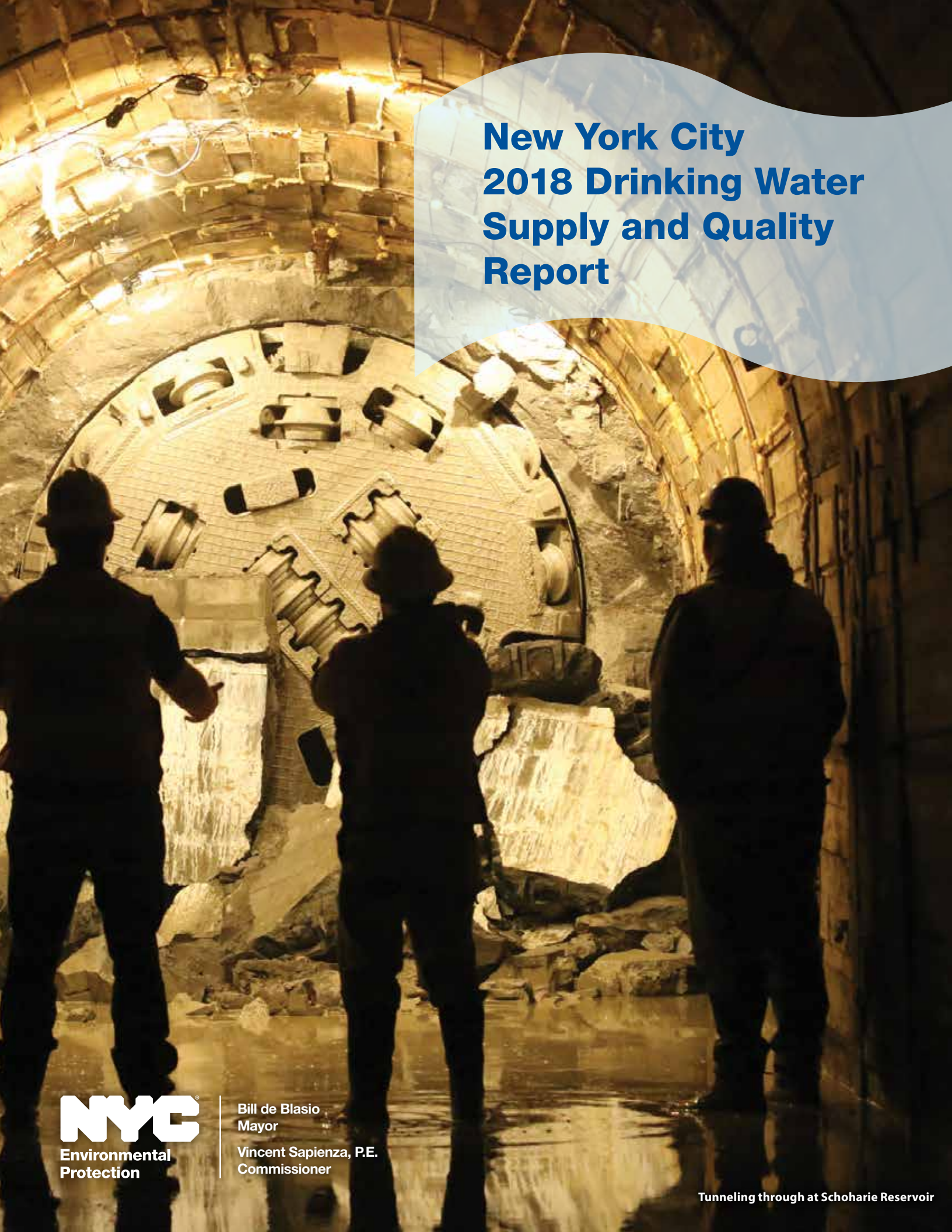


New York City 2018 Drinking Water Supply and Quality Report

NYC Environmental Protection

Bill de Blasio
Mayor

Vincent Sapienza, P.E.
Commissioner

Tunneling through at Schoharie Reservoir


Catskill/Delaware Watersheds
Croton Watershed
NYC Environmental Protection
CHENANGO COUNTY
OTSEGO COUNTY
SCHOHARIE COUNTY
ALBANY COUNTY
RENSSELAER COUNTY
DELAWARE COUNTY
GREENE COUNTY
COLUMBIA COUNTY
DUTCHESS COUNTY
ULSTER COUNTY
SULLIVAN COUNTY
ORANGE COUNTY
PUTNAM COUNTY
ROCKLAND COUNTY
WESTCHESTER COUNTY
NASSAU COUNTY
CONNECTICUT
MASSACHUSETTS
NEW YORK
NEW JERSEY
PENNSYLVANIA
Oneonta
Gilboa
Delhi
Hunter
Walton
Downsville
Deposit
Phoenicia
Kingston
Liberty
Ellenville
Poughkeepsie
Schoharie Reservoir
Shandaken Tunnel
Pepacton Reservoir
Cannonsville Reservoir
Ashokan Reservoir
Esopus Creek
West Branch Delaware
East Branch Delaware
East Delaware Tunnel
West Delaware Tunnel
Neversink Reservoir
Neversink Tunnel
Rondout Reservoir
Delaware Aqueduct
Catskill Aqueduct
Delaware River
Neversink River
Hudson River
125 Miles
100 Miles
75 Miles
50 Miles
25 Miles (from City Hall)
Boyds Corner Reservoir
Lake Gleneida
Middle Branch Reservoir
Lake Gilead
Bog Brook Reservoir
East Branch Reservoir
Kirk Lake
Croton Falls Reservoir
Diverting Reservoir
Titicus Reservoir
Amawalk Reservoir
Cross River Reservoir
Muscoot Reservoir
West Branch Reservoir
New Croton Reservoir
New Croton Aqueduct
Kensico Reservoir
Cat/Del UV Facility
White Plains
Croton Water Filtration Plant
Hillview Reservoir
Jerome Park Reservoir
City Tunnel No. 1
City Tunnel No. 2
City Tunnel No. 3
City Tunnel No. 3 (Stage 2) Queens/Brooklyn Leg (Activation Ready)
Richmond Tunnel
Silver Lake Park (Underground Storage Tanks)
Staten Island Siphon
Bronx
Manhattan
Queens
Brooklyn
Staten Island
Long Island Sound
East River
Lower New York Bay
New York Bay
Atlantic Ocean
NEW YORK CITY WATER TUNNELS AND DISTRIBUTION AREAS
NY City Line
Catskill/Delaware water service area
Croton and Catskill/Delaware blended water service area
Groundwater supply system (offline)
MAP NOT TO SCALE

NYC Environmental Protection

Vincent Sapienza, P.E.
Commissioner

Dear Friends:

On behalf of my nearly 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 2018, we continued to deliver more than 1 billion gallons of clean and delicious drinking water to nearly 10 million people every day.

Many communities throughout the United States remain concerned about the safety of their public water supplies. Here in New York, we are fortunate to have a water supply that is well protected and operated by dedicated scientists, engineers and other professionals who have earned admiration among their colleagues throughout the world.

The evidence of New York City's high-quality drinking water is in the numbers and on your taste buds.

In this report, you will see that New York City's drinking water continued to meet or surpass every national and state standard for quality. These data are based on 53,200 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 654,000 times by scientists working in our four water quality laboratories. Robotic monitoring stations on our reservoirs provided another 1.3 million tests to ensure DEP was sending the best-quality water to New York City at all times.

The excellent scientific results were validated last summer by our customers and other New Yorkers. In 2018, New York City earned first place in the New York State Tap Water Taste Test competition. That honor was based on hundreds of people who lined up in New York City and at the state fair in Syracuse to taste water from dozens of cities, towns, and villages. In the end, New York City earned the blue ribbon for our great-tasting water.

