NEW YORK STATE DEPARTMENT OF EVIRONMENTAL CONSERVATION

Long Island Sound Enhanced Implementation Plan

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New York State Long Island Sound Enhanced Implementation Plan

The purpose of this Enhanced Implementation Plan (EIP) is to qualitatively assess progress towards achieving the nonpoint source load reduction goals specified in the Long Island Sound Nitrogen Total Maximum Daily Load (LIS N TMDL) document developed in 2000 and approved by the United States Environmental Protection Agency (EPA) in 2001. Additionally this EIP will identify data gaps for quantitatively assessing progress toward meeting the reduction requirements and what steps can be taken to improve controlling the nitrogen load to LIS via stormwater and other nonpoint sources.

1 Executive Summary

The nonpoint source/stormwater load from NYS as calculated in the 2000 TMDL indicates this load is less than 1% of the total nitrogen load to LIS. Review of the calculation of this load applied run-off coefficients developed for New England and are probably not relevant to the NY portion of the watershed which encompasses Nassau and Suffolk counties most likely resulting in an overestimation of the stormwater runoff from these areas. The TMDL reassessment process will develop a more credible estimate of the non-point source and regulated stormwater load from NYS to LIS.

The 2000 TMDL required a 10% reduction from the nonpoint source/stormwater load. Effectively all of the LIS watershed within NYS is within an MS4 area, however this does not mean that all of the stormwater that falls within an MS4's topographical or political boundary is conveyed through an MS4 conveyance system. This fact became evident as the DEC looked to develop an implementation plan for pathogen impaired saltwater embayments. In many instances, there were no MS4 outfalls to these embayments. While there are no doubt numerous MS4 outfalls discharging directly to LIS or more likely to an embayment of LIS, (something that will be quantified in the TMDL Reassessment) there are also vast stretches of land, particularly as you move east in Suffolk County where, to preserve the natural shoreline and due to the bluffs, there are no MS4 outfalls to LIS and therefore any stormwater runoff would be unregulated. Another factor that limits stormwater from being discharge to surface waters on Long Island is the fact that the highly permeable soils allow for stormwater infiltration basins to be located in-land to manage stormwater. This is a very common practice on Long Island.

Where there are MS4 outfalls contributing stormwater to LIS, NYS has estimated that compliance with the six minimum control measures (6 MCMs) as required by the General Permit for small to medium MS4s (GP-0-10-002) should generally achieve a 10% reduction in the nitrogen load from this regulated stormwater: as such, TMDLs that required a 10% or less reduction in the nitrogen load from an MS4 were not included in Part IX, the enhanced implementation portion of the General Permit that places additional requirements on MS4 municipalities discharging to waters with a TMDL.

A data gap that was identified with respect to tracking MS4's implementation of the 6 MCMs is that the annual report, and the information required to be submitted by the MS4's could be improved upon. Some of the information requested is not as valuable as some other information not currently required could be. The DEC will take this information under consideration.

The Phase 1 MS4 program, which included New York City, had been incorporated into the permits of the wastewater treatment plants servicing a particular area. While these activities did require the Phase I MS4 areas to take steps to control runoff, the NYSDEC is currently revising the Phase I stormwater permit

Most of NYC is serviced by combined sewers, and greater than 90% of the area of NYC within the LIS watershed is serviced by combined sewers. In 2012 the NYSDEC and NYCDEP signed an agreement to reduce combined sewer overflows (CSOs) using a hybrid green and grey infrastructure approach. As part of the agreement, the NYCDEP will develop 10 waterbody specific long term control plans (LTCPs) plus one city wide LTCP to reduce CSOs and improve water quality in the water bodies around NYC. To date, the NYCDEP has spent over $1.8 billion to control CSO discharges which has resulted in a CSO capture rate of approximately 72%. Additionally, the NYCDEP has committed to spend an additional $1.6 billion on grey infrastructure that is projected to reduce current CSO discharges by 28%.

While this report focuses on the control of stormwater and nonpoint sources of nitrogen pollution to LIS, it is important to note that the WWTP in Westchester, Nassau and Suffolk Counties all are required to reduce their nitrogen discharges from the baseline load by greater than 58.5% (61.2%, 63.8% and 80.7% respectively). This additional reduction from the WWTPs is to address some of the anthropogenic nonpoint source load since this load can only reasonable be expected to be reduced by 10% through nonpoint and stormwater controls. The cost to upgrade the WWTPs per the 2000 TMDL is roughly $1.8 billion.

There are two areas in NYS where the nonpoint/stormwater load was not fully addressed in the 2000 TMDL. This includes the load from the Bronx River and the groundwater load. Westchester County has assessed the pollution load from the Bronx River and has developed a watershed plan for the Bronx River to reduce nitrogen pollution from this source by 15 – 25%. This omission from the 2000 TMDL and subsequent actions that have been taken and are planned for will be addressed in the TMDL Reassessment.

The groundwater load from Nassau and Suffolk Counties was not specifically identified in the 2000 TMDL. The United States Geological Survey (USGS) has studied the potential nitrogen contribution from groundwater to LIS (Monti and Scorca, Estimates of Nitrogen Loads Entering Long Island Sound from Ground Water and Streams on Long Island, New York, 1985 – 96, U.S Geological Survey, Water-Resources Investigations Report 00-4196, 2001). This loading source will be further evaluated in the TMDL Reassessment. There are many smaller (<30,000 gpd) WWTPs in Suffolk County that discharge to groundwater. The contribution of these WWTPs to eutrophication of estuarine surface waters around Long Island has been brought into focus by some advocacy groups. This is a topic with broad implications.

One of the approaches this effort took was to look at changes in the “Drivers of Nitrogen Loads” to LIS. Drivers of nitrogen loads were identified as things like changes in land use within the watershed, changes in population, number of golf courses, etc. Generally, land uses and the extent of impervious cover in the NY portion of the LIS watershed have been relatively unchanged since 1990. Unfortunately,

where the largest change in land use occurred was via the loss of riparian buffers within the watershed. The loss of riparian buffer within the watershed from 1985 – 2010 was approximately 2.6% The population density of the County's within the LIS watershed have increased an average of approximately 10%, however the distribution of where that population change offered and it is was within the LIS watershed is unknown. An interesting fact to come out of this report has to do with the number of golf courses within the NY portion of the LIS watershed: eight (80). It is not clear if there was a change in the number of golf courses since 1990, however golf courses typically are large user of fertilizer among other chemical products for golf course maintenance.

NYS, Nassau, Suffolk and Westchester County's have all implemented fertilizer laws to control pollution from fertilizer use The degree to which these laws will have an impact on reducing nitrogen pollution is unclear at this time. Generally, the counties have implemented a ban on the use of any fertilizer on county owned properties that do not really need to be fertilized

As previously mentioned, Westchester County has developed a comprehensive watershed management plan for the Bronx River. There have been many other watershed plans developed and implemented at the county level (eg. Suffolk County North Shore Embayments Management Plan) as well as by local water protection/restoration groups (eg. Hempstead Harbor Coalition) to improve local water quality. NYC has embraced a number of plans to manage stormwater including the PlaNYC initiative, Sustainable Stormwater Management Plan and Green Infrastructure Plan. While there is a plethora of activity resulting from these watershed management plans, there is no centralized database to identify actions taken and subsequent benefits incurred through these actions. This data gap may be mitigated via the LISS project to develop a NPS Tracking tool to address this information void.

The LISFF has provided funding of over $5 million to NYS for water quality improvement projects in NYS since 2005. Since most of these projects have a 50% match, more than $10,000,000 has been spent on projects to improve water quality from this funding source alone. This is an excellent source of funds that provide a direct benefit to LIS water quality, however there is no tracking of the outcome of projects or their effectiveness.

NYS does have many air regulations that control NOx emissions from stationary emission sources. NEIWPCC is taking the lead on reporting on air regulations and their potential impacts on reducing atmospheric deposition of nitrogen onto the land and water.

New York State, the Department of Environmental Conservation, the NYC Department of Environmental Protection, Nassau, Suffolk and Westchester Counties and the individual towns and villages located within the LIS watershed understand the economic importance of a healthy LIS and how it directly relates to their economic health. Fortunately a healthy LIS is defined by its water quality and the quality of the natural habitat, so a healthy LIS not only provides for economic prosperity but also prosperity with respect to the natural systems and the fish and wildlife they support.

2 Background

2.1 LIS N TMDL

The document "A Total Maximum Daily Load Analysis to Achieve Water Quality Standards for Dissolved Oxygen in Long Island Sound", December 2000 established a total maximum daily load (TMDL) for nitrogen inputs into LIS to meet the dissolved oxygen (DO) water quality standards in existence at that time. This TMDL was determined using a complex water quality model called LIS 3.0 which was used to identify DO improvements in LIS resulting from reductions from nitrogen and carbon loads to LIS through various management scenarios. Ultimately, it was determined that controlling nitrogen as the primary pollutant of concern, especially from WWTPs would also have a corresponding control or reduction in carbon loading to LIS, therefore, this TMDL was established to control nitrogen load to LIS to reduce the duration and extent of hypoxia in western LIS. The TMDL was anticipated to be implemented in phases, with the 2000 TMDL effectively focusing on "Phase III". The Phase III action for hypoxia management concluded that the TMDL should include a 58.5% reduction from the baseline nitrogen load to LIS from in-basin sources (New York and Connecticut). So the TMDL may be expressed as follows:

TMDL = 58.5% nitrogen reduction from in-basin sources + (Phase IV) reductions in nitrogen and carbon from out of basin sources + non-treatment alternatives + Margin of Safety (MOS)

The allocation of the TMDL between the point sources (waste load allocation or WLA), the nonpoint sources (load allocation or LA) and any MOS can be a complicated task, and was indeed complicated in this TMDL. In this TMDL, the MOS is implicit, so the TMDL was allocated between the WLA and the LA. Figure 1 presents the relative nitrogen contributions from all nitrogen sources at the edge of LIS. Figure 2 presents the relative contribution of the trade equalized nitrogen loads without the boundary condition. Excluding the boundary load, which represents the largest load to LIS, the New York State (NYS) wastewater treatment plants clearly represent the majority of the nitrogen load to LIS at 37%. The NYS nonpoint source load, equalized per the System Wide Eutrophication Model (SWEM), which has replaced the LIS 3 model, represents approximately 3% of the nitrogen load.

Figure 1: Baseline N Loads to the LIS @ Edge of Sound

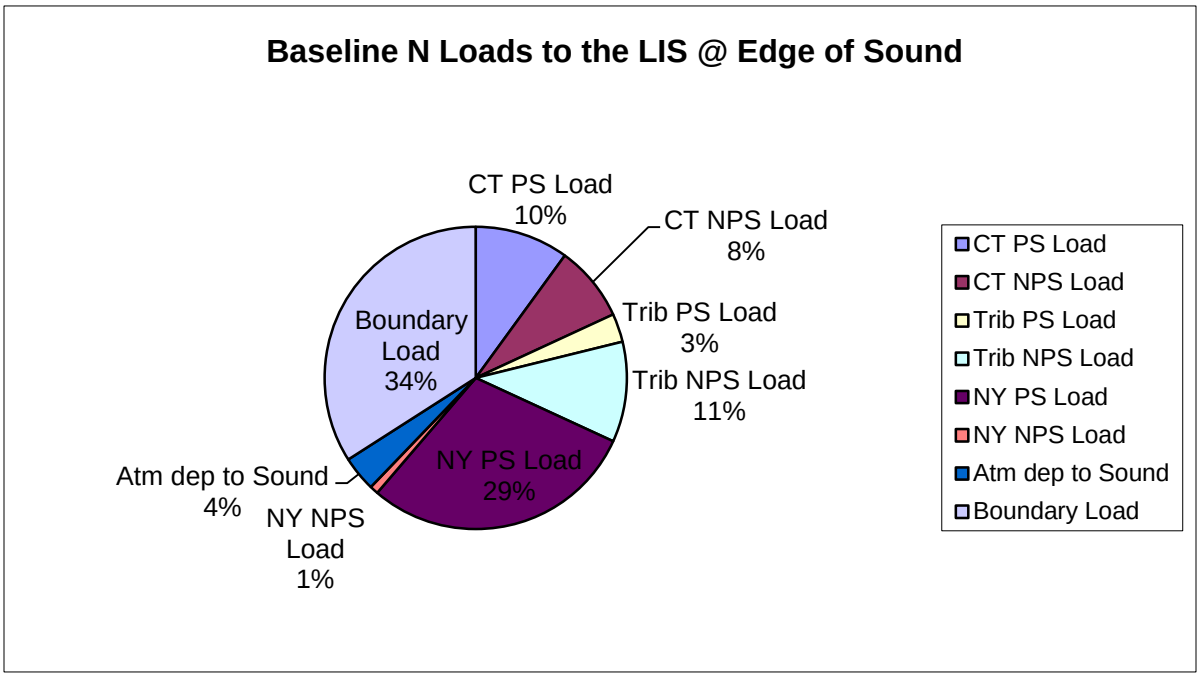
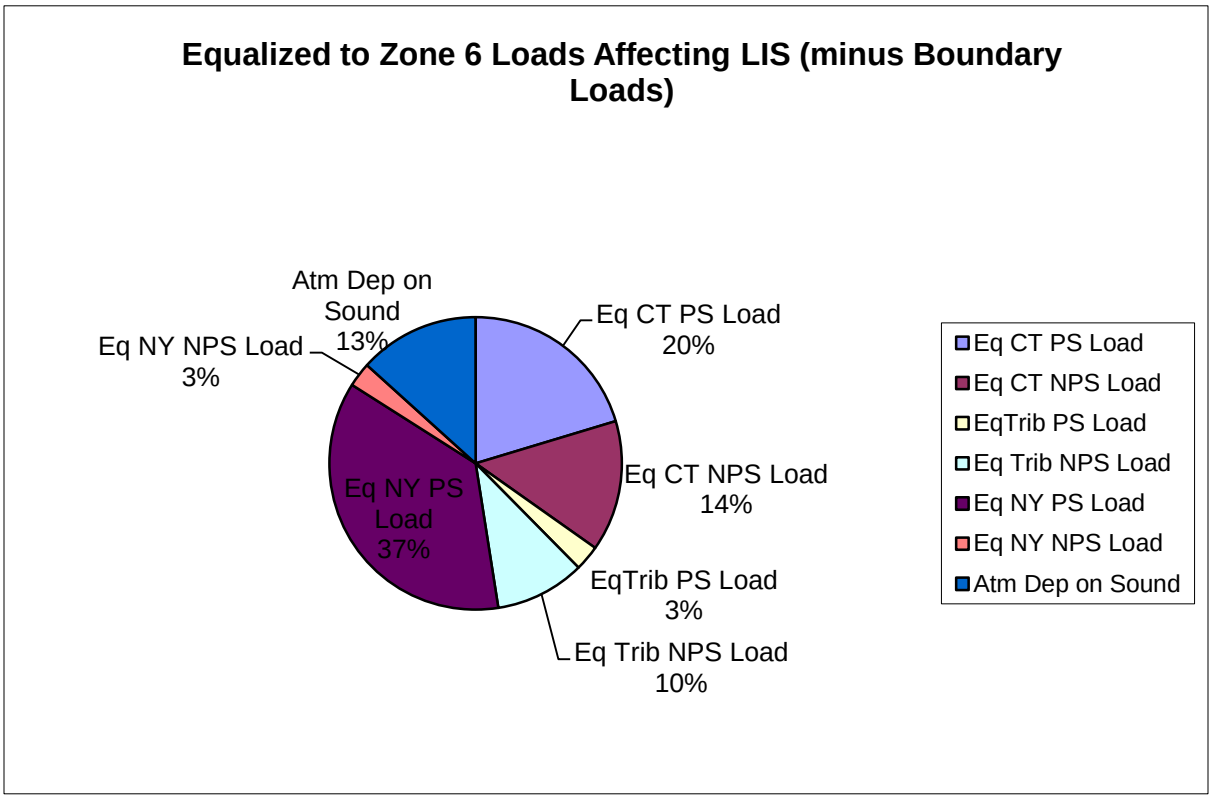


Figure 2: Equalized to Zone 6 Loads Affecting LIS (Minus Boundary Loads)



2.1.1 Waste Load Allocation

The purpose of this Enhanced Implementation Plan (EIP) is to document the progress that has been made in New York State with respect to achieving reductions from nonpoint sources; however it is important to have a discussion on the WLAs imposed since the WLA reflects a greater than 58.5% reduction from baseline from non-New York City (NYC) WWTPs. This is in part to offset the lack of expecting a 58.5% reduction from nonpoint sources. The NYC WWTPs were given a WLA based on the 58.5% reduction because most of the land areas surrounding these WWTPs are serviced by combined sewers and therefore the plans for addressing Combined Sewer Overflows (CSOs), discussed later on in this document, could effectively result in a 58.5% reduction in the nitrogen load from stormwater which is captured and sent to the NYC WWTPs.

Table 1 presents information regarding the baseline loads and the WLA for the management zones in New York State (Zones 7 – 11). With the exception of the New York City zones (8 & 9), the WLA's for the NY zones represent a greater than 58.5% reduction from these sources. The average reduction required from NYS waste water treatment plants is 68%. This reduction above the 58.5% represents the level of WWTP upgrade that was deemed "cost effective" and also picks up some of the reduction "needed" from the nonpoint sources since all anthropogenic nitrogen inputs needed a 58.5% reduction and the nonpoint sources are only anticipated to achieve a 10% reduction. Table 2 presents the reductions required from the WWTPs per the TMDL WLA and compares them to what the tons per year WLA would have been had the 58.5% reduction been the only reduction required from the WWTPs.

It is important to note that at the time of the TMDL development, the WWTP upgrade cost analysis estimated upgrades to Limit of Technology (LOT), which in the northeast could achieve a total nitrogen concentration at about 3 mg/l, to be in the order of $2.5 billion to upgrade all in-basin WWTPs. The cost estimate for "cost effective" upgrades was $650 million. The improvement in DO response based on the modeling indicated a statistically insignificant difference in DO improvement when comparing the cost effective upgrade to the LOT. It will cost approximately $1.85 billion to upgrade the NY WWTPs to meet the WLAs in the TMDL.

2.1.2 Load Allocation

The TMDL indicated that nitrogen loads to LIS from in-basin sources needed to be reduced by 58.5%. This is the reduction required from all anthropogenic nitrogen sources. It is not considered technically feasible to achieve a 58.5% reduction from nonpoint sources. As a matter of fact, the TMDL established that a 10% reduction from urban and agricultural nonpoint sources "reflect both the effectiveness of urban and agricultural controls in controlling nitrogen and the rate at which such controls can be applied in the region. It represents an aggressive and costly, but technically feasible reduction target"

Table 3 presents the estimation of the nonpoint source load from Zones 7 – 11, the NYS portion of the LIS watershed. It is important to note that the run off coefficients used in this analysis were developed based on data from Connecticut. These run off coefficients are probably applicable to Zone 7, Westchester County, however the validity of these runoff coefficients being applicable to the sandy soils of Long Island (LI) is questionable at best. The use of these runoff coefficients for Zones 10 and 11, Nassau and Suffolk Counties on LI have most likely resulted in an over estimation of the NPS stormwater

load from these areas. Additionally, stormwater control practices on LI utilize to a large extent infiltration basins, significantly reducing the actual stormwater runoff being discharged to a surface water. These issues will be discussed further in the" Data Gaps and Recommended Improvements" section of this document.

Table 4 presents the New York Load Allocations and the required nitrogen reduction from each management zone. Again, for management zones 10 and 11 the NPS load estimated in the TMDL is most likely an unrealistically high number based on the sandy soils of LI and the long practiced stormwater management practice using infiltration basins to direct stormwater to groundwater. These two facts inevitably will result in a significantly smaller estimate of the actual stormwater nitrogen load from these areas.

2.2 Land Use in the New York portion of the LIS Watershed

Figure 3 presents the NY portion of the LIS watershed. The NY portion of the watershed in land mass (281,887 ac) relative to the entire LIS watershed is very small. However, a large portion of this land area is highly urbanized as shown in Figure 3. This area includes the greater New York City area. New York City (NYC) consists of 5 boroughs – The Bronx, Brooklyn, Manhattan, Queens and Staten Island, and is the most populous city in the United States per the 2010 census: more than 8 million people live in NYC, which has a land mass of only 302 sq mi (193,279 ac). The density of people living in NYC is 27,243 people /sq mi, the highest density of any US city. The greater metropolitan area around NYC has a population of almost 19 million people distributed over 6,720 sq mi.

Not all of the land mass of NYC contributes nitrogen to LIS. As shown in Table 3, Zones 8 & 9, which represents NYC, constitute about 70% of the land area of NYC. Zone 8 is closer to LIS and per the SWEM has an exchange ratio of 0.482. Zone 9, which is further away and more influenced by the flows of the East River and Hudson River plays a lesser role in contributing nitrogen to LIS as is evidenced by its SWEM exchange ratio of 0.119. Regardless, the existence of the largest city in the US being located within the watershed of LIS plays a significant role in contributing nitrogen to LIS from many sources and controlling these sources is a daunting task. NYC is taking pollution control from all sources very seriously in an effort to improve water quality in all the waters surrounding NYC, including LIS and the New York/New Jersey Harbor, which is one of the world's largest natural harbors. NYC's pollution control efforts have already been discussed with respect to WWTP upgrades. Actions NYC is taking with respect to combined sewer overflows (CSOs) and the Phase I MS4 Permit will be discussed in the applicable sections of this document.

Figure 3: New York State Long Island Sound Watershed Land Use

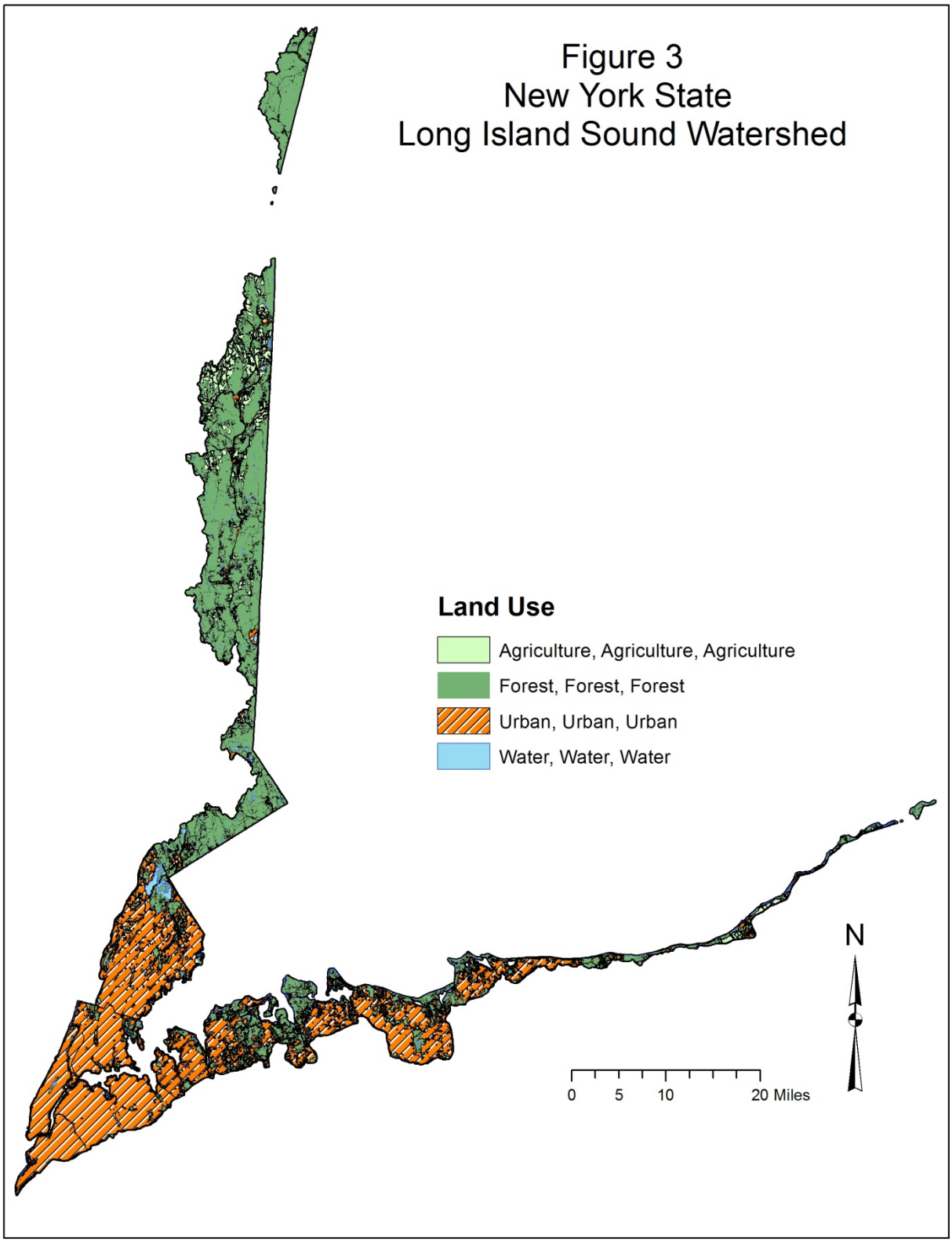
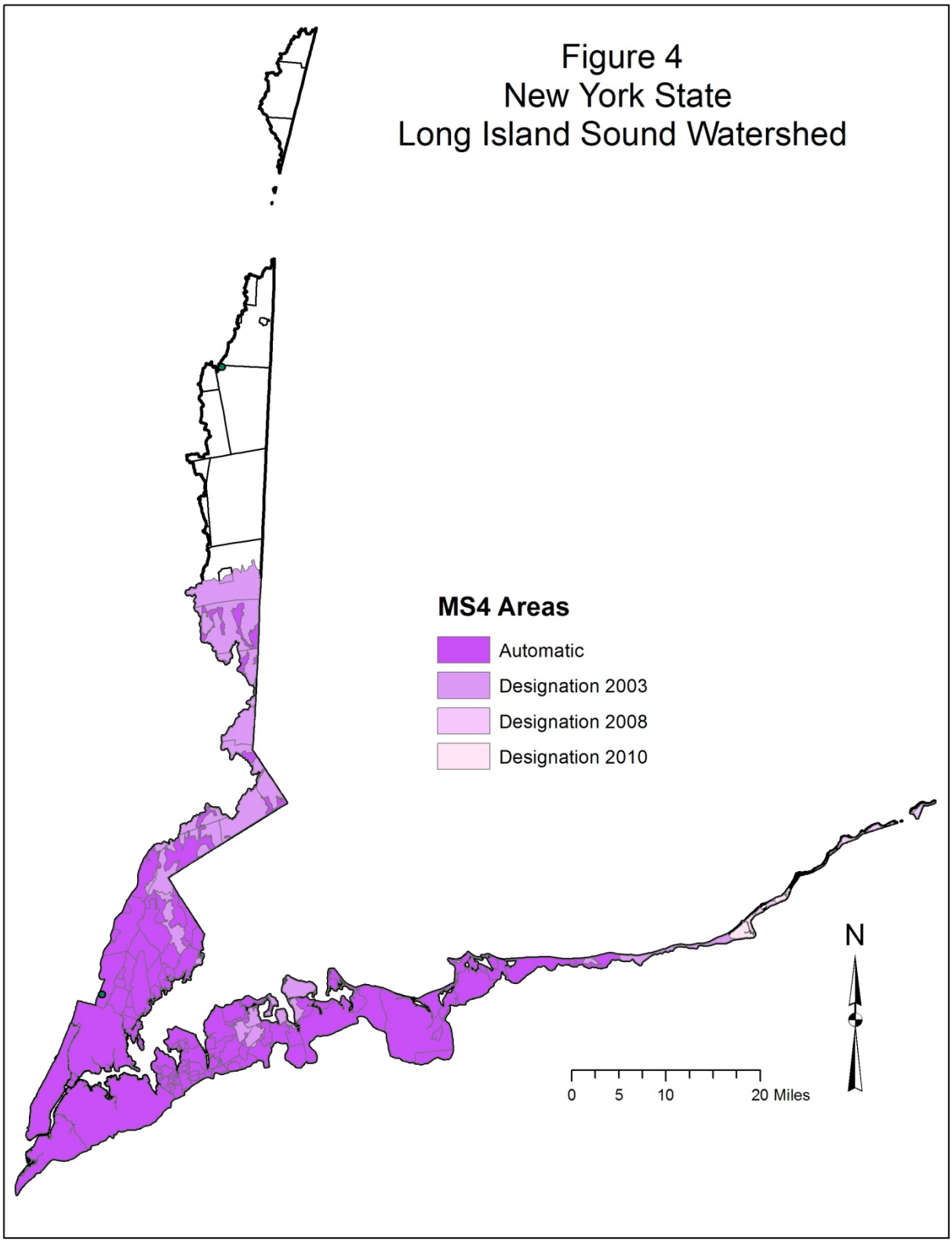


Figure 4: New York State Long Island Sound Watershed MS4 Areas



2.2.1 Urban

81% of the NY LIS watershed is considered "urban" land, with 43% of that urban land being NYC. As shown on Figure 4, effectively all of the municipalities in the NY Zones identified in the TMDL are considered Municipal Separate Storm Sewer Systems (MS4) and therefore covered by either the Phase I or Phase II MS4 Stormwater Regulations (there are very small portions of the north fork of LI, in the Town of Southold that are not MS4 areas). While most of the land area of NYC is serviced by combined sewer systems (CSSs), there are limited areas of NYC that have separate stormwater sewer systems. Areas of NYC covered by the Phase I MS4 Stormwater Regulations have generally been incorporated into the State Pollution Discharge Elimination System (SPDES) permit of the WWTP in which the MS4 is located. Table 5 presents the list of MS4s covered by the Phase II Stormwater Regulations and therefore covered under the NYS Phase II MS4 General Permit.

