



NEW YORK CITY WETLANDS: REGULATORY GAPS AND OTHER THREATS JANUARY 2009

A GREENER, GREATER NEW YORK



The City of New York
Mayor Michael R. Bloomberg

NEW YORK CITY WETLANDS: REGULATORY GAPS AND OTHER THREATS

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Summary

Wetlands are an important component of the City's vision for a greener, greater future set out in PlaNYC. Wetlands help improve water quality and control floods by trapping pollutants, capturing stormwater runoff, sequestering carbon dioxide, moderating storm surges, providing habitat for local and migratory birds, fish and other wildlife, and creating a unique opportunity for New Yorkers to observe wildlife and to undertake other quiet, contemplative recreation. For those reasons, the City owns and manages thousands of acres of wetlands as open space, and the National Park Service controls extensive tracts of wetlands in and around Jamaica Bay and Staten Island. Other wetlands within the city are protected by Federal and New York State regulations, but the scope and vigor of those protections is uncertain.

One initiative in PlaNYC's water quality chapter seeks to address this uncertainty by assessing existing gaps in wetlands protections and exploring options for filling those gaps. This white paper – written by an interagency group and in consultation with outside experts and advocates – fulfills that initiative. It has several key findings:

1. In general, existing Federal and State protections protect New York City's tidal wetlands and its large freshwater wetlands from threats related to land use and development.
2. Freshwater wetlands smaller than 12.4 acres are not protected by State law and are vulnerable to determinations that they are outside of the scope of Federal protection. The extent of these smaller wetlands in New York City is not fully known. Moreover, the ecological functions of wetlands vary widely and it is necessary to prioritize their protection and restoration. As a result, this paper finds that detailed, lot-level mapping of small wetlands is a critical next step; such mapping using satellite imagery and aerial photography is scheduled to start in 2009.
3. Upland buffer areas around tidal wetlands are protected by State law, but the extent of such remaining areas in New York City is unclear. Since our shoreline has been developed over the past several centuries, many tidal wetlands that would naturally retreat inland in response to sea level rise will be closed off from such migration. The mapping effort and related climate change adaptation planning that will be completed in 2009 will help identify areas where natural expansion is likely and possible.
4. Upland buffer areas of freshwater wetlands are protected by State law, but subject to the 12.4 acre and mapping jurisdictional limitations applicable to the underlying wetlands.
5. The remaining threats to tidal and large freshwater wetlands are not due to a lack of regulatory protection, but rather to the way that Federal and State permit and mitigation requirements are enforced in practice, the existing polluted or degraded condition of wetlands, and the effects of climate change. These challenges will require significant resources to reverse and, therefore, require new and creative funding mechanisms.

The City has addressed or is addressing other aspects of wetlands protection through other planning processes, reports, and policies. The Wetlands Transfer Task Force (WTTF) issued a report in October 2007, pursuant to Local Law 83, recommending the transfer of 82 City-owned wetlands properties to the Department of Parks and Recreation (Parks Department), including Arlington Marsh, and the study of an additional 111 properties for transfer. Until the work is complete, the City has placed a hold so that no City-owned wetlands properties can be transferred without the knowledge of the Parks Department. The Department of Environmental Protection (DEP) issued a comprehensive report for the protection of Jamaica Bay in October 2007, with an update in October 2008. The City published a Sustainable Stormwater Management Plan in December 2008 to reduce sources of point and non-point pollution. And the City is undertaking a comprehensive planning effort to adapt wetlands and other critical infrastructure to sea level rise and other effects of climate change, with a final report scheduled for publication in December 2009. In addition, DEP has an active Bluebelt program for the acquisition and maintenance of wetlands to control stormwater pollution, the Parks Department and DEP are overseeing numerous restoration efforts, and the Office of Environmental Coordination is revising the City Environmental Quality Review (CEQR) Technical Manual for identifying and mitigating project-specific environmental impacts.

All of these efforts have provided the City with an understanding of the challenges facing remaining local wetlands. New York City has only 1% of its historic freshwater wetlands and 10% of its historic tidal wetlands. These remaining wetlands are concentrated in Brooklyn (principally tidal wetlands around Jamaica Bay), Queens (principally tidal), and Staten Island (both tidal and freshwater). Although occupying relatively small land areas compared to their historic range, these wetlands continue to provide important benefits to the city. Wetlands provide natural flood control by temporarily holding and absorbing flood water, moderate coastal storm surge, help control erosion and stabilize shoreline, provide critical fish and wildlife habitat, and provide opportunities for recreation and education. The critical role that wetlands play in the Staten Island Bluebelt system demonstrates the ability of wetlands to improve water quality by removing nutrients, waste, and sediment from stormwater runoff.

Wetlands in New York City have been protected through a combination of Federal and state laws. Recent changes in Federal law, however, have had a cascading effect that has weakened the matrix of regulations that protects the nation's remaining wetlands, which may affect wetlands in New York City. These conditions include the following:

- Recent Supreme Court decisions have limited the reach of the Clean Water Act over “isolated” freshwater wetlands, and while December 2008 agency guidance interpreting those decisions has seemingly avoided the most extreme interpretation of these decisions, the implementation of the guidance will be uncertain for the near future as jurisdictional determinations are made in the field.
- Federal regulations do not extend to transition or buffer areas adjacent to freshwater or tidal wetlands.
- State regulations do not apply to freshwater wetlands of less than 12.4 acres (5 hectares) and do not apply to unmapped wetlands. The applicable regulatory maps are widely recognized to be imprecise and outdated (most are over 30 years old), but the extent of development in New York City has led at least one major environmental organization to conclude that there may not be any unmapped wetlands remaining in Staten Island.
- Federal and State permits and mandatory conditions for mitigation and restoration have been unevenly enforced in the past.

Table 1: Relative Strength of Regulatory Protections

LEVEL	FRESHWATER > 12.4 ACRES		FRESHWATER < 12.4 ACRES		TIDAL WETLANDS		SUBMERGED LANDS
	WETLANDS	UPLANDS	WETLANDS	UPLANDS	WETLANDS	UPLANDS	
Federal	●		●		●		●
State	●	●			●	●	●
Local	○		○		○	○	

● Strong ● Medium ○ Weak

- Local oversight through relevant city laws – the CEQR process, the New Waterfront Revitalization Program, and the Uniform Land Use Review Procedure – does not apply to all development activities that might affect wetlands and are multifaceted programs that are not exclusively or even principally directed towards wetlands protection.

In addition, submerged lands policy will be more important as sea levels rise in response to climate change. While open waters are subject to extensive State and Federal regulatory protections, the City lacks a comprehensive submerged lands management policy.

Taken together, these factors create legal gaps in the regimes that protect wetlands in New York City (Table 1), which may translate to actual threats depending on the extent and position of existing wetlands. These jurisdictional gaps are more pronounced for freshwater than tidal wetlands. Moreover, in New York City, most freshwater wetlands that remain are less than 12.4 acres in size, leaving them potentially unprotected by New York State regulations. The upland areas around both freshwater and tidal wetlands are also affected by a number of gaps, particularly the lack of Federal protection, but also by limitations to how those areas are protected under State and local law.

Jurisdictional gaps could have important effects if new development directly displaces wetlands or adjacent areas that could otherwise be protected. The existence of gaps has led to repeated calls for a comprehensive city wetland policy. The policy options available to New York City, as with other municipalities in the State, include:

- Requesting that the State designate any remaining wetlands below 12.4 acres to be of “unusual local importance” and thus within State protection;
- Conducting a thorough study of the hydrological and ecological connection between wetlands and waters that are clearly covered by the Clean Water Act, to bring those areas more clearly within the jurisdiction of Federal regulators;
- Imposing zoning overlay districts on private wetlands or buffer areas or both, and possibly extending that protection to near shore and other underwater lands;
- Creating a local wetland regulatory permitting scheme that would protect smaller freshwater wetlands below 12.4 acres or buffer areas or both;
- Allocating more resources to the restoration or management of City-owned wetlands; or
- Acquiring more privately-owned wetlands.

Any policy discussion must take into account whether there are a significant number and acreage of unprotected wetlands that would justify a program, the costs and benefits of protecting otherwise vulnerable wetlands from development and fill, and the opportunity costs of spending finite municipal resources on one policy when another might be more cost-effective. Moreover, any restriction on land use has to be weighed against the need for housing, education, municipal services, parks, and other public needs that require land.

At this point, however, it is not possible to quantify the scale of the threats posed by jurisdictional gaps because the available mapping inventory of wetlands is based on outdated and incomplete information. For example, this white paper finds that the largest regulatory gap applies to freshwater wetlands, but that at least one study by an environmental group compared existing data sets and suggested that there are few remaining unprotected wetlands in Staten Island or elsewhere in the city to be protected. (Witt et al. 2005) If that is the case, then City resources are better spent on restoring and maintaining publicly-owned wetlands rather than developing and implementing a regulatory regime that might have very little impact.

The City cannot draw final conclusions about the costs and benefits of different approaches for filling these gaps and until it develops better maps that will provide a more precise understanding of the scale and size of remaining unprotected wetlands. (Table 2)

Because comprehensive maps are an essential precursor to any new, local wetlands policy meant to fill regulatory gaps and will also aid in restoration and other wetlands management efforts, the City is obtaining satellite and aerial images in April and August 2009, when leaf and vegetation cover are optimal for delineation. Likely wetlands locations will be field verified and delineated so that the City will have detailed, digital maps.

Filling jurisdictional gaps would not address threats that are unrelated to direct displacement and fill. These other challenges include historic upland development of buffer areas that has disrupted natural hydrology, point and non-point pollution that discharges sediment and other pollution, contaminated soils that leach chemicals, sea level rise that drowns wetlands, and hardened shorelines that prevent the migration of tidal wetlands. Indeed, the most acute threat to wetlands in New York City is the rapid loss of tidal marshes in Jamaica Bay from forces other than current dredging and filling activities; there is no one known cause of that loss but there is a widely-perceived need for additional and immediate restoration efforts.

Accordingly, while awaiting the results of data collection necessary to make certain policy decisions, the City will continue related work to address sea-level rise, non-point source pollution, and other threats to wetlands, including:

- Implementing the recommendations of the Wetlands Transfer Task Force to protect the most important City-owned wetlands that are not currently managed by the Parks Department and to evaluate other transfers;
- Implementing the comprehensive Jamaica Bay Watershed Protection Plan for the restoration of tidal marshes and other aspects of the Jamaica Bay ecosystem, depending on substantial funding and coordination from many federal, state, and local agencies and other stakeholders;

Table 2: Summary of Threats, Uncertainties, and Next Steps

AREA	THREATS	UNCERTAINTIES	NEXT STEPS
Freshwater wetlands and related upland areas	• Gaps in regulatory protection exist for smaller freshwater wetlands and leave an unknown number of wetlands at risk • Non-point source pollution • Funding for restoration and maintenance	• The number and extent of vulnerable freshwater wetlands • Funding to meet restoration and maintenance needs of existing inventory under City control	• Infrared satellite and other aerial images to be taken in April 2009 • Mapping of wetlands vegetation areas to be completed by December 2009 • Complementary mapping efforts for impermeable areas to be completed by December 2009 • Explore innovative funding mechanisms, including mitigation banking, and coordinate plans with Federal, State, and private entities
Tidal wetlands and related upland areas	• Sea level rise creates the need for inland wetlands migration and policies for submerged land • Non-point source pollution • Funding for restoration and maintenance, especially in Jamaica Bay	• The number and extent of vulnerable tidal wetlands and adjacent floodplains • Funding to meet restoration and maintenance needs of existing inventory under City control	• Infrared satellite and other aerial images to be taken in April 2009 • Mapping of wetlands vegetation areas to be completed by early 2010 • Other relevant climate change adaptation information to be completed by December 2009, including floodplain maps, inventories of at-risk wetlands and flood areas, and adaptation plans • Explore innovative funding mechanisms, including mitigation banking, and coordinate plans with Federal, State, and private entities

- Implementing the Sustainable Stormwater Management Plan to reduce point and non-point source water pollution;
- Exploring cooperative approaches for resource management and citizen stewardship;
- Exploring alternative funding, mitigation banking and other mechanisms for improved restoration and maintenance of wetlands;
- Completing a comprehensive plan for the adaptation of wetlands and other critical infrastructure to sea level rise and other effects of climate change;
- Acquiring additional Bluebelt properties; and
- Revising the CEQR Technical Manual.

