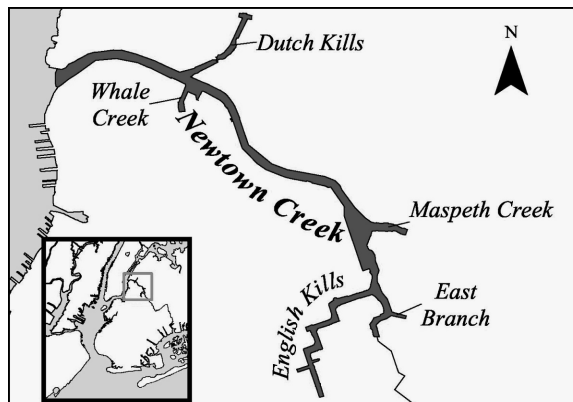


**USE AND STANDARDS ATTAINMENT PROJECT  
PRELIMINARY WATERBODY/WATERSHED CHARACTERIZATION REPORT**

**NEWTOWN CREEK**

**Introduction**

Newtown Creek is an estuarine tributary of the East River, located between the Boroughs of Brooklyn and Queens. The headwaters of the creek begin at Johnson Avenue in Brooklyn, flowing downstream in a northwest direction to where it enters the East River. The creek has several tributaries, branches and turning basins but no freshwater sources. The tributaries and upstream end of the creek are narrow, bulkheaded and shallow with water quality mostly influenced by the watershed. The downstream reach deepens and broadens into the East River and its water quality is influenced most by New York Harbor conditions.



The Newtown Creek watershed includes several neighborhoods in Brooklyn and Queens, and is serviced by two water pollution control plants with combined and separately sewered areas. There are no freshwater sources other than combined sewer overflows (CSO) and stormwater during wet weather. Waterbody and waterfront uses are primarily commercial and industrial supported in some measure by waterborne transportation. There are no developed parks adjacent to the creek and there is very limited recreational access to the waterbody and few existing recreational waterbody uses.

The following preliminarily characterizes the Newtown Creek project area for the Use and Standards Attainment Project being conducted by the New York City Department of Environmental Protection (DEP). Water quality improvement projects and other water use initiatives are also described. The project area for this characterization includes the watershed and all waters of Newtown Creek and its tributaries, terminating at the East River.

**Waterbody/Watershed Characteristics**

The following preliminarily describes the physical, water quality, and ecological characteristics of Newtown Creek and its watershed, as documented in historical chronicles and/or

other publications. Designated uses, compliance with water quality standards, and other regulatory issues concerning Newtown Creek are presented.

### Historical Changes

Newtown Creek was originally a stream draining the uplands of western Long Island. Newtown Creek has had a long history of maritime and manufacturing activity along its banks and within the vicinity of the creek. First mapped by Dutch settlers in 1613-14, Newtown Creek was once a meandering estuarine stream surrounded by wetlands that have been filled and dredged. Tributary creeks that once reached far into the watershed and flowed through marshes have been eliminated, water courses have been permanently altered, and riparian zones have been created and removed. For instance, in 1855 the waters of Maspeth Creek surrounded a small island called Mussel Island that has since been eliminated. By 1891, Newtown Creek had few more undisturbed tributaries than it presently possesses, although Maspeth Creek and Dutch Kills once extended much farther into the watershed than they do today. During the 1920s and 30s, Newtown Creek was widened and deepened to accommodate heavier shipping traffic, thus emerging as a major shipping hub for the Northeast United States. These developments transformed the area surrounding the creek from supporting agricultural and shellfishing uses to mostly industrial uses such as sugar refineries, tanneries, canneries, copper wiring plants, and oil refineries. Although waterfront industrial activities have significantly declined over the years, Newtown Creek still remains an active area for manufacturing, wholesale distribution, solid waste handling, oil storage and distribution, and municipal uses.

### Physical

Newtown Creek is 3.8 miles long from the East River to its farthest reach inland, and has a total surface area of approximately 165 acres. There are five major tributaries or branches: English Kills, East Branch, Maspeth Creek, Dutch Kills and Whale Creek. The East Branch and English Kills both have small turning basins oriented perpendicular to the creek. Seven bridges span the creek: Grand Street/Metropolitan Avenue bridge, Grand Avenue bridge, Kosciuszko bridge, JJ Bryne Memorial bridge, Hunterspoint Avenue bridge, Borden Avenue bridge and Pulaski bridge. Several of these are drawbridges. The Pulaski bridge, JJ Bryne Memorial bridge and Kosciuszko bridge cross the creek at a significant height and do not restrict vessel traffic.