Experience has shown that it is not valid to assume the entire land area of an MS4 municipality is serviced by an MS4 system. As such, it is incorrect to assume that the entire "urban" stormwater load should be attributed to the MS4 municipalities within the LIS watershed. This is particularly true for Zones 10 & 11 (Nassau and Suffolk Counties) where the soils are such that runoff from pervious surfaces is very low. Also, the practice of directing stormwater to groundwater infiltration basins is widespread in these zones effectively reducing the land area actually contributing to an MS4 surface water discharge. Additionally, just because a municipality is covered as an MS4 entity, it does not mean that the entirety of the municipality is serviced by an MS4 system. There is insufficient information at this time to quantify the actual load attributable to each MS4 municipality in the LIS watershed. Since an MS4 is regulated, and will be given an actual WLA in the TMDL Reassessment, it will be critical to get the relevant information from all MS4 municipalities within the LIS watershed to ascertain an accurate existing load from these systems. This will be discussed in further detail in the "Data Gaps and Recommended Improvements" section of this document.

With respect to Zone 7, the 2000 TMDL does not seem to have accurately reflected the total area of Westchester County that does indeed drain to the LIS watershed. NYS has received the Land Use and Total LIS Watershed shape file from Connecticut. The attribute table for the land use layer indicates that the area of Zone 7 within the LIS watershed is 65,125 ac. This area is less than the roughly 110,000 ac which make up the entire contributing area of Westchester County. This difference is attributed to the fact that Zone 7 is defined only as the area of Westchester that has shoreline in LIS. The northern part of Westchester County that is identified as being within the LIS watershed via GIS is identified as Zone 6, a Connecticut management Zone. Zone 7 is primarily urban, while the area of Westchester County that is included in Zone 6 is primarily forested. Since forested areas are not expected to have any reduction requirements, the inclusion of this area as a stormwater management area for Westchester County is relatively insignificant. Regardless of this difference, the 2000 TMDL only considered 33,623 ac from Zone 7. It appears that the land area east of the Bronx River was the only land area included in Zone 7. This discrepancy will be discussed further in the "Data Gaps and Recommended Improvements" section of this document.

2.2.2 Agricultural

A small percentage, approximately 1.4%, of the total NYS watershed land area is listed as agricultural, and it is all located in Zone 11, Suffolk County. Agricultural land makes up approximately 4.6% of the land area in the Zone 11.

2.2.3 Forested

Approximately 18% of the total NYS watershed land area is forested. Forested land is found in zones 7, 10 and 11. Also, the land area in Putnam and Dutchess Counties that are within the NY portion of the LIS watershed are primarily forested, with relatively small pockets of urban land area. The contribution for these areas was not included in the management zones for NYS but may have been included in the Connecticut load since these areas are small areas of larger Connecticut watersheds.

Nassau County, Zone 10 has the largest forested area in both acres and relative percent. Approximately 40% of Zone 10 is forested with the remaining 60% being urban land.

Approximately 24% of Suffolk County, Zone 11, is forested, and 71% is urban land.

3 Drivers of Changes of Nitrogen Load from Nonpoint Sources

The following factors are considered to be factors that have the potential to impact the load of nitrogen from nonpoint sources from urban land and agricultural land. Forested land does contribute to the nonpoint source nitrogen load, however this load is generally considered to be a "natural" or background load for which controls are assumed, for the purpose of this assessment, to have a negligible effect. This is beyond the scope of discussion for the NY portion of the LIS watershed, but will be mentioned in the "Data Gaps and Recommended Improvements" section of this document.

Drivers from urban land include:

- Percent Impervious Cover (Land Cover Change)
- Urbanization (Land Cover Change)
- Population/Demographics
- Golf Courses
- Residential Fertilizer Use
- Number of Septic Systems
- Number of Cars
- Changes in Land Use Types (Land Cover Change)

Drivers from agricultural land include:

- Acres of crop planted
- Fertilizer use practices
- Animal Population
- Number of Agricultural BMPs implemented

The following sections discuss the specifics of the urban drivers relative to the NY portion of the LIS watershed. While there are agricultural lands within the LIS watershed, the relative proportion is very small. Also, studies have shown that agricultural practices on Long Island generally have a greater affect on groundwater than from surface water runoff. Once duck farming would have been a concern to surface waters of Long Island, however there is only one duck farm left in operation on Long Island and it is not in the LIS watershed. There are two medium sized CAFOs within the LIS watershed: a dairy farm up in Dutchess County and the Yonkers Raceway. The farm in Dutchess County is within the land area that seems to have been included in management zone 6, and Yonkers Raceway is within the Bronx River watershed that was not included in the 2000 TMDL. Both of these operations and there potential for contributing to the nitrogen load to LIS will be assess as part of the TMDL Reassessment.

3.1 Land Cover Changes in the NYS Portion of the LIS Watershed

The Long Island Sound Study (LISS) funded an enhancement grant issued to the University of Connecticut's Center for Land Use Education & Research (CLEAR) to compile data regarding land use changes within the LIS watershed in CT and NY. They focused on land cover changes, riparian area changes and impervious cover changes from 1985 to 2010. They did this based on the HUC-12 basins within the watershed (there are a total of 195 HUC-12 basins in the LIS watershed in NY and CT, with all of CT being within the LIS watershed).

The CLEAR project broke the NY portion of the watershed into two major subgroups they called "Bronx" and "Northern Long Island". The following sections discuss land cover changes in each of these subgroups as it relates to percent impervious cover, urbanization and changes in land use types.

3.1.1 Bronx

Bronx Basin (02030102) is approximately 172 sq mi (110,026 ac) and includes management zones 7 – 9 (Westchester and NYC). This area drains to western LIS and includes the following HUC-12 basins: East Creek-Mamaroneck Harbor, Flushing Creek-Flushing Bay, Hutchinson River-Eastchester Bay, Kensico Reservoir, Lower Bronx River, Sheldrake River-Mamaroneck River, Upper Bronx River and Westchester Creek-East River.

Table 6 presents the land use changes within this larger watershed. Changes within each of the sub-basins that make up the larger Bronx basin are presented in Appendix A. Overall for the larger Bronx basin, there were no significant changes in the Land Cover, the Riparian Zone Land Cover or the Impervious Surface Estimate from 1985 to 2010. This is not unexpected since this entire area has been "built out" for a long time. The predominant land use within this basin is "developed" area, followed by "turf & grass" and "deciduous forest". Unfortunately, the overall trend in land use change was a slight decrease in all land use categories with the exception of "Developed" and "Turf & Grass" which saw a slight increase from 1985 to 2010. The largest change was reported as a 2.6% increase in developed land in riparian zones. The land use category which saw the largest losses was deciduous forests, with a loss of 1.6% in the general land cover category and a 1.5% loss from the Riparian Zone Land Cover.

While these losses are relatively small, losses in riparian areas could result in waterbody quality degradation. It is not possible to make any definitive conclusions regarding changes in water quality based on the information regarding the larger Bronx Basin.

These slight changes in the land use categories did not result in any appreciable change in the estimated impervious surface area.

3.1.2 Northern Long Island

The Northern Long Island Basin (02030201) is approximately 286 sq mi (182,806 ac) and includes management zones 10 and 11 (Nassau and Suffolk Counties). This area effectively makes up the southern edge of LIS and constitutes the "North Shore" of Long Island. This basin includes the following HUC-12 basins: Alley Creek-Little Neck Bay, Brown Hills, Cold Spring Harbor-Oyster Bay, Crab Meadow-Fresh Pond, East Creek-Dosoris Pond, Glen Cove Creek-Hempstead Harbor Goldsmith Inlet-Mattituck Creek Huntington Harbor-Lloyd Harbor Mill Neck Creek-Oyster Bay Harbor Mitchells Creek-Manhassett Bay Mt Sinai Harbor-Port Jefferson Harbor Nissequogue River Northport Bay Rocky Point-Wading River West Meadow Creek-Stony Brook Harbor.

Table 7 presents the land use changes within this larger basin. Changes within each of the sub-basins that make up the larger Northern Long Island basin are presented in Appendix B. Overall this basin has seen even less changes in land use than the Bronx Basin. The predominant land uses in this area are "developed" and "deciduous forest" in both 1985 and 2010, however once again the general trend is a small loss in all land use categories with the exception of "developed" and "turf & grass", both of which had slight increases in both the general land cover and the riparian zone land cover. The change in land use in the riparian zone was not as large (as measured as the percent change in land cover) in this basin as it was in the Bronx basin. Probable reasons for the limited change in land use could be attributed to factors such as:

- Development of the north shore of LI includes areas with many large estates; older, wealthy and well established towns and quite a bit of open space preserved through conservation activities
- The relatively steep terrain of the bluffs that make up a good part of the north shore of LI naturally limit development.
- State laws regarding Tidal Wetland Land Use Regulations (6 NYCRR Part 661) contain limitations for development in applicable areas
- Many shoreline Municipalities have land use planning and zoning regulations as well as local wetland regulations that limit growth
- Local conservation of open space

3.2 Population/Demographics

Population can be defined as the total number of persons living in a specified area, or the total number of persons of a particular group, class, etc residing in a place. Demography is the study of vital and social statistics. The following section will give brief statements about both population and demographics of the areas of NYS within the LIS watershed. Details regarding both pollution and demography of these

areas will be more definitively defined in the TMDL Reassessment process and therefore will be identified in the "Gaps and Recommended Improvements" section of this report.

For comparisons, data regarding median incomes was obtained from www.muninetguide.com , www.newyork-demographics.com and the US Census Bureau. Based on these sources, the median household income as the US average is $52,300, the New York State average is $55,603. 14.2% of the population lives below the poverty level in NYS.

3.2.1 Westchester County

Westchester County, which is represented as management zone 7, covers an area of 450 sq mi and has a population of 949,133 per the 2010 Census. The population density of Westchester County is 2209 people per sq mi. The population of Westchester County in 1990 was 874,866, so the county has seen a population growth of roughly 9% since 1990, however, where that growth has occurred has not been determined at this time. Per the 2000 TMDL, only 52.5 sq mi of Westchester County is located within the LIS watershed. This area underestimates the contribution from Westchester County because it does not include the watershed west of the Bronx River that is part of the LIS watershed. Based on the 2000 TMDL, New York's 4th largest city, Yonkers, is located outside the LIS watershed. The revised watershed map for LIS includes the land area west of the Bronx River and therefore would include half of the City of Yonkers.

The median household income in Westchester is $79,619, well above both the state and US average. Per the US Census Bureau, 8.2% of the population of Westchester County lives below the poverty line. This is well below the state average.

At this time, there can be no definitive conclusions drawn about the change in population or demographics of Westchester County as depicted in the 2000 TMDL as it related to stormwater contributions to LIS.

3.2.2 The Bronx

The Bronx is one of the five boroughs that make up NYC and has a land area of 42.1 sq mi. The Bronx is located in management zone 8. As with Westchester County, it appears that only the land area east of the Bronx River was included in the land area of the 2000 LIS watershed. In the revised watershed boundary, most of the area of the Bronx is identified as being within the LIS watershed. This is supported by the fact that the East River forms the southern boundary of the Bronx, and the Harlem River makes up most of the western boundary of the Bronx, and both rivers are tributaries to LIS. As such, it can be argued that all of the Bronx, with the exception of a small portion (approximately 3.5 sq mi) in the North West corner which is part of the Saw Mill River watershed, which is tributary to the Hudson River, is within the LIS watershed

The population of the Bronx per the 2010 census was 1,385,108 for a population density of 32,904 people per sq mi. The US Census considers the Bronx to be the most diverse area in the county, with 53.5% of the population of Hispanic, Latino or Spanish origin. The median income for a household in the Bronx is $34,264, well below the state average. Approximately 28.4% of the population lives below the poverty line, well above the state average. Much of the poverty in the Bronx is concentrated in the

south west portion of the Borough. The areas adjacent to LIS and the East River typically have poverty levels below 20%

The population of the Bronx in 1990 was 1,203,789, so there has been an increase in population of roughly 15%. Per the 2000 census, almost 40% of the population was born overseas from places including the Dominican Republic, Jamaica, Mexico, Guyana and Ecuador. Since most of the Bronx is actually within the LIS watershed, the fact that the population has increased significantly since 1990, that the area has a very high population density, a very low household median income and a high rate of poverty, it is likely that pollution from stormwater from this area continues to need improvement.

3.2.3 New York County

All of New York County is included in management zone 9. New York County, which consists of Manhattan Island and several small adjacent islands, is the most densely populated county in the United States, and one of the most densely populated areas in the world. The 2010 census indicated a population of 1,585,873 people in a 22.96 sq mi area. This gives New York County population density of 69,464 people per sq mi. In 1990, the population of New York County was 1,487,536, so New York County has seen a population increase of approximately 8% from 1990 to 2010.

New York County and Manhattan in particular is one of the highest income places in the United States. The Upper East Side of Manhattan, zip code 10021, is home to more than 100,000 people and has one of the largest concentrations of extreme wealth in the United States; however, there are very large differences in median incomes throughout the neighborhoods of New York County. The median household income for New York County is $64,971, which is higher than the state average. 17.8% of the population lives below the poverty line, which is slightly more than the state average.

If population alone attributes to the level of pollution in stormwater, the fact that New York County is one of the most densely populated areas of the world in and of itself would indicate pollution from stormwater could be expected to be significant.

In addition to the population that lives in NYC, approximately 48.8 million people visited NYC in 2010, which was up from about 36.2 million visitors in 2000.

3.2.4 Kings County

Kings County is part of management zone 9 and is one of the five boroughs of NYC. The total land area of Kings County is 70.82 sq mi however less than 1/3rd of this area is in the LIS watershed. The population of Kings County is 2,504,700 per the 2010 census. The population density is 35,369 people per sq mi.

The median household income is $42,567, which is lower than the state average. 22% of the population lives below the poverty line, which is significantly higher than the state average.

3.2.5 Queens County

Queens County is included in both management zones 8 and 9. Approximately 1/3rd of the land area, the northern 1/3rd, is located within the LIS watershed. Queens is the largest of the five boroughs of New York City with 108.53 sq mi of land area and the second largest in population. Queens is the most

ethnically diverse urban area in the world with a population of 2,230,722 per the 2010 census. Approximately 47% of the population is foreign-born, representing over 100 different nations and speaking over 138 different languages. The population density of Queens is 20,554 people per square mile. While Queens itself is very diverse, residents of Queens often closely identify with their neighborhoods rather than with the borough or city. The population of Queens in 1990 was 1,951,598, so there has been a population increase of approximately 15% since 1990.

The median income for a household in this county is $55,291, effectively the same as the NYS median household income. 13% of the population lives below the poverty line, which is also effectively the same as the state average.

The physical make up of the neighborhoods of Queens are as diverse as the population so a more detailed analysis of the area of Queens located within the LIS watershed will be developed as part of the TMDL Reassessment. At this point in time, specific statements about the population or demographics of Queens and how they relate to stormwater pollution cannot be made. However, given the high population density, it is reasonable to expect that stormwater pollution could be expected to be significant.

3.2.6 Nassau County

Approximately the northern 1/4th of Nassau County is located within the LIS watershed. Nassau County has a total area of 453 square miles, 287 of which are land and 166 are water. The total population of Nassau County per the 2010 census was 1,339,532 people. The population of Nassau County in 1990 was 1,287,348, so the population has increased roughly 4% since 1990. The actual number of people estimated to live within the LIS watershed in Nassau County has not been determined at this time. The average population density of Nassau County is 4,655 people per square mile, though this density is most likely not as high in the LIS watershed. In 2012, Forbes magazine ranked Nassau County as the 12th richest county in America and the highest median household income ($96,145) in the State of New York. A large portion of the wealth in Nassau County is concentrated along the north shore and therefore within the LIS watershed (review of median household incomes for north shore communities as reported by www.muninetguide.com/states/new_york/county/Nassau

While the population density for Nassau County is high, there is probably a decrease in the population density of Nassau County within the LIS watershed. The fact that the population of Nassau County was relatively stable from 1990 to 2010, there has most likely not been any significant change in stormwater pollution as a result of population density. The affluence of the communities that are located within the LIS watershed may have a role in contributing to nitrogen pollution in stormwater as a consequence of the landscaping that is typically associated with affluent homes/neighborhoods. This statement needs to be further assessed and will be identified as a need in the “Data Gaps and Recommendations” section of this report.

3.2.7 Suffolk County

Suffolk County is largely suburban and is the fourth most populous county in the state with a population of 1,493,350 people per the 2010 census. Suffolk County is also a large county, the second largest of the

62 counties in the state (2,373 sq mi), however, only a very small portion of the county is located within the LIS watershed: the northern edge of the county which is bounded by LIS. The population of Suffolk County in 1990 was 1,321,864 so the population has increased approximately 13% from 1990 to 2010.

Suffolk County continues to be the leading agricultural county in the state of New York however much of the agricultural activity happens away from the coasts and therefore make up a small part of the land use within the LIS watershed. Much of Suffolk County that is within the LIS watershed continues to be "natural" and protected coastal habitat.

The median family income was $72,112 and only 4% of the population is below the poverty line. There are two Indian reservations within Suffolk County: the Poospatuck and Shinnecock Indian reservations. Neither of these is within the LIS watershed.

While the increase in population of Suffolk County is relatively significant, it is undetermined at this time what the population grown within the LIS watershed was. Since much of this coastline is "protected" and natural, this area is not likely to contribute significantly to stormwater pollution. Exceptions could be in more developed areas around some of the harbors. It is not likely that agriculture from Suffolk County plays a significant role in stormwater pollution to LIS, however the actual location and types of agricultural activities that are going on within the watershed is an area for the "Data Gaps and Recommendations" section of this report.

3.3 Golf Courses

There are 75 golf courses located in the LIS watershed in NYS. Figure 5 presents the location of these. The following is a breakdown of the number of golf courses in each management zone:

- 33 in Management Zone 7
- 5 in Management Zone 8
- 1 in Management Zone 9
- 21 in Management Zone 10
- 15 in Management Zone 11

All of these golf courses have been in existence since 1990. Table 8 presents the list of Golf Courses within the LIS watershed

The presence of golf courses in a watershed has been identified as a potential source of stormwater pollution. Golf courses can act as a source of stormwater pollution for such things as nitrogen, phosphorous and pesticides to name a few potential pollutants. This effort is focused on the potential for nitrogen pollution in stormwater from golf courses.

While the mere presence of a golf course in and of itself does not ensure the golf course is a source of stormwater pollution, how they manage their activities most likely does. Nutrient application and management on golf courses has the potential to negatively affect water quality as the result of nitrogen pollution of stormwater runoff.

Figure 5: New York State Long Island Sound Watershed Golf Courses

3.4 Residential Fertilizer Use

3.4.1 NYS Nutrient Runoff Law

Title 21 Sections 17-2103 established regulations governing the sale or use of phosphorous fertilizer in NYS, effective January 1, 2012. This law prohibits the application of phosphorous containing fertilizer on lawns or non-agricultural turf except when a soil test indicates phosphorous is needed or to help establish a newly established lawn of non-agricultural turf during the first growing season.

This law also prohibits that application of any fertilizer to:

- lawn or nonagricultural turf between December first and April first annually
- any impervious surface, requiring the clean up of any such "application"
- to any lawn or non-agricultural turf on any real property within twenty feet of any surface water, unless there is a continuous natural vegetative buffer, at least ten feet wide separating the lawn or non-agricultural turf from the surface water

3.4.2 Nassau County Fertilizer Law – Local Law No 11-2009

On June 6, 2009 the Nassau County Legislature passes a local law known as the "Nassau County Fertilizer Law". The intent of the law is to reduce nitrogen runoff and leaching which leads to contaminated drinking water, storm water, groundwater as well as the pollution of waterways, wetlands and estuaries. This law aims to do that by prohibiting the application of fertilizer to any real property in the County between November 15th and April 1st every year. Any person who violates this law is subject to fines that range from $250 for the first offence to $1000 for repeat offenders.

3.4.3 Suffolk County local law (41-2007)

The purpose of the Suffolk County fertilizer law is to reduce the amount of nitrogen released into the groundwater and surface water by eliminating the use of fertilizers were practicable on lawns and on County property. This law was approved December 18, 2007.

This law requires that fertilizer shall not be applied to County owned real property, except as authorized under the law. Exemptions to this law include golf courses, The Suffolk County Farm, and athletic fields. Any fertilizer application to these properties requires application per best management practices.

This local law prohibits the application of all fertilizers (including on residential lawns) between November first and April first. Violators may be fined up to $1000.

Additionally, this law requires "Home Improvement Contractors" who are required to obtain a license and who apply fertilizer, to attend and educational course on fertilizer application.

3.4.4 Westchester County 2009 Lawn Fertilizer Law

Westchester County passes a lawn fertilizer law effective January 3, 2009 which requires the following:

- Fertilizer cannot be applied between December 1 and April 1, when the ground is frozen and more likely to produce runoff

- Fertilizer cannot be applied on impervious surfaces such as driveways, parking lots, roadways or sidewalks
- Fertilizer cannot be applied to lawn areas that are within 20 feet of any surface water, unless a natural vegetative buffer at least 10 feet wide separates the lawn area and the surface water.

This law also required, effective November 1, 2009

- Contractors must complete an approved turf management course and submit proof of completion when applying for or renewing home improvement licenses

Additional requirements to this law became effective January 1, 2011 and require:

- Fertilizer containing phosphorous cannot be applied to lawn areas unless soil tests confirm the need
- Fertilizer containing phosphorous can be applied to newly established turf or lawn areas during their first growing season.
- Fertilizer can be applied to vegetables and flower gardens, trees and shrubs

3.5 Septic Systems

Man has recognized the importance of managing sanitary waste as far back as 3500 B.C. However the management of sanitary waste and the connection between it and water pollution was not made until relatively recently.

Man has managed sanitary waste in a number of ways, from the use of Chamber pots in the middle ages, to outhouses and indoor plumbing. The first patent for a flushing toile was issued to Alexander Cumming in 1775. Up until the 1840, indoor plumbing could be found only in the houses of the rich and better hotels, and generally only in city's or towns. In 1921 only one percent of homes In the United States had indoor plumbing: Outhouses continued to be the norm in rural America. In the 1930s in America, as electricity was reaching rural communities, so was indoor plumbing. It is important to note that much of Long Island was considered "rural America" as late as the 1930's.

Prior to the use of indoor plumbing in rural America, the USDA published a rural sanitation guide in the 1920's. The focus of these guides was primarily for public health protection and did not necessarily consider contamination of water ways or groundwater as a problem. For example, The Privy Law in North Carolina (1919) required that every residence located within 300 feet of another residence must have an improved privy of a type approved by the NC State Board of Health. The 300 foot distance was established because this was the distance a hookworm could crawl from the "source". These "privy's" were also known as outhouses which effectively were a structure built over a pit in the ground, which effectively acted as both a septic tank and leach field, disposing of both solid and liquid sanitary waste.

The Federal Water Pollution Control Act of 1948 was the first major law to address water pollution and provided federal funds for water quality surveys and construction of collection and treatment plants. By 1960, 50% of the US population had access to some form of wastewater treatment.

In 1957 the U.S Government Printing Office published a Manual of Septic-Tank Practice: Developed in Cooperation with the Joint Committee on Rural Sanitation. However, sanitary waste and water pollution control were not fully integrated until the Clean Water Act was established in 1972.

On Long Island, especially in Suffolk County, most areas are served by septic systems. Due to the highly permeable soils of Long Island, many residents are serviced by cesspools. Less than one third of Suffolk County is serviced by sewer districts and wastewater treatment plants, with most of that area being located along the south west area of Suffolk County, thus outside of the LIS watershed.

Approximately 95% of Nassau County is serviced by sewer districts and wastewater treatment plants. There is a very small area on the North Shore of Nassau County that is still serviced by septic systems, most likely cesspools.

The area of Westchester that is not serviced by sewer districts and wastewater treatment plants is unknown at this time. There is also a lack of information regarding areas of New York City that are not sewered.

3.5.1 Regulations

Sanitary wastewater discharges to groundwater are regulated by either the New York State Department of Health (NYSDOH), the NYSDEC, local Departments of Health and/or local building departments. Many counties Department of Health's have been delegated authority to issue permits for larger residential and commercial sanitary discharges to groundwater by both the NYSDOH and the NYSDEC. For individual household systems and smaller developments (typically less than 5 housing units) local building departments oversee these systems. The following sections briefly discuss septic system regulations.

3.5.1.1 Residential Septic Systems Discharging Less than 1000 Gallons per Day

The New York State Department of Health (NYSDOH) has established regulations for residential wastewater treatment systems discharging less than 1000 gpd. These regulations are entitled "Appendix 75-A, Wastewater Treatment Standards – Residential Onsite Systems. Design guidance for residential onsite systems are published under the title Residential Onsite Wastewater Treatment System Design Handbook. Both of these publications are available on the NYSDOH website.

The NYSDOH regulations establish a minimum set or requirements for septic systems. Local health departments that have been delegated to oversee these programs may impose even stricter requirements or modify some requirements to accommodate any special conditions that an area of the State may pose. In most cases however, residential septic systems are governed by local building code/building departments and therefore there is no centralized database regarding the types of septic systems in use in NYS.

3.5.1.2 Sanitary Wastewater Treatment Plants <30,000 gpd Discharging to Groundwater

The "Design Standards for Intermediate-Sized Wastewater Treatment Systems" have been developed to, in addition to other things, provide regulators with guidance on the design, operation and maintenance of WWTPs that are <30,000 gpd and discharge to groundwater. The principal goal of the design

standards is to provide design criteria for building WWTPs that protect the water quality of groundwater and surface water, along with the ecosystems associated with them. These design standards are currently being revised by the NYSDEC.

Permitting and oversight of WWTPs that fall into this category in Suffolk County has been delegated to the Suffolk County Department of Health.

3.6 Number of Cars

Per the following website, http://www.nyc.gov/html/dot/downloads/pdf/nyc_greendividend_april2010.pdf, there were about 1,980,000 vehicles registered in the 5 boroughs of NYC in 2008. If you include Westchester, Nassau and Suffolk Counties, the total number of vehicles in the greater metropolitan area of NYC is about 4,520,000. While the actual number of vehicles within the NY portion of the LIS watershed would be considerably less, this number represents a very high density of cars in the area.

Per the website www.streetsblog.org, fewer people in the greater New York metropolitan area are driving to work than they did in 2000. However, that website also indicated that citywide, car ownership has increase by 1.7% over the same period. NYC is the only locality in the country where more than half of all households do not own a car. In Manhattan, more than 75% of households do not own a car. NYC has, by far, the highest rate of public transportation use of any American city, with 54.2% of workers commuting to work by this means in 2006

NYCs uniquely high rate of public transit makes it one of the most energy efficient city in the US. Gasoline consumption in NYC in 2006 was at the rate of the national average in the 1920s. The Brookings Institute ranked the NYC metro area as having the lowest per-capita transportation-related carbon footprint and fourth lowest overall per-capita carbon footprint in 2005 among the 100 largest metro areas of the United States. This supports that vehicular NOx emissions would also be low on a per-capita basis.

Regardless of the energy efficiencies realized by public transportation, the vast number of people who live, work and drive cars in the greater metropolitan is significant, causing significant congestion on the roadways that service this area.

3.7 Number of Airports

There are three major airports in the greater NYC metropolitan area (John F. Kennedy International, Newark Liberty International and LaGuardia) making NYC the top international air passenger gateway to the United States. 100 million travelers used the city's airports in 2005 and 103.6 million travelers used the city's airports in 2010. New York is the busiest air gateway in the nation; however, there were roughly 1.19 million flights at these airports in 2005 and only 1.16 million flights in 2010. This number of flights does not take into account the size of aircraft.

