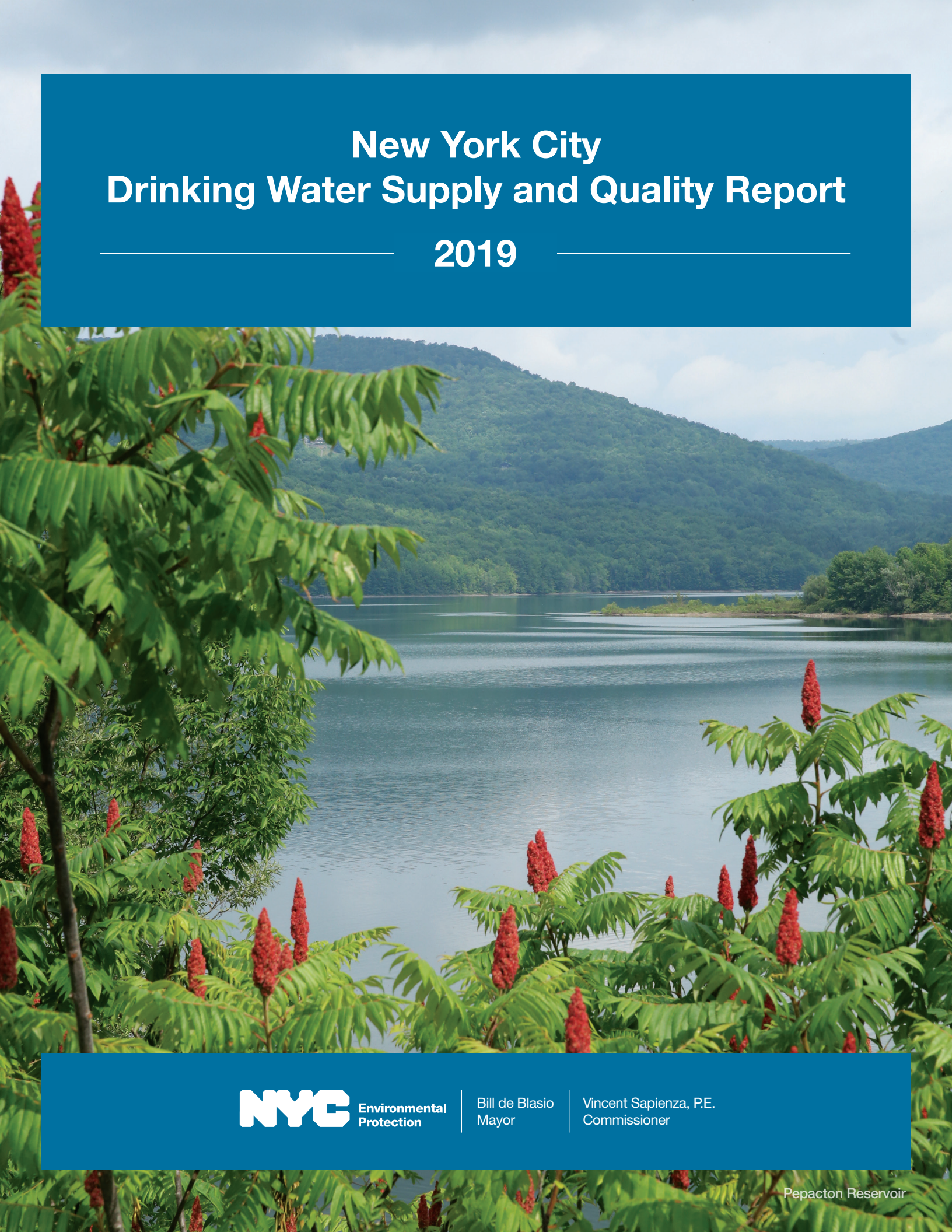
New York City
Drinking Water Supply and Quality Report

2019



NYC Environmental Protection

Bill de Blasio
Mayor

Vincent Sapienza, P.E.
Commissioner

Pepacton Reservoir

NYC Environmental Protection

Vincent Sapienza, P.E.
Commissioner

Dear Friends:

On behalf of my 6,000 colleagues at the Department of Environmental Protection (DEP), I am proud to report that New York City continues to enjoy some of the best tap water in the world. In 2019, we delivered more than 1 billion gallons of clean and delicious drinking water to nearly 10 million people every day.

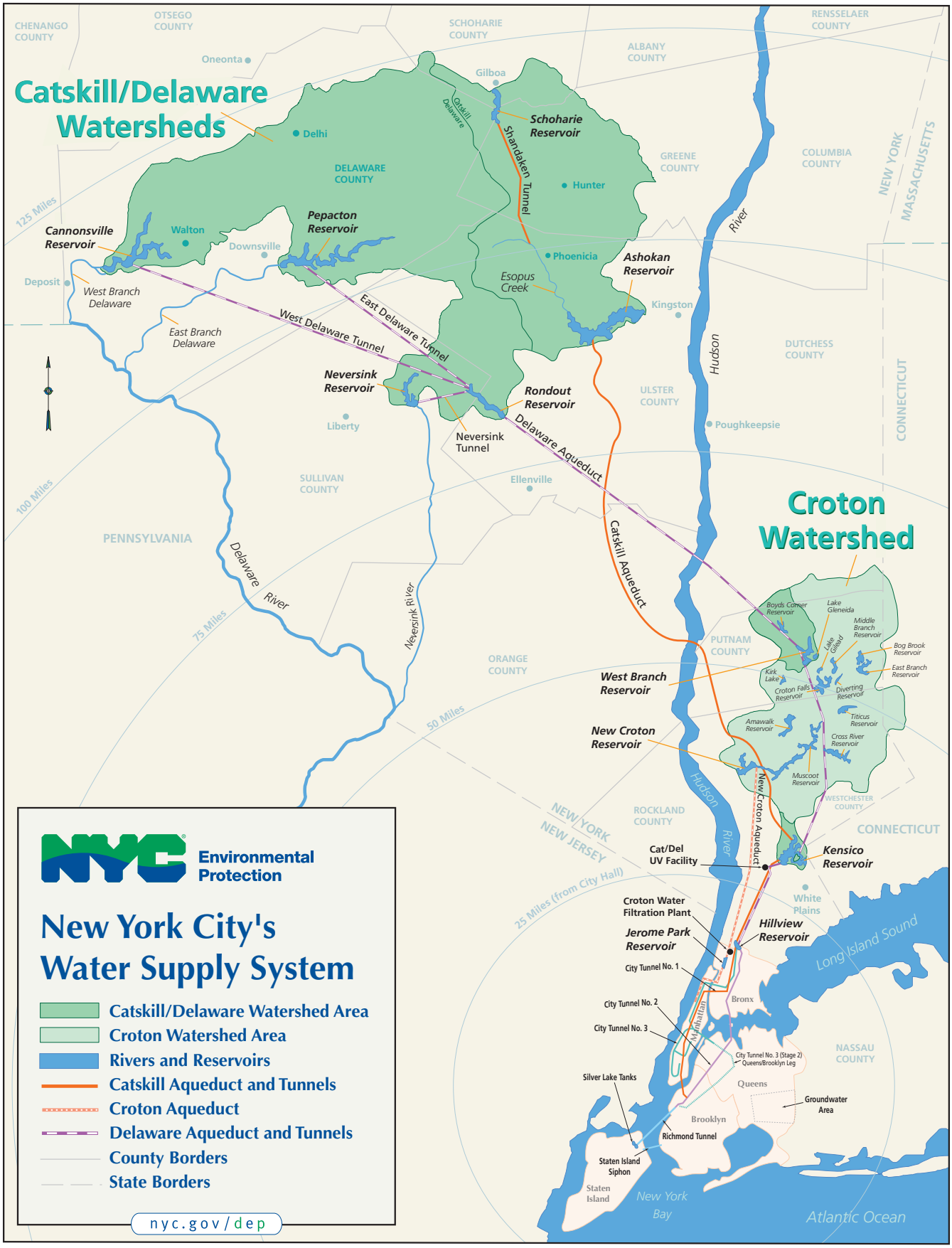
In this report, you will see that New York City's drinking water met or surpassed every national and state standard for quality in 2019. These data are based on over 51,000 samples that were collected by DEP scientists throughout our reservoir system, and at nearly 1,000 street-side sampling stations in every neighborhood across the city. Those samples were analyzed 719,000 times by scientists working in our four water quality laboratories. Robotic monitoring stations on our reservoirs provided another 2 million tests to ensure DEP was sending the best-quality water to New York City at all times.