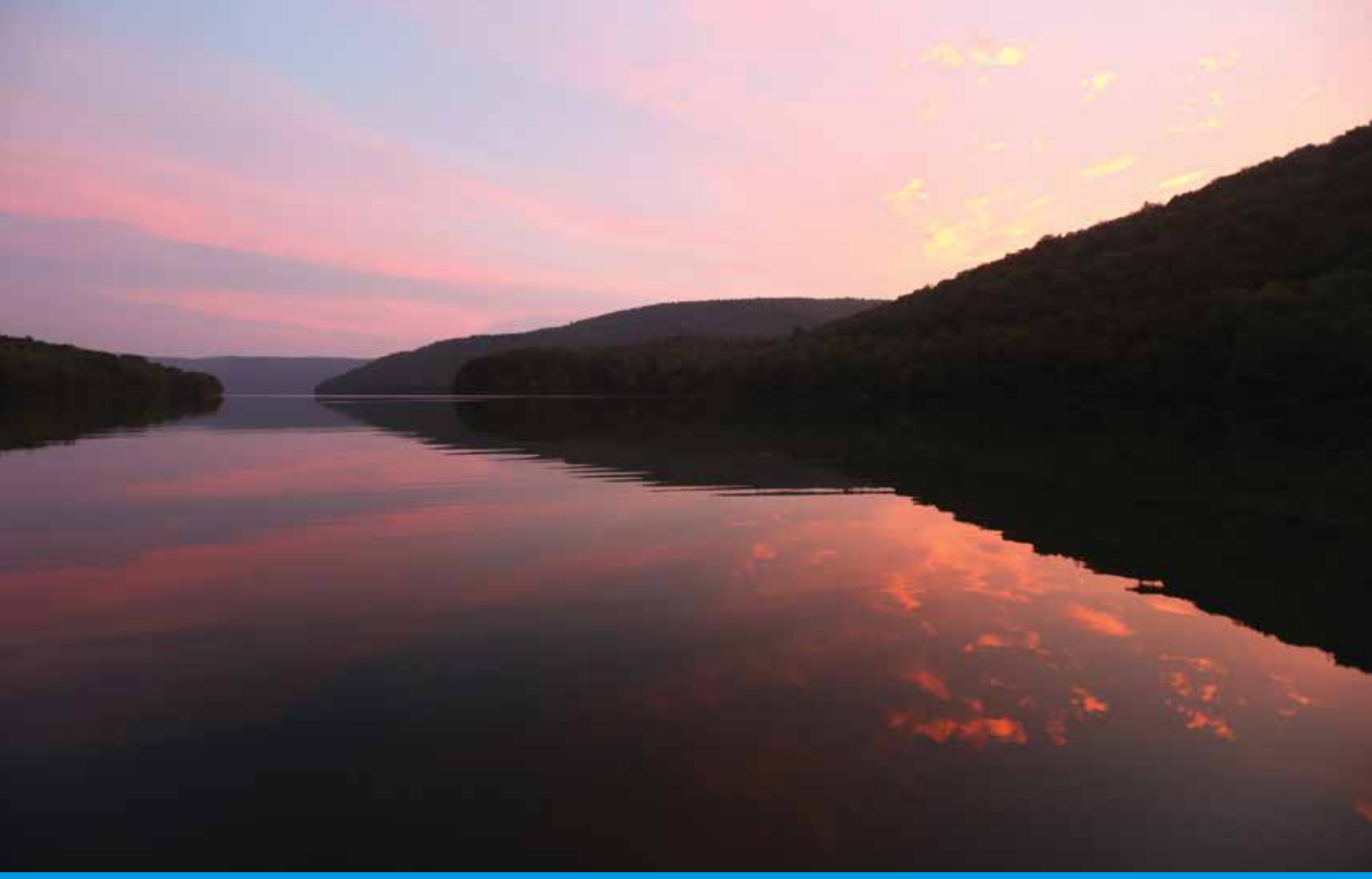
None of these good results happen by accident. Our drinking water system relies on vast reservoirs, large dams, hundreds of miles of aqueducts, and thousands of miles of water mains. Steady and focused investment in drinking water infrastructure is key to the future of New York City. That is why you will also find in this report news about a number of infrastructure investments DEP is making now and in the decades ahead. In 2018, we announced a $1.2 billion tunneling project in Westchester County to improve operational resiliency and flexibility between a key reservoir and treatment facility. The largest repair project in the history of our water supply system, the $1 billion Delaware Aqueduct Bypass Tunnel, continued to make steady progress last year as a tunneling machine excavated toward the Hudson River. You will find details about these and other projects in the pages that follow.

As we look forward to 2019 and beyond, I want to thank you for entrusting DEP with the operation, protection, and maintenance of 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



Pepacton Reservoir

NEW YORK CITY'S WATER SUPPLY

The New York City Water Supply System provides approximately one billion gallons of safe drinking water daily to more than 8.6 million residents of New York City, and to the millions of tourists and commuters who visit the City throughout the year. The water supply system also provides about 105 million gallons a day to approximately one million people living in the counties of Westchester, Putnam, Orange, and Ulster. In all, the New York City Water Supply System provides nearly half the population of New York State with high-quality drinking water.

WHERE DOES NEW YORK CITY'S DRINKING WATER COME FROM?

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 not located in New York City, but rather upstate, in portions of the Hudson Valley and Catskill Mountains that are as far as 125 miles north of the City. A map of the watershed and reservoirs can be found on the inside of the front cover of this report. The New York City Water Supply System, Public Water System Identification Number (PWSID) NY7003493, consists of three individual water supplies called the Catskill/Delaware supply, located in Delaware, Greene, Schoharie, Sullivan, and Ulster counties; the Croton supply, New York City's original upstate supply, in Putnam, Westchester, and Dutchess counties; and a groundwater supply in southeastern Queens. Although the Department of Environmental Protection (DEP) has a permit to operate the groundwater supply, water from that system has not been delivered to customers in many years.

In 2018, New York City received a blend of drinking water from the Catskill/Delaware and Croton supplies. The Catskill/Delaware supply provided approximately 94 percent of the water, and approximately six percent was supplied by Croton.

HOW DOES NEW YORK CITY TREAT ITS WATER SUPPLIES?

Catskill/Delaware Supply located in Delaware, Greene, Schoharie, Sullivan, and Ulster counties

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. Rather, the Catskill/Delaware supply operates under a Filtration Avoidance Determination (FAD), and the water from the supply is treated using two forms of disinfection to reduce microbial risk.

Disinfection

Chlorine
Water is disinfected with chlorine which is a common disinfectant added to kill germs and stop bacteria from growing on pipes.

UV Light
At the UV Disinfection Facility exposure to UV light inactivates potentially harmful microorganisms. UV treatment does not change the water chemically, as nothing is added except energy.

Catskill/Delaware Ultraviolet (UV) Disinfection Facility

It is the largest of its kind in the world located in Westchester County. The facility is designed to disinfect more than 2 billion gallons of water per day.

Fluoride*
Added to water to improve dental protection, it is effective in preventing cavities at a federally approved level of 0.7 mg/L.

Other Treatment

Sodium Hydroxide
Added to raise the pH, it reduces corrosion of household plumbing.

Food Grade Phosphoric Acid
Added because it creates a protective film on pipes that reduces the release of metals, such as lead, from service lines and household plumbing.

Croton Water Supply located in Putnam, Westchester, and Dutchess counties

The Croton supply is filtered by the Croton Water Filtration Plant, located underground in the Bronx. The plant has the ability to filter up to 290 million gallons of drinking water each day, which helps to ensure a sufficient supply of water for the City in the event of drought, and increases the flexibility of New York City's supply against the potential effects of climate change. The Croton Water Filtration Plant first began operating in May 2015. In 2018, it was in operation from May 17 to August 15, September 26 to October 14, and October 17 until December 31, 2018.

