WATER DEMAND MANAGEMENT REPORT

June 2014 Update

NYC Environmental Protection

Bill de Blasio
Mayor
Emily Lloyd
Commissioner

TABLE OF CONTENTS

INTRODUCTION

Ashokan Reservoir

Through a complex arrangement of dams, reservoirs, tunnels, and aqueducts, the New York City system serves 8.3 million New York City residents, millions of commuters from the tri-state area, and more than one million residents in 55 upstate communities per day. From the 1840s to the 1960s the City's approach to water was to increase supply to meet demand. Since then, New York City's Department of Environmental Protection's strategy has been to optimize the existing systems while promoting water conservation and managing demand to fall within available supplies. The city played an important role in driving significant decreases in water demand during the 1980s and 90s through implementation of several policies and programs that incentivized water efficiency (Figure 1). Overall demand has decreased by approximately 30% since the 1980s despite a 19% population increase over the same period.

Since establishing the Water Demand Management Plan and the goal of reducing water demand by 50 million gallons per day, DEP has made significant progress toward accomplishing this goal. We have negotiated partnerships, put contracts in place, retrofitted over 142 facilities, and replaced 3994 fixtures throughout NYC.

In addition to the original 5 strategies outlined in the in Water Demand Management Plan, DEP has made significant progress in advancing partnerships with our upstate wholesale customers. We are adding this as a sixth strategy in the plan and in future update reports.

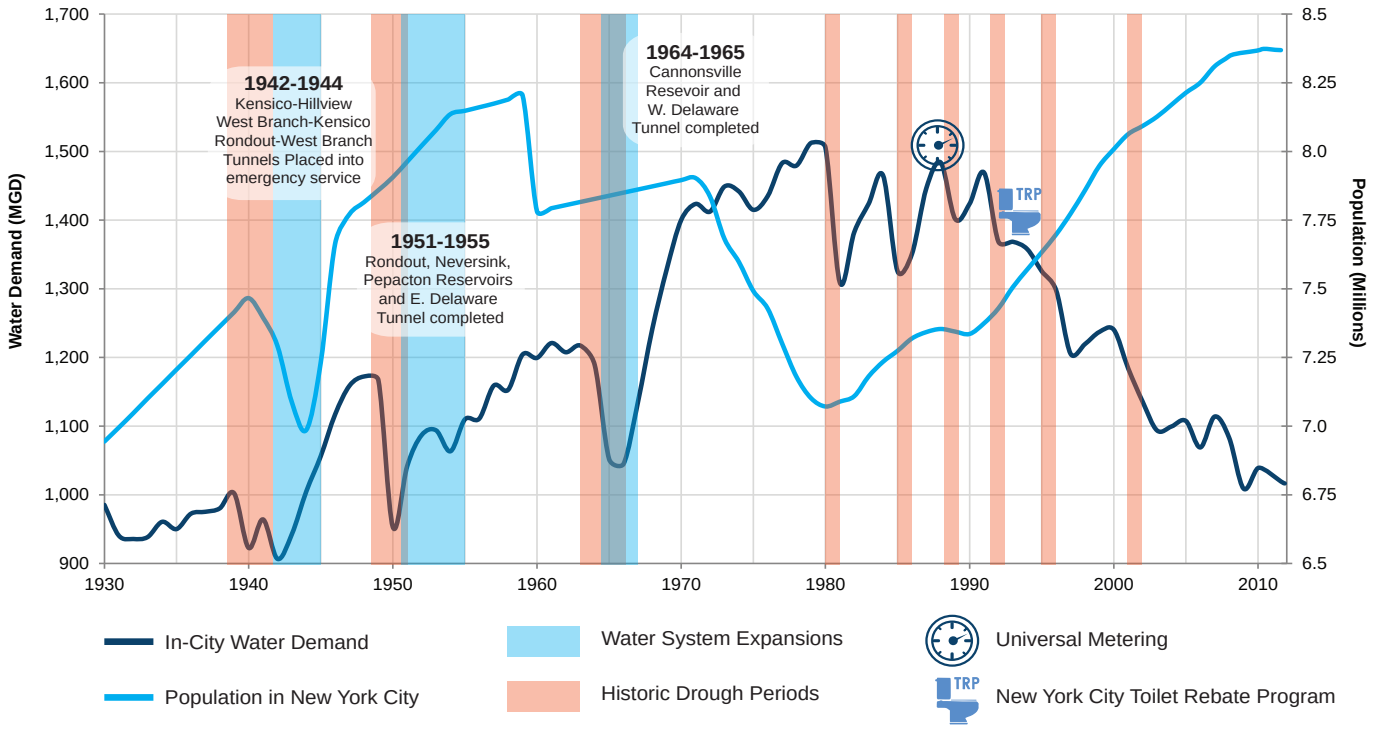
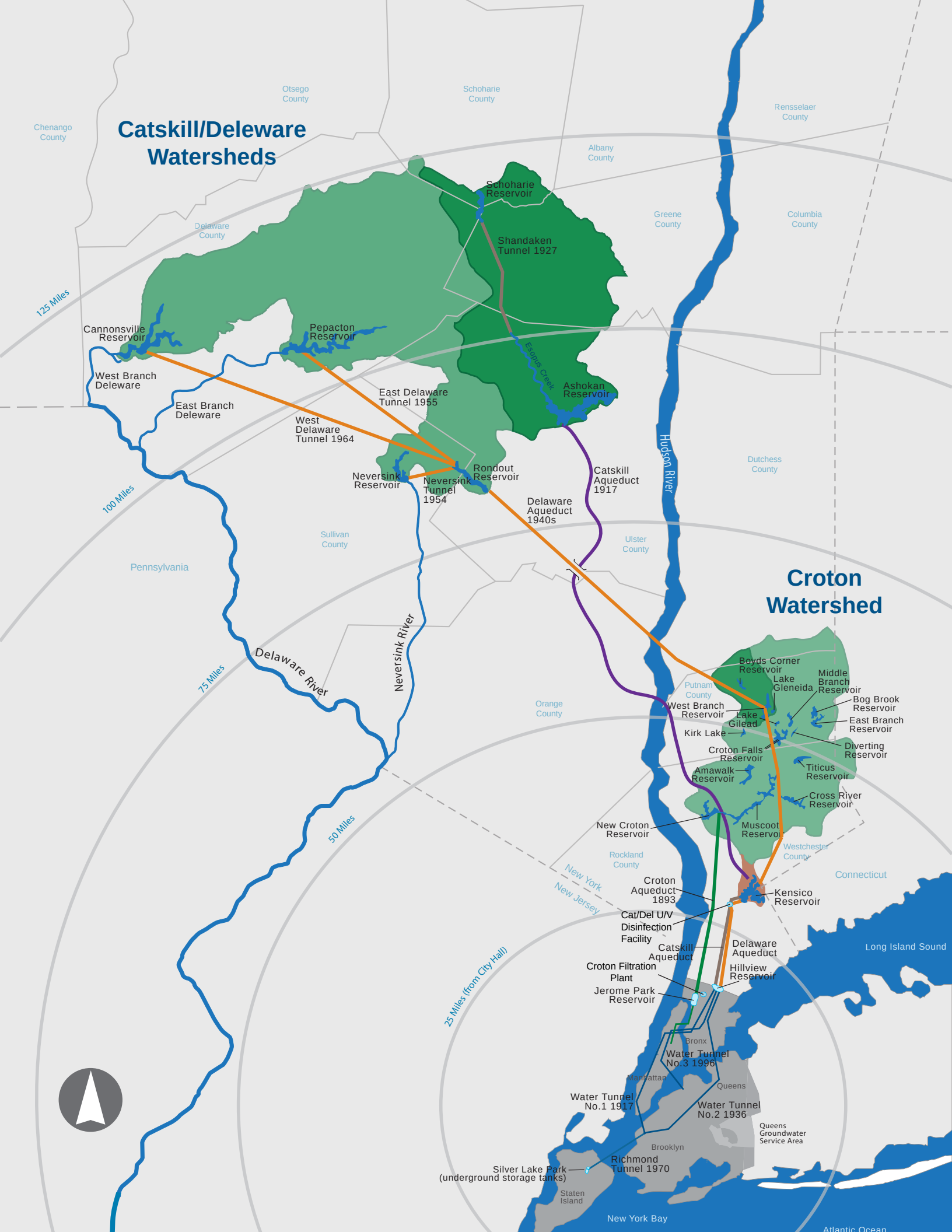