Our drinking water system relies on vast reservoirs, large dams, hundreds of miles of aqueducts, and thousands of miles of water mains. We believe that steady and focused investment in infrastructure is key to the future of New York City. This is why we have more than $20 billion in investments planned over the next decade, to ensure a continuous supply of high-quality drinking water for generations to come.

As we end a decade and look forward to the next, I want to thank you for entrusting DEP with your drinking water supply. We take great pride in delivering the best water to millions of New Yorkers every day.

Sincerely,

Vincent Sapienza, P.E.
Commissioner


Catskill/Delaware Watersheds
Croton Watershed
CHENANGO COUNTY
OTSEGO COUNTY
SCHOHARIE COUNTY
ALBANY COUNTY
RENSSELAER COUNTY
Oneonta
Gilboa
Delhi
DELAWARE COUNTY
Schoharie Reservoir
Shandaken Tunnel
Catskill Delaware
GREENE COUNTY
COLUMBIA COUNTY
NEW YORK
MASSACHUSETTS
Hunter
125 Miles
Cannonsville Reservoir
Walton
Pepacton Reservoir
Downsville
Phoenicia
Ashokan Reservoir
Esopus Creek
Deposit
West Branch Delaware
East Branch Delaware
West Delaware Tunnel
East Delaware Tunnel
Kingston
Hudson River
DUTCHESS COUNTY
CONNECTICUT
Neversink Reservoir
Rondout Reservoir
ULSTER COUNTY
Liberty
Neversink Tunnel
Delaware Aqueduct
Poughkeepsie
SULLIVAN COUNTY
Ellenville
100 Miles
PENNSYLVANIA
Delaware River
Catskill Aqueduct
Neversink River
PUTNAM COUNTY
Boyds Corner Reservoir
Lake Gleneida
Middle Branch Reservoir
Lake Gilead
Bog Brook Reservoir
East Branch Reservoir
Kirk Lake
Croton Falls Reservoir
Diverting Reservoir
West Branch Reservoir
Titicus Reservoir
Amawalk Reservoir
Cross River Reservoir
New Croton Reservoir
75 Miles
ORANGE COUNTY
Muscoot Reservoir
New Croton Aqueduct
Hudson River
WESTCHESTER COUNTY
50 Miles
NEW YORK
NEW JERSEY
ROCKLAND COUNTY
CONNECTICUT
Cat/Del UV Facility
Kensico Reservoir
25 Miles (from City Hall)
Croton Water Filtration Plant
White Plains
Jerome Park Reservoir
Hillview Reservoir
Long Island Sound
City Tunnel No. 1
Bronx
City Tunnel No. 2
City Tunnel No. 3
Manhattan
City Tunnel No. 3 (Stage 2) Queens/Brooklyn Leg
NASSAU COUNTY
Silver Lake Tanks
Queens
Groundwater Area
Brooklyn
Richmond Tunnel
Staten Island Siphon
Staten Island
New York Bay
Atlantic Ocean
Environmental Protection
New York City's Water Supply System
Catskill/Delaware Watershed Area
Croton Watershed Area
Rivers and Reservoirs
Catskill Aqueduct and Tunnels
Croton Aqueduct
Delaware Aqueduct and Tunnels
County Borders
State Borders
nyc.gov/dep

NEW YORK CITY'S WATER SUPPLY SYSTEM

New York City's water supply system provides more than 1 billion gallons of safe drinking water every day to more than 8.4 million residents of New York City; 1 million people living in the counties of Westchester, Putnam, Orange, and Ulster; and more than 60 million tourists and commuters who visit the five boroughs throughout the year. In all, the system provides high-quality drinking water to nearly half the population of New York State.

New York City gets its drinking water from 19 reservoirs and three controlled lakes spread across a nearly 2,000-square-mile watershed. The watershed is located upstate in portions of the Hudson Valley and Catskill Mountains that are as far as 125 miles north of the city. New York City's water supply system is comprised of two primary water supplies called the Catskill/Delaware and Croton. The city also has a permit to operate a groundwater supply in Southeast Queens, although water from that system has not been delivered to customers in many years.

DEP employs more than 6,000 dedicated scientists, engineers, and other professionals who protect, operate and maintain the water supply system—considered by many to be an engineering marvel.

In 2019, New York City received a blend of drinking water from the Catskill/Delaware and Croton supplies. The Catskill/Delaware provided approximately 93 percent of the water, and approximately 7 percent was supplied by Croton.

DEP's Distribution Water Quality Laboratory in Queens, NY where DEP scientists analyze thousands of water samples from across the five boroughs seven days a week, 365 days a year.

TREATING OUR DRINKING WATER

CATSKILL/DELAWARE SUPPLY

Due to the very high quality of our Catskill/Delaware supply, New York City is one of only five large cities in the country with a surface drinking water supply that does not utilize filtration as a form of treatment. The Catskill/Delaware supply operates under a filtration waiver, referred to as the "Filtration Avoidance Determination" (FAD), and the water from this supply is treated using two forms of disinfection to reduce microbial risk.

Water is disinfected with chlorine, a common disinfectant added to kill germs and stop bacteria from growing on pipes. Water is also treated with ultraviolet (UV) light at the Catskill/Delaware Ultraviolet Light Disinfection Facility. The facility, located in Westchester County, is the largest of its kind in the world and is designed to disinfect more than 2 billion gallons of water per day. At the UV disinfection facility, exposure to UV light inactivates potentially harmful microorganisms without changing the water.