Filtration

Croton Water Filtration Plant

Coagulation — Chemicals are added to untreated water, causing particulates to bunch together and become larger particles called floc.

Dissolved Air Flotation — Injected air bubbles float the floc to the top where it is skimmed off.

Sand Filtration — The water flows through a bed of sand removing any remaining particles.

Fluoride**

Other Treatment

Sodium Hydroxide

Food Grade Phosphoric Acid

Chlorine

UV Light

Disinfection

NYC Distribution
to the Customer

* During 2018, only 0.3 percent of the water produced by Catskill/Delaware supply was not fluoridated.
** During 2018, only 0.06 percent of the water produced by the Croton Water Filtration Plant was not fluoridated.

DEP scientists in the watershed

DRINKING WATER QUALITY

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.

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. Additional information concerning drinking water can be found at: **www.epa.gov/safewater** or **www.health.ny.gov**.

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. To accomplish this goal, throughout the watershed and as the water enters the distribution system, DEP continuously monitors and conducts analyses for certain water quality parameters, including microbiological, chemical, and physical measures. DEP also regularly tests water quality at nearly 1,000 water quality sampling stations throughout New York City. In 2018, DEP performed approximately 414,000 analyses on 37,500 samples from the distribution system, meeting all state and federal monitoring requirements. These data are summarized in tables starting on page 10. Additionally, DEP performed approximately 240,000 analyses on 15,700 samples from the upstate reservoir watersheds, and took close to 1.3 million robotic monitoring measurements to support Filtration Avoidance Determination (FAD) watershed protection programs and to optimize water quality.

LEAD IN DRINKING WATER

New York City's water is healthy and safe to drink. It is delivered virtually lead free from our upstate reservoir system to more than nine million New Yorkers. However, some older homes may contain lead plumbing that releases small amounts of lead into the water. Fortunately, residents can take simple steps to minimize their exposure.

What Are The Health Impacts of Lead?

Lead is a metal that can be harmful, especially to young children and pregnant women. It is a neurotoxin that can impact a young child's development, behavior, and ability to learn. Lead exposure during pregnancy may contribute to low birth weight and developmental delays in infants. There are many sources of lead in the environment, most notably peeling paint, and it is important to reduce exposure to lead as much as possible.

Can Lead Get In My Drinking Water?

Lead can be released when drinking water is in contact with older plumbing materials that contain lead, like pipes, solder, faucets, fittings, and valves. If water has not been used for several hours, such as overnight, more lead can be released into the water. DEP treats NYC's water supply to reduce this release, and our frequent testing confirms that it is effective. Nonetheless, that treatment cannot always reduce lead in every faucet to a safe level all of the time.

Monitoring Drinking Water for Lead

The federal Lead and Copper Rule was established in the 1990s to require all municipalities to regularly test drinking water for these two metals, and to take protective measures if standards are not met. DEP analyzes the drinking water from hundreds of homes each year, and these samples confirm that drinking water meets the federal standards. These results are presented in the table on page 13 of this report.

How Can I Limit My Lead Exposure?

DEP recommends you take the following steps when using drinking water for drinking or cooking to reduce 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 water is more likely to contain lead and other metals.
- Remove and clean the faucet screen (also called an aerator) monthly, where small particles can get trapped.
- Hire a licensed plumber to identify and replace plumbing fixtures and/or service lines that contain lead.

How Do I Get My Water Tested for Lead?

If you are concerned about lead in your drinking water, you can have your home's water tested at no cost. DEP offers free testing kits, with prepaid postage, to all New York City residents. DEP's Free Residential Testing Program is the largest of its kind in the nation. DEP has distributed approximately 130,000 sample collection kits since the start of the program. Call 311 or visit www.nyc.gov/apps/311 to request a free lead test kit.

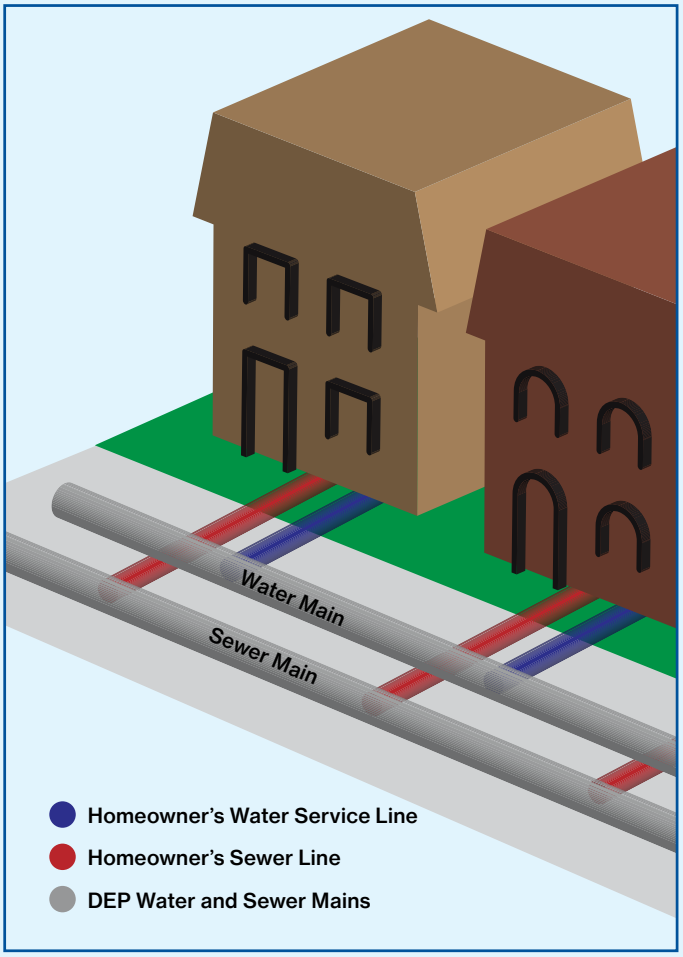
Who Can I Contact?

For health-related questions:

- Call NYC Health Department – Healthy Homes at (646) 632-6023
- Visit www.nyc.gov/health - Healthy Homes, Lead Poisoning Prevention
- Contact your health care provider if you need a blood test for you or your child

For questions about lead in drinking water:

- Call DEP Lead Unit at (718) 595-5364 or
- Email DEPLeadUnit@dep.nyc.gov
- Visit www.nyc.gov/dep/leadindrinkingwater
- Call the Safe Drinking Water Hotline (1-800-426-4791) or visit www.epa.gov/safewater/lead.



Fishing in the watershed

WATERSHED PROTECTION AND POLLUTION PREVENTION PROGRAMS

Source Water Assessment Program

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 the water supply; rather, they indicate the need for water suppliers to implement additional precautionary measures.

In 1993, New York City secured its first FAD for its Catskill/Delaware supply. That was followed in 1997 by the historic New York City Watershed Memorandum of Agreement, which was signed by the City, state, and federal regulators, watershed communities, and environmental advocates. Since that time, DEP has been implementing a series of programs to protect our reservoirs and the streams that feed them from a variety of contaminants. These ongoing programs operate under the close scrutiny of both the NYSDOH and EPA. Because of these efforts, which are reported in the Watershed Water Quality Annual Report, NYSDOH does not deem it necessary to perform a source water assessment on the New York City Water Supply. To view the *DEP Watershed Water Quality Annual Report*, visit **www1.nyc.gov/html/dep/pdf/reports/fad_5.1_watershed_monitoring_program-2017-watershed_water_quality_annual_report_07-18.pdf**.

