



Submitted by the
Jamaica Bay Watershed Protection Plan
Advisory Committee

June 1, 2007

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National Park Service, Gateway National Recreation Area, and Jamaica Bay Institute. 2004, March. *The Evolving Legacy of Jamaica Bay*.

New York City Department of Environmental Protection. 2006, February 9. The Jamaica Bay watershed protection plan. Presentation at York College, Queens.

PLANNING FOR JAMAICA BAY’S FUTURE:
FINAL RECOMMENDATIONS ON THE JAMAICA BAY WATERSHED PROTECTION PLAN

Submitted by the Jamaica Bay Watershed Protection Plan Advisory Committee

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Summary Statement of the Jamaica Bay Watershed Protection Plan Advisory Committee

Jamaica Bay's resources are in jeopardy. Most alarmingly, thousands of acres of the bay's marshlands are disappearing – between 1924 and 1999, more than 50 percent of the bay's marshes disappeared.¹ At the current rate of loss, the marsh islands will completely vanish by 2024.² Poor water quality is a continuing problem for the Bay.³ Nitrogen from New York City's wastewater treatment plants is the leading pollutant, and may even be spurring the marsh loss. Natural areas around the periphery of the bay, already too few in number and limited in size, continue to be lost to development.

In the Jamaica Bay Watershed Protection Plan Advisory Committee's (Advisory Committee or Committee) view, the city's enactment of Local Law 71 in 2005, which requires the Department of Environmental Protection (DEP) to develop and implement a *Jamaica Bay Watershed Protection Plan* (Plan), demonstrated three things: a recognition of the crisis gripping the bay, the bay's value to New York City and, finally, the city's role in the bay's degradation. Equally importantly, the law's directive to develop and implement the Plan provided a long sought and vitally necessary opportunity to develop and implement an adequate response to Jamaica Bay's problems.

In early March 2007, DEP submitted its *Draft Jamaica Bay Watershed Protection Plan* (Draft Plan) to the City Council and the Mayor. The Draft Plan is the product of considerable work, skill, and dedication by agency staff, and provided a comprehensive discussion of the bay's problems and possible responses. But the Committee is concerned, based on the Draft Plan, that DEP does not ultimately intend to develop and implement a Plan that contains the type of actions and timetables that the bay's problems require – in other words, that the promise of Local Law 71 may well be fleeting, with disastrous consequences for the bay and the city.

Most concretely, the Draft Plan did not actually contain what a draft "plan" reasonably should contain, in that it lacked a proposed set of actions (rather it set forth an array of possible actions still under consideration) and an implementation process, both of which are required Plan components. These shortcomings in the Draft Plan have significantly constrained the Advisory Committee's ability to provide its recommendations and comments at this juncture. Although we requested the opportunity to review and comment on a revised draft Plan with the missing pieces, and an extension of the deadlines in the law to allow this to happen, this request has not yet been acted on. Accordingly, we are submitting our recommendations in order to meet the existing timelines in the law. The Advisory Committee, however, reiterates its request that we be provided the formal opportunity to comment on a version of the Plan that contains both a set of specific proposals and a process for making them a reality, *i.e.*, an implementation plan, so that we have adequate opportunity to perform our appointed role. As things currently stand, the Committee intends, on its own initiative, to supplement its recommendations following DEP's submission of the Plan in October 2007.

At this juncture, the Advisory Committee wants to be clear about two things:

First, in terms of the measures that the Plan should include, the Committee believes that the following five measures must be included for short-term implementation, *i.e.*, next several years, if the Plan is to have a reasonable opportunity of succeeding:

1. Implement a Jamaica Bay nitrogen control strategy at least equal, *i.e.*, a 55 percent reduction by 2015, to that of Long Island Sound.
2. Develop and implement a comprehensive stormwater best management practices (BMP) program throughout the Jamaica Bay watershed/sewershed with the goal of eliminating violations of water quality standards in the bay (including tributaries) as a result of combined sewer overflows (CSOs) and stormwater, and tailored to specific neighborhood, sewer system, hydrologic, and tributary characteristics. As an immediate step, this program should require that city agencies immediately incorporate BMPs into the design of city and city-financed projects occurring in the Jamaica Bay watershed/sewershed, with the goal of maximizing the use of on-site retention and infiltration techniques to reduce off-site discharge of stormwater. The lead agency on a project should be required to consult with DEP's Bureau of Environmental Planning and Assessment, and to describe its compliance with this directive in any CEQR/SEQR (City Environmental Quality Review/State Environmental Quality Review) documentation.

3. Develop/expand a habitat protection and restoration program targeting the bay's peripheral tidal wetlands and upland buffer areas. This should include an immediate development moratorium for city and other publicly-owned open space and natural areas within and adjacent to the bay, implementation of currently-proposed acquisition/restoration projects, as well as remaining recommendations in the *Buffer the Bay* and *Buffer the Bay Revisited* reports, and preventing other similarly situated, privately held natural areas from harmful development.
4. Expand existing efforts to restore the bay's interior saltmarsh islands.
5. Develop and implement a comprehensive science program for the bay, including additional investigation of the factors of marsh loss in the bay, enhanced water quality monitoring, an investigation of the adequacy of pretreatment programs to prevent harmful quantities of industrial chemicals from reaching the bay, characterization of chemicals in the waste stream that may have harmful ecological effects like synthetic estrogens, and pilot projects for advanced pollution treatment.

Second, the Plan must set out a detailed implementation plan, including, as required by Local Law 71, specific goals, and interim and final milestones for both the goals and the Plan's measures. The Advisory Committee believes that specific goals, with interim milestones, are critical to the ultimate success of the Plan. They will serve as a means to evaluate and guide the restoration and protection of the bay through the implementation of the Plan. At a minimum, the goals and milestones should be quantitative and measurable at specific points in the Plan implementation. It is not sufficient, for example, to have a goal simply calling for, for example, an "improvement" relating to a particular performance measure; rather, the goal should express how much improvement in specific quantitative terms on a set timeline. It is equally critical that the Plan provide milestones for the specific measures, most significantly expressed as timelines for implementation. The Committee believes that any potential prerequisites to action, such as studies, involvement of other agencies, legislative action, to name some possibilities, should be integrated into these timetables.

* * *

The Advisory Committee urges DEP, and the City of New York, to wholly commit to the Plan's success. The city is truly fortunate to have a unit of the National Park Service within its borders, including the only wildlife refuge accessible by subway. The bay's waters and marshes are home for more than eighty fish species and many threatened and endangered species, a critical stopover point for migrating birds – visited annually by nearly twenty percent of the continent's bird species – and a haven for millions of people who fish, boat and enjoy a view of Manhattan from within this urban oasis.⁴ It serves as a nursery for fishes and the other marine life that swim our waterways and are caught by the city's fishermen. The bay's wetlands mitigate flooding and provide shoreline erosion control for surrounding homes and businesses in Brooklyn and Queens. If the bay's wetlands are lost, the bay's resources as a general matter will not be far behind, and the city will be a much poorer place.

1 National Park Service, Gateway National Recreation Area, and Jamaica Bay Institute. 2004. *The Evolving Legacy of Jamaica Bay*.

2 Hudson River Foundation. 2004. *Health of the Harbor: The First Comprehensive Look at the State of the NY/NJ Harbor Estuary*. Prepared for the NY/NJ Harbor Estuary Program.

3 New York City Department of Environmental Protection. 2004. *The 2003 New York Harbor Water Quality Report*.

New York City Department of Environmental Protection. 2005. Unpublished 2004 harbor water quality data. Provided by J. Stein.

4 National Park Service, Gateway National Recreation Area, and Jamaica Bay Institute. 2004.

U.S. Army Corps of Engineers-New York District. 2004, June. *Hudson-Raritan Estuary Environmental Feasibility Study: Jamaica Bay Study Area Report*.

Davis, T. H. 2002. Birds of Jamaica Bay. Pamphlet revised 2002 by D. Taft; Gateway National Recreation Area. Accessed 24 May 2007 from http://www.nps.gov/gate/jbu/pdf_files/nature_birds_of_jamaica_bay_brochure.pdf.

U.S. Fish and Wildlife Service. No date. Significant habitats and habitat complexes of the New York bight watershed. Accessed 24 May 2007 from http://training.fws.gov/library/pubs5/web_link/text/jb_form.htm.

Background

Just under two years ago, on July 20, 2005, Mayor Michael Bloomberg signed Local Law 71 – a landmark act requiring the Department of Environmental Protection (DEP) to develop a comprehensive action plan to save Jamaica Bay’s resources for future generations (See Appendix A). Pursuant to the new law, this *Jamaica Bay Watershed Protection Plan* (Plan) is to “restore and maintain the water quality and ecological integrity of Jamaica bay.”¹ Local Law 71 also established the Jamaica Bay Watershed Protection Plan Advisory Committee (Advisory Committee or Committee); its seven members (three members appointed by the city council and four members appointed by the mayor) are charged with assisting DEP in Plan development (See Appendix B). The original timeline in the law called for submission of the final Plan by September 1, 2006; this timeline was extended to October 1, 2007 by Introduction 376 (See Appendix C).

Local Law 71, as amended, also provided an iterative process for the Plan’s development, with several opportunities for the Advisory Committee to provide formal input to DEP. Pursuant to this process, on June 29, 2006, the Advisory Committee provided its *Preliminary Recommendations on the Jamaica Bay Watershed Protection Plan*, on September 1, 2006, DEP submitted an *Interim Report on the Jamaica Bay Watershed Protection Plan* and on March 1, 2007, DEP submitted its *Draft Jamaica Bay Watershed Protection Plan* (Draft Plan). Local Law 71, as amended, requires the Advisory Committee to submit its final recommendations concerning the plan by June 1, 2007. This report was prepared to satisfy this mandate. As the Committee explained *supra*, because the Draft Plan did not contain a proposed plan, meaning it contained neither specific measures to be undertaken nor a process for their implementation, the Committee intends to supplement these recommendations following DEP’s submission of the Plan in October.

Throughout the process, the Committee received a large number of comments from the public, which we have done our best to reflect in this report. In January and February 2006, the Committee and DEP co-hosted public outreach meetings in Queens and Brooklyn to invite both oral and written comments from the public. The Committee and DEP co-hosted another public meeting in October 2006 to solicit feedback on the Committee’s preliminary recommendations and provide an update on the process. Committee members presented their preliminary recommendations to interested community boards within Jamaica Bay throughout the fall of 2006 and in December 2006 participated in a DEP public workshop at which the public was encouraged to comment on possible strategies to benefit the bay.

The Committee has also considered the most current scientific information available on the problems confronting the bay. Expert panels were convened on the topics of stormwater and green building best management practices, wetland loss, water quality, wastewater treatment plant disinfection technologies and nitrogen reduction methods in order to gain greater knowledge of the issues facing Jamaica Bay and to explore new ways of reducing stresses on the bay. Panelists represented many sectors, including environmental engineering firms, government agencies, academic and research institutions, and non-profit organizations. Both DEP staff and Committee members attended the panels, which were held throughout 2006 (See Appendix D).

Since the beginning, the Committee has viewed its role in the development of the watershed protection plan as independent of, but cooperative with, DEP. In addition to the Committee’s regular meetings, the Committee held what were usually monthly joint sessions with DEP, and regularly exchanged technical information and progress reports.

The Importance of Jamaica Bay & the Challenges Facing Its Future

An Oasis Amid America’s Largest City

Accessible to America’s most populated city by subway and bus, Jamaica Bay is a haven for wildlife and the millions of people who visit the area each year. Hundreds of species of birds visit the bay as they traverse the Eastern Flyway migration route to their breeding grounds further north. Endangered and threatened species

like peregrine falcons, piping plovers, and the Atlantic Ridley sea turtle reside in or visit the bay, and the wetland fringes and marsh islands serve as important habitat for more than eighty fish species.²

The bay comprises one of the largest and most productive coastal ecosystems in the northeastern United States, and includes the largest tidal wetland complex in the New York metropolitan area.³ Jamaica Bay's wetlands mitigate flooding and provide shoreline erosion control for homes and businesses in Brooklyn and Queens. The Jamaica Bay watershed, which feeds the freshwater portion of the Hudson-Raritan Estuary, extends deep into Brooklyn, Queens, and Nassau County (See Appendix E).

Made of glacial till left behind during the last ice age and shaped by erosion and wave action,⁴ the open water and wetlands portion of Jamaica Bay is approximately eight miles long, four miles wide and covers 26,645 acres,⁵ more than half of which is part of Gateway National Recreation Area's (Gateway) Jamaica Bay Unit.⁶ The National Park Service (NPS) administers Gateway, which was established by Congress in 1972 in an effort to preserve outstanding natural areas closer to major urban centers. Gateway encompasses the largest collection of natural systems, wildlife habitats, historic and cultural resources, and recreational opportunities in the New York City/New Jersey metropolitan area. Three-fourths of Gateway's Jamaica Bay Unit is water, marsh, and meadowland; the remaining upland areas include beaches, dunes, and forests.⁷

At the heart of the Jamaica Bay Unit is the Jamaica Bay Wildlife Refuge (Refuge), which covers 9,100 acres and is the only wildlife refuge accessible by subway.⁸ The Refuge, a state and nationally recognized important bird area, provides a variety of habitats for more than 325 kinds of waterfowl and shorebirds (sixty-two of which are confirmed to breed in the bay).⁹ The Refuge has also been designated by the New York State Department of State as a Significant Coastal Fish and Wildlife Habitat, and was the first site to receive designation from the National Audubon Society as an "Important Bird Area."¹⁰ Visited by nearly twenty percent of the continent's species of birds every year, Jamaica Bay is considered one of the best bird-watching locations in the western hemisphere.¹¹

The neighborhoods surrounding Jamaica Bay are home to more than five hundred thousand New Yorkers.¹² The bay is bounded by Brooklyn and Queens on its northwestern and northeastern shores, Rockaway Peninsula (also part of Queens County) on its southern shore, and Hempstead, Nassau County, along a small section of the bay's southeastern shore. Major neighborhoods within and bordering the bay include the Rockaways, Canarsie, Spring Creek, Starrett City, Howard Beach, and Broad Channel. Residents of these communities consider the waters, parks, and open space surrounding the bay "a sanctuary or haven from the stress of the city."¹³

The Changing Bay

Human actions over time have significantly changed the bay's physical dynamics. Throughout the bay's history, it has served such competing functions as providing food and recreation for local residents, and as a place for sewage effluent and solid waste disposal. High bacterial levels from waste disposal ultimately forced the closure of the once-vibrant shellfishing industry in 1921.¹⁴ Sections of the bay's bottom were dredged in the early part of the 20th century as the city considered turning Jamaica Bay into a major commercial and industrial port.¹⁵ Although the port was never built, the dredged channels and pits continue to impact the bay's water quality and ecology. Many marshes surrounding Jamaica Bay have been filled and tributaries drastically altered to accommodate residential, commercial and transportation needs. Construction of John F. Kennedy International Airport (JFK) alone decreased the surface area of marshland by 18 square kilometers.¹⁶

Stakeholder efforts have been active in the bay since the late 1970s, and in 2001 Gateway convened a blue ribbon panel of national experts to examine the bay's alarming and perplexing marsh loss. The panel focused on the bay's reduced sediment supply and suspension problems and recommended a number of additional studies and restoration projects, such as the Big Egg Marsh thin layer sediment spraying, to restore healthy marsh elevations. Following on the panel's work, the Jamaica Bay Ecosystem Research and Restoration Team (JABERRT) investigated potential restoration sites in the bay, primarily around the periphery. Restoration activities are moving forward at a few of these sites, but most remain still on the drawing board.