DEP also adds food grade phosphoric acid, sodium hydroxide, and fluoride to the water before sending it into distribution. Phosphoric acid creates a protective film on pipes to reduce the release of metals, such as lead, from service lines and household plumbing. Sodium hydroxide is added to raise the pH and reduce corrosion of household plumbing. Fluoride is added to improve dental protection, and is effective in preventing cavities at a federally-approved level of 0.7 mg/L. During 2019, only 0.6 percent of the water produced by Catskill/Delaware supply was not fluoridated.

In 2019, New York City's drinking water met or exceeded all federal and state drinking water standards.

CROTON SUPPLY

The Croton supply is treated by the Croton Water Filtration Plant, located underground in the Bronx. The plant has the ability to treat up to 290 million gallons of drinking water each day, which helps to ensure a large enough supply of water for the city to withstand droughts. It also allows DEP to periodically shut down other parts of the water supply for repairs and inspections, and increases the flexibility of the City to respond to the evolving effects of climate change.

Water undergoes several forms of treatment as it passes through the filtration plant. The process includes coagulation, dissolved air flotation, filtration, and disinfection. During coagulation, chemicals are added to untreated water, causing any particulates to bunch together and become larger particles called floc. Injected air bubbles float the floc to the top where it is skimmed off during the process called dissolved air flotation. Finally, during filtration, the water flows through a bed of anthracite and sand to remove any remaining particles. Just like the Catskill/Delaware supply, Croton water is disinfected with chlorine and UV light to protect against potentially-harmful microorganisms. In addition, Croton water is treated with food grade phosphoric acid, sodium hydroxide, and fluoride. During 2019, 0.01 percent of the water produced by the Croton Water Filtration Plant was not fluoridated.

The Croton Water Filtration Plant first began operating in May 2015. In 2019, it was in operation from January 1 to March 20, April 29 to June 3, and October 16 to December 23.

DEP's water quality monitoring program—far more extensive than required by law—demonstrates that the quality of New York City's drinking water remains high and meets all state and federal drinking water standards.

TESTING FOR QUALITY

DRINKING WATER SAMPLING AND MONITORING

DEP monitors the water in the distribution system, upstate reservoirs and feeder streams, and wells that are sources for New York City's drinking water supply. We continuously sample, and conduct analyses for numerous water quality parameters, including microbiological, chemical, and physical measures, throughout the watershed and as the water enters the distribution system. DEP also regularly tests water quality at nearly 1,000 water quality sampling stations throughout New York City. In 2019, DEP performed approximately 456,500 analyses on 36,300 samples from the distribution system, meeting all state and federal monitoring requirements. These data are summarized in tables starting on page 14. DEP also performed approximately 262,500 analyses on 15,000 samples from the reservoirs and their watersheds. A growing network of robotic monitoring stations provided another 2 million water quality measurements last year, allowing DEP to optimize its operation of the reservoirs, support watershed protection efforts, and study water quality trends.

REGULATION OF DRINKING WATER

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activities. Contaminants that may be present in source water include: microbial contaminants, inorganic contaminants, pesticides and herbicides, organic chemical contaminants, and radioactive contaminants.

To ensure that tap water is safe to drink, the New York State Department of Health (NYSDOH) and the United States Environmental Protection Agency (EPA) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The NYSDOH and the federal Food and Drug Administration's (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. The presence of contaminants does not necessarily indicate that water poses a health risk. These regulations also establish the minimum amount of testing and monitoring that each system must undertake to ensure that the tap water is safe to drink.

Visit epa.gov/safewater or health.ny.gov for more information about drinking water.

PROTECTING OUR WATER AT THE SOURCE

10-YEAR FILTRATION AVOIDANCE DETERMINATION

DEP funds and administers a number of watershed protection and pollution prevention programs to maintain the high quality of our drinking water. These science-based strategies are designed to protect New York City's drinking water at its source by keeping pollution out of our reservoirs and the streams, creeks, and rivers that feed them.

NYS DOH issued the latest FAD in 2017, allowing DEP to operate its Catskill/Delaware supply without filtration through at least 2027. DEP will invest an estimated $1 billion during that time to comply with the FAD. That funding will go toward our watershed protection programs that preserve watershed lands, upgrade wastewater infrastructure, implement clean water strategies on watershed farms, and manage streams, forests, and other natural resources that affect water quality.

SOURCE WATER ASSESSMENT PROGRAMS

Federal regulations require states to develop and implement source water assessment programs to identify the areas that supply public tap water, inventory contaminants, assess water system susceptibility to contamination, and inform the public of the results. The states are given a great deal of flexibility on how to implement source water assessment programs. These assessments are created using available information to help estimate the potential for source water contamination. Higher susceptibility ratings do not mean that source water contamination has occurred or will occur in a water supply; rather, they indicate the need for water suppliers to implement additional precautionary measures. Because of DEP's extensive watershed protection and pollution prevention programs, NYSDOH does not find it necessary to perform a source water assessment on the New York City water supply.

Over the past 25 years, DEP's programs in the watershed have become national and international models for protecting water at its source. Each year, water utility managers and public health professionals come from around the globe to study DEP programs.

CONSERVING OUR SUPPLY

Although New York City has grown by more than 1 million people since 1980, demand for water has dropped by approximately 35 percent—making it one of the most water-efficient large cities in the country.

The average single-family household in New York City uses approximately 70,000 gallons of water each year at a cost of $3.99 per 100 cubic feet of water (748 gallons), or about $373 a year. Since nearly all customers also receive wastewater collection and treatment services, which cost about $593, the combined annual water and sewer charge for the typical New York City household using 70,000 gallons per year is $966, calculated at fiscal year 2020 rates.

Advances in technology have played a key role in the drop in demand. By the end of our Toilet Replacement Program in 2019, DEP had funded the replacement of more than 13,000 inefficient toilets in private multi-family homes, saving 620,000 gallons of water per day. To help our customers detect leaks, DEP created an automated leak notification program, which sends alerts to property owners if there is an unusual spike in water consumption.

These, and other recent investments, have reduced overall demand for water by more than 10.2 million gallons per day. By 2022, we plan to nearly double that by conserving 20 million gallons per day.

DEP has partnered with other city agencies, colleges, and businesses to help conserve water. We have installed more than 400 spray shower timers in NYC Parks playgrounds, saving 1.1 million gallons per day in the summer, and have upgraded over 34,000 inefficient bathroom fixtures in 402 New York City public schools, saving 3.31 million gallons per day.

PLANNING FOR THE FUTURE

More than a century ago, New York City developed comprehensive plans to build and expand its water supply in forested areas that would protect water quality. Those plans were based on a deep foundation of research, including studies of geology, weather patterns, and engineering methods to deliver the water. These analyses also examined the quantity of water needed to sustain a city that was growing by millions.

Our system of reservoirs, dams and aqueducts was built on a legacy of long-term planning that continues today as DEP applies the best science and engineering to meet future challenges.

Building upon this legacy of long-term planning, DEP continues to think big—committing more than $20 billion to upgrading our infrastructure over the next decade. When planning for the future, we consider a variety of factors, including current and upcoming federal and state mandates, financial plans, institutional knowledge, technological trends, workforce demographics, and impacts to our customers. In these times, we must also consider how climate change may affect the watershed and, in turn, our water supply.