MAINTAINING NEW YORK CITY'S WORLD-RENOWNED WATER SUPPLY

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.

In 2017, NYSDOH issued a new 10-year FAD that allows DEP to continue operating its Catskill/Delaware supply without filtration through at least 2027. DEP will commit an estimated $1 billion over the coming decade to comply with the FAD. That funding will go toward preserving watershed lands, upgrading wastewater infrastructure, implementing clean water strategies on watershed farms, and managing streams, forests, and other natural resources that affect water quality.

Including the new FAD, DEP has committed more than $2.7 billion toward its watershed protection programs since 1993, when the EPA first issued the City a waiver from the federal requirement to filter tap water that comes from surface sources such as reservoirs. DEP's watershed programs are based on the premise that it is most cost-effective and environmentally sound to protect the quality of drinking water at its source. The filtration waiver allows DEP to avoid construction of a large filtration plant

for the Catskill/Delaware supply. Such a facility is estimated to cost more than $10 billion to construct, which would make it the largest public works project in the City's history.

Over the past 25 years, DEP's programs in the watershed have become a national and international model for protecting water at its source. Each year, water utility managers and public health professionals come from around the globe to study DEP programs. DEP has welcomed visitors from Australia, Canada, Chile, China, Colombia, India, Singapore, the United Kingdom, and others who aimed to solve water-quality challenges by replicating part of New York City's protection efforts.

DEP's source water protection initiatives and achievements include:

- Land acquisition: DEP has preserved more than 152,000 acres of land since 1997, in addition to the nearly 45,000 acres of land surrounding its reservoirs previously owned by the City. The State of New York owns and permanently protects 210,000 acres as parkland or forestland, and other entities have preserved more than 27,000 acres in the watershed. In all, nearly 40 percent of the watershed is now preserved as open space.
- Agricultural program: The not-for-profit Watershed Agricultural Council, one of DEP's watershed partners, has completed more than 450 "whole farm" plans that incorporate pollution prevention into the business operations of local farms. Those plans are complemented by the installation of more than 7,800 best management practices that control runoff from farms and minimize the amount of nutrients or potential contaminants entering local streams.
- Wastewater treatment plant upgrades: DEP has completed upgrades on all private and public wastewater treatment plants in the Catskill/Delaware watershed.
- Septic system repair: The Catskill Watershed Corporation (CWC), another partner organization funded by the City, has invested in the repair of failing septic systems across the watershed, with more than 5,500 repairs completed through 2018.
- Stream management: DEP has implemented a comprehensive stream management program to restore the natural stability and flood resiliency of streams that feed the reservoir system. Through 2018, the program has funded more than 375 projects to restore stream stability and streamside vegetation along approximately 44 miles of waterways in the Catskills.
- Land management and recreation: DEP has developed a comprehensive plan to manage the forests on City-owned land, which naturally filter the water as it moves toward the reservoirs. DEP has also opened nearly 137,000 acres of City-owned property for fishing, hiking, and other types of low-impact recreation in the watershed.
- Regulatory program: While balancing the goals of watershed protection with the needs of the region, DEP administers a regulatory program to review and approve new development proposals in the watershed and works with local communities to identify and invest in projects that mitigate flooding.

The new FAD requires DEP to continue these core programs. It also requires DEP fund new efforts to collect and process wastewater, preserve streams and their buffer lands, and expand our work with watershed farmers. In addition, the FAD includes an expert review of the City's source water protection programs by the National Academies of Sciences, Engineering, and Medicine, which is expected to be complete in 2020.

More information about the FAD can be found on the NYSDOH website at: **www.health.ny.gov/environmental/water/drinking/nycfad**.

More information about New York City's watershed protection programs can be found at: **www.nyc.gov/watershed**.

KENSICO-EASTVIEW CONNECTION

DEP last year announced plans for a $1.2 billion tunneling project in Westchester County that will improve operational resiliency and flexibility between facilities that are vital to the treatment of New York City's drinking water.

The centerpiece of the project – known as the Kensico-Eastview Connection (KEC) – will be a 2-mile-long tunnel between Kensico Reservoir and the Catskill/Delaware UV Disinfection Facility. The new aqueduct will provide an additional conveyance between these vital components of the water supply, giving DEP the ability to take other facilities out of service for periodic maintenance or inspection.

The KEC project will include construction of the new tunnel, facilities to draw water from Kensico Reservoir and move water into the UV plant, and other infrastructure work. DEP has already begun to collect soil and bedrock samples from the area to support the design of the project. Construction on the first parts of the KEC project are expected to start in approximately five years; work on the tunnel itself will start around 2025. DEP expects to finish the project around 2035.

The finished tunnel will measure approximately 27 feet in diameter and run 400-500 feet below ground. It will be large enough to carry a maximum of 2.6 billion gallons of water each day. Its design accounts for future growth in New York City and Westchester County, the potential addition of treatment facilities in the future, and the need to periodically take other aqueducts out of service for maintenance or inspection.

NEW YORK CITY'S WATER ENERGY NEXUS – LINKING WATER SUSTAINABILITY TO GREENHOUSE GAS REDUCTIONS

To advance New York City's position as a global leader in sustainability, DEP continues to track and reduce greenhouse gas (GHG) emissions to meet citywide climate change objectives. DEP's water supply, stormwater, and wastewater management facilities currently account for 17 percent of total GHG emissions from New York City government buildings. To offset our emissions and provide indirect energy co-benefits, DEP has invested in a number of sustainability programs, including water demand management.

DEP's commitment to achieving the Mayor's OneNYC goal of reducing GHG emissions 80 percent by 2050 (relative to the 2005 baseline) is driving changes in the way DEP operates. DEP recently measured the amount of GHG emissions produced by several of our traditional facilities, including wastewater resource recovery facilities (WRRFs). However, DEP did not have a way to measure the influence water conservation and demand management has on the agency's overall GHG portfolio.

To improve our data, DEP began in 2016 a Water-Energy Nexus Study to calculate the relationship between decreasing water demand and reducing GHG emissions. The study was based on a simple premise – if New York City is using less drinking water, it must also be using less energy and chemicals to treat its water and wastewater. The goal was to figure out how these reductions affected our GHG emissions. As part of the study, experts developed a tool that accurately estimates the GHG emissions that are avoided as New Yorkers curtail their demand for water, allowing DEP to use less energy for treatment.

Utilizing the Water Energy Nexus Tool, DEP discovered that its water efficiency programs have also successfully reduced GHG emissions. As of May 2018, DEP's water efficiency programs have led to a reduction of 68 metric tons (MT) CO_2 equivalent (CO_2e) per year, resulting from retrofits of fixtures in 400 schools, replacing 400 spray showers in City parks, and replacing 12,637 toilets in multi-family residential buildings. Overall, DEP's sustainability programs have reduced carbon emissions by over 480 MT CO_2e per year, which is equivalent to 131 standard passenger cars (10,000 miles per year) or 6,406 60-watt lightbulbs (used for 8 hours per day, every day).

Water quality testing

THE NEW YORK CITY 2018 DRINKING WATER QUALITY TESTING RESULTS

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

The following section of the *Drinking Water Supply and Quality 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 2018.

Table 1 reflects 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 2018. Table 2 represents those parameters monitored for, but not detected in any sample.

Most of our data are representative of 2018 testing; concentrations of parameters or contaminants do not change frequently. For previous years' results you can view our reports at: **www.nyc.gov/waterquality**.

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.

