

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

GOWANUS CANAL

Introduction

Gowanus Canal, originally known as Gowanus Creek, is located near the Carroll Gardens, Red Hook, Cobble Hill, and Park Slope neighborhoods of western Brooklyn within Community Districts 6 and 7. It is generally bounded by Third Avenue to the west, Smith Street to the east and Butler Street to the north. The Canal begins at Butler Street and extends southward to the Hamilton Avenue drawbridge where it broadens into Gowanus Channel, which is connected to Gowanus Bay and Upper New York Bay.

The Canal is approximately 7,500 feet long, 100 feet wide, with a depth ranging from 4 to 16 feet at mean low water (MLW). There are several turning basins branching off the east side of Gowanus Canal that extend approximately one city block. South of Hamilton Avenue, Gowanus Channel is approximately 6,500 feet long, 100 to 2,200 feet wide, with depths between 16 and 35 feet MLW, and opening onto Gowanus Bay. The Gowanus Canal system is estuarine and tributary to Upper New York Bay with a semi-diurnal tidal cycle varying between 5 and 7 feet. There are no freshwater sources other than stormwater and combined sewer overflows (CSO) during wet weather. A flushing tunnel is operated by the City of New York to artificially circulate water through Gowanus Canal by drawing harbor water from Buttermilk Channel into the head end of the Canal.

Gowanus Canal is primarily bounded by commercial and industrial land uses. Riparian areas are dominated by warehousing and heavy industrial uses along its length. There are no developed

parks adjacent to the canal although local community groups and organizations are improving access and developing end-of-street green areas. Waterbody and waterfront uses are primarily commercial and industrial to serve local businesses. A local canoe club, the Gowanus Dredgers, makes recreational use of the waterbody.

Preliminary Waterbody/Watershed Characterization

The following preliminarily describes the physical, water quality, and ecological characteristics of Gowanus Canal and its watershed. Designated uses, compliance with water quality standards, and other regulatory issues concerning Gowanus Canal are also described. The project area of this characterization includes all of Gowanus Canal extending into Gowanus Bay and terminating at a line drawn between Clinton Avenue in Red Hook on the western shore to the eastern shore at 23rd Street.

Physical

Gowanus Canal, known as Gowanus Creek prior to navigational dredging, was used from the 1600's to 1930's as a commercial/industrial transportation route to move goods to and from Brooklyn. By 1840, dams, landfill, straightening and bulkheading had altered channel ecology. The area was largely industrial, consisting of flour mills, cement works, tanneries and paint, ink and soap factories that emitted pollutants into the waterway. In 1849, the first mile of Gowanus Creek was dredged and its transformation into Gowanus Canal occurred in the late 1860's. The development of efficient railroads and truck routes led to the Canal's rapid decline in use by the mid-1930's. There are four turning basins oriented perpendicular to the canal that have experienced siltation and

reductions in overall depth: the 4th Street Basin, 6th Street Basin, 7th Street Basin and 11th Street Basin. A fifth turning basin is mapped at 1st Street however it is entirely filled. There are five water-level bridges and two elevated bridges crossing the Canal. Specifically the Gowanus Expressway and an elevated subway cross the Canal but do not restrict vessel traffic. The City of New York operates retractable bridges over the Canal at Hamilton Avenue, 9th Street, Union Street, Carroll Street and 3rd Street. There are no designated tidal wetlands in Gowanus Canal.

By 1911, the Gowanus Canal Flushing Tunnel was constructed by the City of New York to provide artificial circulation in the waterbody and to relieve severe anoxic (low dissolved oxygen) conditions that existed. The flushing tunnel was designed to convey water in either direction between Upper New York Bay at Buttermilk Channel and Gowanus Canal. It was constructed primarily beneath Butler Street and terminated at the head of the Canal at Douglass Street. The flushing tunnel operated until the mid-1960's, pushing about 325 million gallons per day of either Buttermilk Channel or Gowanus Bay waters through the Canal. The propeller's drive shaft powering the tunnel broke in the 1960's causing waterbody conditions to degrade to its previous impaired conditions. In March 1999, New York City Department of Environmental Protection (DEP) reactivated the flushing tunnel, conveying an average 150 million gallons per day (MGD) of Upper New York Bay water to Gowanus Canal.

The Gowanus Canal watershed is approximately 1,900 acres. The watershed is drained by storm and combined sewers that discharge to the Canal during wet weather. There are eight permitted CSOs to the project area from the Red Hook Water Pollution Control Plant (WPCP) service area. CSOs from the Gowanus Pumping Station at Butler Street and several smaller pump stations located at the head of the Canal represent a majority of wet weather discharges to the

waterbody. There are four permitted CSOs from the Owls Head WPCP service area. There is one stormwater discharge to the Canal near the head end. Gowanus Canal has no other freshwater sources from its watershed, which has been entirely urbanized. This results in a significant increase in the amount and frequency of pollutant discharges to the waterbody during wet weather and has a significant effect on water quality and aesthetic conditions in the Canal.

Gowanus Canal is almost entirely channelized and is dominated by a wide array of uses including warehousing, oil distribution facilities, asphalt plants, transfer stations (solid waste and construction and demolition debris) and other heavy industrial uses. Vessel transport in the Canal supports these uses. Residential areas are generally located further north and south of the Canal. The eastern side of Gowanus Canal is zoned for light industrial uses and the western side is zoned for light and heavy industrial uses. Land uses along the eastern side of the Canal are approximately 49 percent residential, 18 percent commercial, 11 percent vacant, 9 percent park, 7 percent institutional, and 6 percent industrial. Land uses along the western side of the Canal are approximately 49 percent residential, 25 percent commercial, 10 percent vacant, 5 percent park, 4 percent institutional, and 7 percent industrial. Two mapped parks border Gowanus Canal on the east side, one between 5th and 7th Street and one on the corner of Hoyt Street and 4th Street, further east there are seven other small parks within an area known as the Red Hook Recreational Area.