3.8 Seaports

The Port of New York and New Jersey has historically been one of the most important ports in the United States, and is now the third busiest in the US behind Los Angeles and Long Beach, California in

the volume of goods that pass through the port. In 2005 more than 5,300 ships delivered goods to the port that went to 35% of the US population. The port is experiencing rapid growth with shipments increasing about 12% in 2005 from previous years. The future of the port and its potential for expansion is directly tied to the expansion and deepening of the Panama Canal. Completion of the Panama Canal work is expected in 2014, and therefore the Port of NY and NJ is looking to capitalize on that increased ship traffic. In addition to the Port of NY & NJ, there are three additional cargo terminals around NYC and several more in NJ.

New York Harbor is also a major hub for passenger ships. More than half a million people depart annually from Manhattan's New York Passenger Ship Terminal on the Hudson River, accounting for five percent of the worlds cruise industry. The Queen Mary 2, the world's second largest passenger ship, was designed specifically to fit under the Verrazano Bridge, itself the longest suspension bridge in the United States. There are two other passenger ship terminals serving the metropolitan NY area.

4 Regulated Stormwater and Other Permitted Programs

The New York State Pollution Discharge Elimination System (SPDES) Stormwater Program regulates stormwater discharges form a number of potential sources including but not limited to:

- Municipal Separate Storm Sewer Systems (MS4s)
- Construction Activities
- Industrial Activities
- Concentrated Animal Feed Operations (CAFOs)

The following sections describe in detail the elements of each one of the general permits for stormwater issued by the New York State Department of Environmental Conservation

4.1 SPDES Phase I MS4 Permit

4.1.1 General Program Information

Phase I stormwater program covered medium and large MS4s. Phase I MS4s were automatically designated nationwide as medium MS4s if they were located in an incorporated place or county with a population between 100,000 – 249,999, or as large MS4s if they were located in an incorporated place or county with a population of 250,000 or greater

The EPA's Phase I MS4 requirements for New York City (NYC) were included in the April 1998 modification of the SPDES Permits for the fourteen NYC Water Pollution Control Plants (WPCPs). The MS4 requirements in the 1998 SPDES Permit modification included source identification, discharge characterization, submittal to DEC of DEP's proposed discharge monitoring and stormwater management programs, and assessment of pollution controls.

The MS4 requirements were updated and revised in the SPDES Permit modifications issued in April 2003; this SPDES Permit modification was litigated and finally resolved in June 2010. The revised MS4 requirements in the April 2003 SPDES Permit modification were included in the Permits for ten of the

fourteen WPCPs that have MS4 drainage areas (i.e., Bowery Bay, Coney Island, Hunts Point, Jamaica, Newtown Creek, Oakwood Beach, Owls Head, Port Richmond, Rockaway, and Tallman Island). The SPDES Permits for the fourteen WPCPs were renewed in October 2010 for a period of five years. The MS4 requirements in the April 2003 SPDES Permit modification were carried over into the administratively renewed SPDES Individual Permits for the ten WPCPs with MS4 drainage areas.

Of the ten WPCPs that have MS4 drainage areas, the following are within the LIS watershed:

- Bowery Bay
- Hunts Point
- Tallman Island
- Newtown Creek

The MS4 requirements in the active SPDES Permits for the ten WPCPs with MS4 drainage areas included evaluation of the need to make necessary amendments to the sewer use regulations based on the stormwater discharge characterization report (prepared as a result of the 1998 MS4 requirements), develop a stormwater monitoring program, estimation of seasonal stormwater pollutant loads, develop a trackdown and remediation program, inventory of industrial and waste handling facilities discharging to the MS4, assessment of controls, and submission of report/progress report on the implementation of MS4 requirements. The detailed MS4 requirements from the active (2010) SPDES Permit for the Tallman Island WPCP are provided in Appendix A.

NYCDEP has submitted reports to NYSDEC from 1999 to 2010 that satisfied most of the 1998 and the 2003 Phase I MS4 requirements.

Additionally, the SPDES Individual Permits have ongoing requirements for shoreline survey and outfall identification that surveys the shoreline of New York City including the MS4 areas. The SPDES Individual Permits also have some ongoing requirements in the best management practices (BMPs) for combined sewer overflows (CSO), which the City is also implementing in the MS4 areas. The CSO BMP requirements that are being implemented citywide include catch basin repair and maintenance, catch basin retrofitting, and public education programs in the control of floatable and settleable solids, and on-site detention and retention for new developments to meet allowable sewer flow requirements.

NYCDEP has been submitting annual and periodic reports to NYSDEC to continue to meet these requirements.

4.1.2 Description of Nitrogen Control Requirements

NYC is developing a robust program for managing stormwater from all sources to minimize the impacts of stormwater on water quality. The following sections detail many of the programs NYC is implementing to address stormwater. Many of these activities will have a positive impact on reducing nitrogen from stormwater.

4.1.2.1 Industrial Activities

Industrial facilities engaged in activities defined in 40 CFR 122.26(b)(14)(i-ix) and (xi) are required to obtain permit coverage for stormwater discharges to surface waters of New York State through either an individual industrial SPDES permit, the SPDES Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity, or provide certification using the No Exposure Exclusion that industrial activities are not exposed to stormwater.

The Industrial Stormwater General Permit was issued for the first time in 1998 and facilities in New York City MS4 and surface water direct discharge drainage areas have been covered under this Permit. The Permit went through significant revisions in 2007 and 2012, and the current version of the Multi-Sector Industrial Stormwater General Permit is GP-0-12-001.

Facilities covered under the Industrial Stormwater SPDES General Permit are required to prepare a site-specific stormwater pollution prevention plan (SWPPP). SWPPPs are required to include structural and non-structural best management practices (BMPs) for each of the areas where industrial materials or activities are exposed to stormwater. Permitted facilities are required to perform periodic and annual compliance inspections and maintenance of the BMPs. Monitoring requirements for permitted facilities include quarterly visual monitoring and annual dry weather monitoring for all facilities and benchmark monitoring for many sectors of industrial activities and numeric effluent guidelines for some sectors.

The individual SPDES Permits for large industrial facilities with industrial stormwater component are required to implement BMPs to runoff control BMP requirement in the Permit.

4.1.2.2 Stormwater Discharges from Construction Activity

Since the Phase II stormwater regulations became effective in New York State in 2003, construction activities involving soil disturbances greater than 1 acre in New York City MS4 and surface water direct discharge drainage areas are required to obtain coverage under the SPDES General Permit for stormwater discharges from construction activity (currently GP-0-10-001). The construction stormwater SPDES General Permit coverage in New York City MS4 and direct discharge drainage areas is also required for construction activities involving soil disturbances of less than 1 acre, where the NYSDEC has determined that a SPDES permit is required for stormwater discharges based on the potential for contribution to a violation of a water quality standard or for significant contribution of pollutants to surface waters of New York State.

All construction activities covered under the Construction Stormwater SPDES General Permit are required to prepare a site-specific stormwater pollution prevention plan (SWPPP). All SWPPPs are required to include erosion and sediment control (E&SC) measures and pollution prevention/good housekeeping practices during construction. All construction projects identified in Table 2 of Appendix B of the Construction Stormwater SPDES General Permit are also required to prepare and implement a SWPPP with post-construction stormwater management practices. Post-construction stormwater management practices, required as part of the construction stormwater General Permit, are mostly stormwater quality controls because most sites discharges directly or through a MS4 with allowable flow requirements to a fourth order stream or larger.

Since 2007, SWPPP requirements for construction stormwater discharges have also been included in the renewals of individual SPDES Permits for large industrial facilities that have construction activities.

Erosion and sediment controls are also included in the Permits issued by NYSDEC for construction activities in the tidal and freshwater wetland areas.

4.1.2.3 NYCDEP Sewer Connection Application

Development projects that apply for new connection or changes to connection to the MS4 are required to meet the allowable flow requirements for the sewer. Projects that do not meet the allowable flow requirements of the sewer are required to provide for onsite stormwater detention. Although stormwater detention facilities are inadequate to meet the Phase II stormwater quality control goals, they can and are being coupled with stormwater quality controls to meet the goals.

4.1.2.4 Non-Traditional MS4s

Since the Phase II stormwater regulations became effective in New York State in 2003, non-traditional MS4s such as federal and state government facilities, Metropolitan Transportation Authority (MTA) facilities that discharge to the NYC MS4 or surrounding waterbodies are required to obtain coverage under the SPDES General Permit for Stormwater Discharges from Municipal Separate Storm Sewer System (MS4).

These non-traditional MS4s are required to submit a Notice of Intent (NOI) to gain coverage under the SPDES General Permit, and prepare and implement a Stormwater Management Plan (SWMP) for the stormwater discharges from its MS4. The SWMP for these small MS4s must include the 6 minimum control measures (MCMs): Public Education and Outreach on Stormwater Impacts, Public Involvement/ Participation, Illicit Discharge Detection and Elimination (IDDE), Construction Site Stormwater Runoff Control, Post-Construction Stormwater Management, and Pollution Prevention/Good Housekeeping for Municipal Operations

4.1.2.5 NYC Green Infrastructure Plan

NYC is in the process of implementing the Green Infrastructure (GI) Plan, which was released in September 2010, to improve the quality of NYC's waterways by capturing and retaining stormwater to reduce combined sewer overflows. While the current implementation of the GI Plan is mostly in combined sewer drainage areas, pilot projects are also being implemented in MS4 drainage areas and the GI Plan will eventually be extended to include MS4 areas. Stormwater controls that can be implemented in MS4 drainage areas include green roofs, bioswales, pocket wetlands, porous pavement, and rain barrels.

4.1.2.6 Street Sweeping

NYC engages in a citywide street sweeping program to clean the streets and reduce floatable entry into catch basins. The program is administered by the Department of Sanitation and evaluated through systematic street litter monitoring, known as the "Scorecard Program," conducted by the Mayor's Office of Operations. According to the Scorecard Program, city-wide street litter levels have improved somewhat over the past six years with clear improvements in the percent acceptable and percent filthy ratings.

4.1.2.7 Catch Basin Repairs and Maintenance

NYC conducted an initial catch basin inspection and hooding program in 1999. Since then, catch basin inspection and hooding continued in what is referred to as the "post-inspection" program which is conducted on a three-year cycle for all areas of the City.

Inspections and Cleaning

Catch basin maintenance and repair work is a major focus of NYCDEP's Bureau of Water and Sewer Operations (BWSO) daily activities with BWSO devoting significant resources to these tasks both as part of the programmatic (scheduled) three year cycle and in response to complaints from the public. BWSO tracks inspection progress in several ways: by community board, by managing progress towards the target of inspecting one third of the catch basins annually, by reviewing the number of basins inspected and cleaned on a regular basis, and by ensuring timely response to any issues reported by the public.

For the calendar year 2011, 42,873 catch basin inspections were completed at an approximate monthly average rate of 3,573 basins per month. NYCDEP also cleaned 31,957 catch basins in 2011.

Hood Replacement

The provisions of the SPDES permits require that the NYCDEP "shall replace missing or damaged catch basin hoods within 90 days after the date of the inspection for the basins known to be hooded upon completion of the catch basin hooding program". NYCDEP hooded 654 catch basins during the year 2011 across all the 14 WPCP drainage areas.

Catch Basin Retrofitting, Repair, and Reconstruction

The SPDES permit provisions require that any retrofits for hooding compliance be completed by April 1, 2008. The SPDES provisions also require that catch basins requiring extensive repairs before a hood can be installed be hooded by January 2010. The NYCDEP BWSO uses three categories of work to achieve compliance with the SPDES requirements for retrofit, repair and reconstruction.

Retrofit: As defined in the SPDES permits and previous BMP reports, "retrofitting may include the replacement of street grating, restriction of elimination of curb cuts, installation of an outlet "90 degree elbow" catch basin sieves, or other device to limit street litter from entering the combined sewer system as approved by the Department". For practical and efficiency purposes, the retrofit that NYCDEP has used for compliance with retrofitting requirement is the restriction (closure or absence) of catch basin curb cuts (curb inlet or curb piece). This is consistent with the WPCP SPDES permits which recognize that absence or closure of the catch basin curb inlet is an appropriate retrofit that minimizes the amount of street debris entering the basins.

Repair: The repair category refers to catch basin work done by NYCDEP in house forces to allow a basin to accept a hood that cannot in its existing condition. Specifically, repairs refer to basin rehabilitation activities including brick work on portions of the basin, and/or replacement or rehabilitation of particular components of the basin. In the repairs category, the existing catch basin structure and footprint remains largely unchanged.

Reconstruction: The reconstruction category refers to the complete reconstruction of the basin, including the removal of the existing basin structure, excavation or placement of fill if needed to change the elevation of the basin or reconfigure the basin's connection to the sewer and the construction of an entirely new basin structure that meets all current design standards.

Floatables Containment and Capture

The NYCDEP maintains 23 permanent floatable containment facilities and 1 temporary for a total of 24, corresponding to combined sewer and MS4 drainage areas totaling approximately 60,000 acres.

The floatable materials contained by the boom and net sites are retrieved by four, City-owned skimmer vessels. Offloading currently occurs at two NYCDEP WPCPs. The skimmer vessels are operated by a NYCDEP contractor. The contractor also provides containment site inspection, maintenance and repair and vessel maintenance and repair services.

Skimmer vessels are dispatched to retrieve floatables from booms and nets based on inspections conducted with small vessels within 24 to 48 hours of significant rain events. The inspection vessels are also equipped with hand netting tools in order to retrieve small amounts of floatables, so that the skimmer vessel use is more focused on containment sites with large amounts of floatables.

In 2011, 1,990 cubic yards of floatable material were retrieved from the 24 containment facilities and various water bodies.

4.1.2.8 Public Education and Outreach

NYCDEP currently manages an extensive public education program that targets New York City students, teachers, parents, residents, community organizations, businesses, and visitors and internet users. The program is supported through the Visitor Center at the Newtown Creek WPCP and the Newtown Creek Nature Walk, outreach events at schools and public events, multi-media promotion, public exhibitions, support of volunteer programs, literature and publication distribution, promotional item distribution, and the DEP website.

In 2011, the Keep New York City Beautiful organization remained active, focusing on citywide community-improvement programs such as litter prevention, neighborhood clean-ups, urban greenspace initiatives, tree plantings, and other activities. The 'Keep New York City Beautiful' activities and impacts during 2011 included:

- Enhanced the collection of floatable litter by conducting beach and shoreline cleanups through a NYCDEP initiative, removing approximately 298 cubic yards of debris.
- Cleaned over 4,233 vacant lots citywide.
- Continued to collaborate with 64 Business Improvement Districts (BIDs) and hundreds of their cleaners to sweep up, adopt litter baskets, and spruce up areas through a joint effort with the Departments of Sanitation and Small Business Services and were able to sign two more BIDS into law. The two BIDS will begin providing services in 2012.

- Ticketed 387 dog walkers who failed to clean up after their dogs through a Sanitation Department public awareness campaign; bringing total number of tickets issued under the program to 1,800.
- Million Trees NYC planted 558,799 new trees along with Reforestation, 291,321, Street Trees 85,334, Other 182,144. During the Fall Volunteer Planting Week in October, 2011, over 20,000 new trees were planted throughout the five boroughs.
- Since the inception of PlaNYC, have constructed 312 Greenstreets.

4.1.2.9 Shoreline Survey and Outfall Identification Program

The NYCDEP completed a survey of the shoreline for outfalls tributary to the WWTP drainage areas of Bowery Bay, Coney Island, Jamaica, Newtown Creek, North River, Red Hook, Tallman Island, and Wards Island in the first five year cycle from 1998 to 2003.

A shoreline survey of outfalls tributary to the WWTP drainage areas of the remaining six drainage areas of 26th Ward, Hunts Point, Oakwood Beach, Owls Head, Port Richmond, and Rockaway were completed in the second five year cycle from 2003 to 2008. A Shoreline Survey Report dated March 31, 2008 was submitted by the NYCDEP to the NYSDEC that compiled the outfall information of the entire NYC shoreline obtained from shoreline survey and outfall identification program in the two five-year cycles, in response to the shoreline survey requirement in the SPDES Permit for the fourteen WPCPs.

4.1.3 Estimated Effectiveness of Nitrogen Controls or General Measures

There are so many factors that contribute to the status of water quality of the waters of NYC that it is not yet possible to make any clear assessments as to the effectiveness of MS4 control measures. It is clear however that NYC is making great strides in addressing stormwater related pollution as is evidence by the efforts it is putting forward in both reducing CSO's as well as stormwater from MS4 areas.

City wide initiatives that will have a direct impact on nitrogen in stormwater include:

- Sewer Connection Applications
- The Green Infrastructure Plan
- Street Sweeping Program
- Catch Basin Cleaning
- Public outreach programs including:
    - Programs targeting litter removal/prevention
    - Enforcement of the Pet Waste Law
    - Tree Plantings

4.1.3.1 Harbor Water Sampling Data

The NYCDEP collects and analyzes data from a total of 70 sampling stations harbor-wide to monitor water conditions and understand how water quality can be improved. The NYCDEP collects harbor samples at stations throughout NYC waterways weekly from June through September and biweekly from October through May. The most recent report shows results of tests for Dissolved Oxygen (DO), Fecal Coliform (FC), Enterococcus, and Secchi Transparency. The level of DO in marine waters can be related to the nitrogen load to those waters and resulting algal blooms that then die and consume

oxygen. Sample results for DO in the Inner Harbors of the NY NJ Harbor have shown a steady increase in both surface and bottom waters beginning in the late 1980. The average DO levels for surface and bottom waters of the Inner Harbor have risen from approximately 4.3 and 2.8 mg/l in 1970 to 6.5 and 5.8 m/l in 2010, respectively. DO levels in the Upper East River and Western Long Island Sound have also shown a general positive trend upward from 1970 through 2010 though the improvements have not been as great as those in the Inner Harbor. The DO levels of both bottom waters and surface waters in these areas have averaged above the NYS DO water quality standard for Class I waters at the NYCDEP sample locations since 2005.

4.1.4 Relative Change in Scope and Effectiveness of Program from 1990 to 2012

NYC has become much more focused on stormwater that is not within a combined sewer system from 1990 through present as is evidenced by the number of programs the NYCDEP and the Mayor's office have initiated to address stormwater pollution from 1990 through 2012. Information on all pollution related activities being conducted in NYC can be found at http://www.nyc.gov/html/dep/html/home/home.shtml

4.2 SPDES Phase II MS4 Permit (GP-0-10-002)

4.2.1 General Program Information

The Phase II rule requires statewide coverage of all operators of small MS4s that are located within the boundaries of a Bureau of the Census-defined "urbanized area". A small MS4 is any MS4 that is not already covered by the Phase I stormwater program and operates within such an urbanized area (UA) or other areas designated by the State. An urbanized area is a densely settled core of census tracts and/or census blocks that have a population of at least 50,000, along with adjacent territories containing non-residential urban land uses, as well as, territories with low population density included to link outlying densely settled territory with the densely settled core.

The permitting authority is required to develop a set of designation criteria and apply them at a minimum to all small MS4s located outside of an UA serving a jurisdiction with a population of at least 10,000 and a population density of at least 1,000 people/sq mile. The following designation criteria have been adopted to designate additional MS4s in New York State:

Criteria 1: MS4s discharging to waters for which an EPA-approved TMDL required reduction of a pollutant associated with stormwater beyond what can be achieved with existing programs (and the area is not already covered under automatic designation as UA).

Criteria 2: MS4s contiguous to automatically designated urbanized areas (town lines) that discharge to sensitive waters classified as AA Special (fresh surface waters), AA (fresh surface waters) with filtration avoidance determination or SA (saline surface waters).

Criteria 3: Automatically designated MS4 areas are extended to Town, Village or City boundaries, but only for Town, Village or City implementation of Minimum Control Measures (4) Construction Site Stormwater Runoff Control and (5) Post Construction Stormwater Management in Development and Redevelopment. This additional designation may be waived, by written request to the Department,

where the automatically designated area is a small portion of the total area of the Town, Village or City (less than 15 %) and where there is little or no construction activity in the area outside of the automatically designated area (less than 5 disturbed acres per year).

An area may be additionally designated as a regulated small MS4 if the New York State Department of Environmental Conservation determined that its discharges directly or indirectly cause, or have the reasonable potential to cause or contribute to an adverse impact on water quality.

Urban Sources of pollution include improperly sited, designed and maintained on-site wastewater treatment (OSWT) systems or septic systems, pet wastes, lawn and garden fertilizers and pesticides, household chemicals that are improperly disposed of, automobile fluids, road deicing/anti/icing chemicals and vehicle emissions. Stormwater that comes into contact with these sources has the potential to contain pollutants that further impact impaired waterbodies. These pollutants are known as Pollutants of Concern (POC) and include:

- Sediment
- Solids/Floatables
- Oxygen demanding substances
- Pathogens
- Fertilizers/nutrients
- Hydrocarbons
- Metals

To address the potential for these POC to be present in stormwater discharge the Phase II MS4 Permit requires that all covered entities develop and implement a Stormwater Management Plan (SWMP) that satisfies the requirements of each of the six minimum control measures (MCM) developed by the EPA. These six MCM are as follows:

1. Public Education and Outreach on Stormwater Impacts
2. Public involvement/Participation
3. Illicit Discharge Detection and Elimination (IDDE)
4. Construction Site Stormwater Runoff Control
5. Post-Construction Stormwater Management
6. Pollution Prevention/Good Housekeeping for Municipal Operations

MS4s that discharge to impaired watersheds are required to modify their SWMP to comply with additional requirements that are included in the Watershed Improvement Strategy section (Part IX) of the permit.

4.2.2 Description of Nitrogen Control Requirements

The NYSDEC has not included the LIS in Part IX of the Phase II MS4 General Permit because the NYSDEC believes that implementation of the 6 MCMs required under the terms of the general permit conditions can conservatively achieve a 10% reduction in nitrogen from regulated stormwater. Typical sources of nitrogen pollution in stormwater from an MS4 include:

- Failed septic systems
- Leaking sanitary sewer lines
- Sewer cross connects/illicit discharge of sanitary waste
- Pet waste
- Wildlife waste
- Putrefied garbage
- Leaf litter
- Grass clippings
- Fertilizer use/misuse
- Automobile exhaust'
- Atmospheric deposition

Automobile exhaust and atmospheric deposition are sources of nitrogen pollution that could be reduced through implementation of the 6 MCMs, however air pollution regulations to control nitrogen emission to the atmosphere will be more important in addressing these sources.

4.2.3 Estimated Effectiveness of Nitrogen Controls or General Measures

It is reasonable to expect that implementation of the 6 MCMs will achieve reduction in stormwater nitrogen pollution by approximately 10%. The following sections identify the elements of each of the 6 MCM's that are expected to produce a reduction in nitrogen pollution in stormwater. Since these requirements were not in place in 1990, the data presented is reflective of when this reporting data began.

4.2.3.1 Public Education and Outreach (MCM 1)

Though the LIS is not included in Part IX of Phase II MS4 General Permit, educational programs and outreach activities should be administered as outlined in 40 CFR 122.34(b). In terms of Nitrogen as the POC, the Public Education and Outreach MCM 1 components may be:

a. Plan and conduct an ongoing public education and outreach program designed to describe the impacts of Nitrogen (the POC) on waterbodies. The program must identify potential sources of Nitrogen in stormwater runoff and describe steps that contributors can take to reduce the Nitrogen in stormwater runoff.

b. Develop, or acquire if currently available, specific educational material dealing with sources of Nitrogen in stormwater and pollutant reduction practices. At a minimum, the educational material should address the following topics:

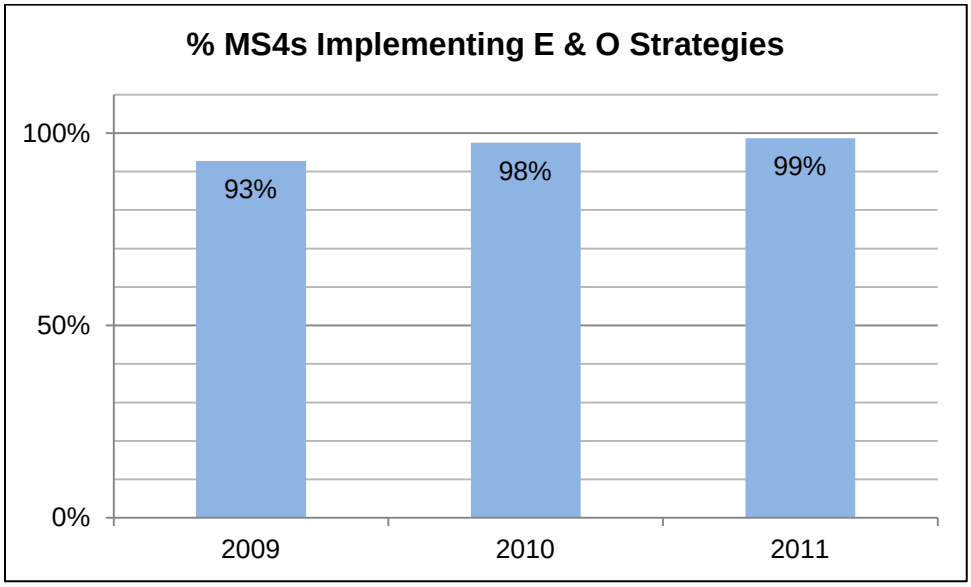
i. understanding the Nitrogen issue;
ii. septic systems as a source of Nitrogen; and
iii. Nitrogen concerns with fertilizer use.

Strategies implemented for MCM 1 were varied between MS4s and were dependant on each MS4s needs from year to year. Overall those strategies included:

a. Training for Construction Site Operators
b. Direct mailings
c. Public Displays and Kiosks
d. List Serve
e. Mailing Lists
f. Newspaper Advertisements
g. Public Events
h. School Programs
i. TV Advertisements
j. Printed Materials

In data recorded from annual reporting years from 2009 to 2011 the percent of MS4s Implementing Education and Outreach Strategies increased from 93% to 99% (See Figure 6). In 2011, over 489,000 people attended Public Events held by the MS4s to promote awareness and educate.

Figure 6: Percent of MS4s Implementing E&O Strategies



4.2.3.2 Public Involvement/Participation (MCM 2)

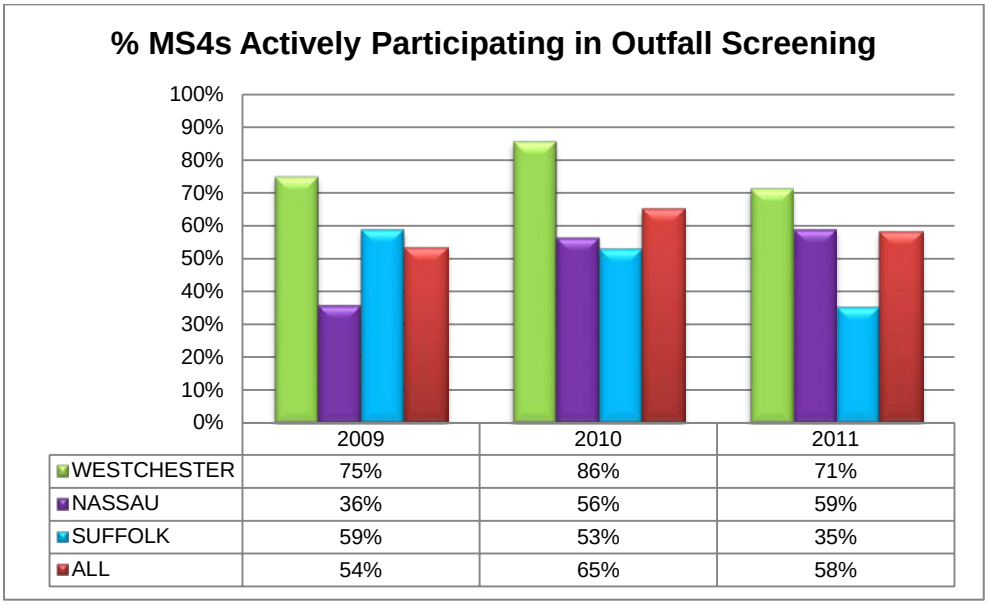
Clean up events and Community Meetings have the highest participation from MS4s in the LIS watershed of all the supplied categories for MCM 2 in the annual report. The trend is showing that as public awareness increases through education and outreach, public participation is increasing as well.