UNITS & 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
NTU = nephelometric turbidity units
/50L = per 50 liters

Water sampling station

TABLE 1: DETECTED PARAMETERS

THIS TABLE SUMMARIZES MONITORING RESULTS FOR ALL DETECTED PARAMETERS IN 2018

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	14 - 80	21	No	Erosion of natural deposits
Aluminum (µg/L)	50 - 200 (1)	-	464	7 - 54	21	No	Erosion of natural deposits
Barium (mg/L)	2	2	464	0.01 - 0.05	0.02	No	Erosion of natural deposits
Bromide (µg/L)	- (2)	-	6	8 - 35	20.4	No	Naturally occurring
Calcium (mg/L)	-	-	464	5.4 - 29.8	7.6	No	Erosion of natural deposits
Chlorate (mg/L)	- (2)	-	32	ND - 0.2	0.06	No	By-product of drinking water chlorination using sodium hypochlorite
Chloride (mg/L)	250	-	309	12 - 101	20	No	Naturally occurring; road salt
Chlorine Residual, Free (mg/L)	4 (3)	-	16,033	0.0 - 1.3	0.6 (3)	No	Water additive for disinfection
Chromium (µg/L)	100	-	464	ND - 3	ND	No	Erosion of natural deposits
Chromium VI (µg/L)	- (2)	-	32	ND - 0.06	0.04	No	Erosion of natural deposits
Color - distribution system (color units - apparent)	-	-	14,700	3 - 35 (4)	6	No	Presence of iron, manganese, and organics in water
Color - entry points (color units - apparent)	15 (5)	-	1,333	3 - 14	6	No	Presence of iron, manganese, and organics in water
Copper (mg/L)	1.3 (6)	1.3	464	0.002 - 0.088	0.008	No	Corrosion of household plumbing; erosion of natural deposits
Corrosivity (Langelier index)	- (7)	-	308	-2.74 to - 0.96	-2.2	No	
Fluoride (mg/L)	2.2 (5)	4	2,103	ND - 0.9	0.7	No	Water additive which promotes strong teeth; erosion of natural deposits
Hardness (mg/L $CaCO_3$)	-	-	464	18 - 116	27	No	Erosion of natural deposits
Hardness (grains/gallon[US] $CaCO_3$) (8)	-	-	464	1.1 - 6.7	1.5	No	Erosion of natural deposits
Iron (µg/L)	300 (5) (9)	-	464	ND - 197	32	No	Naturally occurring
Lead (µg/L)	15 (6)	0	464	ND - 1	ND	No	Corrosion of household plumbing; erosion of natural deposits
Magnesium (mg/L)	-	-	464	1.1 - 10	1.9	No	Erosion of natural deposits
Manganese (µg/L)	300 (5) (9)	-	476	ND - 93	17	No	Naturally occurring

Continued on next page

TABLE 1: DETECTED PARAMETERS (CONTINUED)

THIS TABLE SUMMARIZES MONITORING RESULTS FOR ALL DETECTED PARAMETERS IN 2018

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
Nickel (µg/L)	-	-	464	ND - 2	ND	No	Erosion of natural deposits
Nitrate (mg/L nitrogen)	10	10	309	0.06 - 0.48	0.13	No	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Nitrite (mg/L nitrogen)	1	1	305	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)	-	16,034	7.0 - 10.8	7.4	No	
Phosphate, Ortho- (mg/L)	1-4 (11)	-	16,032	0.3 - 2.6	2.1	No	Water additive for corrosion control
Potassium (mg/L)	-	-	464	0.5 - 2.8	0.7	No	Erosion of natural deposits
Silica [silicon oxide] (mg/L)	-	-	308	1.7 - 7.5	2.5	No	Erosion of natural deposits
Sodium (mg/L)	NDL (5) (12)	-	464	9 - 57	13	No	Naturally occurring; road salt; water softeners; animal waste
Specific Conductance (µS/cm)	-	-	16,032	82 - 530	120	No	
Strontium (µg/L)	-	-	464	19 - 99	26	No	Erosion of natural deposits
Sulfate (mg/L)	250	-	309	3.5 - 21	5.2	No	Naturally occurring
Temperature (°F)	-	-	16,034	33 - 80	53	No	
Total Dissolved Solids (mg/L)	500 (1)	-	310	37 - 295 (13)	72	No	Metals and salts naturally occurring in the soil; organic matter
Total Organic Carbon (mg/L)	-	-	459	1.3 - 2.6 (14)	1.7	No	Organic matter naturally present in the environment
Total Organic Carbon - source water (mg/L)	- (2)	-	6	2.1 - 4.2	3.1	No	Organic matter naturally present in the environment
Turbidity (15) - distribution system (NTU)	5 (16)	-	14,700	ND - 33.8	1 (16)	No	Soil runoff
Turbidity (15) - source water (NTU)	5 (17)	-	-	-	1.6 (17)	No	Soil runoff
Turbidity (15) - filtered water (NTU)	TT (18)	-	-	-	0.23 (18)	No	Soil runoff
UV 254 Absorbency (cm^{-1})	-	-	309	0.025 - 0.045	0.032	No	Organic matter naturally present in the environment
Zinc (mg/L)	5 (5)	-	464	ND - 0.016	ND	No	Naturally occurring

Continued on next page

TABLE 1: DETECTED PARAMETERS (CONTINUED)

THIS TABLE SUMMARIZES MONITORING RESULTS FOR ALL DETECTED PARAMETERS IN 2018

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	-	365	ND - 4.0	1.5	No	By-product of drinking water chlorination
Bromodichloroacetic Acid (µg/L)	50	-	60	1.7 - 5.1	2.6	No	By-product of drinking water chlorination
Chlorodibromoacetic Acid (µg/L)	50	-	60	ND - 0.6	ND	No	By-product of drinking water chlorination
Chloropicrin (µg/L)	50	-	27	ND - 0.5	0.1	No	By-product of drinking water chlorination
Chloral Hydrate (µg/L)	50	-	24	1.5 - 11.2	5.7	No	By-product of drinking water chlorination
Dalapon (µg/L)	50	-	309	ND - 1.08 [10]	ND	No	By-product of drinking water chlorination
1,2-Dibromo-3-chloropropane	50	-	27	ND - 0.09	ND	No	Used to make fire resistant materials
Diethylphthalate	50	-	93	ND - 7.5 [10]	ND	No	Plasticizer used in toothbrushes, toys, cosmetics, food packaging and aspirin
Haloacetic Acid 5 (HAA5) (µg/L)	60 [19]	-	365	19 - 77	49 [19]	No	By-product of drinking water chlorination
Haloacetic Acid 6 (HAA6Br) (µg/L)	- [2]	-	60	2.2 - 9.3	4.3	No	By-product of drinking water chlorination
Haloacetic Acid 9 (HAA9) (µg/L)	- [2]	-	60	31 - 82	54	No	By-product of drinking water chlorination
Haloacetonitriles (HANs) (µg/L)	50	-	27	1.1 - 2.9	2.1	No	By-product of drinking water chlorination
Halogenated Ketones (HKs) (µg/L)	50	-	27	1.2 - 4.5	2.8	No	By-product of drinking water chlorination
Hexachlorocyclopentadiene	50	-	25	ND - 0.064 [10]	ND	No	Discharge from chemical factories
Total Organic Halogen (µg/L)	-	-	283	98 - 281	153	No	By-product of drinking water chlorination
Total Trihalomethanes (TTHM) (µg/L)	80 [19]	-	304	10 - 64	48 [19]	No	By-product of drinking water chlorination
1,4-Dioxane [10]	50 [2]	-	16	ND - 0.08 [10]	ND	No	By-product present in paint strippers, dyes, greases, deodorants, shampoos and cosmetics

Continued on next page

TABLE 1: DETECTED PARAMETERS (CONTINUED)

