

Public Health Assessment

Final Release

NEWTOWN CREEK

**CITY OF NEW YORK
BOROUGH OF QUEENS/BROOKLYN
QUEENS/KINGS COUNTY, NEW YORK**

EPA FACILITY ID: NYN000206282

**Prepared by
New York State Department of Health**

FEBRUARY 24, 2014

**Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
Atlanta, Georgia 30333**

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR's Cooperative Agreement Partner pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6)), and in accordance with our implementing regulations (42 C.F.R. Part 90). In preparing this document, ATSDR's Cooperative Agreement Partner has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

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Table of Contents

SUMMARY	1
PURPOSE AND HEALTH ISSUES	5
BACKGROUND	5
A. Site Description and History:.....	5
B. Site Visit	7
C. Demographics	7
DISCUSSION	9
A.Environmental Contamination	9
B.Pathways Analysis	11
C.Public Health Implications Adult and Child's Health Considerations	13
D. Health Outcome Data Evaluation.....	14
COMMUNITY HEALTH CONCERNS	14
CONCLUSIONS	15
RECOMMENDATIONS	17
PUBLIC HEALTH ACTION PLAN	17
REFERENCES	19
REPORT PREPARATION	21
APPENDIX A	22
Figures.....	22
APPENDIX B	25
Conclusion Categories and Hazard Statements	25
APPENDIX C	27
Summary of Public Comments and Responses.....	27

SUMMARY

INTRODUCTION

The New York State Department of Health (DOH) and the Agency for Toxic Substances and Disease Registry (ATSDR) want to provide the community around Newtown Creek in Queens and Brooklyn, New York with the best information possible about how contaminants in the creek might affect their health.

This document is part of the congressional mandate that a public health assessment (PHA) be conducted for each site being proposed to the federal National Priorities List (NPL) by the United States Environmental Protection Agency (EPA). This document fulfills the mandate for the Newtown Creek.

The agencies have information that some city residents use Newtown Creek for recreation, such as boating tours, canoeing, kayaking, and scuba diving, and that some residents catch and eat fish and crabs from the creek. There are access points for small boats and places where people have been observed fishing and catching crabs on Newtown Creek.

DOH has environmental sampling data on chemical contamination of underwater creek sediments and biological contamination data for surface water. Newtown Creek's physical characteristics and a history of industrial uses and storm sewer overflows also help to inform recommendations the DOH and ATSDR make in this PHA.

CONCLUSION 1

DOH and ATSDR conclude that swimming and other full body immersion recreation (for example, scuba diving) in Newtown Creek could harm people's health.

BASIS FOR DECISION

There are physical and biological hazards for swimmers and other people recreating in Newtown Creek. Since the greatest exposure to biological hazards is by swallowing water, people should avoid swimming in the creek.

Waterfront uses of Newtown Creek are primarily commercial and industrial, supported, in part, by waterborne transportation. Large commercial boat traffic and high bulkheads (marine retaining walls) in some places pose a threat to physical safety of people engaging in water recreation. Other physical hazards that could lead to injury and drowning have not been fully assessed.

Failure to meet bacterial standards in Newtown Creek can be attributed to combined sewage overflows and urban runoff after rainfall events. Biological hazards are likely present at all times, but are greater after combined sewer overflows. Water samples collected from throughout Newtown Creek indicate that levels of coliform and enterococci bacteria exceed standards on occasion (for example, in 18% to 50% of samples in 2010). Increased risk of illness is likely to occur when swimming in the water during these time periods. Water pollution

caused by fecal contamination is a serious public health concern due to the risk of contracting diseases when swimming, through swallowing or coming in contact with disease causing agents such as bacteria, viruses and protozoa. This may include gastrointestinal illness caused by pathogens such as *E.coli*, *Shigella spp.*, *Hepatitis A*, *Giardia* and *Cryptosporidium*.

Exposure to hazardous chemicals in the surface water when swimming is also possible, however, sampling for hazardous chemicals in places where people contact water during non-swimming activities is also needed.

CONCLUSION 2

DOH and ATSDR conclude that recreational boating (for example, canoeing, and kayaking) or “catch and release” fishing in Newtown Creek is not expected to harm people's health, although there may be some physical hazards, such as large commercial boat traffic. Certain precautions are recommended because incidental ingestion and dermal contact with the water when boating or fishing in some areas of the creek would lead to increased exposure to biological contaminants. These precautions are discussed below under general recommendations.

BASIS FOR DECISION

There are access points for small boats on Newtown Creek, at the end of Manhattan Avenue and at the Newtown Creek Wastewater Treatment Plant Nature Walk in Brooklyn. There is an increased risk of illness from water contact while canoeing, boating, kayaking and fishing during exceedances of indicator bacteria standards. Since people do not usually submerge their heads during these activities, the volume of incidental water consumption is lower than swimming. Subsequently, the risk of illness can also be assumed to be lower. Recreational boaters may also have increased exposure to chemical contaminants when coming into contact with sediments, although observations and discussion with community representatives suggest that there are no places where recreational boaters or anglers come into contact with sediment, even at low tide.

CONCLUSION 3













The DOH and ATSDR conclude that eating fish and crabs taken from Newtown Creek could harm people's health by increasing their risk for adverse health effects if people don't follow DOH's fish consumption advisories.

BASIS FOR DECISION

DOH has a restrictive fish consumption advisory that covers Newtown Creek (advisory for the East River, DOH, 2013a). DOH expects that contaminant levels in Newtown Creek fish and crabs are similar to levels in fish and crabs from the East River because of the close proximity and physical connection of these waters.

People who are considering eating fish and crab caught in the creek should follow the DOH consumption advisories for fish and crabs caught in the East River to reduce their exposures to chemical contaminants (DOH, 2013a).

The advisories for the East River are: Women under 50 years old and children under 15 years old should not eat any fish or crabs from these waters. The advisories for women over 50 and men over 15 are less restrictive and are shown in the table that follows:

DOH Fish Consumption Advisory for the East River, Including Newtown Creek.			
		Women Under 50 & Children Under 15	Women Over 50 & Men Over 15
	American eel	don't eat New York State Department of Environmental Conservation (DEC) regulations prohibit the harvest/possession of American eel for food.	
	Atlantic needlefish	don't eat	up to 1 meal/month
	Blue crabs	don't eat don't eat tomalley	up to 6 crabs/week don't eat tomalley
	Bluefish	don't eat	up to 1 meal/month
	Carp	don't eat	up to 1 meal/month
	Channel catfish	don't eat	don't eat
	Gizzard shad	don't eat	don't eat
	Goldfish	don't eat	up to 1 meal/month
	Rainbow smelt	don't eat	up to 1 meal/month
	Striped bass	don't eat	up to 1 meal/month
	White catfish	don't eat	don't eat
	White perch	don't eat	up to 1 meal/month
Other fish not listed		don't eat	up to 4 meals/month

GENERAL RECOMMENDATIONS

For those people using Newtown Creek for recreation, the DOH and ATSDR recommend measures to reduce exposures to the biological hazards that are present. People recreating in and around the creek can reduce the risk of becoming ill by avoiding the creek water after periods of effluent discharge, rainfall, when the water is cloudy or turbid, or when pollution is observed. People should wash their hands after coming into contact with the water, especially

before eating. If people get water or sediments on more than just their hands and arms, it is advisable to take a shower to wash off the creek water.

The ATSDR and DOH recommend that additional samples be taken in Newtown Creek so that people's potential exposure to contaminants in the creek can be more comprehensively evaluated. Data that are needed include data for hazardous chemicals in creek surface water and exposed sediment if locations are identified where people may be exposed to them while fishing and entering/launching and exiting/beaching recreational watercraft. Fish and crab sampling data specific to Newtown Creek are also needed.

NEXT STEPS

1. The ATSDR and DOH will work with the DEC and EPA to collect the environmental data needed to evaluate possible human exposures to chemical contaminants in the creek. EPA will be further evaluating the nature and extent of contamination in Newtown Creek, possible contributions to it, and the need for future cleanup of the creek.
2. ATSDR and DOH will evaluate EPA data as they become available to us to determine whether actions are needed to further reduce people's exposure to contamination in the creek.
3. The ATSDR, DOH and the New York City Department of Health and Mental Hygiene (NYCDOHMH) will coordinate with the DEC, EPA, New York City Department of Environmental Protection (NYCDEP), and other involved agencies to make sure that public health messages regarding recreational use (e.g. swimming, boating and fishing) of Newtown Creek effectively communicate the potential hazards and the risks related to the contamination.