Context

Wetlands Functions

Swamps, marshes, bogs, and similar areas are known collectively as wetlands. The common feature of these areas is saturation or flooding by surface or ground waters for varying periods during the year. Federal and state wetland classification systems recognize two main types of wetlands, tidal and freshwater (non-tidal) wetlands. Within these broad policy categories there are many unique ecological systems. Tidal wetlands include estuarine intertidal flats (mudflats, sand bars, and beaches), estuarine emergent wetlands (vegetated flats), low salt marshes that are flooded on a daily basis, and high salt marshes in intermittently flooded tidelands. Freshwater wetlands include emergent, scrub-shrub and forested wetlands, freshwater marshes, wet meadows, vernal pools and seasonally inundated floodplains. Shallow open waters such as near shore, submerged areas or ponds provide similar ecological functions as wetlands, but those areas are often regulated under separate laws.

Wetlands are among the most biologically productive ecosystems in the world, supporting more plants and animals and producing more organic material than adjacent aquatic or upland areas. (United States Geological Survey (USGS) 2008) The productivity of wetlands is often compared to tropical rainforests and coral reefs. (Environmental Protection Agency (EPA) 2006) Some types of wetlands rival the best cultivated lands in biomass production and produce more than 10 tons of organic matter per acre. (Tiner 2000) This vegetation provides important habitat for fish and wildlife and forms the base of a rich food pyramid. (Tiner 2000) More than two-thirds of shellfish, fish, and crustaceans harvested commercially and recreationally in New York State depend on tidal wetlands during part of their life cycle; nationally, more than one-third of threatened and endangered species depend on wetlands for some part of their life cycle. (EPA 2006)

Scientists and policy-makers speak of wetland “functions” or “ecosystem services” (flood storage, erosion control, pollution and sediment filtration, groundwater recharge, storm surge protection and habitat for numerous bird and fish species) and wetland “values” (the economic and social benefits derived from wetland functions, including food, timber, improved water quality, and recreation.) Wetlands’ essential characteristics include their unique position at the interface of terrestrial and aquatic ecosystems, stands of vegetation that can survive in flooded conditions, and shallow, multi-channeled, bodies of water that are protected from high waves and wind. Wetlands improve water quality by trapping sediments, nutrients and other pollutants, storing flood waters, buffering the effect of storm surges, providing a nursery to replenish fish stocks, and providing habitat for plants, wildlife, and fish. For example, an acre of wetlands can store 1 to 1.5 million gallons of floodwater. (EPA 2001a) Wetlands also provide recreational opportunities and aesthetic enjoyment and these open spaces are highly valued in our dense urban area. The City’s Bluebelt system on Staten Island explicitly recognizes the benefits of these functions by using wetlands, streams and ponds to store and filter stormwater, thereby avoiding the expense of constructing storm sewers and avoiding downstream erosion.

Trends in Wetland Coverage

Since the time of European colonization, the continental United States has lost half of its original 221 million acres of wetlands. Estimates of losses of wetlands in New York State since colonial times range from 50% to 60%. (Dahl 1990; EPA 2001b) Although wetlands losses have slowed dramatically since the 1970s, approximately 290,000 acres of wetlands are lost nationally per year. (Dahl 2000) The loss of wetlands can have a drastic effect. The impacts to New Orleans and other communities along the Gulf Coast from Hurricane Katrina were due in large part to development decisions – and attendant regulatory decisions – that reduced wetlands and the natural protections from storm surge that they provide. (Travis 2005)

Wetland loss in New York City has been similarly dramatic. The construction of bulkheads, pierheads, and hardened shorelines, and the dredging of channels, has significantly altered tidal wetlands, shoreline, subsurface and aquatic habitats, and hydrology. Now, the city's high marsh areas and accessible low marshes are either completely filled or confined to narrow strips in the landscape, and the upland edges have been filled and hardened for urban development. (Hartig et al. 2001; Hartig et al. 2002) Island marshes in Jamaica Bay have not been developed to the same extent, but are disappearing for other reasons, including sea level rise. One study of Jamaica Bay estimates that 1,174 acres were lost from 1900 to 1974 due to filling for development, airports and landfills, or approximately 16 acres per year. Even after filling activities were highly regulated and Gateway National Recreational Area provided additional protections in Jamaica Bay, from 1974 to 1994 approximately 400 acres were lost due to erosion, sea level rise or other non-development causes, an average rate of 20 acres per year. (Hartig et al. 2001) For the Hudson-Raritan Estuary as a whole, including New York City, only 14 square miles of coastal wetlands remain from the original 86 to 100 square miles, a loss of 83% to 86%. (RPA 2002; Figure 1)

Freshwater wetlands have been filled to an even greater extent for residential, commercial, industrial, and transportation development. Only an estimated 2,000 of 224,000 acres of freshwater wetland that once existed in New York City remain, a loss of over 99% (Figure 1).

The effects of past development cannot be undone, and even if they could that may not be socially desirable. Nevertheless, it is important to protect, as much as possible, the city's remaining wetlands. These are either fragmented freshwater wetlands, predominantly on Staten Island and in parts of Queens, or intertidal low marsh areas, coastal shoals, bars, flats, and the littoral zone, predominantly in Jamaica Bay, Staten Island, and the north shore of Queens. (Hartig et al. 2002) Development and fill are not the only, or the most important, threat to these wetlands. New York City's legacy of fill for past development and contaminated soils, present stormwater runoff from adjacent developed areas and future rising sea levels due to climate change, all present challenges to wetlands with respect to ecological function, habitat value, flood control, and stormwater attenuation.

Despite these historic losses due to development and emerging threats from other purposes, the remnant wetlands in New York City are still significant natural resources. The New York City Park System includes more than 10,000 acres of undeveloped forest, tidal and freshwater wetlands, and meadows. In addition, Jamaica Bay is one of the largest coastal ecosystems in New York State. It is an estuary with diverse habitats including open water, coastal shoals, bars, and mudflats, low and high marshes, and upland areas. (Hartig et al. 2002) Originally a sanctuary protected by the New York City Department of Parks and Recreation, since 1972 a large portion of Jamaica Bay has been part of the National Park Service's Gateway National Recreation Area, including the uplands, wetlands and waters south of the Belt Parkway in Brooklyn and Queens, and most of the island marshes. Other shoreline marshes in Jamaica Bay are located outside the refuge boundaries. Jamaica Bay is home to more than 300 species of birds, provides crucial habitat and feeding grounds for shorebirds and overwintering waterfowl, and is a vital link along the Eastern flyway used by migratory birds.

Figure 1: Historic Wetlands Loss



Additionally, the Arthur Kill watershed contains some of the most productive wetland habitats in New York City, with the Arlington Marsh complex on Staten Island alone supporting approximately fifty species of water birds. (Blanchard and Kerlinger 2001)

A number of government programs have recognized the importance of the City's wetlands as a wildlife habitat. The U.S. Fish and Wildlife Service (FWS) and EPA Harbor Estuary Program (HEP), Priority Acquisition and Restoration Lists, have identified Jamaica Bay and Breezy Point, the Arthur Kill Complex, the Narrows and the Lower Hudson River Estuary as Significant Habitat Complexes. (FWS 1997; HEP) The New York State Department of State (DOS) and Department of Environmental Conservation (DEC) have identified Lemon Creek, Fresh Kills, Pralls Island, Chelsea Marsh, Goethals Bridge Pond, Shooters Island, the Lower Hudson Reach, North and South Brother Islands, Pelham Bay Park Wetlands, Alley Pond Park, Meadow and Willow Lake, Jamaica Bay and Breezy Point as significant habitats. (DOS 1992) And the National Audubon Society has identified North and South Brother Islands, Pelham Bay Park, Van Cortland Park, Central Park, Prospect Park, the Jamaica Bay Complex, and the Harbor Herons Complex as critical habitat and Important Bird Areas. (Wells 1998)

Overview of Existing Regulations

New York City wetlands are governed by a mix of federal, state and local regulatory programs. These overlapping jurisdictions create multiple levels of protection that apply to many of the city's wetlands.

Federal Law

The principal Federal law governing wetlands is comprised of the 1972 amendments to earlier statutes that are collectively known as the Federal Water Pollution Control Act (commonly referred to as the Clean Water Act (CWA)). The purpose of the CWA is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." (CWA, 33 U.S.C. § 1251(a)) The CWA prohibits the unauthorized discharge of pollutants into navigable waters. The CWA does not distinguish between tidal and freshwater wetlands.

The relevant CWA programs include:

- Section 402, which regulates the discharge of pollutants to waters of the United States from pipes and other point sources, and contains an absolute prohibition on those discharges except as expressly allowed by a permit that limits effluent levels. The EPA has delegated authority to nearly every state to administer this program.
- Section 404, which contains the "dredge and fill" program administered by the Corps under the oversight of EPA. The CWA prohibits the placement of fill into or the excavation or dredging of material into "waters of the United States" without a Corps permit. Certain wetlands have been considered "waters of the United States" and thus within the permit requirement. Only Michigan and New Jersey have fully delegated Section 404 programs.

Wetlands permits are often jointly issued under the authority of Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899, which requires Corps permits for certain discharges or other potential obstructions in navigable waters of the United States. Since tidal wetlands in New York City are adjacent to navigable waters, this older act is a separate, independent basis for Federal regulation of those wetlands.

Other relevant Federal laws include the National Environmental Policy Act (NEPA), which requires an assessment of the environmental impact of all permits and other major Federal actions, and the Coastal Zone Management Act (CZMA), which requires state coastal management plans and provides

for state review of Federal actions to ensure consistency with those plans. As explained below, CZMA authority has been delegated in part from New York State to New York City, giving the city some degree of control over Federal permits.

State Law

Protection of wetlands can be traced to the New York State Constitution, which states

The policy of the state shall be to conserve and protect its natural resources and scenic beauty The legislature, in implementing this policy, shall include adequate provision for the abatement of air and water pollution ..., the protection of agricultural lands, wetlands and shorelines, and the development and regulation of water resources. (N.Y. Const. Art. XIV, § 4)

New York State has adopted separate statutory regimes for the protection of tidal and freshwater wetlands. Those statutes potentially regulate more area than Federal law because they extend protections to buffer areas that are adjacent to wetlands. However, the statutes require that the New York State Department of Environmental Coordination (DEC) identify and map individual wetlands before they can be regulated.

The Tidal Wetlands Act of 1973 is codified in Article 25 of the New York Environmental Conservation Law (ECL) and is implemented through DEC regulations promulgated at 6 NYCRR Part 661. There is no acreage threshold for jurisdiction under the Tidal Wetlands Act, meaning that all tidal wetlands are regulated regardless of size. The Tidal Wetlands Act also regulates adjacent areas up to 300 feet upland of the wetland boundary except in New York City, where the buffer area is limited to 150 feet. Tidal wetlands maps are inventoried and maintained in DEC Regional Offices. In reality, the extent of tidal wetlands is subject to frequent change because the coast is such a dynamic ecosystem.

