MASPETH MARSH:

A CASE FOR INTERTIDAL RESTORATION IN NEWTOWN CREEK

Introduction

Riverkeeper and the Newtown Creek Alliance are dedicated to achieving a remediated, restored, resilient, and recreation-friendly Newtown Creek. These goals encompass the entire Newtown Creek system, including the waterbody's surrounding industrial community and nearby residents. In 2017, we began a process to better understand the state of the Creek, the collective vision for its future and the interventions necessary to get there. The 85 ideas generated in the resulting visioning report are flexible, intended to be shaped by Newtown Creek stakeholders, including the Superfund Community Advisory Group.

A key element of the Newtown Creek Vision Plan is a restored Maspeth Creek wetland. Before it was industrialized, hardened and re-shaped during the 20th century, a rich wetland habitat once existed in the historic footprint of the Creek. It featured extensive shallow marshes and islands populated by mussels. In order to allow large ships the opportunity to turn around in Newtown Creek, the islands were removed and shallow edges were dredged and filled, leaving the right angles and tightened footprint of Maspeth Creek today.

In its current state, Maspeth Creek presents one of the best local opportunities for ecosystem restoration, since it is shallow, silty, and bordered by overgrown shorelines. Decades of sedimentation have made Maspeth impassable by boats and difficult to navigate at low tide. With large-scale industrial operations encircling the tributary, mostly consisting of parking lots abutting the waterway, and a trash boom stretching across the mouth of Maspeth Creek, the waterway has been kept a world apart from human use, both recreational and industrial. Although coated in contamination and saturated with sewage, the inaccessibility of Maspeth Creek and the shoreline provide some sanctuary for wildlife. Numerous bird species like cormorants, herons and egrets are often observed foraging and fishing around the trash boom and in the open waters of the adjacent Turning Basin.

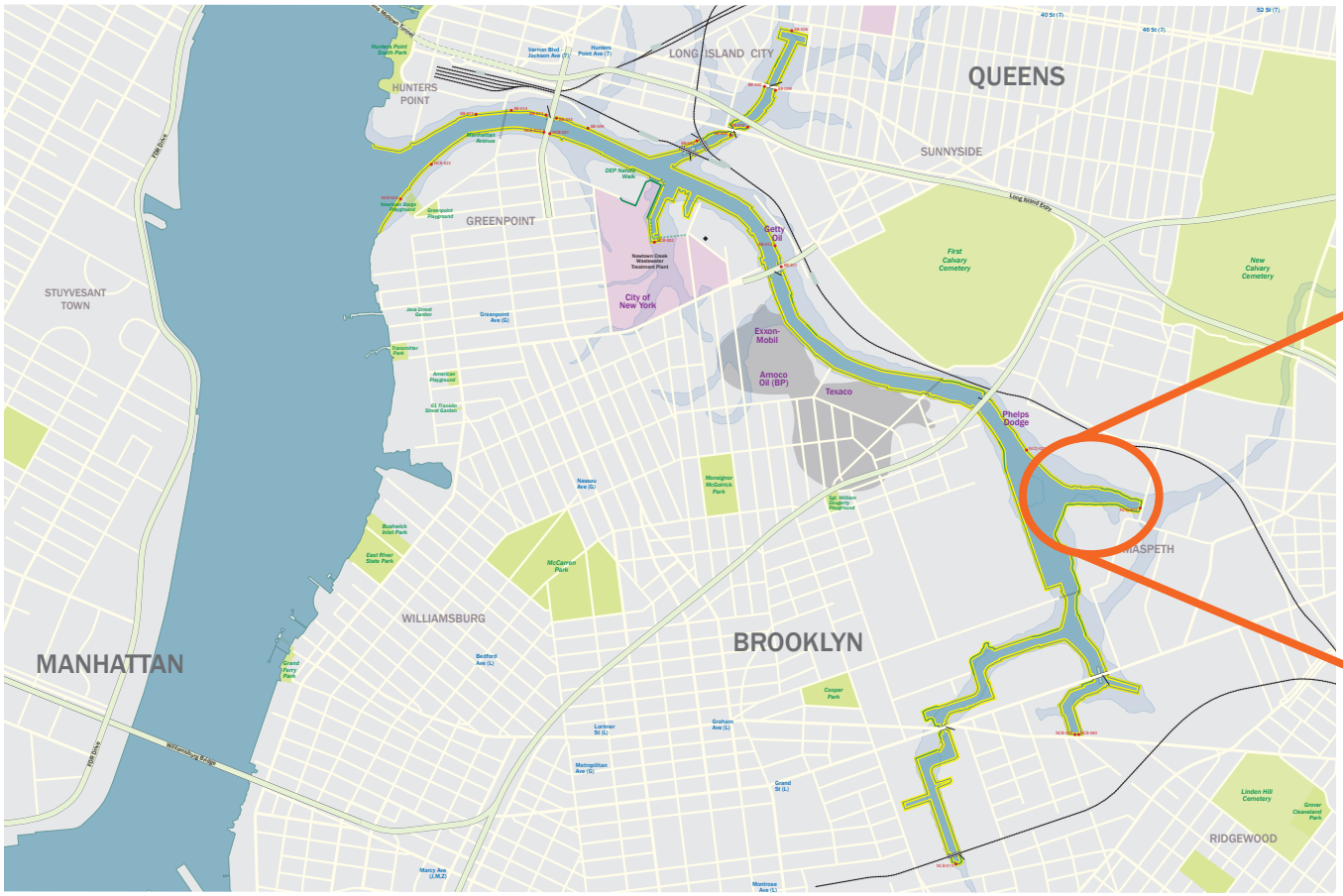
The current shallow water conditions of Maspeth Creek leave much of the Creek bottom exposed during the lowest tides of the year. This is one of the most practical areas to de-list the formal navigability or develop liens, leases, and land trusts, that would allow complete salt marsh restoration. A restored Maspeth Creek could improve water quality and wildlife habitat as well as provide a buffer for storm surge events. Capturing CSOs, remediating legacy contamination, and improving bulkhead and waterfront edge designs would be necessary to realize the ecological potential. Managed as part of the Newtown Creek system, the restoration would anchor the Creek and support a natural community asset.

Methods

Though the Vision Plan process made clear the community's interest in a Maspeth Creek Marsh, and the potential significance, the path to realize that vision is complicated. Newtown Creek is not necessarily at a point at which creating a design with a landscape architect or a design firm would help to progress implementation. There are many policies that the community needs to navigate and that agencies need to implement, to realize a theoretical design and for that salt marsh design to succeed. What this document does, is find that crucial next step, to lay a path for stakeholders to navigate and eventually build a Maspeth Creek Marsh.

Over the past year Newtown Creek Alliance (NCA) and Riverkeeper consulted with experts and went on site visits with our colleagues at the NYS Department of Environmental Conservation (DEC), NYC Department of Environmental Protection (DEP), National Oceanic and Atmospheric Administration (NOAA), U.S. Fish and Wildlife Service (FWS), LaGuardia Community College and NYC Parks Department to identify ecological and policy dynamics. Through these discussions and a careful examination of policy, we built this document, both a study and a path.

This document outlines the specific and current physical condition of Maspeth Creek, magnifying the reach to understand and catalog legacy and combined sewer overflow (CSO) contamination, ecology and wildlife, and socio-political influences. NCA developed studies to catalog ecology and wildlife, supplemented by citizen science to fill gaps in research. Once the current state of Maspeth Creek is articulated, this document establishes baseline conditions for implementing a salt marsh as well as methods to achieve those conditions. To conclude, the plan illustrates a clear, simple and adaptable design plan for a salt marsh. This study's design aims to spark an in-depth restoration plan as part of a Natural Resources Damages Assessment (NRDA) project, and to understand the motivation, base conditions required, precedent projects, need, and potential for a salt marsh in Maspeth Creek as part of any remediated Newtown Creek Plan.