RESEARCH

DEP research scientists and other experts are studying emerging threats to drinking water, new treatment techniques, and other state-of-the-industry tools that can help us operate and protect the city's vast waterworks.

One of the largest ongoing studies by DEP research scientists focuses on climate change. In the future, the quantity and quality of water in New York City's reservoir system could be altered as global temperatures increase and weather patterns change. To understand climate change and its potential impact on the future state of our water supply, DEP scientists have been studying nearly two dozen global climate models. This multi-phase study of climate change is one of the largest and most advanced efforts by any water utility in the United States.

This year we established the first research agenda for our water supply, providing background and context for critical research and applying best practices in water supply operations to ensure the delivery of high-quality drinking water now and into the future.

CAPITAL PROJECTS

In 2019, DEP made progress on a $400 million project to upgrade infrastructure at Schoharie Reservoir, the northernmost reservoir in the city's water supply system. Schoharie Reservoir provides about 15 percent of New York City's drinking water during a typical year. Rehabilitation of the intake chamber and the construction of new release works will restore the full function of the reservoir to ensure it continues to serve New Yorkers for generations to come.

DEP also completed excavation of the Delaware Aqueduct Bypass Tunnel, a significant milestone for the largest repair in the 178-year history of New York City's water supply system. The tunnel is part of a $1 billion effort to repair two leaks in the 85-mile-long Delaware Aqueduct, which is the longest tunnel in the world. The aqueduct delivers about 50 percent of New York City's water each day.

On August 13, 2019, workers completed excavation of the 2.5-mile-long tunnel when a massive tunneling machine broke through the last stretch of bedrock nearly 700 feet beneath Dutchess County. The tunnel will continue to be reinforced with steel and concrete for the next several years as the project moves toward completion in 2023.

The "holing through" of the Delaware Aqueduct Bypass Tunnel with one of the world's most advanced tunnel boring machines, NORA. The machine measures 21.6 feet in diameter and is more than 470 feet long.

LEAD IN DRINKING WATER: FREQUENTLY ASKED QUESTIONS

IS THERE LEAD IN MY DRINKING WATER?

New York City's award-winning tap water is delivered virtually lead-free through 7,000 miles of lead-free aqueducts, tunnels, and water mains in the city's water supply system. However, homes built prior to 1961 may have lead service lines (which connect your house to the city's water main in the street), and some homes, regardless of the year they were built, could have household plumbing and internal fixtures that contain lead. Although New York City takes extensive steps to protect water in homes that may have lead in their plumbing, lead from plumbing may still be released into a home's drinking water. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing. DEP is responsible for providing high-quality drinking water, but cannot control the variety of materials used in plumbing components.

HOW CAN I FIND OUT IF I HAVE A LEAD SERVICE LINE?

Visit nyc.gov/dep/servicelinemap to view an interactive map. This map offers historical information largely based on third-party plumbing records supplemented, in some cases, by information gathered during inspections.

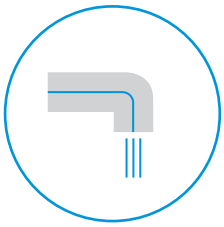
HOW CAN I TEST THE WATER IN MY HOME?

DEP offers free lead test kits to all New York City residents. Our residential testing program is the largest of its kind in the nation. Call 311 or visit nyc.gov/apps/311 to request a free lead test kit. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline (1-800-426-4791) or at epa.gov/safewater/lead.

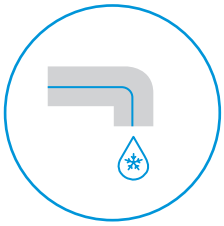
WHAT ARE THE HEALTH EFFECTS OF LEAD?

Exposure to lead can cause serious health problems, especially for pregnant women, infants, and young children. For more information, visit nyc.gov/lead.

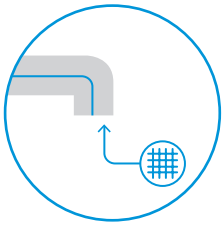
How can I limit my lead exposure?



Run
your water for at least 30 seconds or until it gets cold. Once the water is cold, run it for 15 seconds more.



Use Cold Water
for cooking, drinking, or preparing infant formula. Hot tap water is more likely to contain lead and other metals.

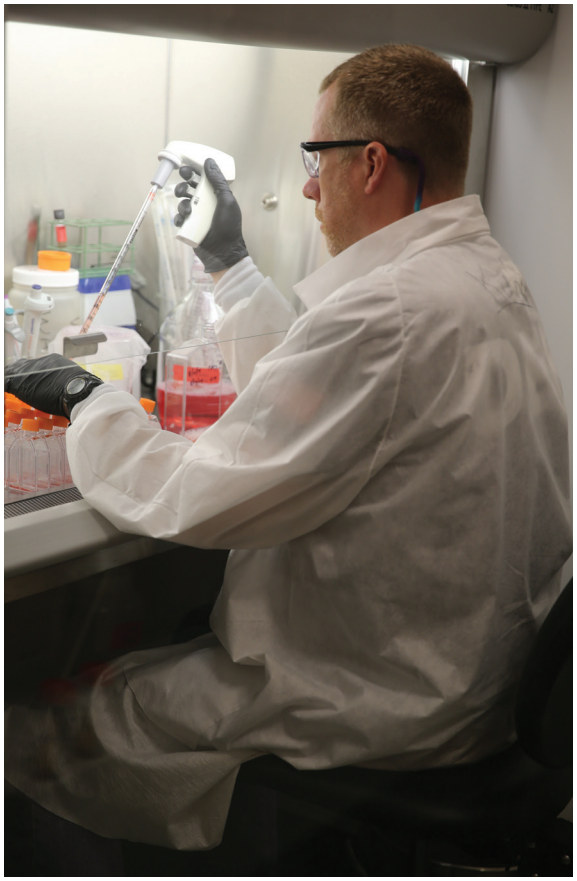


Remove & Clean
the faucet screen monthly (also called an aerator), where small particles can get trapped.

Hire
a licensed plumber to identify and replace plumbing fixtures and/or service line that contain lead.

CRYPTOSPORIDIUM AND *GIARDIA*

In 1992, DEP started a comprehensive program to monitor its source waters and watersheds for the presence of *Cryptosporidium* and *Giardia*, microscopic organisms (pathogens) that can cause disease. In 2019, DEP collected weekly samples from the outflow of the Kensico Reservoir, prior to chlorination and UV disinfection, and the outflow of Hillview Reservoir, prior to secondary disinfection with chlorine. The outflow of the New Croton Reservoir was sampled quarterly in 2019. Samples were analyzed using EPA Method 1623.1. The *Cryptosporidium* and *Giardia* data for Kensico, Hillview, and New Croton Reservoir outflows are presented in the table on page 17 of this report. The presence of low levels of *Cryptosporidium* and *Giardia* detected in the source water required no operational changes on the part of DEP.



DEP's Pathogen Laboratory in Kingston, NY where DEP scientists analyze drinking water samples for *Cryptosporidium* and *Giardia*.