Jamaica Bay's Sewage Problem

Major investments in the city's sewage treatment plants over the past three decades have dramatically improved the bay's water quality, but significant problems remain. Dissolved oxygen levels in Grassy Bay and certain other borrow pits, as well as in some tributaries, are often too low to sustain year-round marine life and healthy biodiversity. At least seven highly toxic sediment sites exist in the bay.¹⁷ And since 1986, algae levels have been on the rise and water clarity in Jamaica Bay has declined more than 20 percent.¹⁸

The primary culprits are combined sewer overflows (CSOs) and discharges of treated wastewater from the four city sewage treatment plants that encircle the bay (26th Ward, Coney Island, Jamaica, and Rockaway plants).¹⁹ A combined sewer system that carries sewage and stormwater runoff to the plants for treatment serves most of the communities surrounding the bay. Citywide, rainfall intensity as low as 0.15 centimeters per hour for 6.7 hours will exceed the limited sewer and plant storage capacity, causing overflow of untreated sewage combined with stormwater through numerous outfalls ringing the bay's waters.²⁰ Although system upgrades continue to be made to combat the CSO problem, according to city records and based on a 40-year average rainfall, only about 32 percent of the bay's CSO is being captured.²¹

Additionally, every day, the plants release more than 250 million gallons of treated wastewater into the bay.²² The wastewater effluent contains thirty to forty thousand pounds of nitrogen each day, far too much nitrogen for the bay to assimilate.²³ One estimate puts the removal capacity of existing marshes somewhere between a tenth and a fifth of the total nitrogen inputs.²⁴ In certain places and times in the bay, the excess nitrogen creates a eutrophic environment, where an overabundance of organic matter in the water spurs the growth of algae blooms that decrease oxygen levels in the bottom water as the algal organisms die off and decompose. Oxygen levels can dip so low that any aquatic life not able to swim away will die.²⁵ Indeed, by default, Jamaica Bay itself has become part of the city's wastewater treatment process – providing sinks for nitrogen, fine particulates, and biological oxygen demand – a practice which has taken its toll on the ecology of the bay.

One reason for the bay's high nitrogen loadings is the wastewater processing that occurs at the treatment plants. As the final step in the treatment process, the residual thickened organic matter or sludge is dewatered; the wastewater from this process is called centrate.²⁶ This centrate is very nitrogen-rich and although it is run back through the plant's systems to help reduce its nitrogen level, it still contributes significantly to overall nitrogen releases.²⁷ The Jamaica plant usually dewateres its own sludge; the 26th Ward plant dewateres sludge from Coney Island, Rockaway, and sometimes the Jamaica and Owls Head plants.²⁸

The waters within Jamaica Bay are classified by the New York State Department of Environmental Conservation (DEC) as either Class SB (the open waters of Jamaica Bay, Shellbank Creek, Gerritsen Creek and Mill and East Mill Basins) or Class I. Class SB waters should be suitable for primary (*e.g.*, swimming) and secondary contact recreation (*e.g.*, kayaking, fishing); Class I waters do not allow primary recreation. The DEC has included Jamaica Bay on its Section 303(d) impaired water list since 1998 because of violations of these water quality standards relating to pathogens, nitrogen, and oxygen demand, and lists CSOs and wastewater as the primary causes of the impairment.²⁹ In fact, DEP's modeling discussed in the *Draft Jamaica Bay Watershed Protection Plan* "... clearly show[s] that the WPCPs are the major contributors to the phosphorus, nitrogen, silica, and carbon loadings to Jamaica Bay. CSOs are just as clearly the major contributors to the pathogen loadings to the Bay."³⁰ CSOs are also believed to be significant sources of both organic pollutants and metals – such as dioxins, various pesticides, PCBs, lead and mercury – into the bay.³¹

Some areas of Jamaica Bay have separated storm and sanitary sewers whereby wastewater is directed to the plants and stormwater is sent directly out to the bay. While this system eliminates CSOs, the stormwater still contains pollutants. For instance, the Belt Parkway's runoff contains pollutants from automobiles, including motor oil, engine coolant, brake dust and gasoline. JFK, which occupies nearly 5,000 acres along the bay's north shore and is ranked thirteenth in worldwide airport passenger traffic,³² discharges into the bay runoff contaminated with antiicing and deicing compounds and other toxic chemicals drained from the large paved surfaces that form JFK's network of runways and taxiways.

Together with CSOs and stormwater, past releases from industrial facilities and three closed landfills – Edgemere Landfill off Rockaway Peninsula and the Fountain and Pennsylvania Avenue Landfills in Brooklyn – have significantly contributed to contaminant loading in the sediments of Jamaica Bay.³³ Delays in the bay's flushing time caused by human alterations to the water flow (from dredging, filling, development) have increased the potential for pollutants to settle out to the bottom.³⁴ Flushing time (or residence time) is the amount of time it would take for a particle of water (or contaminant) to circulate through the bay, i.e. from start to finish. Many of the toxic contaminants are persistent in the environment with the potential to accumulate through the food chain in the tissues of plants, invertebrates, fish and birds.³⁵ CSOs and stormwater outfalls also add to the bay's "floatables" – water-borne litter and debris like plastic bags, cigarettes, drink containers, and food wrappers.³⁶

The loss of the bay's once-vibrant shellfish populations have also harmed overall water quality, as well as diminished recreational values and fishing benefits. Oysters filter out contaminants and their colonies form natural reefs that provide fish habitat. In the latter part of the 19th century, Jamaica Bay was celebrated for its shellfish, including the eastern oyster, known then as the Rockaway oyster. Nearly 450,000 tons of oysters and clams were harvested from Jamaica Bay in 1906, but pollution, decreasing habitat, and overharvesting caused the industry to crash less than twenty years later.³⁷

Current treatment plant technologies do not screen out hormone disrupting chemicals from wastewater. Recent studies have revealed that trace substances with hormone-like properties from prescription and over-the-counter drugs, and chemicals from soaps and other products exist in treatment plant effluent, and could be accumulating in the sediments of receiving waterbodies.³⁸ For example, estrogen from pharmaceuticals and industrial detergents that break down into products that mimic the hormone estrogen can contribute to higher levels of estrogen-like materials in treatment plant effluent. These chemicals can build up in the sediments and affect development of marine life by depressing the male to female ratio, causing delayed development and reduced hatch and survival rates. Scientists are seeing this occur now with winter flounder in the bay.³⁹

Reduction and eventual elimination of CSOs, as well as the reduction of pollutant loadings from separate stormwater discharges, will require a multi-pronged approach. Increasing the system's wet weather holding capacities and system maintenance will decrease CSO occurrences and contribute to cleaner waters with less organic content. Cleaning out sewer lines to remove accumulated sediment will enhance storage capacity immediately. It remains important that DEP continue to site, design, and construct adequate CSO storage capacity, particularly for areas in the watershed/sewershed in which this is the only or principal CSO abatement option available. But constructing additional retention tanks on a diminishing land base and increasing sewer storage will not be enough to eliminate the CSO problem. It is becoming increasingly clear that simply building huge storage tanks to capture for eventual treatment all of the ever-expanding wastewater and the stormwater will need to be augmented with other strategies – on a citywide basis, by DEP's own calculations, the currently planned suite of CSO storage tanks will barely keep pace with the city's currently projected development patterns.⁴⁰ In other words, it is anticipated that DEP's planned projects will not improve overall water quality, but will simply prevent it from getting worse.

It is vital to move solutions to the CSO and polluted stormwater problem up into the watershed/sewershed and closer to the problem's source. Stormwater "best management practices" (BMPs) can delay and/or reduce stormwater flow into the sewer system (*e.g.* through increased plantings that encourage infiltration and minimize runoff from pavement and other impervious surfaces directly to sewers), reducing the deluge of water that overwhelms the sewage and treatment system's holding capacity. Preliminary modeling conducted by DEP indicates that implementation of BMPs in the watershed/sewershed could result in a significant reduction in the number and severity of CSO events in Jamaica Bay. DEP has previously suggested that a long-term solution to the CSO problem include a weakening of water quality standards for certain waterbodies.⁴¹ The Committee strongly discourages this "move the goalposts" approach. The goal of "fishable and swimmable" water for Jamaica Bay and its tributaries should not be changed. The bay and its resources deserve and require this standard of performance, as do the communities that rely on and enjoy these waterbodies.

In addition, at various times in the past, the relocation of a portion or all of the bay's sewer and/or stormwater outfalls out into the Atlantic Ocean has been proposed. While such plans would reduce contaminated waters entering Jamaica Bay, given circulation patterns and tidal flows, a portion of the nitrogen-rich effluent discharged from the pipe would eventually end up back in the bay and in New York Harbor.⁴² The relocation scheme would also remove critical freshwater flows into the bay.⁴³ Currently, only 10 percent of the bay's freshwater input is through groundwater.⁴⁴ It is the Advisory Committee's opinion that such options should continue to be studied, but that further nitrogen treatment for the bay's sewage treatment plants and stormwater BMPs must first be implemented and the results monitored. The Committee believes that the technical and legal difficulties associated with outfall relocation are likely to be insurmountable, and recommends converting the Jamaica Bay watershed into a showcase for state-of-the-art sewage treatment and green technologies. The Committee also recommends examining additional connections for flow of ocean water to the back bay through an open cut in the form of a stabilized inlet or through a series of underground chambers or culverts. In addition to the enhanced flushing of the back bay's waters, such a connection to the Atlantic Ocean may provide a source of additional sediment; a lack of sediment is considered to play a role in the salt marsh loss problem.

Will There Be Any Marshes Left to Save in 20 Years?

Scientists currently predict that the bay's marsh islands will disappear by 2024.⁴⁵ Between 1924 and 1999, more than 50 percent of its marshes vanished,⁴⁶ and since the 1970s marsh loss has accelerated, first to an average of 26 acres per year between 1974 and 1994, and more recently to an average of 44 acres per year between 1994 and 1999.⁴⁷ Increasingly, marsh loss is occurring within the interior of marsh islands. When tidal pools expand, marsh areas become fragmented as the vegetation, largely saltmarsh cordgrass, *Spartina alterniflora*, becomes waterlogged and drowns, loosening the root structures that hold the saltmarsh substrate in place and turning into unvegetated mudflats.⁴⁸ On some islands, more than 75 percent of the vegetation has disappeared in the past three decades.⁴⁹ The exact cause or causes of Jamaica Bay's wetlands degradation are still unknown. Even without further increases in mean sea level, at the current rate of loss, much of the wetlands are expected to erode, degrade and fragment.⁵⁰

Ongoing investigations into the causes of the marsh loss have focused on changes in sediment deposition and excessive sulfides in sediments caused by water pollution. A hardening of the bay's perimeter has made it more difficult for sediment to enter the bay by washing over land and has lowered the bay's sediment budget (the amount of water-borne sediment available for deposition onto land).⁵¹ Without new sediment washing up on the marsh islands, they may be eroding and disappearing. Changes in the bay's physical contours by westward progression of the Rockaway Peninsula, the dredging of navigational channels, the stabilization of Rockaway Inlet, landfills, and the construction of JFK and its runway into the bay have reduced sediment transport or affected water circulation. Jamaica Bay's tributaries, basins, creeks and canals have also been highly altered over the years and tend to have little or no freshwater flow other than that conveyed by CSOs and/or storm sewers.⁵² Hardened shorelines have also removed the natural graded edge between habitats, which is often the most productive strip. Borrow pits and other areas from which sandy sediment was dredged to construct JFK and other areas around the bay and establish navigation channels may be acting as sediment sinks, and the increased wave energy and sediment flushing time caused by a deeper average depth may affect sediment accretion.⁵³ The flushing rate/residence time for water to circulate throughout the entire bay is around 35 days;⁵⁴ however, the specific residence time of water varies in different sections of Jamaica Bay – Grassy Bay with its deep borrow pits, for example, has a residence time of roughly one week.⁵⁵ (See Appendix F.) Changes in hydrology also affect the bay's salinity and, if significant enough, can make the bay unsuitable for many of its current species of flora and fauna.

Recent research comparing accretion rates to marsh loss has pointed out another potential cause: water pollution. High amounts of organic content from wastewater and CSOs in the bay may be contributing to high concentrations of sulfide; longer periods of flooding also lead to a gradual build up of hydrogen sulfide in sediments. *S. alterniflora* has limited ability to oxygenate its roots and detoxify sulfide. At high sulfide

concentrations, it cannot recover; its roots degrade, marsh grass loss occurs and the marsh begins to lose its physical integrity and fragments.⁵⁶

Other factors are exacerbating marsh loss. The bay's remaining natural uplands serve as important buffers in maintaining the bay's wetlands, reducing stormwater flow, and providing habitat corridors. But these uplands continue to be lost to development, and those that remain are frequently in degraded condition.⁵⁷ Additionally, snow geese graze and trample on *S. alterniflora*. When marshes were more plentiful this did not pose a serious problem, but as the wetlands disappear, the geese's impacts increase.⁵⁸ Mussel banks block the natural drainage channels of the marshes, allowing ponds to form on marshlands and immersing *S. alterniflora* for longer periods each year.⁵⁹ Tides bring wrack (sea lettuce, straw, dried seaweed, and floatable debris) into the bay to cover the marshes and smother the remaining *S. alterniflora*.⁶⁰ There is also the possibility that nitrogen-enriched water is causing an excessive growth of *Ulva sp.* (sea lettuce), which is carpeting the bay's bottom and preventing sediments from being resuspended into the water for redistribution onto the marsh surfaces.⁶¹

Historically, the bay's sediment accretion rate has kept pace with sea level rise and local subsidence.⁶² However, global climate models predict an increase in average sea level rise, which would exceed the historical accretion rate of the bay, leading to more frequent inundation of the marshes, wave action and marsh erosion, thereby potentially transforming them to mudflats.⁶³ In research conducted for the U.S. Global Climate Change Research Program, a number of sea level rise projections were compared with plausible rates of marsh growth; analysis suggests that if enough sediment were available to marshes, the wetlands could survive all but the most extreme cases of future sea level rise.⁶⁴ This is, of course, independent of any additional marsh loss caused by other factors, such as discussed above.