Figure1: Timeline showing New York City water demand compared with population growth, and other factors affecting overall demand.


Catskill/Deleware Watersheds
Croton Watershed
Otsego County
Schoharie County
Rensselaer County
Chenango County
Albany County
Greene County
Columbia County
Delaware County
Dutchess County
Sullivan County
Ulster County
Putnam County
Orange County
Rockland County
Westchester County
Pennsylvania
New York
New Jersey
Connecticut
Long Island Sound
Bronx
Manhattan
Queens
Brooklyn
Staten Island
New York Bay
Atlantic Ocean
Queens Groundwater Service Area
Schoharie Reservoir
Shandaken Tunnel 1927
Esopus Creek
Ashokan Reservoir
Cannonsville Reservoir
Pepacton Reservoir
West Branch Deleware
East Branch Deleware
East Delaware Tunnel 1955
West Delaware Tunnel 1964
Neversink Reservoir
Neversink Tunnel 1954
Rondout Reservoir
Catskill Aqueduct 1917
Delaware Aqueduct 1940s
Hudson River
Delaware River
Neversink River
125 Miles
100 Miles
75 Miles
50 Miles
25 Miles (from City Hall)
Boyds Corner Reservoir
Lake Gleneida
Middle Branch Reservoir
Bog Brook Reservoir
West Branch Reservoir
Lake Gilead
East Branch Reservoir
Kirk Lake
Diverting Reservoir
Croton Falls Reservoir
Amawalk Reservoir
Titicus Reservoir
Cross River Reservoir
New Croton Reservoir
Muscoot Reservoir
Croton Aqueduct 1893
Kensico Reservoir
Cat/Del U/V Disinfection Facility
Catskill Aqueduct
Delaware Aqueduct
Croton Filtration Plant
Hillview Reservoir
Jerome Park Reservoir
Water Tunnel No.3 1996
Water Tunnel No.1 1917
Water Tunnel No.2 1936
Richmond Tunnel 1970
Silver Lake Park (underground storage tanks)

STRATEGY 1

MUNICIPAL WATER EFFICIENCY PROGRAM

Fort Hamilton High School in Brooklyn

In advancing Strategy 1, the Municipal Water Efficiency Program, we recognize that this is one of the most important strategies in the overall Water Demand Management Plan. By retrofitting municipally owned buildings and running operations efficiently, we are leading by example and setting the framework for all of the strategies in this plan.

In particular, DEP has made significant progress in advancing water efficiency projects in the properties of municipal entities such as the Departments of Parks and Recreation (DPR), Department of Education (DOE), the Fire Department of New York (FDNY), the New York City Housing Authority (NYCHA), and the City University of New York (CUNY).