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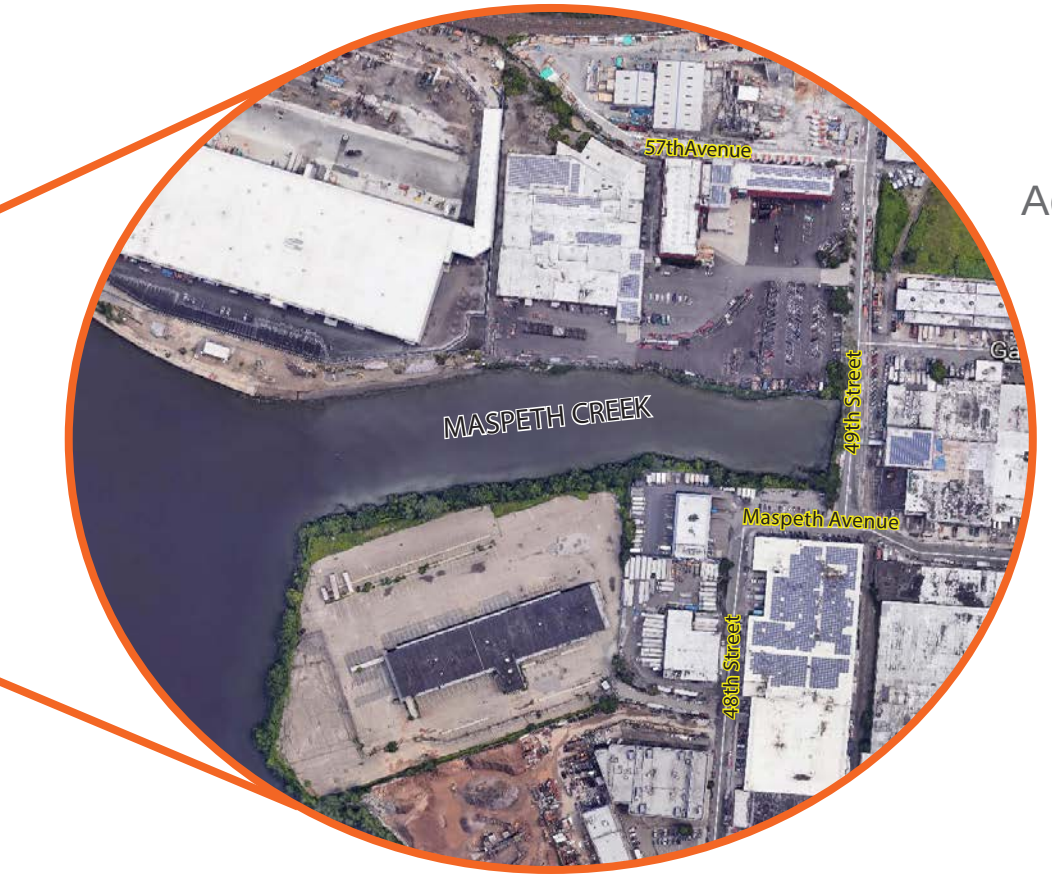


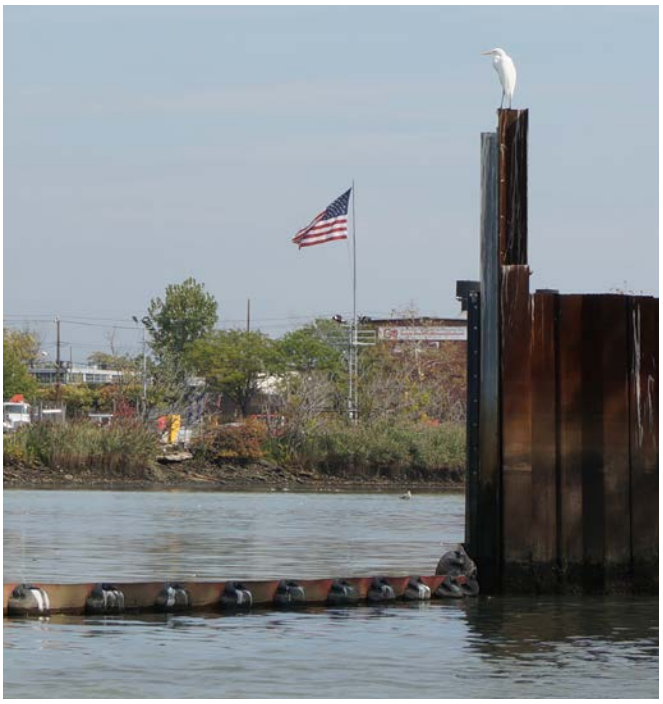
Current State of Maspeth Creek

AT A GLANCE

Maspeth Creek is a small tributary on the Queens side of Newtown Creek, situated 2.5 miles from the East River and branching off of a wide expanse of 20 acres of open water known as the Turning Basin. The tributary, which was one of the last in the area to lose its soft edges to industrial fill, had functioning wetlands as recently as mid-20th century.

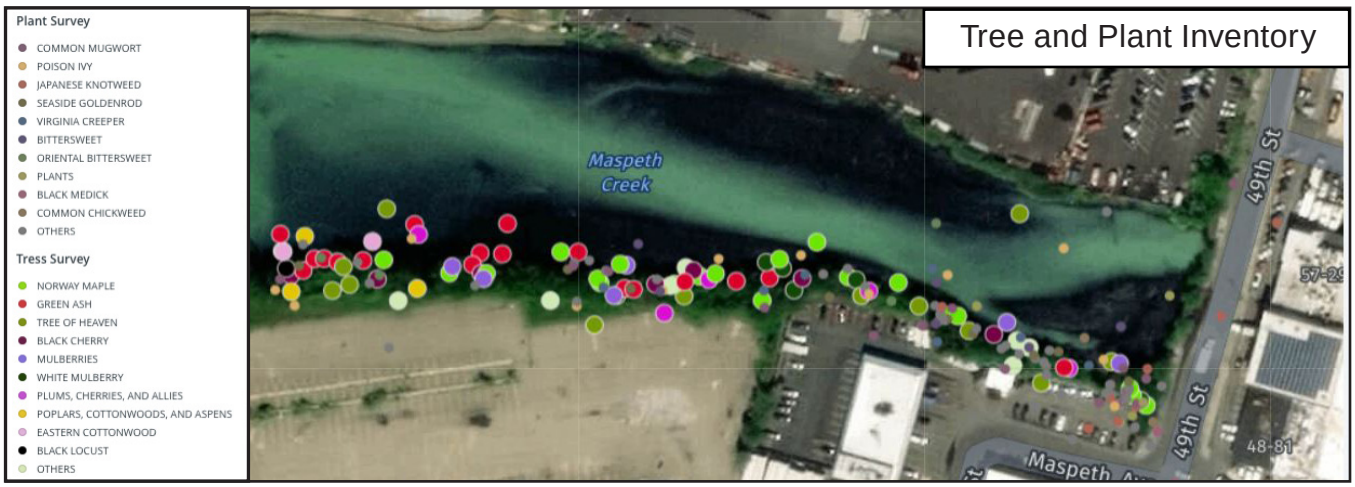
Maspeth Creek is surrounded by industrial lots that have not been used for water-dependent transportation for decades. Immediately surrounding the waters' vegetated edge are large warehouses, impermeable parking lots and truck-laden roadways. The shoreline edges are mixed, ranging from intact bulkheads to softened edges, long taken over by trees and shrubs.

Maspeth Creek is approximately 1,100 feet long and 300 feet wide at the mouth where it meets the Turning Basin. The entire tributary is five acres of shoals and mudflats with 2,400 feet of shoreline and crumbling bulkheads. The area is particularly shallow and silty compared to most of Newtown Creek. At the head of Maspeth Creek, there is a combined sewer overflow, dumping millions of gallons of sewage into the stagnant Creek each year. In spite of a century of industrial legacy contamination, uncontrolled sewage discharge and polluted stormwater runoff, there is an abundance of elegant shorebirds hunting amongst the marine wildlife, small mammals foraging, and a rich diversity in the collection of native and non-native flora found on its tree-lined southern edge.



FLORA

With the support of Hudsonia Ltd. and the app iNaturalist, the Newtown Creek Alliance worked to catalog and map the plants and trees in Maspeth Creek. There is a diverse array of native and non-native species, including a number of endangered Ash trees. The map below depicts the tree species, plants cataloged as well as their abundance, with some habitat-defining plants and trees specifically identified.



Green Ash

Fraxinus pennsylvanica

The green ash tree is a fast-growing native of North America. It can grow in many soil types and although it is drought tolerant, it prefers wet soil conditions. The seeds of the green ash are eaten by wood ducks, finches and cardinals.

Red Maple

Acer rubrum

The red maple has small red flowers in spring, playing an important role for early emergent pollinators. It is adaptable to dry sites but more commonly found in wooded areas with seasonal flooding. They reach an average height of 60 to 90 feet.