The Freshwater Wetlands Act of 1975 (FWA) is codified in ECL Article 24 and is implemented through DEC regulations promulgated at 6 NYCRR Parts 662-665. Freshwater wetlands must be 12.4 acres (5 hectares) or greater to be regulated under the Freshwater Wetlands Act. (ECL § 24-0301) In individual cases DEC staff have attempted to prove that smaller wetlands are hydrologically connected through surface waters and thus can be aggregated to exceed the 12.4 acre threshold; those efforts depend on clear proof and the vagaries of enforcement and judicial review. The only explicit exception to the acreage threshold is for smaller wetlands that the DEC designates as having “unusual local importance” under the procedures and substantive standards set forth at 6 NYCRR Part 664. Localities and citizens can petition the DEC to designate individual freshwater wetlands. Article 24 of the Freshwater Wetlands Act also regulates 100 foot buffer areas adjacent to regulated freshwater wetlands. Freshwater wetlands regulated by Article 24 are assigned a number and are depicted on regulatory maps that are available through DEC as well as county and municipal clerks’ offices, county Soil Water Conservation Districts, and county health offices. The FWA requires DEC to rank wetlands in one of four classes ranging from Class I, which represents the greatest benefits, to Class IV. The permit requirements are more stringent for a Class I wetland than for a Class IV wetland. Because of this, wetland classifications are important and are subject to public comment during the map hearing process.

Although DEC does not have jurisdiction over unmapped wetlands under the letter of the law, as a practical matter some unmapped wetlands may be subject to DEC regulatory review. That phenomenon is due to the rather large margin of error in the jurisdictional line on the regulatory maps, a result of the small-scale photographs on which they are based. Before the DEC maps a wetland or amends a wetlands map, affected landowners and the general public receive notice and an opportunity to submit comments to DEC. As with other DEC decisions related to wetlands, landowners and other affected parties may challenge mapping decisions before the Freshwater Wetland Appeals Board and may continue their challenges in appeals through the court system.

In addition, the DEC has permitting control over all fill activities and other alternations that affect open waters under its Part 608 (Use and Protection of Waters) regulations. These regulations implement Article 15 of the Environmental Conservation Law, which protects the beds, banks and areas within 50 feet of waterbodies.

DEC permits and other actions that affect wetlands are also governed by the State's "baby NEPA" law, the State Environmental Quality Review Act (SEQRA), ECL § 8-0101 to -0117, 6 NYCRR Part 617, which requires an assessment of potential impacts and the avoidance or mitigation of any impacts.

New York also administers delegated Federal programs. New York, like 47 other states, has not assumed Clean Water Act Section 404 authority over wetlands. However, New York has assumed Clean Water Act Section 401 authority to issue water quality certificates to ensure that wetlands fill permits issued by the Corps and other Federal permits are consistent with state law. Accordingly, the State's consistency certifications provide a check against the Federal government in a manner that is similar to the operation of the CZMA.

Local Law

Unlike other states that preempt local regulation, New York State's wetlands statutes explicitly recognize several alternatives for local regulation of wetlands. Accordingly, localities in New York State have several options for protecting wetlands. At present, New York City does not have a stand-alone wetlands protection statute or regulation. Rather, the City's wetland policies are outlined in the 2002 New Waterfront Revitalization Program (WRP), which implements the City's coastal planning obligations delegated by New York State under the CZMA, and the 2001 City Environmental Quality Review (CEQR) Manual, which implements the City's environmental review law.

The WRP designates "Special Natural Waterfront Areas" (SNWAs) as having "particular natural habitat features that should be considered in connection with any waterfront activity." Three SNWAs have been designated: the Northwest Staten Island Harbor Herons Area, Jamaica Bay, and East River Long Island Sound. In addition, the WRP recognizes "Ecological Complexes" that encompass both the waterfront and upland areas that hold a "variety of important resources" as well as Significant Coastal Fish and Wildlife Habitat. Two areas fall under the Ecological Complex category: the south shore of Staten Island and Riverdale in the Bronx. The WRP also includes ten policies used to guide management, protection, and use of the coastal zone. WRP Policy 4 explicitly calls for the City to prevent the net loss of wetlands in the city. Policy 4 also states that "public investment should not interfere" with the habitat functions within a particular wetland area and that "fragmentation or loss of habitat areas within the SNWAs should be avoided and could be the basis for a determination of inconsistency with the WRP." With particular focus on the SNWA, Policy 4 seeks to protect and restore the ecological quality of these habitats by avoiding activities that would contribute to "permanent adverse changes" and fragmentation of these areas. The policy states that these ecological complexes should be restored and protected and careful consideration should be given to indigenous plants, rare ecological communities, vulnerable species, and sites designated as Significant Coastal Fish and Wildlife Habitats.

Under CEQR review, an action of the City must be evaluated for its potential to affect freshwater wetlands, tidal wetlands, and associated buffer areas. The CEQR Manual, Chapter 3K, cross references Policy 4 of the WRP. CEQR also requires an alternatives analysis for proposed actions that are inconsistent with the policies of the WRP, as well as mitigation where necessary to assure consistency with the policies of the WRP. If impacts are unavoidable, economically feasible mitigation measures must be identified and proposed. In practice this evaluation is generally limited to Federal and state regulated wetlands and buffer areas. Wetland plant and animal species that are known to be threatened, rare, endangered, or otherwise sensitive or worthy of protection are also given individual consideration. However, there is wide discretion in how these evaluations are treated and how vulnerable species are protected.

Wetlands Transfer Task Force

There are also non-regulatory protections in place for City-owned wetlands. The Administration continues to look for opportunities to expand its holdings of protected areas, within budgetary and management constraints. The DEP is continually adding to its acquisition of Bluebelt wetlands (and upstate properties in the drinking water supply watershed). And the Parks Department recently acquired South Brother Island, which includes significant wetlands and bird habitat.

Transfer of wetlands properties to the Parks Department has accelerated through the recent work of the Wetlands Transfer Task Force (WTF), which completed a working inventory of over 2,000 City-owned wetlands and ranked the 1,020 wetlands not under Parks Department management according to their resource value and potential for permanent protection. The WTF study was completed on October 1, 2007. The Task Force recommended 82 properties for transfer to Parks Department, primarily within the Edgemere Urban Renewal Area in Queens, but also located elsewhere in Queens, Staten Island and the Bronx. The City first had to complete standard due diligence to determine whether there are any site contamination, title defect or other issues that may create liability for the City. Each of the 82 parcels requires an individualized assessment.

As of March 2008, all of the recommended properties had been assessed by the Parks Department. As of August 2008, 3 properties had been transferred and the Department has initiated requests to transfer 34 additional properties. The remaining 45 parcels require further action, including boundary surveys, signing and securing property, removing existing debris, and performing other clean-up work at the sites, which are still currently managed by the Department of Citywide Administrative Services (DCAS), the New York City Economic Development Corporation, the New York City Department of Housing Preservation and Development, and other agencies. Of special note are the 3 properties at Arlington Marsh on Staten Island. The Administration remains eager to complete these partial transfers; however, as indicated in the recommendations of the Task Force, the project to expand the New York Container Terminal (NYCT) calls for related work to occur that will affect the adjacent properties. Apportioning the properties to allow their transfer in part to the Parks Department awaits a final determination of the area needed for the NYCT project and as well as likely mitigation requirements. The Parks Department has reservations about requesting transfer of 4 of the remaining properties and marked them for "Special Review."

The WTF recommended 111 parcels for special review for technical, legal or other issues such as lack of proximity to other City-owned parklands. Review of those parcels will be undertaken by the agency that is currently administering the parcel in question or, on a case by case basis, another agency that has a significant interest. A final determination about the disposal of these properties may be contingent on the outcome of ongoing discussions about wetlands policies in the city and mitigation opportunities. In some cases the WTF recommended splitting a lot with the upland portion being leased or sold for development and only the wetland portion being transferred to the Parks Department.

The WTF identified 168 small properties with wetlands in the DCAS portfolio that needed additional review to determine whether they should be protected by the Parks Department. The City has put a hold on the 168 lots for further wetlands study by the Parks Department. The holds were effective on October 1, 2007, the date of the Task Force report. Those properties will remain under DCAS control until the Parks Department requests transfer of the lot or relinquishes the hold through a written request.

Wetlands not yet transferred will be assessed for suitability in the future. All City-owned properties that may contain wetlands will be reviewed by the Parks Department before sale or transfer for a use other than open space. The Parks Department does have continuing concerns about the viability and cost of managing small, isolated, or otherwise compromised properties.

Regulatory Gaps

Despite the Federal and state regulatory programs, there are gaps to the protection of wetlands within the City's boundaries:

1. Federal regulatory protection has become less clear over wetlands that are not directly connected to surface waters. This casts doubt on Federal protection for many of the smaller freshwater wetlands that could be found to be isolated. Tidal wetlands and larger freshwater wetlands are not generally vulnerable to this limitation.
2. While State regulations would protect large freshwater wetlands whether or not they are protected by Federal statute, the State regulations do not apply to freshwater wetlands smaller than 12.4 acres or to any wetlands unless they are first mapped and specifically designated.
3. Those freshwater and tidal wetlands that are ostensibly protected by permits are still subject to filling and other activities that can result in a net loss of wetlands because the oversight of mitigation requirements, especially for decentralized on-site mitigation, has been uneven. This is not a regulatory gap per se but rather a management gap. However, this paper discusses the oversight and mitigation issues here because the problems are so well documented as to constitute a significant gap in the protection of wetlands in the Federal and State regulatory programs.

The effects of these regulatory and management gaps are exacerbated by perennial shortfalls in funding and staff in Federal and state permitting and enforcement offices, which force staff to prioritize their time and to focus on wetlands that are certain to be within their jurisdiction or that are of special importance.

Jurisdictional Gaps over Small Freshwater Wetlands

The most significant gaps in regulatory authority arise with freshwater wetlands. Historically, Federal and state laws overlapped in ways that left few of the city's wetlands unprotected. Recent changes in case law about the limitations of the waters that fall under CWA jurisdiction and legislative inaction in New York State in response to those rulings have left smaller freshwater wetlands unprotected.

Federal Gaps

The 1899 Rivers and Harbors Act regulates filling and other activities that have the potential to create hazardous obstructions to navigation and commerce. The 1948 Federal Water Pollution Control Act, a forerunner of the CWA, used the term "interstate waters" to define those waters that were within Federal protection. In 1961 Congress changed the term to "navigable waters" to broaden the law's coverage. The 1972 CWA further broadened the law by defining "navigable waters" as "waters of the United States, including the territorial seas." Waters not within the definition of "navigable waters"

are not protected by the CWA, although they may be subject to state or local regulation. The jurisdictional term “waters of the United States” has always been understood to include traditional navigable waters, i.e., waters that are, were, or could be used in interstate and foreign commerce, in the broadest sense of commerce in the Commerce Clause of the United States Constitution. Waters that cross state lines, whether or not used for commerce, are also clearly included within this term. Waters that ultimately drain into navigable waters present closer questions.

That means that wetlands adjacent to navigable or interstate waters are subject to Clean Water Act regulation. *United States v. Riverside Bayview Homes* (474 U.S. 121) (upholding the jurisdiction of the Corps as to “low-lying, marshy land” adjacent to a navigable lake). The Court noted that through the 1972 CWA “Congress evidently intended to repudiate limits that had been placed on Federal regulation by earlier water pollution control statutes and to exercise its powers ... to regulate at least some waters that would not be deemed ‘navigable’ under the classical understanding of that term.” The Court’s decision emphasized the ecological necessity of protecting nearby wetlands in order to protect the navigable waters with which they were connected.