Through these partnerships, DEP has developed a plan to implement water efficiency measures in government-owned facilities citywide, including the replacement of older, inefficient toilets and urinals as well as retrofits for spray showers in the city's parks and playgrounds. Currently this program mostly targets toilets and urinal retrofits and will maintain this focus for the foreseeable future. In addition to replacing fixtures in buildings owned by agency partners, DEP and DPR have developed a plan to retrofit spray showers in parks and playgrounds throughout the city.

DEP will continue to advance a wide-ranging effort that incorporates water efficiency retrofits, education, curriculum development, metering, and water benchmarking.

Initiative 1: Save Water in Wastewater Treatment Facilities

In the Water Demand Management Plan DEP proposed to reduce consumption at the 14 wastewater treatment plants it owns and operates, setting a target of a reduction of 2.1 MGD over five years of implementation.

One of the ways in which DEP is working to reach this target is through the Commissioner's Water Challenge which targets a 10% reduction from the normalized 2012 water usage within one year and an additional 10% reduction year over year until 2021.

To meet the 10% reduction goal, the Plant Chiefs must reduce their City water usage, measured in MGD, by implementing the water conservation standard operating procedures (SOPs) (Figure 2).

The first Commissioner's Water Challenge was initiated in March 2013 with four wastewater treatment plants that had meters and Automated Mater Reader (AMR) devices. These four plants achieved cumulative water savings of .315 MGD in the period from March 2013 to February 2014. The two plants that achieved 10% or more reduction in water usage are Wards Island and Jamaica wastewater treatment plants. The goal was to achieve a total of 10% reduction on the 2012 average gallons per day consumption for the four plants, or .238 MGD. By achieving .315 MGD average reduction across the four plants, DEP has achieved more water savings than it had set out to in its first year.

In relationship to the larger goal of saving 2.1 MGD of water in the 14 DEP wastewater treatment plants these savings represent 15% of the savings desired in the wastewater treatment plants. DEP will conduct another Commissioner's Water Challenge with more treatment plants in 2014.

Standard Operating Procedure on City and
Effluent Water Use

1. **Meters - City Water**
   - Record water consumption on a weekly basis and compare to Automated Meter Readings by logging onto "My DEP Account". If there are discrepancies or if the meter(s) appear to be malfunctioning, contact John Sexton, Chief, Energy Analysis & Planning Section.
2. **Leaks – City Water**
   - Immediately isolate and repair in-house or submit Work Request to Engineering.
3. **Effluent Water Strainer System**
   - Clean strainer basket once per day.
   - If system is malfunctioning, repair leaks in-house or submit Work Request to engineering.
   - Develop maintenance plans and schedules for effluent water pumps. Maintain the effluent water pumps in accordance with the developed plans and schedules and keep an inventory of spares.
4. **Pump Packing – Use of Mechanical Seals**
   - Mechanical seals are only to be used on MSPs and effluent water pumps. They are only to be used in these type pumps if the application meets all applicable manufacturer's criteria. This applies to new pump purchases and when transitioning from traditional packing to mechanical seals.
5. **Use of Effluent Water* instead of City Water**
   - Use effluent water instead of city water in the applications listed below.
   - If an application could be sensitive to the use of effluent water instead of city water, contact the Energy Analysis & Planning Section for further evaluation.

MSPs	Ring Flush Water
Foam Control	Aeration Tanks
	Thickeners
	Final Tanks
	Chlorlorine Contact Tanks
Cooling Water	Blowers
	Engines
	Heat Exchangers
	Centrifuges
	AC Chillers
	AC Condensers

Dilution/Mixing	Hypochlorite
	Polymer
Cleaning/Washing	Tanks
Miscellaneous	Grit Washing
	Grit Suspension
	Agitation Water
	Balance Water (Thickeners)
	Flushing (Centrifuges)
	Blockage Removal in Pipes

* For cleaning/washing, utilize effluent water only if there will be no human contact with the surfaces after they have been cleaned with effluent water.

6. **Use of City Water**
   - Do not use city water to freshen up tanks.
   - When using any type of hose for washing down areas where city water must be used, a low flow nozzle should be utilized.

NYC Environmental Protection

Commissioner's Water Challenge

Figure 2: Standard Operating Procedures for Wastewater Treatment Plants

Initiative 2: Save Water in Schools

In the Fiscal Year of 2014, DEP completed the retrofit of 26 schools, 3 more than originally anticipated for that year. Within these 26 schools, over 2,300 toilets and 900 urinals have been replaced (Figure 4). DEP has finalized a list of 75 schools slated for retrofit for fiscal year 2015 and has completed fixture surveys to begin work in the summer of 2014. This work will replace 6,800 toilets and 2,600 urinals.

As part of the program, DOE has committed to installing meters and Automated Meter Reading (AMR) devices in every retrofitted school. By installing meters and AMR devices DEP can track the water usage of the schools going forward, and will also allow DEP to implement leak detection. A number of pilot schools that were metered prior to their fixture retrofit showed a water use reduction of as much as 60% after replacing their fixtures.

Work at the schools has been greatly appreciated by the DOE. Contractors work at night or on weekends while students are not present and have been effective at seamlessly working the new fixtures in to the building's operations. Many of the fixtures that have been replaced had required maintenance prior to the program, allowing the DOE to shift this budget to other important building maintenance activities.