FOR MORE INFORMATION

If you have questions about the environmental investigation of Newtown Creek, please contact the EPA at (212) 637-4275. If you have questions about the PHA or have other questions about the site, please contact Mr. Christopher Doroski of the DOH at 518-402-7860.

PURPOSE AND HEALTH ISSUES

The purpose of this PHA is to evaluate human exposure pathways and health risks for contaminants at the Newtown Creek National Priorities List (NPL) site. PHAs fulfill the congressional mandate that a public health assessment be conducted for every site being proposed to the federal NPL. The EPA proposed that the Newtown Creek be added to the NPL on September 23, 2009. The site was added to the NPL on September 27, 2010.

BACKGROUND

A. Site Description and History:

Newtown Creek is part of the New York – New Jersey Harbor Estuary that forms the northern-most border between the New York City boroughs of Brooklyn and Queens (Kings and Queens Counties) (Appendix A, Figure 1).

Newtown Creek is a tributary to the East River and includes five branches along its 3.8-mile reach. The branches are (from east to west) English Kills, East Branch, Maspeth Creek, Whale Creek, and Dutch Kills (Appendix A, Figure 1). The creek and its branches have a total surface area of about 165 to 170 acres. The target depth for navigation for the creek is 20 feet deep, but many areas are shallower (AECOM Environment, 2011). Current flow into the creek consists exclusively of storm water runoff, combined sewer overflows (CSOs), and permitted and unpermitted discharges. The creek rises and falls with the tide, but it is mostly stagnant.

In the mid-1800s, the area adjacent to Newtown Creek was one of the busiest hubs of industrial activity in New York City. More than 50 industrial facilities were located along its banks, including oil refineries, petrochemical plants, fertilizer and glue factories, sawmills, and lumber and coal yards. The creek was crowded with commercial vessels, including large boats bringing in raw materials and fuel, as well as taking out oil, chemicals and metals. In addition to the industrial pollution that resulted from these activities, the city began dumping raw sewage directly into the water in 1856. During World War II, the creek was one of the busiest ports in the nation. Currently, factories and commercial facilities still operate along the creek. Various contaminated sites along the creek have contributed to the contamination of Newtown Creek. Today, as a result of its industrial history, including numerous spills, Newtown Creek is reported by EPA to be one of the nation's most polluted waterways (EPA, 2011).

In the early 1990s, New York State declared that Newtown Creek was not meeting water quality standards under the Clean Water Act. The creek is classified as a saline Class D (SD) water body by the DEC. These waters are considered suitable for fish, shellfish, and wildlife survival. This classification may be given to those water bodies that, because of natural or man-made conditions, cannot meet the requirements for primary and secondary contact recreation (for example, swimming, wading, and recreational

boating) and fish propagation (DEC, 2013).

The Greenpoint Petroleum Remediation Project lies on land adjacent to the middle of Newtown Creek. In the past, multiple oil refineries operated along Newtown Creek. A series of spills on what is currently Exxon/Mobil property on the eastern end of the Greenpoint community resulted in a large plume of petroleum based hydrocarbons in the groundwater. In 1978, the US Coast Guard found evidence of an oil spill entering Newtown Creek. Subsequent investigations found product from the spill encompassing more than 52-acres under Greenpoint. The volume of petroleum that was leaked and spilled onto land in the area is estimated at 17 million gallons.

Use and Characteristics

According to the NYCDOHMH there are no permitted bathing or swimming facilities along the boundaries of the creek.

According to the EPA, people use Newtown Creek to catch fish and crab for human consumption. The heaviest fishing use is likely to be near the mouth of the creek because it is closer to the East River and there is more open water (EPA, 2011). EPA reports that fishing has been observed in Newtown Creek at Dutch Kills, and crabbing for consumption has been observed at the end of Manhattan Avenue in Brooklyn (Appendix A, Figure 2). Evidence of fishing was also observed on the Queens side of the creek. NYCDEP staff observed fishing at several other locations. However, according to the NYCDEP, the dissolved oxygen levels in the creek have at times been close to zero, making fish survival difficult.

DOH has extensive, restrictive fish consumption advisories for the East River (DOH, 2013a), and these advisories apply to Newtown Creek because it is a tributary of the East River. Although DOH has no specific fish data for Newtown Creek, DOH expects that contaminant levels in Newtown Creek fish and crabs are similar to levels in fish and crabs from the East River because of the close proximity and physical connection of these waters (see Figure 1). The contaminants of concern for these waters are polychlorinated biphenyls (PCBs) and dioxin in fish, and cadmium, PCBs, and dioxin in crabs. Women under 50 years old and children under 15 years old should not eat any fish from these waters. The advisory for women over 50 and men over 15 is less restrictive and is shown in the Summary section or on-line (DOH, 2013a).

Newtown Creek is used for other recreation, including kayaking, boating, and scuba diving. Small boat access points are at the end of Manhattan Avenue and at the Newtown Creek Wastewater Treatment Plant Nature Walk in Brooklyn (Appendix A, Figure 2). The New York City Department of Parks and Recreation's website (NYCDPR, 2011) describes a suggested trip starting at the Manhattan Avenue launch site. The NYCDEP opened a waterfront nature walk at the Newtown Creek Wastewater Treatment Plant in September 2007, allowing public access to the waterfront. Nevertheless, there are physical hazards for small recreational water craft, such as

large commercial boat traffic, that may present a safety hazard to boaters. And, in some places there are high bulkheads (marine retaining walls) that may make it difficult to get out of the creek when necessary for safety.

B. Site Visit

The DOH and the EPA have made multiple visits to the areas surrounding the Newtown Creek. Visits have been made to evaluate inactive hazardous waste sites along the creek and visually assess the impact on the creek. DOH staff Christopher Doroski, Betsy Prohonic, Brian Hart and Don Miles, along with ATSDR and EPA staff and a representative each from Riverkeepers and the Newtown Creek Alliance visited the site on April 28, 2011. The group toured the Newtown Creek Wastewater Treatment Plant Nature Walk, the Manhattan Avenue access point and two other access points. The group discussed and observed access to and recreational use of the creek. At the time of the visit, the group observed no active recreational use.

C. Demographics

The DOH estimated, from the 2010 Census (US Census Bureau, 2011), that 240,218 people lived within one mile of the Newtown Creek area. The age distribution of the area showed somewhat lower percentages of people less than 20 or over 64 years old compared to Kings, Queens and New York City. There were 66,365 females of reproductive age (ages 15-44) within the area. The area has a higher proportion of whites than other parts of New York City but still has a minority population of about 63% due in part to the large Hispanic community. Based on the 2005-2009 American Community Survey (US Census Bureau, 2010), a higher percentage of the population is living below the poverty level while the median household income is lower than other parts of New York City. These comparisons are provided in Table 1.

Table 1. Demographics of the Newtown Creek Area, Kings and Queens Counties, and New York City.

Census Demographics Estimates	Newtown Creek Area	Queens County	Kings County (Brooklyn)	New York City
Total Population¹	245,904	2,230,722	2,504,700	8,175,133
Percent Male	49.8	48.4	47.2	47.5
Percent Female	50.2	51.6	52.8	52.5
Age Distribution¹ (%)				
<6 years	6.8	7.1	8.4	7.5
6-19 years	14.5	16.2	18.1	16.9
20-64 years	69.6	63.9	62.0	63.4
>64 years	9.1	12.8	11.5	12.1
Race/Ethnic Distribution¹ (%)				
White	54.4	39.7	42.8	44.0
Black	10.0	19.1	34.3	25.5
Native American	<1	<1	<1	<1
Asian	10.2	22.9	10.4	12.7
Pacific Islander	<1	<1	<1	<1
Other	20.1	12.9	8.8	13.0
Multi-Racial	4.4	4.5	3.0	4.0
Percent Hispanic	43.1	27.5	19.8	28.6
Percent Minority*	63.0	72.4	64.3	66.7
Economic Description²				
Median Household Income	\$42,240.45	\$54,870	\$42,894	\$50,160
Percent Below Poverty Level	22.4	12.1	21.8	18.6

¹US Census Bureau, 2011.

²US Census Bureau, 2010.