Mugwort

Artemesia vulgaris

A perennial native to Asia, mugwort has been used as a medicinal plant for centuries. Out of its native habitat, it spreads aggressively through its root systems (rhizomes) and forms dense stands, inhibiting the growth of other species and producing allergy-inducing pollen.

Frost Aster

Symphyotrichum pilosum

Found in abundance in the United States, this small annual bush produces prodigious flowers in the fall until heavy frosts set in. It is found in fields or open woodlands but does very well in disturbed areas, spreading copious amounts of seeds in the wind.

Seaside Goldenrod

Solidago sempervirens

A flowering perennial found in areas with sandy, well-drained, and poor soils, it is salt tolerant. It is a common plant along urban and industrial waterways as well as near salted roadway. It is an important plant for late season pollinators and nesting shorebirds.

Oriental Bittersweet

Celastrus orbiculata

A woody climbing perennial vine with oval leaves and eye-catching red and orange seeds in the fall and winter months. Commonly found at abandoned properties, fields, and road edges, birds and other wildlife eat its seeds and contribute to its dispersal.

FAUNAL DIVERSITY

A diversity of marine wildlife, including various types of bird, fish, crustacean and mollusk exist along the shorelines and mudflats of Maspeth Creek. Key species that are common to wetland habitats, including ribbed mussels and great egrets, make use of the tributary despite the extent of contamination and pollutants currently present. Below are some of the wildlife that has been observed by the Newtown Creek Alliance in recent years.

BIRDS

Wading Birds

Wading birds walk out into shallow water for food like fish, crustaceans, and mollusks. Typical characteristics of herons and egrets include long necks and spear-like bills for striking prey. Long legs keep their feathers and bodies out of the water and widespread toes help them keep their balance in the mud.

Water Fowl

These web-footed birds are highly adapted for an aquatic existence on the water's surface. Ducks feed as either dabblers or divers, and geese exhibit traits of both. Most water fowl mate for life. Some flocks divide their time between nearby land and waterways.

Diving Birds

These birds are perfectly adapted for hunting, whether diving into surface waters or chasing fish deeper down. Diving birds perch on branches or pilings, or hover above the water looking for prey before plunging in for fish, crustaceans, amphibians, reptiles or other aquatic animals.

FISH

Newtown Creek is home to many species of fish, including Striped bass, eel, and mummichog. Mummichog are able to endure extremes in temperature, salinity, and oxygen levels. These resilient fish have been key to sustaining food webs when NY Harbor water quality is at its worst.

BIVALVE

Bivalves are double shelled, soft-bodied invertebrates, whose hard shells close at a hinge. They are suspension or filter feeders and are critical to good water quality. These animals can be found buried in sediments, or attached to rocks, roots, or other hard textured surfaces.

CRUSTACEANS

Crustaceans form a large and diverse group that includes familiar animals like crabs, lobsters, crayfish, shrimp, krill, woodlice, and barnacles. The Blue Crab and the Atlantic Mud Crab are common among the Creek's intertidal areas, foraging for a variety of food-including other crabs. These animals are great swimmers and excellent scavengers.

WATER QUALITY

Water quality within Maspeth Creek is a critical concern when planning for salt marsh restoration. CSO outfall NCQ-077 sits at the head of Maspeth Creek where it releases approximately 300 million gallons of untreated sewage per year, jeopardizing human and ecological health.

The narrow confines and stagnant conditions of Maspeth Creek compound the impacts of untreated sewage discharge. During each sewage overflow event the local ecosystem is thrown into chaos, often requiring extended dry weather periods to return to safe levels of bacteria, nutrients and oxygen.

Dissolved oxygen (DO), the amount of oxygen present in the water, is a key factor in determining the health of a waterway and ability for fish, crabs and other marine wildlife to survive. Warmer water holds less oxygen and can become oversaturated with nutrients, a condition referred to as eutrophication. Eutrophication can fuel algae blooms producing massive amounts of bacteria, decomposing and consuming oxygen in the process. Algal blooms are commonly witnessed in Maspeth Creek during summer and fall months.

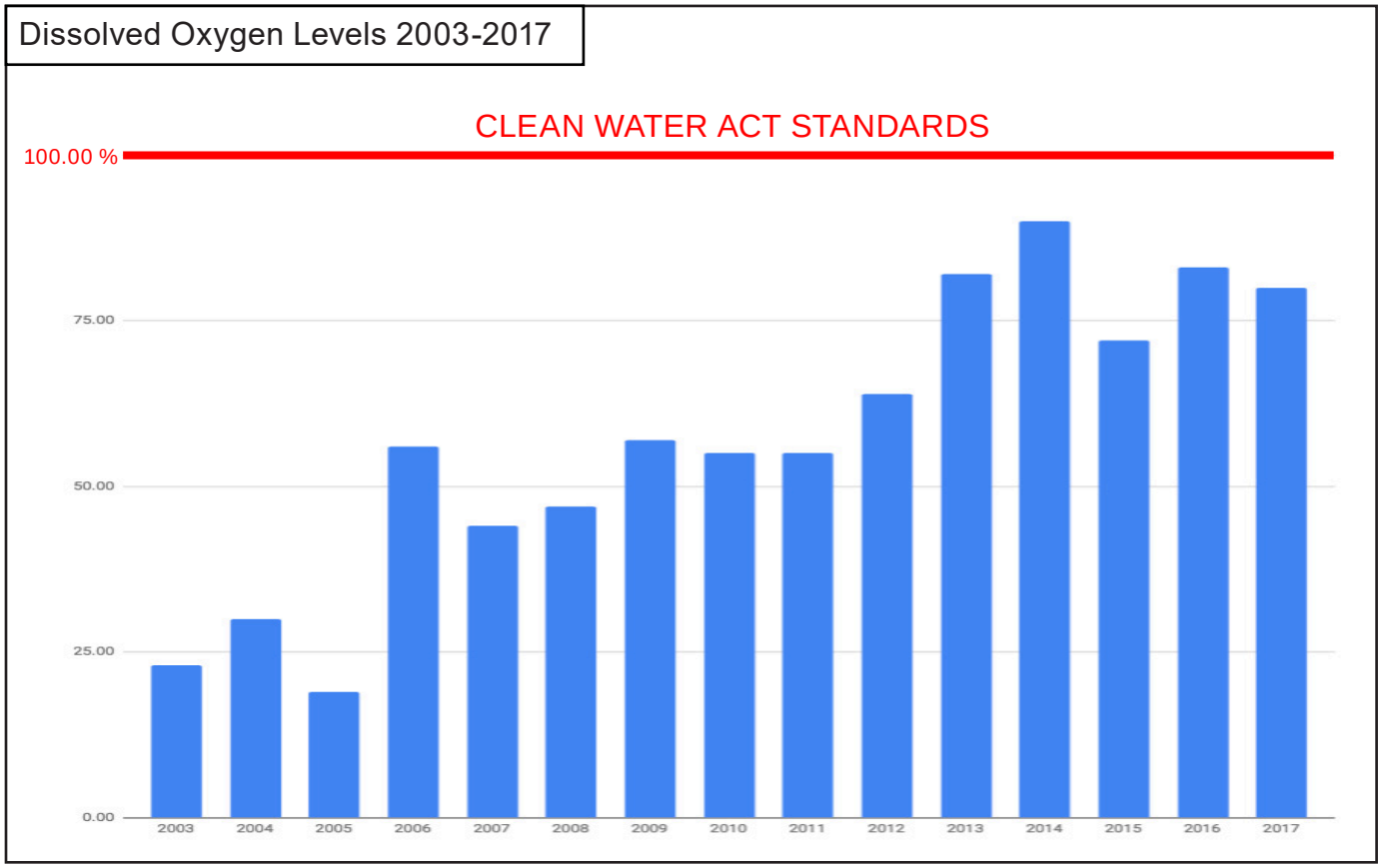
DO is often measured by milligrams per liter (mg/L). New York State requires that dissolved oxygen in the most impaired waterways, including Newtown Creek, not fall below 3 mg/L. While DO is still an issue in the waters near Maspeth Creek,* there have been significant improvements over the past 15 years.

Enterococcus is a sewage indicating bacteria used by federal, state and city agencies in determining water quality. Because the bacteria provides a high correlation with human pathogens often found in sewage, it is a good indicator for how safe a body of water may be for swimming or primary contact. Enterococcus levels are measured as Most Probable Number (MPN) of colonies per 100 mL.