Numerous reports have generated recommendations for the acquisition and restoration of wetland and upland buffer areas around the periphery of Jamaica Bay.⁶⁵ Restoration projects at locations, such as Four Sparrow Marsh, Idlewild Park, Spring Creek, Fresh Creek, and Big Egg Marsh have been implemented, and numerous *Buffer the Bay* recommended sites, including Vernam-Barbados Peninsula, Paerdegat Basin and Fresh Creek Basin, have been wholly or partially acquired.⁶⁶ A larger salt marsh restoration effort funded by the U.S. Army Corps of Engineers and Port Authority of NY/NJ and implemented through an extensive partnership with others, including NPS, DEC, and DEP, was completed in 2006 at the eastern end of Elders Point. Another one with multiple funding partners is being planned to complete the restoration of the Elders Point marsh and undertake another this Summer at Yellow Bar.⁶⁷ This is a commendable start. But there needs to be a significantly expanded effort to maintain the momentum to reverse the net loss and degradation of these interior, as well as fringe, wetlands.

In addition to habitat loss, Jamaica Bay's natural ecology is threatened by non-native and/or invasive species that out-compete indigenous species, as they often do not have naturally existing predators to check their proliferation. For example, *S. alterniflora* provides food and shelter for birds, diamond-backed terrapins, and other animals, and its detritus supports the salt marsh food chain.⁶⁸ Large stands of common reed or *Phragmites* are overtaking disturbed wetlands and uplands, and driving out *S. alterniflora* without providing the same set of ecological functions.⁶⁹ Other very aggressive invasive plant species, including Japanese knotweed, Japanese honeysuckle, Oriental bittersweet, Russian olive and mugwort, are decimating entire plant communities around Jamaica Bay and drastically reducing biodiversity.

How Will We Respond?

To date, Jamaica Bay's problems have, at best, been responded to on an ad hoc basis. More than twenty-five governmental agencies have jurisdictional responsibilities in Jamaica Bay and while they often confer on specific projects, their overall programs lack coordination.⁷⁰ Differing missions and mandates continue to frustrate the development of an overall plan or vision for Jamaica Bay.⁷¹ Jamaica Bay also lacks an overarching research plan to help guide water quality and habitat restoration studies. Several useful scientific forums have been held, but without a funded, dedicated coordinating structure, scientists have largely approached Jamaica Bay in an individualistic fashion, as targeted grants and specific research interests dictate.

Construction and development within the Jamaica Bay watershed has been conducted without consideration of potential adverse impacts on the bay and sometimes even without notice to all interested and affected parties. Enforcement against polluters and clean-ups have not consistently been as strong as needed to preserve the bay's visual appearance and its ecological integrity.

Significantly, Jamaica Bay suffers from a lack of identity outside of a committed core of advocates and users. Jamaica Bay's ecological importance, and the recreational opportunities available to those who visit it, are largely unknown to New York City's residents as a whole. Limited and poor quality access to the bay has prevented even local residents from enjoying this resource and from advocating for its protection and restoration. A much greater political constituency for Jamaica Bay must be created in order to attract necessary public funding and to ensure that government decisionmakers consistently consider the bay's protection to be a priority.

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Advisory Committee Recommendations

The Advisory Committee provides recommendations concerning the Plan below. These recommendations are somewhat constrained by the limited nature of the DEP Draft Plan. Accordingly, in order to fully carry out what we believe to be both the letter and spirit of our responsibilities pursuant to Local Law 71, the Committee intends to submit supplemental recommendations after we review the Plan to be submitted by DEP on October 1, 2007.

Advisory Committee Recommendations Concerning Plan Goals

Local Law 71 requires the Plan to include “specific goals related to restoring and maintaining the water quality and ecological integrity of Jamaica bay.”¹ The DEP Draft Plan did not include any proposed goals. The Advisory Committee believes that specific goals are critical to the ultimate success of the Plan. They will serve as a means to evaluate and guide the restoration and protection of the bay through the implementation of the Plan. The Committee recommends that the goals should pertain both to long-term restoration objectives and individual measures or projects, should define the Plan’s restoration performance goals in scientific terms as much as possible, and be traceable. At a minimum, the goals should be quantitative and measurable at specific points in the Plan implementation.

The DEP Draft Plan did include what are described as “objectives.” While not a substitute for the specific Plan goals discussed above, the Advisory Committee generally supports these objectives (listed below) as generalized narrative goal statements, and have amended them below. Our recommended modifications or additions are in italicized text. Please note that these items are not presented in order of importance.

It is critical that these objectives/goals be further developed to include specific quantitative and measurable milestones. A goal simply calling for, for example, an “improvement” relating to a particular performance measure is inadequate for purposes of the Plan; rather, the goal should express how much improvement in specific quantitative terms and provide a timeframe for improvement.

Category 1: Water Quality Improvements

Objective 1a: Improve stormwater management to reduce the volume of stormwater runoff and filter and remove pollutants. *Eliminate all CSOs into Jamaica Bay (including tributaries) by 2020.*

Objective 1b: Reduce nitrogen loading to the tributary basins and Jamaica Bay.

Objective 1c: Increase dissolved oxygen levels in tributary basin areas of chronic hypoxia to improve ecological productivity.

Objective 1d: Increase dissolved oxygen in the Grassy Bay and North Channel areas of chronic hypoxia to improve ecological productivity.

Objective 1e: Reduce pathogen loading into the tributary basins and the Bay.

Objective 1f: Reduce floatables in tributary basins, open waters, and along the shoreline.

Objective 1g: Alleviate the loading of hydrocarbons or other toxic contaminants into the Bay, tributaries, groundwater and/or surface water resources, and prevent future leakage in commercial and industrial areas.

Objective 1h: Provide for the proper remediation of toxic sediments in the Jamaica Bay estuary, and prevent the further degradation of sediments from heavy metals and other contaminants. *There should be no localized or net increase in contaminant concentration in sediments and soil within the Jamaica Bay watershed as a result of inputs via combined sewer overflows and sewage treatment plant wastewater.*

Objective 1i: Meet or exceed current federal, state and local water quality standards for Jamaica Bay’s open water and tributaries. Attaining these standards would at least ensure water suitable for secondary recreation in most of Jamaica Bay’s waters, and primary recreation in the bay’s open waters. The short-term priority should be on attaining standards in the shallow water portions of the bay.

Category 2: Restoration Ecology

Objective 2a: Restore the salt marsh islands in Jamaica Bay.

Objective 2b: Protect wetlands through research, monitoring, and enforcement.

Objective 2c: Restore and create additional tidal wetlands along the peripheral and shoreline buffer areas of the Jamaica Bay estuary.

Objective 2d: Restore submerged aquatic vegetation (SAV) such as eelgrass (*Zostera mariana*) in protected areas of the Bay.

Objective 2e: Restore or create additional freshwater channels, ponds, and non-tidal wetlands around the periphery of Jamaica Bay and throughout the watershed.

Objective 2f: Restore the headwater tributaries of the Bay.

Objective 2g: Restore and enhance existing indigenous grassland communities.

Objective 2h: Restore or enhance dune and beach habitats.

Objective 2i: Support the recovery of federal and state-listed rare, threatened, and endangered (RTE) plant and animal species.

Objective 2j: Restore or create additional woodland and shrubland habitats.

Objective 2k: Restore populations of oysters and other shellfish to Jamaica Bay.

Category 3: Public Use and Enjoyment

Objective 3a: Increase public access to Jamaica Bay.

Objective 3b: Increase public access to a wider range of landscape types in the upper watershed in order to expand the public's understanding of the interconnectivity of the entire Jamaica Bay watershed.

Category 4: Sound Land Use and Development

Objective 4a: Minimize the extent of impervious surfaces within existing and new development in the watershed.

Objective 4b: Enhance the use of on-site stormwater management techniques and best management practices in new and existing development.

Objective 4c: Encourage “green” development in the Jamaica Bay watershed.

Category 5: Public Outreach and Education

Objective 5a: Increase the visibility of the Bay and the interconnections between human activities in the watershed and impacts on Bay conditions.

Objective 5b: Improve coordination among existing groups involved in Jamaica Bay-related education activities.

Objective 5c: Raise awareness of Jamaica Bay-related issues among young people to promote local environmental stewardship during childhood.

Objective 5d: Raise awareness of Jamaica Bay-related issues through creating an informed citizenry.

Objective 5e: Reduce polluting or damaging behaviors through community outreach and educational activities related to land use activities.

Objective 5f: Increase the number of volunteers throughout the watershed by promoting volunteer opportunities in a coordinated manner and by providing meaningful volunteering experiences.

Objectives 5g: Institute an ongoing Jamaica Bay monitoring/science research program that identifies additional scientific needs, and coordinates interagency research and monitoring.

The DEP Draft Plan also set out a “vision statement,” which the Advisory Committee endorses:

“The Jamaica Bay watershed is a place where New Yorkers and visitors co-exist with natural areas and clean water that harbor healthy waterfowl, fish, and shellfish populations. It is a place where urban communities embrace environmental stewardship and where wetlands and other natural areas are protected and restored for future generations. The Jamaica Bay estuary is once again a cultural and recreational hub for Brooklyn and Queens, where residents swim, fish, boat, and enjoy nature.”²

Finally, the Advisory Committee supports the following draft narrative goal statements that DEP included in its September 1, 2006 *Interim Report on the Jamaica Bay Watershed Protection Plan*, although we again caution that they are not a substitute for the specific measurable goals that the Plan requires:

1. Improve and maintain water quality in Jamaica Bay to support a healthy and self sustaining ecosystem and to improve recreational use.
2. Protect, restore or create wetlands and adjacent upland buffers.
3. Protect, restore, and maintain indigenous fish, shellfish, birds, other native wildlife and invasive species control.
4. Provide public access and recreational opportunities along Jamaica Bay and in its watershed.
5. Promote watershed protection practices in land use planning and development within the watershed.
6. Foster local watershed stewardship among all stakeholders by increasing public awareness and community involvement through outreach and education activities.
7. Provide a framework for the implementation and coordination of recommended protection and restoration actions into the future.

Advisory Committee Recommendations Concerning Plan Measures

Pursuant to Local Law 71, the Plan is to include specific measures, including in the areas of stormwater “best management practices,” habitat acquisition, protection and restoration, inter-agency coordination, public education, and enforcement.³ The Draft Plan did discuss possible measures in most of these areas, with the exceptions of inter-agency coordination and enforcement. But rather than proposing specific measures, the Draft Plan set out an array of possible measures – called “potential management strategies” – that the agency states are still under consideration. The Draft Plan did not provide assessments of the technical, legal, environmental and economical feasibility of the various possible measures.

For purposes of responding to the Draft Plan and consistent with our responsibilities under Local Law 71, the Advisory Committee has developed recommendations concerning Plan measures according to a tiered or prioritized format. Tier I measures are the highest priority – the Committee strongly recommends their inclusion in the Plan and an aggressive short-term implementation schedule (*i.e.*, generally within next three years). Tier II and Tier III actions may be undertaken on a more protracted schedule. Under each recommended measure, we have listed the relevant “potential management strategies” from the Draft Plan, which we have annotated in italicized text as needed. Additional specific Advisory Committee recommendations are also provided as appropriate. Within the tiers, overarching measures themselves are not ordered according to priority, though an effort has been made to roughly prioritize the importance of the specific potential measures that fall underneath these general measures.

The Committee notes that there frequently appeared to be a “disconnect” in the Draft Plan between the potential management measures under consideration for a particular objective, and the objective itself, meaning that it appears unlikely that the potential management strategies as stated, even if adopted in the Plan, will result in adequate progress towards the stated objective. The Advisory Committee’s annotations and additional specific recommendations frequently are intended to address this likely performance shortfall.

The Committee also emphasizes again how important it will be that the final Plan contain milestones relating to each goal and each measure. As we discuss *infra*, the Plan also needs to include monitoring to ensure that measures are achieving their intended purpose, including contributing adequately to achievement of Plan goals.

Tier I

- 1. Implement a Jamaica Bay nitrogen control strategy at least equal, *i.e.*, a 55 percent reduction by 2015, to that of Long Island Sound.**

Relevant Draft Plan Potential Management Strategies

- 1b2: Limit processing of additional centrate from WPCPs outside of Jamaica Bay.
- 1b1: Evaluate and implement appropriate end-of-pipe nitrogen removal technologies in tributary basins, including algal turf scrubbers, constructed wetlands, and oyster reef restoration.

- 1b4: Review and evaluate on-site sewage treatment decentralization technologies. *The Advisory Committee believes that appropriate on-site decentralized treatment technologies should be implemented, not simply “evaluated.”*
- 1e4: Increase efforts to promote the proper disposal of pet-waste, including the provision of pet waste disposal bags and enforcement of sanitation ordinances.