*Minorities include Hispanics, African Americans, Asian Americans, Pacific Islanders and Native Americans, Multi-Racial and Other Americans. Some people are in more than one category.

The DEC and the EPA developed guidelines for identifying potential environmental justice communities. A potential environmental justice community is defined as a minority or low income community that may bear a disproportionate environmental burden resulting from industrial, municipal and commercial operations. A low income community is defined by the 2000 US Census as one in which at least 23.59% of the population are living below the poverty level. A minority community is defined by the 2000 US Census as one having a minority population equal to or greater than 51.1% of the total population in an urban area or 33.8% of the total population in a rural area. If a community is found to be either low income or minority then it is defined as a potential

environmental justice community. Since the population of the Newtown Creek area exceeds the threshold for the definition of a minority community, it is considered a potential environmental justice community.

The environmental justice information about the community provides a more complete picture of the area under consideration for regulatory agencies. It may suggest the need for action, including more stringent permit conditions, voluntary pollution reduction, or other corrective measures for this area. The information should be used in making permitting decisions along with other considerations such as regulatory standards, environmental impacts, mitigation, benefits, needs, and costs.

DISCUSSION

DOH and ATSDR have insufficient environmental and exposure information to complete an assessment of health risks presented by exposure to chemical contaminants in Newtown Creek. DOH has chemical contamination data for underwater creek sediments, but none for locations where people would contact the sediments. DOH does not have chemical data for surface water, fish or crabs, although EPA is planning to collect additional data. Although DOH has no specific fish data for Newtown Creek, based on the close association of these waters, DOH expects that contaminant levels in Newtown Creek fish and crabs would be similar to levels in fish and crabs from the East River. DOH does not have information about which and how much fish and crabs people catch and eat from the creek.

A. Environmental Contamination

Biological Contamination

Water pollution caused by fecal contamination is a serious public health concern due to the risk of contracting diseases through swallowing or coming in contact with disease causing agents such as bacteria, viruses and protozoa. Collectively, these agents are known as pathogens. Frequently, concentrations of pathogens from fecal contamination are small, and the number of different possible pathogens is large. As a result, routine testing for pathogens in water samples is not practical. Instead, the presence of pathogens is determined through indirect evidence by testing for an "indicator" organism such as fecal coliform or enterococci bacteria. Fecal coliform and enterococci bacteria likely come from the same sources as pathogenic organisms. Fecal coliform and enterococci bacteria are relatively easy to identify, are usually present in larger numbers than pathogens, and respond to the environment and wastewater treatment similarly to many pathogens. As a result, testing for fecal coliform and/or enterococci bacteria can be a reasonable indication of whether water is contaminated with fecal pollution and pathogens are likely to be present.

The NYCDEP collected water samples from four stations along the creek (NYCDEP 2010a,b) and tested for fecal coliform and/or enterococci bacteria. See Figure 2 for location of sampling points. Samples are generally collected on a monthly basis or more frequently to track the presence of high bacteria levels. DOH reviewed the data from 2005 to 2010 and concluded that the data are similar for these years, and, therefore, DOH used only the 2010 data for this discussion. Table 2, below, shows the results for coliform and enterococci bacteria samples collected in 2010.

Table 2. New York City Department of Environmental Protection 2010 Bacterial Sampling Data for Newtown Creek				
Coliform Bacteria				
Sampling Location	Number of Samples	Coliform Range *	DOH Standard for Coliform *	Number of Samples Exceeding Standard
NC 0	22	12 - 200,000	1,000	7
NC 1	22	10 - 200,000	1,000	7
NC 2	22	10 - 200,000	1,000	8
NC 3	22	12 - 200,000	1,000	4
Enterococci Bacteria				
Sampling Location	Number of Samples	Enterococci Range*	DOH Standard for Enterococci *	Number of Samples Exceeding Standard
NC 0	22	12 - 20,000	104	11
NC 1	22	4 - 20,000	104	8
NC 2	22	4 - 11,800	104	8
NC 3	22	4 - 4,900	104	7

*Units are in number of colonies per 100 milliliters of water. A colony is a group of bacteria grown on a nutrient media that was inoculated from a water sample. The colony becomes visible to the naked eye and the number of colonies on a plate can be counted.

Results of samples collected from Newtown Creek indicate that the levels of fecal coliform and enterococci exceeded the bacteriological standards for bathing waters in New York State. Although the origin of the bacteria contamination is unknown, the creek has numerous combined sewer outflows that discharge untreated sewage into the creek during high flow events

Chemical Contamination

Limited data for chemical contamination of Newtown Creek sediments are from the Expanded Site Inspection Report Newtown Creek Brooklyn/Queens, New York (Weston

Solutions, Inc., 2009). Additional investigations are planned by the EPA, and as additional data become available they will be used to update the health assessment as appropriate.

Sediments

The EPA collected 58 sediment samples from Newtown Creek and six from the nearby Atlantic Basin for comparison. EPA collected sediment samples at 0 to 2 feet (shallow) and 2 to 6 feet (deeper) depth intervals under water that was 7 to 23 feet deep. None of the samples were taken from locations where sediments are available for contact by the public. The Atlantic Basin is further south down the East River, near where the River meets the New York Upper Bay and across from Governor's Island. EPA had the sediment samples analyzed for metals, volatile organic compounds, semi-volatile organic chemicals and PCBs.

EPA compared Newtown Creek sediment results to the samples collected from the Atlantic Basin and reported contaminants in the Newtown Creek samples that exceeded levels detected in the Atlantic Basin samples (Weston Solutions, Inc., 2009).

EPA reported that several metals, volatile organic chemicals, semivolatile organic chemicals and PCBs in some Newtown Creek shallow sediment samples exceeded levels found in Atlantic Basin samples. The specific organic contaminants having higher levels in shallow sediment from the Newtown Creek included chlorobenzene, isopropylbenzene, polycyclic aromatic hydrocarbons, bis(2-ethylhexyl)phthalate), and two commercial mixtures of PCBs (Aroclor 1242 and Aroclor 1254). Several of the deeper sediment samples contained petroleum related compounds at levels above Atlantic Basin samples.

B. Pathways Analysis

This section of the PHA identifies completed exposure pathways associated with past, present and future uses of the creek. An exposure pathway is how an individual could be exposed to contaminants in the creek. An exposure pathway is comprised of five elements:

- (1) A contaminant source,
- (2) Environmental media and transport mechanisms,
- (3) A point of exposure,
- (4) A route of exposure, and
- (5) A receptor population.

The source of contamination is the place where a contaminant is released into the environment (any waste disposal area or point of discharge). In the case of Newtown Creek, the original places of release are not completely known. Environmental media and transport mechanisms carry contaminants from the source area to points where

human exposures may occur. The exposure point is a location where actual or potential human contact with a contaminated medium (soil, air, water, and/or biota) may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (ingestion, inhalation, and dermal absorption). The receptors are the people who are exposed or may potentially become exposed to contaminants at a point of exposure. Two types of exposure pathways are evaluated in this PHA. A completed exposure exists when all five elements of an exposure pathway are documented. A potential exposure pathway exists when any one of the five elements of an exposure pathway is not present or its presence is not known.

Potential Exposure Pathways:

DOH and ATSDR identified swimming as one way people may be using the creek for recreation. However, DOH does not have clear evidence that swimming in Newtown Creek is occurring. Nevertheless, DOH evaluated this potential exposure further in this PHA.

Completed Exposure Pathways:

DOH and ATSDR identified boating and fishing (including crabbing) as two ways people are using the creek for recreation. Exposures to contaminants present in the surface water can occur through incidental ingestion or dermal absorption during recreation activities such as boating or fishing. Although the number of people participating in recreational activities within the boundaries of the creek is not known, increases in access to the creek in the future may increase the number of people using it. DOH has limited information about how many people fish in and eat fish and crabs taken from the creek. The DOH has a health advisory for limiting the consumption of fish and crabs taken from the creek (DOH, 2013a).

Since DOH does not have chemical contamination sampling data for fish or crabs from Newtown Creek, DOH cannot evaluate this pathway further at this time. Nevertheless, contamination of creek surface water, sediments (e.g., PCBs) and in the creosote-treated wood in the bulkheads likely contribute to contamination of edible biota in the creek and results in increased exposures to those who eat fish and crabs from the creek.