In 2001, however, the U.S. Supreme Court began to limit the reach of the CWA. The Court revisited the issue of CWA jurisdiction in a case involving isolated ponds, some only seasonal, that were located entirely within one state. *Solid Waste Agency of Northern Cook County (SWANCC) v. United States Army Corps of Engineers* (531 U.S. 159). While acknowledging that the term “navigable waters” is not limited to traditionally navigable waters, the Court observed that some effect should be given to the term “navigable” and that its earlier ruling in *Riverside Bayview* had relied on the “significant nexus” between the wetlands and the navigable waters in that case. Since the Corps’ asserted CWA jurisdiction over isolated ponds solely because of their use by migratory birds, the Court rejected the agency’s authority because there was no “significant nexus” to navigable waters. To hold otherwise, the Court said, would infringe on the traditional powers of the states over water and land use.

The SWANCC decision threw the relatively settled state of Federal wetlands regulations into disarray, and Corps districts were left to make their own determinations of which wetlands were subject to Federal protection and which were not. The resulting confusion had a greater impact on states with no independent wetlands protections. Even in New York State, however, the decision exposed to development wetlands that are smaller than the FWA’s 12.4 acre limit of regulation. A 2004 GAO report determined that the Corps’ districts differ significantly in determining whether wetlands and waters are within Federal jurisdiction. (GAO 2004) For the two Corps Districts in New York State, for example, another 2004 report found that the New York District issued determinations of non-jurisdiction in approximately 25% of cases while the Buffalo District issued determinations of non-jurisdiction in approximately 50% cases. (Witt et al. 2005) Yet another report concluded that New York is among the top 15 states where the Corps has declined to exercise jurisdiction after the recent Supreme Court decisions. (Schaeffer and Himmelsbach 2005) Either wetlands in New York State have less of a “significant nexus” with navigable waters than in other states, or that the Buffalo and New York Corps Districts are interpreting judicial limitations in CWA jurisdiction more strictly than other Corps offices.

In 2006, the Supreme Court again addressed the extent to which wetlands are protected by the CWA in two consolidated cases, *Rapanos v. United States and Carabell v. United States* (547 U.S. 715) (*Rapanos*). In *Rapanos*, the wetlands to be filled had a surface water connection with non-navigable tributaries of traditional navigable waters. In *Carabell*, the wetlands at issue were separated by a berm from non-navigable tributaries of traditional navigable waters. A deeply divided court issued no majority opinion, but five judges formed a plurality that agreed to overturn the lower court decisions finding CWA jurisdiction and to send the cases back for reconsideration. Justice Kennedy, the fifth justice concurring in the judgment to remand the case to the lower courts, wrote a separate opinion

interpreting the CWA's jurisdiction, and his concurrence is now treated as the controlling opinion. The pivotal inquiry in Justice Kennedy's analysis was whether a "significant nexus" existed between the wetlands in question and traditional navigable waters. He said the significant nexus inquiry should focus on

whether the wetlands, either alone or in combination with similarly situated lands in the region, significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as "navigable". When, in contrast, wetlands' effects on water quality are speculative or insubstantial, they fall outside the zone fairly encompassed by the statutory term "navigable waters."

(126 S. Ct. at 2248-9)

In December 2008 the EPA and the Corps finalized joint guidance to describe how they will make CWA jurisdictional determinations in the wake of the *Rapanos* decision. (EPA 2008) The guidance relies on factors that at least five justices agreed would create CWA jurisdiction, and was a year and a half in the making.

Under the 2008 Guidance, the EPA and Corps will assert jurisdiction over the following waters:

- Traditional navigable waters;
- Wetlands adjacent to traditional navigable waters;
- Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months); and
- Wetlands that directly abut such tributaries.

The EPA and Corps will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with a traditional navigable waterbody:

- Non-navigable tributaries that are not relatively permanent;
- Wetlands adjacent to non-navigable tributaries that are not relatively permanent; and
- Wetlands adjacent to but that do not directly abut a relatively permanent nonnavigable tributary.

The agencies generally will not assert jurisdiction over swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow) or ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water. That position is unchanged from the general understanding that preceded the *Rapanos* decision.

The agencies' significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters. The 2008 Guidance states that a significant nexus includes consideration of hydrologic factors (the volume, duration, and frequency of flow, including consideration of certain physical characteristics of the tributary, proximity to the traditional navigable water, size of the watershed, average annual rainfall, and average annual winter snow pack) and ecologic factors (the potential of tributaries to carry pollutants and flood waters to traditional navigable waters, the provision of aquatic habitat that supports a traditional navigable water, the potential of wetlands to trap and filter pollutants or store flood waters, and the maintenance of water quality

in traditional navigable waters). In addition, the significant nexus test will consider the affects of “similarly situated” wetlands, i.e., where a tributary and its adjacent wetlands collectively have a significant nexus with traditional navigable waters, the tributary and all of its adjacent wetlands are jurisdictional.

It remains to be seen whether the joint 2008 Guidance will eliminate the uncertainties surrounding wetlands protections under the CWA that arose after the *SWANCC* decision (and to a lesser extent the *Rapanos* decision). In particular, the agencies have significant discretion to judge whether wetlands are “adjacent” to surface and open waters that become jurisdictional. The 2008 Guidance is less than clear about how this term should be interpreted; it includes a catch-all provision that wetlands must be “reasonably close” to jurisdictional water. The application of the 2008 Guidance by the local Corps and EPA offices will not be apparent for several years. Even if the “significant nexus” standard is applied liberally to cover many kinds of wetlands that could have been considered “isolated” following *SWANCC*, the case-by-case nature of agency jurisdictional decisions means that individual wetlands may still be unprotected from fill and development. And challengers to jurisdictional decisions may receive favorable hearings in lower courts, which will be able to draw upon the limiting language in *SWANCC* and *Rapanos*.

At the same time, the roadmap provided by the guidance for establishing a “significant nexus” between wetlands and jurisdictional waters provides an opportunity for proactive efforts to establish a scientific basis for that finding for all “similarly situated” wetlands on a watershed basis. That opportunity is discussed in more detail in the last section of this paper.

State Gaps

In New York State, the 1975 FWA restricts activities that may occur in mapped freshwater wetlands that are at least 12.4 acres in size or that have been determined to be of “unusual local importance.” Where applicable, the FWA also protects 100-foot wide adjacent areas that act as buffers. Certain activities, such as routine maintenance, ordinary agriculture, and most recreational hunting and fishing are exempt from regulation. (New York State also regulates tidal wetlands under a separate regulatory regime In Article 25 of the ECL; Federal regulation does not distinguish between freshwater and tidal wetlands.)

For the protections of the FWA to take effect, the DEC must first map the wetlands, provide notice to the owners of the affected wetlands, provide an opportunity for a public hearing on the accuracy of the maps, make appropriate changes to the maps, and file the maps with all local governments. The DEC maintains official regulatory maps of wetlands. Since wetlands grow and recede, DEC is authorized to change the maps, subject to the same notice and hearing procedures. The original wetlands maps for New York City were filed between 1987 and 1995. None have been amended. (Table 3)

Apparently DEC staff based in the Long Island office prepared updated, field-verified maps for New York City counties about a decade ago, based on then-available aerial imagery. However, the DEC has never filed updated, official maps, and the person responsible for creating the maps has retired. It is not clear that DEC has any intention of filing the maps, and the passage of time means that additional updates would still be required.

It is widely understood that the official maps were not complete when first made and have not kept pace with physical changes in wetlands. First, the technology of mapping has greatly improved over the past 20 years. DEC plotted wetlands on 1:24,000 planimetric quadrangle from interpretations of aerial photographs on a scale of 1 inch to 2,000 feet. New and better aerial photography, computer based geographic information systems, and digital soil surveys now allow regulators to produce regulatory maps with greater precision in relation to natural and man-made features and lot lines.

Table 3: DEC Maps of Freshwater Wetlands Over 12.4 Acres in New York City

COUNTY	ORIGINAL MAP FILING DATE	MAP AMEND.	ACRES OF REGULATED WETLANDS (OVER 12.4 ACRES) BY CLASS				NUMBER OF LANDOWNERS
			I	II	III	IV	
Bronx	03/30/88	--	98	0	0	0	<10
Kings	03/30/88	--	7	0	0	0	<10
New York	03/30/88	--	0	0	0	0	0
Queens	09/27/95	--	260	49	0	0	200
Richmond	09/01/87	--	2,192	718	0	0	4,500

Second, the science of wetlands also has matured in the past 20 years. Only about 14% of our wetlands fit the former paradigm of marsh and open water. Most wetlands are shrub or forested swamps, and many lie along rivers and streams in the floodplain riparian zone. Many of these critical wetlands were missed in DEC's initial FWA mapping process.

A Sierra Club study compared DEC's official inventory of wetlands with maps prepared by the U.S. Fish and Wildlife Service's (FWS's) inventory, known as the National Wetlands Inventory (NWI), which were compiled using a different methodology. (Witt et al. 2005) (The NWI uses the Cowardin classification system which identifies five systems, marine, estuarine, riverine, lacustrine, and palustrine; the first two are tidal and the last three are freshwater.) The study notes that DEC reported the regulation of 15,625 freshwater wetlands in the State, which represents only 6% of the 281,216 palustrine wetlands shown on NWI maps. The same study, however, suggests that in highly urbanized areas, specifically Staten Island, the NWS maps and DEC maps have very little discrepancy. (Witt et al. 2005) This finding suggests that there may not be many remaining unmapped, unprotected wetlands in New York City.

Local Gaps

New York State's FWA allows localities to enact local wetlands programs that are at least as protective as the State's, but New York City has not done so.

New York City law and procedures afford limited protection to its wetlands through a patchwork of programs, including WRP, CEQR, and applicable sections or provisions of the Zoning Resolution. The WRP applies to the City's discretionary decisions in its management plans and in Uniform Land Use Review Procedures (ULURP), CEQR, zoning, and variances before the Board of Standards and Appeals, and other regulatory programs. Such decisions must be consistent with WRP policies. The WRP and CEQR requirements do not necessary apply to all City or private actions that affect tidal or freshwater wetlands; nondiscretionary actions or those of a limited scope, generally classified as CEQR Type II actions, are not reviewed for consistency. Accordingly, projects are not addressed in the WRP/CEQR process if they are not in the coastal zone, are built "as of right," involve only ministerial government action, or are on the Type II list. Actions that are not subject to any of the above procedures include those affecting freshwater wetlands outside of the coastal zone, issuance of a building permits for as-of-right construction or any Type II action under CEQR, and purely private actions not involving any local or state agency approval or funding.

Gaps In Freshwater Wetland Protections

The interplay between Federal and State laws produces jurisdictional gaps over freshwater wetlands. New York State's 12.4-acre jurisdictional threshold means that small, isolated freshwater wetlands in New York had been protected only by Federal regulations. The 2001 *SWANCC* and 2006 *Rapanos*

decisions created significant questions about CWA jurisdiction over seasonal or other wetlands that do not have a permanent connection to surface water. As a result, many small wetlands in New York State that do not have obvious surface connections to tributaries of navigable waters – including rare and important ecosystems such as intermittent forested wetlands, fens, and bogs – are now potentially vulnerable to development without Federal or State protection.