There are varying guidelines for how much Enterococcus is safe for human contact. The EPA's 2012 Recreational Water Quality Criteria states that any individual sample over 60 MPN/100 mL is not fit for swimming and recommends public notification and the possible closure of public beaches. While Maspeth Creek is not a bathing beach and swimming in Newtown Creek is not advisable due to maritime traffic and the presence of chemical contaminants, these guidelines can be helpful in determining baseline health of the waterbody. Data shows that waters in the Turning Basin have consistently **failed to meet Clean Water Act standards.**

*Because of the shallow waters and difficult access, there is not a substantial amount of water quality information within Maspeth Creek. However, there is consistent data collection within the adjacent Turning Basin area, including regular sampling by DEP and Newtown Creek Alliance, since 2003 and 2016 respectively.

Algal blooms at the mouth of Maspeth Creek. Photo credit: Waterways of Hope

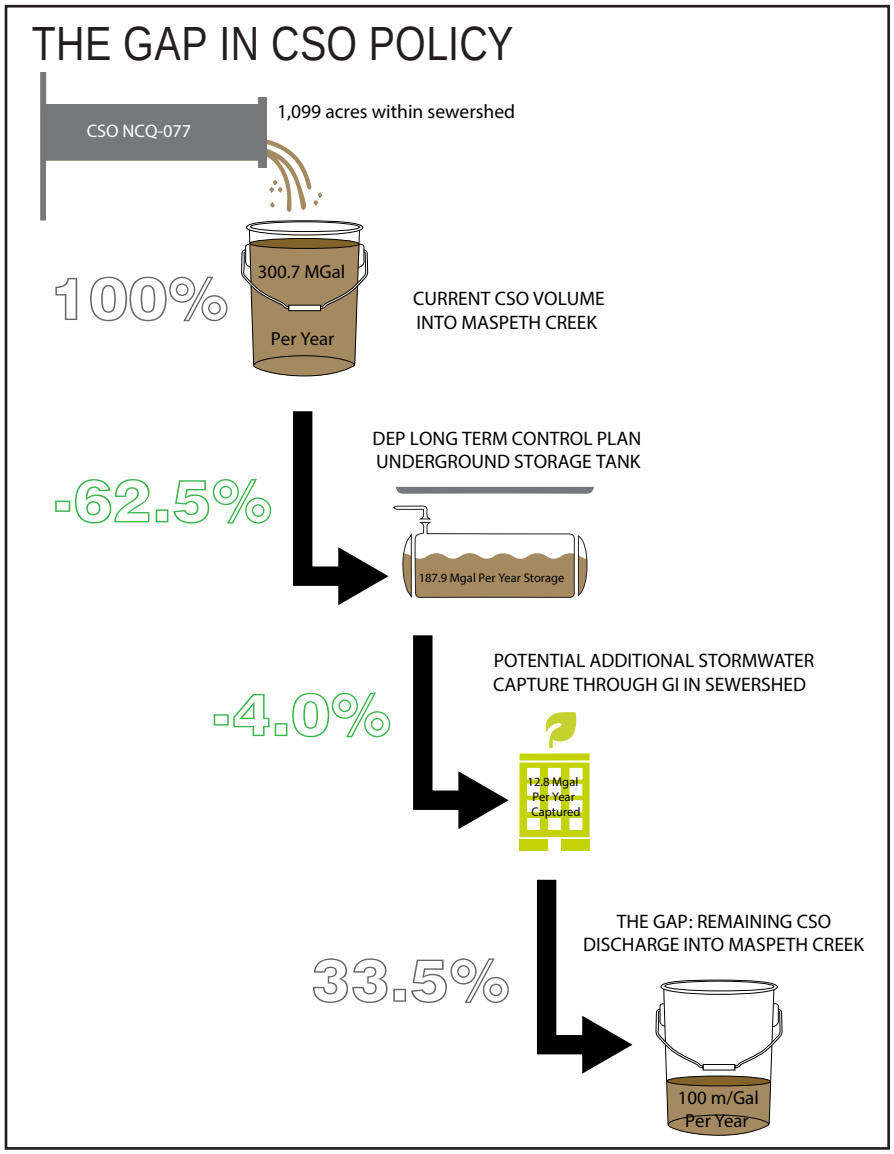


Indicated above is the percent of samples that meet Clean Water Act standards from 2004 to 2017. Base standard to meet is 3mg/L for fish survival. Despite significant improvements waters have consistently failed to meet Clean Water Act standards.

COMBINED SEWER OVERFLOW

Controlling Combined Sewer Overflow (CSO) will be critical for realizing a restored Maspeth Marsh. An estimated 300 million gallons a year flow out of NCQ-077, the CSO outfall in Newtown Creek. With 41 overflow events occurring in 2016 with less than .2 inches of rain, NCQ-077 is the largest single outfall in the Creek.

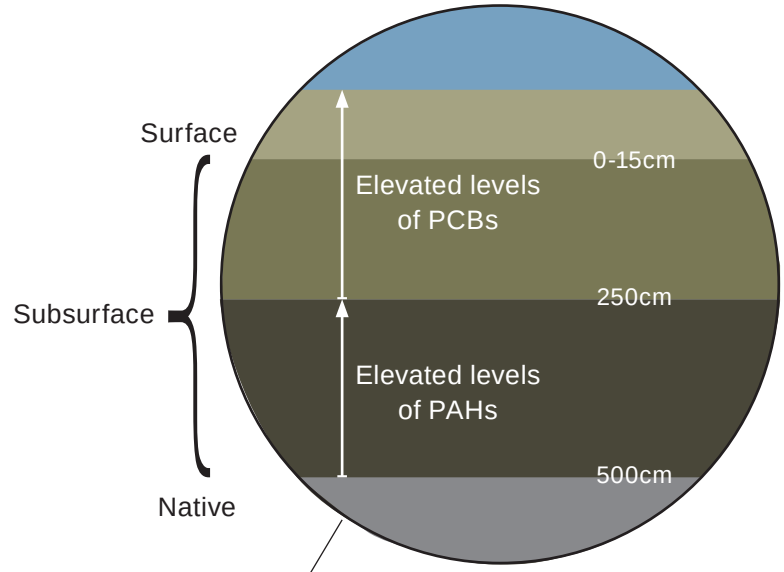
The DEP is required by law to adhere to an agreement with the DEC, called a Long Term Control Plan (LTCP). A LTCP is a long-term strategy to improve water quality and meet Clean Water Act standards. Based on modeling numbers within the LTCP, total CSO volume entering Newtown Creek will be approximately 500 million gallons per year. This represents a 58% decrease from the baseline of 1,161 million gallons per year. Thus, there will continue to be a tremendous amount of untreated sewage and stormwater entering the waterway every year. Understanding how much stormwater will continue to enter Maspeth Creek, after the LTCP is fulfilled, is critical to understand marsh potential and then to determine adaptive strategies to realize a salt marsh goal. The analysis graphic at right demonstrates the quantity of CSO that will be addressed via the existing LTCP. The potential strategies to address stormwater that go beyond the LTCP are explored in the potential strategies section of this document.



Active CSO at the head of Maspeth Creek

SEDIMENTS

As with the entirety of Newtown Creek, chemical contamination within the sediments of Maspeth Creek pose significant risk to human and ecological health and needs to be properly addressed as part of any long-term planning or redevelopment, including wetland restoration. The surface and subsurface sediments contain a mixture of historical and recent contaminants associated with nearby sources including CSO and industrial operations such as the Phelps Dodge and Brooklyn Union Gas sites. Using data from Superfund investigations, below is a generalized profile of the sediments and descriptions of just three contaminants of concern.