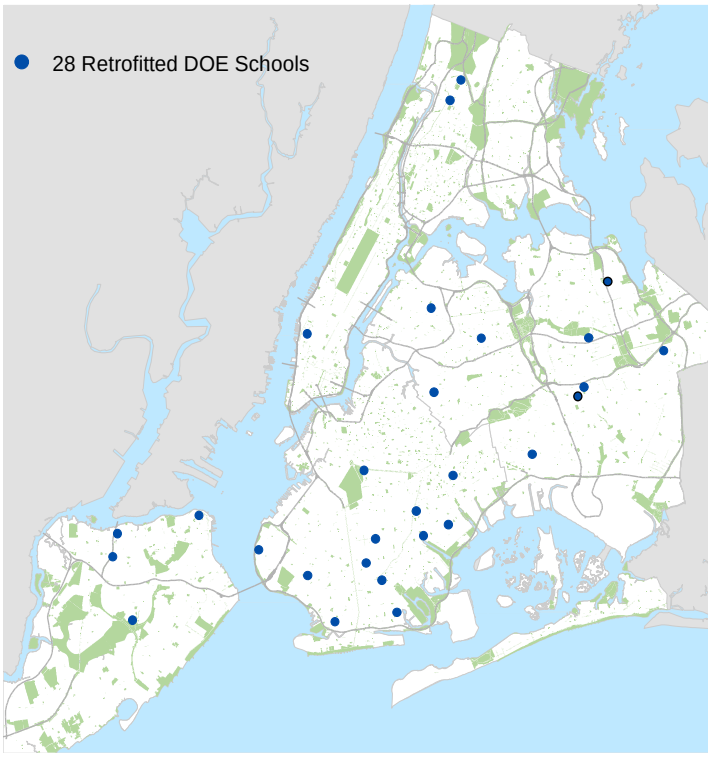


Figure 3: New York City Schools Retrofitted to date

Figure 4: Retrofitted urinals at Martin Van Buren High School in Queens

Figure 5: Retrofitted Lindower Park Spray Shower Bollard

Within this education outreach, we specifically targeted schools we had retrofitted, to spread awareness of the Water for the Future program while also explaining the conservation that was occurring as a result of the retrofit. We held outreach sessions in multiple classrooms at William C Bryant, De Witt Clinton , Grover Cleveland, and James Madison High schools. Approximately 350 students participated in this targeted outreach.

Initiative 3: Save Water in Parks

DEP has proposed to work with the Department of Parks and Recreation (DPR) to reduce water consumption in parks, specifically in spray showers and recreational centers located across New York City. The goal under the Demand Management Plan is reduce consumption by 1.1 MGD over five years of implementation by retrofitting 400 existing spray showers with automated spray showers (Figure 5) .

As of May 2014, DEP has worked with DPR to complete 102 spray shower retrofits (Figure 6). By completing 102 spray shower retrofits out of a total of 400, DEP has completed 25% of the spray shower retrofits it has committed to retrofit by 2018. DEP expects to complete 50 spray showers in the summer of 2014 and another 100 spray shower retrofits by the end of 2015.

DEP is searching for additional reduction in consumption of .026 MGD working with the DPR to retrofit 37 recreational centers by replacing toilets and urinals. DEP expects to begin working to replace toilets and urinals in two recreational centers by the end of 2015.

Another effort that DEP has spearheaded is the metering of DPR owned parks. These areas represent a large portion of the cityscape that has not been fully metered. The water mains that run in to these parks are also old, and only found by park staff with long institutional knowledge of the park itself. By replacing and installing meters and AMR devices, DEP has created a computerized database that has locations of the mains and is now actively tracking water usage.

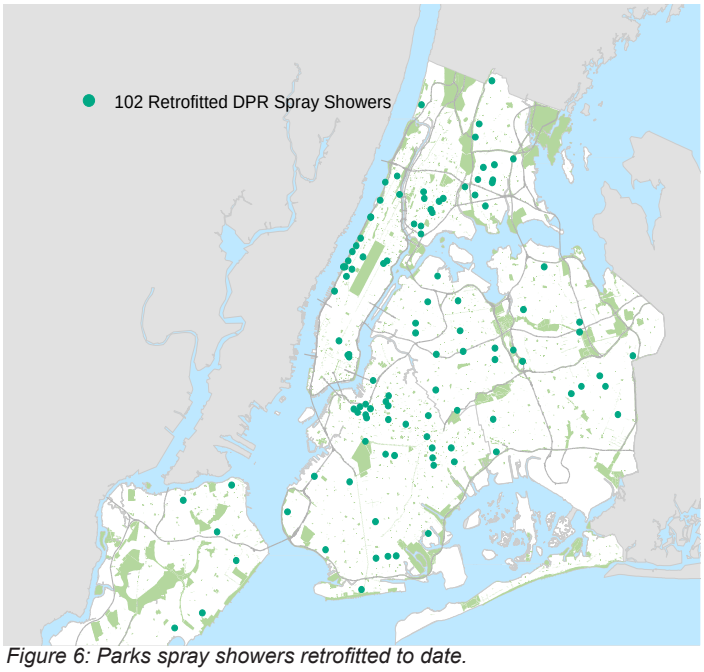


Figure 6: Parks spray showers retrofitted to date.

These meters will allow us to have a database of information where we will be able to further understand how effective water demand management has been and protect against leaks in the future.

Initiative 4: Save Water in Public Housing

NYCHA is the largest public housing authority in the United States, and consequently, is one of DEP's largest customers. Over one million people live in the 1,100 plus NYCHA owned buildings. Providing specific care for these customers is important, and to that end, DEP has stepped up communications and established partnerships between the two agencies to improve both metering and leak detection.