The states still have a “veto” over Federal wetlands permits because CWA Section 401 and CZMA require that Federal actions be “consistent” with state laws. Before the *SWANCC* and *Rapanos* decisions, this veto gave New York State the right to insist upon conditions that become incorporated into Corps’ wetlands permits regardless of the size of the underlying wetlands. The extent of this veto power, however, depends upon the scope of Federal regulatory permitting authority; state “consistency” requirements are irrelevant if no Federal permit is needed in the first instance. The pullback of Federal CWA jurisdiction means that the ability of New York to use this “backdoor” method of extending its reach to freshwater wetlands smaller than the 12.4 acre cutoff in State law has been diminished.

To compensate for the regulatory gaps left by *SWANCC* and *Rapanos*, a few states – Ohio, Wisconsin and Indiana – have adopted remedial wetland statutes. Other states – Nebraska, Ohio, South Carolina, North Carolina, Texas, Washington, and California – have tightened pollution control regulations to address the gaps. (Kusler 2004)

New York State has not yet adopted regulations to fill the gaps created by the U.S. Supreme Court’s *SWANCC* and *Rapanos* decisions. In 2004, New York State Senator Marcellino and Assemblyman DiNapoli sponsored A.7905-A/S.4480-A, a bill to lower the jurisdictional threshold under the FWA from 12.4 to one acre, among other things. The Assembly passed the bill in April 2004 but it was stalled in the Senate and never received a full vote. The bill was reintroduced in 2007 as the Clean Water Protection/Flood Protection Act of 2007 (A.7133/S.3835). It would have redressed certain other aspects of the FWA that make it less protective than it could be and, by doing so, protect New York State wetlands even if Federal protections are further reduced. For instance, it would have protected wetlands less than one acre in size that are adjacent to other waterbodies; eliminated the need for a wetland to be mapped to be protected, thereby changing the use of the wetlands maps from a regulatory tool to an educational one; and streamlined the mapping process. Supporters of the legislation assembled information that eight other states in the Northeast protect isolated wetlands and have no size threshold for regulation. The bill did not pass in the 2007/2008 legislative session that ended on June 30, 2008.

In summary, the regulatory gaps in Federal and New York wetlands laws are not necessary filled by existing New York City land use laws, which have a limited reach.

Table 4: Comparison of Federal and State Freshwater Wetlands Programs

ASPECT	FEDERAL WETLANDS PROGRAM	N.Y. STATE WETLANDS PROGRAM
Mapping of wetlands required?	No	Yes
Minimum freshwater wetlands size?	No	Yes
Required link to Nation's waters?	Yes	No
Buffer zone protection?	No	Yes

Oversight of Compensatory Mitigation in Tidal and Freshwater Wetlands

After attempts to avoid and minimize filling are exhausted, regulatory programs require that any remaining wetlands losses must be replaced through compensatory mitigation. The end goal of mitigation is that the lost ecological functions and associated values (i.e., the economic and social benefits) of adversely affected wetlands are replaced at the same level or better. Mitigation is widely recognized as a useful policy tool in cases where competing priorities favor the alteration of wetlands. Depending on how and where wetlands are defined and delineated, mitigation can serve as an effective way to offset losses and to protect a regulatory regime that might otherwise become embroiled in compensatory takings or other litigation.

The creation of man-made or improved wetlands is a maturing field, and under the best circumstances it may take years for a restored, enhanced, or created wetland to be as productive (in function and value) as a natural, undisturbed wetland. Accordingly, in mitigation decisions the preservation of existing wetlands is preferred over the restoration of degraded wetlands, and restoration is generally preferred over the creation of new wetlands. Mitigation can take place on the site of the permitted filling activities or off-site, and can be performed by the permittee or by a third party through in-lieu-fee arrangements or payments to an approved, off-site mitigation bank.

The conventional wisdom has been that on-site mitigation provides better compensation for lost wetlands functions. More recent studies have re-examined these assumptions in light of the well-documented failure of on-site mitigation programs and the specific wetlands function sought to be replicated (Shabman 2004). Those studies have concluded that while hydrologic (e.g., flood storage) and ecological (e.g., sediment and pollutant removal) functions should be replicated as close as possible to lost wetlands to better preserve the status quo ante, habitat functions may be better replicated off-site where wetlands can be larger, less fragmented, and more removed from the disrupting activities of human society. In addition, there is a shrinking amount of wetlands available for mitigation, especially to meet in-kind and on-site constraints. These developments suggest greater exploration of alternative mitigation arrangements.

Banking currently represents about 10% to 15% of compensatory mitigation, and is a growing percentage in many places. (ELI, 2005) There are well over 400 mitigation banks permitted across the country. (ELI, 2005) Banking is not uniformly available, however; New Jersey has a long experience with mitigation banking, including many projects designed to enhance the extensive wetlands in the Meadowlands, but New York State does not allow for banking in its program.

All compensatory mitigation projects must be carefully monitored and managed, with frequent and thorough follow-through to make sure that developers build and maintain mitigation projects as required in permits. While mitigation is regarded as a helpful tool in wetlands management, there have been a number of problems with past mitigation programs, and the lack of effective oversight constitutes a significant gap in existing regulatory protections.

Federal Mitigation Rules

Compensatory mitigation was first mentioned in 1980, when the EPA published guidelines for the Section 404 program. Mitigation helps achieve the goals of the CWA of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters, including wetlands.

Mitigation became a key part of the Federal program after 1989 when it became national policy to have “no net loss” of wetlands. The commitment for no net loss of wetland functions and values was adopted in a 1990 memorandum of agreement between the Corps and EPA and then in the Water Resources Development Act of 1990. Later, the Clinton administration expanded the goal to achieve a net increase of 100,000 acres per year. The “no net loss” goal for wetlands is now required by statute for the Corps Civil Works Program. (33 U.S.C. § 2317(a)(1))

The goal of “no net loss” of wetlands is reflected in the decision hierarchy mandated by CWA regulations. (33 C.F.R. 320.4(r); 40 C.F.R. § 230.10) Avoidance of any fill is the top priority unless there is no feasible alternative to achieve project goals deemed important. Unavoidable impacts are to be minimized to the maximum extent practical. Lastly, unavoidable impacts that cannot be minimized are to be ameliorated through compensatory mitigation. Under this avoid-minimize-compensate hierarchy, the Corps could have achieved the “no net loss” goal by ceasing to issue any permits for filling or other activities in wetlands. It has not taken that drastic action, which would have upset the CWA's balance of competing interests and the permission of wetlands alterations under controlled circumstances.

Instead, the Corps has continued to issue permits that are conditioned upon the completion of compensatory mitigation, i.e., the restoration of former or degraded wetlands, the preservation of existing wetlands that are not already protected, or the creation of entirely new wetlands. Between 1993 and 2005, the Corps required mitigation on more than 40,000 acres of land per year. From fiscal years 2001 to 2005, the mean annual wetland impacts authorized were 23,000 acres, and the mean annual wetlands compensatory mitigation required was 50,000 acres. (73 Fed. Reg. 19603 (March 31, 2008)) In fiscal year 2005, the Corps authorized 20,754 acres of wetland impacts, and required 56,693 acres of compensatory mitigation through wetland restoration, establishment, enhancement, and preservation to offset those unavoidable impacts. (Id.)

Despite these seemingly favorable numbers showing that the acreage of compensatory mitigation outnumbers affected wetlands, it does not appear that the Corps' mitigation strategy has achieved “no net loss” of wetlands. The EPA requested that the National Research Council (NRC) evaluate how well and under what conditions compensatory wetland mitigation projects required under CWA Section 404 were meeting the goal of preventing net loss of wetland functions and values. NRC found that “[t]he goal of no net loss of wetlands is not being met for wetland functions by the mitigation program, despite progress in the last 20 years.” (NRC 2001, 2) Afterwards, the Corps undertook its own evaluation of its mitigation program, and made a similar finding. For example, the New England District evaluated 60 mitigation sites; although 67% percent of the projects were found to meet permit conditions, only 17% “were considered to be adequate functional replacements for the impacted wetland.” (Minkins and Ladd 2003)

The gap in mitigation oversight may be addressed by new Federal regulations meant to respond to various critical reports, and to implement a 2002 interagency National Wetlands Mitigation Action Plan and a 2003 directive from Congress (Section 314 of the National Defense Authorization Act for Fiscal Year 2004). On March 31, 2008, EPA and the Corps issued revised, final regulations governing compensatory mitigation for authorized impacts to wetlands, streams, and other waters. (73 Fed. Reg. 19594 (March 31, 2008)) The rule clarifies the requirements for compensatory mitigation and requires the use of enforceable permit conditions, performance standards, and third party agreements. The Corps will also track permitted impacts and compensatory mitigation through the use of databases in each District that run on the same platform.

The 2008 compensatory mitigation rule requires new mitigation plans to contain the following twelve elements: objectives, site selection criteria, site protection instruments (e.g., conservation easements), baseline information (for impact and compensation sites), credit determination methodology, a mitigation work plan, a maintenance plan, ecological performance standards, monitoring requirements, a long-term management plan, an adaptive management plan, and financial assurances. (See new 33 C.F.R. § 332.4(c); 40 C.F.R. § 230.94(c)) The ecological performance standards must be objective and verifiable, but the rule does not prescribe the individual variables or metrics that should be used, and instead requires that they be based on the best available science that can be measured or assessed in a practicable manner. (33 C.F.R. § 332.5(b), 40 C.F.R. § 230.95(b)) And the rule initiates a watershed approach to mitigation, whereby both authorized impacts and mitigation are considered on a watershed scale rather than on a project by project basis, to the extent appropriate and practicable. (33 C.F.R. § 332.3(c)(1), 40 C.F.R. § 230.93(c)(1)) Finally, the rule attempts to incorporate principles of ecological restoration and landscape ecology, by, for example, specifying detailed factors for determining ecological suitability for mitigation project sites. (33 C.F.R. § 332.3(d), 40 C.F.R. § 230.93(d))

Federal Oversight and Enforcement of Mitigation Requirements

A significant challenge for mitigation, however, is whether requirements, even if adequate on paper, are actually enforced. The Corps is responsible for ensuring that permit holders, operators of mitigation banks, and sponsors of in-lieu-of-fee programs carry out the compensatory mitigation requirements in Section 404 permits. The U.S. Government Accountability Office (GAO) issued a report to Congress entitled “Wetlands Protection: Corps of Engineers Does Not Have an Effective Oversight Approach to Ensure that Compensatory Mitigation is Occurring.” The GAO reviewed the Corps’ guidance for overseeing compensatory mitigation requirements in wetlands fill permits, the adequacy of the Corps’ oversight, and the Corps’ enforcement actions to uphold mitigation requirements, and concluded that the Corps’ oversight was ineffective in every category. (GAO 2005) This conclusion echoed that of earlier GAO reports finding that the Corps did not place a high priority on enforcing compliance of permit conditions, including compensatory mitigation. (GAO 1988; GAO 1993; GAO 2001; NRC 2001; Cole and Shafer 2002)

The GAO reported that Corps officials spent little time on compliance activities because of budget constraints, and that none of the districts reviewed had a system for tracking reports from either permit holders or third parties. The Corps’ guidance establishes two oversight mechanisms: monitoring reports by permit holders and compliance inspections. On monitoring reports, the guidance suggests that a high priority should be given to their requirement and review if there is “substantial mitigation” but does not define that term or the information that should be included in a monitoring report. The discretion of district officials in overseeing monitoring reports has led to substantial variation between Corps’ districts. On inspections, the guidance contains contradictory instructions to district officials about whether they should check for compliance at a high percentage of compensatory mitigation sites, or whether those inspections are a low priority.