Additional Specific Advisory Committee Recommendations

- *Implement significant upgrades in nitrogen treatment at Jamaica Bay treatment plants.*

2. **Develop and implement a comprehensive stormwater best management practices (BMP) program throughout the Jamaica Bay watershed/sewershed with the goal of eliminating violations of water quality standards in the bay (including tributaries) as a result of combined sewer overflows (CSOs) and stormwater, and tailored to specific neighborhood, sewer system, hydrologic, and tributary characteristics. As an immediate step, this program should require that city agencies immediately incorporate BMPs into the design of city and city-financed projects occurring in the Jamaica Bay watershed/sewershed, with the goal of maximizing the use of on-site retention and infiltration techniques to reduce off-site discharge of stormwater. The lead agency on a project should be required to consult with DEP’s Bureau of Environmental Planning and Assessment, and to describe its compliance with this directive in any CEQR/SEQR (City Environmental Quality Review/State Environmental Quality Review) documentation.**

Relevant Draft Plan Potential Management Strategies

- 1f1: Continue efforts to repair, maintain, and retrofit catch basin hoods and clean storm drain inlets, sewer lines and catch basins. *Sewer lines and catch basins are the bay’s first defense against oil, grease, trash and organic matter in stormwater; the cleaner these routes to the plants are, the more room they have to hold their full capacity of water and prevent CSOs. The Advisory Committee believes that current three-year cleaning schedules are inadequate. For example, Los Angeles County and the City of Philadelphia ensure that all catch basins be cleaned annually.*⁴
- 4b1: Encourage/require low impact development and best management practices for new and existing private development (residential and non-residential).
- 4b3: Revise sewer codes, drainage plans or building codes to facilitate the use of BMPs and protect environmental features.
- 4c1: Promote incentive programs for new developments and buildings that implement design options which employ open space, green building techniques, and low impact development measures during design and construction. *Such incentive programs should actually be developed, not simply “promoted.”*
- 1a5: Identify off-site stormwater BMPs to capture and treat “first flush.” *The Advisory Committee notes that this analysis should be prioritized to first address those bayside communities that are separately sewered. Also, “first flush” technologies should be implemented, not simply “identified,” at inlets discharging to the bay. Initial stormwater runoff, known as the “first flush,” is usually the most polluted, due to the washing effect of runoff on pollutants that have accumulated on the land.*
- 1a3: Promote and evaluate the use of highway rights-of-way and adjacent lands under New York City Department of Transportation (NYCDOT) jurisdiction (including the future bridges reconstruction project for the Belt Parkway) for their potential to accommodate stormwater BMPs. *The Advisory Committee recommends the Plan include a comprehensive program for implementation of stormwater*

BMPs in transportation corridors and parkways, not simply their “promotion” and “evaluation.” Such BMPs are among the most effective currently available, including from a cost standpoint.

- 1a4: Increase the number of street trees in the watershed, to provide additional leaf canopy and rainfall interception, as well as to provide stormwater runoff attenuation, infiltration, and vegetative uptake.
- 4a3: Reduce the imperviousness of commercial and residential driveways and on-site parking areas through techniques such as the use of permeable and porous pavement for certain driveways, sidewalks, walkways and overflow parking lots; reducing parking ratios, promoting shared driveways, and encouraging other practices.
- 4a2: Restrict the creation of new impervious surfaces within existing development.
- 4b2: Identify currently occupied City-owned properties in the Jamaica Bay watershed that can be retrofitted to incorporate on-site BMPs. *The Advisory Committee recommends that the Plan include implementation of on-site BMPs on appropriate city-owned properties, not simply their identification.*
- 1a2: Promote and evaluate the use of existing open space (such as parks, plazas, community gardens, etc.) for their potential to accommodate stormwater BMPs. *Again, the Plan should include an effective program of implementing stormwater BMPs on appropriate open spaces, and not simply “evaluation” and “promotion.”*
- 4a1: Adopt a requirement in the zoning code to maintain a percentage of lots as pervious surface for new residential, commercial, and manufacturing development. Consider implementation of a maximum impervious surface requirement for new development, and/or an amendment of open space requirements that requires a percentage of open space to remain pervious.
- 1a1: Promote and evaluate the use of vacant public lands for their potential conversion to “stormwater parks” that facilitate stormwater runoff attenuation and infiltration to capture pollutants and reduce runoff volumes. *The Advisory Committee recommends that such “stormwater parks” – which would also provide new and/or improved community space – actually be developed, not simply “promoted and evaluated.”*
- 1e1: Reduce Jamaica Bay CSO discharges through the incorporation of off-line and in-line storage, drainage basin planning, and high-level storm sewer design. *The Advisory Committee does not support high-level storm sewers, absent implementation of on-site BMPs and otherwise adequately treating the stormwater prior to discharge into the bay.*
- 5e1: Create a targeted campaign for developers, residents, and business owners to provide information about how to protect Jamaica Bay through on-site stormwater management techniques, wise use of household chemicals, water conservation, and energy conservation measures.

Additional Specific Advisory Committee Recommendations

- *The New York City’s Waterfront Revitalization Plan, as authorized by the New York State Department of State Coastal Zone Management Plan, should also be revised to be consistent with these changes. Zoning changes generally should be formulated and adopted as necessary to provide compatible uses within the bay environment while creating upland buffer areas and increased tidal wetlands adjacent to the bay through more stringent setback and building density requirements, and to reduce new impervious surfaces and promote stormwater best management practices. Overlay district(s) in environmentally sensitive areas of the watershed should be adopted, which would minimize impervious surfaces, promote stormwater best management practices, and conserve available open space, environmental features, and wildlife habitat.*

3. Develop/expand a habitat protection and restoration program targeting the bay’s peripheral tidal wetlands and upland buffer areas. This should include an immediate development moratorium for city and other publicly-owned open space and natural areas within and adjacent to the bay, implementation of currently-proposed acquisition/restoration projects, as well as remaining recommendations in the *Buffer the Bay* and *Buffer the Bay Revisited* reports, and preventing other similarly situated, privately held natural areas from harmful development.

Relevant Draft Plan Potential Management Strategies

- 2c2: Review existing recommendations for the acquisition and restoration of tidal wetlands and upland buffer areas around the Bay’s periphery and evaluate the potential for additional acquisition and restoration opportunities. *This measure needs to include more than simply a “review.” There is wide agreement on the importance of many proposed acquisition sites and restoration projects around the bay. As stated above, for at least these sites and projects, the Plan should include acquisition and/or implementation actions. As we stated in our preliminary recommendations, the Advisory Committee also believes that the city should expeditiously transfer city-owned wetlands and adjacent areas within the Jamaica Bay watershed/sewershed to a responsible public agency, per the recommendations of the Wetlands Task Force created by Local Law 83, and recommends that the wetlands and adjacent areas identified by the Task Force within the Jamaica Bay watershed be protected from development immediately (See Appendix G).*
- 2f1: Identify degraded habitats in Thurston Basin for groups of wildlife species and improve these habitats by using appropriate headwater basin planning and restoration. *This area suffers from lack of access, and projects to improve connections, both ecological and in terms of public access, between the Thurston Basin headwaters and the bay should be implemented.*
- 4c4: Develop strategies to encourage the preservation of critical open spaces in the Jamaica Bay watershed through new development proposals. *The Advisory Committee suggests implementation of a Transfer of Development Rights (TDR) program in the Jamaica Bay watershed to encourage the preservation of existing open space, a graduated real estate property transfer tax for new development within the Jamaica Bay watershed to fund marsh restoration, and the use of significantly higher mitigation ratios (amount of land mitigated in exchange for losing land to development) for tidal wetlands impacts in Jamaica Bay than those currently used. Throughout the Hudson-Raritan Estuary, the U.S. Army Corps of Engineers and DEC have typically required mitigation ratios of 2:1 to 3:1 for projects with unavoidable impacts to tidal wetlands and adjacent areas. Given the bay’s historic wetland loss, mitigation for unavoidable tidal wetlands impacts in Jamaica Bay should use a 5:1 ratio as a minimum, with higher ratios required as appropriate.*

4. Expand existing efforts to restore the bay’s interior saltmarsh islands.

Relevant Draft Plan Potential Management Strategies

- 2a2: Prioritize the restoration of additional salt marsh islands such as Black Wall, Ruler’s Bar, Duck Point, etc. *The Advisory Committee stresses that filling low-lying areas of marshes with clean sediment to help restore their historic footprint should be conducted as soon as possible; the technique of “spot filling” through jet or slurry spray should be used, along with larger fill, as appropriate, to restore additional low-lying areas of Big Egg Marsh, and sections of Little Egg, Yellow Bar, Elders Point, Goose Pond, Black Bank, Silver Hole, and JoCo Marshes. Further, the Committee recommends fast-tracking feasibility studies for Black Wall, Rulers Bar, Duck Point, and Stony Point Marshes based on their severe marsh loss.*

The Advisory Committee recommends that all restoration and filling activities within Jamaica Bay use either existing Jamaica Bay sediments moved from another location within the bay or clean

*sediments similar in grain size and sediment type to existing sediments. Any materials treated or untreated that would be characterized by their nature as in need of disposal should not be placed in Jamaica Bay.**

5. Develop and implement a comprehensive science program for the bay, including additional investigation of the factors of marsh loss in the bay, enhanced water quality monitoring, an investigation of the adequacy of pretreatment programs to prevent harmful quantities of industrial chemicals from reaching the bay, characterization of chemicals in the waste stream that may have harmful ecological effects like synthetic estrogens, and pilot projects for advanced pollution treatment.

Relevant Draft Plan Potential Management Strategies

- 2b1: Develop funding mechanisms to promote continuing research on the causes and rate of salt marsh disappearance, implement field programs to continue wetlands monitoring, and continue enforcement efforts.
- 5d1: Organize a "State of the Bay" scientific symposium at least every two years to bring together researchers, academicians, civic groups, community members, resource managers and agencies to coordinate and guide scientific investigations and report scientific findings related to the Jamaica Bay watershed.
- 2d1: Design and implement a monitoring plan to track water quality at candidate restoration sites to determine if SAV restoration is feasible and monitor levels of success. *The Advisory Committee also recommends development and implementation of a Jamaica Bay shellfish remediation and management plan to secure the long-term revitalization of oysters and other local shellfish for improved water quality. Eelgrass restoration is a necessary part of this plan.*
- 5b2: Promote access to and use of the Jamaica Bay Institute as a centralized research and information repository to coordinate watershed-related research.

Additional Specific Advisory Committee Recommendations

- *The Advisory Committee recommends increasing the number of remote real time monitoring stations in Jamaica Bay and the infrastructure necessary to support these. Current technology allows for marine water quality stations (buoys) to transmit real time data to DEP offices. Routine water quality parameters that should be monitored include salinity, dissolved oxygen, pH, temperature, and nitrogen levels. The selection of station locations should allow for a broad assessment of the bay's water quality at any point in time. Increased monitoring data will reduce the city's reliance on analytical modeling and provide a more accurate picture of the ecological system.*

* One committee member dissents from this view on several points, believing that: 1.) Depending on the action proposed, it may not be necessary or appropriate to always use the same grain size or sediment type for a restoration. For example, it may be determined that finer grained material would be more suitable to restore some historic marshes, or it may be more economical to use "clean" rock or glacial till to partially recontour an area as long as the final cap is of a similar grain size and type to the surrounding area. 2.) There are unnecessary limitations imposed by the terminology of "clean" material without better defining it. Much of the bay bottom is currently contaminated at varying levels and the term "clean" fill may be incorrectly interpreted to mean "pristine" or free from contaminants at any level, a unnecessarily strict interpretation that would severely hinder the ability to restore bay habitats by imposing higher costs and severely curtailing the supply of material that could be employed for restoration. He believes that most scientists and regulatory agencies would agree that sediments that meet state/Federal testing criteria, depending on how they are used, would be acceptable because they provide a potential for long-term ecological benefits without a threat of a significant long-term or adverse impact to the marine system. 3.) There is a premature preclusion of an option for careful use of treated and stabilized or decontaminated material as sub-fill, above which a thick layer of clean material would further isolate any residual contaminants.

- *Explore alternative treatment plant disinfection methods. Conventional chlorine treatment results in the formation of chlorinated organic compounds in plant effluent; such chlorinated compounds are increasingly considered to be environmentally harmful. Ultraviolet (UV) and ozone are two alternate methods of disinfection that should be considered.*
- *DEP should implement an “open door” policy for outside scientists, sharing data and allowing access for monitoring and sampling.*

Tier II

6. Improve access to the bay.

Relevant Draft Plan Potential Management Strategies

- *3a1: Provide access and connections to the waterfront for neighborhoods most in need, based on consideration of current lack of access, population density, and physical barriers. The Advisory Committee recommends that access points be added in Southwestern and Southeastern Queens. There is currently no access of any meaningful kind to Jamaica Bay from Southeastern Queens. Crumbling bulkheads, abandoned street ends, and vacant lands cut off communities that lie along the northern shore of the Rockaways and near JFK from the bay. The New York Waterfront Blueprint identified public access opportunities in this area that would provide a natural link for Brooklyn and Queens residents to each other and to the bay; these should be considered.*
- *3a2: Improve publicly accessible waterfront by adding public amenities, facilities and programs, including but not limited to walkways, boat launches, biking paths, fishing access points, etc. Increase the public awareness of these amenities, facilities and programs. Public transportation to the bay should also be increased.*
- *3b1: Build upon the existing New York City Bicycle and Greenways Plan to establish landscape connectivity within the watershed.*

7. Establish an active, coordinated planning body for the bay.

Relevant Draft Plan Potential Management Strategies

None.