People may be exposed to contaminated sediments and dermally absorb contaminants while entering/launching or exiting/beaching small water craft in areas of the creek not bound by bulkheads during low tide, although observations and discussion with community representatives indicate that there are no places where recreational boaters come into contact with sediment. People will not be directly exposed to sediments that are deep under water and, therefore, sediments are not further evaluated in this PHA.

C. Public Health Implications - Adult and Child's Health Considerations

Use of Newtown Creek for recreation (for example swimming, boating, and fishing) can result in exposure to chemical and biological contaminants via incidental ingestion and dermal absorption. An analysis of the potential for health risks associated with ingestion and dermal exposure to biological contaminants while using the creek for recreation is presented below. Eating fish or crabs from the creek can also result in exposure to chemical and biological contaminants via ingestion. Since DOH does not have information about which and how much fish or crabs people catch and eat from the creek, DOH cannot specifically evaluate these exposures.

Chemicals

DOH and ATSDR have insufficient information about levels of chemical contaminants in surface water to evaluate health risks associated with exposure to contaminants in Newtown Creek. DOH and ATSDR will evaluate data collected by EPA as they become available to us.

Pathogens

Research suggests a direct relationship between the extent of exposure to contaminated water, the area of the body coming into contact with contaminated water and the risk of subsequent illness (WHO, 2003). Sample results in excess of 1,000/100 milliliters (ml) of water for coliform or 104/100 milliliters of water for enterococci (i.e., those that exceed the New York State standards) indicate an increased risk of gastrointestinal illnesses through participating in swimming activities. This increase is based on an assumption that swimming includes submerging the face and head under the surface of the water and can result in ingestion of water. Children and young adult swimmers swallow an average of 37 ml of water during a 45 minute swimming session, and adult swimmers swallow an average of 16 ml (Dufour et al., 2006). Ingestion volumes may be even higher for toddler age children. While the average volume of water consumed by swimming may appear of little significance, several pathogens known to be found in sewage contaminated waters, such as *E.coli* O157:57, *Shigella* spp., Hepatitis A, *Giardia* and *Cryptosporidium* have relatively low infective doses. This means that swallowing a very small number of these pathogens can result in illness. Immersing the head in the water while swimming also increases the likelihood of eye, ear, and nose infections.

Published risk assessments suggest there could be an increased risk of illness from other water contact activities (for example canoeing, boating, and fishing) in water with indicator bacteria standard/guideline exceedances (Rijal et al, 2009). Since the head is not usually submerged during these activities, the volume of incidental water consumption is lower than during swimming. Subsequently, the risk of illness can also be assumed to be lower. The risk of illness increases with increased duration and

frequency of participation in recreational activities in water where indicator bacteria standards or guidelines are exceeded.

Water samples collected from Newtown Creek indicate that levels of fecal coliform and enterococci bacteria often exceed standards. This results in an increased risk of illness through recreational contact with Newtown Creek water. The risk of illness will increase in the presence of undertreated sewage or overflow events. The extent of the increased risk will depend on the extent of effluent treatment, the volume of pathogens released, the amount of rain or snowmelt runoff and other factors. Environmental factors such as sunlight, tides, currents and wind can also affect the fate and transport of pathogens in water.

D. Health Outcome Data Evaluation.

The DOH has not previously evaluated health outcome data specific to the Newtown Creek neighborhood. Both DOH and NYCDOHMH can provide health statistics for the neighborhoods in Brooklyn and Queens surrounding the creek. DOH is in the process of conducting a Health Outcomes Review for the Newtown Creek area because of community concerns about possible exposure to chemicals from the Greenpoint oil spill or chemicals currently in the creek. A Health Outcomes Review is a type of study that uses currently available data to evaluate rates of specific health outcomes in a defined geographic area to determine if rates are elevated. No exposure to chemicals has been documented and the outcomes reviewed are not related to exposure to the pathogens likely to be present in the creek. The Newtown Creek area Health Outcomes Review will evaluate cancer, birth defects and other adverse birth outcome rates in an area within 1/4 mile of the creek as well as an additional area of Greenpoint near the Greenpoint Petroleum Remediation Project (Figure 2). DOH chose this study area with input from community members. DOH will use data from the DOH Cancer Registry, Congenital Malformation Registry, and Vital Statistics in the Health Outcomes Review. The results will be shared with the public in a health consultation report.

COMMUNITY HEALTH CONCERNS

DOH and ATSDR continue to gather and evaluate community concerns. DOH has received expressions of concern from people in the communities near the Greenpoint Petroleum Remediation Project. The agencies identified other community health concerns from websites maintained by community groups and organizations and in discussions with their representatives (e.g. Newtown Creek Alliance and Riverkeeper). In the past, the DOH has met with a community advisory group of the Newtown Creek Alliance. Below is a summary of the concerns and DOH's responses:

Comment: Community members are concerned about the overall water quality of Newtown Creek and the contribution that the Greenpoint Petroleum Remediation Project and other sites along the creek make to water quality problems.

Response: DOH and ATSDR are also concerned about the water quality, but do not have complete information about the overall water quality of Newtown Creek. The EPA will be assessing the contribution from the Greenpoint Petroleum Remediation Project and other sites to the water quality of Newtown Creek. The DOH and DEC will work with EPA to address any potential exposure pathways associated with other sites in the area that may be affecting Newtown Creek.

Comment: People are concerned about the creek's suitability for recreational uses such as swimming and kayaking.

Response: DOH and ATSDR are also concerned and conclude that swimming in Newtown Creek could harm people's health because of known physical and biological hazards for swimmers. DOH and ATSDR conclude that, if precautions are taken, recreational boating (for example, canoeing or kayaking) in Newtown Creek is not expected to harm people's health.

Comment: Some people are concerned about the safety of eating fish and crabs taken from the creek.

Response: DOH is also concerned and, therefore, has a fishing advisory for the East River that applies to the Newtown Creek. People who are considering eating fish and crab caught in the creek should follow the DOH consumption advisories for fish taken from the East River to reduce their exposures to chemical contaminants. Details of the fish advisories are presented elsewhere in this document. The fish advisories are also available in Spanish, Polish and Chinese at:

http://www.health.ny.gov/environmental/outdoors/fish/health_advisories/publications.htm

DOH invited the public to review the draft of this PHA during the public comment period, which ran from February 3, 2012 to June 15, 2012. DOH held two public meetings to discuss and receive comments on the draft PHA. The first was held on Monday, May 14, 2012, at LaGuardia Community College in Queens, and the second was held on Thursday, May 24, 2012 at the Polish National Home/ Warsaw in Brooklyn. DOH also received written comments. Appendix C contains a summary of the comments received on the public comment draft of the Newtown Creek PHA and the DOH responses.

CONCLUSIONS

DOH and ATSDR conclude that swimming and other full body immersion recreation (for example, scuba diving) in Newtown Creek could harm people's health (see Appendix B). There are physical and biological hazards for swimmers and other people recreating in Newtown Creek. Since the greatest exposure to biological hazards is by swallowing water, people should avoid swimming in the creek.

Waterfront uses of Newtown Creek are primarily commercial and industrial, and are supported, in part, by waterborne transportation. This represents physical safety concerns related to swimming and other water recreation, and includes large commercial boat traffic and in some places high bulkheads (marine retaining walls). Other physical hazards that could lead to injury and drowning have not been fully assessed.

Failure to meet bacterial standards in Newtown Creek can be attributed to combined sewage overflows and urban runoff after rainfall events. Biological hazards are likely present at all times, but are greater after combined sewer overflows. Water samples collected from throughout Newtown Creek indicate that levels of coliform and enterococci bacteria exceed standards on occasion (for example, in 18% to 50% of samples in 2010). Increased risk of illness is likely to occur when swimming in the water during these time periods. Water pollution caused by fecal contamination is a serious public health concern due to the risk of contracting diseases when swimming, through swallowing or coming in contact with disease causing agents such as bacteria, viruses and protozoa. This may include gastrointestinal illness caused by pathogens such as *E.coli*, *Shigella spp.*, *Hepatitis A*, *Giardia* and *Cryptosporidium*.

When swimming, human exposure to chemical hazards in the surface water is also possible; however, sampling for hazardous chemical constituents in places where people come into contact with water through non-swimming activities is needed.