PCBs

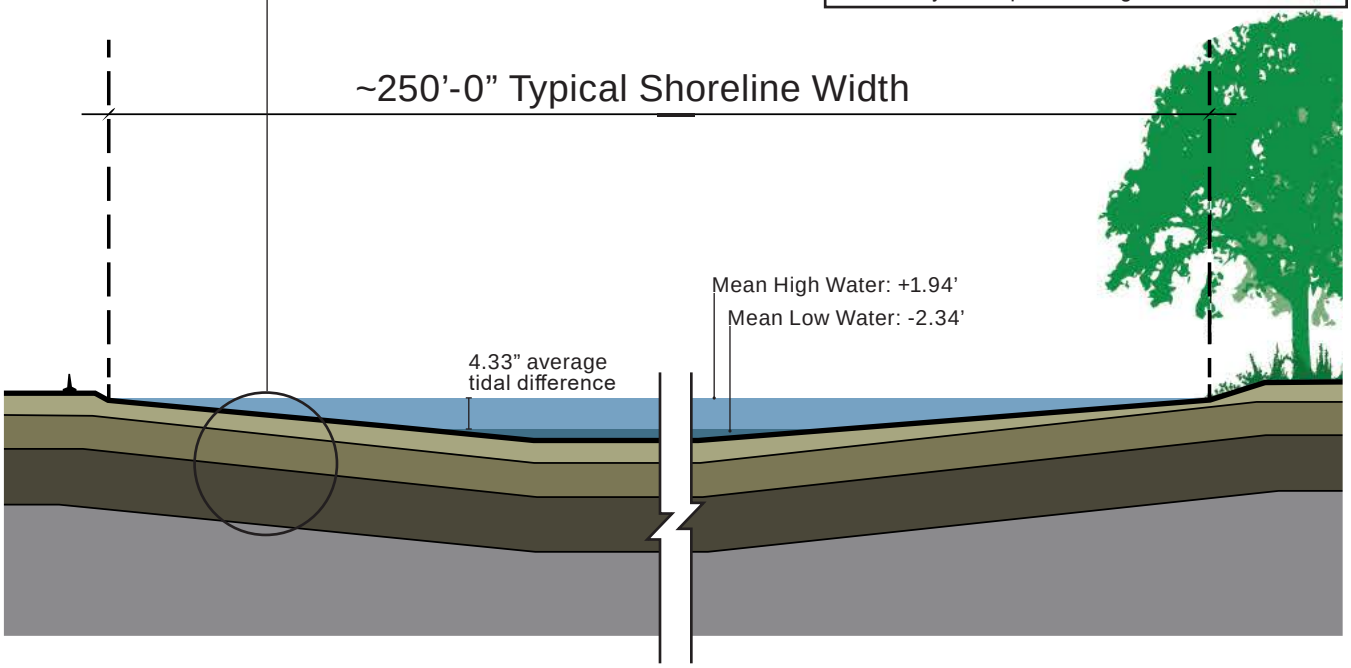
Polychlorinated Biphenyls are a group of 209 toxic man-made chemicals consisting of carbon, hydrogen and chlorine atoms. Prior to the Clean Water Act, industries utilized PCBs for many production related applications. Because they are easily absorbed and accumulate in flesh, they present a risk to marine wildlife and humans.

PAHs

Polycyclic aromatic hydrocarbons are a group of over 100 chemicals that form during the incomplete burning of materials such as coal, oil and gas, garbage, crude oil, and asphalt. PAHs have been shown to cause health problems, including tumors, complications in reproduction, and immunity.

Copper

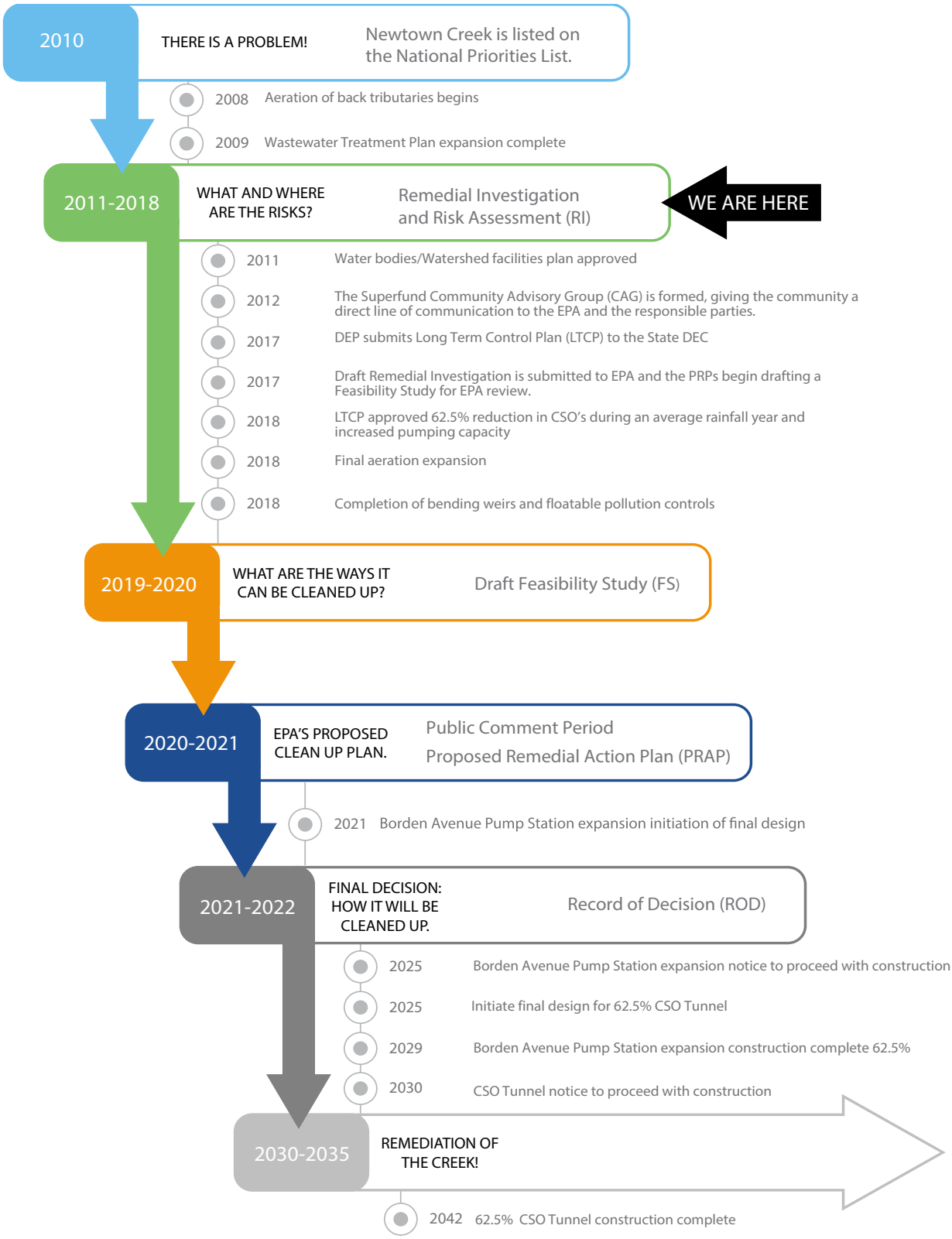
Copper is a reddish metal naturally occurring in rock, soil, water, sediment, and air. Copper refining or mining operations can lead to copper contamination in soils and waterways. Copper is an essential element for living organisms, including humans, but toxic effects can occur when they are exposed to high levels.



AGENCY AND POLICY CONTEXT

The systems map below illustrates in detail the agencies, policies, and elected officials that have the ability to influence and shape the future of Maspeth Creek.

TIMELINE


2010
THERE IS A PROBLEM!
Newtown Creek is listed on the National Priorities List.
2008 Aeration of back tributaries begins
2009 Wastewater Treatment Plan expansion complete
2011-2018
WHAT AND WHERE ARE THE RISKS?
Remedial Investigation and Risk Assessment (RI)
WE ARE HERE
2011 Water bodies/Watershed facilities plan approved
2012 The Superfund Community Advisory Group (CAG) is formed, giving the community a direct line of communication to the EPA and the responsible parties.
2017 DEP submits Long Term Control Plan (LTCP) to the State DEC
2017 Draft Remedial Investigation is submitted to EPA and the PRPs begin drafting a Feasibility Study for EPA review.
2018 LTCP approved 62.5% reduction in CSO's during an average rainfall year and increased pumping capacity
2018 Final aeration expansion
2018 Completion of bending weirs and floatable pollution controls
2019-2020
WHAT ARE THE WAYS IT CAN BE CLEANED UP?
Draft Feasibility Study (FS)
2020-2021
EPA'S PROPOSED CLEAN UP PLAN.
Public Comment Period
Proposed Remedial Action Plan (PRAP)
2021 Borden Avenue Pump Station expansion initiation of final design
2021-2022
FINAL DECISION: HOW IT WILL BE CLEANED UP.
Record of Decision (ROD)
2025 Borden Avenue Pump Station expansion notice to proceed with construction
2025 Initiate final design for 62.5% CSO Tunnel
2029 Borden Avenue Pump Station expansion construction complete 62.5%
2030 CSO Tunnel notice to proceed with construction
2030-2035
REMEDIATION OF THE CREEK!
2042 62.5% CSO Tunnel construction complete

Improving Water Quality

POTENTIAL STRATEGIES

In order for a Maspeth Creek salt marsh to flourish, there are key limiting policy and water quality issues that would need to be addressed. CSO, direct drainage, and legacy contaminants would need to be significantly reduced or eliminated. Once contamination is limited, a method to increase tidal flow or source water flow would be necessary. To secure the long term vitality of the marsh, eliminating or limiting future large vessel navigability would be critical. This section identifies strategies that will help to create these baseline conditions, including the policies already in motion, and measures that could be implemented beyond existing policies.

