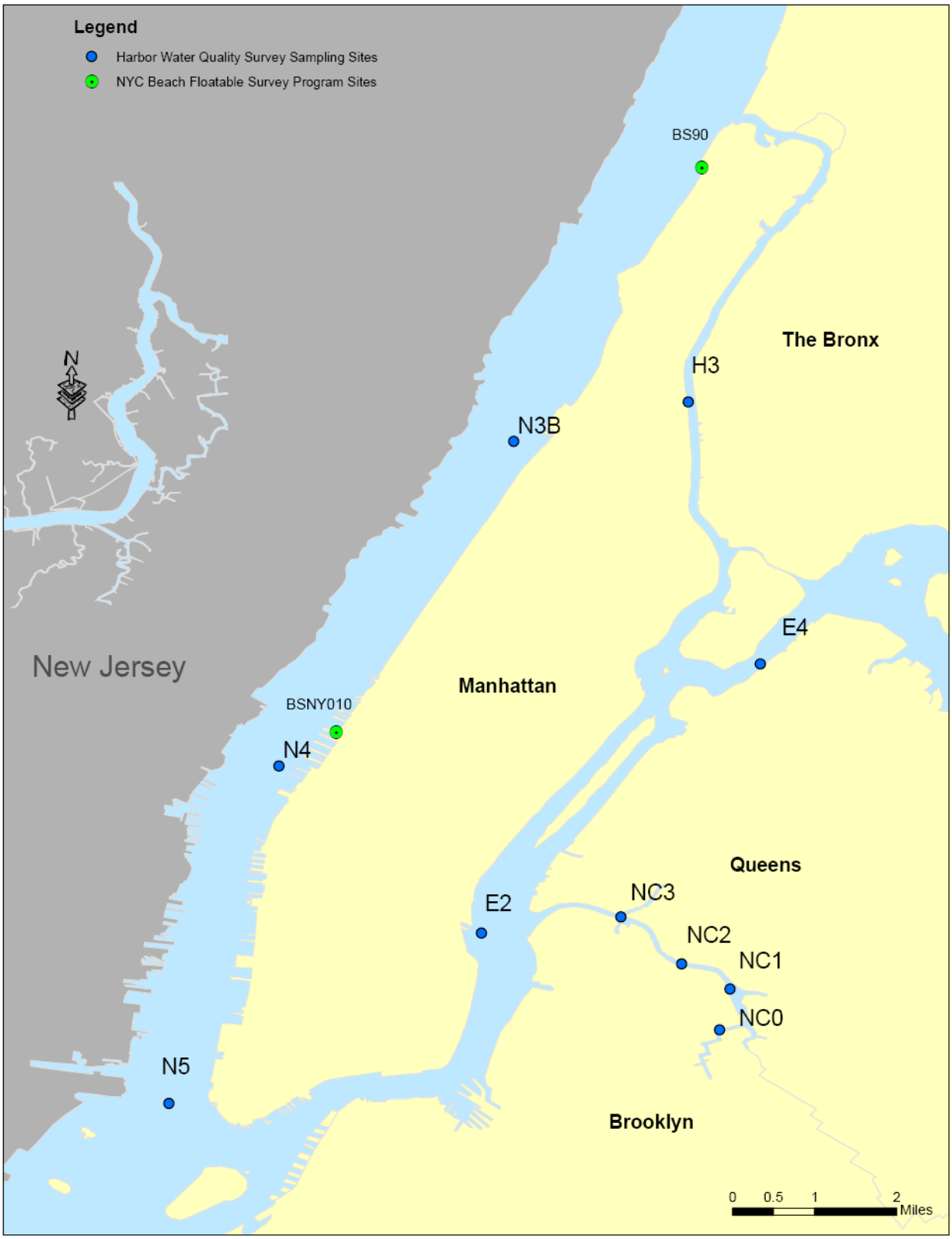

Figure 2. Detailed area of monitoring station map (Manhattan, East River).

City of New York Department of Environmental Protection
Floatables Monitoring Program
Location of Pilot Program
Monitoring Stations
March 2018

Figure 3. Detailed area of monitoring station map (Upper East River).