As a tributary to the East River, Newtown Creek is an estuarine waterbody experiencing a semi-diurnal tidal cycle varying between 5 and 7 feet. Newtown Creek has been dredged to varying depths of about 15 to 16 feet at mean low water (MLW) and widths between 200 and 300 feet. This accommodates small ship and barge navigation through most of the waterbody. The tributaries and

branches of the creek are also relatively deep, between 10 and 17 feet MLW, although shallowing towards their head ends where sediments are often exposed at low tides. English Kills, upstream of Metropolitan Avenue, becomes very shallow for a significant distance towards its head end at Johnson Avenue. The downstream reach of Newtown Creek is significantly wider than English Kills and the other tributaries, averaging about 550 feet, and expanding to approximately 820 feet as it enters the East River. There are no tidal wetlands in Newtown Creek designated by the New York State Department of Environmental Conservation (DEC). Shorelines along Newtown Creek are almost entirely bulkheaded or supported by riprap with some sections in disrepair and others entirely collapsed.

With well-defined shoreline boundaries channelized for maritime industrial activities and intermodal transportation (rail-barge), Newtown Creek will most likely remain a working waterfront development area in the future. The vast majority of Newtown Creek is designated as a Significant Maritime and Industrial Area in New York City's "The New Waterfront Revitalization Program," which was released by the New York City Department of City Planning in September 2002. As a major waterfront industrial area, there exists a wide range of manufacturing, distribution, waste handling, transportation, and other municipal uses along the creek, including the City's Newtown Creek Water Pollution Control Plant (WPCP) and Greenpoint Marine Transfer Station, the Brooklyn Union Gas Company, ExxonMobil, and a former Phelps Dodge copper refinery. Oil storage and distribution facilities are located on the creek, where soil and waterbody contamination is being addressed via State consent orders for remediation. There are twelve solid waste transfer stations along the creek - the highest concentration in New York City. There are no developed parks adjacent to the creek. Although a waterfront promenade is planned by DEP for the Newtown Creek WPCP, most of the shoreline areas will still be dedicated to industrial uses with limited public access. Other opportunities for public access to Newtown Creek are at bridges and a few streets that end at the creek. Commercial and industrial waterbody uses of the creek have decreased but scrap metal barging and oil transport continue. A local canoe club, the Newtown Creek Canoe and Kayak Club, and the East River Apprenticeship make recreational use of the waterbody.

Newtown Creek borders the Brooklyn neighborhoods of Greenpoint and East Williamsburg and the Queens neighborhoods of Hunters Point, Long Island City, Blissville, West Maspeth, and Ridgewood. The waterbody lies between, and its watershed includes, Community District 1 in Brooklyn and Community Districts 2 and 5 in Queens. Land uses within a quarter mile radius of the creek are 53 percent industrial, 30 percent commercial, 3 percent residential, 4 percent vacant, 4 percent institutional, and 6 percent miscellaneous. The Calvary Cemetery (open space) and residential uses constitute a very small portion of the land uses adjacent to the waterbody. However, moving upland into the watershed, residential uses predominate.

The Newtown Creek watershed is approximately 12,000 acres and is drained by storm and combined sewers. The watershed has been permanently altered by urbanization such that there is no freshwater flow to the creek other than stormwater and combined sewer overflows (CSO) during wet weather. Sewer systems in the watershed are located in the service areas of the Bowery Bay and Newtown Creek WPCPs, with areas north of the creek within the Bowery Bay service area and areas south of the creek serviced by the Newtown Creek WPCP. The Bowery Bay WPCP discharges to the upper East River. The Newtown Creek WPCP primarily discharges to the East River, but sometimes overflows during wet weather to Whale Creek. There are twenty CSOs and well over 100 stormwater discharges to Newtown Creek, of which twelve CSOs discharge from the Bowery Bay WPCP service area and eight CSOs discharge from the Newtown Creek WPCP service area. The CSOs are located throughout the length of the waterbody and several significant CSOs are located at the head ends of English Kills, East Branch, Maspeth Creek and Dutch Kills. In addition, there are a number of state-permitted industrial and other discharges to the creek.

### Water Quality

Newtown Creek is classified by the State of New York as a Class SD saline surface water with a designated use of fishing. The numerical dissolved oxygen water quality standard for Class SD is a never-less-than concentration of 3.0 mg/L, intended to support fish survival. A Class SD waterbody has no recreational designation and as such has no numerical water quality standards for coliform bacteria. Narrative water quality standards apply to the creek protecting aesthetic and other uses.

Several water quality and sediment characterizations of Newtown Creek have been conducted by DEP since 1982. DEP conducted the Inner Harbor CSO Facility Planning Project, which included water quality field investigations at a station near the mouth of Newtown Creek, from May through September 1989. Dry and wet weather surveys of the creek and special studies characterized water quality and sediment conditions and identified sources of impairments at this station. The Newtown Creek Water Quality Facility Planning Project collected dry and wet weather data at multiple locations in the creek in 1990 to characterize water quality and sediment conditions and identify sources of impairments. Water quality data was collected between November and December 1993 during an Air Curtain Pilot Study for DEP's City-Wide Floatables Study. An instream aeration pilot study was conducted by DEP in 1996 with data collection.