Water Quality

The State of New York State classifies the project area including Gowanus Canal and Gowanus Channel as a Class SD waterbody with a best use of fishing. These waters shall be suitable for fish survival requiring a dissolved oxygen concentration never less than 3.0 mg/L. There

is no recreational use classification of Gowanus Canal and as such there are no water quality standards applied to the waterbody for coliform bacteria. Narrative criteria for discharges, odors and other parameters protecting aesthetic uses are applied.

Prior to the reactivation of the Gowanus Canal Flushing Tunnel, the waters of the Canal were degraded and represented significant impairments to aquatic life, recreational, and aesthetic uses of the waterbody. The New York City Department of Environmental Protection (DEP) conducted a facility planning project that included water quality field investigations of Gowanus Canal from May through September 1989. Dry and wet weather surveys of the Canal and special studies characterized water quality conditions and identified sources of impairments. Data analyses and mathematical modeling of the waterbody indicated that water quality conditions in Gowanus Canal did not comply with its Class SD classification. In addition, a sediment mound that is exposed at low tides had formed at the head end of the Canal due to historical CSO discharges. Odors caused by anoxic conditions and floatables from CSO and stormwater discharges impaired aesthetic uses.

There have been marked improvements in water quality conditions in Gowanus Canal since reactivation of the Gowanus Canal Flushing Tunnel in March 1999. Artificial circulation provided by the flushing tunnel delivers Upper New York Bay water with dissolved oxygen and improves the Canal's assimilative capacity for pollutant discharges. Odors were reduced and water clarity improved. The DEP's Harbor Survey established several water quality monitoring stations on the Canal. These data plus post reactivation monitoring of dissolved oxygen in the Canal by DEP indicated that Class SD water quality standards are met. However, the Flushing Tunnel has been shut down on several occasions for maintenance. During these times Harbor Survey data indicated that water quality conditions degrade to the former impaired conditions.

Gowanus Canal is identified on the 2002 New York State Section 303(d) list and is scheduled for Total Maximum Daily Load (TMDL) development before 2005. Oxygen demand is listed as the pollutant with urban runoff, stormwater and CSO as the source.

Ecology

Before the channelization and urbanization of Gowanus Canal, Gowanus Creek was a notable habitat for shellfish, mostly blue mussels, soft clams and oysters. Due to the long term degradation of water quality within the Canal, ecological resources were historically limited. Improvements in ecological conditions have been observed in the Canal since the reactivation of the Gowanus Canal Flushing Tunnel. Post-reactivation monitoring by DEP has indicated that the number of benthic macroinvertebrates, specifically polychaetes and bivalves, has drastically increased. In addition, people have reported seeing geese, egrets, horseshoe crabs, blue crabs, fiddler crabs, baby flounder, shrimp, mussels, killifish and jellyfish in the Canal. Oysters were recently reintroduced to Gowanus Canal in September 1999 as part of a program being conducted by the New York-New Jersey Baykeeper Program.

Water Quality Improvement Projects

The DEP has several ongoing projects and programs that have beneficial water quality impacts on Gowanus Canal. These programs include controlling floatables discharges and continued CSO abatement planning.

Floatables conditions in Gowanus Canal have improved by implementing watershed controls

and containment of floatables that are discharged. DEP's City-Wide Catch Basin Hooding Program was recently conducted to ensure that hoods are installed in catch basins to reduce floatables discharges to receiving waters including the Canal. A floating containment boom, designed to catch floatable debris discharged by CSOs, was installed at the head end of Gowanus Canal as part of the DEP's Interim Floatables Containment Program. Floatables are collected by DEP following wet weather events using a skimmer vessel.

The Gowanus Canal Flushing Tunnel was reactivated by DEP in March 1999. The DEP has identified that improvements are needed in the operation of the flushing tunnel and is conducting planning that will improve its reliability and may increase the flushing action above its present level. DEP is also evaluating improvements that can be made to the Gowanus Pumping Station that may result in somewhat abating CSO discharges to the head end of the Canal.

Other Water Use Initiatives

The U.S. Army Corps of Engineers (USACE) is conducting ecosystem restoration projects throughout the New York - New Jersey Harbor complex. Its ongoing Gowanus and Bay Canal Ecosystem Restoration Study is focused on Gowanus Canal and Bay. The purpose of the study is to determine the feasibility of environmental restoration and protection projects relating to water resources and sediment quality. The study will culminate in recommendations for USACE implementation while also providing recommendations for programs or projects to be implemented by non-Federal interests. The DEP is the non-federal sponsor in the study and is providing cost-sharing and in-kind services.

The Gowanus Canal Community Development Corporation (GCCDC) is a neighborhood preservation non-profit organization dedicated to the revitalization of the Gowanus Canal area. Its efforts are focused on the environmental remediation of Gowanus Canal, housing, economic development, and commercial revitalization. It recently procured funds from the New York City Department of Parks and Recreation to create three street end public open spaces along the Canal through the City's Green Street program.

Summary

Gowanus Canal and its watershed has been significantly altered from its original characteristics of Gowanus Creek. The watershed has been urbanized such that watershed discharges to the Canal and represents a source of use impairment. Historical modifications of the

waterbody itself has resulted in a channelized and bulkheaded waterbody. Since reactivation of the Gowanus Canal Flushing Tunnel, the Canal appears to be meeting the water quality standards of its Class SD designation. Water quality conditions have markedly improved and DEP continues to conduct planning that may result in even greater improvements. Other water use initiatives like the USACE ecosystem restoration project and local community initiatives are also seeking to improve access to and uses of the Canal.

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