4.2.3.3 Illicit Discharge Detection and Elimination (MCM 3)

Investigation, Field work and Mapping are key components at the center of MCM 3. MS4s showed a general increase in overall performance for the reporting years 2009 to 2011. It should be noted that the event of Tropical Storm Irene in August 2011 may have had an impact on MS4s reporting procedures and regular day-to-day activities. The data shows an increase in activities from 2009 to 2010, and either no increase or a decrease in activities between 2010 and 2011. Of the 84 MS4s within the LIS watershed, 71 have 100% of the outfalls mapped within their jurisdiction. 65% of MS4s actively

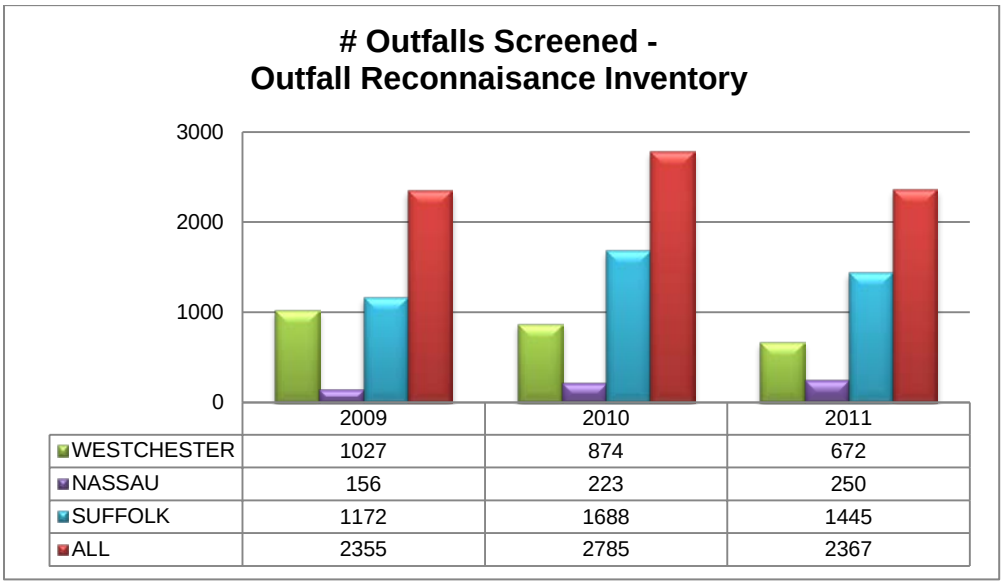
participated in Outfall Screening in 2010 (Figure 7) with 2785 outfalls screened (Figure 8). These numbers dropped to 58% and 2367 respectively in 2011. In 2010 the number of MS4s that have adopted an IDDE Law was up to 79 (Figure 9). Sewershed mapping has been completed by 58 of the 84 MS4s, up from 27 in 2009 (Figure 10).

Figure 7: Percent MS4s Actively Participating in Outfall Screening



	2009	2010	2011
WESTCHESTER	75%	86%	71%
NASSAU	36%	56%	59%
SUFFOLK	59%	53%	35%
ALL	54%	65%	58%

Figure 8: Number of Outfalls Screened - Outfall Reconnaisance Inventory



	2009	2010	2011
WESTCHESTER	1027	874	672
NASSAU	156	223	250
SUFFOLK	1172	1688	1445
ALL	2355	2785	2367

Figure 9: Number of MS4s Adopted IDDE Law

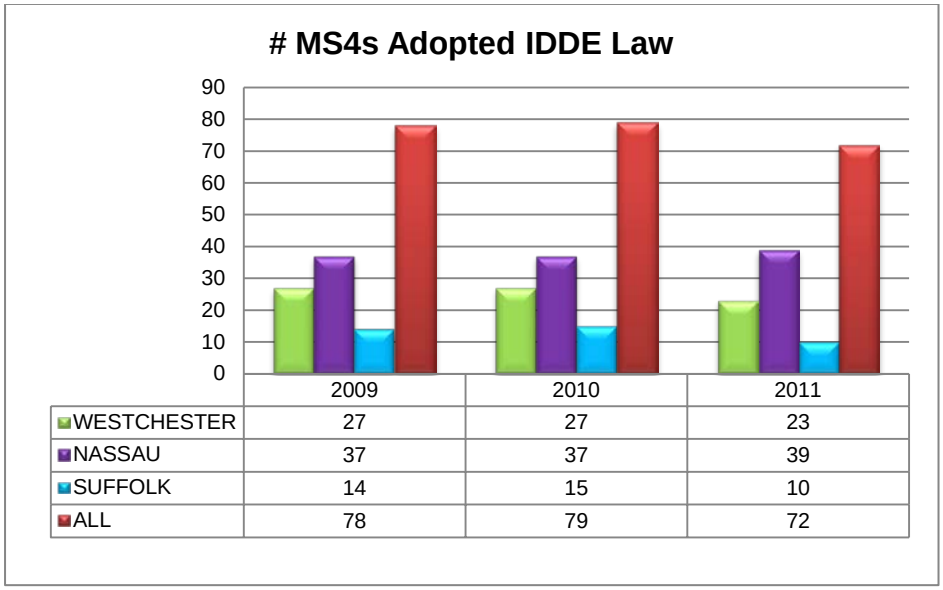
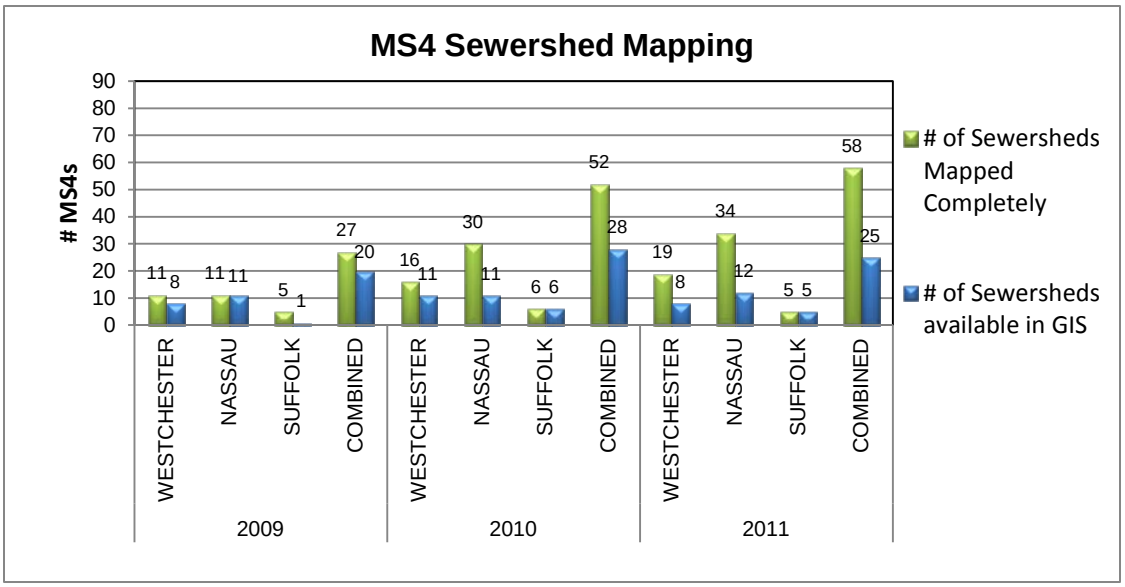


Figure 10: MS4 Sewershed Mapping



4.2.3.4 Construction Site Stormwater Runoff Control (MCM 4)

MCM 4 is designed to help permittees address construction related requirements of the MS4 permit. An inventory of current ongoing construction and the MS4s attention to this construction activity and its education of the site operators is the foundation of MCM 4. There was an overall increase in the number of MS4s who actively participated in the administrative duties associated with this minimum control measure (Figure11). Close to 100% of all construction sites in the Westchester, Nassau and Suffolk MS4s

contributing to the LIS were inspected in each reporting period (Figure 12). There was a steady increase in MS4s reporting the number Contractors that received education on Construction Site Stormwater management (Figure 13). This data has a correlation with a decrease in the number of enforcement actions performed by the MS4s over the 3 years (Figure 14).

Figure 11: MS4 Administrative Duties

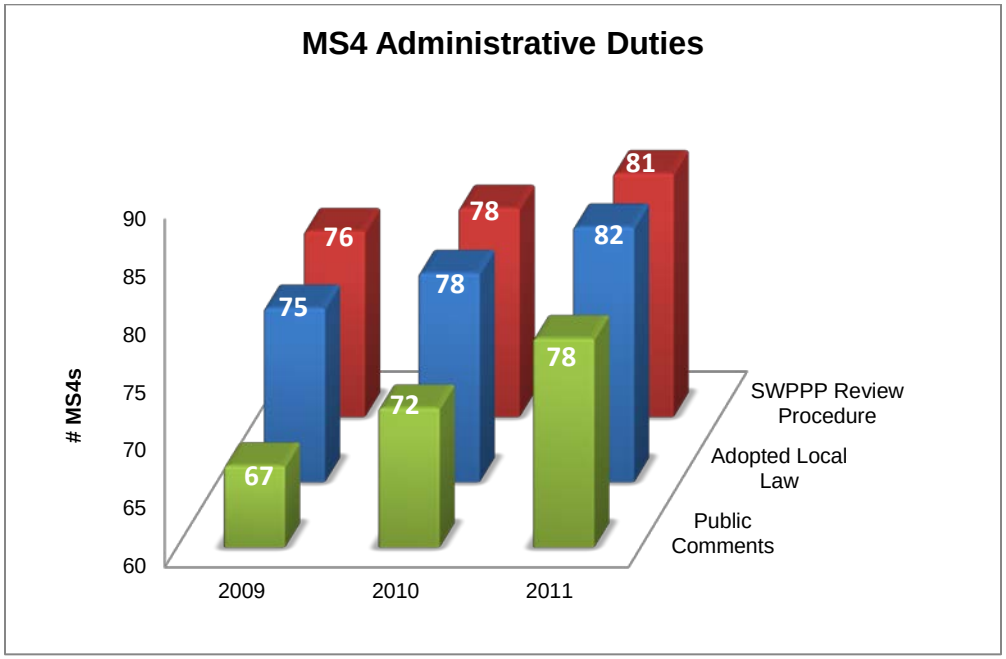


Figure 12: Active Construction Sites

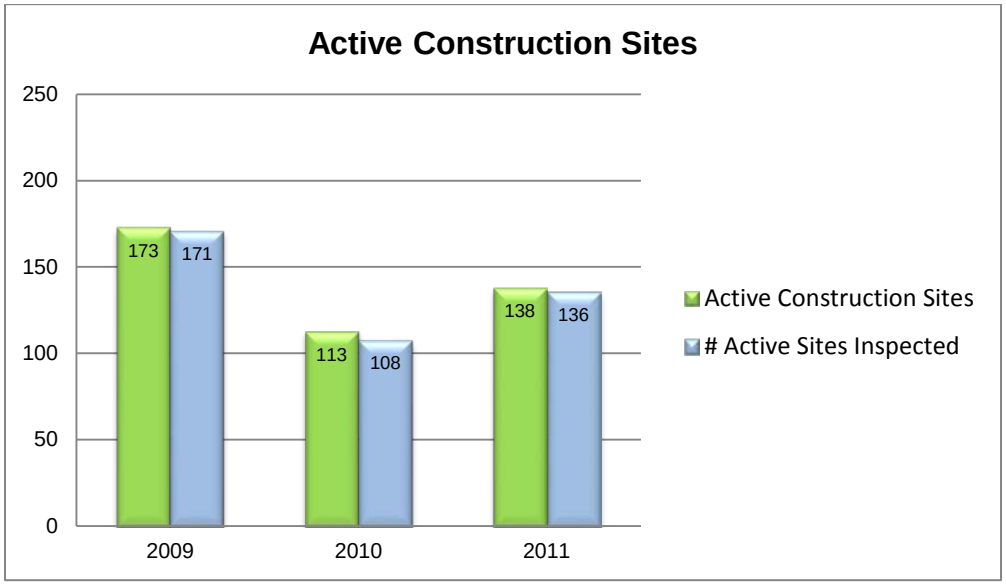
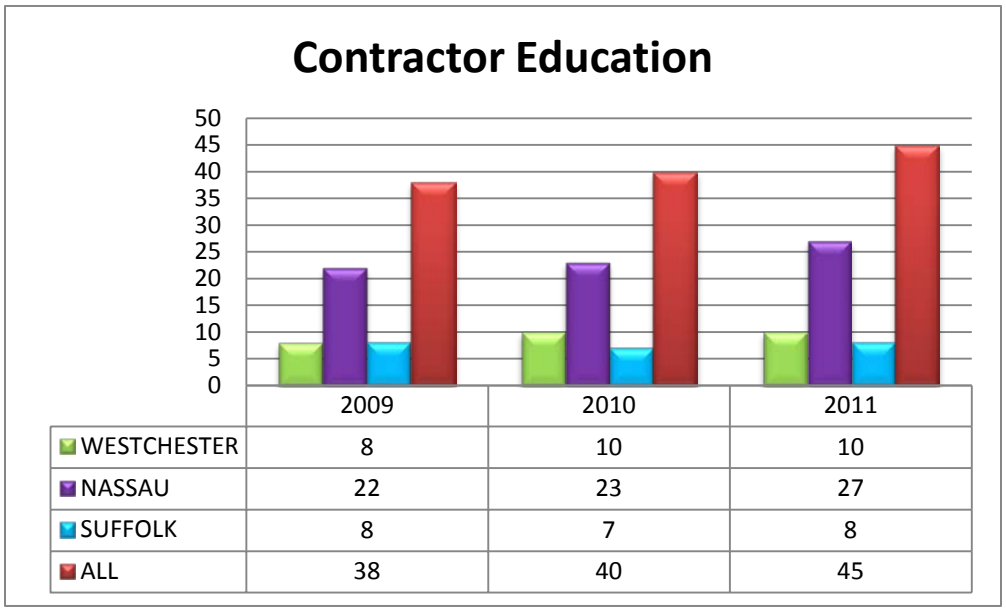
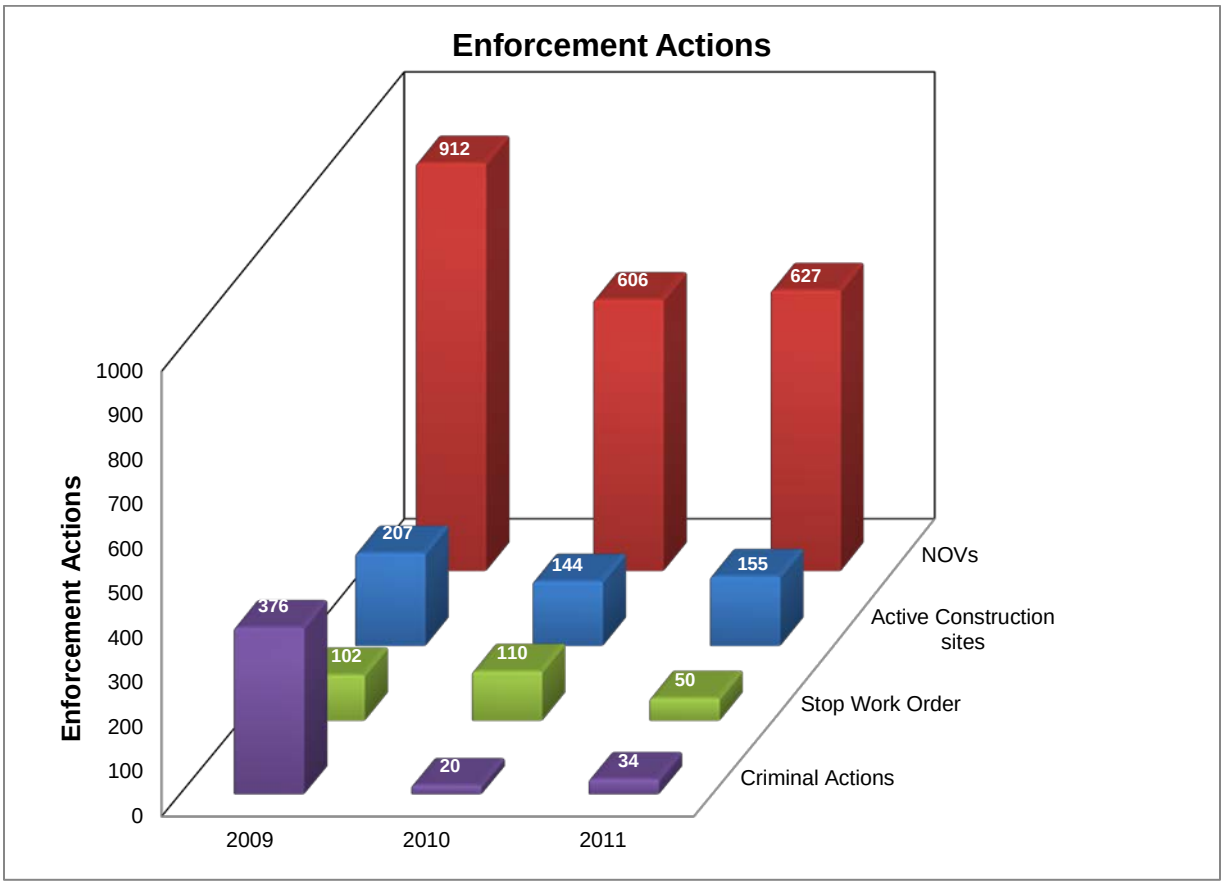


Figure 13: Contractor Education



	2009	2010	2011
WESTCHESTER	8	10	10
NASSAU	22	23	27
SUFFOLK	8	7	8
ALL	38	40	45

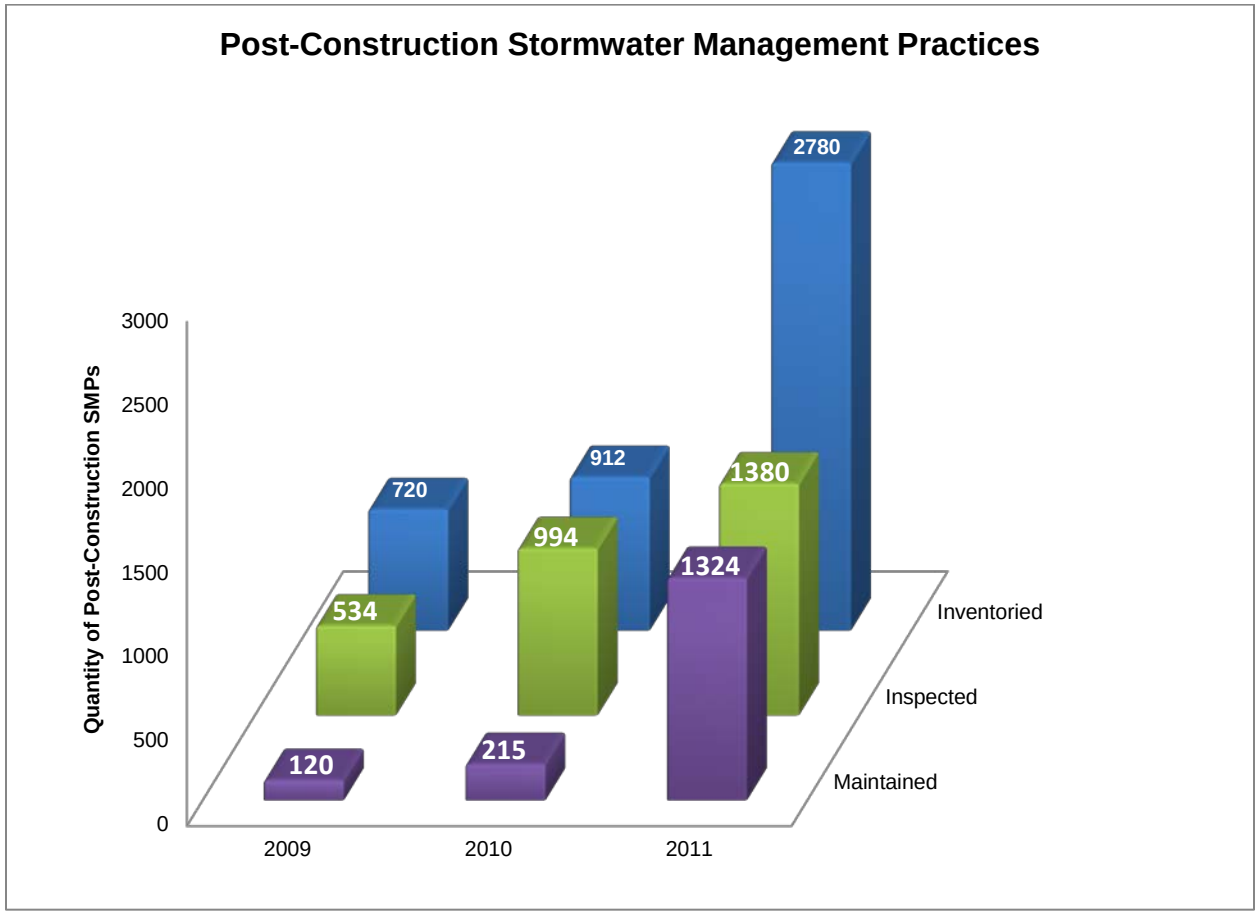
Figure 14: Enforcement Actions



4.2.3.5 Post-Construction Stormwater Control Measures (MCM 5)

The Phase II regulations require regulated small MS4 operators to develop, implement, and enforce a program to address stormwater discharges from new development and redevelopment sites that disturb greater than or equal to one acre to the MS4 (including projects that disturb less than one acre that are part of a larger common plan of development or sale). The regulations also require that the MS4 ensure that control measures are installed and implemented that prevent or minimize water quality impacts. The number of Post Construction Stormwater Management Practices inspected, inventoried and maintained increased for the MS4s contributing to the LIS watershed for the 3 consecutive reporting periods (Figure 15).

Figure 15: Post-Construction Stormwater Management Practices



4.2.3.6 Pollution Prevention/Good Housekeeping for Municipal Operations (MCM 6)

The MS4 Permit requires the operator of a regulated MS4 community to:

a. Develop (for newly authorized MS4s) and implement a pollution prevention / good housekeeping program for municipal operations and facilities.
b. Consider and incorporate cost effective runoff reduction techniques and green infrastructure in the routine upgrade of the existing stormwater conveyance systems and municipal properties to the MEP. Some examples include replacement of closed

drainage with grass swales, replacement of existing islands in parking lots with rain gardens, or curb cuts to route the flow through below grade infiltration areas or other low cost improvements that provide runoff treatment or reduction.

c. Develop (for newly authorized MS4s), record, periodically assess and modify as needed measurable goals; and
d. Select and implement appropriate pollution prevention and good housekeeping BMPs and measurable goals to ensure the reduction of all POCs in stormwater discharges to the MEP.
e. Adopt techniques to reduce the use of fertilizers, pesticides, and herbicides, as well as potential impact to surface water.

Figures 16 and 17 show a marked decrease in the use of fertilizers, pesticides and herbicides by the MS4s. Total Nitrogen used decreased from 17,312 lbs to 6,258 lbs from 2009 to 2011 (Figure 16).

Figure 16: Application of Nutrients

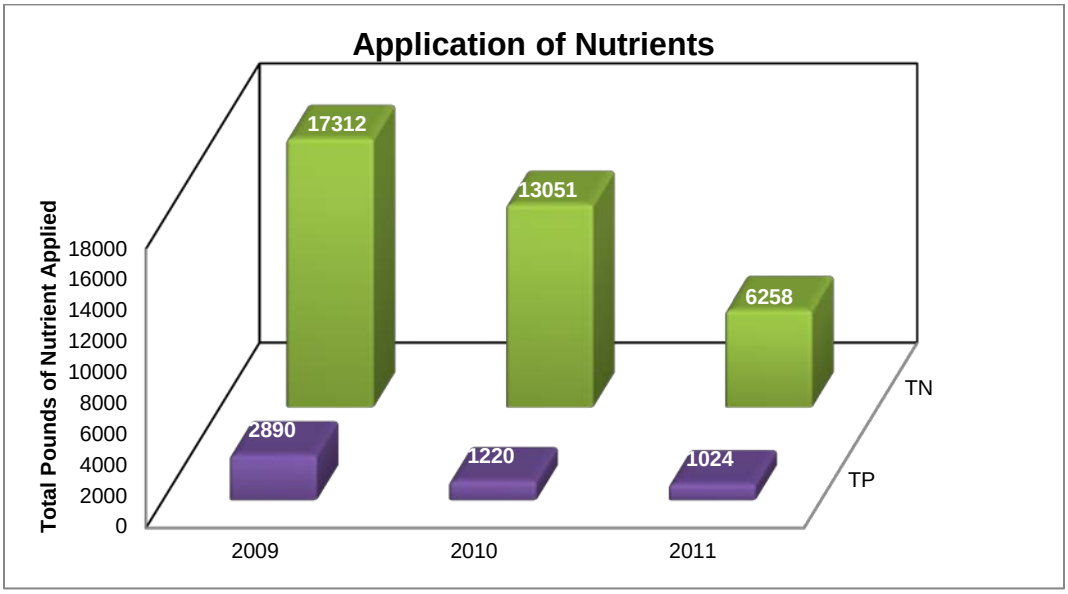
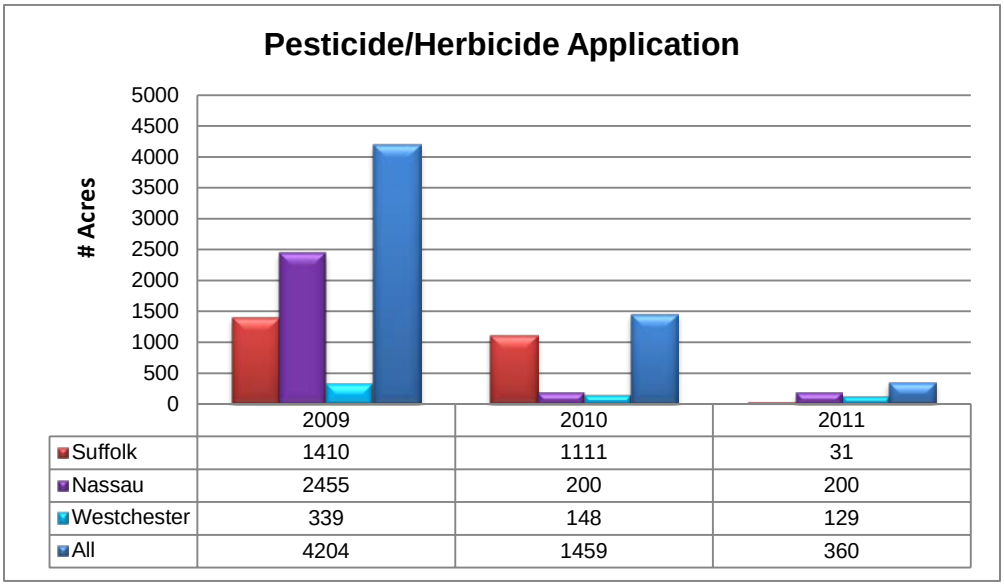


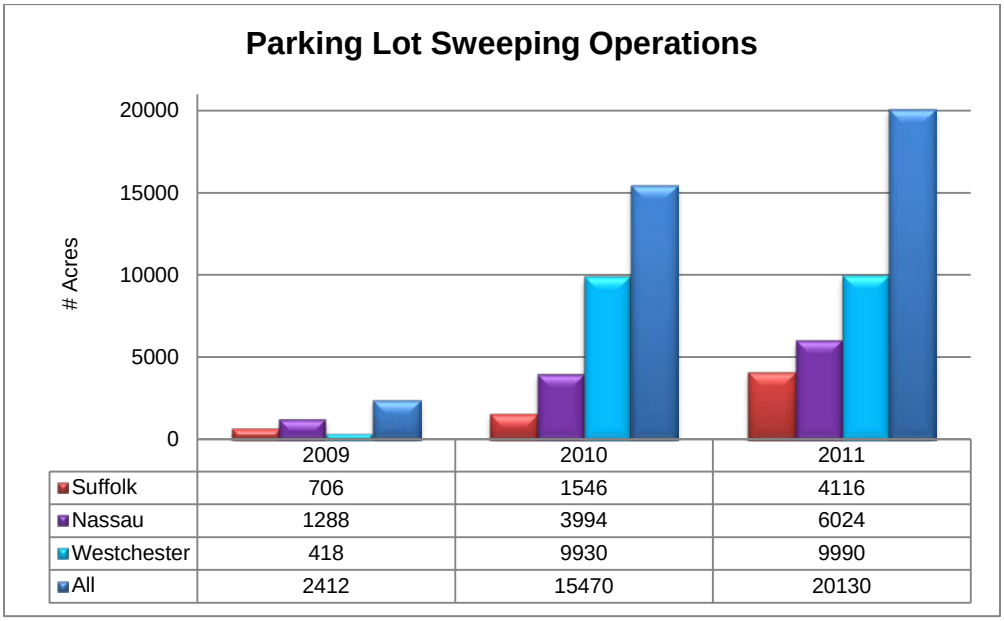
Figure 17: Pesticide/Herbicide Application



	2009	2010	2011
Suffolk	1410	1111	31
Nassau	2455	200	200
Westchester	339	148	129
All	4204	1459	360

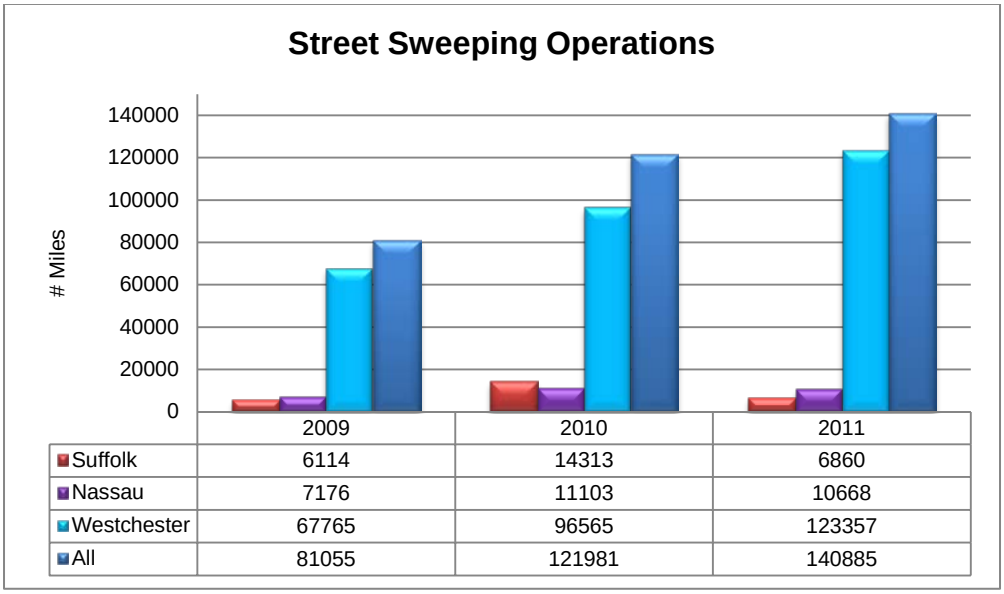
There was an overall increase of all municipal maintenance operations from 2009 to 2011; This trend can be seen in the Parking Lot (Figure 18) and Street Sweeping (Figure 19) operations reported by the MS4s.