The DEP's Harbor Survey has been monitoring water quality at three stations near the mouth of Newtown Creek since 1968. Monitoring is conducted at stations twice per month during summer and once per month for the remainder of the year. In 2003, three stations were added to the Harbor Survey inside Newtown Creek with the same monitoring frequency. One station is located near the

mouth of Whale Creek, one halfway between the Kosciuszko and JJ Bryne Memorial bridges, and the third near mouth of Maspeth Creek.

Data analyses and mathematical modeling of Newtown Creek indicate that water quality conditions in the waterbody do not comply with the Class SD dissolved oxygen standard. CSO discharges are among the main causes of low dissolved oxygen. With no freshwater inputs and with limited tidal flushing action, pollutants generally settle within the creek. Water quality and sediment conditions in upstream reaches, in particular, have degraded to a level where anoxic conditions (no dissolved oxygen) occur periodically in bottom waters and odors are released.

Newtown Creek was listed on New York State's 1998 Section 303(d) list as an impaired waterbody and was scheduled as a high priority for Total Maximum Daily Load (TMDL) development before the year 2005. Oxygen demand was listed as the pollutant of concern, primarily as a result of CSO discharges. Since completion of a TMDL in 2002 by DEC, the creek was subsequently de-listed.

### Ecology

Like a number of other local tributaries to New York Harbor, Newtown Creek is now simply a peripheral canal system fed by tides, CSO and stormwater discharges. None of its original freshwater creeks and extensive wetlands exist anymore, the whole area having been transformed into a series of canals by channelization, land reclamation (filling) and bulkheading. Biological abundance and diversity is impaired by reductions in the amount and variety of physical habitat, and by a vulnerability of the remaining habitat to retention and accumulation of pollutants. Although no scientific studies have been identified prior to 2001, it can be expected that biota of Newtown Creek reflect similar conditions in other highly impacted waterbodies around the harbor. Thus, a fouling community composed of epibenthic invertebrates such as barnacles and sea squirts should be present on pilings and bulkheads; a fairly homogenous community of benthic invertebrates dominated by tolerant forms of polychaete worms should be found in the sediments, and a typical assemblage of regionally indigenous fish such as striped bass, winter flounder, bay anchovy, Atlantic menhaden, snapper bluefish, sea robin and tautog may come and go as water levels and quality permit.

### **Water Quality Improvement Projects**

DEP is upgrading the Newtown Creek WPCP to provide for additional and improved treatment capacity. This is part of DEP's plan to improve regional water quality in New York Harbor and Long Island Sound and meet the goals of the federal Clean Water Act. The Newtown

Creek WPCP, serving an area of 4,162 acres with 180 miles of sewers and 63 regulators, will be expanded to encompass an additional block between Kingsland and Greenpoint Avenues. The upgrade will improve daily treatment capacity, increase wet weather capacity, and improve treatment processes. A waterfront promenade with native landscaping along Whale Creek and Newtown Creek will be constructed and opened to the community. This project will result in improved water quality in Newtown Creek and the region, improved odor control and reduced air emissions, on-site soil remediation, and increased waterfront access for the local community.

Newtown Creek is designated by DEP and DEC as a Track I CSO planning waterbody. Facility planning has been conducted by DEP during several projects that have developed plans to improve water quality conditions in the creek. There are currently several ongoing and/or future DEP initiatives to implement these plans. The 1993 Inner Harbor Facility Plan will automate and improve the operation of many CSO regulators discharging to Newtown Creek. The 1993 Newtown Creek Water Quality Facility Plan has undergone modifications since its original conception but it is now being implemented in several phases that include instream aeration, sewer system modifications, and CSO retention. DEP is first evaluating instream aeration to improve dissolved oxygen in Newtown Creek. This will be implemented consecutively in two zones where aeration piping and diffusers will be located; Zone I is the upper reaches of English Kills and Zone II is the lower reaches of English Kills, plus East Branch and Dutch Kills. A blower facility will first be constructed on the south side of Grand Street (to the west of English Kills) that will supply air via piping to the Zone I diffusers. The diffusers will be placed on top of the sediment along the center of upper English Kills. Instream aeration will increase dissolved oxygen levels in English Kills to eliminate anoxic conditions. DEP will evaluate the design, performance and effectiveness of the Zone I application and then will proceed with implementing Zone II. Subsequent phases of the facility plan includes regulator modifications, construction of a throttling facility on the Kent Avenue Interceptor Sewer (coordinated with the Newtown Creek WPCP upgrade), and construction of a relief sewer and a CSO retention tank, all intended to reduce CSO discharges and improve water quality further.