DOH and ATSDR conclude that recreational boating (for example, canoeing, kayaking, and touring) or “catch and release” fishing in Newtown Creek is not expected to harm people's health, although there may be some physical hazards, such as large commercial boat traffic. Also, certain precautions are recommended because incidental ingestion and dermal contact with the water when boating or fishing in some areas of the creek would lead to increased exposure to biological contaminants. These precautions are discussed below under general recommendations.

There are small boat access points on Newtown Creek, at the end of Manhattan Avenue and at the Newtown Creek Wastewater Treatment Plant Nature Walk in Brooklyn. There is an increased risk of illness from water contact activities associated with canoeing, boating and fishing during exceedances of indicator bacteria. Since people do not usually submerge their heads during these activities, the presumed volume of incidental water consumption is lower than during swimming. Subsequently, the risk of illness can also be assumed to be lower. Recreational boaters and anglers may also have increased exposure to chemical contaminants when coming into contact with sediments, although observations and discussion with community representatives suggest that there are no places where recreational boaters come into contact with sediment, even during low tide.

The DOH and ATSDR conclude that eating fish and crabs taken from Newtown Creek could harm people's health by increasing their risk for adverse health effects.

DOH has a fish consumption advisory that covers Newtown Creek (advisory for the East River, DOH, 2013a). Based on the close association of these waters DOH would expect that contaminant levels in Newtown Creek fish and crabs would be similar to levels in fish and crabs from the East River. People who are considering eating fish and crab caught in the creek should follow the DOH consumption advisories for fish and crabs taken from the East River to reduce their exposures to chemical contaminants. Women under 50 years old and children under 15 years old should not eat any fish from these waters. Further advice can be found in the Summary section above or on-line (DOH, 2013a) <http://www.health.ny.gov/publications/2784.pdf>.

RECOMMENDATIONS

For those people using Newtown Creek for recreation, the DOH and ATSDR recommend measures to reduce exposures to the biological hazards that are present. People recreating in and around the creek can reduce the risk of becoming ill by avoiding the creek water after periods of effluent discharge, rainfall, when the water is cloudy or turbid, or when pollution is observed. People should wash their hands after coming into contact with the water and sediments, especially before eating. If people get water on more than just their hands and arms, it is advisable to take a shower to wash off the creek water.

The ATSDR and DOH recommend additional sampling of Newtown Creek so that people's potential exposure to chemical contaminants can be comprehensively evaluated. Surface water sampling is needed in locations where people are entering the water. Sediment or creek side soil sampling is needed if locations are identified where people may be exposed to them during recreational activities. Fish and crab sampling data specific to Newtown Creek are also needed to evaluate whether existing fish consumption advisories are sufficiently protective.

PUBLIC HEALTH ACTION PLAN

The DOH will evaluate any new data provided by DEC or EPA on surface water or sediments from public access areas where people may be exposed. DOH and ATSDR will determine whether additional public health recommendations are needed based on those new data.

The DOH will evaluate new data provided by DEC or EPA on edible fish and crabs as the data become available to determine whether the DOH fish consumption advisories for the creek should be modified.

The DOH, in conjunction with ATSDR, will evaluate any other new environmental, toxicological and/or health outcome data as they become available.

The ATSDR, DOH, and NYCDOHMH will coordinate with the DEC, EPA, NYCDEP and

other involved agencies to make sure that public health messages regarding recreational use (e.g., swimming, boating and fishing) of Newtown Creek will effectively communicate the potential hazards and the risks related to the contamination.

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REPORT PREPARATION

This Public Health Assessment for the Newtown Creek site was prepared by the New York State Department of Health under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with the approved agency methods, policies, procedures existing at the date of publication. Editorial review was completed by the cooperative agreement partner. ATSDR has reviewed this document and concurs with its findings based on the information presented. ATSDR's approval of this document has been captured in an electronic database.

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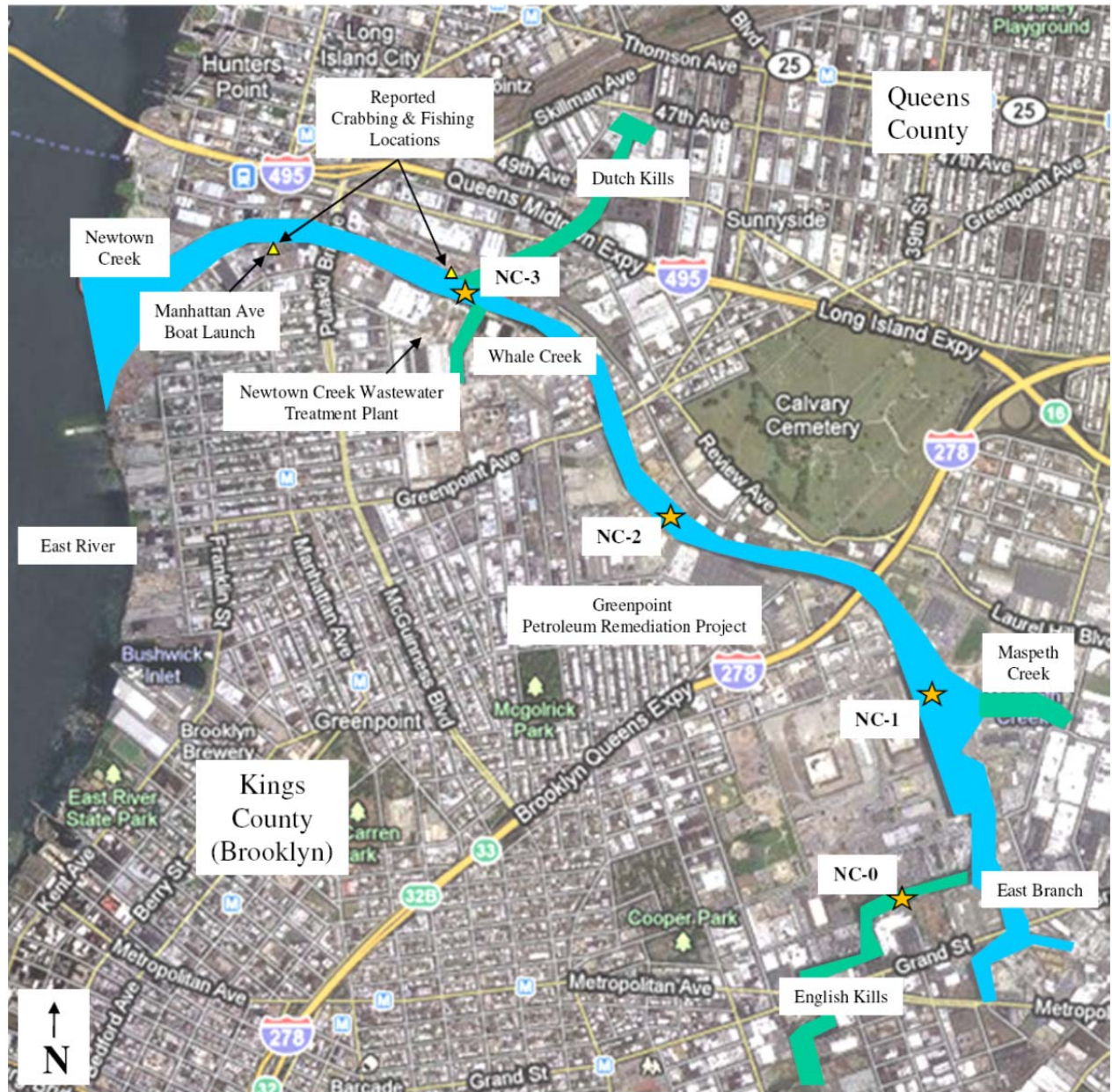
APPENDIX A

Figures

Figure 1. Map of the Newtown Creek, Queens, New York.



Figure 2. Observed Locations for Fishing and Boating in the Newtown Creek.



APPENDIX B

Conclusion Categories and Hazard Statements

Conclusion Categories and Hazard Statements

ATSDR has five distinct descriptive conclusion categories that convey the overall public health conclusion about a site or release, or some specific pathway by which the public may encounter site-related contamination. These defined categories help ensure a consistent approach in drawing conclusions across sites and assist the public health agencies in determining the type of follow-up actions that might be warranted. The conclusions are based on the information available to the author(s) at the time they are written.