Figure 18: Parking Lot Sweeping Operations



	2009	2010	2011
Suffolk	706	1546	4116
Nassau	1288	3994	6024
Westchester	418	9930	9990
All	2412	15470	20130

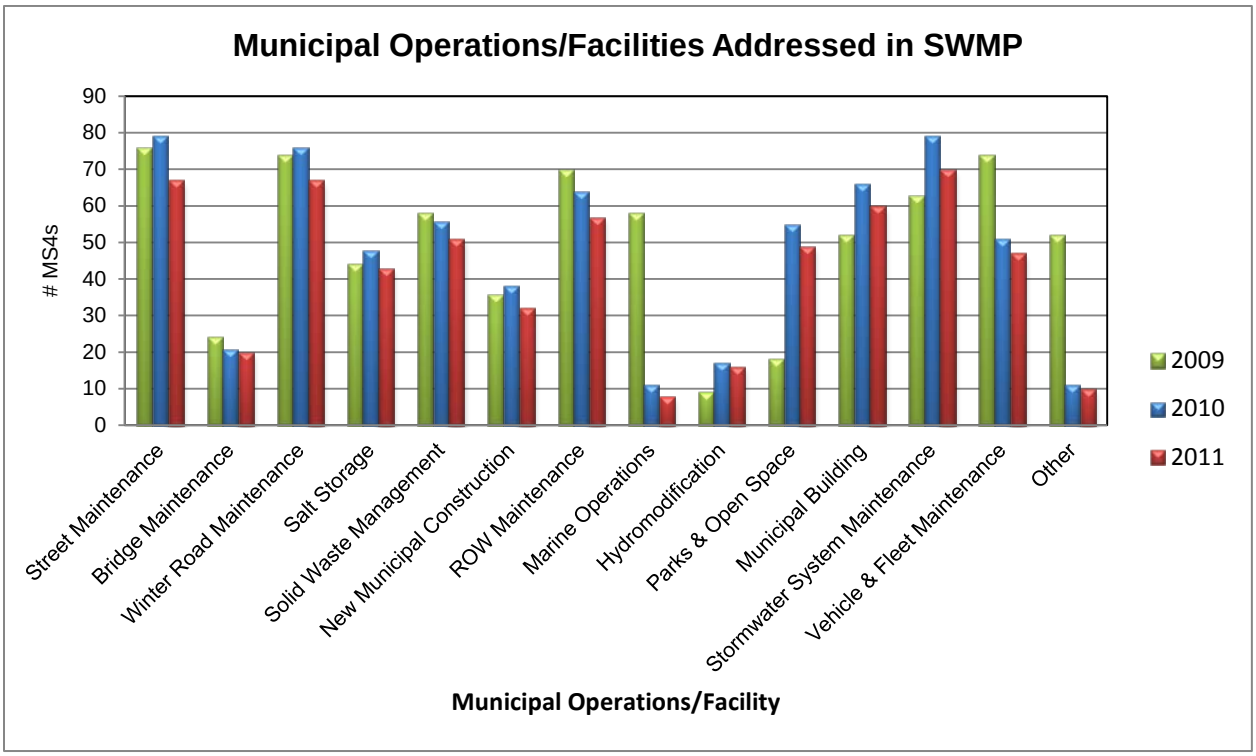
Figure 19: Street Sweeping Operations



	2009	2010	2011
Suffolk	6114	14313	6860
Nassau	7176	11103	10668
Westchester	67765	96565	123357
All	81055	121981	140885

The data collected in the Annual Report for MCM 6 also gives an indication of the range of Operations and Facilities that the MS4s are responsible for in terms of pollution prevention (Figure 20). It can be considered from the data that not all operations are present in each MS4. The data also shows a decrease in operations in 2011, which may be indicative of the Tropical Storm Event in the latter half of the year. It is conceivable that regular maintenance gave way to emergency maintenance for the last 4 months of 2011.

Figure 20: Municipal Operations/Facilities Addressed in SWMP



4.2.4 Relative Change in Scope and Effectiveness of Program from 1990 to 2012

In 2003, the Department expanded its program to include the EPA mandated Phase 2 stormwater program which covered 'regulated' small MS4s and began with the issuance of the SPDES General Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (GP-02-02). SPDES MS4 GP-0-08-002 replaced the GP-02-02 and was revised to increase the clarity of the Departments expectations of permittees. Major changes to the Phase 2 MS4 permit included:

1. The permit format changed to include minimum control measures (MCMs) for both traditional land use control MS4s (cities, towns, villages) and non-traditional MS4s (county, state, and federal MS4s - prisons, hospitals, transportation, office buildings, etc). Additional MCMs were also identified for MS4s within TMDL watersheds.
2. Selected items required for annual reporting were included with each of the MCMs.
3. Appendices with a list of the impaired stream segments subject to the permit requirements, and maps of the TMDL watersheds were added to the permit.
4. Definitions were taken from footnotes and incorporated into a stand-alone section.

Due to a significant public interest and response to GP-0-08-002, the Department embarked on an 18 month post issuance review process which included participation from original commenter's. Replacing GP-0-08-002, SPDES MS4 GP-0-10-002 was revised to include provisions that were deemed beneficial through the 18 month review process. The draft general permit was published for public review and comment in the Environmental Notice Bulletin (ENB) on October 28, 2009 with an extended period of public comments accepted by January 15, 2010. The MS4 permit became effective on May 1, 2010 and

was modified to update Appendix 2 in October 2011. The major changes that were made from the previously issued GP-0-08-002:

1. Modifications to the designation criteria for Identifying Regulated MS4s
2. MS4 GP updates including:
    a. Permit Coverage
    b. Single Entities coverage for many MS4s
    c. Impaired Waters
    d. Clarifications to specific MCMs
    e. Watershed Improvement Strategies
    f. A SWPPP Review and Acceptance Process for Regulated Construction Activities

4.3 Stormwater from Construction Activity General Permit (GP-0-10-001)

4.3.1 General Program Information

Construction sites can have a significantly adverse impact on water quality due to soil disturbance and the increase in impervious coverage. Stormwater that comes into contact with construction activities can contain pollutants like sediment, debris, and various other chemicals. As this stormwater flows into nearby storm sewers or directly discharges to rivers, lakes, or coastal waters the pollutants are transported into these waterbodies causing disturbances in aquatic habitat or other wildlife. Additionally, increase impervious cover, reduced tree canopy and soil compaction due to the construction activity can increase the volume and velocity of stormwater runoff which can subsequently cause stream bank erosion, channel incision and sediment deposition in stream channels.

The SPDES General Permit for Stormwater Discharges from Construction Activity General Permit (GP-0-10-001) requires statewide coverage for projects that involve soil disturbance of one or more acres prior to commencing the construction activity. For the New York City East of Hudson watershed, this requirement also applies to construction projects disturbing 5,000 square feet to one acre. Construction activities include any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance.

4.3.2 Description of Nitrogen Control Requirements

The permit requires that a Stormwater Pollution Prevention Plan (SWPPP) be developed and implemented to address erosion and sediment control practices, as well as, post-construction stormwater management practices that will be used and/or constructed to reduce the pollutants in stormwater discharges. At a minimum the SWPPP shall contain:

1. An erosion and sediment control component that includes the erosion and sediment control practices designed in conformance with the most current version of the New York State Standards and Specifications for Erosion and Sediment Control.

2. A post-construction stormwater management practice component that includes practices designed in conformance with the most current version of the New York State Stormwater Management Design Manual.

3. Enhanced phosphorus removal component that includes practices in place and designed in conformance with the Enhanced Phosphorus Removal Standards contained in the New York State Stormwater Management Design Manual.

The post-construction stormwater management practices that specifically address nitrogen removal are ponds, wetlands, infiltration practices and sand/organic filters.

4.3.3 Estimated Effectiveness of Nitrogen Controls or General Measures

There is insufficient data to make any estimates of the effectiveness of nitrogen controls from the MS4 permit. It is expected that ambient water quality data will ultimately indicate the effectiveness of these controls.

4.3.4 Relative Change in Scope and Effectiveness of Program from 1990 to 2012

This permit came into effect in after 1990. The requirements of this permit, including the 6MCMs are widespread with the intent to control pollution from stormwater from municipal systems. Clearly the annual report information indicates that most MS4s within the LIS watershed are actively implementing the permit requirements.

4.4 SPDES Phase II Multi Sector General Permit (MSGP) for Stormwater Discharges associated with Industrial Activity (GP-0-12-001)

4.4.1 General Program Information

Activities that take place at industrial facilities such as material handling and storage are often located in areas that are exposed to stormwater. The SPDES Multi-Sector General Permit for Stormwater Discharges associated with Industrial Activity (MSGP) provides coverage for facilities engaged in industrial activities that have the potential to discharge stormwater from a point source or outlet to any surface waterbody. These industrial activities have been organized into 31 specific industrial sectors based on OSHA classifications. Each sector has specific benchmark or effluent limitations that must be monitored on at least an annual basis.

The permit requires that all facilities covered under the MSGP permit develop and implement a SWPPP to document the selection, design, installation and maintenance of control measures selected to meet discharge requirements. The SWPPP must also indentify potential sources of pollution which may reasonably be expected to affect the quality of stormwater discharges. In addition, the plan shall describe and ensure the implementation of practices which are to be used to minimize the pollutants in stormwater discharges associated with the industrial activity at the facility.

Any facility that directly discharges to a surface waterbody that has been identified as an impaired waterbody listed in the 303(d) list or has an established TMDL is subjected to quarterly monitoring if that facility has the potential to discharge the pollutant for which the waterbody has been impaired for. The 17 pollutants of concern specific to the MSGP permit that a waterbody can be impaired with are pH,

ammonia, aquatic toxicity, cadmium, copper, cyanide, dissolved oxygen, floatables, mercury, nitrogen, nutrients, PCBs, phosphorus, priority organics, salts, silt/sediment, and turbidity.

The SWPPP for any facility that is determined to discharge to such an impaired waterbody must address the measures that are in place to prevent all discharge of such pollutants. If it is determined that it is infeasible to prevent all discharge then the SWPPP must include a description of the type and location of existing and planned BMPs selected for each of the areas where the pollutant(s) of concern are exposed to stormwater. These BMPs shall be selected to minimize the pollutant(s) of concern from being discharged to the impaired waterbody. The plan shall describe how each BMP is being, or will be implemented for all the areas where the pollutant(s) of concern will be exposed to stormwater.

4.4.2 Description of Nitrogen Control Requirements

The following 10 industrial sectors have been identified as potential sources for nitrogen pollution in stormwater.

1) Timber Products
2) Chemical and Allied Products Manufacturing
3) Mineral Mining and Dressing
4) Landfills
5) Hazardous Waste Treatment, Storage, or Disposal Facilities
6) Air Transportation
7) Food and Kindred Products
8) Leather Tanning and Finishing
9) Fabricated Metal Products
10) Non Classified Facilities/Stormwater Discharges Designated by the NYS DEC as Requiring Permit Coverage

If a facility is engaged in any of these activities and/or classified as one of these sectors the facility must then monitor at a minimum on an annual basis for total nitrogen, calculated as the sum of ammonia, nitrate-nitrite and organic nitrogen. This monitoring requires that a stormwater discharge sample be taken, analyzed and compared against the benchmark cut-off concentration (6 mg/L). This benchmark cut-off concentration is intended as a guideline for the owner or operator to determine the overall effectiveness of the SWPPP in controlling the discharge of nitrogen to receiving waters. This benchmark concentration does not constitute direct effluent limitations allowing a benchmark exceedance to not be a permit violation in and of itself. However, if the concentration of nitrogen in any sample does exceed the 6 mg/L then corrective and follow-up actions must be taken. These actions provide a systematic approach for the owner or operator to:

i) Evaluate the facility for potential sources of nitrogen contamination to the stormwater.
ii) Implement non-structural and/or structural BMPs to prevent recurrence for any source indentified.
iii) Document the implementation of these new BMPs in the SWPPP
iv) Ultimately evaluate the new BMPs by collecting another sample after the measures have been implemented and ensuring that the benchmark cut-off concentration is not subsequently exceeded.

If the facility is discharging to a waterbody that is impaired for ammonia, dissolved oxygen, nitrogen or nutrients then the benchmark monitoring must be done quarterly, as well as, a sample must be taken from the discharge of all storm events that result in at least 0.1 inches of precipitation. If any of these samples exceed the benchmark cut-off of 6 mg/L than the previously discussed corrective and follow up actions must be performed.

4.4.3 Estimated Effectiveness of Nitrogen Controls or General Measures

The MSGP permit focuses on the use of best management practices to minimize the discharge of pollutants (specifically nitrogen) into surface waterbodies. The owner/operator is required for coverage under this permit to monitor and evaluate the effectiveness of the BMPs in place. BMPs were estimated to be able to reduce nitrogen concentration in stormwater by 25%. The heightened requirements for facilities that discharge to impaired waterbody(ies) ensure that these BMPs are continually evaluated and aggressively maintained. In cases such as this it is estimated that these BMPs can reduce the nitrogen concentration in stormwater by 33%. (Ref: Total Maximum Daily Load (TMDL) for Nitrogen in the Peconic Estuary Study Area).

4.4.4 Relative Change in Scope and Effectiveness of Program from 1990 to 2012

In response to the increase concern for water bodies that have reduced levels of dissolved oxygen or increased frequency of algae blooms attributed to excessive levels of nutrients, the most recent Multi-Sector General Permit (GP-0-12-001) has added the additional requirements for stormwater discharge to impaired water bodies. Previous versions of this permit did not include this impaired waterbody component. Facilities engaged in industrial activities were only required to sample on an annual basis, hindering critical evaluation of the practices that were in place to minimize the discharge of such pollutants. These additional requirements that are in GP-0-12-001 are intended to ensure that stormwater discharge from industrial activities is not causing or contributing further to a water quality impairment. It is anticipated with the increase sampling frequency that facilities engaged in activities subjected to nitrogen benchmark monitoring will aggressively select, implement and evaluate best management practices to minimize the discharge of nitrogen.

The Corrective and Follow-up Actions requirements that are in GP-0-12-001 were also not included in previous versions of this permit. These requirements ensure that when a benchmark exceedence occurs the facility re-evaluates the SWPPP, as well as, BMPs to determine the effectiveness of these measures and to make corrections or additions wherever needed in order to meet discharge requirements.

4.5 NYS Environmental Conservation Law & Clean Water Act General Permit for Concentrated Animal Feeding Operations (CAFOs) (GP-0-09-001)

4.5.1 General Program Information

Concentrated Animal Feeding Operations (CAFOs) generate large volumes of animal waste in very compacted areas. Under the Clean Water Act, CAFOs are defined as point source discharges and are often identified as a major source of nutrients (nitrogen and phosphorus), pathogens, and organic enrichment contributing to water quality impairments in many New York State rivers, lakes, and

estuaries. There are three classifications of CAFOs which are categorized based on the quantity of animals that the operation stables or confines:

i) Large Concentrated Animal Feeding Operation (Large CAFOs)
ii) Medium Concentrated Animal Feeding Operations (Medium CAFOs)
iii) Small Concentrated Animal Feeding Operations (Small CAFOs)

The NYS ECL GP-0-09-001 does not regulate the discharges of pollutants from a CAFO per se, but rather requires all medium and large CAFOs who do not discharge or propose to discharge to seek State permit coverage, as New York law governs the creation of a point source. In other words, facilities covered under this permit are required to demonstrate that there will not be any discharge from their facility under any circumstances.

There is one CAFO that has coverage under this permit in the watershed: Yonkers Raceway.

4.5.2 Description of Nitrogen Control Requirements

Effectively, since there are no discharges permitted under this permit, facilities covered by this permit do not discharge nitrogen into surface waters of New York State. The SPDES General Permit for Concentrated Animal Feeding Operations (CAFOs) (GP-0-09-001) requires coverage for all Large and Medium CAFOs (existing and new) and small animal feeding operations that are designated by the New York State Department of Environmental Conservation as a CAFO or request coverage. The permit requires that a Comprehensive Nutrient Management Plan (CNMP) be developed and maintained for each facility covered by this permit. The CNMP must address all areas where manure, litter, process wastewater or fertilizers are produced, land applied or stored on or for use by the facility. For all CAFOs the CNMP must also consist of an implementation schedule that includes at a minimum the following:

1) Any required new and any necessary updates or replacement of existing Best Management Practices (BMPs).
2) An estimate of the installation of BMPs not yet needed for compliance with this general permit that will be needed to address future operational or management changes at the CAFO.
3) Any additional BMP enhancements being implemented by the facility beyond the requirements of this general permit.

The permit requires an annual manure analysis that mandates all CAFOs must analyze each individual land-applied waste source at least once annually for nitrogen and phosphorus in accordance with applicable NRCS standards.

4.5.3 Estimated Effectiveness of Nitrogen Controls or General Measures

Since coverage under this permit implies that there are no discharges from the covered entity, the effectiveness of the nitrogen controls is very high.

4.5.4 Relative Change in Scope and Effectiveness of Program from 1990 to 2012

This CAFO permit was first established in 1999 and was later revised in 2009. Currently, the regulations governing this permit are being revised by the DEC.

4.6 Clean Water Act General Permit for Concentrated Animal Feeding Operations (CAFOs) (GP-04-02)

4.6.1 General Program Information

Concentrated Animal Feeding Operations (CAFOs) generate large volumes of animal waste in very compacted areas. Under the Clean Water Act, CAFOs are defined as point source discharges and are often identified as a major source of nutrients (nitrogen and phosphorus), pathogens, and organic enrichment contributing to water quality impairments in many New York State rivers, lakes, and estuaries. There are three classifications of CAFOs which are categorized based on the quantity of animals that the operation stables or confines:

iv) Large Concentrated Animal Feeding Operation (Large CAFOs)
v) Medium Concentrated Animal Feeding Operations (Medium CAFOs)
vi) Small Concentrated Animal Feeding Operations (Small CAFOs)

The Clean Water Act GP-04-02 allows for the discharge from a CAFO under certain storm conditions (greater than the 25-year-24 hour rainfall event). There is one medium CAFO that has coverage under this permit in the watershed: Coon Brothers Dairy Farm.

4.6.2 Description of Nitrogen Control Requirements

The SPDES General Permit for Concentrated Animal Feeding Operations (CAFOs) (GP-04-02) requires coverage for all Large and Medium CAFOs (existing and new) and small animal feeding operations that are designated by the New York State Department of Environmental Conservation as a CAFO or request coverage. The permit requires that a Comprehensive Nutrient Management Plan (CNMP) be developed and maintained for each facility covered by this permit. The CNMP must address all areas where manure, litter, process wastewater or fertilizers are produced, land applied or stored on or for use by the facility. For all CAFOs the CNMP must also consist of an implementation schedule that includes at a minimum the following:

4) Any required new and any necessary updates or replacement of existing Best Management Practices (BMPs).
5) An estimate of the installation of BMPs not yet needed for compliance with this general permit that will be needed to address future operational or management changes at the CAFO.
6) Any additional BMP enhancements being implemented by the facility beyond the requirements of this general permit.

The permit requires an annual manure analysis that mandates all CAFOs must analyze each individual land-applied waste source at least once annually for nitrogen and phosphorus in accordance with applicable NRCS standards.

4.6.3 Estimated Effectiveness of Nitrogen Controls or General Measures

Coverage under this permit requires a facility to retain all all process generated waste water and runoff for less than the 25 year, 24 hour rainfall event. As such the effectiveness is determined by the frequency of this type of storm event. Generally there are no discharges from covered entities except

when allowed; therefore the effectiveness of the nitrogen control is very good except in the allowed discharge scenario.

4.6.4 Relative Change in Scope and Effectiveness of Program from 1990 to 2012

This CAFO permit was first established in 2009. The effectiveness of the program is not necessarily tracked. Currently, the regulations governing this permit are being revised by the DEC.

4.7 SPDES General Permit for Private, Commercial or Institutional (PCI) Facilities discharging 1,000 to 10,000 gallons per day of sanitary wastewater to groundwater (GP-0-05-001)

4.7.1 General Program Information

This general permit authorizes the discharge to groundwater of 1,000 – 10,000 gallons per day of treated sanitary waste, without the admixture of industrial wastes, from on-site treatment works serving private, commercial, and institutional facilities using treatment units or processes referenced in *Design Standards for Wastewater Treatment Works – Intermediate Size Sewerage Facilities* (NYSDEC 1988, draft revised design standards in 2013). This general permit is applicable in the DEC regions 2, 3, 4, 5, 6, 7, 8 and 9.

Activities excluded from this General Permit are facilities in special (100 year) flood hazard areas as defined in 42 United States Code 4001; freshwater and tidal wetlands and their adjacent areas as defined in ECL Articles 24 and 25 respectively; coastal erosion hazard areas as defined in ECL Article 34; wild, scenic and recreational river corridors as defined in ECL Article 15, Title 27; or facilities located in the counties of Kings, Nassau, Queens and Suffolk nor previously authorized by GP-95-01

4.7.2 Description of Nitrogen Control Requirements

Typically there are no controls for nitrogen discharges from sources covered by this permit.

4.7.3 Estimated Effectiveness of Nitrogen Controls or General Measures

Not applicable.

4.7.4 Relative Change in Scope and Effectiveness of Program from 1990 to 2012

This permit became effective in 2005 and expires May 10, 2015.

4.8 Combined Sewer Overflows

4.8.1 General Program Information

High nitrogen loadings promoted the growth of phytoplankton and the subsequent depletion of dissolved oxygen levels and hypoxic condition in LIS. The sources of the high nitrogen loadings are WWTP discharges, combined sewer overflows, non point surfaces, and atmospheric deposition. The 6 NYC plants were targeted for reduction since they are responsible for 90% of the total nitrogen from waste load allocations. NYC couldn't comply with the dates of the three step down limits because nitrogen reduction technologies, especially of this magnitude were fairly new, which required NYS to conduct research on BNR implementation. Additionally, these 5 treatment plants have minimum

requirements for secondary treatment, which needed to be upheld during periods of construction when tanks are out of service.

Consent Judgment was issued as a bridge to compliance with TMDL. Consent Judgment was originally effective in February 2006 and then modified in June 2011 to address hypoxic conditions in Jamaica Bay, using the same nitrogen reduction techniques. The Consent Judgment established compliance schedules for BNR upgrades at the Upper East River WWTPs and set forth interim step down limits and a final step down limit, resulting in compliance with the final TMDL by January 2017. This final date of compliance was determined based on the extent of construction and the conclusions of the Applied Research Program.

The efforts towards TN reduction in LIS are channeled towards upgrades at WWTPs because they are the major point source contributor of TN in the LIS, in comparison to CSOs. The project to reduce TN at the WWTPs is a two phased approach. The first phase includes implementing step feed BNR (enhances the biological process in the secondary treatment to reduce nitrogen) to the 4 plants in Zone 8 of the LIS (Bowery Bay, Hunts Point, Tallman Island, and Wards Island). Phase I is complete at 2 of the 4 plants (Bowery Bay and Hunts Point), and will be completed at the remaining 2 plants by October 2013. The second phase includes a supplemental carbon facility (which further enhances the same biological process) at the 4 plants in Zone 8, which will be complete in June 2016.

4.8.2 Description of Nitrogen Control Requirements

NYCDEP's Long Term Control Plan to control CSO's is initially focused on addressing the major water quality issues associated with dissolved oxygen and aesthetics. TN, however, is also addressed to some degree. The TN from CSOs are taken into account in the WWTPs efforts through a more stringent final TN step down limit, which is included in both the SPDES permits for the WWTPs and the First Amended Nitrogen Consent Judgment. The final step down limit, effective January 1, 2017 and results in compliance with the LIS TMDL, includes a 650 lb/d offset from CSO TN contribution. The initial limit was 44,975 lbs/d, but the final limit is 44,325 lbs/d.

Additionally, NYC is required to report the CSO TN contribution annually, which is required under the SPDES permits.

The CSO offset, included in the LIS step down limits for the WWTPs, are:

-126 lbs/d until 7/31/2014

-650 lbs/d starting 8/1/2014

The CSOs subject to the calculation of TN loadings include those associated with the six wastewater treatment plants (WWTP) drainage areas tributary to the East River and the four WWTP drainage areas tributary to Jamaica Bay as follows:

East River WWTP CSO Management Zones and Jamaica Bay WWTP Drainage Areas

LISS Zone 8 – Upper East River WWTP

Drainage Areas: Bowery Bay, Hunts Point, Wards Island, Tallman Island

LISS Zone 9 – Lower East River WWTP

Drainage Areas: Newtown Creek, Red Hook

Jamaica Bay WWTP

Drainage Areas: 26th Ward, Coney Island, Jamaica and Rockaway

4.8.3 Estimated Effectiveness of Nitrogen Controls or General Measures

The NYC State Pollution Discharge Elimination System (SPDES) discharge permits for the WWTPs with CSOs that discharge into the lower and upper reaches of the East River and Jamaica Bay require annual reporting of the monthly TN mass that is discharged through the CSOs. Because of the number of CSO locations, the number of storms that create overflows, and the difficulty in sampling these overflows, reporting cannot be done through direct measurement of overflow volume and total nitrogen concentration. Therefore, monthly CSO TN loads are developed each year for the Zone 8, Zone 9, and Jamaica Bay WWTP drainage areas through the use of mathematical models of the sewer systems.

As part of the Long Term Control Planning (LTCP) project to minimize the impacts of CSO discharges, the NYCDEP has adopted a system-wide usage of the InfoWorks model as the uniform approach to support facility planning analyses. The models in other platforms are being converted to InfoWorks framework and calibrated for each of the 14 NYC WWTP drainage areas. Once completed, the calibrated InfoWorks models will provide the most sophisticated and accurate representations of the NYC drainage areas. In the future, the CSO TN loading analyses will utilize only the fully-calibrated InfoWorks models. In CY2011, the loadings have been developed using the calibrated InfoWorks models for 9 drainage areas tributary to the East River and Jamaica Bay, and using the RAINMAN model for the Coney Island drainage area.

Elements that are required in the model to develop the loads accurately that could possibly change from year to year or month to month are listed below.