Floatables pollution are waterborne materials that are buoyant or semi-buoyant and float either on or below the water surface. Street litter washed into sewer systems and discharged by CSOs and storm sewers is the predominant form of floatables, especially in urban waterbodies like Newtown Creek. Floatables conditions in the creek have recently improved with DEP's implementation of watershed controls and construction of waterbody containment systems. The City-Wide Catch Basin Hooding Program was conducted to ensure that hoods are installed in catch basins to prevent street litter from entering the sewer system. Three floating containment booms, designed to catch floatable debris discharged by CSOs, were installed in Maspeth Creek, East Branch, and English Kills as part of DEP's Interim Floatables Containment Program. Floatables are

prevented from moving downstream and are collected by a DEP skimmer vessel. The skimmer vessel offloading facility is located in Whale Creek adjacent to the Newtown Creek WPCP for the management and disposal of these materials.

DEP and the New York City Industrial Technology Assistance Corporation have initiated the Greenpoint-Williamsburg Clean Industrial Program. The program assists industrial companies in incorporating pollution prevention and containment measures to reduce runoff and other environmental impacts.

### **Other Water Use Initiatives**

There are several planned activities for improving public access to Newtown Creek and nearby waterfronts. The Greenpoint Terminal Market Esplanade, running from Greenpoint Avenue to Oak Street, will have its bulkhead replaced. The Greenpoint Manufacturing and Design Center will provide a public esplanade for pedestrians and bicyclists nearly 1,000 ft in length nearby along the East River. The community has identified several sites along Greenpoint's waterfront as key greenway destinations and waterfront parks: a lumberyard site, the Greenpoint Terminal Market and Noble Street Pier, India Street Pier, Bushwick Creek Inlet, and the WNYC transmitter site. The Bushwick Creek Inlet and the WNYC transmitter site lie to the south of Newtown Creek along the East River. Other sites have been identified by local organizations as potential end-of-street parks and other access opportunities.

The U.S. Army Corps of Engineers (USACE) is conducting ecosystem restoration projects throughout the Hudson-Raritan Estuary including one focused on Newtown Creek. The major goal of the project is habitat restoration, including selective and careful removal of undesirable fill, and the restoration of tidal flow to enhance fish and wildlife habitat value and water quality function. The Port Authority of New York and New Jersey is the local non-Federal sponsor and DEP is contributing to the project by sharing data and coordinating planning activities.

### **Summary**

Newtown Creek and its watershed has been significantly altered from its original characteristics. Historical modifications of the waterbody have resulted in a channelized and bulkheaded waterbody with poor habitat. The watershed has been urbanized and industrialized such that watershed discharges to the creek adversely affect water quality and waterbody uses. Newtown Creek currently does not meet its designated water quality standards. CSO, stormwater and industrial pollution are major contributing sources of degraded conditions. Several ongoing and future initiatives are being implemented by DEP and others to improve water quality and habitat.

These initiatives are improving dissolved oxygen concentrations, reducing coliform bacteria levels and minimizing floatables discharging to the creek, but the creek may not fully achieve its water quality standards all of the time.

## **Bibliography**

1. Hazen & Sawyer, P.C. and HydroQual, Inc., *Inner Harbor CSO Facility Planning Project*, Prepared for the New York City Department of Environmental Protection, January 1993.
2. HydroQual Inc., *City-Wide Floatables Study, Contract II - Floatables Pilot Program - Final Report*, Prepared for the New York City Department of Environmental Protection, January 1995.
3. Lawler, Matusky and Skelly Engineers, *Newtown Creek Water Quality Facility Planning Project-Subtask 2.5 Data Report*, Prepared for the New York City Department of Environmental Protection, February 1992.
4. New York City Department of City Planning, *The New Waterfront Revitalization Program*, September 2002.
5. New York City Department of Environmental Protection, *New York City Shoreline Survey Program, Newtown Creek and Bowery Bay WPCPs*, March 1993.
6. New York State Codes, Rules and Regulations, *New York City Waters*, 6 NYCRR, Article 13 - Part 890 (D-1).
7. New York State Department of Environmental Conservation, *Tidal Wetlands Maps*, 1974.
8. Newman, Andy. "Life Returns to a Fouled Creek." The New York Times, November 12, 1999, p. B1.
9. United States Department of the Interior, Fish and Wildlife Service, *National Wetland Inventory Maps*, (Brooklyn), April 1980.
10. URS Corp., *Newtown Creek Water Quality Facility Planning Project-Final Facility Plan Report*, Prepared for the New York City Department of Environmental Protection, September 2003.

11. URS Corp., *Newtown Creek Water Quality Facility Planning Project-Addendum To Facilities Plan Report Phase I Aeration Facilities*, Prepared for the New York City Department of Environmental Protection, August 1999.