The GAO reviewed mitigation oversight at seven Corps districts representing different geographic areas of the United States by selecting a random sample of 249 wetlands permit files issued in fiscal year 2000. (GAO 2005) Of 152 permit files where the permit holder was required to perform mitigation, 89 permits required monitoring reports, 21 files contained evidence that the Corps had received the reports, and only 23 contained evidence of a Corps inspection. The GAO also reviewed the Corps’ oversight of 85 mitigation banks by reviewing permit files. Of the 60 required to submit monitoring reports, only 42 contained evidence that the Corps had received at least one report. Of the 85 banks reviewed, only 31 contained evidence of any Corps inspection. The GAO also reviewed 12 in-lieu-fee arrangements, and found that 6 were required to submit monitoring reports, 5 had submitted at least one report, and the Corps had conducted inspections of 5 of 12 arrangements.

Even for those files showing some reports or inspections, the GAO concluded that the Corps did not always perform suggested follow-up action to ensure that required work was started in a timely fashion, was ever completed, that plants survived as specified, or that wetlands functions had been achieved.

Regarding enforcement of permit and mitigation requirements, the GAO found that the Corps rarely issued compliance orders, assessed administrative penalties, required forfeiture of performance bonds, suspended or revoked permits, implemented the enforcement provisions of third-party agreements, or recommended any legal action. Instead, Corps officials primarily relied on negotiation to settle violations of mitigation conditions. In some cases, this was due to compensatory mitigation requirements in permits that were not specific enough to enforce.

In sum, the results of the 2005 GAO report showed that little had changed since earlier reports that mitigation practices were not allowing the Corps to meet the goal of “not net loss of wetlands.” (NRC 2001) That study had found that a low percentage of permits required mitigation, a low percentage of those mitigation projects were ever started, a low percentage of those projects were monitored for compliance, and a low percentage of those projects achieved required mitigation ratios. Of mitigations required, about 75% are actually implemented, half of those ultimately comply with permit requirements, and 20% overall achieve some measure of functional equivalence with lost wetlands.

Indeed the practical problems in policing numerous small projects have led the Corps and EPA to conclude that onsite mitigation is less promising than mitigation banking and other efforts that create or restore larger wetland areas. In the March 2008 mitigation rule, the agencies rejected a preference for on-site compensatory mitigation because the failure rate is quite high, and instead expressed a more open attitude towards large-scale, off-site projects. (See 73 Fed. Reg. 19594 (March 31, 2008)) The rule states that mitigation banks and similar pooling arrangements can create economies of scale, are easier to track, are more dependable, create habitat of sufficient size, are supported by trust funds, and are more easily turned over to non-profits or other entities for management and stewardship in perpetuity.

State Mitigation Rules and Oversight and Enforcement of Mitigation Requirements

New York State has not adopted statutes or regulations that authorize off-site mitigation banks for those wetlands within its jurisdiction (mapped freshwater wetlands covered by the FWA and mapped tidal wetlands). In at least 22 other states, statutory or regulatory authority has resulted in state mitigation banks, private wetland mitigation banks, or mitigation banks for the sole use of state transportation authorities. (ELI 2008)

For on-site mitigation, New York recommends mitigation at a ratio of at least one acre of new or restored wetland for every acre filled or impacted, and recognizes that it often will be necessary to implement higher mitigation ratios to fully compensate for lost wetland acreage and functions. (DEC 1993) When the State does address violations of permit conditions that require on-site mitigation, not all of the money is directed to environmental projects. Penalties and other fines generally go to the general treasury. For example, the DEC recently settled decade-old oil storage and wetland violations with the Hess Corporation. (DEC 2008b). Of the \$1.1 million penalty, only \$300,000 was directed to the restoration and management of tidal wetlands in the estuary.

The poor record of existing Federal and State mitigation programs in the New York metropolitan area was recognized in a report issued by the New York/New Jersey Harbor Estuary Program (HEP), an intergovernmental, interagency entity. The Habitat Workgroup of the HEP issued a report entitled

“Draft Recommendations for Improving Compensatory Mitigation in the New York/New Jersey Harbor Estuary.” Among other things, the workgroup recommended increased monitoring and evaluation for at least 10 years after completion of mitigation activities, which is more consistent with observed rates of ecosystem recovery. (NY-NJ HEP 2002)

The unique characteristics of the New York Harbor – highly developed upland and filled areas, fewer in-kind mitigation opportunities, contaminated soils and other degraded lands, high land and restoration costs and pressure on the remaining large stands of wetlands – have led the HEP to recommend that mitigation efforts should rely more on acquisition of existing wetlands, even if off-site, than on restoration or creation. (HEP 2002)

Local Mitigation, Oversight, and Enforcement

The genesis of local restoration efforts can be dated to natural resource damage actions against Exxon Corporation for an oil spill in the Arthur Kill in the early 1990s. However, the City does not have a general wetlands mitigation policy. This is largely due to the lack of city-level wetlands legislation. Furthermore, there is no process to track implementation of mitigation commitments in the city.

While the City does not have a specific wetland law, it can and does require mitigation for a variety of projects through the application of CEQR or other mechanisms. Otherwise, laws that have addressed historic soil pollution have provided the framework for wetlands restoration projects. Indeed, there are many examples of successful City-run wetlands restoration projects accompanying or resulting from landfill closures or hazardous waste remediation projects, including at the Fresh Kills, Pennsylvania Avenue, and Fountain Avenue landfills. However, the City’s mitigation efforts through CEQR have been criticized for lacking a mechanism for tracking mitigation proposals for possible conflicts, approval status and, especially, implementation. (Cohen 2007) And the gaps are partially exacerbated by the increased capital, labor, and land acquisition costs of restoration projects in the city.

In conclusion, the success of wetland mitigation projects in New York City has not been formally evaluated. But observation of local mitigation projects indicates that compensatory mitigation projects often fall short of offsetting losses of functions and values. This appears to be especially true when freshwater wetlands are involved. Reasons for the poor performance of wetland mitigation projects in New York City include:

- The small size of some restoration areas and the disturbed urban matrix make newly created or restored sites vulnerable to colonization by invasive plant species;
- Polluted soils in many of our wetlands mean that the costs of restoration projects are higher in the city than elsewhere and that fewer wetland acres can be restored; and
- Standardized, explicit guidelines and specifications for the implementation of wetland restoration and creation do not exist.

Quality control and assurance is at best inconsistent and subject to widely varying expertise among regulatory and project lead agencies, and widely divergent agendas of project lead agencies. For example, among city agencies, the Department of Parks and Recreation and Department of Environmental Protection have strong in-house expertise in wetland restoration design and implementation and improving environmental quality are high agency priorities for both. For most other entities, wetland restoration is performed because it is required as a permit condition for a project unrelated to environmental enhancement.

Other Challenges to Wetlands Protection

The nature of the threats to wetlands is evolving from direct fill to other issues, including:

1. Sea level rise, which will both submerge wetlands and force tidal wetlands areas to migrate landwards;
2. Non-point source pollution from off-site sources; and
3. Inadequate funding for restoring degraded wetlands and maintaining existing wetlands.

Sea Level Rise and Tidal Wetland Migration

The City projects a sea level rise of 2 to 6 inches by the 2020s, 6 to 12 inches by the 2050s, and 12 to 22 inches by the 2080s. (DEP 2008) (The New York City Panel on Climate Change will provide updated estimates of sea level rise and other effects of climate change in the first quarter of 2009.) At present, the rate of sea-level rise in Jamaica Bay is about 2.7 mm per year, which is much greater than the mean global sea-level rise of 1.8 mm per year from the 1900s to the present. (Hartig et al. 2001) The higher New York City average is partially due to ongoing local geological changes that are still responding to the removal of the weight of vast ice sheets during the last glacial period.

As a consequence, underwater lands will be a larger percentage of the City's overall portfolio than at present, and mudflats and shallow open waters will likely comprise a larger percentage of New York City's "wetlands" in the future. One study of a large wetland in Jamaica Bay, Big Egg Marsh, projects that mudflats and open water will be 59% of the wetlands, up from 15% today. (Hartig et al. 2002) The question of how to manage these lands will become more pressing.

Sustained high flooding will also drown some wetlands. More immediately, in Jamaica Bay, marshlands are facing increasing threats of submergence. The causes for this subsidence are under investigation and include such issues as reduced sediment flows. (DeLaune, et al., 1994). Earlier dredging of navigation channels, the historic westward growth and stabilization of the Rockaway spit, and the urbanization of Long Island all have eliminated sediment sources from upland areas, normal tidal flows, and overwash deposits from storms. Waves triggered by barge and boat traffic along navigation channels could also be responsible for some marsh erosion.

Sea level rise will also cause the zone of wetlands-appropriate elevations to migrate inland. Depending on the vertical shore profile, a three foot sea level rise would cause the shore to retreat horizontally by as much as 50 to 100 yards. A key question is whether this natural inland migration can occur. Already, wetlands on Long Island's South Shore have retreated inland where there is sufficient open space. (Hartig et al. 2001) The DEC notes that Shinnecock Bay gained 161 acres of tidal wetlands from 1974 to 1995 due to landward movement of the tidal wetlands boundary, making up for the loss of 21 acres of tidal wetlands, including the destruction of 6 of the original 13 tidal

wetlands islands. Similarly, Moriches Bay showed a gain of approximately 100 acres of tidal wetlands from 1974 to 1988 as a result of landward movement of the tidal wetlands boundary, more than compensating for the loss of 2.5 acres of tidal wetlands.

In New York City, however, the highly urbanized upland edge of many of our tidal wetlands prevents inland migration to adjacent upland or freshwater zones. (Hartig et al. 2001). Development that occurred before Federal or State regulations occurred directly up to or on wetlands, leaving no transition area. Even development of upland adjacent areas that occurred after Federal or State wetland regulations may not have left much transition area for inland migration. Federal law has no transition area. While State law requires a 150-foot transition area in New York City, and 300 feet elsewhere, in practice permitted fill activity has been allowed up to 35 feet from the tidal wetland boundary.

Even where some inland migration is possible, or wetlands will otherwise tolerate sea level rise, other aspects of climate change will pose a threat. For example, if there are more extreme weather events, including greater storm surges and higher waves, that will increase erosion and harming wetlands. (Hartig et al. 2001) Another hurricane like the 1960 hurricane that swept through the New York City area could scour out shallow sediments all the way to (and over) sea-walls, coastal roads and other hard shoreline surfaces, and cause permanent damage to coastal wetlands.

Federal and State Regulatory Authority over Tidal Submerged Lands

Tidal land that is fully submerged is squarely within Federal and State regulatory protections. While these regimes prohibit filling and dredging activities, they do not provide for proactive planning to encourage or support adaptation of wetlands in response to sea level rise or potential migration. New or supplemental regulations may be required to better fit changing conditions.

A central mandate of the Corps is to maintain navigable channels and the general functioning of the Nation's waterways. The Corps reviews and issues permits for activities that occur in navigable waters, including dredging, filling, bulkheading and placement of structures in the water. In reviewing projects, the Corps consults with other Federal agencies including the National Marine Fisheries Service (NMFS), the Coast Guard and the Environmental Protection Agency. Consultation is required by statute, including the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act which set forth the Essential Fish Habitat (EFH) provisions to identify and protect important habitats of federally managed fish species. The NMFS has taken a broad view of EFH as all areas used by fish throughout their life cycle where habitat attributes and functions are important for sustaining the production of managed species. Any protections imposed by NMFS apply only where there is a Federal permit and only to the extent there is designated EFH.