At the end of 2013, DEP held meetings to discuss protocol when NYCHA has a leak. Rather than go through 311, NYCHA now has direct access to DEP to quickly address issues in the system on their property. Within the first few months of this new strategy, seven requests have been submitted and quickly responded to by DEP. Issues range from broken fire hydrants to sewer stoppage. Response teams were dispatched to the following buildings once this program was established: Taft Houses, Manhattanville Houses, Douglas Houses, 860/870 Columbus Ave.

DEP has worked with NYCHA to move them from frontage billing to the Multifamily Conservation Program (MCP). An important part of this transition requires that meters and AMR devices are installed. NYCHA has identified a number of properties where DEP will partner with them to install large water meters, ranging from two to eight inches. DEP has completed site assessments on eight developments, and is procuring job order contracts to carry out necessary metering and AMR installations. We will continue to do site assessments through 2014. All NYCHA properties will have meters replaced and AMR installed by June 2016.

Initiative 5: Save Water in Universities

DEP is working with the City University of New York (CCNY) to reduce consumption in the third largest university system in the United States. DEP has proposed to reduce consumption of water by .75 MGD over a period of seven years in 21 colleges in the CCNY system. In its initial agreement developed with CCNY in 2014, DEP has begun to work with CCNY to replace more than 800 toilets and urinals in 10 buildings through 2015. Work is expected to be complete by the end of summer of 2014.

Figure 7: Bronx Community College The City University of New York

Initiative 6: Save Water in Fire Department Facilities

Under the Demand Management Plan DEP proposed to reduce consumption of water at the Fire Department facilities by .04 MGD over a period of six years. In Fiscal Year 2013, DEP completed retrofits in 12 of the largest FDNY firehouses (Figure 8), replacing 74 toilets and 27 urinals with high efficiency models. While DEP has surveyed additional fire houses for conservation, the cost per gallon saved was not deemed cost efficient compared to other initiatives.

DEP is partnering with FDNY on the construction of a water reuse system at the Training Academy Facility on Randall's Island and expects completion by the end of calendar year 2016. DEP expects to achieve the reduction of .04 MGD in the consumption of water at FDNY through the implementation of this project at the FDNY Training Academy.

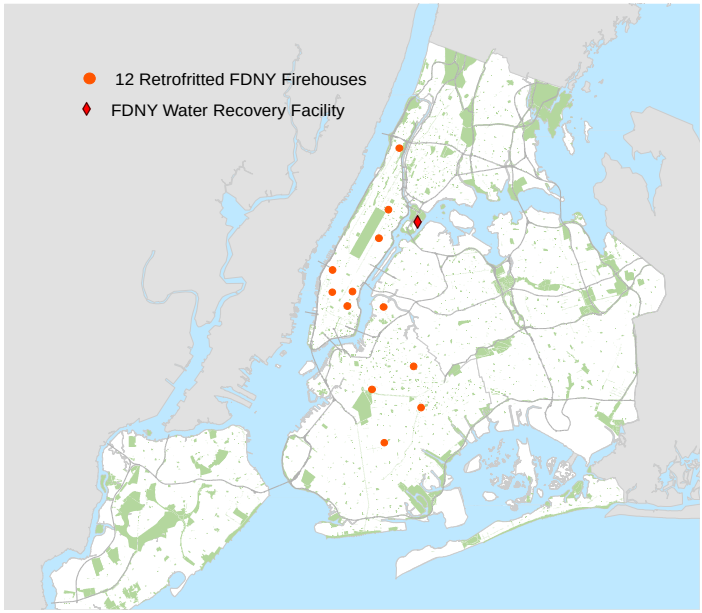


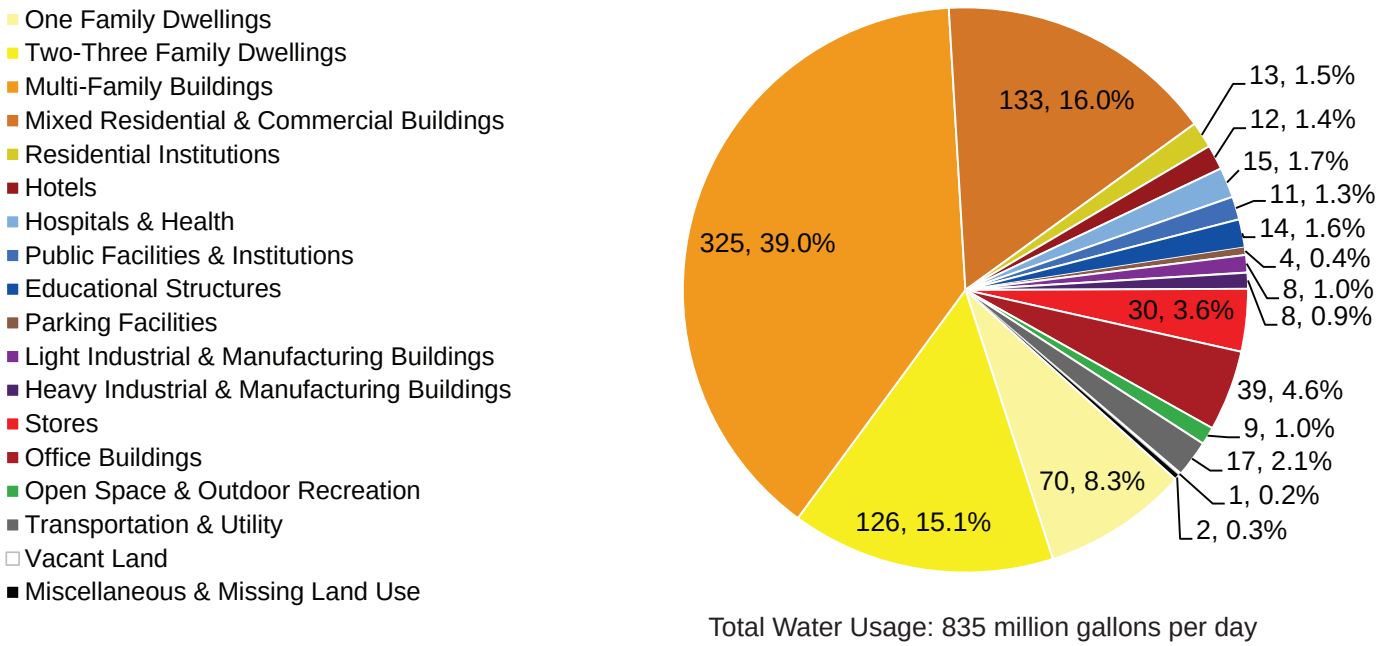
Figure 8: Firehouses retrofitted to date.