THIS TABLE SUMMARIZES MONITORING RESULTS FOR ALL DETECTED PARAMETERS IN 2018

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	9,754	-	25	-	0.7%	No	Naturally present in the environment
E. coli (MPN/100mL)	- [20]	0	9,754	-	1	-	0.1%	No	Animal fecal waste
Heterotrophic Plate Count (CFU/mL)	TT	-	12,640	ND - 2,972	217	1	-	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	0.185	0.004 - 0.483	0 out of 481	No	Corrosion of household plumbing
Lead (µg/L)	15	0	11	ND - 277	26 out of 481	No	Corrosion of household plumbing

CRYPTOSPORIDIUM AND *GIARDIA* SAMPLING FROM SOURCE WATER AND RESERVOIR OUTFLOWS [21]: JANUARY TO DECEMBER 2018

PARAMETER	RESERVOIR OUTFLOW	# SAMPLES	# SAMPLES POSITIVE	RANGE	LIKELY SOURCES IN DRINKING WATER
Cryptosporidium (oocysts/50L)	Kensico	53	5	0 - 1	Animal fecal waste
	Hillview	53	5	0 - 2	
	Jerome Park	2	0	0	
Giardia (cysts/50L)	Kensico	53	37	0 - 6	Animal fecal waste
	Hillview	53	9	0 - 4	
	Jerome Park	2	0	0	

TABLE 2: NOT-DETECTED PARAMETERS

THE FOLLOWING PARAMETERS WERE MONITORED FOR, BUT NOT DETECTED IN ANY SAMPLE IN 2018

CONVENTIONAL PHYSICAL AND CHEMICAL PARAMETERS

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

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,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, 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, Trialemefon, 2,4,5-Trichlorobiphenyl, Trichlorotrifluoroethane (Freon 113), Tricyclazole, Trifluralin, Vernolate

Unregulated Contaminant Monitoring Rule (UCMR3) Parameters: [2]

Androstenedione, Bromochloromethane, Bromomethane, 1,3-Butadiene, Chlorodifluoromethane, Chloromethane, Cobalt, 1,1-Dichloroethane, Equilin, Estradiol, Estriol, Estrone, Ethynylestradiol, Molybdenum, Perfluorobutanesulfonic acid (PFBS), Perfluoroheptanoic acid (PFHpA), Perfluorohexanesulfonic acid (PFHxS), Perfluorononanoic acid (PFNA), Perfluorooctanesulfonic acid (PFOS), Perfluorooctanoic acid (PFOA), Testosterone, 1,2,3-Trichloropropane, Vanadium

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

FOOTNOTES

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

(2) Monitored for under the Unregulated Contaminant Monitoring Rule (UCMR), UCMR3 in 2013 to 2016 and UCMR4 in 2018. UCMR3 included chlorate and chromium VI, and UCMR4 included bromide and total organic carbon in source water. No MCL has been established for any of these parameters and the NYSDOH chromium MCL is for chromium (total).

(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) An unusual maximum color value of 240 units was measured at site 52050 (Port Richmond, 10302) on 1/16/18 which was not believed to be representative of normal conditions. The next sample collected at this site on 1/29/18 had a value of 6 color units.

(5) 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.

(6) Action Level (not an MCL) applies to samples 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.

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

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

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

(10) Only detected in one sample: nitrite was detected from site 47550 (Seaside, 11694) on 10/3/18; dalapon was detected from site 37950 (East Village, 10003) on 11/7/18; diethylphthalate and hexachlorocyclopentadiene were detected from site 1S03A (Wakefield, 10466) on 5/21/18. The single detection of diethylphthalate by the contract laboratory was questionable due to the lab's inability to reproduce the analysis and an extensive historical record of non-detection by multiple labs, thus it is believed to be from sample contamination. The low level detection of hexachlorocyclopentadiene in the same sample was below the NYS required reporting limit of 0.1 µg/L. Resampling and split sampling between two labs on 8/20/18 produced non-detects for these parameters. 1,4-Dioxane was detected in only one sample collected for the UCMR3 on 12/8/15 from site 1SCL1 (Van Cortlandt Village, 10463). In all other samples the parameters were not detected.

(11) NYSDOH established Optimal Water Quality Parameters (OWQP) under the Lead and Copper Rule which includes a range for pH and ortho-phosphate which are presented here. The reported average value for pH is the median value. The pH was elevated in four samples collected from site 3ISL4 (Randalls Island, 10035) between 6/20/18 and 12/12/18; in two samples collected from site 51550 (Arden Heights, 10312) on 7/25/18 and 8/5/18; in two samples collected from site 23900 (Highland Park, 11207) on 10/24/18 and 11/15/18; in one sample collected from site 56000 (Prince's Bay, 10309) on 11/28/18; and in one sample collected from site 79450 (South Ozone Park, 11420) on 7/6/18. Ortho-phosphate was below range in one sample collected at site 3ISL4 (Randalls Island, 10035) on 12/12/18.

(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) An unrealistically low value for TDS of 13 mg/L was measured from site 10250 (High Bridge, 10452) on 1/3/18; resample was 49 mg/L on 1/11/18.

(14) An unrealistically high value for TOC of 22.9 mg/L was measured from site 1S03A (Wakefield, 10466) on 1/16/18; resample was 1.56 mg/L on 2/6/18.

(15) 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.

(16) 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.

(17) 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.

(18) 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 12/5/18. In 2018, 100% of turbidity results were <0.3 NTU while the Croton Filtration Plant was in operation.

(19) 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.

(20) 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.

(21) Samples are collected prior to final disinfection or filtration (Jerome Park). 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.

New Croton Reservoir

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 2018, 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 Jerome Park Reservoir prior to filtration was also sampled twice in 2018 to complete sampling requirements under the Long Term 2 Enhanced Surface Water Treatment Rule. Samples were analyzed using EPA Method 1623.1. The *Cryptosporidium* and *Giardia* data for Kensico, Hillview, and Jerome Park Reservoir outflows are presented in the table on page 13 of this report.

The presence of low levels of *Cryptosporidium* and *Giardia* detected in the source water required no action on the part of DEP. DEP's *Cryptosporidium* and *Giardia* data from 1992 to the present can be viewed on the DEP website at **www.nyc.gov/waterquality**.

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 2018.

CROTON WATER

Did you know that even the cleanest waters can have different chemical and physical properties?

Water hardness is one such attribute that DEP receives many questions about when New Yorkers are installing dishwashers, water heaters, and other equipment that use water. Hardness is a measure of the natural minerals – specifically calcium and magnesium – that dissolve into water as it passes through soil and rocks. The more dissolved natural minerals, the harder the water.

Neighborhoods in New York City receive their drinking water from reservoirs in the Catskill/Delaware watershed, the Croton watershed, or a blend from both locations. Water from the Croton supply is considered "moderately hard," while the Catskill/Delaware supply is considered "soft" or "slightly hard." Citywide average hardness is about 1.5 grains/gallon ($CaCO_3$). In areas of the City where Catskill/Delaware and Croton water supplies are blended, the hardness can reach 6.8 grains/gallon ($CaCO_3$).

In 2018, DEP increased use of the Croton System because other parts of the water supply were temporarily shut down for infrastructure upgrades. As a result, water in several areas of the City may have become harder. The water is still of excellent quality and safe to drink. Water hardness, however, may affect the efficiency of some equipment. Consult the owner's manual for the device being operated. DEP has also compiled some additional information on water hardness and its effects at: **www.nyc.gov/dep/water-hardness**.

To help homeowners and building managers determine whether they are in an area of the City that could receive moderately hard water, DEP has posted maps of the water distribution system that can be found at: **www.nyc.gov/html/dep/html/drinking_water/croton-water-distribution-maps.shtml**.