While there is no evidence that any cases of cryptosporidiosis or giardiasis have been caused by the New York City water supply, federal and state law requires all water suppliers to notify their customers about the potential risks from *Cryptosporidium* and *Giardia*. Cryptosporidiosis and giardiasis are intestinal illnesses caused by microscopic pathogens, which can be waterborne. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Some people may be more vulnerable to disease causing microorganisms, or pathogens, in drinking water than the general population. Immuno-compromised persons, such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly individuals, and infants, can be particularly at risk from infections. These people should seek advice from their health care providers about their drinking water. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium*, *Giardia*, and other microbial contaminants are available from EPA's Safe Drinking Water Hotline at 1-800-426-4791.

DEP's Waterborne Disease Risk Assessment Program conducts disease surveillance for cryptosporidiosis and giardiasis to track the disease incidence, and syndromic surveillance for gastrointestinal illness to identify potential citywide gastrointestinal outbreaks. Persons diagnosed with cryptosporidiosis are interviewed concerning potential exposures, including tap water consumption. Disease and syndromic surveillance indicates that there were no outbreaks of cryptosporidiosis or giardiasis attributed to tap water consumption in New York City in 2019.

THE NEW YORK CITY DRINKING WATER QUALITY TESTING RESULTS - 2019

HOW TO READ THE NEW YORK CITY DRINKING WATER QUALITY TESTING RESULTS

The following section of this report compares the quality of your tap water to federal and state standards for each parameter (if applicable). The monitoring results show that New York City's drinking water met all drinking water standards in 2019.

The following tables reflect the compliance monitoring results for all regulated and non-regulated parameters, the number of samples collected, the range of values detected, the average of the values detected, and the possible sources of the parameters, unless otherwise footnoted. The monitoring frequency of each parameter varies and is parameter specific. Data presented are for the Catskill/Delaware and Croton supplies, which were the only sources of water in 2019. The table on page 18 represents those parameters monitored for, but not detected in any sample.

Most of our data are representative of 2019 testing; concentrations of parameters or contaminants do not change frequently.

UNITS AND ABBREVIATIONS

$CaCO_3$ = calcium carbonate
CFU/mL = colony forming units per milliliter
/cm = per centimeter
°F = degrees Fahrenheit
µg/L = micrograms per liter (10^{-6} grams per liter)
µS/cm = microsiemens per centimeter
mg/L = milligrams per liter (10^{-3} grams per liter)
MPN/100mL = most probable number per 100 milliliters
ND = lab analysis indicates parameter is not detected
NDL = no designated limits
ng/L = nanograms per liter (10^{-9} grams per liter)
NTU = nephelometric turbidity units
/50L = per 50 liters

DEFINITIONS

ACTION LEVEL (AL):

The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements that a water system must follow. An exceedance occurs if more than 10 percent of the samples exceed the Action Level.

MAXIMUM CONTAMINANT LEVEL (MCL):

The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible, using the best available treatment technology.

MAXIMUM CONTAMINANT LEVEL GOAL (MCLG):

The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MAXIMUM RESIDUAL DISINFECTANT LEVEL (MRDL):

The highest level of a disinfectant allowed in drinking water. The addition of a disinfectant is necessary for control of microbial contaminants.

MAXIMUM RESIDUAL DISINFECTANT LEVEL GOAL (MRDLG):

The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contamination.

TREATMENT TECHNIQUE (TT):

A required process intended to reduce the level of a contaminant in drinking water.

90TH PERCENTILE VALUE:

The values reported for lead and copper represent the 90th percentile. A percentile is a value on a scale of 100 that indicates the percent of a distribution that is equal to or below the value. The 90th percentile is equal to or greater than 90 percent of the lead and copper values detected at your water system.

DETECTED CONVENTIONAL PHYSICAL AND CHEMICAL PARAMETERS

PARAMETER	NYSDOH MCL (Highest Level Allowed)	EPA MCLG (Ideal Goal)	# SAMPLES	RANGE	AVERAGE	MCL VIOLATION	LIKELY SOURCES IN DRINKING WATER
Alkalinity (mg/L $CaCO_3$)	-		309	13 - 70	22	No	Erosion of natural deposits
Aluminum (µg/L)	50 - 200 (1)		600	6 - 56	17	No	Erosion of natural deposits
Barium (mg/L)	2	2	600	0.01 - 0.03	0.02	No	Erosion of natural deposits
Bromide (µg/L)	- (2)		8	8 - 35	20	No	Naturally occurring
Calcium (mg/L)	-		600	5 - 26	7	No	Erosion of natural deposits
Chloride (mg/L)	250		309	10 - 91	19	No	Naturally occurring; road salt
Chlorine Residual, Free (mg/L)	4 (3)		15,939	0.0 - 1.2	0.6 (3)	No	Water additive for disinfection
Color - distribution system (color units - apparent)	-		14,550	3 - 50	6	No	Presence of iron, manganese, and organics in water
Color - entry points (color units - apparent)	15 (4)		1,390	3 - 10	6	No	Presence of iron, manganese, and organics in water
Copper (mg/L)	1.3 (5)	1.3	600	ND - 0.062	0.006	No	Corrosion of household plumbing; erosion of natural deposits
Corrosivity (Langelier index)	- (6)		309	-2.81 to -1.22	-2.21	No	
Fluoride (mg/L)	2.2 (4)	4	2,082	ND - 0.8	0.7	No	Additive which promotes strong teeth; erosion of natural deposits
Hardness (mg/L $CaCO_3$)	-		600	16 - 102	25	No	Erosion of natural deposits
Hardness (grains/gallon[US]$CaCO_3$) (7)	-		600	0.9 - 5.9	1.4	No	Erosion of natural deposits
Iron (µg/L)	300 (4) (8)		599	ND - 240	31	No	Naturally occurring
Lead (µg/L)	15 (5)	0	600	ND - 28 (9)	ND	No	Corrosion of household plumbing; erosion of natural deposits
Magnesium (mg/L)	-		600	1 - 8.9	1.8	No	Erosion of natural deposits
Manganese (µg/L)	300 (4) (8)		604	ND - 137	15	No	Naturally occurring
Nitrate (mg/L nitrogen)	10	10	309	0.07 - 0.52	0.15	No	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits

Continued on next page

DETECTED CONVENTIONAL PHYSICAL AND CHEMICAL PARAMETERS (continued)