REDUCING CSOs

While the Long Term Control Plan will reduce sewage, the volume of CSO released will still be substantial, particularly in an area as shallow and stagnant as Maspeth Creek. Moreover, the measures that will result in the largest sewage reductions, like the tunnel storage project, will not be complete until 2042. Of the reductions planned, Green Infrastructure (GI) assets will manage less than ten percent of total managed stormwater. Although GI is a method currently used to reduce CSO events, it is underutilized and represents untapped potential.

View GI project maps and plans on the DEP website: nyc.gov/greeninfrastructure

Maspeth Creek CSO Outfall

GREEN INFRASTRUCTURE

Green Infrastructure (GI) uses ecological systems, such as soil and plants, to reduce and eliminate stormwater entering the sewer system. GI helps reduce pollution, capturing stormwater runoff from rooftops, sidewalks, and roads through rain gardens, roadside plantings, and green roofs. By preventing polluted stormwater from draining into our waterways, GI decreases the frequency of CSOs.

DEP primarily uses infiltrating bioswales, or rain gardens, throughout the sewershed. However, there are many other GI mechanisms that would be effective that are not currently in the LTCP, such as options for non-infiltrating bioswales, engineering assessments of green roofs, GI potential and requirements on private property or in redevelopment projects, and an analysis of potential above ground rainwater capture along elevated highways or along manufacturing corridors.

Expanding the opportunity area for GI should be considered, because unlike large infrastructure stormwater capture projects, which

can take decades to complete, GI projects can be completed in short time frames and at significantly less cost. GI also has many additional co-benefits such as filtering the air, lowering surrounding ambient air temperature, reducing local flooding, and providing habitat for wildlife. There is a need for many of these co-benefits in the area around Maspeth Creek, like cooling temperatures and providing an adaptive flood risk strategy. Maspeth ranks high as one of hottest areas for Urban Heat Island (UHI) in the city and is Highly Vulnerable according to the Heat Vulnerability Index, which takes into account high temperatures, green space, and other social factors for the area. The area around Maspeth Creek is within a 100-year floodplain zone; it flooded during Superstorm Sandy and will likely flood again in a similar rain event. GI has the potential to help Maspeth adapt to these issues that continue to grow as a result of climate change.

Recognizing some of the limitations of the existing GI private property grant program, and in an effort to spur participation, DEP released a Request for Proposals in November 2018 for a consultant to implement a Private Property Green Infrastructure Retrofit Incentive Program. Though this could represent positive change for GI in Maspeth on private property, other options should simultaneously be pursued. CSOs are under investigation as sources of chemical contamination under the Superfund process. As with the Gowanus Canal, it is possible that the EPA will require CSO reductions and capture in Newtown Creek. GI remains a cost-effective alternative method, with the added bonus of co-benefits, to meet requirements.

NCA Installing GI Near Newtown Creek

Jamaica Bay Marine Park Salt Marsh

Kingsland Wildflowers Green Roof

AREAS OF OPPORTUNITY

In order to demonstrate and develop an understanding of Green Infrastructure opportunities not identified in the LTCP, we utilize a model developed by our partners at the SWIM Coalition. The model develops a broad picture of potential capacity for the CSO drainage area to manage stormwater. The exercise functions as an educational tool to help identify GI potential and the scale of the CSO that must be managed. The model utilizes available data and GIS spatial analysis, identifying different land and building uses that could support GI through a diversified mix of green infrastructure solutions. These solutions include green roofs, permeable parking lots, rain gardens, linked greenways, wetland restoration, and marsh grass habitat for bank stabilization.

The CSO sewershed is analyzed by land use, lot size and building area, selecting for a mix of property types, including educational structures and lots, industrial buildings of scale, parking lots and vacant lots. Parks and cemeteries are also included in the assessment because these land uses, with compacted and underutilized soils, are generally underperforming in their stormwater capture. They too can be retrofitted for improved stormwater capture.

The project area for the Maspeth Creek model focuses on NCQ-077. While the area is highly impervious, it has the potential to manage a significant amount of stormwater. In order to understand how the system manages stormwater it is necessary to look at current management capacity at different levels of rainfall, considering the amount of rainfall generated at each level, in inches, across the area of the CSO drainage basin. Once the quantity of water generated is understood, the amount managed across the sewershed by the Newtown Creek Wastewater Treatment Plant can be accounted for. As long as the Treatment Plant is able to process the stormwater, a CSO overflow will not occur. The point at which the sewer overflows is considered the trigger point of the CSO. We calculate the remaining amount of stormwater, the amount that will overflow, at each rainfall quantity and at the trigger point, via a simple calculation. Quantity generated minus the quantity managed determines the amount of stormwater that needs to be mitigated and enters the CSO at each rainfall level.

The calculations show that the CSO sewershed can potentially manage nearly half of the stormwater via various green infrastructure assets at .5 inches of rainfall (when utilizing projected 2017 DEP data). There are a number of assumptions made, in that the exercise assumes each property selected is suitable and could store stormwater at an average capacity. In actuality, there are limiting factors, social and physical. Regardless of these limitations, the exercise illustrates that many opportunities remain that could have a significant impact on stormwater mitigation. These opportunities can be researched and pursued now through city agency collaboration and effective outreach for the new existing and forthcoming GI grant program. This exercise shows that there is potential to have a significant impact on NCQ-077 long before a large infrastructure project is completed.

SYSTEMS SOLUTIONS

Another method of stormwater management to consider is **Regenerative Stormwater Conveyance**. Water is captured and either filtered through a designed system of pipes and catchments or using ecosystem conveyance methods to treat, capture and transport. The system is designed to avoid infiltration into possibly contaminated soils before conveyance to the Creek. The system is utilized to capture clean, uncontaminated water, to recreate natural flow conditions and to take the place of historic natural springs. The method could be integrated into non-infiltrating green infrastructure projects as well.

The focus of this restoration plan is to determine the conditions needed to develop a **Salt Marsh**, and once a salt marsh flourishes it will form a feedback loop to improve the conditions necessary for its continued success. An effective salt marsh can help improve water quality in Maspeth Creek. While minimum conditions must first be met for its survival, installation of the salt marsh would help maintain the water quality in marsh. Cordgrasses uptake excessive nutrients as well as transfer oxygen through their root system back into the water column. Additionally ribbed mussels, which grow at the base of spartina alterniflora, can filter out various bacteria, including Enterococcus. Further improvements to water quality could be achieved if the depths of Maspeth Creek were restored to a more natural system where the areas near the head of the tributary were shallower to help create circulation and flush water out towards the Turning Basin.

A **Floating Boom** currently blocks the mouth of Maspeth Creek. It was installed and maintained by DEP to prevent floating trash originating from the CSO from entering the rest of Newtown Creek and NY Harbor. While the boom serves as a common foraging and resting spot for numerous waterfowl, it restricts the movement of surface waters. In December 2017 the DEP completed a major upgrade of the CSO so that it would collect floatables and prevent debris from entering Maspeth Creek, eliminating the need for a containment boom. The removal of the boom could help with circulation and improve water quality.

Regenerative Stormwater Conveyance Roof Capture, Bioretention, Philadelphia Water Department.