Additional Specific Advisory Committee Recommendations

- *Direct the Mayor’s Office of Environmental Coordination to ensure that all relevant state, municipal and federal agencies are notified of construction and restoration activities and their impacts within the Jamaica Bay watershed/sewershed.*
- *Create a new Jamaica Bay watershed/sewershed environmental assessment form that ensures additional scrutiny of projects within the Jamaica Bay watershed, with an emphasis on environmental issues pertinent to the bay. The assessment should incorporate an analysis of cumulative impacts, including from related projects; after all, it has been the cumulative effects of countless projects, large and small, over the past 100 years that have so degraded Jamaica Bay. The Committee also specifically notes that, as the redevelopment of Rockaway Beach and other bay areas continues, standards and requirements must be developed to ensure that such development is fully compatible with the goal of protecting and restoring the bay.*
- *Establish an inter-agency task force to coordinate and prioritize initiatives undertaken under the Plan, to coordinate on agency actions that may conflict with Plan goals, and to manage dispute resolution. This task force should meet several times a year.*

8. Undertake additional restoration of the tributaries leading into Jamaica Bay.

Relevant Draft Plan Potential Management Strategies

- 1c1: Identify the tributary basins that would receive the greatest benefit from the removal of CSO sediment mounds and/or recontouring to enhance drainage and eliminate borrow pits and deep trenches. *The Advisory Committee believes that the tributaries leading into Jamaica Bay should be restored – improving these water corridors could help increase the natural flow of water and sediments to the bay, and reduce the impact of CSO events. CSO sediment mounds should be removed along with depositional mounds at the mouth of the tributaries that interfere with full flushing of the creeks. Removal of artificial barriers and obstructions to tidal flushing within Jamaica Bay, such as repairing the drainage culverts under the Federal Aviation Administration roads to the east of the Rockaway Turnpike, would improve the area’s tidal flushing.*

The Committee, however, does not agree that DEP’s “1d1: Improve flushing and dissolved oxygen levels by recontouring Grassy Bay and North Channel with uncontaminated material in partnership with other agencies.” should be a priority at this time. If filling of borrow pits in Norton Basin and Little Bay moves ahead, subsequent monitoring data should be used to examine future potential benefits and drawbacks that such recontouring actions might have for the bay’s remaining borrow pits.[†]

9. Establish Jamaica Bay as a “no discharge zone.”

Relevant Draft Plan Potential Management Strategies

- 1e5: Expand the boat pump-out program in Jamaica Bay. *The Advisory Committee recommends that the DEP undertake the necessary surveys and steps to lay the groundwork for designation of Jamaica Bay as a “no discharge zone,” which would prohibit any vessels from dumping treated or untreated waste into the waters.*

10. Mitigate toxic sediments in the bay.

Relevant Draft Plan Potential Management Strategies

- 1h1: Identify the existing extent and condition of contaminated sediments in Jamaica Bay.
- 1h2: Create a plan to mitigate toxic sediment mounds in Jamaica Bay, either through on-site capping or sediment removal. *In addition to identification of toxic sediments within the bay, the Committee recommends that the areas be prioritized for removal, isolation and/or treatment based on whether or not these areas will erode over time or impact the water column. Toxic sediments should be classified as those that may pose a human health hazard and those that may impair the ecological and biological functioning of the ecosystem.*
- 1f5: Review and strengthen enforcement activities and sanctions against illegal dumping into Jamaica Bay. *The Advisory Committee recommends that businesses with records of polluting behaviors should face additional requirements, such as performance bonds or letters of credit in favor of city permit issuing agencies (DEP, New York City Department of Buildings), when undertaking work within the*

[†] One committee member dissents from this view, stating that, at this time, he is against the filling of *any* borrow pits in Jamaica Bay unless it can be scientifically proven that there will be no harmful/detrimental effects to the surrounding area or the bay as a whole. He states that any potential benefits from the filling of Little Bay or Norton Bay should not necessarily be used to initiate action for other areas of the bay due to these areas’ unique differences.

Jamaica Bay watershed. The Committee also proposes using natural resource damage assessment procedures to impose fines for illegal discharges to the bay that could have been avoided by proper maintenance or practices, and create a dedicated fund for restoration programs arising from these claims.

- 1g1: Review NYCDEP’s portfolio of industrial pre-treatment permittees within the Jamaica Bay watershed with the goal of enhancing BMPs with respect to their industrial processes.
- 1g2: Perform risk identification of potential sources of contamination, including airports and other industrial operations, as well as known underground storage tanks, oil storage facilities, former landfills, and Superfund sites.

11. Improve trash removal through dedication of a skimmer boat to collect the bay’s floatables.

Relevant Draft Plan Potential Management Strategies

- 1f2: Continue the ongoing floatables booming, skimming, and netting programs, as appropriate, until other floatable control operations become effective. *The Advisory Committee recommends dedicating a skimmer boat to Jamaica Bay’s clean up efforts. Due to the bay’s distinct geography, the boat must be able to navigate shallow waters as well as move quickly throughout the bay – a shallow draft pontoon-type skimmer vessel with a detachable height pickup net would be ideal. The bay’s importance warrants dedication of a vessel.*

12. Develop and implement a strategy to “brand” Jamaica Bay.

Relevant Draft Plan Potential Management Strategies

- 3b2: Brand the Jamaica Bay Watershed as a recognizable concept along with a process for disseminating related messages. *The Advisory Committee believes that a formal designation that capitalizes on the history and natural resources of Jamaica Bay would instill the area with an identity that the city would be encouraged to further protect. Signage throughout the watershed would increase public understanding of the role that upland areas, as well as wetlands, have on the bay. Enhanced use of BMPs could also be encouraged within the area. Developing an “Adopt a Waterfront” effort would allow private and public interests to be responsible for keeping areas of the bay clean.*
- 5e3: Heighten public awareness through a “Don’t Dump, Drains to Jamaica Bay” message affixed to curb inlets, storm drains, and catch basins.
- 5c1: Design, develop, implement, and evaluate new and enhanced multi-disciplinary, inquiry-based environmental education curricula for K-12 grade students that include opportunities to learn about Jamaica Bay’s ecological systems, introduce environmental careers, and facilitate environmental stewardship.
- 5c5: Develop a series of interpretive exhibits at GNRA facilities and beyond.
- 4c2: Promote the economic value of open space, wetlands, “green” development, and low impact development within the watershed. *The Advisory Committee also believes that producing an economic analysis of the benefits that Jamaica Bay’s wetlands provide to the area will encourage community and business support for investment in the resource.*
- 5a2: Create a targeted campaign for public officials and public agency representatives that include briefings, workshops and boat tours about Bay-related issues and opportunities.

- 5b1: Develop a process for disseminating Jamaica Bay related information to the watershed community. *The Advisory Committee believes that the Jamaica Bay community needs a Web site that is regularly updated, coordinated with other relevant Web sites, and made as user-friendly as possible to encourage community groups to interact and network. The Jamaica Bay Research and Management Information Network Web site could fill this need.*
- 5f1: Work with City agencies and public interest groups to publicize volunteering events and opportunities.
- 5f3: Provide opportunities for public involvement in watershed protection through hands-on community service projects.
- 5f2: Continue support for community, environmental advocacy, and volunteer groups to remove litter and other debris from accessible shoreline sites as well as upland areas.

13. Increase trash removal efforts.

Relevant Draft Plan Potential Management Strategies

- 1f4: Request that NYCDPR and NPS maintain trash receptacles on beaches and parks through the end of October. *The Advisory Committee shares DEP's concern that trash in the bay accumulates as a result of the removal of receptacles in public parks and nearshore areas during the Refuge's "off-season" from Labor Day to Memorial Day. Exploring the use of animal-proof containers and solar-powered trash compactors which can hold trash for longer periods of time, or possibly negotiating additional disposal options with the New York City Department of Sanitation, would improve the bay's floatables problem.*
- 1f3: Provide support for litter removal and reduction programs including beach clean-ups. *The Advisory Committee supports DEP's development of a permanent program for collection and removal of large-scale debris visible above the high tide mark that has been demonstrated to affect aesthetic or ecological uses within the bay.*

14. Undertake additional activities to restore and protect wetlands/habitats.

Relevant Draft Plan Potential Management Strategies

- 2c1: Reduce the extent of invasive vegetation to create wetlands and/or upland buffers and develop a GIS layer displaying the extent of invasive vegetation within the watershed. *The Advisory Committee prioritizes development of a plan to monitor the spread of invasive species, assess impact on Jamaica Bay's health, and develop programs for control. NPS' draft invasive species management plan (due in early 2008) will be critical to this effort and DEP should coordinate their restoration and clean up efforts to this plan.*
- 2e1: Identify and compile all known freshwater habitat restoration plans. Where applicable, implement federal, state, and local agency projects along the periphery of Jamaica Bay and within the watershed.
- 2i1: Identify habitats of listed species and suggest projects that would support the recovery of animals and plants that are listed as RTE. *This measure should include implementation of recovery projects, not simply their identification.*

- 1b3: Evaluate the potential for harvesting excess *Ulva* from the water column (possibly with the use of skimmer boats) to improve aesthetic issues and to evaluate the potential for limited nitrogen removal.
- 4c3: Examine the list of brownfields within the Jamaica Bay watershed and evaluate on a case by-case basis how to improve their ecological functioning. *This measure should include implementation of appropriate enhancement projects at brownfields sites, not simply an examination.*
- 2h1: Prepare a GIS map of existing and potential dune and beach habitats that could benefit from restoration, prioritize restoration sites, and develop habitat restoration or enhancement plans. Implement active monitoring of restored dune and beach habitats in along the Jamaica Bay shoreline. *This measure should include implementation of restoration/enhancement projects, not simply development of plans.*
- 2j1: Prepare a GIS map of existing and /or potential locations that could benefit from woodland and shrubland restoration, prioritize restoration sites, and develop woodland and shrubland restoration or enhancement plans. Implement active monitoring of restored woodland and shrubland habitats in the Jamaica Bay watershed. *This measure should include implementation of restoration/enhancement projects, not simply development of plans.*
- 2g1: Develop, implement, and monitor native grassland restoration or enhancement plans for selected areas in the Jamaica Bay watershed.

15. Reduce or eliminate barriers to water flow/circulation within bay.

Relevant Draft Plan Potential Management Strategies

- 1d3: Investigate potential land breaching locations such as northwest corner of Floyd Bennett Field, Rockaway Spit, and the northeast corner of Rockaway Peninsula to enable increased circulation of Bay waters and the potential for sediments to enter the Bay.

16. Improve sewer connections in problem areas of the watershed/sewershed.

Relevant Draft Plan Potential Management Strategies

- 1e3: Provide sewage treatment service to the remaining un-sewered neighborhoods along margins of the Bay.
- 1e2: Correct compromised sanitary sewers and implement a sanitary sewer connection program focusing enforcement and monitoring of interconnections between sanitary and storm sewers within the Jamaica Bay watershed.

17. Revise JFK's State Pollutant Discharge Elimination System (SPDES) permit. The existing permit has not been significantly modified since it was first issued in 1987 and it no longer meets Environmental Protection Agency and state regulatory requirements. Recently, a draft permit was released and groups are working to strengthen its requirements for monitoring and stormwater pollution prevention planning, and include effluent limits that ensure that the permit fully protects Jamaica Bay's water quality from harmful contaminants in the airport's runoff.

Relevant Draft Plan Potential Management Strategies

None.

Tier III

18. Assess and implement, as appropriate, additional methods of reducing levels of nitrogen and organic wastes entering into Jamaica Bay’s waters.

Relevant Draft Plan Potential Management Strategies

- 1c2: Identify hypoxic locations in the tributary basins and determine areas that may benefit from alternative strategies to increase dissolved oxygen levels, such as mechanical aeration.
- 1d2: Improve dissolved oxygen in Grassy Bay and North Channel by evaluating alternative strategies such as mechanical aeration, fountains, or other engineering solutions.
- 5e2: Develop an expanded grease remediation program.

19. Further improve habitat values.

Relevant Draft Plan Potential Management Strategies

- 2a3: Using information from Elders Point and existing literature, examine various technologies of “non-hardened” wave attenuators (such as coir logs) to protect windward and ice flow sides of marsh islands from wind and water erosion forces.
- 2a1: Promote the beneficial uses of appropriate dredged material to restore or create salt marsh island wetlands. Establish an interagency coordinating committee to oversee and direct these efforts. *The Advisory Committee also recommends passing legislation establishing for Jamaica Bay the right of first refusal for any navigational or construction-related dredged bay floor sediment. In instances where sediments are dredged from the bay, for example in Rockaway Inlet, the potential beneficial use for these sediments within Jamaica Bay should be considered before their uses elsewhere. Discussion of what constitutes clean fill is discussed in above in recommendation #4.*
- 2c3: Identify and restore areas of peripheral shallow water and mudflats.

20. Implement additional activities to increase public awareness and education about the bay’s resources.

Relevant Draft Plan Potential Management Strategies

- 5f4: Provide opportunities for urban plantings and creating landscapes that are community-organized and administered (such as community gardens). *The Advisory Committee recommends that community planting programs using native species be promoted, and that educational materials and a protocol to standardize Jamaica Bay restoration efforts be set up to make these programs more efficient.*
- 5d2: Enhance and support university-led research programs and college-level student research related to the Jamaica Bay watershed.
- 5a1: Establish a program of events including a “Bay Day” or “Eco-festival” that increases awareness and enjoyment of Jamaica Bay through celebration and learning.
- 5c2: Design, develop, implement and evaluate new and enhanced multi-disciplinary, inquiry based environmental education programs outside of school-time (after school, on weekends, or during summer vacations) for young people to learn about Jamaica Bay’s ecosystems and environmental careers, and to facilitate environmental stewardship.

- 5c3: Create multi-media resources including DVDs or videos that feature the Jamaica Bay watershed and ways young people interact with and learn from the Bay’s ecological system.
- 5c4: Design, develop, implement, and evaluate professional development opportunities for elementary through high school formal and non-formal educators.
- 5d3: Utilize service learning opportunities at higher education institutions and community organizations to create an informed citizenry.
- 5e4: Continue the long-term anti-littering campaign in schools, on the streets, with waterfront properties, and in public service announcements.

21. Require the New York City Department of Health and Mental Hygiene to conduct a public health survey of people who regularly eat fish from Jamaica Bay and, based on this report, review existing fishing policies. Based on anecdotal information, a significant number of subsistence anglers and their families eat fish from the bay despite New York State Department of Health advisories; the possibility for additional outreach specific to Jamaica Bay should be explored.

Relevant Draft Plan Potential Management Strategies

None.

22. Support the passage of an expanded New York State bottle bill, “The Bigger, Better, Bottle Bill.” An extension of current returnable container deposit laws to cover non-carbonated beverages, such as bottled water, fruit juice, and teas, would reduce the number of bottles entering the waste stream and found as litter across the city’s streets and waterways. The current bill would also require bottle distributors to transfer unclaimed deposits to the state’s Environmental Protection Fund. Since 1982, when the city passed its current returnable container deposit law, more than 80 million bottles and cans have been recycled.

Relevant Draft Plan Potential Management Strategies

None.

Recommendations Concerning Plan Schedule, Milestones and Monitoring

Local Law 71 requires that the Plan set forth a “schedule, including interim and final milestones, for implementing the measures and achieving the specific goals included in such plan and methods of monitoring progress towards achieving such milestones and goals.” DEP’s Draft Plan does not include these necessary and critical items.

DEP was tasked with developing a Plan that, if enacted, would restore and improve the bay’s water quality and ecological habitat. DEP was not asked to accept responsibility for items that are outside of its mission, but the agency should develop a Plan that fixes those ecological services adversely affected by the city, and also provides a roadmap for actions that should be taken by other agencies, either alone or in partnerships with DEP. We are pleased that DEP has begun to reach out to other agencies, and urge the city as a whole to work together to improve this remaining natural treasure for the future. As already stated, we also strongly recommend that DEP quickly step up to the challenges resulting from the excess nitrogen discharged from the sewage treatment plants, in part because it will demonstrate an appropriate assumption of responsibility in an effort that eventually will require significant action on the part of many entities.