PARAMETER	NYSDOH MCL (Highest Level Allowed)	EPA MCLG (Ideal Goal)	# SAMPLES	RANGE	AVERAGE	MCL VIOLATION	LIKELY SOURCES IN DRINKING WATER
Nitrite (mg/L nitrogen)	1	1	309	ND - 0.002 [10]	ND	No	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
pH (pH units)	6.8 - 8.2 [11]		15,933	7 - 10.8 [11]	7.4	No	
Phosphate, Ortho- (mg/L)	1-4 [11]		15,937	0.4 - 3.6 [11]	2.1	No	Water additive for corrosion control
Potassium (mg/L)	-		599	0.4 - 2.6	0.7	No	Erosion of natural deposits
Silica [silicon oxide] (mg/L)	-		309	2.3 - 7.4	3.2	No	Erosion of natural deposits
Sodium (mg/L)	NDL [4] [12]		600	8 - 46	12	No	Naturally occurring; road salt; water softeners; animal waste
Specific Conductance (µS/cm)	-		15,940	73 - 468	115	No	
Strontium (µg/L)	-		600	17 - 83	24	No	Erosion of natural deposits
Sulfate (mg/L)	250		309	3.2 - 22.2	5.5	No	Naturally occurring
Temperature (°F)	-		15,940	34 - 84	54	No	
Total Dissolved Solids (mg/L)	500 [1]		310	36 - 246	72	No	Metals and salts naturally occurring in the soil; organic matter
Total Organic Carbon (mg/L)	-		615	1.3 - 2.6	1.6	No	Organic matter naturally present in the environment
Total Organic Carbon - source water (mg/L)	- [2]		8	2.1 - 4.2	3.1	No	Organic matter naturally present in the environment
Turbidity [13] - distribution system (NTU)	5 [14]		14,550	ND - 14.1	0.9 [14]	No	Soil runoff
Turbidity [13] - source water (NTU)	5 [15]		-	-	1.2 [15]	No	Soil runoff
Turbidity [13] - filtered water (NTU)	TT [16]		-	-	0.35 [16]	No	Soil runoff
UV 254 (absorbance/cm)	-		309	0.020 - 0.044	0.031	No	Organic matter naturally present in the environment
Zinc (mg/L)	5 [4]		600	ND - 0.03	ND	No	Naturally occurring

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DETECTED ORGANIC PARAMETERS

PARAMETER	NYSDOH MCL (Highest Level Allowed)	EPA MCLG (Ideal Goal)	# SAMPLES	RANGE	AVERAGE	MCL VIOLATION	LIKELY SOURCES IN DRINKING WATER
Bromochloroacetic Acid (µg/L)	50		324	ND - 3.2	1.4	No	By-product of drinking water chlorination
Bromodichloroacetic Acid (µg/L)	50 (2)		80	1.4 - 5.1	2.5	No	By-product of drinking water chlorination
Chlorodibromoacetic Acid (µg/L)	50 (2)		80	ND - 0.6	ND	No	By-product of drinking water chlorination
Chloropicrin (µg/L)	50		6	0.27 - 0.42	0.34	No	By-product of drinking water chlorination
Chloral Hydrate (µg/L)	50		6	0.91 - 4.68	2.52	No	By-product of drinking water chlorination
Geosmin (ng/L)	- (17)		14	ND - 7.2	3.0 (17)	No	Naturally present in the environment
Haloacetic Acid 5 (HAA5) (µg/L)	60 (18)		324	19 - 60	51 (18)	No	By-product of drinking water chlorination
Haloacetic Acid Brominated (HAA6Br) (µg/L)	- (2)		80	2.2 - 9.3	4.3	No	By-product of drinking water chlorination
Haloacetic Acid 9 (HAA9) (µg/L)	- (2)		80	31 - 82	53	No	By-product of drinking water chlorination
Haloacetonitriles (HANs) (µg/L)	50		6	1.4 - 2.3	2.0	No	By-product of drinking water chlorination
Halogenated Ketones (HKs) (µg/L)	50		6	1.9 - 2.8	2.3	No	By-product of drinking water chlorination
Hexachlorocyclopentadiene (µg/L)	50		25	ND - 0.076	ND	No	Discharge from chemical factories
Methylisoborneol (MIB) (ng/L)	- (17)		14	ND - 16	7 (17)	No	Naturally present in the environment
Total Organic Halogen (µg/L)	-		188	116 - 302	169	No	By-product of drinking water chlorination
Total Trihalomethanes (TTHM) (µg/L)	80 (18)		308	11 - 79	50 (18)	No	By-product of drinking water chlorination

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DETECTED MICROBIAL PARAMETERS

PARAMETER	NYSDOH MCL (Highest Level Allowed)	EPA MCLG (Ideal Goal)	# SAMPLES	RANGE	# SAMPLES POSITIVE	AVERAGE	HIGHEST MONTH % POSITIVE	MCL VIOLATION	LIKELY SOURCES IN DRINKING WATER
Total Coliform Bacteria (% of samples positive/month)	5%	0	9,719	-	14	-	0.5%	No	Naturally present in the environment
E. coli (MPN/100mL)	- [19]	0	9,719	-	0	-	0.0%	No	Animal fecal waste
Heterotrophic Plate Count (CFU/mL)	TT	-	12,577	ND - 92	199	ND	-	No	Naturally present in the environment

LEAD AND COPPER RULE SAMPLING AT RESIDENTIAL WATER TAPS

PARAMETER	NYSDOH AL	EPA MCLG (Ideal Goal)	90% OF YOUR LEVELS WERE LESS THAN	RANGE	# SAMPLES EXCEEDING AL	Exceedance	LIKELY SOURCES IN DRINKING WATER
Copper (mg/L)	1.3	1.3	0.189	0.004 - 0.413	0 out of 453	No	Corrosion of household plumbing
Lead (µg/L)	15	0	10	ND - 380	26 out of 453	No	Corrosion of household plumbing

CRYPTOSPORIDIUM AND GIARDIA SAMPLING FROM SOURCE WATER AND RESERVOIR OUTFLOWS [20]

PARAMETER	RESERVOIR OUTFLOW	# SAMPLES	# SAMPLES POSITIVE	RANGE	LIKELY SOURCES IN DRINKING WATER
Cryptosporidium (oocysts/50L)	Kensico	52	3	0 - 1	Animal fecal waste
	Hillview	52	2	0 - 1	
	Croton	4	0	0	
Giardia (cysts/50L)	Kensico	52	37	0 - 12	Animal fecal waste
	Hillview	52	22	0 - 6	
	Croton	4	2	0 - 10	

NOT DETECTED CONVENTIONAL PHYSICAL AND CHEMICAL PARAMETERS

Antimony, Arsenic, Asbestos*, Beryllium, Bismuth-212*, Bismuth-214*, Cadmium, Cesium-134*, Cesium-137*, Chromium, Cyanide, Gross Alpha*, Gross Beta*, Lead-212*, Lead-214*, Lithium, Mercury, Nickel, Potassium-40*, Radium-226*, Radium-228*, Selenium, Silver, Thallium, Thallium-208*, Thorium-234*, Uranium*, Uranium-235*

NOT DETECTED ORGANIC PARAMETERS

Principal Organic Contaminants:

Benzene, Bromobenzene, Bromochloromethane, Bromomethane, n-Butylbenzene, sec-Butylbenzene, tert-Butylbenzene, Carbon tetrachloride, Chlorobenzene, Chloroethane, Chloromethane, 2-Chlorotoluene, 4-Chlorotoluene, Dibromomethane, 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, Dichlorodifluoromethane, 1,1-Dichloroethane, 1,2-Dichloroethane, 1,1-Dichloroethene, cis-1,2-Dichloroethylene, trans-1,2-Dichloroethylene, 1,2-Dichloropropane, 1,3-Dichloropropane, 2,2-Dichloropropane, 1,1-Dichloropropene, cis-1,3-Dichloropropene, trans-1,3-Dichloropropene, Ethylbenzene, Hexachlorobutadiene, Isopropylbenzene, p-Isopropyltoluene, Methylene chloride, n-Propylbenzene, Styrene, 1,1,1,2-Tetrachloroethane, 1,1,2,2-Tetrachloroethane, Tetrachloroethylene, Toluene, 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene, 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, Trichloroethene, Trichlorofluoromethane, 1,2,3-Trichloropropane, 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, m-Xylene, o-Xylene, p-Xylene