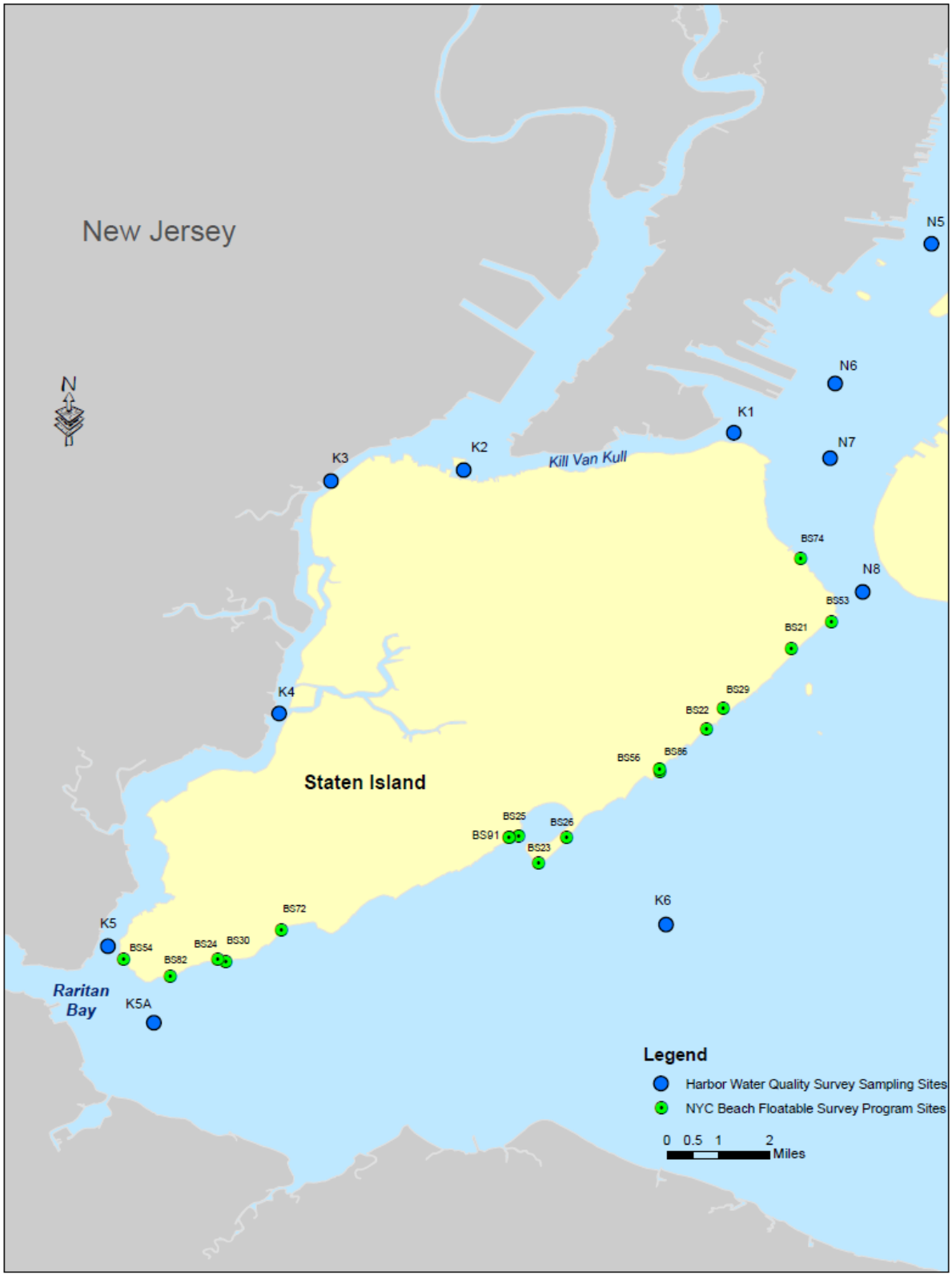

Figure 4. Detailed area of monitoring station map (Staten Island).