1. Short-term Exposure, Acute Hazard “ATSDR concludes that...could harm people’s health.”

This category is used for sites where short-term exposures (e.g. < 1 yr) to hazardous substances or conditions could result in adverse health effects that require rapid public health intervention.

2. Long-term Exposure, Chronic Hazard “ATSDR concludes that...could harm people’s health.”

This category is used for sites that pose a public health hazard due to the existence of long-term exposures (e.g. > 1 yr) to hazardous substance or conditions that could result in adverse health effects.

3. Lack of Data or Information “ATSDR cannot currently conclude whether...could harm people’s health.”

This category is used for sites in which data are insufficient with regard to extent of exposure and/or toxicologic properties at estimated exposure levels to support a public health decision.

4. Exposure, No Harm Expected “ATSDR concludes that ... is not expected to harm people’s health.”

This category is used for sites where human exposure to contaminated media may be occurring, may have occurred in the past and/or may occur in the future, but the exposure is not expected to cause any adverse health effects.

5. No Exposure, No Harm Expected “ATSDR concludes that ...will not harm people’s health.”

This category is used for sites that, because of the absence of exposure, are not expected to cause any adverse health effects.

APPENDIX C

Summary of Public Comments and Responses

**Newtown Creek
Public Health Assessment
Summary of Public Comments and Responses**

The DOH prepared this summary to address comments and questions on the public comment draft of the Newtown Creek PHA. DOH invited the public to review the draft during the public comment period, which ran from February 3, 2012 to June 15, 2012. DOH held two public meetings to discuss and receive comments on the draft PHA. The first was held on Monday, May 14, 2012, at LaGuardia Community College in Queens, and the second was held on Thursday, May 24, 2012 at the Polish National Home/ Warsaw in Brooklyn. DOH also received written comments. In response to these comments, some statements were reworded for clarity and brevity. Questions about the summary should be addressed to the DOH's project manager, Chris Doroski, at (518) 402-7860.

Comment 1: Commenters raised concerns about surface water assessments being done for boating without air quality assessments. There was concern or lack of clarity about how DOH gets data. The commenters also expressed concern about using air data from models and locations not representative of the experience of Newtown Creek.

Response: The DOH is not aware of any ambient air data collected specifically to evaluate the effect of Newtown Creek on the outdoor air quality of the neighborhood. DOH will evaluate environmental data, which may include ambient air data, that EPA provides as part of their planned remedial investigation.

Comment 2: Commenters raised concerns about what DOH has been doing during the time the PHA has been in progress and why DOH still doesn't have the needed data.

Response: DOH prepared the PHA using existing data; the DOH does not typically collect environmental data independent of the environmental agencies during the preparation of health assessments. The EPA has not completed a remedial investigation for Newtown Creek. Therefore, data for some environmental media are not yet available. The PHA identifies those data gaps and DOH will evaluate any new data related to those data gaps.

Comment 3: A community member asked why DOH was releasing the PHA now when the data are incomplete.

Response: Although DOH and ATSDR have insufficient information about levels of chemical contaminants in surface water to evaluate health risks associated with exposure to contaminants in Newtown Creek, the available data, especially on biological contamination, were sufficient to make the conclusions drawn in the PHA. DOH considered the public health messages contained in those conclusions important

messages for the public to understand, and, therefore, released the PHA as soon as possible. Updates to the conclusions may be needed as additional data become available.

Comment 4: A community member asked whether ATSDR was working on the Health Outcomes Review or on the PHA.

Response: DOH is performing both activities under a cooperative agreement with ATSDR. ATSDR participates as needed in the preparation of the PHA and in carrying out the health outcomes review as needed. ATSDR reviews, provides comments, and approves DOH documents.

Comment 5: A community member asked whether there will be another meeting after the air/water sampling has been completed.

Response: DOH and ATSDR will review new environmental sampling data as they become available. If these data significantly change the conclusions and recommendations made in this PHA, DOH and ATSDR will communicate to the public, and will schedule a public meeting if it is needed.

Comment 6: Community members commented that they would like to see the sampling findings and know the schedule of sampling if possible. They are also concerned that the cleanup of Newtown Creek would take 22 years and asked whether volunteers could help expedite the process.

Response: The timing of sampling and publishing the results of sampling are EPA activities. The EPA can be reached at 212-637-4275 or by email (Contacts: Wanda Ayala, Community Involvement Coordinator (ayala.wanda@epa.gov) or Caroline Kwan, Remedial Project Manager (kwan.caroline@epa.gov)).

Comment 7: Newtown Creek Alliance representatives vocalized concerns that it is commonly known that the chemicals started from the land and the air and that this assessment will not tell the community anything new.

Response: This PHA is focused on Newtown Creek, as defined by the EPA as the National Priorities List site. DOH and ATSDR recognize that much of the pollution originated on the land adjacent to the creek. EPA is evaluating these sources, in an effort to reduce pollution to the creek. In addition, many of the on-land potential sources are regulated under other programs under the jurisdiction of the EPA, DEC and New York City Department of Environmental Protection (NYCDEP). Questions regarding on-land potential sources should be directed to these agencies.

Comment 8: A community member referenced a Queens Community College study that DOH should review.

Response: DOH has not been able to confirm the specific study referenced in this comment. The study referenced by the community member might be, "*Local Environmental Pollution Strongly Influences Culturable Bacterial Aerosols at an Urban Aquatic Superfund Site*" (Elias M. Dueker et al., 2012). DOH reviewed this article and found it reiterated the concern about bacteriological contamination of the creek.

Comment 9: A community member commented the environmental issues in Newtown Creek have been present for decades, stating there have been many cancer cases, not just by the creek, but in the whole area. Other community members expressed frustration regarding ongoing environmental issues in the area, indicating sources of contamination were not only from the creek. They felt government agencies have known about these environmental impacts for years and the community wanted to hear new information.

Response: Comment noted. DOH (DOH and ATSDR) acknowledge that the environmental pollution problems in Newtown Creek are long standing, and that cancer occurs in people living near as well as far from the creek. Many of the current and historical on-land potential sources are regulated by the EPA, DEC and NYCDEP. Questions regarding on-land potential sources should be directed to these agencies.

Comment 10: A community member urged the younger generation of activists to go to more meetings and to be more vocal.

Response: Comment noted.

Comment 11: A community member stated that this PHA is coming at such a late time.

Response: DOH prepared the PHA because the Newtown Creek was proposed for the National Priorities List on September 2009, and released the PHA as soon as it was completed.

Comment 12: A community member asked about the availability of grants for communities to do their own data collection.

Response: DOH and ATSDR are not aware of any such grants.

Comment 13: A Newtown Creek Alliance member asked what kind of outreach was done to promote the May 14 and May 24, 2012 PHA public meetings. The member felt

only the bare minimum was done to promote the meetings and there were concerns raised over meeting advertisements. Examples were given of efforts that should have been made, such as newspaper advertising or distributing flyers translated into Spanish and Polish.

Response: Comment noted. DOH relied on a stakeholder e-mail list to distribute the announcements for these meetings and made fish advisory fact sheets available in English, Spanish and Chinese. Nevertheless, for future meetings, DOH and ATSDR will explore additional ways to communicate with the interested public.

Comment 14: A community member asked whether soil vapor intrusion assessments and indoor air quality testing would be included in the PHA.

Response: DOH is not aware of any plans to conduct such environmental sampling. If EPA conducts these types of sampling in the future, DOH and ATSDR will evaluate the public health implications of the sampling results.

Comment 15: A community member asked about the Brownfields classification, and whether it was true that, unless an upland source is definitively proven to be polluting the creek, the source may be shifted to the Brownfields program and, therefore, not be covered under Superfund. The member also asked whether the Newtown Creek site could be classified as a Brownfields site as more data are processed.

Response: DOH and ATSDR are not aware of any such requirements. Newtown Creek is expected to remain an NPL site until such a time as it can be removed from the NPL because it has been cleaned up.

For more information, the EPA can be reached at 212-637-4275 or by email (Contacts: Wanda Ayala, Community Involvement Coordinator (ayala.wanda@epa.gov) or Caroline Kwan, Remedial Project Manager (kwan.caroline@epa.gov)).

Comment 16: A Newtown Creek Alliance representative stated that maps from the oil spills on the DEC website are incorrect. The representative also expressed concerns about the sampling techniques of DEC, and asked why DEC is not looking at the list of 100 contaminated sites.