Salt Marsh, Jamaica Bay, NYC Sierra Club

Floating Boom, NCA

ADDRESSING LEGACY CONTAMINATION

As noted in the timeline on page 10, Newtown Creek is roughly two years away from a Record of Decision (ROD) that will determine the extent of the contamination and the cost of cleanup, moving the remediation process into action. The best-case scenario for remediation would be a Creek that is dredged of contamination and then filled, a process whereby the contaminated soils and silt are removed and replaced with new sediment and soils. Because contamination in some Superfund sites is found to depths of 100 feet or more, the clean-up strategy could also involve dredging and then capping the Creek floor with cement or clay to prevent recontamination prior to replacing with sediments and soil. Though a cement-floored Creek is a bold measure, the capping and filling would provide workable conditions for a salt marsh installation.

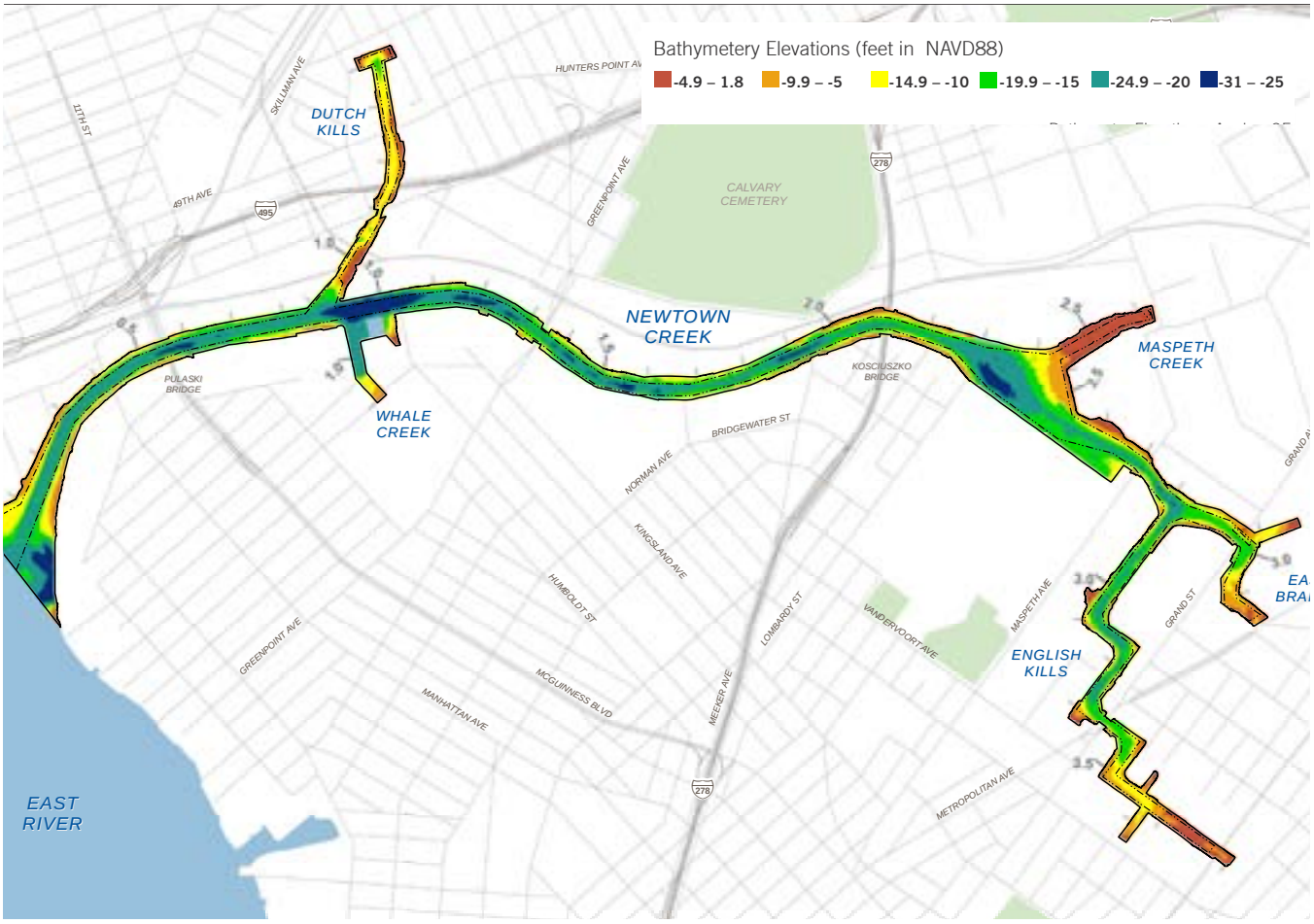
Though there is little the community can do to physically mitigate contamination, the community can help to expedite the Superfund process. An active Community Advisory Group (CAG) can advocate for and ensure that a ROD is reached as soon as possible and then implemented as quickly and effectively as possible. NCA and Riverkeeper recommend an active, diverse CAG represented by businesses, educators, recreational users of the Creek, and community members from both boroughs and neighborhoods to expedite a fair and just process.

Sediment dredging on Gowanus Canal. Credit: Brooklyn Eagle

NAVIGABILITY

In order to ensure the longevity of a Maspeth Marsh, social and legal agreements about the navigability of the channel need to be reached. While recognizing issues of navigability on Newtown Creek are sensitive, NCA and Riverkeeper believe that there are some areas not suited for navigability. The areas not utilized or needed by businesses on the Creek ought to fulfill other environmental and community needs. Of the few areas within the Creek where navigability is no longer relevant, Maspeth Creek could benefit the most from denavigation. Delisting Maspeth Creek as a navigable channel is a Federal process, but there are other methods that could ensure areas along Creek edges are available and protected for marsh restoration. Lease agreements can be reached, through which shoreline rights are purchased and placed in the hands of Land Trusts and Partnerships. We see opportunity for developments like these to take shape as part of the Natural Resources Damages Assessment and resulting repayment for environmental losses.

The chart below shows water depths within Newtown Creek. Maspeth Creek is the shallowest area of the entire Creek, a trait well suited for salt marsh restoration. Source: AnchorQEA.



Depth in Newtown Creek

Maspeth Marsh

SALT MARSH IN NYC

Understanding the significance of salt marsh habitats within the context of the larger New York harbor estuary can better situate the value of ecological restoration within a challenging area like Maspeth Creek. In addition to providing intertidal habitat to an array of marine wildlife, improving water quality and stabilizing shorelines, salt marshes are also an essential tool in mitigating impacts from climate change driven storm surges.

NYC Parks Department, which restores and manages salt marshes within its jurisdiction, has shared its insight on the significance of salt marshes to NYC.

NYC Parks

Coastal salt marshes provide essential habitat for birds, fish, and other organisms, sustain biodiversity, and offer unique experiences for people to experience nature in our highly developed urban environment. Salt marsh ecosystems also provide essential ecosystem services to improve the ecological health of our city. They help improve water quality by filtering pollutants and excess nutrients and protect our communities from storm impacts by detaining floodwaters and dampening wind and wave energy. Salt marshes can also help to mitigate climate change in the long term by capturing and storing carbon.

Over the past 100 years, much of New York City's 520 miles of shoreline have been armored, filled, and developed, leading to the loss of thousands of acres of salt marsh. Today, less than 10% of the historic extent of New York City's salt marsh remains—about 4,000 acres. Protecting existing salt marshes, and other natural shoreline habitats that might convert to tidal wetlands as sea levels rise, is a critical strategy for ensuring that New Yorkers benefit from salt marsh ecosystems in the long run. With ongoing salt marsh loss, due to sea-level rise and continuing development pressures, salt marsh restoration remains an important tool for conserving this valuable ecosystem for future generations of New Yorkers.

Salt marshes occupy a unique ecological niche in the landscape in the intertidal zone along the shoreline of our bays and estuaries and provide a critical ecological connection from our waterways to our uplands. Each plant species found growing in salt marshes is adapted to flooding with saline water at a certain depth, duration and frequency, and thus inhabits a specific elevation range relative to mean tide level. Throughout the northeast, salt marshes are characterized by distinct plant communities at the lower and higher end of the tidal range: the low marsh and high marsh.