Specified Organic Contaminants:

Alachlor, Aldicarb (Temik), Aldicarb sulfone, Aldicarb sulfoxide, Aldrin, Atrazine, Benzo(a)pyrene, Butachlor, Carbaryl, Carbofuran (Furadan), Chlordane, 2,4-D, Dalapon, 1,2-Dibromo-3-chloropropane, Dicamba, Dieldrin, Di(2-ethylhexyl)adipate, Di(2-ethylhexyl)phthalate, Dinoseb, Diquat, Endothall, Endrin, Ethylene dibromide (EDB), Glyphosate, Heptachlor, Heptachlor epoxide, Hexachlorobenzene, 3-Hydroxycarbofuran, Lindane, Methomyl, Methoxychlor, Methyl-tertiary-butyl-ether (MTBE), Metolachlor, Metribuzin, Oxamyl (Vydate), Pentachlorophenol, Picloram, Polychlorinated biphenyls (PCBs), Propachlor, Simazine, Toxaphene, 2,4,5-TP (Silvex), 2,3,7,8-TCDD (Dioxin), Vinyl chloride

Unspecified Organic Contaminants:

Acenaphthene, Acenaphthylene, Acetochlor, Acetone, Acifluorfen, Allyl chloride, Ametryn, tert-Amyl ethyl ether, tert-Amyl methyl ether, Anthracene, Bentazon, Benzo[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Benzo[g,h,i]perylene, alpha-BHC, beta-BHC, delta-BHC, Bromacil, 2-Butanone (MEK), Butylate, Butylbenzylphthalate, tert-Butyl alcohol, tert-Butyl ethyl ether, Caffeine, Carbon Disulfide, Carboxin, Chloramben, alpha-Chlordane, gama-Chlordane, Chlorobenzilate, 2-Chlorobiphenyl, 1-Chlorobutane, Chloroneb, Chlorothalonil (Draconil, Bravo), Chlorpropham, Chlorpyrifos (Dursban), Chrysene, Cycloate, 2,4-DB, DCPA(Dacthal), DCPA (total mono & diacid degradate), 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, DEF(Merphos), Diazinon, Dibenz[a,h]anthracene, Di-n-Butylphthalate, 3,5-Dichlorobenzoic acid, 2,3-Dichlorobiphenyl, Dichlorprop, Dichlorvos (DDVP), Diethyl ether, Diethylphthalate, Di-isopropyl ether, Dimethoate, Dimethylphthalate, 2,4-Dinitrotoluene, 2,6-Dinitrotoluene, Di-N-octylphthalate, Diphenamid, Disulfoton, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin aldehyde, EPTC, Ethoprop, Ethyl methacrylate, Etridiazole, Fenamiphos, Fenarimol, Fluoranthene, Fluorene, Fluridone, alpha-HCH, beta-HCH, delta-HCH, 2,2',3,3',4,4',6-Heptachlorobiphenyl, Heptachlor epoxide (isomer B), 2,2',4,4',5,6'-Hexachlorbiphenyl, Hexachloroethane, Hexazinone, Indeno[1,2,3-cd]pyrene, Isophorone, Malathion, Methiocarb, Methyl acetate, Methyl iodide, Methyl paraoxon, 4-Methyl-2-pentanone (MIBK), Mevinphos, MGK264-isomer a, MGK264-isomer b, Molinate, Naphthalene, Napropamide, 4-Nitrophenol, cis-Nonachlor, trans-Nonachlor, Norflurzon, 2,2',3,3',4,5',6,6'-Octachlorobiphenyl, Paraquat, Parathion, Pebulate, Pendimethalin, 2,2',3',4,6-Pentachlorobiphenyl, Pentachloroethane, Permethrin (cis- & trans-), Phenanthrene, Prometryn, Pronamide, Propazine, Propoxur (Baygon), Pyrene, 2,4,5-T, Simetryn, Stirofos, Tebuthiuron, Terbacil, Terbufos, Terbuthylazine, Terbutryn, 2,2',4,4'-Tetrachlorobiphenyl, Tetrahydrofuran, Thiobencarb, Triademefon, 2,4,5-Trichlorobiphenyl, Trichlorotrifluoroethane (Freon 113), Tricyclazole, Trifluralin, Vernolate

Unregulated Contaminant Monitoring Rule (UCMR4) Parameters: [2]

Anatoxin-a, 1-Butanol, Butylated hydroxyanisole, Chlorpyrifos, Cylindrospermopsin, Dimethipin, Ethoprop, alpha-HCH, Germanium Total ICAP/MS, 2-Methoxyethanol, Monobromoacetic acid, Monochloroacetic acid, Oxyfluorfen, Profenofos, 2-Propen-1-ol, Quinoline, Tebuconazole, o-Toluidine, Total Microcystins, Total Permethrin (cis & trans), Tribromoacetic acid, Tribufos

2019 MONITORING DATA FOOTNOTES

(1) EPA Secondary MCL: NYSDOH has not set an MCL for this parameter.

(2) Monitored for under the Fourth Unregulated Contaminant Monitoring Rule (UCMR4) in 2018 and 2019. UCMR4 included source water monitoring for bromide and total organic carbon; no MCL has been established for these parameters.

(3) Value represents MRDL, which is a level of disinfectant added for water treatment that may not be exceeded at the consumer's tap without an unacceptable possibility of adverse health effects. The MRDL is enforceable in the same manner as an MCL and is the calculated running annual average. Data presented are the range of individual sampling results and the highest of the four quarterly running annual averages.

(4) Determination of MCL violation: If a sample exceeds the MCL, a second sample must be collected from the same location within two weeks, or as soon as practical. If the average of the two results exceeds the MCL, then an MCL violation has occurred.

(5) Action Level (not an MCL) measured at-the-tap. The data presented in this table were collected from sampling stations at the street curb. For at-the-tap monitoring, see the Lead and Copper Rule Sampling at Residential Water Taps table.

(6) A Langelier Index of less than zero indicates corrosive tendencies.

(7) Hardness of up to 3 grains per gallon is considered soft water; between 3 and 9 is moderately hard water.

(8) If iron and manganese are present, the total concentration of both should not exceed 500 µg/L.

(9) Lead was detected at one location, site 17250 (Allerton, 10469) on 1/31/19, above the Action Level.

(10) Only detected in one sample: nitrite was detected from site 52050 (Port Richmond, 10302) on 8/6/19. In all other samples the parameter was not detected.

(11) NYSDOH established Optimal Water Quality Parameters (OWQP) under the Lead and Copper Rule which includes ranges for pH and ortho-phosphate presented here. The reported average value for pH is the median value. The pH was elevated in three samples collected from site 3ISL4 (Randalls Island, 10035) on 3/21/19, 11/21/19 and 12/12/19, one sample collected from site 50050 (Rosebank, 10305) on 12/30/19, and one sample collected from site 58250 (Annadale, 10312) on 11/1/19. Ortho-phosphate was below range in one (1) sample collected at site 3ISL4 (Randalls Island, 10035) on 3/21/19.