STRATEGY 2

RESIDENTIAL WATER EFFICIENCY PROGRAM

Multi-family buildings in Queens, NY.

As stated in the Water Demand Management Plan, residential properties account for 78% of the city's total water demand (Figure 9). Residential demand is driven primarily by various types of domestic end uses. We have been actively promoting incentives, creating partnerships, and promoting simple housekeeping practices to keep our residential buildings as water efficient as possible.



Total Water Usage: 835 million gallons per day

Figure 9: Total water usage in New York City by land use (This does not include unaccounted for water, which is approximately 21%).

Initiative 1: Save Water through Toilet Replacement Program Phase I

Phase I of the Toilet Replacement Program will be launched to approximately 10,000 residential customers working to meet the requirements established by the Multi-family Conservation Program (Table 1). Qualified customers will receive a letter inviting them to participate in the program by logging into their My DEP Accounts and submitting a voucher application through the Toilet Replacement Program Website Portal. Program participants will receive a voucher for $125 per toilet that can be taken to one of the five participating wholesale plumbing supply vendors located throughout New York City. Toilets purchased using the voucher must be rated 1.28 gallons per flush by appropriate national standards and be Maximum Performance Tested with a score of at least 600 grams. It is estimated that Phase I of the Toilet Replacement Program will reduce citywide demand by 10 MGD.

Unit Range	Total Number of Accounts	% of Total Accounts	Total Number of Units	% of Total Units
4 to 9	5,865	57%	37,509	22%
10 to 19	2,072	20%	28,288	17%
20 to 49	1,794	17%	52,022	31%
50 to 99	421	4%	28,291	17%
more than 100	124	1%	20,889	13%
Totals	**10,276**	**100%**	**166,999**	**100%**

Table 1: Phase 1 Toilet Replacement Program Units and Accounts

Phase I of the Toilet Replacement Program will result in approximately 10,000 tons of crushed porcelain. As part of our commitment to environmental stewardship, we have launched a Toilet Recycling Program to run in tandem with the Toilet Replacement Program. In order to reuse the crushed and processed toilets as sub-base in city side-walks and DEP's own Green Infrastructure Program, we submitted a Beneficial Use Determination application to the New York State Department of Environmental Conservation (NYS DEC) which has jurisdiction over determining which waste materials can be beneficially used. After receiving NYS DEC approval in April 2014, a Negotiate Acquisition document was developed to procure a Large Volume Porcelain Toilet Recycling Contractor in New York City for the Toilet Recycling Program. The solicitation for the Large Volume Porcelain Toilet Recycling Contractor is scheduled to be released July 1, 2014.

Initiative 2: Save Water through the Toilet Replacement Program Phase II

Depending on the success rate of the first phase of the Toilet Replacement Program, DEP is evaluating a second phase of a similar program which may have the potential to produce the greatest results of all proposed conservation programs detailed in the Water Demand Management Plan, with an estimated water savings of 20 MGD. DEP currently estimates that approximately 500,000 units may be eligible for toilet replacement vouchers under Phase II. The program is tentatively scheduled to start in 2016.

Initiative 3: Save Water through the NYC Build it Back Program

DEP has initiated discussions with the NYC Build it Back Program about program design. More than 22,000 New Yorkers have already registered for the NYC Build It Back Program. This partnership gives DEP the opportunity to assist an ongoing program through promoting water savings in homes affected by Hurricane Sandy while making a substantial impact toward broader water conservation goals. With the help of Federal support, and collaboration between City agencies and the Mayor's Office, we can repair and rebuild more sustainable, water efficient and resilient homes and buildings. This program has the potential to save .8 MGD.

Initiative 4: Save Water through Residential Water Surveys and Home Water Saving Kits

DEP has offered the service of complementary household water surveys, conducted by its contractor Honeywell, to building owners, to promote water conservation at their properties. In these surveys, Honeywell helps the building owners identify opportunities for water savings, as well as any leaks which may exist. In 2013, Honeywell conducted surveys in 433 apartment buildings and in a total of 13,286 individual apartments. Within these properties they surveyed 3,086 1-3 unit properties, and 6,761 individual units. This program has been shown to save 0.4 MGD through reported leaks and other corrective measures, and we expect to continue to realize savings through offering this service.

Waldorf Astoria, Manhattan, NY.

STRATEGY 3

NON-RESIDENTIAL WATER EFFICIENCY PROGRAM

Our efforts in the non-residential sector have focused on establishing partnerships aimed at developing informed, mutually-beneficial policies that incentivize water efficiency, reuse and alternative water use. To date, large private industry groups which manage large individual properties in New York City have formed the backbone of the non-residential water efficiency efforts.