Response: DOH forwarded these comments to the appropriate DEC staff.

Comment 17: A community member wanted to understand why DOH cannot look at known areas of contamination and examine their sources of contamination, and asked if something be done with the historic data from the sites adjacent to the creek.

Response: Looking at known areas of contamination, historic data and contamination sources are all part of the evaluation of environmental contamination that EPA is conducting as part of their remedial investigation.

Comment 18: A commenter asked if DOH took the Organizations United for Trash Reductions and Garbage Equity (OUTRAGE) air quality study from truck traffic emissions into consideration when evaluating the atmosphere around Newtown Creek. The commenter expressed that the PHA study is too disconnected from the wider environment, and that a true study cannot just isolate itself to the creek bed and water alone.

Response: DOH acknowledges the work that OUTRAGE accomplished in their study and acknowledges the effect that large amounts of truck traffic can have on local air quality. The air quality data that EPA collects as part of the remedial investigation for the Newtown Creek site should help to evaluate the contribution that the creek itself may make to air quality problems in the neighborhood. The planned Health Outcome Review will evaluate the health outcomes in the neighborhood, as designated in consultation with the Community Advisory Group (CAG), regardless of individual air pollutant sources.

Comment 19: A commenter asked why DOH is not outright prohibiting swimming and fishing in the creek if it is so polluted that people have to wash their hands even after boating in it. The commenter expressed alarm that these activities still occur at Newtown Creek and said that the appropriate federal, state and city agencies must prohibit fishing and in-water and underwater activities such as swimming at Newtown Creek, as long as it is possible that such activities could result in serious threats to public health and safety. The commenter added that these prohibitions must be taken seriously and enforced by the authorities until the creek has been deemed safe for these uses. Finally, the commenter stated that warning signs should be prominently posted providing information about the proper precautions to be observed when boating, canoeing and kayaking.

Response: The PHA indicates that the ATSDR, DOH, and NYCDOHMH will coordinate with the DEC, EPA, NYCDEP and other involved agencies to make sure that public health messages regarding recreational use (e.g., swimming, boating and fishing) of Newtown Creek effectively communicate the potential hazards and the risks related to the contamination. However, DOH and ATSDR have an advisory role and do not have the authority to ban swimming or fishing. DOH established the fishing consumption advisory to help the public protect themselves from contaminants contained in fish and crabs. DOH and ATSDR are working with other agencies and groups to determine better ways to reach out to people who may be fishing and eating fish and crabs taken from Newtown Creek. Likewise, DOH and ATSDR are coordinating with other agencies regarding posting of warning signs around the creek.

Comment 20: A Newtown Creek Alliance representative acknowledged the clarification of the definitions of a PHA and a Health Outcomes Review given in the presentation, but wanted to know if a health outcome review will be able to provide information related to cause of death for community members (e.g., brain disease).

Response: No. The health outcomes review planned with community input does not include a review of death certificate data for the study area. Mortality studies have the limitation that only deaths are included, so a mortality study is not ideal for studying many types of chronic disease such as cancer.

Comment 21: The Newtown Creek Alliance and Barge Park Pals commented that it was unacceptable to offer incomplete data that does not adequately cover the health concerns of the community, and expressed particular concern about investigations of autoimmune disorders and brain disease.

Response: DOH is aware of the concerns about autoimmune disorders and brain disease in this community and in other communities in NYS. Unfortunately, complete and accurate data on the incidence of these types of conditions are not routinely available, making it impossible to accurately assess whether the area around Newtown Creek is experiencing unusually high incidence or prevalence of these types of conditions. The term incidence means the number of cases of a particular health outcome that are newly diagnosed in a population over a specific time period.

Comment 22: Commenters expressed much concern about what health outcomes could and could not be evaluated in the health outcome review, and said this project now seems to require a tremendous amount of reconsideration.

Response: DOH has developed, with community input, a plan for a review of adverse birth outcomes and cancer for the study area. These are outcomes for which DOH has more complete and accurate data, and for which DOH may be able to draw valid conclusions about whether a particular community has high rates of adverse health outcomes.

Comment 23: Community members made recommendations to seek data from hospital admissions, emergency departments, and physicians.

Response: Hospital and emergency department admission data are appropriate for studying some kinds of acute health conditions. However, many outcomes of interest, such as autoimmune or neurological disease, do not routinely lead to hospital admissions, and therefore hospital data would not provide representative information about disease prevalence. Electronic health data from physician or other health care provider records are not routinely collected by DOH, thus DOH does not have this type of data available for health outcome studies. Adverse birth outcomes and cancer are

already reported to the DOH, so these additional data sources are not needed for those outcomes.

Comment 24: Several commenters expressed the study will cover too much of an industrial area and not enough of a residentially populated area. They are concerned that the study will fail to reach the many homes that are enduring a cumulative effect from the various contamination sources related to the creek and its surroundings.

Response: DOH worked with interested community members to develop the proposed study area boundaries. The intention was to design meaningful boundaries in terms of potential exposures and respond to the concerns of the community. DOH held a follow-up meeting with the Newtown Creek Community Advisory Group (CAG) on July 17, 2012 and discussed this and other issues raised in the comments on this document. DOH and the CAG members agreed to amend the study boundaries for the health outcomes review to include both $\frac{1}{4}$ mile and $\frac{1}{2}$ mile boundaries from the creek. Health outcomes will be studied in the two buffer areas, considered separately and combined.

Comment 25: The Newtown Creek Alliance urged including population density and land use as ways to expand the map and expressed an interest in having an assessment of cumulative public health risks or exposures from all sources surrounding the creek and its tributaries.

Response: DOH held a follow-up meeting with the CAG on July 17, 2012 and discussed this issue, which is addressed in part by the expansion of the health outcome review boundaries.

Comment 26: Commenters asked whether the health outcome review will be using old data, and were concerned that using such data will not provide any new information.

Response: While it is true that the health outcome review of birth outcomes and cancer will be based on existing data, the data are being assembled for a specific study area to run analyses that have never been done. The review will provide new information on whether these types of adverse health outcomes are elevated in the study area surrounding the creek.

Comment 27: A commenter pointed out that the map was missing an asphalt plant on the Queens side near NC2.

Response: DOH created the map to show the study area boundaries. It is not intended to be an exhaustive representation of the area's existing or former industrial facilities, or sources of unusual exposures.

Comment 28: Commenters expressed concern about a lack of outreach to the industrial community, since the health outcome review study is focused in a district that is primarily industrial. The Newtown Creek Alliance commented that there should be an effort to reach out to the industrial community to educate them about the study and the PHA, and to actively involve them in the process. The DOH should consider reaching out to tugboat workers in particular because of the amount of time they spend on the water.

Response: The methods needed for ascertaining health outcomes for an occupational group differ markedly from the geographical studies of a community, such as the Newtown Creek area. If local industries or workers are interested in discussing concerns with DOH, DOH is available to discuss and respond to their concerns.

Comment 29: A Newtown Creek Alliance representative commented that since the May 14, 2012 meeting 180 signatures have been collected for participation in a comprehensive health study.

Response: DOH acknowledged this information and reiterated that the type of study being proposed for the Newtown Creek area does not require active participation of any community members, although DOH obtained input from the community on the study design and reporting of results. DOH does not plan on conducting a study that requires active participation because experience shows that such studies are unable to achieve sufficient participation to produce results considered valid by the scientific community. With low response rates, study results are biased and not sufficiently representative of the entire community.

Comment 30: Some community members expressed frustration that DOH is not willing to change its approach.

Response: DOH acknowledges this frustration. Unfortunately, more comprehensive health data on the many types of medical conditions about which people are concerned are not systematically collected at this time. DOH is willing to continue to discuss some specifics of the study plan that can be changed so that DOH responds as completely as possible to the concerns being expressed in these comments.

Comment 31: A Newtown Creek Alliance representative pointed out that DOH has not been keeping meeting minutes and therefore does not have a record of requests or agreements from the community. The representative cited some examples since 2007-08 where DOH did not ultimately respond to requests made during meetings regarding planning for the health outcome review.

Response: Several DOH and ATSDR representatives took notes during these meetings on the draft PHA and this fact is reflected in the current summary of public comments. DOH could not respond to all past requests. However, DOH hopes that this summary and responses help answer questions and comments made at the meetings.