Under the Public Trust Doctrine, New York State is the trustee of most underwater lands in the state. DEC administers the Tidal Wetlands Land Use Regulations which went into effect in 1977. Tidal wetlands jurisdiction encompasses an area that extends from 6 feet below mean sea level to 150 feet landward of any wetland in New York City (or to an elevation of 10 feet or to the first substantial manmade structure such as a road or bulkhead, constructed before 1977), or 300 feet landward outside of New York City. In addition, near shore dredging and filling activities are limited by the Protection of Waters regulations authorized by Article 15 of the ECL. Permits are required for most activities that take place in these areas, and mitigation is often required. The State and the City are engaged in numerous discussions about the availability and extent of permits and mitigation for the creation of waterfront parks and esplanades and the maintenance of existing bulkheads.

In short, Federal and State protection of submerged lands is more robust than the protection over wetlands. These programs are entirely reactive, however, and do not authorize a proactive, planning approach to the management of submerged lands.

Local Submerged Lands Policy

Within its boundaries, the City holds grants to most underwater lands from the bulkhead line to the pierhead limit. These grants of State public trust lands were for the purpose of promoting the commerce of the State and for other purposes, and consequently many of the granted underwater lands have been filled. Nevertheless, a preliminary analysis of the property database maintained by the Department of Citywide Administrative Services shows that the City owns over 3,300 acres of underwater lands (i.e., lands under open waters), and that only about half of this amount is under the control and protection of the Parks Department.

As noted in previous sections, New York City's WRP provides the framework for evaluating the consistency of all discretionary actions in the coastal zone. Through individual project review, the WRP aims to promote activities appropriate to various waterfront locations. City-owned submerged lands may provide opportunities for economic development, environmental preservation and public access to the water, but these objectives may conflict at any given location and a balance must be sought to ensure the public benefits. WPR Policy 4 recognizes the need to protect and, where appropriate, to restore specific designated natural resources, including state and federally regulated tidal and freshwater wetlands, that make up fifteen designated Significant Coastal Fish and Wildlife Habitats within New York City.

The WTTF noted that management of underwater properties presents technical and legal challenges of ownership and access, including considerations for the heightened maritime security level around New York Harbor, aquaculture considerations, port and marina issues, underwater turbines, liquefied natural gas or other off-shore energy production facilities and submerged structures. Many of these issues are involved in the implementation of the City's Solid Waste Management Plan, which involves the construction of several marine transfer stations.

Non-point Source Pollution

Another current threat to wetlands is posed by sediment and other pollution carried by sheet flow from non-point sources that are upgradient of wetlands, which can slowly fill wetlands and degrade habitat. To a degree, wetlands can absorb and filter these pollutants, as aptly demonstrated by the Bluebelt system on Staten Island, where engineered wetlands absorb and filter street runoff. But if pollutants exceed the carrying capacity of wetlands, then the ecological functions will diminish over time. These impacts are not addressed by Federal and State wetlands laws, which are triggered by direct impacts through dredging and filling activities. As a consequence, however, any jurisdictional gaps in those laws do not increase threats from non-point solutions.

However, there are other environmental laws that address these threats. The Federal CWA and State permitting programs require construction permits and municipal plans to minimize stormwater pollution. And the City has recently published a Sustainable Stormwater Management Plan to promote on-site retention and detention of stormwater, and is also examining its building and construction codes to minimize runoff pollution. These efforts are discussed in greater detail in the last chapter of this white paper.

Restoration and Maintenance

Wetlands that are already publicly owned – as well as wetlands that could potentially be acquired by the City – typically have to be restored and always require regular maintenance so that they can continue to produce ecological services. Periodic maintenance is required to remove washed up debris and wind-blown litter, to remove sediments, to replant eroded areas, and to provide for appropriate wildlife habitat. Continued and vigilant management is necessary to prevent illegal dumping and incursion by off-road vehicles, to maintain appropriate levels of public access, and to

protect sensitive wildlife. Some wetlands owned by the City – and many more that could otherwise be acquired – are adjacent to, or are underlain by, polluted soils, are otherwise degraded, and need to be restored. The maintenance, stewardship, and restoration of wetlands requires significant resources.

Federal

There are a few longstanding efforts to coordinate restoration efforts between the Federal, State and City governments. One such effort is the Corps' Hudson-Raritan Estuary Environmental Restoration Study (HRE Study) and another is the HEP, a joint effort of the Corps, EPA, New Jersey, New York, Port Authority, and other stakeholders. In the first quarter of 2009, the Corps of Engineers will publish its Comprehensive Restoration Plan (CRP), a comprehensive, system-wide restoration plan that will set a unified restoration agenda for the entire Hudson-Raritan Estuary.

While the HRE Study and the CRP will not provide funding for restoration and maintenance, the co-ordinated effort will inform external sources of funding, including Congressional and Federal agency appropriations for wetlands protection, through the Corps, EPA, National Oceanic and Atmospheric Administration, FWS, and U.S. Department of Agriculture. In addition, the Federal government also collects enforcement penalties and natural resource damages from oil spills and other matters, and directs those funds to wetlands acquisition and restoration. Until that happens, however, mitigation or restoration projects will continue to consist of independent actions of permit holders within project-specific guidelines.

State

The State also has programs that are available for wetland restoration. Relevant state programs include the Clean Water/Clean Air Bond Act of 1996 (\$1.75 billion at its inception), the New York State Environmental Protection Fund (a permanent state revenue fund), wildlife grants, and the Long Island Sound and South Shore Estuary Reserve.

In addition, the State brings permit or other enforcement actions that may be settled for acquisition funds or restoration programs. However, when the State does address violations, not all of the money is directed to environmental projects. Penalties and other fines generally go to the general treasury. For example, the DEC recently settled decade-old oil storage and wetland violations with the Hess Corporation. (DEC Press release, Feb. 28, 2008). Of the \$1.1 million penalty, only \$300,000 was directed to the restoration and management of tidal wetlands in the estuary.

The State is another trustee that can and occasion does brings natural resource damage claims that may result in more direct restoration funds or projects, especially if that relief is aligned with the underlying legal claims. However, to date New York has been less aggressive than New Jersey and other states in collecting natural resource damages. That may change, as the DEC created a Natural Resources Damages unit in 2007.

Local

As described above in the discussion of mitigation, the City has undertaken restoration efforts that were funded out of general operating funds as part of mitigation for landfill closures. Other City-led restoration efforts are undertaken by the Parks Department's Natural Resources Group, and are funded through Federal, State and non-profit grants. Some of these projects are undertaken under the auspices of HEP. Maintenance and management functions are underwritten by general appropriations; external sources of funding are not generally available for these essential functions. For that reason, the Parks Department and DEP are reluctant to accept transfer of isolated, small, and dispersed wetlands that require significant, ongoing resource obligations in excess of their hydrologic or habitat functions.

Filling Regulatory Gaps and Addressing Other Challenges

There are several policy alternatives that would fill the identified regulatory gaps address the other identified threats. To adopt the most cost-effective alternative, it is essential to understand the scale of the problem to be solved and the likely benefits of alternative programs. This chapter identifies about policy alternatives available to the City and ongoing efforts to gather requisite information.

This chapter also describes the City's ongoing and new initiatives to address other wetlands challenges, principally sea level rise, stormwater pollution, and the lack of resources for the restoration and maintenance of existing City-owned wetlands and the acquisition of new wetlands for public stewardship.

General Policy Alternatives

If the City were to decide to fill jurisdictional gaps or take other actions, then there are several approaches that it could take to protect freshwater wetlands. These policy alternatives are described briefly below.

Expand the Reach of State Regulations to Small Freshwater Wetlands

First, the City could insist that the State file updated maps for New York City, including the maps that may have been created by DEC already. While new maps would not result in any additional regulation of freshwater wetlands below 12.4 acres, they would reflect changes in wetland location and composition over the past 20 years, prevent the filling of unmapped wetland extension to wetland complexes over 12.4 acres, and provide greater certainty to regulators and landowners alike.

Second, the City could petition DEC to designate certain smaller, unprotected wetlands to be of "unusual local importance." The standards at ECL 24-0105.7 require that such wetlands provide flood and storm control, pollution treatment, or open space, among other characteristics. Given the scarcity of wetlands in the city compared to historic abundance, and therefore the more intense use of those areas, it may be relatively straightforward to establish that many unprotected freshwater wetlands are of unusual local importance. The City could work with local groups and other stakeholders to identify the most essential unprotected wetlands and to articulate their importance.

The potential costs of such an approach include relinquishing control over land use to the State, which could hamper the ability of the City to meet other, competing policy needs such as additional schools or public housing. For that reason, any petitions would have to be specific and limited in scope.

Expand the Reach of Federal Regulations to Small Freshwater Wetlands

Similarly, the City could take advantage of the December 2008 EPA guidance to clarify that the Federal government has CWA jurisdiction over many smaller wetlands that would otherwise be considered isolated. Under the guidance, the EPA and Corps can rely upon hydrologic factors (e.g., volume, duration, and frequency of flow, proximity of wetlands to the navigable waters, size of the watershed, etc.) and ecologic factors (e.g., the potential of wetlands to trap and filter pollutants or store flood waters, and the maintenance of water quality in traditional navigable waters) to support a “significant nexus” with navigable waters and therefore CWA jurisdiction. Moreover, the agencies are supposed to consider whether a tributary and all of its adjacent wetlands collectively have a significant nexus with traditional navigable waters. Generally, this assessment is made on a case by case basis.

In theory, the City could make the case for such a significant nexus on a larger scale, i.e., for entire watersheds. Through comprehensive watershed studies, the City could establish that the hydrological and ecological connection between collective wetlands and navigable waters. Such studies could shift the burden away from agencies to prove that small freshwater wetlands meet the significant nexus test for CWA jurisdiction to landowners who would have to disprove such a connection. In this manner, the City would be leveraging existing Federal regulatory resources to further its goals of wetlands protections.

Adopt Overlay Zoning Districts for Wetlands and Submerged Areas

Another option for expanding wetlands protections would be the creation of an Environmental Protection Overlay District (EPOD). An overlay district is a zoning tool used in conjunction with a comprehensive management plan. The overlay creates a series of regulations designed to guide development according to specific criteria. Areas that contain wetlands can be designated as EPODs subject to additional zoning requirements. These requirements could include limits on the ability to build and fill in or around wetlands and floodplains, covenant requirements for properties that partially contain those areas, and mitigation requirements for any activities that affect wetlands. Relevant considerations include whether existing information is sufficient to create EPODs, the boundaries of the overlay districts, the activities that would be permitted as-of-right, and whether to include categorical off-site mitigation for certain uses. If implemented, EPOD layers could be managed within the existing zoning system, but would require additional management, oversight, and funding.

Enact a Local Law for Permitting Activities in Small Freshwater Wetlands

The City could establish its own wetlands permit program. In New York State, municipalities can choose to enact independent wetlands protection and management ordinances if they are at least as protective as State law. In practice, this means that municipalities can enact freshwater wetlands laws that protect wetlands less than 12.4 acres in size through a local permitting regime. Such a program would not have to include a mapping requirement. For example, Westchester County has developed a model ordinance for use by municipalities within that county. The model ordinance, as well as actual ordinances enacted by towns within Westchester, require permits for most activities on or around wetlands that are smaller than the State threshold. The permits are reviewed by a special board or reviewing authority and can include mitigation requirements.

Local legislation would be required to establish a permitting authority, a review procedure for permitting decisions, and a system for monitoring and enforcing permit requirements. In addition, a local permitting program would require additional resources to identify remaining wetlands, process permit applications, and enforce permit conditions. The costs of establishing and enforcing a new regulatory regime may well exceed the benefits of protecting a relatively small number of wetlands, and that may excessively restrict legitimate development.