Initiative 1: Save Water through Voluntary Partnerships

In April 2013 DEP partnered with the Hotel Association of NYC, Inc. and the Mayor's Office to develop the NYC Water Challenge to Hotels – a public-private partnership designed to encourage hotels to reduce their annual water consumption by 5%. Twelve hotels signed on to the program, which assisted hotels in developing water conservation plans. Educational workshops were held for the NYC Water Challenge participants in October 2013, January 2014 and March 2014. Workshops focused on a variety of water conservation strategies applicable to the hotel industry and featured guest speakers from various public and private water conservation advocacy groups.

The NYC Water Challenge to Hotels concluded at the end of May 2014. At the conclusion of the program the participating hotels had managed to reduce water demand by 20% when compared to the previous year's usage. An award ceremony will be held at the end of June 2014 to recognize hotels that managed to meet or exceed the 5% reduction goal. As a result of this challenge and lessons learned from it, DEP has also worked with the Alliance for Water Efficiency to develop a booklet of housekeeping tips aimed at hotel management, which DEP will distribute at the award ceremony and post digitally on the web.

Coming off the success of the NYC Water Challenge to Hotels, we are working with the Mayor's Office to target restaurants in the next public-private water conservation partnership. The program is currently under development, using lessons learned from the NYC Water Challenge to Hotels, with a tentative start date of late 2014.

Figure 10: New Yorker Hotel, a Mayor's Water Challenge participant.

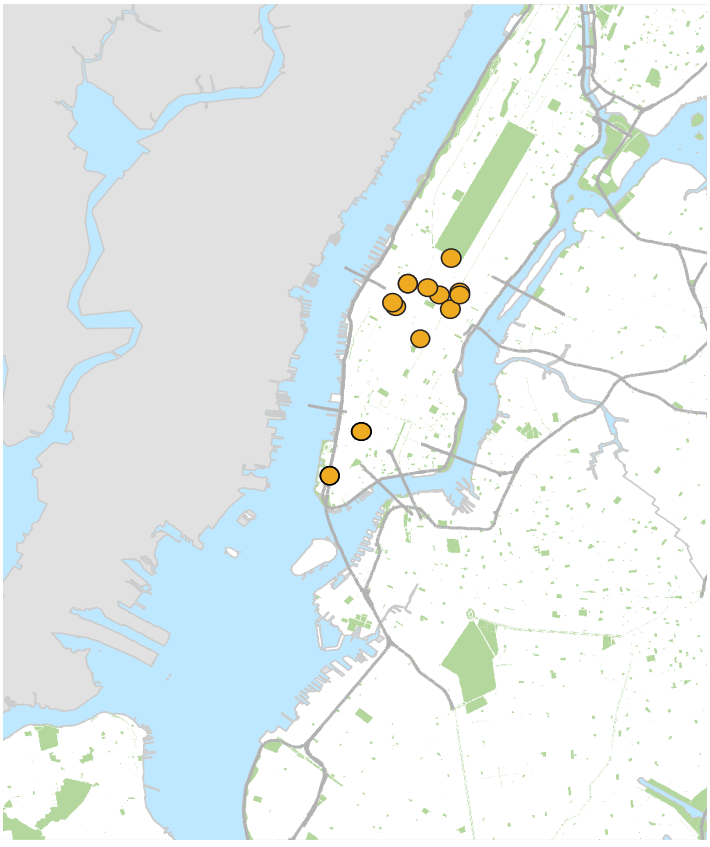


Figure 11: Hotels that participated in the NYC Water Challenge to Hotels

Initiative 2: Save Water through Cost Sharing

DEP hopes to unveil a new cost sharing program by 2015 and is currently in the process of evaluating and developing criteria. Benefits from incentivizing water reuse and alternative use extend to the deferred capital costs of large-scale water, wastewater, and stormwater infrastructure, reduced loadings to sewers and water bodies, improved environmental stewardship, and increased capability to manage demand on the water supply system. The program will be designed to target water efficiency in the non-residential sector, and will encompass a diverse set of technologies that address: water-cooled refrigeration in food related businesses, hotels or health care facilities, reuse of water in laundry and car wash facilities, steam condensate use for toilet or urinal flushing, cooling tower makeup water or other non-potable uses, increasing cycles of concentration in cooling towers, changes to water industrial processes, climate based smart irrigation controls, and water reuse for non-potable applications, such as toilet flushing and irrigation.

STRATEGY 4

WATER DISTRIBUTION SYSTEM OPTIMIZATION

Sonar leak detection equipment helps staff determine the likely location of leaks.

Through the Universal Metering Program, DEP and its customers have been able to monitor water usage, detect inefficiencies, and track water demand citywide. The infrastructure that provides water to our customers every day is massive and primarily underground, hidden from view. Mains and service connections that range in size from one to 96 inches carry water from three main in-city tunnels to the city's residences, business, and institutions. This massive infrastructure must be continually monitored, maintained, repaired, and eventually replaced. DEP continues to search for ways to improve our water system and to ensure that New Yorkers are receiving top quality water in the most sustainable way.

Initiative 1: Optimize the Leak Detection Program

In 2013, DEP surveyed a total of 3,866 miles and replaced 38.2 miles of water mains. DEP estimates that 0.9 MGD were saved as a result of these efforts. Leaking and/or

Figure 13: Digital correlator

Figure 14: Leak location being marked

vandalized fire hydrants can also contribute significantly to water waste, as an illegally opened fire hydrant can release more than 1,000 gallons per minute. In 2013, DEP repaired 10,764 hydrants, replaced another 1,549, and provided other maintenance services to 5,267 hydrants.