- Rainfall
- WWTP wastewater flows
- Dry weather sewage TN concentrations
- Runoff/stormwater TN concentrations

As discussed in the next section of this document, these items will be developed for each month to provide an accurate representation of the factors influencing the TN concentrations and loadings in the CSOs.

The input parameters that are common to RAINMAN and InfoWorks application include:

a. maximum WWTP capacity;
b. precipitation at hourly or shorter intervals;

c. dry weather flow and its diurnal pattern at each regulator; and
d. stormwater and sanitary TN concentrations.

The dry-weather sewage TN concentration data at all ten WWTPs within the Zone 8, Zone 9, and Jamaica Bay drainage areas need to be developed and used together with model calculated flows to calculate TN CSO loads. DEP samples each WWTP for various forms of influent nitrogen on a daily basis and maintains a database of these concentrations. Since the TN concentrations during wet periods are typically lower due to dilution with stormwater runoff, the hourly precipitation data were used in conjunction with the hourly plant flows to identify "dry days," and the corresponding dry-weather influent TN concentrations represent the sanitary sewage TN concentrations at each WWTP. The product of these sanitary-sewage TN concentrations and the corresponding sanitary-sewage component of the CSO volume discharged from each WWTP drainage area (as generated by the sewer-system model) were then calculated to yield the TN load associated with the sanitary-sewage component of the CSO discharges.

Stormwater concentrations of TN are not regularly measured and information about stormwater TN concentrations is very limited. To characterize typical stormwater TN concentrations in NYC, several studies were reviewed, including 2002 DEP measurements compiled as part of the municipal separate stormwater sewer system (MS4) permit process for separately sewered areas. Based on this information, a stormwater TN concentration of 2.28 mg/L was selected as a representative constant for stormwater generated from all the drainage areas discharging into the Zone 8, Zone 9 and Jamaica Bay zones.

4.8.4 Relative Change in Scope and Effectiveness of Program from 1990 to 2012

As early as 1993, DEC had an inventory of approximately 1300 CSO outfalls listed in the permits of Publicly Owned Treatment Works (POTW) with CSOs. As of 2009, this CSO outfall inventory is less than 1000 due to various CSO abatements by the permittees. In 1994, the United States Environmental Protection Agency (EPA) issued a National CSO Control Policy. The Wet Weather Water Quality Act of 2000 requires combined sewer systems to conform to the requirements in the National CSO Control Policy. The requirements include implementing Nine Minimum Controls (NMC) and a Long-Term Control Plan (LTCP). The NMCs are technology-based controls that can be used to abate CSOs. The LTCP consists of more extensive characterization and monitoring of the combined sewer system and the receiving water, as well as selection and implementation of CSO control alternatives, with the intent of minimizing the impacts of CSOs on water quality.

New York City Department of Environmental Protection (DEP) is required under a 2005 Order on Consent to reduce combined sewer overflows (CSOs) from its sewer system to improve the water quality of its surrounding waters, such as Flushing Bay, Jamaica Bay, and tributaries to the East River, Long Island Sound, and Outer Harbor.

Under the 2005 Consent Order, the DEP has completed Waterbody/Watershed Facility Plans, which are the initial phase of CSO planning, and are required to construct various grey infrastructure projects, and develop Long-Term Control Plans.

In 2011, the New York State Department of Environmental Conservation (DEC) and DEP identified numerous modifications to the CSO Consent Order, including integration of green infrastructure and substitution of more cost-effective grey infrastructure, and agreed to fixed dates for submittal of the Long-Term Control Plans. The modification to the CSO Consent Order, was executed by DEC on March 8, 2012

5 Nonpoint Source

5.1 Urban

Stormwater runoff from urban areas that does not go through a constructed conveyance system (MS4 or CSO) is not a regulated discharge. While effectively 100% of the New York portion of the LIS watershed is either an MS4 or has CSOs, there are many urban areas that either do not have any defined MS4 outfalls to LIS, including embayments. Additionally, on Long Island, the practice of capturing stormwater and diverting it to a recharge basin inland from LIS is commonplace and can effectively reduce the geographical area contributing stormwater directly to a surface water by more than 2/3rds of the geographical area.

5.2 Agricultural

5.2.1 NRCS Programs

The United States Department of Agriculture Natural Resources Conservation Service (NRCS) manages the Environmental Quality Incentives Program (EQIP), a voluntary program that provides financial and technical assistance to agricultural producers through contracts up to a maximum term of ten years in length. These contracts provide financial assistance to help plan and implement conservation practices that address natural resource concerns and for opportunities to improve soil, water, plant, animal, air and related resources on agricultural land and non-industrial private forestland. In addition, a purpose of EQIP is to help producers meet Federal, State, and local environmental regulations.

EQIP assistance is provided to agricultural producers on Long Island through a variety of initiatives and specific EQIP funding categories. EQIP funding categories target specific types of needs of agricultural producers. The following EQIP categories have been particularly important in providing assistance to agricultural producers on Long Island. Funding levels in each category vary from year to year, so this list is not in specific priority or funding level order.

- Air Quality Initiative: The EQIP Air Quality Initiative is intended to address needs for specific States and Counties which are designated as non-attainment according to Clean Air Act requirements. The Air Quality Initiative may provide assistance related to pollution prevention and energy efficiency in agricultural production, with benefits for both air and water quality. Examples of Long Island-related projects include petroleum storage and diesel engine replacement to reduce environmental impacts.
- Agricultural Management Assistance: The EQIP Agricultural Management Assistance category provides financial and technical assistance to agricultural producers to voluntarily address issues

such as water management, water quality, and erosion control by incorporating conservation into their farming operations. Examples of Long Island-related projects include irrigation management and high-tunnel agricultural systems.

- Conservation Activity Plans: The EQIP Conservation Activity Plan initiative provides financial and technical assistance to agricultural producers for comprehensive nutrient management plans and other plans that further the purposes of EQIP. For Long Island, these plans typically address Integrated Pest Management, nutrient management, and energy and air quality management.
- Conservation Innovation Grants: The EQIP Conservation Innovation Grant effort is a voluntary program intended to stimulate the development and adoption of innovative conservation approaches and technologies while leveraging Federal investment in environmental enhancement and protection, in conjunction with agricultural production.

5.2.2 State Programs

The New York State Agricultural Environmental Management (AEM) Program, under the direction of the New York State Soil and Water Conservation Committee (NYS SWCC) and the New York State Department of Agriculture and Markets (NYSDAM), coordinates state and local agencies and the private sector to provide technical and financial assistance to address environmental and nonpoint source issues on farms. AEM is based on a tiered planning and implementation approach on individual farms, and is most effective where accomplished on a comprehensive basis across a priority watershed. AEM assesses farm practices related to environmental concerns, develops management plans to address those concerns, implements Best Management Practices to reduce environmental impacts, and evaluates resulting environmental improvements. AEM is the umbrella initiative used to implement New York's Agricultural Nonpoint Source Abatement and Control Grant Program and the Conservation Reserve Enhancement Program (CREP), and provide financial assistance to agricultural producers for water quality protection initiatives. AEM is also a key tool in participation in Federal Farm Bill Programs and Concentrated Animal Feeding Operations (CAFO) compliance in New York State. The AEM Certification Program certifies public and private sector professionals as Comprehensive Nutrient Management Planners and provides a foundation for the NYSDEC CAFO Permit Program.

The AEM Program has four general goals. The primary goal is to enhance and grow a voluntary program by encouraging proactive environmental stewardship through adequate technical assistance and incentives. The AEM Program is a primary framework for coordination and delivery of local, state and federal agriculturally related environmental and nonpoint source programs. The AEM Program also is designed to project a consistent message to all stakeholders through coordinated and comprehensive communication. Finally, the AEM Program is intended to establish and nurture farmer, neighbor and community communications on a broad range of environmental concerns.

The overall priority for funding AEM related projects is to support planning, implementation and evaluation projects on individual farms that form the core of the program. Additionally, a key funding priority is supporting AEM training. AEM planning projects typically address farm environmental assessments or individualized Comprehensive Nutrient Management Plans. Implementation projects cover a wide range of BMPs, including manure storage, barnyard runoff and pasture management, erosion control and waste management. Evaluation projects focus on achievements and stewardship at

individual farms. The significant majority of funding for planning and implementation activities is from the NYS Environmental Protection Fund (EPF) through the Agricultural Nonpoint Source Abatement and Control Program, also referred to as Ag-NPS implementation projects.

On Long Island, the AEM Program has provided support of planning projects designed to improve nutrient management and energy-related management for agriculture. Support has also been provided through Ag-NPS implementation project funding for petroleum storage and groundwater protection.

5.3 Groundwater and Stream Flow from New York

The Unities States Geological Survey (USGS) has produced a report that estimates nitrogen loads entering LIS from groundwater and streams, 1985 – 96 (Monti & Scorca 2001, Water-Resource Investigations Report 00-4196). Neither groundwater nitrogen loads nor tributary loads from New York were considered in the 2000 LIS N TMDL.

5.3.1 Groundwater

The nitrogen load estimated by Monti and Scorca being carried to LIS by shallow groundwater via simulated shallow aquifer discharges from Nassau and Suffolk Counties are 84 tons/yr from Nassau County and 384 tons/yr from Suffolk County. Nitrogen contributions from the deep aquifers were estimated at 89 tons/yr from Nassau County and 265 tons/yr from Suffolk County. These estimates were based on the estimated groundwater discharge to LIS and concentrations of nitrogen in groundwater wells from various representative areas (sewered, unsewered and agricultural). This methodology does not take into account the processing of nitrogen as it comes up through the bottom sediments or hyporheic zone.

5.3.2 Stream Flow

There are four (4) major streams on the north shore of Long Island that have long term discharge and water quality records. Of these rivers, the following information was presented in the Monti-Scorca report

Table . Estimated annual mean nitrogen loads entering Long Island Sound from four streams on north shore of Long Island, N.Y., 1985-96
[ton/yr, tons per year; kg/yr, kilograms per year. Dashes indicate no samples collected.]

Year	Glen Cove Creek		Mill Neck Creek		Cold Spring Brook		Nissequogue River	
	ton/yr	kg/yr	ton/yr	kg/yr	ton/yr	kg/yr	ton/yr	kg/yr
1985	35	32,000	13	12,000	--	--	87	79,000
1986	36	33,000	14	13,000	--	--	99	89,000
1987	36	32,000	15	14,000	--	--	96	87,000
1988	28	25,000	16	15,000	--	--	65	59,000
1989	38	34,000	22	20,000	--	--	110	100,000
1990	33	30,000	19	17,000	--	--	149	135,000
1991	32	29,000	14	12,000	--	--	140	127,000
1992	25	22,000	12	11,000	3	2,400	107	97,000
1993	24	22,000	11	10,000	2	1,600	103	93,000
1994	27	25,000	14	13,000	2	1,600	92	83,000
1995	20	18,000	10	8,800	1	1,100	67	61,000
1996	31	28,000	14	13,000	--	--	86	78,000

This data does not show any clear trends in nitrogen loads from any of these Long Island streams discharging to the LIS. It should be noted that all of the LI streams discharge into relatively large embayments before the flow from these rivers would make it into LIS.

There are five (5) tributaries that discharge from Westchester County into LIS. They are:

- Bronx River
- Hutchinson River
- Mamaroneck River
- Beaver Swamp Brook
- Blind Brook

Data regarding the nitrogen loads from these NYS tributaries were also not considered in the 2000 LIS N TMDL, and there in not a lot of data regarding nitrogen loads from these sources readily compiled. These rivers, unlike the rivers on Long Island, generally do not go into large embayment and discharge more or less directly into LIS.

Nonpoint Source/319 Eligible Project Funding

Since 1995 the New York State Department of Environmental Conservation has awarded grants to Long Island Sound communities through the 1996 Clean Water/Clean Air Bond Act and the Environmental Protection Fund. Funding for these projects was focused on high priority water quality issues impacting the Long Island Sound including projects that address nonpoint source abatement and control and aquatic habitat. Table 9 presents a list of these projects.

6 LISFF Projects in New York

Table 10 presents a list of Long Island Sound Futures Fund (LISFF) projects that have been funded since 2005 for project in NYS associated with improving stormwater and non-point source stormwater pollution controls.

The total monitory amount of LISFF awarded for stormwater related projects in NYS was $5,007,106. It must be noted that to quality and an element of project scoring is related to a contributing match by the applicant. This match is typically 50% of the grant funding requested, and many times 100% of the grant amount requested. As such it is reasonable to expect the total leveraged amount of funding spent on stormwater pollution control as a result of this program is greater than $10,000,000.

7 Watershed Management Plans

The following is a partial list of watershed management plans that have been developed in the NYS portion of the LIS watershed.

Suffolk County North Shore Embayment's Watershed Management Plan (2007)

Nassau County Stormwater Management Program Plan (2009)

Bronx River Watershed Management Plan (2007)

Westchester County Controlling Polluted Stormwater (2001)

- Sheldrake and Mamaroneck Rivers
- Mamaroneck Harbor

Westchester County Controlling Nonpoint Source Pollution in Long Island Sound (1996)

- Beaver Swamp Brook
- Blind Brook
- Mamaroneck Harbor
- Milton Harbor
- Port Chester Harbor

Westchester County Controlling Nonpoint Source Pollution in Long Island Sound (1997)

- Stephenson Brook
- Burling Brook
- Pine Brook
- Larchmont Harbor

Manhasset Bay Water Quality Improvement Plan (1999)

2001 Nonpoint Water Quality Strategy for Nassau County (2001)

Common themes and goals are evident in all Stormwater Management Plans in the Long Island Sound Watershed.

1. Reduce stormwater runoff by detention and treatment and subsurface containment.
2. Reduce groundwater Nitrogen concentrations through planning, implementation and education.
3. Evaluate sites for stormwater retrofits and install in priority areas
4. Improve surface water quality
5. Preserve open space areas.
6. Establish a public education program to include information on pet waste, waterfowl feeding, lawn fertilization and other public contributors;
7. Increase the number of Pet Waste stations
8. Apply water quality monitoring and track the progress of the WMP implementation.

8 Other Regulations/Laws to Control Nitrogen in Stormwater

8.1 NYS Applicable Air Regulation

This section is to be completed by New England Interstate Water Pollution Control Commission.

9 Data Gaps and Recommended Improvements

9.1 LIS N TMDL

9.1.1 Data Gaps

The nonpoint source/stormwater load from NYS as calculated in the 2000 TMDL indicates this load is less than 1% of the total nitrogen load to LIS. Review of the calculation of this load applied run-off coefficients developed for New England and are probably not relevant to the NY portion of the watershed which encompasses Nassau and Suffolk counties most likely resulting in an overestimation of the stormwater runoff from these areas.

Also, the 2000 TMDL assumed that 100% 0f the stormwater runoff from the watershed was discharged to LIS. While this assumption may be marginally appropriate for Westchester and the NYC areas, it is not an appropriate assumption for Nassau and Suffolk Counties were the soils are highly permeable and flood control practices direct large quantities of stormwater to infiltration basins.

Effectively all of the LIS watershed within NYS is within an MS4 area, however this does not mean that all of the stormwater that falls within an MS4's topographical or political boundary is conveyed through an MS4 conveyance system. This fact became evident as the DEC looked to develop an implementation plan for pathogen impaired saltwater embayments. In many instances, there were no MS4 outfalls to these embayments. While there are no doubt numerous MS4 outfalls discharging directly to LIS or an embayment of LIS, (something that will be quantified in the TMDL Reassessment) there are also vast stretches of land, particularly as you move east in Suffolk County where, to preserve the natural shoreline and due to the bluffs, there are no MS4 outfalls to LIS and therefore any stormwater runoff would be unregulated.

The 2000 TMDL Watershed excluded the Bronx River. Subsequent watershed maps developed include the Bronx River, which does indeed discharge in the LIS watershed.

9.1.2 Recommended Improvements

The data gaps identified in the nonpoint source load estimate in the 2000 TMDL will be addressed in the TMDL Reassessment. The following efforts will be undertaken:

- A specific runoff coefficients appropriate to the soils of Long Island will be developed to estimate the stormwater load
- The actual contributing areas of an MS4 sewershed to LIS will be identified, complete with the land uses to estimate the nitrogen load from the MS4s within the LIS watershed.
- The Bronx River watershed will be included in the area contributing to LIS.

9.2 Drivers of Changes of Nitrogen Load

9.2.1 Data Gaps

There are seventy five (75) golf courses in the NY portion of the LIS watershed. The number of these that are municipally owned is unknown at this time. Additionally, there are a number of golf courses that are adjacent to waterbodies, including LIS itself.

9.2.2 Recommended Improvements

The DEC will identify municipally owned golf courses and encourage the municipalities to incorporate the management of these golf courses in the MS4 program, including evaluating the installation of BMPs to control stormwater runoff as well as any changes to fertilizer use.

9.3 Fertilizer Laws

9.3.1 Data Gaps

NYS and Nassau, Suffolk and Westchester Counties all have recently implemented fertilizer laws. The county laws all call for a reduction or discontinuation of the use of fertilizer on municipally owned land. Currently there are no reporting requirements to quantify the benefit of these laws.

9.3.2 Recommended Improvements

This effort should be incorporated into the MS4 annual report, quantifying the reduction in fertilizer use these laws have produced.

9.4 Septic Systems

9.4.1 Data Gaps

While most of the NYS portion of the LIS watershed is services by sanitary sewers and wastewater treatment plants that are being upgraded to reduce their nitrogen load to LIS, most of Suffolk County within the LIS watershed is unsewered. The contribution of these systems and how they relate to the nitrogen concentration in groundwater has not been quantified.

Additionally, WWTPs that discharge to groundwater at a rate of <30,000 gpd are relatively common within the LIS watershed in Suffolk County. The impact of these groundwater discharges, and what they might be contributing to the nitrogen load to LIS is completely unknown.

9.4.2 Recommended Improvements

Since septic systems are governed by the Department of Health, and in most instances the inspection for installation and routine inspections are the responsibility of local building code officials, a large amount of research would need to be done to:

- Understand the number of different types of septic systems there are on Long Island (i.e. cesspool vs. conventional)
- Understand the distribution of the various types of septic systems within the highly variable time of travel zones of groundwater to surface waters
- Evaluate the existing local DOH laws governing the use of septic systems

- Based on these evaluations, make recommendations for any potential improvements to the use of septic systems on Long Island, including looking at advanced septic system deisgns

In addition to looking at individual septic systems, the design standards for WWTP <30,000 gpd discharging to groundwater should be evaluated specifically for these systems on Long Island. The NYSDEC is currently revising the Design Standards for Intermediate WWTP, which are the design standards for these systems. This is an area of concern from both environmental groups as well as the NYSDEC. Currently, these WWTPs are permitted and managed by the Suffolk County DOH under a memorandum of understanding with the NYSDEC. Study of the potential impacts these WWTPs could be having on LIS is recommended.

9.5 Phase I MS4 Permit

9.5.1 Data Gaps

The Phase I MS4 permit is currently being revised.

9.5.2 Recommended Improvements

Not applicable since the permit is currently being revised.

9.6 Phase II MS4 Permit

9.6.1 Data Gaps

Review of the information submitted by the MS4's within the LIS watershed per the requirements of the Annual Report.

9.6.2 Recommended Improvements

Based on a review of the Annual Report and what data is submitted, make a determination if there are changes that could be made to the Annual Report that would streamline the reporting requirements of the MS4 and improve the type of data that is requested.

9.7 Groundwater Flow

9.7.1 Data Gaps

The USGS has studied and attempted to quantify nitrogen loads to LIS from groundwater. This information was not included in the NPS load in the 2000 TMDL.

The USGS groundwater study made the assumption that it was a simple mass balance contribution of the groundwater based on the groundwater discharge and the concentration of nitrogen in that groundwater. This does not take into account any nitrogen losses in the hyporhetic zone.

9.7.2 Recommended Improvements

The contribution of the nitrogen load from groundwater should be further evaluated to understand the relationship between groundwater, pollutants in groundwater and how this load may enter LIS. This work would have to include further research into the potential nitrogen losses through the hyporhetic zones.

Tables

Table 1: LIS 2000 TMDL NYS Point Sources Analysis

Total Nitrogen Wasteload Allocation for New York Point Source Discharges

Zone	Facility	SPDES	2000 TMDL Point Source WLA							Flows	
			Baseline tpy	Baseline lbs/day	WLA lbs/day	WLA tpy	WLA- Permitted Flow mg/l	WLA - Ave Flow mg/l	Percent Reduction from Baseline	Permitted Flow Mgal/day	Ave Flow Mgal/day
7	Mamaroneck	0026701	390	2,135	829	151	4.83	6.14	61.2%	20.60	16.22
	Port Chester	0026786	103	563	219	40	4.38	5.26	61.1%	6.00	5.00
	Blind Brook	0026719	62	338	131	24	3.15	4.14	61.2%	5.00	3.80
	New Rochelle	0026697	277	1,516	589	107	3.68	4.62	61.1%	19.20	15.33
	North Castle	0109584	6	33	13	2	4.11	6.53	60.6%	0.38	0.24
	Total Zone 7		**837**		**1,781**	**325**			**61.2%**		
	Tons of N reductions from Zone 7	**512**									
8	Wards Island	0026131	7,873	43,140	17,903	3,267	7.82	10.33	58.5%	275.00	208.24
	Hunts Point	0026191	5,225	28,630	11,881	2,168	7.13	12.08	58.5%	200.00	118.14
	Bowery Bay	0026158	3,152	17,270	7,167	1,308	5.74	7.81	58.5%	150.00	110.24
	Tallman Island	0026239	1,252	6,860	2,847	520	4.27	5.93	58.5%	80.00	57.66
	CSO		579	3,170	1,316	240			58.5%		
	Total Zone 8		**18,080**		**41,114**	**7,503**			**58.5%**		
	Tons of N reductions from Zone 8	**10,577**									
9	Newtown Creek	0026204	8,262	45,270	18,787	3,429	7.28	9.53	58.5%	310.00	236.88
	Red Hook	0027073	841	4,610	1,913	349	3.83	7.30	58.5%	60.00	31.45
	CSO		314	1,721	714	130			58.5%		
	Total Zone 9		**9,417**		**21,414**	**3,908**			**58.5%**		
	Tons of N reductions from Zone 9	**5,509**									
10	Belgrave	0026841	39	213	77	14	4.62	5.79	63.8%	2.00	1.60
	Glen Cove	0026620	163	893	323	59	7.05	10.71	63.8%	5.50	3.62
	Great Neck SD	0026999	83	457	165	30	5.22	7.42	63.9%	3.80	2.67
	Great Neck (V)	0022128	39	212	77	14	6.17	10.50	63.7%	1.50	0.88
	Oyster Bay	0021822	40	220	80	15	5.34	8.47	63.6%	1.80	1.13
	Port Washington	0026778	120	655	237	43	7.12	10.22	63.8%	4.00	2.79
	Total Zone 10		**484**		**959**	**175**			**63.8%**		
	Tons of N reductions from Zone 10	**309**									
11 west	SUNY (SCSD #21)	0206644	38	208	40	7	1.92	2.54	80.8%	2.50	1.89
	Port Jefferson (SCSD #1)	0021750	37	202	39	7	4.07	6.33	80.7%	1.15	0.74
	Huntington	0021342	82	448	87	16	4.18	5.46	80.6%	2.50	1.91
	Kings Park (SCSD #6)	0023311	24	134	26	5	5.20	9.39	80.6%	0.60	0.33
	Northport (V)	002 4881	9	52	10	2	2.67	3.46	80.8%	0.45	0.35
	Total Zone 11w		**191**		**202**	**37**			**80.7%**		
	Tons of N reductions from Zone 11w	**154**									
11 east	Greenport (V)	002 0079	14		11	2	2.03	4.13	85.5%	0.65	0.32
	Total Zone 11e		**14**		**11**	**2**			**85.5%**		
	Tons of N reductions from Zone 11e	**12**									
	Total Tons/Yr of N to be Reduced from NYS WWTPs	**17,072**									

Table 2: New York State Point Sources Analysis WLA vs. LA Reduction

Zone	Facility	SPDES	Baseline tpy	WLA tpy	Percent Reduction from Baseline	WLA if 58.5% Reduction from Baseline tpy	Zone LA Required Reduction tpy	Difference in WWTP Reduction from TMDL WLA vs. 58.5% Reduction tpy	Does WWTP TMDL WLA "Cover" the Required NPS Reduction?*
7	Mamaroneck	0026701	390	151	61.2%	162			
	Port Chester	0026786	103	40	61.1%	43			
	Blind Brook	0026719	62	24	61.2%	26			
	New Rochelle	0026697	277	107	61.1%	115			
	North Castle	0109584	6	2	60.6%	2			
	Total Zone 7		**837**	**325**	**61.2%**	**347**	**18**	**22**	**yes**
	Tons of N reductions from Zone 7	**512**							
8	Wards Island	0026131	7,873	3,267	58.5%				
	Hunts Point	0026191	5,225	2,168	58.5%				
	Bowery Bay	0026158	3,152	1,308	58.5%				
	Tallman Island	0026239	1,252	520	58.5%				
	CSO		579	240	58.5%				
	Total Zone 8		**18,080**	**7,503**	**58.5%**		**0**	**na**	
	Tons of N reductions from Zone 8	**10,577**							
9	Newtown Creek	0026204	8,262	3,429	58.5%				
	Red Hook	0027073	841	349	58.5%				
	CSO		314	130	58.5%				
	Total Zone 9		**9,417**	**3,908**	**58.5%**		**0**	**na**	
	Tons of N reductions from Zone 9	**5,509**							
10	Belgrave	0026841	39	14	63.8%	16			
	Glen Cove	0026620	163	59	63.8%	68			
	Great Neck SD	0026999	83	30	63.9%	35			
	Great Neck (V)	0022128	39	14	63.7%	16			
	Oyster Bay	0021822	40	15	63.6%	17			
	Port Washington	0026778	120	43	63.8%	50			
	Total Zone 10		**484**	**175**	**63.8%**	**201**	**23**	**26**	**yes**
	Tons of N reductions from Zone 10	**309**							
11 west	SUNY (SCSD #21)	0206644	38	7	80.8%	16			
	Port Jefferson (SCSD #1)	0021750	37	7	80.7%	15			
	Huntington	0021342	82	16	80.6%	34			
	Kings Park (SCSD #6)	0023311	24	5	80.6%	10			
	Northport (V)	002 4881	9	2	80.8%	4			
	Total Zone 11w		**191**	**37**	**80.7%**	**79**	**36**	**42**	**yes**
	Tons of N reductions from Zone 11w	**154**							
11 east	Greenport (V)	002 0079	14	2	85.5%	6			
	Total Zone 11e		**14**	**2**	**85.5%**	**6**	**3**	**4**	**yes**
	Tons of N reductions from Zone 11e	**12**							
	Total Tons/Yr of N to be Reduced from NYS WWTP per TMDL WLA	**17,072**							

*** The TMDL indicated that a 58.5% reduction was required from all anthropogenic nitrogen sources**
Since it is not reasonable to expect a 58.5% reduction from NPSs, the WWTPs are reducing their nitrogen loads at levels greater than 58.5% to help account for the required total nitrogen reduction.
This table illustrates that the total WWTPs reductions in a zone results in additional reductions greater than the reduction required per the LA.