ADMINISTRATIVE ORDERS

Hillview Reservoir is the final stop for drinking water from the Catskill/Delaware System before it enters the City's distribution system. On May 24, 2010, New York City and EPA entered into an Administrative Order on Consent that set forth a milestone schedule to install a cover over the Hillview Reservoir by mid-2028. The City has a parallel Administrative Order with NYSDOH. The EPA Administrative Order required the City to issue a notice to proceed to commence site preparation work by January 30, 2017 at the Hillview Reservoir Site. The City advised EPA and the NYSDOH that it was not undertaking that work pending EPA's review of the Long Term 2 Enhanced Surface Water Treatment Rule; thereafter EPA declined to revise that rule. EPA and the City are in discussions concerning revised milestones.

WATER CONSERVATION

DEP operates the largest combined water supply and wastewater utility in the United States. DEP employees work hard to ensure that a reliable supply of high-quality water is delivered to about 9.6 million customers each day, and that about 1.3 billion gallons of wastewater from the five boroughs is collected and treated every day. Although New York City has grown by more than 1.6 million people since 1980, its demand for water has dropped by approximately 35 percent during that time – making it one of the most water-efficient large cities in the country.

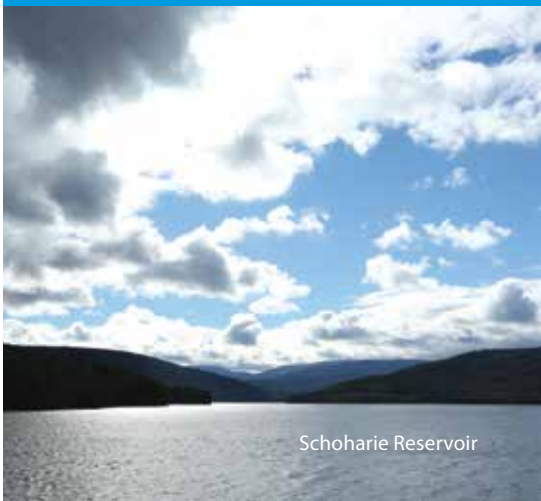
The average single-family household in New York City uses approximately 80,000 gallons of water each year at a cost of $3.90 per 100 cubic feet of water (748 gallons), or about $417 a year. Since nearly all customers receive wastewater collection and treatment services in addition to water service, the combined annual water and sewer charge for the typical New York City household using 80,000 gallons per

UPGRADES AT SCHOHARIE RESERVOIR

DEP continued to make steady progress on a $400 million program to upgrade infrastructure at Schoharie Reservoir, the northernmost reservoir in New York City's vast water supply system.

Workers this winter "holed through" on the final segment of a 2,118-foot-long tunnel that will give DEP the ability to release water downstream from the reservoir into Schoharie Creek. The new release works will help DEP facilitate dam maintenance, respond to potential emergencies, mitigate flood risk for downstream communities, and enhance downstream habitat for fish and wildlife. Construction of the valve chamber and other elements of the release works will continue for the next two years.

DEP also made considerable progress on its rehabilitation of the Shandaken Tunnel Intake Chamber, which draws the City's drinking water from Schoharie Reservoir. Work at the intake chamber includes the replacement of eight sluice gates that control the flow of water into the tunnel by opening and closing large waterways. Last year, skilled divers descended about 130 feet into a flooded shaft to take precise measurements of the gates and the grooves that guide them. The divers will begin to remove and replace those gates in 2019.



Schoharie Reservoir

Delaware Aqueduct Bypass Tunnel

year is $1,080, consisting of $417 for water service and $663 for wastewater services, calculated at fiscal year 2019 rates.

With the creation of an Automated Leak Notification Program, which sends alerts to property owners if there is an unusual spike in water consumption, more than 290,000 customers have signed up to quickly find and fix leaks on their property. To sign up, go to: **www.nyc.gov/dep/leak-notification**.

NYC Water Conservation Efforts

Did you know that the average New Yorker has reduced his or her water use by nearly half over the past 40 years? Thanks to strategic investments in our water delivery system and advances in technology, New York City is quickly becoming one of the most water-efficient large cities in the world.

The proof is in the numbers. The per-capita demand for water in New York City peaked in 1979 at 213 gallons per day. That per-capita demand by water consumers, however, has dropped steadily since the 1990s, falling all the way to the current level of 117 gallons per day.

So how did New York City shift from chugging water to sipping it? Two factors have been key to reducing our demand for water over time.

Advances in technology have played a key role. Low-flow fixtures that came onto the market starting in the 1990s helped the average New Yorker use less water. Toilets that flushed with four gallons of water were replaced by those that flushed with one gallon or fewer. Low-flow showerheads, washing machines and dishwashers also played a role.

DEP has also partnered with other City agencies, colleges and businesses to help conserve water. Recent investments have reduced overall demand for water by 10 million gallons per day, and DEP is working on plans to conserve another 10 million gallons per day over the next five years.

Drinking water conservation efforts benefit the City in many ways. For one, they have helped to reduce greenhouse gas emissions related to operating our water and wastewater systems by 68 metric tons annually, as well as limiting sewer overflows into local waterways during rain events. Reducing the demand for water also means that New York City is better protected against future droughts, as the water stored in our reservoirs will last longer during periods of dry weather. And it gives DEP the flexibility to shut down parts of our water supply system for repairs, including the 6-month shutdown of the Delaware Aqueduct that is planned for 2022-2023 to finish repairing a leak in the world's longest tunnel.

A comprehensive report on the City's water-conservation efforts, *One Water NYC: 2018 Water Demand Management Plan* can be found at: **www.nyc.gov/html/dep/pdf/conservation/2018-water-demand-management-plan.pdf**. Some highlights of our work in recent years include:

- The installation of timers on 400 spray showers in NYC Parks Department playgrounds, saving 1.1 million gallons per day in the summer.
- Upgrading 30,000 inefficient bathroom fixtures in New York City public schools, saving 3.3 million gallons per day.
- Capital upgrades and modifications of treatment procedures at DEP's 14 wastewater resource recovery facilities (WRRFs), saving 1.83 million gallons per day.
- The installation of 500 efficient toilets and 280 urinals in 10 City University of New York buildings, saving 40,000 gallons of water per day.
- Construction of a water reuse facility at the New York City Fire Department's Randall's Island Training Facility, saving 30,000 gallons of water per day.
- Replacement of more than 13,900 inefficient toilets in private residences, saving 560,000 gallons of water per day.
- Distribution of nearly 100,000 home water saving kits to promote conservation, saving 400,000 gallons per day.
- The installation of water meters and efficient toilets, urinals, showerheads, faucets, ice machines and dishwashers at NYC Health + Hospitals/Harlem, saving more than 90,000 gallons of water per day.
- Voluntary challenges with colleges, hotels, restaurants, and hospitals throughout the City, each with the goal of cutting their water use by 5 percent.
- Partnering with 10 of its largest wholesale customers, DEP is developing and implementing water demand management plans, under the Wholesale Customers Water Demand Management Program. Implementation of all plans will continue through October 2022, and achieve an estimated demand savings of 4.6 million gallons per day.

Spray showers in NYC park

DELAWARE AQUEDUCT BYPASS TUNNEL

DEP has now excavated more than 60 percent of a tunnel needed for the largest repair in the 177-year history of the New York City Water Supply System.

Workers made substantial progress on the Delaware Aqueduct Bypass Tunnel in 2018. The $1 billion project will repair two leaking sections of the 85-mile-long Delaware Aqueduct, the longest tunnel in the world. The Delaware Aqueduct delivers about 50 percent of New York City's drinking water each day.

The centerpiece of the repair is a 2.5-mile-long bypass tunnel that will carry water around the largest leak, which is located in Newburgh, N.Y. That tunnel is being constructed 600 feet below the Hudson River from Newburgh to Wappinger. Once finished, both ends of the bypass tunnel will be connected to structurally sound portions of the existing Delaware Aqueduct to carry water around the leaking section.