For each specific measure in the final Plan, the following is needed:

- measurable deliverables that tie back to a goal of the specific measure and to an overall Plan goal, and an identified means of monitoring progress and determining success
- a timeline for implementation that identifies not only the start date, but also the projected amount of time to reach the goal
- specific milestones to check in on the measure's implementation and success
- specific information on who will be conducting the work and how working relationships will be structured (*e.g.*, which division within DEP will be working on a project, which agency needs to take the lead in a shared project, etc.)
- a process for adaptive management, so that as lessons are learned they are communicated effectively throughout the project team and to similar groups and result in the necessary changes
- an identified budget requirement.

Should it be necessary to conduct additional studies prior to a restoration/mitigation project start, then the objectives of those studies should be clearly outlined and approximate start and end dates for such research set out. It is not enough to simply examine the circumstances surrounding a particular issue – we are at the point, given conditions in the bay, that we must begin action steps to help redress the situation, working under the best scientific information we have at the time.

The budget needs noted for completion of each project do not need to be linked to a specific funding source. At this stage, it is more important to have a comprehensive and adequate Plan. Stakeholder groups should come together after the Plan's initial release to together discuss how the Plan can be best funded.

1 City of New York Local Law 71. 2005. Developing a watershed protection plan for the watershed/sewershed of Jamaica Bay.

2 New York City Department of Environmental Protection. 2007. *Draft Jamaica Bay Watershed Protection Plan*.

3 City of New York Local Law 71. 2005.

4 City of Los Angeles. No date. Catch basin cleaning. Department of Public Works, Bureau of Sanitation. Accessed 30 May 2007 from <http://www.lacity.org/SAN/wpd/WPD/residents/cbcleang.htm>.

City of Los Angeles. No date. Stormwater frequently asked questions. Department of Public Works, Bureau of Sanitation.

Accessed 30 May 2007 from <http://www.lacity.org/SAN/wpd/WPD/residents/faqs.htm#catch%20basins%20cleaned%20out?>.

City of Philadelphia. No date. City provides advice on handling flood damage. Accessed 30 May 2007 from

<http://www.phila.gov/floodadvice.html>.

Appendix A

**LOCAL LAWS
OF
THE CITY OF NEW YORK
FOR THE YEAR 2005**

No. 71

Introduced by Council Members Gennaro, Avella, Barron, Brewer, Clarke, Comrie, Fidler, Gonzalez, Jennings, Koppell, Liu, Nelson, Palma, Quinn, Recchia, Sanders, Vallone Jr. and Weprin.

A LOCAL LAW

To amend the administrative code of the city of New York, in relation to developing a watershed protection plan for the watershed/sewershed of Jamaica Bay.

Be it enacted by the Council as follows:

Section 1. Legislative findings and intent. In October of 1972, the United States Congress established the Gateway National Recreation Area (“Gateway”) as part of an effort to bring the National Park System and its ethic of preserving and protecting outstanding resources closer to major urban areas.

Gateway encompasses the largest collection of natural systems, wildlife habitats, historic resources, and recreational opportunities in the New York City/New Jersey metropolitan area. It also encompasses numerous sites of critical natural and cultural importance to the health of local ecosystems, to the life of migratory and native species and to the military, navigational and aviation history of the region and the nation, especially in the context of attendant defenses of New York Harbor.

According to the National Park Service (NPS), Gateway is the only extensive public natural area in the New York City region. The Jamaica Bay Unit is one of several units, consisting of lands, waters, marshes and submerged lands, comprising Gateway. The Jamaica Bay Wildlife Refuge (“Refuge”), established by the City of New York in 1948, is located within the Jamaica Bay Unit. The Refuge, a State and nationally recognized important bird area, encompasses 2,500 acres within the boroughs of Brooklyn and Queens. The only wildlife refuge in the National Park System, it provides a shelter for rare and endangered birds and a variety of habitats for more than 325 kinds of waterfront and shorebirds. It is also a critical stop-over area along the Eastern Flyway migration route and is one of the best and world renowned bird-watching locations in the western hemisphere.

Jamaica Bay is one of the largest and most productive coastal ecosystems in the State of New York, as well as within the Northeastern United States, and is an important recreational destination for local, national and international visitors. It contains approximately 13,000 acres of surface waters, including the largest tidal wetland

complex in New York State. These wetlands provide benefits such as natural water quality improvement, flood protection and shoreline erosion control for the commercial and residential areas in and around the Bay in Brooklyn and Queens. Unfortunately, construction and development within the Jamaica Bay watershed has often been conducted without consideration of potential adverse impacts on the Bay and sometimes without notice to all interested governmental agencies, civic groups and other interested parties. One such governmental agency is the NPS, which is the primary steward of the Bay, itself, and with whom, among many other agencies, it is critical for the City to collaborate in order to protect the Bay.

Jamaica Bay's future as an oasis of great ecological importance is in severe jeopardy due to the fact that thousands of acres of the Bay's marshy islands, which serve as nesting and feeding areas for an abundance of birds and other wildlife, are rapidly and mysteriously vanishing. Scientists predict that the Jamaica Bay marshlands will completely vanish in less than twenty years if the cause of their deterioration and a solution to their preservation are not found.

This legislation would require the New York City Department of Environmental Protection to create a watershed protection plan for the watershed/sewershed of Jamaica Bay, and would create a Jamaica Bay watershed protection plan advisory committee. The Council finds that such watershed planning is vital to the future of Jamaica Bay. This legislation establishes the initial pathway towards restoring and maintaining the water quality and ecological integrity of the Bay by comprehensively assessing threats to the Bay and coordinating environmental remediation and protection efforts in a focused and cost-effective manner. Watershed protection planning for Jamaica Bay is an efficient and effective means of promoting the sustainability of the Bay's environment, the economy associated with the Bay, and the linkages between the two.

§2. Chapter five of title 24 of the administrative code of the city of New York is hereby amended by adding thereto a new section 24-527 to read as follows:

§24-527 Watershed protection plan for the watershed/sewershed of Jamaica bay. a. No later than September 1, 2006, the commissioner shall complete a watershed protection plan for the watershed/sewershed of Jamaica bay, which shall, among other things, include measures the city can implement to help protect Jamaica bay. The overall goal of such plan shall be to restore and maintain the water quality and ecological integrity of Jamaica bay.

b. The commissioner shall assess the technical, legal, environmental and economical feasibility of including the following measures, at minimum, in the plan prepared pursuant to subdivision a of this section:

(1) best management practices for the minimization and control of soil erosion and stormwater runoff and reduction of both point and non-point source pollution, including, but not limited to, the promotion of development practices such as the on-site detention and infiltration of stormwater runoff, the minimization of impervious surfaces and the creation of natural systems to control and minimize stormwater runoff;

(2) measures to address threats to aquatic habitat, including, but not limited to, stabilizing and restoring salt marshes, wetlands, soils and other natural areas, strengthening ecological buffers, restoring natural features to the Jamaica bay watershed/sewershed shoreline, and reestablishing water flows;

(3) land acquisition and land use planning practices and opportunities, including, but not limited to, incentives, such as expedited permitting and property tax relief, for infill, brownfield redevelopment and other environmentally beneficial development, and

disincentives, such as stricter development guidelines, for development that may adversely impact Jamaica bay;

(4) a protocol for coordination with appropriate federal, state and city governmental entities that have jurisdiction over the Jamaica bay area, with respect to, but not limited to, efforts to restore and maintain the water quality and ecological integrity of Jamaica bay and notification regarding proposed development projects within the Jamaica bay watershed/sewershed that may adversely impact Jamaica bay;

(5) a protocol for coordination with the office of environmental coordination that ensures that environmental assessments and reviews of projects within the Jamaica bay watershed/sewershed address potential impacts to Jamaica bay and are conducted pursuant to all applicable federal, state and city environmental quality review laws and regulations;

(6) a public education program, including, but not limited to, programs for schools, developers, commercial facilities, civic groups and other local organizations and entities to increase awareness about the ecological significance and degradation of Jamaica bay; potential threats to Jamaica bay; restoration and watershed stewardship activities undertaken by the department and others involving Jamaica bay; and methods and practices to reduce pollution in Jamaica bay; and

(7) a program to target enforcement efforts that will help reduce polluting behaviors and operations that may adversely impact Jamaica bay.

c. The watershed protection plan prepared pursuant to subdivision a of this section, as it may be revised pursuant to subdivision f of this section, shall contain the following:

(1) specific goals related to restoring and maintaining the water quality and ecological integrity of Jamaica bay;

(2) the geographic boundaries of the watershed/sewershed of Jamaica bay for the purpose of achieving the goals of such plan and an explanation for the selection of such boundaries;

(3) the assessments the commissioner completed for each measure considered for inclusion in such plan;

(4) for any final recommendation of the Jamaica bay watershed protection plan advisory committee established pursuant to subdivision h of this section that was not assessed for inclusion or incorporated in such plan, an explanation for such omission; and

(5) a schedule, including interim and final milestones, for implementing the measures and achieving the specific goals included in such plan and methods of monitoring progress towards achieving such milestones and goals.

d. The commissioner shall implement the plan prepared pursuant to subdivision a of this section, as it may from time to time be revised pursuant to subdivision f of this section, in accordance with its provisions.

e. The commissioner shall submit to the mayor and the speaker of the council the watershed protection plan prepared pursuant to subdivision a of this section, or any revised plan prepared pursuant to subdivision f of this section, no later than five business days after its completion.

f. The watershed protection plan prepared pursuant to subdivision a of this section shall be reviewed and revised as necessary to achieve its goals, but in no event shall such review occur less often than once every two years.

g. No later than October 1, 2007, and no later than October 1 every two years thereafter, the commissioner shall submit a report to the mayor and the speaker of the council, which shall include, but not be limited to:

(1) the implementation status of the measures included in the watershed protection plan prepared pursuant to subdivision a of this section, as it may have been revised pursuant to subdivision f of this section; and

(2) where the plan has been reviewed in accordance with subdivision f of this section and the commissioner determines that no revisions are required, such determination and the reasons for it.

h. (1) A Jamaica bay watershed protection plan advisory committee shall be established, which shall provide advice to the commissioner for the duration of its term and provide final recommendations to the commissioner and the speaker of the council on the watershed protection plan prepared pursuant to subdivision a of this section regarding:

i. the specific goals of such plan related to restoring and maintaining the water quality and ecological integrity of Jamaica bay;

ii. the geographic boundaries of the watershed/sewershed of Jamaica bay to be included in such plan;

iii. any measures that should be assessed by the commissioner for inclusion in such plan, in addition to those listed in subdivision b of this section;

iv. the assessment of the technical, legal, environmental and economical feasibility of including in such plan the measures listed in subdivision b of this section and any additional measures; and

v. a schedule, including interim and final milestones, for implementing the measures and achieving the specific goals to be included in such plan and methods of monitoring progress towards achieving such milestones and goals.

(2) Such advisory committee shall be comprised of seven members, three of whom shall be appointed by the speaker of the council and four by the mayor. The members shall be appointed within forty-five days after the effective date of this section and shall serve without compensation. The chairperson shall be elected from amongst the members. Any vacancy shall be filled in the same manner as the original appointment for the remainder of the unexpired term. The commissioner may provide staff to assist the advisory committee.

(3) Such members of the advisory committee shall serve until three months after the date upon which the commissioner completes the watershed protection plan prepared pursuant to subdivision a of this section, after which time the committee shall cease to exist.

(4) No later than July 1, 2006, the chairperson of such committee shall submit a report containing its final recommendations to the commissioner and the speaker of the council.

§3. This local law shall take effect immediately.

THE CITY OF NEW YORK, OFFICE OF THE CITY CLERK, s.s.:

I hereby certify that the foregoing is a true copy of a local law of the City of New York, passed by the Council on June 30, 2005, and approved by the Mayor on July 20, 2005.

VICTOR L. ROBLES, City Clerk of the Council

CERTIFICATION PURSUANT TO MUNICIPAL HOME RULE LAW §27

Pursuant to the provisions of Municipal Home Rule Law §27, I hereby certify that the enclosed Local Law (Local Law 71 of 2005, Council Int. No. 565-A) contains the correct text and:

Received the following vote at the meeting of the New York City Council on June 30, 2005: 50 for, 0 against, 0 not voting.

Was signed by the Mayor on July 20, 2005.

Was returned to the City Clerk on July 21, 2005.

JEFFREY D. FRIEDLANDER, Acting Corporation Counsel

Appendix B

LIST OF COMMITTEE MEMBERS INCLUDING AFFILIATIONS AND BIOGRAPHIES

Doug Adamo

Since his appointment as Chief of the Division of Natural Resources at Gateway National Recreation Area in March, 2003, Doug Adamo has worked in coordination with Park natural resource staff on a variety of issues/efforts focusing on Jamaica Bay Resources. The largest effort was the Big Egg Marsh Experimental Saltmarsh Restoration Project, for which Mr. Adamo provided administrative assistance and began shortly after he reported to Gateway. In a multi-agency effort over the past 13 months, Mr. Adamo worked on compliance, alternative, and monitoring issues for the proposed Elder's Point – Yellow Bar Saltmarsh Restoration Project sponsored by the U.S. Army Corps of Engineers, New York City Department of Environmental Protection, and the Port Authority of NY/NJ.

Mr. Adamo also serves on the Harbor Estuary Program's Management Committee and the Long-Term Control Planning Government Steering Committee, both of which involve considerable efforts toward improving water quality in Jamaica Bay. In addition, he has coordinated development of and sought funding for several National Park Service project proposals to restore ecosystem health to Jamaica Bay. In April 2005, he hosted the first symposium on oysters and eelgrass in Jamaica Bay and plans to hold a second symposium in the spring of 2006.

Mr. Adamo has a B.S. in Wildlife Biology and M.S. in Soil Science from West Virginia University. He previously worked as a biologist for the U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and the U.S. Forest Service.

Manny Caughman

A community and environmental activist, Manuel Caughman is an active member of the community, whose contributions in helping to resolve the environmental issues facing the residents of Southeast Queens has been evident for over almost a decade. As Chairman of the Community Board #12 Environmental Committee, the 29th Assembly District Environmental Committee, and a member of the Brooklyn-Queens Aquifer Feasibility Study, he has been instrumental in bringing attention to and resolving the issues currently facing the residents of Southeast Queens.