Expand Acquisition and Restoration Programs

The City already has a number of programs in place to acquire or restore freshwater and tidal wetlands. The City could expand a number of these acquisition programs, including the Bluebelt program and the open space program. Funding is the critical limitation. Without additional resources from the general fund, stormwater rates, or alternative sources (see below), for acquisition, any needed restoration, and maintenance in perpetuity, it would be irresponsible for the City to add to its inventory of wetlands properties.

Developing Basic Information to Inform Policy Choices

To select a wise policy among these options, the City will need to know how many freshwater wetlands are truly at risk from direct fill activities, or would be protected under existing regulations. Some policy options – such as a local permitting program, or additional acquisitions – could be costly. The costs and benefits of these alternative policy approaches are critical to successful implementation. Past cost-benefit analyses conducted by the Bluebelt program, while useful in showing how wetlands can play a role in offsetting larger infrastructure costs, do not necessarily provide a good starting point for assessing the costs of a local regulatory program or the value of wetlands that are not integrated into the Bluebelt system.

Detailed Wetlands Maps

Detailed maps are a necessary foundation for contemporary environmental planning policies and natural resources management systems. Existing wetlands maps are limited by the low quality and coarse resolution of available information that were compiled through overflights in the 1970s and 1980s. In addition, the failure to digitize much of the information renders its use within modern Geographic Information Systems (GIS) impossible. High resolution data mapping and GIS capability are critical for evaluating baseline environmental conditions and for observing and identifying natural resources trends over time, including changes in wetland coverage.

The DEC's official, low-resolution maps are included in New York City's Open Accessible Space Information System Cooperative (OASIS). OASIS is an open-source application and collects the most up-to-date GIS layers that are available. A search for wetlands on OASIS shows that the available DEC-based layers do not provide the resolutions necessary to reveal individual lots and blocks. Similarly, OASIS includes large-scale, broad land use classifications from the U.S. FWS's National Wetlands Inventory. OASIS does incorporate other, finer-scaled data layers that are relevant to wetlands management, including infrared images taken in 2001 and photographic images taken in 2006, but those layers have not been interpreted to discern wetlands features.

The absence of fine-scaled, accurate wetlands maps on a citywide basis is a significant obstacle to potential City regulatory policies (and, indeed, to management policies). This conclusion was reinforced by the experience of the WTTF, which found that existing property management systems could only identify approximately 2,000 City-owned parcels that contained some amount of wetlands. The WTTF had to undertake a parcel-by-parcel, ground-based analysis to determine the extent and value of wetlands on each of those parcels, and the enormity of that work prevented the WTTF from completing its assessment of all City-owned wetlands.

Expanded use of updated satellite imagery will need to play a central role in any efforts to preserve and protect the City's wetlands. With the issue already identified by the early work on this white paper, the City obtained a grant from the New York State Department of State in June 2008 to develop detailed GIS maps of tidal wetlands in the City. Satellite and aerial images for the maps will be taken in August 2009, and the GIS analysis of those images should be complete in early 2010. In addition, DEP is obtaining satellite and aerial images of freshwater wetlands in April 2009, the next emerging growing season, and the GIS analysis of those images should be complete in December 2009.

Wetlands Assessments

It is also important to understand the quality of wetlands at issue. More recent analyses of wetlands benefits look at the entire chain of services provided by wetlands. (King et al. 2000) This chain of services, however, is unique to each wetland, and a comprehensive assessment program is necessary.

For example, the Parks Department is undertaking several assessment programs of City-owned wetlands. One study will determine the extent of wetlands accretion or subsidence in Pelham Bay Park. Sediment Elevation Tables were installed in October 2008 to provide a baseline elevation of those areas. A second, ongoing initiative involves the rapid assessment of the quality and characteristics of freshwater and riparian wetlands mapped by DEC and the National Wetlands Inventory on Parks property as well as unmapped wetlands such as vernal pools or riparian systems. The Parks Department will also determine the GPS coordinates of unmapped ephemeral, intermittent, or piped streams in drainage networks that it believes are significant.

Wetlands Definitions

Most of the city's remaining freshwater wetlands occur on Staten Island. Peculiar soil and hydrophytic plant factors on Staten Island, however, contribute to under-delineation of these wetlands. Standard wetland delineation protocols call for the identification of hydric soils, wetland hydrology, and hydrophytic plants. First, on Staten Island, most woody plants that are adapted to wetland conditions, including red maple, sweet gum, sycamore, tupelo, swamp white oak, pin oak, swamp azalea, high bush blueberry, and others, are equally well distributed in uplands. As a consequence, wetland delineators may underestimate the extent of forested wetlands on Staten Island.

Second, a key indicator used to identify hydric soils is the presence of vertical red streaks in the soil. These are interpreted as channels of oxidation running along the roots of plants that have developed in a low-oxygen, water-logged context. Because Staten Island soils are generally derived from a red parent rock, in many areas the soils themselves tend to appear red, thereby potentially masking a key hydric soil indicator. These Elkton soils exist only on Staten Island in New York and are not included on the state wetland soil list. Some of these reddish Staten Island soils, however, are recognized as wetland soils in other mid-Atlantic states. For example, soils in the Elkton series are identified as wetland soils on lists in New Jersey, Maryland, and Delaware. Inclusion on the lists allows wetland delineators to rely upon Elkton soils criteria when it is difficult to interpret other delineation criteria at a particular wetland site.

Adaptation Planning for Sea Level Rise

Other developments – such as sea level rise, non-point pollution, contaminated soils, and a backlog of restoration and maintenance needs – may pose greater threats to wetlands and their ecological functions overall than direct fill. Accordingly, while awaiting the results of mapping and other data collection, the City will continue related work to address those threats.

The City is undertaking several ongoing efforts to develop accurate information about potential inland migration areas for tidal wetlands from which to make informed policy decisions, and to plan for sea level rise. First, PlaNYC's chapter on climate change and adaptation committed to update FEMA's floodplain maps for New York City, which were last revised in 1983 based on even earlier data. (Recent amendments digitized prior maps without adding additional details.) The updated maps will reflect changes to the shoreline and elevations, rising sea levels, and the increased severity of storms. The information in those maps will inform our understanding of low-elevation, potential migration areas.

Second, the City has convened the New York City Climate Change Adaptation Task Force, which consists of city, state, and Federal agencies and private companies that operate, maintain, or regulate critical infrastructure in New York City. The Task Force is creating an inventory of wetlands and other critical infrastructure that could be at risk from the impacts of sea level rise and climate change. By December 2009, the Task Force will develop adaptation strategies to protect the City's critical infrastructure. This comprehensive planning effort for adaptation will further the protection of wetlands from sea level rise and other effects of climate change.

Reducing Non-point Source Pollution

The City is already planning to reduce stormwater pollution through its Sustainable Stormwater Management Plan, published in December 2008 and available at www.nyc.gov/planyc. The Plan is the culmination of a year-long, multi-agency planning effort that was made a commitment of PlaNYC's water quality chapter and was later embodied in Local Law 5 of 2008. It assessed the costs and benefits of different scenarios for controlling stormwater at the sources of runoff generation – that is, on developed sites, rooftops, sidewalks, roadways, and other impermeable surfaces – through the use of green infrastructure designs. Where additional data is required before full-scale rollout, the City has agreed to design, build, and monitor over 20 different pilot projects to test different tree pit, rooftop, permeable paving, Greenstreets, and other designs. The Plan also calls for the implementation of proven designs such as the rooftop systems used by the Schools Construction Authority, which detain water until treatment plants have excess capacity. A site stormwater performance standard will be adopted in DEP's sewer connection regulations in 2009 for new construction and major alterations. In addition, the City has passed amendments to the Zoning Resolution to require parking lot plantings to absorb stormwater, additional permeable yards, and street trees. The City has also passed a green roof tax abatement to subsidize the construction of planted roofs. All of these changes will result in the on-site detention and retention of significant amounts of runoff and non-point source pollutants.

Improving Restoration and Maintenance

Finally, the City is undertaking several efforts to improve its restoration and maintenance of wetlands. The City is beginning a dialogue with stakeholders about alternative funding, mitigation banking and other mechanisms for improved restoration and maintenance of wetlands, following the WTTF's recommendation for a coordinated effort to allow for greater efficiency and efficacy for those public and private parties obligated to mitigate wetland impacts. This effort is timed well with the Corps' CRP, which will highlight priority restoration opportunities in the Estuary as well as available and new funding mechanisms, including mitigation banking. For example, one scenario may be to channel the mitigation requirements of private and public entities for the alteration of small, unconnected wetlands into the acquisition, restoration, and maintenance of City-owned or managed large-scale wetlands. A significant opportunity for increased funding is the restoration of marsh islands in Jamaica Bay, a high priority for the City and for other stakeholders in the Estuary.

As a first step, for example, the City could work with Federal and State regulators to set up a mitigation banking regulatory apparatus that would satisfy the rigorous standards in the 2008 Mitigation Rule, including third-party monitoring, an oversight board of relevant agencies and stakeholders, accepted protocols for documenting credits created by wetlands restoration and maintenance, and the City's commitment for stewardship in perpetuity. Wetlands systems are dependent in part on size, and mitigation created the opportunities for larger, higher functioning wetland systems over smaller and more isolated systems. Care must be made to locate potential banking sites to maximize the spatial functions of existing wetland systems.

A pilot phase could consist of the sale of smaller, isolated wetlands identified by the WTTF in the third tier of marginal sites. These sales would generate funds to buy more valuable wetlands and buffers areas to be managed by DEP as part of the Bluebelt or by the Parks Department as wildlife reserves or recreational areas. The proceeds might also be used to facilitate the transfer of the 82 “first tier” sites from other City agencies to the Parks Department; many of these transfers are delayed pending resources to clean up and secure the sites.

A second, incremental step might be to expand the bank on Staten Island by allowing mitigation for waterfront development and other permitted activities undertaken on City land to be met by financial contributions to or credits generated by the bank, under third-party supervision and monitoring. A similar bank could be created in Jamaica Bay, to allow for limited, controlled trading between City sites in that watershed to obtain funding to restore the disappearing marsh islands and to create large, intact blocks of highly-functioning wetlands habitat.

The City will also explore cooperative approaches for resource management with other stakeholders, including citizen stewardship. This could be modeled on the citizen steward programs that the Parks Department uses for the upkeep and maintenance of parks, street trees, and Greenstreets.

Continuing Implementation of Other Wetland-Related Initiatives

In addition, the City will continue to implement other, ongoing wetlands initiatives, including:

- Implementing the recommendations of the Wetlands Transfer Task Force to protect the most important City-owned wetlands that are not currently managed by the Parks Department and to evaluate other transfers, within funding and other practical limitations;
- Implementing the comprehensive Jamaica Bay Watershed Protection Plan for the restoration of tidal marshes in Jamaica Bay, the most significant opportunity for protecting wetlands in the city, as well as other approaches, depending on substantial funding and coordination from many federal, state, and local agencies and other stakeholders;
- Acquiring additional Bluebelt properties; and
- Revising the CEQR Technical Manual.

Conclusion

PlaNYC recognizes that wetlands play a critical role in maintaining water quality and provide important wildlife habitat and recreation opportunities. The current regulatory structure does provide some protection for certain wetlands in New York City. The somewhat overlapping Federal, State, and local regulatory regimes, however, contain gaps that may leave critical remaining wetlands vulnerable to a variety of direct and indirect pressures. This white paper identifies those gaps and suggests general approaches to filling them. Before the City can determine the costs and benefits of alternative policy approaches, however, the City must first develop basic information about the number, size, and value of the remaining unprotected wetlands. There are several ongoing efforts to develop that information. In the meantime, the City will continue the implementation of several ongoing initiatives that are related to wetlands, and will launch targeted efforts related to mitigation and stewardship.

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