Low marsh species typically thrive at elevations between the mean tide level and mean high water level (MHW) and are flooded by the tides twice daily. The low marsh is dominated by Spartina alterniflora (salt marsh cordgrass). Few other species are able to survive these conditions aside from the ribbed mussels that attach themselves to the base of the plants, providing support and stability for the plants. The high marsh floods twice per month during the full and new moons and typically establishes between MHW and mean higher high water (MHHW). The high marsh floods twice a month during the full and new moons and is able to support a wider array of species from grasses and wildflowers to shrubs. The high marsh is typically dominated by Distichlis spicata (salt grass), Iva frutescens (marsh elder), Juncus gerardii (black grass), and/or Spartina patens (salt meadow cordgrass or salt hay). This structure allows the high marsh to be a critical nesting ground for many birds. Transitional salt marsh communities are found above MHHW and are adapted to irregular flooding from storms or spring tides and some level of salt spray. Transitional zones are generally dominated by Baccharis halimifolia (groundsel bush), Morella pensylvanica (bayberry), Schizachyrium littorale (coastal little bluestem), and Solidago sempervirens (seaside goldenrod), among others. Transitional zones provide critical linkages to upland maritime grassland, shrubland, and/or forest at higher elevations and will be important ecosystems to protect and restore in order to allow marshes to migrate inland as sea levels rise.

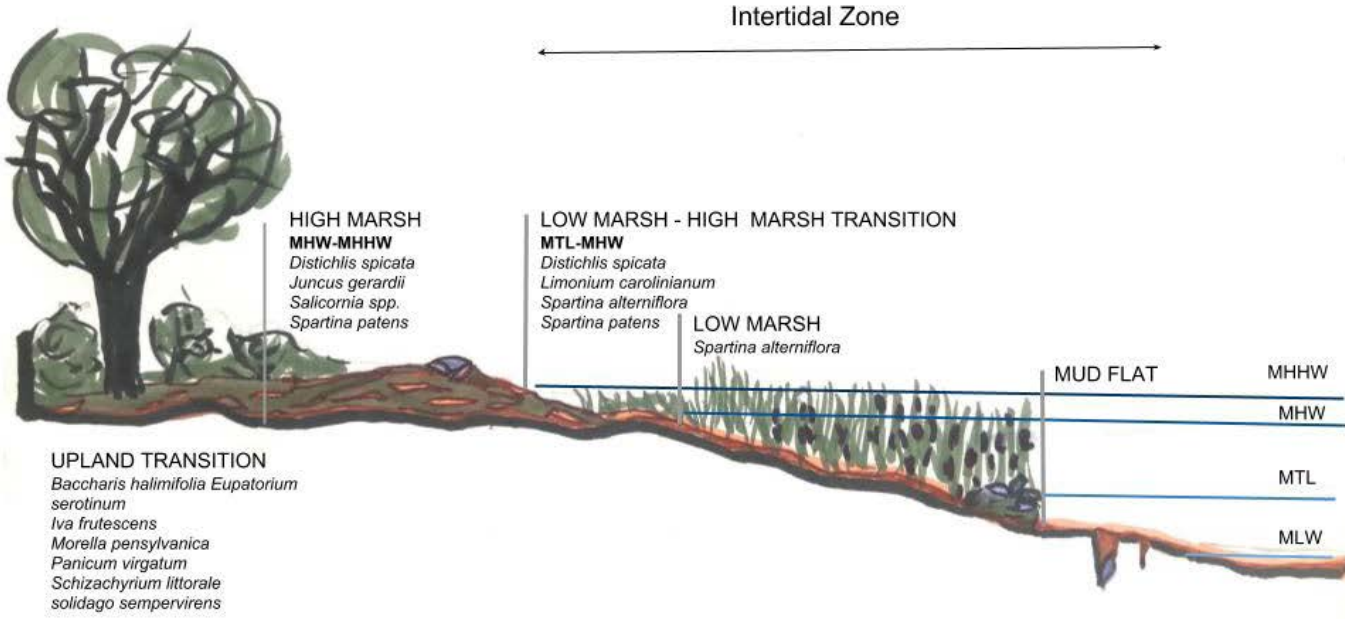
PRECEDENT PROJECTS

Newtown Creek is no stranger to Salt Marsh. The Newtown Creek Alliance and LaGuardia Community College students and professors have been researching and installing salt marsh grasses since 2013, using various adaptive strategies along bulkheaded shorelines such as floating Living Docks and Intertidal Wetland Frames (right).

New York City Department of Environmental Protection (DEP) has undertaken a salt marsh pilot study and has expanded its original study area in another inaccessible area of Newtown Creek, Dutch Kills.

DEP states that “the wetlands will help to improve water quality, provide habitat for wildlife and a more natural aesthetic area for the community.” The recent expansion of the project would support the growth of 6,900 square feet of Spartina alterniflora plugs. Given the poor water quality conditions in Dutch Kills, the success of the project is an amazing signal for salt marsh in the rest of the Creek. The success of these pilot studies in Maspeth Creek is reason enough to believe that given the right conditions, a salt marsh project would succeed and contribute to the health of the Newtown Creek ecosystem.

3.5 ACRES
OF RESTORED MARSHLAND



Typical profile of a natural salt marsh and maritime upland zone. Coastal plant communities are defined relative to tidal inundation levels from NYC Parks Salt Marsh Restoration Design Guidelines. Illustration: Chrissy Remein


49th Street
Maspeth Avenue
48th Street
57th Avenue
1
2
3
4
5
6
7
8
9
10
1 Combined Sewer Outfall
2 Future Public Promenade
3 Rain Harvesting
4 Fresh Water Recharge
5 Native Upland Trees
6 Low Marsh Sub Emergent
7 Sparse Emergent
8 High Marsh Transition
9 Delist Navigation
10 Mussel Island


Maspeth Marsh

2018 Vision Plan

Maspeth Creek Marsh is part of a network of improvements developed for the Newtown Creek Vision Plan. The design area creates ecological and infrastructural improvements that protect local businesses from flooding, provide protected habitat and specific walkways and access points.

Assuming remediation of legacy contamination, improved waterfront edge designs realize ecological potential of the open flowing Turning Basin. Maspeth Creek marsh restoration anchors environmental revitalization, returning a natural asset to marine life and the community. A continuous Creek-side walkway along the northern shore of the Turning Basin, a vacant inaccessible shoreline stretch along the former Phelps Dodge Cooper smelting plant, provides needed open space and connects to the new Kosciuszko Bridge parks. Installed on the western side of the elevated walkway, tethered wetland platforms increase bioavailable salt marsh. The walkway leads to a 49th street overlook near a 2.7 acre parcel of city owned land, another opportunity to capture stormwater with ecosystem and community benefits. Green roofs, throughout, offer opportunities to capture stormwater and provide aesthetic improvements. In an effort to recreate a historical ecological feature, a shoal that was long ago dredged, recreates Mussell Island. Without impeding boat navigation, the intertidal mound of oysters and ribbed mussels provides improvements to water quality and serves as habitat for local shorebirds.


NEW 49TH STREET PUBLIC SPACE
49TH STREET OVERLOOK
OUTDOOR CLASSROOM
PUBLIC PROMENADE
PATH GET-DOWN
MARSH RESTORATION
SURFACE PARKING GREEN INFRASTRUCTURE
MUSSEL ISLAND
GREEN SHORELINE

Conclusions

Though this document focuses on ecological restoration, it also represents the balance that Riverkeeper and Newtown Creek Alliance seek in a remediated and restored Newtown Creek. The plan considers the impacts on water quality and ecological health, while taking into account the context of existing industrial uses and recreation opportunities. Maspeth Creek represents one of the best places for salt marsh in Newtown Creek, and a unique location in New York City.

Driven by city and federal agencies and by local advocates, water quality and stormwater management has improved in Newtown Creek in the past decade. Realizing this project though, is largely contingent on the decisions made in the Superfund process and the timeline therein. To achieve a Maspeth Creek Marsh, an active, vocal and diverse Newtown Creek community and Newtown Creek Community Advisory Group (CAG) can help to amplify the need and expedite the process. You can be a part of achieving Maspeth Creek Marsh, attend a CAG meeting, support Newtown Creek Alliance's mission, or connect to Riverkeeper's advocacy campaigns.

For more information on the Newtown Creek CAG visit: https://newtowncreekcag.wordpress.com/

Site visit at Maspeth Creek with NYC Parks and LaGuardia Community College

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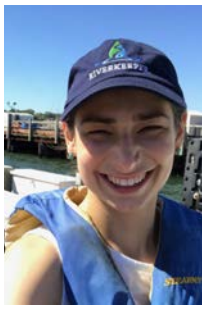
TEAM

RIVERKEEPER
NY's clean water advocate



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