Having received numerous awards for his dedication to environmental issues pertaining to water quality, soil contamination and protection of aquifers, Mr. Caughman is recognized in the community by residents and elected officials on every level of government as a respected authority on issues facing the environment. The remediation of the West Side Hazardous Waste Site was paramount in improving environmental issues by removing petrochemicals from the soil that could possibly contaminate the aquifers. Mr. Caughman is currently working along with city and elected officials to address the rising water table affecting Southeastern Queens.

Len Houston

Len Houston is Chief of the Environmental Analysis Branch for the U.S. Army Corps of Engineers, New York District. He holds a B.S. in Biology from Brooklyn College and a M.S. in Marine Biology from Long Island University.

Mr. Houston authored the Reconnaissance Report (1999) recommending that the Federal government undertake (with the New York City Department of Environmental Protection as partner) preparation of a Feasibility Study for Environmental Improvements to Jamaica Bay. He was the Team Leader who developed the Jamaica Bay Environmental Survey that identified 50+ potential improvement options, and

developed a scope of work and funding transfers for extensive field studies to investigate and assess many of those sites as part of the Jamaica Bay Ecosystem Restoration Program field study undertaken by AREAC (under oversight and guidance of the Gateway National Recreation Area). As Chief of the Special Studies Section, Mr. Houston worked with the New York City Parks and Recreation Department to initiate and complete studies for environmental restoration projects at Gerritsen Beach and Spring Creek; the former of which was completed and led to the signing of a Project Cooperation Agreement with City Parks Department to construct the recommended marsh restoration project upon appropriation of Federal studies. As Branch Chief, he worked with Gateway, the New York State Department of Environmental Conservation, Port Authority of NY/NJ and the New York City Department of Environmental Protection to initiate a study for a pilot project at Elders Point and Yellow Bar to address marsh island losses in Jamaica Bay. The Elders Point project has been funded and a contract to restore the mostly eroded marsh using stockpiled sand from the maintenance of Rockaway Inlet was awarded and is scheduled for completion in summer 2006.

Mr. Houston is the author of several presentations on restoration needs/options in Jamaica Bay for conferences sponsored by Gateway and AREAC. He is the Corps representative to the Jamaica Bay Task Force.

Dan Mundy

Dan Mundy is a retired Fire Captain and a lifelong resident of Broad Channel, Queens. In 1995 he was the first to notice the disappearance of the marshes in Jamaica Bay and in 1996 founded the Jamaica Bay Eco Watchers, an environmental group advocating for the restoration and funding to protect this great resource. He is the environmental chairperson of Community Board #14 and also serves on citizens advisory committees for the Harbor Estuary Program and Pollution Control. Mr. Mundy has been active in the planning, construction, and monitoring of the Big Egg Marsh Restoration project as well as the next restoration project with the U.S. Army Corps of Engineers, New York State Department of Environmental Conservation and New York City Department of Environmental Protection.

Eco Watchers also conducts water quality monitoring and works closely with other scientists working in Jamaica Bay. For the past four years Mr. Mundy has led Operation Clean Sweep, a cooperative effort with National Park Service, New York Department of Environmental Conservation, New York Department of State, Port Authority of NY/NJ, and the New York Police Department, and the Jamaica Bay Guardian in removing hundreds of derelict boats and debris from the water and marshes of Jamaica Bay.

Bradford H. Sewell

Bradford H. Sewell is a senior attorney with the Natural Resources Defense Council, Inc. (NRDC), a public interest organization specializing in environmental protection. He is Director of the NRDC NY/NJ Harbor Bight Project, which focuses on NY/NJ marine environmental issues, including marine water quality and fisheries. Since 1998, Mr. Sewell has also served as Director of the NRDC Everglades Project.

NRDC has been working to reduce the impacts on Jamaica Bay of combined sewer overflows and nitrogen pollution from New York City's wastewater treatment facilities. NRDC also provided legal assistance in the creation of Gateway National Recreation Area. Other relevant areas of NRDC's ongoing work include the clean-up of contaminated sediments in Newark Bay (including minimizing impacts of navigational dredging projects), cleanup of Hudson River PCBs, preserving the Hackensack Meadowlands, coastal habitat preservation around New York City, and green building design in the City. NRDC annually publishes "Testing the Waters," which details the problem of beach closings as a result

of water pollution; also, in 2002, NRDC published a report entitled “Cape May to Montauk: A Coastal Protection Report Card.”

Mr. Sewell has a bachelor's degree from Stanford University, a law degree from Columbia University, and a master's in public health from the Division of Environmental Sciences at Columbia's School of Public Health. He is an adjunct faculty member at Columbia University School of Public Health, Division of Environmental Sciences. From 1992-1998, Mr. Sewell was an attorney at the New York law firm of Paul, Weiss, Rifkind, Wharton and Garrison, where he litigated and counseled clients concerning environmental matters.

Dr. R. Lawrence Swanson

Dr. R. Lawrence Swanson received his Ph.D. in Physical Oceanography from Oregon State University in 1971. Since 1987, he has been the director of the Waste Reduction and Management Institute (WRMI), and since 2003 also the Associate Dean of the Marine Sciences Research Center, Stony Brook University (SBU). Prior to his appointment at SBU, he was with the National Oceanic and Atmospheric Administration and served in a variety of capacities including Project Manager of the Marine Ecosystems Analysis Program for the New York Bight; Director of the Office of Marine Pollution Assessment; and the Executive Director of the Office of Oceanic and Atmospheric Research.

Dr. Swanson plays an active role in New York City's marine policy, often testifying at public hearings and producing government reports and policy recommendations. He has conducted research on water quality, ocean dumping, marine debris and medical wastes, hypoxia, marine pollution issues, and waterfront uses in and around New York City. Dr. Swanson serves as the principal investigator on the New York State component of the National Coastal Assessment Program, where he coordinates sampling of water quality, sediment toxicity and biological health of New York waters, including specific sites in Jamaica Bay. He also served as co-editor of a National Oceanic and Atmospheric Administration book concerning hypoxia and mass mortalities in the New York Bight. Dr. Swanson's work contributed to passage of federal legislation and also led to the national emphasis on regulating combined sewer overflows.

More recently, he synthesized large data sets for the New York City Department of Environmental Protection in order to expand the utility of the City's annual water quality monitoring program. This past year, he, along with other members of his research team, published a monitoring plan for the Hudson River for the New York State Department of Environmental Conservation. Swanson and a colleague, R.E. Wilson, have also prepared a paper for publication synthesizing historical data sets as they pertain to hypoxia in Western Long Island Sound.

Christopher R. Zeppie

Christopher R. Zeppie is Director of the Office of Environmental Policy, Programs and Compliance at the Port Authority of New York and New Jersey. Since coming to the Port Authority in 1979, Mr. Zeppie has held positions of increasing responsibility as Environmental Compliance Specialist; Manager, Permits and Governmental Approvals; Attorney, Environmental Law Division; Assistant Director, Office of Environmental Management; and Chief Environmental Policy Officer.

Mr. Zeppie serves on the Transportation Research Board's “Committee on Climate Change and U.S. Transportation” as well as the Steering Committee of the Environmental Division of the New York Academy of Sciences, the Advisory Committee to New York State Sea Grant, and the NYS Implementation Plan Coordinating Council for the Federal Clean Air Act.

He holds a B.S. degree in biology and ecology from Manhattan College, a M.S. degree in marine environmental science from the Marine Sciences Research Center at Stony Brook, and a J.D. degree from St. John's University School of Law. His Master Thesis is entitled "Vertical Profiles and Sedimentation Rates of Cd, Cr, Cu, Ni and Pb in the Sediments of Jamaica Bay, New York", and entailed extensive research in and around Jamaica Bay.

Prior to coming to the Port Authority, Mr. Zeppie worked as an Oceanographer at the New York District Corps of Engineers, Water Quality Compliance Branch and he has also held the position of environmental engineer at the New York Power Authority. He has been an adjunct faculty member at Stony Brook and the New York Institute of Technology.

Mr. Zeppie lives on Long Island in Rockville Centre and has three children and one grandchild.

Appendix C

Int. No. 376

By Council Members Gennaro, Addabbo Jr., Brewer, Clarke, Fidler, Gerson, James, Koppell, Liu, Mark-Viverito, Monserrate, Nelson, Sanders Jr., Sears and Weprin

A Local Law to amend the administrative code of the city of New York, in relation to the watershed protection plan for the watershed/sewershed of Jamaica Bay.

Be it enacted by the Council as follows:

Section 1. Section 24-527 of the administrative code of the city of New York is amended to read as follows:

§24-527 Watershed protection plan for the watershed/sewershed of Jamaica bay. a. No later than September 1, [2006]2007, the commissioner shall complete a watershed protection plan for the watershed/sewershed of Jamaica bay, which shall, among other things, include measures the city can implement to help protect Jamaica bay. The overall goal of such plan shall be to restore and maintain the water quality and ecological integrity of Jamaica bay.

b. The commissioner shall assess the technical, legal, environmental and economical feasibility of including the following measures, at minimum, in the plan prepared pursuant to subdivision a of this section:

(1) (1) best management practices for the minimization and control of soil erosion and stormwater runoff and reduction of both point and non-point source pollution, including, but not limited to, the promotion of development practices such as the on-site detention and infiltration of stormwater runoff, the minimization of impervious surfaces and the creation of natural systems to control and minimize stormwater runoff;

(2) (2) measures to address threats to aquatic habitat, including, but not limited to, stabilizing

and restoring salt marshes, wetlands, soils and other natural areas, strengthening ecological buffers, restoring natural features to the Jamaica bay watershed/sewershed shoreline, and reestablishing water flows;

(3) land acquisition and land use planning practices and opportunities, including, but not limited to, incentives, such as expedited permitting and property tax relief, for infill, brownfield redevelopment and other environmentally beneficial development, and disincentives, such as stricter development guidelines, for development that may adversely impact Jamaica bay;

(4) (4) a protocol for coordination with appropriate federal, state and city governmental entities that have jurisdiction over the Jamaica bay area, with respect to, but not limited to, efforts to restore and maintain the water quality and ecological integrity of Jamaica bay and notification regarding proposed development projects within the Jamaica bay watershed/sewershed that may adversely impact Jamaica bay;

(5) (5) a protocol for coordination with the office of environmental coordination that ensures that environmental assessments and reviews of projects within the Jamaica bay watershed/sewershed address potential impacts to Jamaica bay and are conducted pursuant to all applicable federal, state and city environmental quality review laws and regulations;

(6) a public education program, including, but not limited to, programs for schools, developers, commercial facilities, civic groups and other local organizations and entities to increase awareness about the ecological significance and degradation of Jamaica bay; potential threats to Jamaica bay; restoration and watershed stewardship activities undertaken by the

department and others involving Jamaica bay; and methods and practices to reduce pollution in Jamaica bay; and

(7) a program to target enforcement efforts that will help reduce polluting behaviors and operations that may adversely impact Jamaica bay.

c. The watershed protection plan prepared pursuant to subdivision a of this section, as it may be revised pursuant to subdivision [f]h of this section, shall contain the following:

(1) (1) specific goals related to restoring and maintaining the water quality and ecological integrity of Jamaica bay;

(2) (2) the geographic boundaries of the watershed/sewershed of Jamaica bay for the purpose of achieving the goals of such plan and an explanation for the selection of such boundaries;

(3) (3) the assessments the commissioner completed for each measure considered for inclusion in such plan;

(4) for any final recommendation of the Jamaica bay watershed protection plan advisory committee established pursuant to subdivision [h]j of this section that was not assessed for inclusion or incorporated in such plan, an explanation for such omission; and

(5) a schedule, including interim and final milestones, for implementing the measures and achieving the specific goals included in such plan and methods of monitoring progress towards achieving such milestones and goals.

d. No later than September 1, 2006, the commissioner shall complete an interim report on the preparation of the watershed protection plan required pursuant to subdivision a of this section, which shall include, at minimum, the following elements:

(1) a description of the current status of the plan preparation, including, but not limited to, the status of all feasibility assessments of measures conducted pursuant to subdivision b of this section; and

(2) for each preliminary recommendation of the Jamaica bay watershed protection plan advisory committee provided to the commissioner pursuant to paragraph four of subdivision j of this section, the commissioner shall state whether:

i. i. the recommendation will be incorporated into the plan required pursuant to subdivision a of this section;

ii. ii. the recommendation will not be incorporated into such plan, in which case the commissioner shall provide a detailed explanation of the basis for any such omission; or

iii. iii. the recommendation will be further assessed for inclusion in such plan, in which case the commissioner shall provide a detailed explanation of the reason for such further assessment, including a timeline for such assessment's completion.

e. No later than March 1, 2007, the commissioner shall complete a draft of the watershed protection plan for the watershed/sewershed of Jamaica bay required pursuant to subdivision a of this section.

f. The commissioner shall implement the plan prepared pursuant to subdivision a of this

section, as it may from time to time be revised pursuant to subdivision [f]h of this section, in accordance with its provisions.

[e]g. The commissioner shall submit to the mayor and the speaker of the council the watershed protection plan, draft of such plan and interim report prepared pursuant to subdivisions a, d and e of this section, or any revised plan prepared pursuant to subdivision [f]h of this section, no later than five business days after its completion.

[f]h. The watershed protection plan prepared pursuant to subdivision a of this section shall be reviewed and revised as necessary to achieve its goals, but in no event shall such review occur less often than once every two years.

[g]i. No later than October 1, [~~2007~~2008], and no later than October 1 of every [two]second year[s] thereafter, the commissioner shall submit a report to the mayor and the speaker of the council, which shall include, but not be limited to:

(1) (1) the implementation status of the measures included in the watershed protection plan prepared pursuant to subdivision a of this section, as it may have been revised pursuant to subdivision [f]h of this section; and

(2) where the plan has been reviewed in accordance with subdivision [f]h of this section and the commissioner determines that no revisions are required, such determination and the reasons for it.

[h]j. (1) A Jamaica bay watershed protection plan advisory committee shall be established, which shall provide advice to the commissioner for the duration of its term and provide preliminary and final recommendations to the commissioner and the speaker of the

council on the watershed protection plan prepared pursuant to subdivision a of this section regarding:

i. the specific goals of such plan related to restoring and maintaining the water quality and ecological integrity of Jamaica bay;

ii. the geographic boundaries of the watershed/sewershed of Jamaica bay to be included in such plan;

iii. any measures that should be assessed by the commissioner for inclusion in such plan, in addition to those listed in subdivision b of this section;

iv. the assessment of the technical, legal, environmental and economical feasibility of including in such plan the measures listed in subdivision b of this section and any additional measures; and

v. a schedule, including interim and final milestones, for implementing the measures and achieving the specific goals to be included in such plan and methods of monitoring progress towards achieving such milestones and goals.