(12) Water containing more than 20 mg/L of sodium should not be used for drinking by people on severely restricted sodium diets. Water containing more than 270 mg/L of sodium should not be used for drinking by people on moderately restricted sodium diets.

(13) Turbidity is a measure of cloudiness of the water. Turbidity is monitored because it is a good indicator of water quality, because high turbidity can hinder the effectiveness of disinfection, and because it is a good indicator of the effectiveness of our filtration system.

(14) This MCL for turbidity is the monthly average rounded off to the nearest whole number. Data presented are the range of individual sampling results and the highest monthly average from distribution sites.

(15) This MCL for turbidity is on individual readings taken every four hours at the unfiltered Catskill/Delaware source water entry point. Value presented is the highest individual sampling result.

(16) This is a Treatment Technique performance standard for the Croton Filtration Plant. The value presented is the highest single combined filter effluent turbidity measurement which occurred on 10/16/19; all other samples were <0.3 NTU. In 2019, 99.9 percent of turbidity results were <0.3 NTU.

(17) Monitoring for the taste and odor compounds, Geosmin and MIB, was conducted at the Croton entry point site 1SCL1 (Kingsbridge Heights, 10463).

(18) The MCLs for HAA5 and TTHMs are the calculated locational running annual average. The data in the Range column are the minimum and maximum values of all sample sites monitored in the distribution system whether for compliance purposes or not. The values in the Average column are the highest locational running annual averages under the Stage 2 Disinfectant and Disinfection By-Products Rule.

(19) If a sample and its repeat sample are both positive for coliform bacteria and one of the two samples is positive for *E. coli*, then an MCL violation has occurred.

(20) Samples are collected prior to final disinfection or filtration. Positive results indicate (oo)cyst detection, not viability or infectivity.

* NYSDOH allows monitoring for these contaminants less frequently than once per year. These data, though representative, are from 2016.

HILLVIEW RESERVOIR CONSENT JUDGEMENT

The Hillview Reservoir is the final stop for drinking water from the Catskill/Delaware supply before it enters the City's distribution system. The City and DEP entered into a Consent Decree and Judgement with the United States and New York State, effective May 15, 2019, which sets forth a schedule of compliance for the City to cover the Hillview Reservoir as required by the Long Term 2 Enhanced Surface Water Treatment Rule (40 C.F.R §141.714). DEP and the City timely complied with all scheduled commitments due under the Decree in 2019.

ADDITIONAL INFORMATION

THE NEW YORK CITY WATER SUPPLY SYSTEM - PUBLIC WATER SYSTEM IDENTIFICATION NUMBER: (PWSID) NY7003493

NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION
Commissioner Vincent Sapienza // 718-595-3000 // nyc.gov/dep

CUSTOMER BILLING QUESTIONS
DEP Customer Service // 718-595-7000 // nyc.gov/dep

HEALTH QUESTIONS (WATER SUPPLY-RELATED)
DOHMH // Call 311 or 212-NEW YORK (639-9675) // nyc.gov/apps/311
NYSDOH Bureau of Water Supply Protection // 518-402-7650 // health.ny.gov

CONTAMINANT QUESTIONS
Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk.
EPA Safe Drinking Water Hotline // 1-800-426-4791

***CRYPTOSPORIDIUM* AND *GIARDIA* QUESTIONS**
Call 311 or 212-NEW YORK (639-9675) // nyc.gov/apps/311
DOHMH Bureau of Communicable Diseases // 347-396-2600

REPORT UNUSUAL COLOR, TASTE OR ODOR OF DRINKING WATER
Call 311 or 212-NEW YORK (639-9675) // nyc.gov/apps/311

REPORT POLLUTION, CRIME, OR TERRORISM IN THE WATERSHED
DEP Police and Security // 888-H2O-SHED (426-7433) // nyc.gov/dep

LEAD IN DRINKING WATER QUESTIONS
DEP Lead Unit // 718-595-5364 // nyc.gov/dep/leadindrinkingwater

REQUEST ADDITIONAL COPIES OF THIS REPORT OR VIEW REPORT ONLINE
Call 311 or 212-NEW YORK (639-9675) // nyc.gov/waterquality

TTY SERVICES
Call 212-504-4115

Printed on recycled paper

This report contains important information about your drinking water. To view this report go to nyc.gov/waterquality, or to request a copy call 311.

Este reporte contiene información muy importante sobre el agua que usted toma. Vea una copia de este informe en español en **nyc.gov/waterquality**, o llame al 311 para solicitar una copia. (Spanish)

Ce rapport contient des informations importantes sur votre eau potable. Pour voir ce rapport en français, visitez **nyc.gov/waterquality**, ou demandez une copie en appelant le 311. (French)

В этом материале содержится важная информация относительно вашей питьевой воды. Читайте версию этого доклада на русском языке в Интернете **nyc.gov/waterquality** или закажите печатный экземпляр по телефону 311. (Russian)

Rapò sa a gen enfòmasyon ki enpòtan anpil sou dlo w'ap bwè a. Gade yonkopi rapò sa a an kreyòl nan **nyc.gov/waterquality**, oswa pou mande yon kopi rele 311. (Haitian Creole)

這個報告中包含有關你的飲用水的重要信息。用中文看此报告 **nyc.gov/waterquality** 或者拨打 311 索取报告文本。 (Chinese)

এই প্রতিবেদনে আপনার পানীয় জল সম্পর্কে গুরুত্বপূর্ণ তথ্য রয়েছে এই প্রতিবেদনের একটি প্রতিলিপি **nyc.gov/waterquality** -তে বাংলায় দেখুন, অথবা একটি প্রতিলিপির জন্য অনুরোধ জানাতে 311 নম্বরে ফোন করুন। (Bengali)

Ten raport zawiera bardzo istotną informacje o twojej wodzie pitnej. Kopię raportu w języku polskim można przejrzeć na **nyc.gov/waterquality** lub zażądać jej dzwoniąc pod numer 311. (Polish)

يتضمن هذا التقرير على معلومات هامة حول مياه الشرب. للإطلاع على هذا التقرير باللغة العربية إذهب الى **nyc.gov/waterquality** أو لطلب نسخة، إتصل بالرقم 311. (Arabic)

이 보고서는 귀하의 식수에 관한 매우 중요한 정보를 포함하고 있습니다. 이 보고서의 사본을 한국어로 보려면 **nyc.gov/waterquality** 를 클릭하거나 사본을 신청하시려면 311번으로 연락하십시오. (Korean)

یہ رپورٹ آپ کے پینے کے پانی کے بارے میں اہم معلومات پر مشتمل ہے۔ اس رپورٹ کو اردو زبان میں **nyc.gov/waterquality** پر دیکھیں یا ایک نقل کے حصول کی درخواست کرنے کے لیے 311 پر کال کری ۔ (Urdu)

NYC Environmental Protection