Comment 32: A commenter said that DOH did not act on a request from the community to extend the buffer around the creek to ½ mile, and a request to add autoimmune disease to the list of health conditions that will be reviewed.

Response: This request to extend the buffer was part of a discussion, and DOH believes a consensus was reached to have a ¼ mile buffer to better capture an area of potentially higher exposure for the study, rather than a larger area, where any health effects would be “diluted.” DOH held a follow-up meeting with the Newtown Creek CAG on July 17, 2012 and agreed to conduct the study using both ¼ mile and ½ mile buffers. The request to include autoimmune disease in the list of health conditions to be reviewed was also discussed at prior meetings. DOH explained that data on autoimmune disease incidence and prevalence in the population are not available and, therefore, cannot be included in the study.

Comment 33: Community members expressed they want DOH to conduct a cumulative health study rather than a site by site study. The Newtown Creek Alliance spokesperson expressed hope that now there is federal oversight, the project will move forward.

Response: Comment noted.

Comment 34: A community member asked how asthma rates will be addressed.

Response: Asthma diagnoses are health outcomes that are not well-captured in a comprehensive data source for the specific boundaries of the study area for this review. Therefore, DOH is not planning to include asthma in the health outcomes review. The type of comprehensive data on asthma available for geocoding into the specific study area boundaries are records of hospital and emergency room visits. Because people with well-managed asthma generally do not experience hospital emergency room visits, hospitalization data, although useful for understanding the burden of severe disease, are not useful for comparing rates of diagnosis of asthma among members of various populations, particularly if access to basic primary and preventive care varies among the populations. For information from the New York City Environmental Health Tracking Portal on asthma hospitalizations in neighborhoods of NYC, please see <http://a816-dohbsp.nyc.gov/IndicatorPublic/MapIt.aspx>.

Comment 35: A resident expressed concerns about how the studies would account for visits to the doctors and medical facilities outside of the immediate area.

Response: For adverse birth outcomes and cancer diagnoses, the data for the study area are gathered based on the address of residence when the health outcome was diagnosed. It does not matter if the doctor or medical facility was outside of the immediate area, as long as the patient's residence was in the study area. However, the available data only include health outcomes diagnosed in New York State, so the doctor or medical facility would have to be in the State.

Comment 36: Councilman Levin reiterated his community's request for a comprehensive public health study (in reference to the health outcome review). He asked that the buffer be extended a full ½ mile around the creek and expressed concern that DOH would be missing an opportunity to work with this community in assessing their exposures if they did not attempt a comprehensive public health study.

Response: Comment noted. Please see responses to comments 29, 30 and 32.

Comment 37: A representative from Greenpoint Center for Health and Environmental Justice suggested that Greenpoint is unique because of the cumulative effect of multiple environmental contaminants. The representative expressed concern that DOH is not experienced with the synergistic effects of multiple sources of contamination.

Response: Multiple exposures are the norm, not the exception, in locations where DOH evaluates the health impacts of contaminants. However, DOH acknowledges that multiple exposures create challenges when evaluating the risks from environmental chemicals.

Comment 38: A commenter stated that DOH should go back to the drawing board on the health outcome review to convene a new stakeholder meeting to encourage participation and to consider including asthma, respiratory, and autoimmune disease in the list of health conditions to be reviewed. The commenter mentioned the Bellevue health study in Cheektowaga, New York as a point of reference for suggestions for working with Newtown Creek.

Response: Cheektowaga is actually an example of an attempt to work closely with a community group on a door-to-door community survey. A great deal of effort went into designing and conducting the study, but it was unsuccessful due to a low participation rate. Community members returned only about 10% of health questionnaires, and strong conclusions could not be drawn from the analyses. In the end, after DOH completed the report, the community members who had demanded the study did not want the study report to be released.

Comment 39: Councilman Levin suggested that DOH should not be dissuaded by concerns of low response rates because this is a strong environmentally-minded community.

Response: Based on previous experiences, low response rates are a problem in every community because the people who respond to surveys cannot be assumed to be representative of the community unless a fairly high (e.g., at least 50%) response rate is achieved.

Comment 40: Community members expressed an interest in working on a health outcome review approach and wanted to know if DOH is willing to work on a new approach with them.

Response: DOH held a follow-up meeting with the Newtown Creek CAG on July 17, 2012. At this meeting, DOH discussed this issue with the CAG and agreed on some changes in approach (see comment number 32).

Comment 41: Several people with comments asked questions on options for conducting a health study other than through surveys. They asked if volunteers could hold informational meetings or door-to-door surveys on their own time, or mail surveys. Finally, they wanted to know if the results are valid only if they come from countless rounds of testing, surveys, etc.

Response: DOH held a follow-up meeting with the Newtown Creek Community Advisory Group on July 17, 2012 and discussed this issue.

Response: DOH held a follow-up meeting with the Newtown Creek Community Advisory Group on July 17, 2012 and discussed this issue. DOH described the problems associated with using data from meetings, mail surveys, door-to-door surveys, or any other type of study that requires getting health information directly from residents. DOH has attempted to conduct such studies in the past. Despite the best efforts of community members seeking to assist DOH with such studies, the results have been disappointing, with no valid conclusions able to be drawn. This is due to poor response rates, resulting in incomplete data, and possibly biased data because people with health problems are more likely to participate. For these reasons, DOH described the strengths associated with the data collected by NYS and NYC on cancer and birth outcomes as a resource for valid health outcome investigations. DOH is able to study these outcomes and draw valid conclusions about a community's relative health status for these outcomes because the available data are nearly 100% complete and accurate because of mandated reporting requirements and medical documentation.

Comment 42: A commenter asked what new results the health outcome review would yield, noting that DOH already know that the asthma and cancer incidence data in the

community of Williamsburg/Greenpont is unusually high. The commenter said this is longstanding knowledge without remediation.

Response: Remediation to prevent exposures is the primary mission of environmental and health agencies. The EPA, ATSDR, and DOH are addressing the exposure issues through the PHA and other activities. The health agencies also conduct health studies where appropriate. The proposed study will provide information about whether levels of adverse birth outcomes and cancer in the study area population are higher or lower than in an appropriate comparison population. The information that comes out of the health outcomes study proposed for this area differs from other information from the area because it will be more specific to a precise study area near the creek.

Comment 43: A commenter stated that generalizations about community health issues are useful, but asked why DOH is not connecting the dots between the toxins found in the ground soil, sediment and water and these health issues (asthma concerns, birth defects). The commenter said that DOH needs to show the direct relationships between the toxins and health issues, and that the cause and effect relationship must be studied with governmental funding.

Response: DOH notes this comment and acknowledges the concern. Causal relationships between environmental exposures and health outcomes are very difficult to prove, even with the best data. However, the accumulation of many well-designed studies showing similar results builds evidence for claiming a causal relationship.

Comment 44: Several commenters said not enough has been done by DOH to actively reach out to people who are fishing, and surveys could be done with people fishing on the creek. They also noted that there are Spanish speaking people fishing and DOH should come prepared with appropriate advisories. They further said site visits should be done in the warmer months to observe the significant amount of uses and activity in and around the creek, like boating. Finally, the commenters asked if DOH has reached out to local fishing shops.

Response: DOH is working with several other agency partners (DEC, EPA, NYCDOHMH, and NYCDEP) to develop strategies to more effectively communicate fish advisories to the broad range of people who may be catching and eating fish and crabs from Newtown Creek, as well as to people who may be using other, similar, New York City waterways. The DOH will be working with the CAG to explore these strategies and prioritize outreach efforts.

Comment 45: A commenter asked why DOH does not put up signs to advise people regarding safety and fishing education along the creek, and if there are funds available to put in signage.

Response: DOH does not have the authority or resources to put up and maintain signs in all locations around the state where fish advisories are in place. DOH reached out to the NYCDEP and NYCDPR and offered assistance in designing and creating appropriate messages, should the agencies wish to post signs in areas where they have jurisdiction. DOH also assists private land owners who wish to post their land, and initiate contacts with agency partners to develop and coordinate messages for posting in appropriate locations. DOH will also be working with the CAG to explore strategies and prioritize locations for posting.

Citation for Response to Public Comments

Dueker, EM, et al. 2012. Local Environmental Pollution Strongly Influences Culturable Bacterial Aerosols at an Urban Aquatic Superfund Site. *Environ. Sci. Technol.* 46: 10926–10933.