(2) Such advisory committee shall be comprised of seven members, three of whom shall be appointed by the speaker of the council and four by the mayor. The members shall be appointed within forty-five days after the effective date of this section and shall serve without compensation. The chairperson(s) shall be elected from amongst the members. Any vacancy shall be filled in the same manner as the original appointment for the remainder of the unexpired term. The commissioner may provide staff to assist the advisory committee.

(3) Such members of the advisory committee shall serve until three months after the date upon which the commissioner completes the watershed protection plan prepared pursuant to subdivision a of this section, after which time the committee shall cease to exist.

(4) No later than July 1, 2006, the chairperson(s) of such committee shall submit a report containing the committee's preliminary recommendations regarding the watershed protection plan prepared pursuant to subdivision a of this section to the commissioner and the speaker of the council.

(5) No later than [July 1, 2006]June 1, 2007, the chairperson(s) of such committee shall submit a report containing [its]the committee's final recommendations regarding the watershed protection plan prepared pursuant to subdivision a of this section to the commissioner and the speaker of the council.

§2. This local law shall take effect immediately.

PCW 6/7/06
LS #1173

Appendix D

LIST OF EXPERT PANELS CONVENED BY THE ADVISORY COMMITTEE

To help advise their recommendations, the Advisory Committee requested that a number of agency representatives and scientists who have conducted research concerning Jamaica Bay or have expertise in certain key areas address the committee. Below please find a list of speakers and the general topics they were asked to address.

November 14, 2006 Panel

Discussion Topic: "Alternative treatment plant disinfection and nitrogen reduction methods"

Panelists:

- Chris Villari, Executive Project Manager, Water Quality Development, New York City Department of Environmental Protection
- Morton Orentlicher, ThermoEnergy Corporation
- Bo Bodniewicz, Project Manager, Metcalf & Eddy

May 15, 2006 Panel

Discussion Topic: "What is the water quality like in Jamaica Bay and how can it be improved?"

Panelists:

- Robert Wilson, Ph.D., Stony Brook University
- Mark Ringenary, Water Quality Specialist, Division of Natural Resources, Gateway NRA
- Martin P. Schriebman, Ph.D., Founding Director of the Aquatic Research and Environmental Assessment Center, Brooklyn College
- Anne McElroy, Ph.D., Stony Brook University

April 26, 2006 Panel

Discussion Topic: "What measures can we take to reverse wetlands loss in Jamaica Bay and restore wetlands?"

Panelists:

- Alex Kolker, Ph.D., Stony Brook University
- Charles Roman, Research Coordinator for the National Park Service, North Atlantic Coast Cooperative Ecosystem Studies Unit
- Steve Zahn, Marine Resources Program Manager, New York State Department of Environmental Conservation, Region 2

March 22, 2006 Panel

Discussion Topic: "How could we adopt more green infrastructure and other stormwater best management practices into the Jamaica Bay watershed?"

Panelists:

- Paul Mankiewicz, Ph.D., Executive Director, The Gaia Institute
- Neil Weinstein, Executive Director, Low Impact Development Center

Appendix E

Jamaica Bay Watershed

20% of the Watershed exists in Nassau County

Queens

Brooklyn

Jamaica

26 Ward

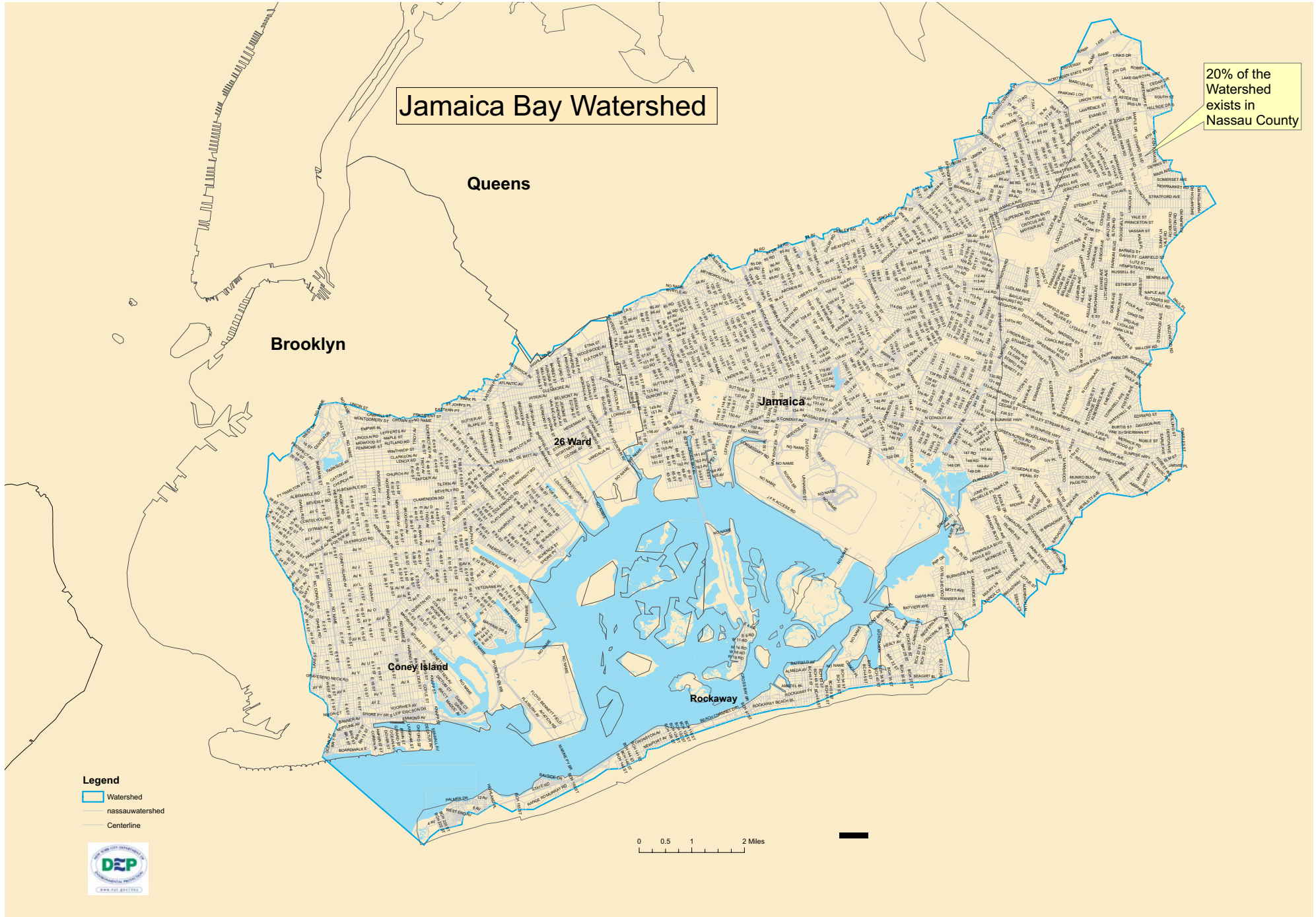
Coney Island

Rockaway

- Legend**
- Watershed
 - nassauwatershed
 - Centerline



0 0.5 1 2 Miles



Jamaica Bay Watershed / Sewershed Congressional Districts

20% of the Watershed exists in Nassau County

Queens

Brooklyn

Flows to Owls Head

Jamaica

26 Ward

Coney Island

Rockaway

Queens Congressional Districts

- 5. Gary Ackerman
- 6. Gregory Meeks
- 8. Jerrold Nadler
- 9. Anthony Weiner

Brooklyn Congressional Districts

- 10. Edolphus Towns
- 11. Major Owens
- 12. Nydia Velazquez
- 13. Vito Fossella

Legend

- Water Treatment Plant
- Watershed
- Sewershed
- Congressional District



0 0.5 1 2 Miles



Appendix F

JAMAICA BAY RESIDENCE TIME

As applied to Jamaica Bay, residence time, together with flushing rate and retention time, are concepts that are complex and extremely variable depending upon the techniques and assumptions used in their calculations. They will also vary considerably based on location within the bay, depth (surface or bottom) and the material being transported. Bay-wide estimates of residence time will be longer than that of a small subset of the bay, or those looking only at surface waters.

There have been many estimates of flushing times for Jamaica Bay, beginning with the National Academy of Sciences' calculation in the early 1970s of a "retention time of about 35 days" for the entire bay (National Academy of Sciences, 1971). More recently, using dye studies, the flushing time for surface waters at Grassy Bay was estimated to be on the order of only a week (Houghton, Gordon and Huber, 2000).

In addition, using a tidal prism technique and assuming that all the tidal prism water is replaced each tidal cycle, the residence time is 1.4 days; if only 25 percent of the water is replaced, the residence time increases to 5-7 days (Beck et al., in press; Wilson, personal communication).

An alternative technique is the freshwater fraction method (Fischer et al 1979). This method requires detailed salinity data for the basin and a knowledge of the freshwater inflow; it provides an estimate of the time required for the freshwater discharge to completely replace the fresh water within the basin. The freshwater fraction method gives a flushing time varying from 11 days to 30 days depending on the amount of fresh water assumed to enter the bay (Beck et al., in press; Wilson, personal communication).

In sum, while there is considerable variability in residence time estimates, it is clear that many locations within the bay are prone to retain pollutants for long periods of time, while pollutants can be removed from other locations rather rapidly.

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Appendix G

**LOCAL LAWS
OF
THE CITY OF NEW YORK
FOR THE YEAR 2005**

No. 83

Introduced by Council Members Gennaro, Addabbo Jr., Avella, Comrie, Fidler, Gerson, Gonzalez, Jennings, Koppell, Lopez, Martinez, McMahon, Palma, Quinn, Recchia, Sanders, Weprin, Reyna, Monserrate, Lanza, Vallone Jr., Brewer, Yassky, Gentile, Liu, Jackson, Gallagher, DeBlasio, Arroyo and the Public Advocate (Ms. Gotbaum).

A LOCAL LAW

To create a temporary task force to study the feasibility of transferring city-owned wetlands to the jurisdiction of the department of parks and recreation.

Be it enacted by the Council as follows:

Section 1. Legislative findings and intent. Wetlands are among the most productive ecosystems in the world. For example, wetlands such as intertidal or salt marshes are comparable in ecological productivity to rainforests. An immense variety of species of microbes, plants, insects, amphibians, reptiles, birds, fish and mammals can be part of a wetland ecosystem. Physical and chemical features such as climate, landscape shape, geology and the movement and abundance of water help to determine the plants and animals that inhabit a wetland. Wetlands provide values that no other ecosystem can, including natural water quality improvement, flood protection, shoreline erosion control and opportunities for recreation and aesthetic appreciation. In the City of New York, there are approximately fourteen square miles of wetlands still in existence, where more than 100 square miles once existed. Despite urbanization, 778 native plants and animals still exist in the City, accounting for sixty percent of the species that existed 100 years ago.

A number of inventories regarding wetland areas in New York City already exist, such as those included in recommendations of the Habitat Working Group of the Harbor Estuary Program; recommendations of "An Islanded Nature", the latest report on expanding the Harbor Herons Urban Nature Refuge concept; the recommendations of the Needs and Opportunities Report to the Army Corp of Engineers on environmental restoration of the harbor estuary; and, the recommendations of the Regional Plan Association. In addition, there may be other inventories in existence that are not included in the above-mentioned list.

An outstanding example of wetlands with ecological, water quality improvement, and recreational and aesthetic significance is those found in or near Jamaica Bay. This bill would create a task force to inventory City-owned wetlands in the City of New York

and ascertain the feasibility of transferring these properties to be under the protection of the Department of Parks and Recreation.

The City Council finds that City-owned wetlands, for which a transfer to the Department of Parks and Recreation is feasible, should be transferred in an expeditious manner in order to protect and maintain their environmental, economic and other benefits to New York City.

§2. a. There is hereby established a temporary task force to advise the mayor of the city of New York and the speaker of the council of the city of New York as to the technical, legal, environmental and economical feasibility of a transfer of city-owned wetland areas, including, but not limited to, those listed in existing inventories, to the department of parks and recreation.

b. Such task force shall be comprised of seven members, three of whom shall be appointed by the speaker of the council and four by the mayor. The members shall be appointed within sixty days of the enactment of this local law and shall serve without compensation. The chairperson shall be elected from amongst the members. Any vacancy shall be filled in the same manner as the original appointment for the remainder of the unexpired term. The commissioners of environmental protection and parks and recreation may provide staff to assist the task force.

c. Such members of the task force shall serve for a period of nine months, after which time such task force shall cease to exist.

d. No later than three months before the expiration of the task force, the chairperson shall submit a report containing its conclusions and recommendations to the mayor of the city of New York and the speaker of the council of the city of New York.

e. No later than six months after the submission of the report pursuant to subdivision d of this section, the mayor of the city of New York, or his or her designee, shall submit a report to the speaker of the council of the city of New York, which shall include, of those city-owned wetland areas that the task force deemed feasible for transfer to the department of parks and recreation:

1. the wetland areas that were transferred to such department, including the dates upon which such transfers occurred;

2. the wetland areas that are in the process of being transferred to such department or for which a determination to transfer has been made but for which the process to transfer has not yet begun, including the status of and anticipated dates for such transfers; and

3. the wetland areas that were not transferred and are not in the process of being transferred to such department, including an explanation as to why such action was not or will not be taken.

§3. This local law shall take effect immediately upon its enactment.

THE CITY OF NEW YORK, OFFICE OF THE CITY CLERK, s.s.:

I hereby certify that the foregoing is a true copy of a local law of the City of New York, passed by the Council on August 17, 2005, and approved by the Mayor on August 31, 2005.

VICTOR L. ROBLES, City Clerk of the Council

CERTIFICATION PURSUANT TO MUNICIPAL HOME RULE LAW §27

Pursuant to the provisions of Municipal Home Rule Law §27, I hereby certify that the enclosed Local Law (Local Law 83 of 2005, Council Int. No. 566-A) contains the correct text and:

Received the following vote at the meeting of the New York City Council on August 17, 2005: 47 for, 0 against, 0 not voting.

Was signed by the Mayor on August 31, 2005.

Was returned to the City Clerk on September 1, 2005.

JEFFREY D. FRIEDLANDER, Acting Corporation Counsel