After tunneling began late in 2017, DEP successfully excavated more than two-thirds of the new tunnel last year. More than 7,000 linear feet of the tunnel has been driven through bedrock, and workers are on schedule to finish excavation by the end of 2019.

Once tunneling is completed, the bypass will be reinforced with 9,200 linear feet of steel. The steel liner is made from 230 individual sections that look like gigantic soup cans. Each section of the liner weighs 80,000 pounds and measures 40 feet long and 16 feet in diameter. Once tunneling is completed, segments of the liner will be moved into the tunnel and welded together one at a time.

The Delaware Aqueduct will be shut down for 5-8 months in 2022 to connect the bypass tunnel to structurally sound portions of the existing aqueduct. The City's other surface water supplies, Catskill and Croton, will meet the needs of water consumers in New York City during the shutdown. Repairs to the Delaware Aqueduct are planned to be finished in 2023.

FREQUENTLY ASKED QUESTIONS

MY WATER IS A RUSTY BROWN COLOR. WHAT CAUSES THIS?

Brown or discolored water is often related to plumbing corrosion problems inside buildings and from rusting water heaters. If you have an ongoing problem with brown water, it may be due to rusty pipes. You should run your cold water for 2-3 minutes if it has not been used for a long period of time. This will flush the line.

If your water suddenly looks discolored, it might be because of a disturbance to nearby water mains, including breaks or repairs. This can also happen if there is construction near your building. Additionally, the use of fire hydrants for firefighting can temporarily cause brown water. Because the water mains are pressurized, a disturbance may stir up or resuspend sediments, which causes the water to be discolored. Discoloration is a temporary condition most often from iron and manganese particles that have settled to the bottom of the water pipes buried under the roadways. Any sudden change in the flow of water within the pipes — or outside vibration — may loosen or resuspend the brownish/red/orange particles of iron into the water. This temporary problem is generally resolved or reduced when DEP flushes water from nearby hydrants.

SOMETIMES I THINK MY WATER HAS THE TASTE OR ODOR OF CHLORINE?

You may, at times, find your water tastes or smells like chlorine. DEP is required to maintain a chlorine residual in the distribution system to prevent the growth of microorganisms. Chlorine is a very effective disinfectant, and is not considered hazardous or harmful in the amounts used to treat the water supply.

Chlorine odors may be more noticeable when the weather is warmer. The following are ways you can remove the chlorine and its odor from your drinking water:

- ✔ *Fill a pitcher and let it stand in the refrigerator overnight. (This is the best way.)*
- ✔ *Fill a glass or jar with water and let it stand in sunlight for 30 minutes.*
- ✔ *Pour water from one container to another about 10 times.*
- ✔ *Heat the water to about 100 degrees Fahrenheit.*
- ✔ *Once you remove the chlorine, be sure to refrigerate the water to limit bacterial growth.*

WHY DOES MY DRINKING WATER LOOK CLOUDY SOMETIMES?

Air becomes trapped in the water as it makes its long trip from the upstate reservoirs to the City. As a result, bubbles of air can sometimes cause water to appear cloudy or milky. This condition is not a public health concern. The cloudiness is temporary and clears quickly after water is drawn from the tap and the excess air is released.

SHOULD I BUY BOTTLED WATER?

You do not need to buy bottled water for health reasons in New York City since our water meets all federal and state health-based drinking water standards. Also, bottled water costs up to 1,000 times more than the City's drinking water. When purchasing bottled water, consumers should look for the NYSHD CERT#. Consumers can access additional information on New York State certified bottled water facilities within the entire United States that can be sold within New York State at ***www.health.ny.gov/environmental/water/drinking/bulk_bottle/bottled.htm.***

WHERE TO GO FOR ADDITIONAL INFORMATION

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. More information about contaminants and potential health effects can be obtained by calling EPA's Safe Drinking Water Hotline at 800-426-4791.

➥ **Questions about water and sewer billing**
DEP Customer Service – 718-595-7000
www.nyc.gov/dep - Customer Service

➥ **Report unusual water characteristics**
In NYC dial 311
Outside of NYC, 212-NEW YORK (639-9675)
TTY Services 212-504-4115
Visit 311 Online at: **www.nyc.gov/apps/311**

➥ **Request a free kit to test for lead in drinking water**
In NYC dial 311
Outside of NYC, 212-NEW YORK (639-9675)
TTY Services 212-504-4115
Visit 311 Online at: **www.nyc.gov/apps/311** – Search lead test kit

➥ ***Cryptosporidium* and *Giardia***
DOHMH – Bureau of Communicable Diseases – 347-396-2600
In NYC dial 311
Outside of NYC, 212-NEW YORK (639-9675)
TTY Services 212-504-4115.
Visit 311 Online at: **www.nyc.gov/apps/311**

➥ **Water supply health-related questions**
DOHMH
In NYC dial 311
Outside of NYC, 212-NEW YORK (639-9675)
TTY Services 212-504-4115.
Visit 311 Online at: **www.nyc.gov/apps/311**
NYSDOH – Bureau of Water Supply Protection – 518-402-7650
www.health.ny.gov

➥ **Report pollution, crime or terrorism activity occurring in the watershed**
DEP Police and Security – 888-H2O-SHED (426-7433)
www.nyc.gov/dep

➥ **Request additional copies of this report, and view the 2018 Drinking Water Supply and Quality Report**
In NYC dial 311
Outside of NYC, 212-NEW YORK (639-9675)
TTY Services 212-504-4115.
www.nyc.gov/waterquality

The DOs & DON'Ts of Water Conservation

BATHROOM

✔ Do take shorter showers and fill the tub halfway.

✖ Don't run water while washing your hands & brushing your teeth.

KITCHEN & LAUNDRY

✔ Do run the dishwasher & washing machine only when full.

✖ Don't let the water run while washing dishes. Kitchen faucets use 2 to 3 gallons a minute. Filling a basin only takes 10 gallons to wash and rinse.

EVERYWHERE

✔ Do install water-saving fixtures.

✖ Don't ignore water leaks. Turn taps off tightly.

OUTDOORS

✔ Do use a self-closing nozzle on your hose.

✖ Don't open fire hydrants.

REPORT LEAKS & WATER WASTE
Call 311

In or out of a drought, every New Yorker can save hundreds of gallons of water each week by following these simple water-saving tips.

www.nyc.gov/dep

NEW YORK CITY DRINKING WATER EARNS TOP PRIZE AT STATEWIDE TASTE TEST

New Yorkers have spoken – the Big Apple has the best tasting water in the entire state.

New York City earned first place in the 2018 New York State Tap Water Taste Test competition. The event began with 30 water suppliers competing in regional competitions. Winners from each region competed in August at the New York State Fair in Syracuse, where hundreds of fairgoers lined up to sample drinking water from each of the finalists.

The taste test competition is organized by the New York State Water and Wastewater Education and Outreach Committee, which aims to protect public health and the environment throughout the state by promoting the sound operation and maintenance of water and wastewater systems. New York City reached the finals after winning the metro-region competition at the American Museum of Natural History, which included water utilities from Nassau, Orange, Suffolk and Westchester counties.

The victory underscored the high quality and great taste of New York City's drinking water. That's good news for other cities, towns, and villages throughout the state. More than 70 communities in Orange, Putnam, Ulster and Westchester counties are connected to New York City's water supply system, and many use the City's supply as their primary source of water.

This report contains important information about your drinking water. To view this report go to www.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 **www.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: **www.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 **www.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 **www.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：**www.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 **www.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 **www.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 **www.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 **www.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 **www.nyc.gov/waterquality** پر دیکھیں یا ایک نقل کے حصول کی درخواست کرنے کے لیے 311 پر کال کری . (Urdu)

NYC Environmental Protection