Table 3: Non-point Source Loads from New York State

Zone	Export Coefficients							1978 Land Use				N Load per Export Coefficiant										
	pre-colonial	terrestrial			atmospheric								terrestrial				atmospheric					tot urban + tot ag
	lb/ac/yr	urban lb/ac/yr	agricultural lb/ac/yr	forest lb/ac/yr	urban lb/ac/yr	agricultural lb/ac/yr	forest lb/ac/yr	pre-colonial (also total area) ac	urban ac	agricultural ac	forest ac	**pre-colonial tpy**	urban tpy	agricultural tpy	forest tpy	**Total Terrestrial tpy**	urban tpy	agricultural tpy	forest tpy	**Total Atm tpy**	Total NPS Load tpy	without Pre-colonial base tpy
7	2.6	4.5	2.9	0	4.9	1.2	1.2	33,623	30,776	0	2,847	**43.7**	69.2	0.0	0.0	**69.2**	75.4	0.0	1.7	**77.1**	190.1	144.6
8	2.6	CSO	CSO	CSO	CSO	CSO	CSO	55,600	55,600	0	0	**72.3**	na	na	na	**0.0**	na	na	na	**na**	na	CSO
9	2.6	CSO	CSO	CSO	CSO	CSO	CSO	42,000	42,000	0	0	**54.6**	na	na	na	**0.0**	na	na	na	**na**	na	CSO
10	2.6	4.5	2.9	0	4.9	1.2	1.2	63,279	37,749	0	25,530	**82.3**	84.9	0.0	0.0	**84.9**	92.5	0.0	15.3	**107.8**	275.0	177.4
11w	2.6	4.5	2.9	0	4.9	1.2	1.2	87,385	62,383	4,001	21,001	**113.6**	140.4	5.8	0.0	**146.2**	152.8	2.4	12.6	**167.8**	427.6	301.4
11e	2.6	4.5	2.9	0	4.9	1.2	1.2															

Table 4: New York Load Allocations

Management Zone	Nonpoint Source Load tons/yr	LA Target Load tons/yr	N Reduction		LA % Reduction* %
			tons/yr	lbs/day	
7	190	172	18	99	9.5%
8	0	0	0	0	NA
9	0	0	0	0	NA
10	275	252	23	126	8.4%
11-w	393	357	36	197	9.2%
11-e	34	31	3	16	8.8%

* the percent reduction is slightly less than 10% from the baseline load since the baseline load includes the pre-colonial load and there is no reduction required from the precolonial load

Table 5: List of Phase II MS4s in NYS LIS Watershed

County	MS4 Municipality	MS4 General Permit Number	MS4 Designation
NASSAU	EAST HILLS	NYR20A001	Automatic
NASSAU	RUSSELL GARDEN	NYR20A016	Automatic
NASSAU	LAKE SUCCESS	NYR20A034	Automatic
NASSAU	ROSLYN HARBOR	NYR20A059	Automatic
NASSAU	PLANDOME	NYR20A066	Automatic
NASSAU	ROSLYN	NYR20A071	Automatic
NASSAU	SEA CLIFF	NYR20A075	Automatic
NASSAU	GLEN COVE	NYR20A100	Desig_2003
NASSAU	PLANDOME HGTS	NYR20A162	Automatic
NASSAU	FLOWER HILL	NYR20A171	Automatic
NASSAU	BAXTER ESTATES	NYR20A174	Automatic
NASSAU	BAYVILLE	NYR20A304	Desig_2003
NASSAU	N HEMPSTEAD	NYR20A318	Automatic
NASSAU	MUNSEY PARK	NYR20A319	Automatic
NASSAU	GREAT NECK EST	NYR20A321	Automatic
NASSAU	MANOR HAVEN	NYR20A338	Automatic
NASSAU	PLANDOME MANOR	NYR20A360	Automatic
NASSAU	GREAT NECK PLA	NYR20A366	Automatic
NASSAU	OYSTER BAY	NYR20A371	Desig_2003
NASSAU	CENTRE ISLAND	NYR20A415	Desig_2003
NASSAU	OLD WESTBURY	NYR20A434	Automatic
NASSAU	OYSTER BAY COV	NYR20A435	Desig_2003
NASSAU	LATTINGTOWN	NYR20A436	Desig_2003
NASSAU	MATINECOCK	NYR20A437	Desig_2003
NASSAU	PORT WASH NO	NYR20A438	Automatic
NASSAU	BROOKVILLE	NYR20A439	Automatic
NASSAU	COVE NECK	NYR20A440	Desig_2003
NASSAU	LAUREL HOLLOW	NYR20A441	Desig_2003
NASSAU	UPR BROOKVILLE	NYR20A442	Desig_2003
NASSAU	THOMASTON	NYR20A443	Automatic
NASSAU	SANDS POINT	NYR20A444	Automatic
NASSAU	SADDLE ROCK	NYR20A445	Automatic
NASSAU	ROSLYN ESTATES	NYR20A446	Automatic
NASSAU	OLD BROOKVILLE	NYR20A447	Automatic
NASSAU	MUTTONTOWN	NYR20A448	Desig_2003

County	MS4 Municipality	MS4 General Permit Number	MS4 Designation
NASSAU	MILL NECK	NYR20A449	Desig_2003
NASSAU	KINGS POINT	NYR20A451	Automatic
NASSAU	KENSINGTON	NYR20A452	Automatic
NASSAU	GREAT NECK	NYR20A453	Automatic
SUFFOLK	ASHAROKEN	NYR20A013	Desig_2003
SUFFOLK	RIVERHEAD	NYR20A020	Desig_2003
SUFFOLK	ISLIP	NYR20A172	Automatic
SUFFOLK	SMITHTOWN	NYR20A277	Desig_2003
SUFFOLK	HUNTINGTON BAY	NYR20A292	Desig_2003
SUFFOLK	HUNTINGTON	NYR20A297	Desig_2003
SUFFOLK	LLOYD HARBOR	NYR20A299	Desig_2003
SUFFOLK	NORTHPORT	NYR20A303	Desig_2003
SUFFOLK	PORT JEFFERSON	NYR20A326	Automatic
SUFFOLK	POQUOTT	NYR20A337	Automatic
SUFFOLK	SHOREHAM	NYR20A350	Automatic
SUFFOLK	NISSEQUOGUE	NYR20A351	Automatic
SUFFOLK	VILG OF BRANCH	NYR20A352	Automatic
SUFFOLK	HEAD OF HARBOR	NYR20A353	Automatic
SUFFOLK	OLD FIELD	NYR20A407	Automatic
SUFFOLK	BROOKHAVEN	NYR20A411	Desig_2003
SUFFOLK	SOUTHOLD	NYR20A524	Desig_2010
WESTCHESTER	YONKERS	NYR20A006	Automatic
WESTCHESTER	PLEASANTVILLE	NYR20A036	Automatic
WESTCHESTER	NORTH CASTLE	NYR20A044	Desig_2003
WESTCHESTER	NORTH SALEM	NYR20A056	Desig_2003
WESTCHESTER	GREENBURGH	NYR20A060	Automatic
WESTCHESTER	NEW CASTLE	NYR20A177	Desig_2003
WESTCHESTER	LARCHMONT	NYR20A178	Automatic
WESTCHESTER	PELHAM MANOR	NYR20A179	Automatic
WESTCHESTER	MOUNT PLEASANT	NYR20A188	Desig_2003
WESTCHESTER	NEW ROCHELLE	NYR20A207	Automatic
WESTCHESTER	MAMARONECK	NYR20A215	Automatic
WESTCHESTER	BEDFORD	NYR20A218	Desig_2003
WESTCHESTER	POUND RIDGE	NYR20A226	Desig_2003
WESTCHESTER	LEWISBORO	NYR20A227	Desig_2003
WESTCHESTER	WHITE PLAINS	NYR20A230	Desig_2003
WESTCHESTER	MAMARONECK	NYR20A233	Desig_2003

County	MS4 Municipality	MS4 General Permit Number	MS4 Designation
WESTCHESTER	PELHAM	NYR20A287	Automatic
WESTCHESTER	TUCKAHOE	NYR20A305	Automatic
WESTCHESTER	SCARSDALE	NYR20A307	Automatic
WESTCHESTER	RYE BROOK	NYR20A308	Desig_2003
WESTCHESTER	PORT CHESTER	NYR20A309	Desig_2003
WESTCHESTER	ELMSFORD	NYR20A312	Automatic
WESTCHESTER	EASTCHESTER	NYR20A313	Automatic
WESTCHESTER	BRONXVILLE	NYR20A314	Automatic
WESTCHESTER	ARDSLEY	NYR20A316	Automatic
WESTCHESTER	RYE	NYR20A381	Automatic
WESTCHESTER	MOUNT VERNON	NYR20A383	Automatic
WESTCHESTER	HARRISON	NYR20A433	Desig_2003

NOTE - Does not include North Hills of Nassau or Belle Terre of Suffolk

Table 6: Center for Land Use Education & Research LISS Land Cover Data: Bronx Basin

Management Zones 7, 8 & 9

Land Cover

	Basin and Cover						Riparian Zone Land Cover					
	1985		2010		Change		1985		2010		Change	
	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%
Developed	66832	60.70%	68960	62.70%	2128	1.90%	4969	41.50%	5275	44.00%	306	2.60%
Turf & Grass	16022	14.60%	16629	15.10%	606	0.60%	1566	13.10%	1727	14.40%	161	1.30%
Other Grass	1357	1.20%	901	0.80%	-456	-0.40%	208	1.70%	151	1.30%	-57	-0.50%
Ag. Field	101	0.10%	97	0.10%	-4	0.00%	1	0.00%	1	0.00%	0	0.00%
Deciduous Forest	19396	17.60%	17651	16.00%	-1745	-1.60%	4000	33.40%	3819	31.90%	-181	-1.50%
Coniferous Forest	354	0.30%	333	0.30%	-21	0.00%	73	0.60%	68	0.60%	-5	0.00%
Water	4174	3.80%	3991	3.60%	-184	-0.20%	590	4.90%	474	4.00%	-116	-1.00%
Non-forested Wetlands	106	0.10%	37	0.00%	-68	-0.10%	37	0.30%	15	0.10%	-22	-0.20%
Forested Wetlands	634	0.60%	554	0.50%	-81	-0.10%	303	2.50%	265	2.20%	-38	-0.30%
Tidal Wetlands	349	0.30%	322	0.30%	-27	0.00%	108	0.90%	100	0.80%	-7	-0.10%
Barren	576	0.50%	428	0.40%	-149	-0.10%	95	0.80%	53	0.40%	-42	-0.30%
Utility ROW (Forest)	126	0.10%	125	0.10%	0	0.00%	26	0.20%	27	0.20%	0	0.00%

Impervious Surface Estimate

	1985		1990		1995		2002		2006		2010		Change	
	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%
Impervious Estimate	24286	3.60%	24466	3.60%	24558	3.70%	24675	3.70%	24702	3.70%	24882	3.70%	596	0.10%

Table 7: Center for Land Use Education & Research LISS Land Cover Data: Northern Long Island Basin

Management Zones 10 & 11

Land Cover

	Basin and Cover						Riparian Zone Land Cover					
	1985		2010		Change		1985		2010		Change	
	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%
Developed	56083	37.10%	58656	38.80%	2573	1.70%	3177	29.60%	3237	30.20%	60	0.60%
Turf & Grass	18458	12.20%	20736	13.70%	2278	1.50%	974	9.10%	1028	9.60%	53	0.50%
Other Grass	3666	2.40%	4139	2.70%	473	0.30%	143	1.30%	273	2.50%	130	1.20%
Ag. Field	4206	2.80%	3630	2.40%	-576	-0.40%	93	0.90%	91	0.80%	-2	0.00%
Deciduous Forest	48963	32.40%	46217	30.60%	-2745	-1.80%	3703	34.50%	3594	33.50%	-109	-1.00%
Coniferous Forest	4149	2.70%	4011	2.70%	-138	-0.10%	269	2.50%	260	2.40%	-9	-0.10%
Water	6863	4.50%	7059	4.70%	195	0.10%	572	5.30%	548	5.10%	-24	-0.20%
Non-forested Wetlands	129	0.10%	93	0.10%	-35	0.00%	51	0.50%	51	0.50%	0	0.00%
Forested Wetlands	1216	0.80%	958	0.60%	-259	-0.20%	564	5.20%	555	5.20%	-9	-0.10%
Tidal Wetlands	2790	1.80%	2573	1.70%	-217	-0.10%	463	4.30%	452	4.20%	-11	-0.10%
Barren	4499	3.00%	2959	2.00%	-1540	-1.00%	724	6.70%	644	6.00%	-80	-0.70%
Utility ROW (Forest)	190	0.10%	182	0.10%	-8	0.00%	3	0.00%	3	0.00%	0	0.00%

Impervious Surface Estimate

	1985		1990		1995		2002		2006		2010		Change	
	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%	acres	%
Impervious Estimate	21973	3.30%	22239	3.30%	22329	3.30%	22478	3.30%	22528	3.30%	22743	3.40%	770	0.10%

Table 8: Golf Courses in the LIS Watershed

Golf_Course	Phone_number	Area (ac)
Harbor Links	516-767-4816	414.55
Hamlet Wind Watch	631-232-9850	164.57
Douglaston Park	718-224-6566	94.09
Baiting Hollow	631-369-4455	94.21
Crab Meadow	631-757-8800	127.79
StoneBridge	631-724-7500	121.68
Winged Foot	914-698-8400	231.15
Quaker Ridge	914-725-1100	121.32
Saxon Woods	914-231-3461	122.54
Bonnie Briar	914-834-0992	135.42
Wykagyl Country Club	914-636-8700	207.78
Siwanoy Country Club	914-337-3840	113.93
Hampshire Country Club	914-698-4610	97.48
Rye Golf Club	914-835-3200	110.95
Sands Point Golf Club	516-883-3077	128.14
Village Club of Sands Point	516-944-7840	156.92
Plandome Country Club	516-627-1200	90.84
North Hempstead Country Club	516-365-7500	121.13
Pelham/Split Rock Golf Course	718-885-1258	372.2
Alfred E. Smith/Sunken Meadow Golf Course	631-544-0036	242.38
Indian Hills Country Club	631-261-5700	120.14
Smithtown Landing Municipal Golf Course	631-979-6534	125.82
Nissequogue Golf Club	631-584-7733	116.67
St. George's Golf and Country Club	631-751-0388	102.29
Port Jefferson Country Club at Harbor Hills	631-473-1440	111.87
Island's End Golf & Country Club	631-477-0777	126.84
Clearview Park Golf Course	718-229-2570	104.25
Rolling Oaks Golf Course	631-744-3200	49.67
Northport Golf Course	631-261-8000	60.25
Huntington Crescent Club	631-427-3400	152.67
Huntington Country Club	631-427-0334	130.31
Cold Spring Country Club	631-692-6550	198.44
Pine Hollow Country Club	516-922-0300	126.33
Mill River Club	516-922-3556	123.19
Muttontown Country Club	516-922-7500	117.81
Old Westbury Golf and Country Club	516-626-1810	236.38
Engineers Golf Course	516-621-5350	127.75
North Shore Country Club	516-676-4225	136.96
Glen Head Country Club	516-676-4050	146.37
Cedar Brook Country Club	516-759-1600	131.01

Golf_Course	Phone_number	Area (ac)
Brookville Country Club	516-671-5440	114.39
Piping Rock Country Club	516-676-2332	214.26
Nassau Country Club	516-676-0554	148
The Creek Club	516-759-0081	154.66
Glen Cove Municipal Golf Course	516-671-0033	91.45
Lake Success Golf Club	516-482-4012	107.76
Deepdale Golf Club	516-365-9111	146.17
Fresh Meadow Country Club	516-482-7300	150.12
Kissena Park Golf Course	718-939-4594	85.94
Flushing Meadow Golf Center	718-271-8182	210.8
Mosholu Golf Course	718-655-9164	259.81
Pelham Country Club	914-738-2730	112.43
Sprain Lake Golf Course	914-231-2481	108.66
St. Andrew's Golf Club	914-478-3500	147.16
Lake Isle Town Park Golf Course	914-337-4975	108.62
Leewood Golf Club	914-793-5900	97.89
Sunningdale Country Club	914-723-3200	127.31
Scarsdale Golf Club	914-723-2840	111.09
Elmwood Country Club	914-592-6600	110.35
Fenway Golf Club	914-723-6000	128.36
Westchester Hills Golf Club	914-948-5020/914-428-3115	264.59
Metropolis Country Club	914-949-4840	119.38
Westchester Country Club	914-967-6000	408.99
Apawamis Club	914-967-2100	106.94
Maple Moor Golf Course	914-995-9200	106.37
Blind Brook Club	914-939-1450	152.62
Doral Golf Club	914-323-4478/914-636-9395	110.17
Old Oaks Country Club	914-683-6000	143.58
Golf Club of Purchase	914-328-5047	273.09
Brae Burn Country Club	914-761-8300	134.73
Century Country Club	914-761-0400	152.37
Knollwood Country Club	914-592-6182	124.49
Canyon Club/Brynwood Golf & Country Club	914-273-9300/914-273-3300	143.53
Whippoorwill Club	914-273-3059	211.21
Rockrimmon Golf Course	203-322-3408	116
Pound Ridge Golf Course	914-764-5771	136.33
Waccabuc Country Club	914-763-8410	151.86
Salem Golf Club	914-669-5485	173.82
Morefar Golf Course	845-279-7179	153.88
Dutcher Golf Club	845-855-9845	34.72

Table 9: Long Island Sound Water Quality Improvement Projects

Applicant	Project Name	State Funding Awarded	Project Type
New York City Department of Environmental Protection	Bowery Bay New Diffuser System	$148,750	Wastewater Treatment Improvement
New York City Department of Environmental Protection	Bowery Bay - Installation of Ferric Chloride Feed System	$191,250	Wastewater Treatment Improvement
Belgrave Water Pollution Control District	Belgrave WPCD Treatment Plant Improvements - BNR Nitro	$2,900,000	Wastewater Treatment Improvement
Westchester County	Mamaroneck Wastewater Treatment Plant Upgrade	$1,469,650	Wastewater Treatment Improvement
Belgrave WPCD	Treatment Plant Improvements-Balance of BNR	$1,237,295	Wastewater Treatment Improvement
SCDPW	SCSD # 1-Port Jefferson Wastewater Treatment ImprovementP Reconstruction	$1,298,500	Wastewater Treatment Improvement
Village ofGreenport	UV light disinfection	$459,000	Wastewater Treatment Improvement
Town of Huntington Sewer District	Huntington Sewage Treatment Plant Nitrogen Removal	$3,242,750	Wastewater Treatment Improvement
Town of North Hempstead-Port Washington WPCD	Port Washington Biological Nitrogen Removal Demonstration	$222,700	Wastewater Treatment Improvement
Westchester County	Mamaroneck Sewer District Nitrogen Removal Demonstration	$3,830,228	Wastewater Treatment Improvement
City of Glen Cove	Glen Cove Nitrogen Removal and Facility Improvement	$2,878,750	Wastewater Treatment Improvement
New York City Department of Environmental Protection	Bowery Bay Enhanced Settling	$1,605,650	Wastewater Treatment Improvement
New York City Department of Environmental Protection	Bowery Bay Froth Control	$409,700	Wastewater Treatment Improvement

Belgrave Water Pollution Control District	Belgrave Nitrogen Removal Demonstration Project	$110,000	Wastewater Treatment Improvement
Suffolk County DPW	Sewer District #6 - Kings Park	$3,152,437	Wastewater Treatment Improvement
City of Glen Cove	Glen Cove Nitrogen Removal and Facility Improvements	$500,000	Wastewater Treatment Improvement
Oyster Bay Sewer District	Nitrogen Removal - Oyster Bay WPCF	$3,752,750	Wastewater Treatment Improvement
Village of Northport	Wastewater Treatment Plant Upgrade	$977,500	Wastewater Treatment Improvement
New York City Department of Environmental Protection	Installation of Froth Control at Hunts Point	$328,461	Wastewater Treatment Improvement
New York City Department of Environmental Protection	Tallman Island Ferric Chloride Feed System	$115,600	Wastewater Treatment Improvement
Nassau County Department of Public Works	The Birches Wastewater Treatment and Disposal	$522,500	Wastewater Treatment Improvement
Westchester County	New Rochelle SSO Nitrogen Reduction	$3,328,493	Wastewater Treatment Improvement
Suffolk County	Suffolk County Sewer District No. 1 - Port Jefferson, Nitrogen Reduction	$3,048,950	Wastewater Treatment Improvement
Town of Huntington	Construction of Nitrogen Removal Facilities at Huntington Sewer District Wastewater Treatment ImprovementP	$5,682,250	Wastewater Treatment Improvement
New York City Department of Environmental Protection	WP-56 Hunts Point WPCP Interim Plant Upgrading - Phase 1	$30,828,162	Wastewater Treatment Improvement
Westchester County	Construction of Overflow Retention Basins	$4,839,898	Wastewater Treatment Improvement
Oyster Bay Sewer District	Construction of Nitrogen Removal Facility at Oyster Bay Sewer District	$2,979,250	Wastewater Treatment Improvement
Suffolk County	Sewer District #6 - King's Park	$4,778,011	Wastewater Treatment

			Improvement
Village of Northport	Wastewater Treatment Plant Modification/Expansion	$155,000	Wastewater Treatment Improvement
New York City Department of Environmental Protection	Ward's Island WPCP Interim Plant Upgrading	$16,542,543	Wastewater Treatment Improvement
Port Washington Water Pollution Control District	Construction of Nitrogen Removal Sys. & Associated Plant Improvements	$11,007,500	Wastewater Treatment Improvement
Village of Greenport	Water Pollution Control Plant Phase II Improvements and Modifications	$1,075,000	Wastewater Treatment Improvement
City of Glen Cove	Full Scale U.V. Disinfection	$1,020,000	Wastewater Treatment Improvement
Port Washington Water Pollution Control District	Process and Operational Enhancements to the Biological Nutrient Removal Demonstration	$291,125	Wastewater Treatment Improvement
Great Neck Water Pollution Control District	Diversion of Discharges to Manhasset Bay from the Village of Great	$15,362,050	Wastewater Treatment Improvement
Suffolk County	SCSD #1 - Port Jefferson WTP Reconstruction	$9,148,550	Wastewater Treatment Improvement
Suffolk County	SCSD #21 - SUNY Nitrogen Removal and Groundwater Recharge	$12,070,000	Wastewater Treatment Improvement
Town of Huntington	Construction of Ultraviolet Disinfection System at the Huntington WTP	$366,000	Wastewater Treatment Improvement
New York City Department of Environmental Protection	Tallman Island WPCP Interim Plant Upgrade Phase 1	$14,843,670	Wastewater Treatment Improvement
Village of Laurel Hollow	Village Beach Restoration/Drainage Improvements on Moore's Hill Road	$198,000	Nonpoint Source Abatement and Control
Town of Brookhaven	Stony Brook Creek Shoreline Restoration & Stabilization	$135,000	Nonpoint Source Abatement and Control
Village of Head of the Harbor	Cordwood Path Dry Retention Swale and Beach Remediation	$50,000	Nonpoint Source Abatement and Control

Village of Head of the Harbor	Pond Woods and Mills Pond SW Mitigation	$65,000	Nonpoint Source Abatement and Control
Town of North Hempstead	Roslyn Pond (Hempstead Harbor Cove) Wetland Restoration	$91,000	Nonpoint Source Abatement and Control
Town of Brookhaven	2005 Brookhaven Wading River Project	$170,000	Nonpoint Source Abatement and Control
City of New Rochelle	Installation of Floatable Debris Collection System(s)	$36,500	Nonpoint Source Abatement and Control
Town of North Hempstead	Mill Pond Water Quality Improvement	$1,012,000	Nonpoint Source Abatement and Control
Village of Laurel Hollow	Laurel Hollow Bathing Beach Water Quality Improvement Project	$49,000	Nonpoint Source Abatement and Control
Town of Huntington	Town of Huntington Stormwater Pilot Program Phase II	$268,400	Nonpoint Source Abatement and Control
Village of Northport	Northport, Norwood Avenue	$110,000	Nonpoint Source Abatement and Control
City of Glen Cove	Glen Cove Stormwater Treatment	$50,000	Nonpoint Source Abatement and Control
Westchester County	Glen Island County Park Stormwater Run-off (New Rochelle)	$242,000	Nonpoint Source Abatement and Control
Village of Nissequogue	Moriches Road Drainage Project	$138,625	Nonpoint Source Abatement and Control
Westchester County Planning Department	Mamaroneck River Water Quality and Aquatic Habitat Restoration	$132,000	Nonpoint Source Abatement and Control
Village of Rye Brook	East Branch Blind Brook Stormwater Control	$218,750	Nonpoint Source Abatement and Control
Town of Oyster Bay	Centre Island Beach Runoff Remediation	$207,760	Nonpoint Source Abatement and Control
Suffolk County DPW	Stormwater Remediation for County Highways Adjacent to Long Island Sound	$270,000	Nonpoint Source Abatement and Control
Town of Brookhaven Highway Department	Stony Brook Shores Stormwater Control Project	$40,806	Nonpoint Source Abatement and

			Control
Town of Brookhaven	Port Jefferson Town Marina Stormwater Reduction	$100,000	Nonpoint Source Abatement and Control
Town of Brookhaven	Mt. Sinai Harbor Marine Stormwater Reduction	$100,000	Nonpoint Source Abatement and Control
City of Glen Cove	Glen Cove Creek Bulkheading	$500,000	Nonpoint Source Abatement and Control
City of New Rochelle	Grit Retention Chambers	$141,400	Nonpoint Source Abatement and Control
Town of Oyster Bay	Seawanhaka Place Road End - Construction Phase	$23,600	Nonpoint Source Abatement and Control
Village of Bayville	Remediation and Development of Schmitt Property	$230,000	Nonpoint Source Abatement and Control
Town of Huntington	West Shore Road Shoreline Stabilization and Stormwater Management	$40,000	Nonpoint Source Abatement and Control
City of Glen Cove	Creation of a Constructed Wetlands Stormwater Treatment System	$100,000	Nonpoint Source Abatement and Control
Town of Smithtown	Landing Avenue Drainage Improvement Project - Phase II	$20,103	Nonpoint Source Abatement and Control
Town of Smithtown	Old Dock Road Drainage Improvement Project	$21,056	Nonpoint Source Abatement and Control
Suffolk County	Remediation of Highway Stormwater Discharge to Huntington Harbor	$320,000	Nonpoint Source Abatement and Control
Village of Huntington Bay	Wincona Drainage Area "C"	$241,391	Nonpoint Source Abatement and Control
Village of Bayville	Bayville Park Boulevard/Perry Avenue Projects	$662,500	Nonpoint Source Abatement and Control
Town of Huntington	Centerport Harbor Stormwater Mitigation - Construction Phase	$250,000	Nonpoint Source Abatement and Control
Village of Northport	Stormwater Runoff Control	$178,000	Nonpoint Source Abatement and Control

Village of Oyster Bay	Stehli Beach Stormwater Mitigation - Construction Phase	$106,000	Nonpoint Source Abatement and Control
Nassau County	Manhasset Valley Park Pond Project	$644,125	Nonpoint Source Abatement and Control
Town of Brookhaven	Aunt Amy's Creek Storwater Mitigation Project	$106,627	Nonpoint Source Abatement and Control
Town of Smithtown	St. Johnland Road Drainage Improvements and Culvert Replacement	$125,000	Nonpoint Source Abatement and Control
Town of Huntington	Fleets Cove/Knollwood Beach Stormwater Mitigation Project	$300,000	Nonpoint Source Abatement and Control
Nassau County Department of Public Works	Whitney Lake Rehabilitation Project	$500,000	Nonpoint Source Abatement and Control
Nassau County Department of Public Works	Stormwater Treatment Project, County Outfall at Glen Cove Marina	$30,000	Nonpoint Source Abatement and Control
Village of Old Field	Stormwater Abatement Activities at Flax Pond, Woods Rd., Crane neck Rd., & Old Field	$48,750	Nonpoint Source Abatement and Control
Village of Nissequogue	Nissequogue Village Stormwater Control Project	$115,000	Nonpoint Source Abatement and Control
Village of Huntington Bay	Bay Crest Willow Pond Dranage Basin Area "G"	$321,751	Nonpoint Source Abatement and Control
Village of Huntington Bay	Bay Hills Drainage Basin Area "L"	$237,038	Nonpoint Source Abatement and Control
Nassau County Department of Public Works	Stormwater Treatment Project, County Outfall at Glen Cove Marina	$7,500	Nonpoint Source Abatement and Control
Town of Huntington	Mill Dam Pond Habitat Restoration and Water Quality Improvements	$1,888,350	Nonpoint Source Abatement and Control
Village of Bayville	Valentine Beach Nonpoint Source and Flood Control	$800,000	Nonpoint Source Abatement and Control
Town of Brookhaven	Gully Landing Road	$90,000	Nonpoint Source Abatement and Control
Town of Brookhaven	Setauket Mill Pond Stormwater Mitigation	$99,000	Nonpoint Source Abatement and

			Control
New York State Department of Environmental Conservation	Tallapoosa West Wetland Restoration	$324,825	Aquatic Habitat Restoration
Town of North Hempstead	Hempstead Harbor Cove Wetland Restoration	$127,500	Aquatic Habitat Restoration
Village of Bayville	Bayville Wetlands Redevelopment Project	$350,000	Aquatic Habitat Restoration
Town of Mamaroneck	Pryer Manor Marsh Restoration	$34,500	Aquatic Habitat Restoration
Town of Brookhaven	Phragmites Removal in Stony Brook Creek	$25,000	Aquatic Habitat Restoration
City of New Rochelle	Aquatic and Non-Aquatic Planting Program	$50,000	Aquatic Habitat Restoration
Town of North Hempstead	Morewood Wetlands Improvement	$230,756	Aquatic Habitat Restoration
Town of Oyster Bay	Wetland Creation and Restoration at the Oyster Bay Western Waterfront	$850,000	Aquatic Habitat Restoration
Village of Centre Island	Centre Island Wetland Restoration Project	$12,500	Aquatic Habitat Restoration
Town of Huntington	Betty Allen Nature Preserve	$100,000	Aquatic Habitat Restoration
Nassau County Department of Public Works	Baxter Pond Rehabilitation Project	$225,000	Aquatic Habitat Restoration
City of Rye	Reconstruction of Rye Town Park Pond	$489,675	Aquatic Habitat Restoration
Westchester County	Long Island Sound Aquatic Habitat Restoration Projects in Westchester County	$110,000	Aquatic Habitat Restoration
Village of Mamaroneck	Pryor Manor Marsh Restoration - Phase 2	$210,000	Aquatic Habitat Restoration
Great Neck Estates	Restoration of Pond	$28,297	Aquatic Habitat Restoration
New York City Parks and Recreation	Soundview/Bronx River Estuary Salt Marsh Restoration	$2,194,420	Aquatic Habitat Restoration
Westchester County	Sheldrake River and Lake Habitat Improvement Project	$1,031,500	Aquatic Habitat Restoration
Village of Lloyd Harbor	Water Quality Improvements at Fiske Pond	$269,065	Aquatic Habitat Restoration
New York City Department of Environmental Protection	Bowery Bay Wetland Restoration	$130,022	Aquatic Habitat Restoration

New York State Department of Environmental Conservation	Beaver Lake Fish Ladder	$58,900	Aquatic Habitat Restoration
New York City Department of Parks and Recreation	Pugsley Creek Salt Marsh and Buffer Restoration	$850,000	Aquatic Habitat Restoration
Town of Huntington	Restoration of Tidal Wetland at Phragmites Park - Construction Phase	$195,450	Aquatic Habitat Restoration
City of Rye	Rye Nursery Wetland Restoration Project	$1,615,150	Aquatic Habitat Restoration
Town of Huntington	Eelgrass and Bay Scallop Restoration Initiative	$190,000	Aquatic Habitat Restoration
New York City Department of Parks and Recreation	Randall's and Ward's Island Park Wetlands Restoration	$1,085,500	Aquatic Habitat Restoration
New York City Economic Development Corporation	Flushing Airport Wetland Restoration Project	$4,321,250	Aquatic Habitat Restoration

Table 10: Long Island Sound Futures Fund Projects

Year	Name	Organization	Location	Award Amount
2005	Flint Park Waterfront Environmental Area (NY)	Village of Larchmont	Village of Larchmont, Westchester County, New York	$25,000
2005	Habitat Monitoring in Flax Pond (NY)	Friends of Flax Pond, Inc.	Flax Pond, Setauket, Suffolk County, New York	$25,000
2005	Long Island City/Astoria Waterfront Catalyst	City Parks Foundation	Long Island City and Astoria, Queens, New York	$20,000
2005	Hempstead Harbor Cove Wetland Restoration	Town of North Hempstead	Hempstead Harbor, Port Washington, New York	$75,000
2005	Sound Practices for West Meadow Beach	The Ward Melville Heritage Organization	West Meadow Beach, Stony Brook, New York	$15,000
2005	Sound Experiences- From Ship to Shore	Cornell Cooperative Extension Association of Suffolk County	Oyster Bay, New York	$29,997
2005	Hempstead Harbor Citizen Water-Monitoring (NY)	Town of North Hempstead	Hempstead Harbor,Sea Cliff,New York	$30,000
2005	Model for LIS Stewardship Initiative	National Audubon Society, Inc.	Marshlands Conservancy,Rye, Pelham Bay Park, Bronx, Oyster Bay, Plum Island, New York: Great Gull Island, Southold, New York.	$40,000
2005	Marine Ecology Education (NY)	Riverhead Foundation for Marine Research and Preservation	Riverhead, Long Island Sound, New York	$20,000
2005	Long Island Sound Stewardship Initiative	Regional Plan Association, Inc.	Township of Smithtown, New York	$40,000
2005	Long Island Sound Eelgrass Restoration (NY)	Cornell Cooperative Extension Association of Suffolk County	St. Thomas Point,Southold,New York	$60,000
2005	Mitigation of Playland Parking Lot Stormwater (NY)	Edith G. Read Natural Park and Wildlife Sanctuary	Playland Lake, Rye, Westchester County, New York	$36,400
2005	Great Pond Wetland Restoration (NY)	Peconic Land Trust	Great Pond,Southold,New York	$40,000
2006	Oyster Bay/Cold Spring Harbor Fish Passage (NY)	Trout Unlimited Long Island Chapter	Oyster Bay/Cold Spring Harbor,New York.	$30,873
2006	Long Island Sound Eelgrass Restoration - II (NY)	Cornell Cooperative Extension Association of Suffolk County	St. Thomas Point,Southold, Old Field Point, Village of Old Field, Caumesette State Park, Lloyd Harbor, New York.	$49,942
2006	Bronx River Restoration (NY)	Bronx River Alliance, Inc.	Bronx River, Bronx, New York.	$73,000
2006	Marine Mammals, Turtles and Citizen Scientists (NY)	Riverhead Foundation for Marine Research	Riverhead, New York.	$28,000

Year	Name	Organization	Location	Award Amount
		and Preservation		
2006	Hempstead Harbor Cove Wetland Restoration- II (NY)	Town of North Hempstead	Town of North Hempstead, Port Washington, New York.	$27,000
2006	Eastern Long Island Beach Nesting Birds (NY)	National Audubon Society, Inc.	Eastern Suffolk County, Long Island Sound, New York.	$34,966
2006	Nissequogue River Stewardship Initiative (NY)	Regional Plan Association, Inc.	Nissequogue River, Town of Smithtown, New York.	$50,000
2006	Native Successional Forest Restoration (NY)	Edith G. Read Natural Park and Wildlife Sanctuary	Edith G. Reade Natural Park and Wildlife Sanctuary, Rye, New York.	$35,000
2006	Oyster Bay/Cold Spring Harbor Water Quality (NY)	Friends of the Bay, Inc.	Oyster Bay & Cold Spring Harbors, Mill Neck Creek, New York	$36,000
2006	Rocking the Boat - On Water Education (NY)	Rocking the Boat, Inc.	Bronx River, Bronx, New York.	$35,000
2006	Shellfish Restoration (NY)	Coastal Steward	Port Jefferson and Mt. Sinai Harbors, New York.	$5,000
2006	Little Neck Bay/Long Island Sound Estuary Fest(NY)	Alley Pond Environmental Center, Inc.	Douglaston, New York	$5,000
2006	2006 NY State Beach Cleanup- Long Island Sound	American Littoral Society	Long Island Sound Beaches, New York.	$5,000
2006	Harbor Island Salt Marsh Interpretive Signage (NY)	Westchester County Department of Planning	Village of Mamaroneck, New York	$4,850
2006	Kips Bay National Estuary Day Celebration (NY)	The Center for Marine Education and Recreation	Oyster Bay, New York	$5,000
2006	MicroMagic Mobile Classroom and Lab (CT)	Schooner, Inc.	New Haven, Connecticut.	$4,900
2006	Sherwood Mill Pond Restoration (CT)	Town of Westport, Connecticut	Westport, Connecticut	$19,246
2006	Restoring the Forge River (NY)	The Peconic Baykeeper	This is not a Long Island Sound Futures Fund project.	$66,429
2007	Restoration of the Headwaters of Alley Creek (NY)	New York City Department of Parks and Recreation	Little Neck Bay, Queens, New York	$146,341
2007	Fish Passage 182nd St Dam Bronx River (NY)	New York City Department of Parks and Recreation	Bronx River, Bronx, New York	$150,000
2007	Conservation Action Plans LIS Stewardship (NY, CT)	National Audubon Society, Inc./Audubon New York	Lighthouse Point Park and Mamacoke Island, Connecticut Orient Point/Plum Island, Edith Reade Sanctuary, and Marshlands, New York.	$35,000
2007	Habitat Monitoring and Outreach in Flax Pond (NY) - II	Friends of Flax Pond, Inc.	Village of Old Field, Suffolk County, New York	$35,000
2007	Oyster Bay/Cold Spring Watershed Action Plan (NY)	Friends of the Bay, Inc.	Oyster Bay / Huntington, Nassau and Suffolk County,	$53,570

Year	Name	Organization	Location	Award Amount
			New York	
2007	Hempstead Harbor Citizen Water Monitoring - II(NY)	Incorporated Village of Sea Cliff, New York	Hempstead Harbor, Nassau County, New York	$30,500
2007	Sound Experiences: From Ship to Shore - II (NY)	Cornell Cooperative Extension of Suffolk County	Brentwood, Central Islip, Oyster Bay, Etc., New York	$35,000
2007	Soundkeeper Habitat Restoration Specialist (NY)	Soundkeeper, Inc.	Pelham Bay, Bronx, New York	$17,500
2007	Long Island Sound - 2007 State Beach Cleanup (NY)	American Littoral Society	Long Island Sound Beaches, New York	$6,000
2007	National Estuaries Day - Annual Family Day (NY)	Long Island Seaport & Eco Center	Port Jefferson, New York	$6,000
2008	Long Island Sound Beach Cleanup (NY)	American Littoral Society	Long Island Sound Beaches, New York	$6,000
2008	National Estuaries Day-Annual Family Day (NY)-II	Long Island Seaport & Eco Center	Harborfront Park, Port Jefferson, New York	$5,000
2008	Marine Debris in Long Island Sound (NY)	Three Village Community Trust	Port Jefferson, New York	$6,000
2008	Little Neck Bay/Long Island Sound Fest (NY)-II	Alley Pond Environmental Center, Inc.	Little Neck Bay, Douglaston, New York	$5,000
2008	Water Quality Monitoring in Long Island Sound (NY)	Friends of the Bay, Inc.	Town of Oyster Bay, Nassau County, New York	$6,000
2008	Mt. Misery Beach Habitat Restoration (NY)	Coastal Steward	Port Jefferson, New York	$6,000
2008	Parks Citywide Greenroof Pilot Project (NY)	New York City Department of Parks and Recreation	Randall's Island, New York City, New York	$50,000
2008	Sunken Meadow Creek - Engineering Model (NY)	New York State Office of Parks, Recreation, and Historic Preservation	Sunken Meadow State Park, Suffolk County, New York	$30,000
2008	Eastern Long Island Sound Eelgrass Restoration (NY)	Cornell Cooperative Extension Association of Suffolk County	Plum Island and Great Gull Island, Town of Southold, New York	$69,862
2008	Shellfish Seeding in Hempstead Harbor (NY)	Nassau County, New York	Hempstead Harbor, Glen Cove, New York	$72,000
2008	Hempstead Harbor Citizen Water Monitoring-III (NY)	Incorporated Village of Sea Cliff, New York	Hempstead Harbor, Nassau County, New York	$35,000
2008	Mattituck Inlet Stormwater Mitigation (NY)	Group for the East End, Inc.	Mattituck Inlet, Mattituck, New York	$40,000
2008	Oyster Bay/Cold Spring Watershed Action Plan (NY)	Friends of the Bay, Inc.	Oyster Bay/Cold Spring Harbor, New York	$15,000
2008	Water Loggers -Citizen Water Monitoring (NY)	Cornell Cooperative Extension Association of Suffolk County	Nissequogue River, Town of Smithtown, New York	$33,000
2008	Rocking the Boat Water Quality Monitoring (NY)	Rocking the Boat, Inc.	Bronx River, Bronx County, New York	$35,000
2008	Eastern Long Island Beach Nesting Birds - III (NY)	National Audubon Society, Inc.	McAllister County Park, Cedar Beach, Mt. Sinai and Port Jefferson Harbors, New York	$50,000

Year	Name	Organization	Location	Award Amount
2008	Developing Marine Mammal and Turtle Stewards (NY)	Riverhead Foundation for Marine Research and Preservation	Riverhead, New York	$35,000
2009	Development of Bronx River Watershed Education Exhibit (NY)	Nunataks Ltd. d/b/a Greenburgh Nature Center	Scarsdale, New York	$5,704
2009	Long Island Sound - 2009 Beach Cleanup (NY)	American Littoral Society	Long Island Sound Beaches, New York	$6,000
2009	Sound Experiences: From Ship to Shore III	Cornell Cooperative Extension of Suffolk County	Brentwood, Central Islip, Oyster Bay Etc., New York	$35,000
2009	Hempstead Harbor Citizen Water Monitoring (NY) - IV	Incorporated Village of Sea Cliff, New York	Hempstead Harbor, Nassau County, New York	$45,000
2009	Harrison Pond Park Wetland Restoration and Dam Removal (NY)	Town of Smithtown	Harrison Pond Park, Kings Park, New York.	$94,993
2009	Social Marketing Campaign: Beach-Nesting Birds, Long Island's North Shore (NY)	National Audubon Society, Inc./Audubon New York	The coastal areas on the North Shore of Long Island, New York	$26,750
2009	Western Long Island Pump-out Boat Initiative (NY)	Going Coastal, Inc.	Western Long Island Sound, covering the waters of Eastchester Bay, East River to Whitestone Bridge to Little Neck Bay, and reaching to Flushing Bay, Queens.	$34,350
2009	Festival of Little Neck Bay and Long Island Sound (NY)	Alley Pond Environmental Center, Inc.	Little Neck Bay, Douglaston, New York	$5,000
2009	Indicator Bacteria and Nutrient Levels in the Norwalk River (CT)	Earthplace - The Nature Discovery Center, Inc.	Norwalk River Watershed(New Canaan, Norwalk, Redding, Ridgefield, Weston, Wilton), Connecticut and Lewisboro, New York	$6,000
2009	Parks Citywide Green Roof (NY) - II	New York City Department of Parks and Recreation	Randalls Island, New York City, New York	$50,000
2009	Implementing the Nissequogue River Stewardship Action Plan	Regional Plan Association, Inc.	Nissequogue River, Town of Smithtown, New York	$54,000
2009	Habitat Monitoring in Flax Pond (NY) - III	Friends of Flax Pond, Inc.	Old Field, New York.	$25,000
2009	Coastal Resilience on Suffolk County Long Island Sound Shore (NY)	The Nature Conservancy	Long Island Sound, Suffolk County, New York	$50,000
2009	Perennial Pepperweed Removal at West Meadow Beach (NY)	Town of Brookhaven	West Meadow Beach is a 7,000 foot long peninsula located along the north shore of the Town of Brookhaven bordering Long Island Sound on the west and West Meadow tidal wetlands to the east.	$38,538
2009	Coastal Classroom (NY)	City Parks Foundation	Astoria and Long Island City, Queens, New York	$6,000

Year	Name	Organization	Location	Award Amount
2009	Signage at Silver Sands State Park for Habitat Conservation (CT)	State of Connecticut	Silver Sands State Park, Milford, Connecticut	$4,000
2011	Long Island Sound Urban Waterfront Education Program (NY)	New York City Parks and Recreation Urban Park Rangers	Pelham Bay Park, Bronx, Bronx County, New York and Fort Totten Park, Queens, Queens County, New York. Latitude: N 40° 47' 31.7097" Longitude: W 73° 46' 33.8473"	$33,673
2011	Oyster Bay/Cold Spring Harbor Protection Committee Creation (NY)	Town of Oyster Bay	A 40 square mile watershed area that spans across 18 municipalities within Nassau and Suffolk Counties, Long Island, NY.	$60,000
2011	Rodman's Neck Coastal Forest Restoration (NY)	City of New York Parks and Recreation	Rodman's Neck is in Pelham Bay Park, Bronx, Bronx County, New York. Latitude: N 40° 50' 55.7281 Longitude: W 73° 48' 1.6006".	$150,000
2011	Curbing Invasion Pathways through Aquatic Invasive Species Awareness (CT, NY)	University of Connecticut	Project activities will be concentrated at bait retailers in Connecticut and New York, at public boat access points, and marinas, primarily in Connecticut but also on the north shore of Long Island.	$33,123
2011	Hutchinson River/Thomas Pell Wildlife Refuge Cleanup (NY)	Hutchinson River Restoration Project	The Thomas Pell Wildlife Refuge, in Pelham Bay Park, Bronx, Bronx County,New York on the shore of the Hutchinson River. Latitude: N 40° 52' 39.249" Longitude: W 73° 49' 11.5869"	$2,884
2011	Conscience Bay Stormwater Control & Buffer Enhancement (NY)	Village of Old Field	Old Field Rd from Mt. Grey Rd to Quaker Path, Village of Old Field, Suffolk County, NY. Latitude: N 40° 57' 26.1498" Longitude: W 73° 7' 39.9649"	$60,000
2011	Goldsmith Waterwash Stormwater Remediation and Outreach (NY)	Group for the East End, Inc.	Goldsmith Inlet Pond is located in the Hamlet of Peconic, Town of Southold, Suffolk County, NY. Latitude: N 41° 3' 7.9352" Longitude: W 72° 28' 16.4968"	$52,097

Year	Name	Organization	Location	Award Amount
2011	The Point's South Bronx Community Green Roof (NY)	The Point Community Development Corporation	THE POINT's main facility at 940 Garrison Avenue, Bronx, Bronx County, NY 10474. Latitude: N 40° 49' 4.9134" Longitude: W 73° 53' 26.3496"	$131,250
2011	Bioextraction of Nutrients from Long Island Sound (CT, NY)	University of Connecticut	The mouth of the Bronx River Estuary, East River, Bronx, Bronx County, NY and off the coast of the Town of Fairfield,Fairfield County,CT.	$123,999
2011	Long Island Sound Day (NY)	National Audubon Society, Inc./Audubon New York	This project involves an event held at the Theodore Roosevelt Audubon Sanctuary and Center in Oyster Bay, NY. Volunteer activities preceding the recruitment event will be held on Long Island.	$9,995
2011	Coastal Classroom on the Queens Waterfront (NY)	City Parks Foundation	The Coastal Classroom program takes place along the East River, in Astoria and Long Island City, Queens, situated within the Long Island Sound watershed.	$10,000
2011	Manhasset Bay Boater Pollution Prevention (NY)	Town of North Hempstead	Manhasset Bay is an embayment of Long Island Sound on the north shore of Long Island in Nassau County. It is surrounded by 15 municipalities, including Port Washington, Great Neck and Manhasset.	$21,350
2011	Beach-nesting Bird Stewardship on Eastern Long Island (NY)	National Audubon Society, Inc.	Orient Point to Plum Island Important Bird Area and LISSI stewardship areas of Jamesport-Mattituck Creek, Plum & Gull Islands, and Fishers Island Coastline.	$25,833
2011	Planning/Design of Storm Water Management Practices at Queensborough Community College (NY)	Research Foundation of the City University of New York	Campus of Queensborough Community College in Bayside, NY, adjacent to Oakland Lake, which feeds into Little Neck Bay.	$34,150
2011	Coastal Cleanup at Long Island Sound (NY)	American Littoral Society	Beach Cleanups will occur at sites affecting Long Island Sound in NY: NYC, and towns in Nassau, Suffolk and	$6,000

Year	Name	Organization	Location	Award Amount
			Westchester	
2011	Water Quality Monitoring on the Bronx River (NY)	Rocking the Boat, Inc.	The project takes place at two locations in the middle of the Bronx River: the Hunts Point site close to Rocking the Boat's facility and the Soundview site closer to the mouth.	$35,000
2011	Town of Mamaroneck Stormwater Quality Control (NY)	Town of Mamaroneck	Town of Mamaroneck, various locations	$63,000
2011	Street Swale Infrastructure Initiative (NY)	Regional Plan Association, Inc.	Flushing Creek in Queens, New York, where the Long Island Expressway and Van Wyck Expressway intersect in Flushing Meadows Corona Park. Latitude:N 40° 44' 34.3235" Longitude:W 73° 50' 14.8527"	$59,935
2011	Mill River-Beekman Creek Restoration (NY)	Friends of the Bay, Inc.	The south end of Oyster Bay Harbor(West Harbor) immediately adjacent to the Oyster Bay NWR in The Town of Oyster Bay, Nassau County, New York. Latitude:N 40° 53' 28.54" Longitude:W 73° 30' 29.7197"	$40,000
2011	SoundWaters Public Engagement Sails on Long Island Sound	SoundWaters, Inc.	Long Island Sound. The schooner SoundWaters will collaborate with community-based organizations located at ports in Connecticut and New York.	$34,486
2011	Hempstead Harbor Citizen Water Monitoring (NY) - V	Incorporated Village of Sea Cliff, New York	Hempstead Harbor (north shore of Long Island) Lat. - 40.830567 Long. - 73.658223	$40,000
2011	Beach and Sound Clean-up at Orchard and Davenport Beaches (NY)	Scuba Sports Club	The Lobster Pot cleanups will leave from City Island and take place in the Sound. The beach cleanups will be located at Orchard Beach and DavePort Park.	$5,000

Year	Name	Organization	Location	Award Amount
2011	Restoration of Forests at Audubon's First Bird Sanctuary (NY)	National Audubon Society, Inc.	This project will be conducted at Theodore Roosevelt Sanctuary and Audubon Center,located on 14 acres at 134 Cove Road,Oyster Bay, NY in Nassau County.Lat.- N 40 52' 11.6206" Long. - 73 30' 24.3896"	$34,977
2011	Water Quality Report for Oyster Bay/Cold Spring Harbor Estuary (NY)	Friends of the Bay, Inc.	Oyster Bay Cold Spring Harbor Estuary and Watershed	$6,440
2011	Sound Experiences: From Ship-to-Shore (NY) - IV	Cornell Cooperative Extension of Suffolk County	The Oyster Bay Waterfront Center, located on West End Avenue in Oyster Bay. Lat.- N 40 52' 33.0942" Long. W 73 32' 23.9497"	$35,000
2011	Adopt-a-Trout: Promoting Community-Based Stewardship (NY)	Hofstra University	Shu Swamp Preserve Lat.- 40.880133 Long. -73.566298 Cleft Road (owner: Town of Mill Neck),; 4 schools in Nassau & 7 in Suffolk, Children's Maritime Museum in Port Jefferson.	$34,978
2011	Reducing Plastic Pollution in Waterways through "Bring Your Own Bag" Campaign (NY)	Citizens Campaign Fund for the Environment, Inc.	The project will take place within the LIS watershed in the communities of Huntington, The village of Northport, and the Village of Port Jefferson.	$25,000
2011	Mamaroneck River Corridor Buffer Restoration (NY)	Westchester County Department of Planning	This project is located along the Mamaroneck River in the County-owned Saxon Woods Park, Mamaroneck/Harrison, N.Y. Latitude:N 40° 58' 38.9436" Longitude:W 73° 44' 37.8986"	$41,000
2011	Festival of Little Neck Bay and Long Island Sound (NY) - IV	Alley Pond Environmental Center, Inc.	APEC, located in Northeast Queens is within the boundaries of Alley Pond Park. Latitude:N 40° 44' 46.4966"Longitude:W 73° 44' 25.4617"	$5,000
2011	Great Egret Foraging Science Education (NY)	Rocking the Boat, Inc.	The project will be conducted at six different sites along the Bronx River in the South Bronx. Latitude:N 40° 49' 15.9036" Longitude:W 73° 53' 0.5489"	$20,000

Year	Name	Organization	Location	Award Amount
2011	Coastal Grasslands Restoration at Caumsett State Park (NY)	New York State Office of Parks, Recreation, and Historic Preservation	Caumsett State Historic Park located in the town of Huntington, NY. The 25 acre site is located NW of the parking area at the entrance to the park.Latitude:N 40° 55' 54.1341" Longitude:W 73° 27' 39.23	$39,466
2011	Engaging Sweet Corn Farmers to Reduce Nitrogen in Long Island Sound (NY)	American Farmland Trust	The project will take place within Suffolk County, New York. See the uploaded map for a visual representation of the proposed project location.	$150,000
2011	Removing Ghost Fishing Gear to Restore the Sound for Long Island Fisheries (NY)	Cornell Cooperative Extension Association of Suffolk County	The proposed project area will encompass Long Island Sound New York waters from Northport/Huntington to Oyster Bay.	$98,556
2011	New York Botanical Garden Lower Portage Trail Restoration (NY)	New York Botanical Garden	The NYBG Lower Portage Trail is located on the west shoreline of the Bronx River, south of the Stone Mill Bridge at Longitude/Latitude: 40.51'28.16" N, 73.52'33.96"	$100,000
2012	Rodman's Neck Coastal Forest Restoration, Phase II (NY), #33072	New York City Department of Parks and Recreation	Rodman's Neck, Eastchester Bay, Pelham Bay Park, Bronx, NY 40.856815 and -73.801907	$100,000
2012	Alley Pond Park Restoration and Stewardship (NY), #33206	New York City Department of Parks and Recreation	Alley Pond Park, Douglaston, Queens, NY 40.761041 and -73.747752	$100,000
2012	The "Marine Meadows" Eelgrass Restoration Program (NY/CT), #33008	Cornell Cooperative Extension Association of Suffolk County	CT: Little Narragansett Bay, N 41° 19.838' and W71° 53.228', Clinton Harbor, Deep N 41° 15.791' and W 72° 31.760', Clinton Harbor, Shallow N 41° 15.826' and W72° 31.775', St. Thomas Point, NY, N 41° 08.410' and W72° 20.248'	$95,341
2012	Great Gull Island Management & Invasives Control Project (NY), #32632	University of Connecticut	Great Gull Island is located between Long Island and Block Island Sound, in Suffolk County, NY. It lies between Plum Island and Fishers Island 41° 12′ 08.79″	$39,866

Year	Name	Organization	Location	Award Amount
			N and 72° 07´ 06.93˝ W	
2012	Conscience Bay Stormwater Treatment & Wetland Enhancement (NY), #32789	Village of Old Field	Village of Old Field, NY 40'57'20"N and 73'07'38"W	$200,000
2012	Engaging Vineyards to Implement Water Quality Improvement (NY), #33028	Cornell Cooperative Extension of Suffolk County	The project will take place on vineyards located on the North Fork of Long Island in the LI Sound Study Coastal Boundary 40 degree 58 min 10 sec N and 72 degree 37 min 29 sec W	$128,000
2012	Onsite Septic Training and Certification Program (NY), #32758	Town of Oyster Bay	The north shore of Nassau and Suffolk counties of Long Island which border the Manhasset Bay, Oyster Bay / Cold Spring Harbor and Hempstead Harbor watersheds 40 52' 31.6"N and 73 31' 56.62"W	$30,000
2012	Plan for Decentralized Wastewater Treatment, North Fork (NY), #33406	Peconic Green Growth	Towns of Southold and Riverhead, NY. LIS boundary on Route 25A in Wading River at approximately 40°56'38.31" and N72°50'48.62" W to the eastern edge of Route 25 in Orient, NY at 41°09'20.81" and N 72°14'30.79"W	$60,000
2012	Randall's Island Wetlands Stewardship Program (NY), #32960	Randall's Island Park Alliance	Randall's Island Park New York NY 40 47'49.64 N, 73 54'56.35W	$35,000
2012	Student Watershed Initiative-Smithtown Bay thru Mt Sinai (NY), #32786	Friends of Flax Pond, Inc.	Smithtown Bay to Mt Sinai (NY) Westerly direction W 73o 17' 6" (Commack/Kings Park) and W 73o 01' 7.68" (Mount Sinai) and Northerly direction N 40o 51' 48.96" and N 40o 58'17.76" (Long Island Sound shore line)	$35,000

Year	Name	Organization	Location	Award Amount
2012	Hempstead Harbor 2012 Water Quality Monitoring Program (NY), #32774	Incorporated Village of Sea Cliff, New York	Hempstead Harbor and Glen Cove Creek, NY Northern-most coordinates 40 degrees 51.647 minutes / 73 degrees 40.428 minutes; and Southern-most coordinates 40 degrees 48.474 minutes / 73 degrees 38.923 minutes	$40,000
2012	Friends of the Bay Water Quality Monitoring 2012 (NY), #32958	Friends of the Bay, Inc.	Oyster Bay/Cold Spring Harbor Estuary and surrounding watershed 40°53'52" and 73°32'11"	$25,996
2012	Long Island Sound Component, 2012 NY Beach Cleanup (NY), #32422	American Littoral Society	Beaches of Queens, Bronx, Westchester, Nassau, Suffolk and New York Counties, NY 40.9371 and -73.4914	$6,000
2012	Festival of Little Neck Bay and Long Island Sound On National Estuaries Day (NY), #32529	Alley Pond Environmental Center, Inc.	Alley Pond Park, Douglaston, Queens, NY 40.761041 and -73.747752	$8,000
2012	Water Access, Invasive Control & Environmental Signs (NY) #32824	Committee to Save the Bird Homestead, Inc.	Bird Homestead-Meeting House as Blind Brook meets Milton Harbor, Rye, NY 40.9607 and -73.6892	$10,000