Of the City's 850,000 meters, approximately 70,000 are considered large water meters (2 inches and larger.) These

Initiative 2: Optimize Pressure Management

DEP has been working to improve maintenance in the pressure zones within the water distribution system. Water main break have decreased by more than 40%. The average of less than 7 breaks per 100 miles of pipe in 2013 was well below the accepted industry average of 25 breaks per 100 miles annually.

Last year DEP completed 5,700 preventive maintenance inspections/ calibrations on pressure regulating valves. We then overhauled 87 of the 542 pressure regulating valves citywide. Four additional pressure zones were established in Staten Island which will allow more efficient distribution of pressure throughout the borough. The activation of City Water Tunnel No. 3 also provided 10 new pressure regulating valves for increased pressure control.

Initiative 3: Replace Large Meters and Optimize Metering and AMR

Maintaining reliable water meters is critical given that city consumption is 1.1 billion gallons per day. If water meter data is incorrect by even 1%, DEP would be unable to account for approximately 12 million gallons per day. 70,000 meters represent $1.1 billion, or roughly one third of all of DEP's revenue. These particular meters are critical points in DEP's billing system, and have been targeted for both replacement and optimization. In 2013, a total of 9,063 large meters were replaced.

In addition, as of the end of 2013, DEP has substantially completed the installation of AMR devices, which now account for some 835,000 service connections. At the start of the AMR program, DEP had an estimated billing percentage of 17.4%. By December of 2013, this fell to 3.82%, a 78% reduction.

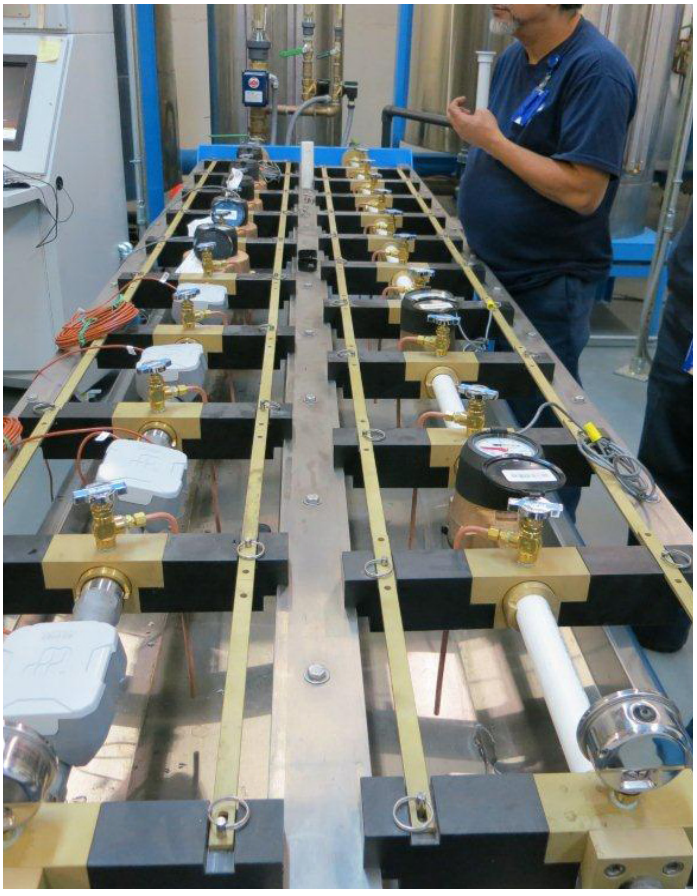


Figure 15: Meter Reading Facility

STRATEGY 5

WATER SUPPLY SHORTAGE MANAGEMENT

Ashokan Reservoir during the 2001 drought.

New York City has experienced approximately nine drought periods of record over the last 75 years. Over time, water efficiency and conservation measures have become increasingly important during drought times. Water shortage relief efforts have played a significant role in reducing demand when water supply has been limited. In order to ensure a coordinated and rapid response to water supply shortage conditions, DEP has developed and implemented standard operating procedures and water use restrictions for periods of shortage. As our water supply infrastructure ages and as climate and weather patterns become more difficult to predict and increasingly severe in magnitude, it is crucial that DEP re-evaluate existing water use restrictions and adapt them to address the changing landscape of current and future conditions.

In addition to potential future water shortages due to natural hydrologic conditions, DEP will also temporarily shut down the Delaware Aqueduct in 2021. Through the Water for the Future program, DEP is working to ensure that sufficient water is available during such construction and through drought periods. The new plan will effectively reduce water use based on the type of water supply shortage condition. As part of this process, DEP is revisiting its existing water supply shortage management plan to incorporate updated information regarding water end uses and to allow the city to implement the updated rules and plan during scheduled and unscheduled infrastructure repairs.

Initiative 1: Establish City Agency Responsibilities

In the last year, DEP has coordinated with the Office of Emergency Management (OEM), and other city agencies to brief them on upcoming changes to the Water Shortage Rules. In collaboration with OEM, DEP contacted each of the required agencies to confirm that standard operating procedures for demand management under water supply shortage conditions have been reviewed, updated and are in place.

DEP has also worked with OEM to develop the Hazard Mitigation Guide which includes a detailed water shortage risk

profile. This guide is designed to be accessible to NYC public officials and the public.

Initiative 2: Develop a Communications Strategy

DEP is working to develop a water supply shortage public information and education campaign which will include hard copy materials to be distributed and mailed, as well as electronic communications such as DEP websites, email distribution lists, and 311 services. DEP will develop this campaign and use it towards the end of the water demand management plan implementation, in a three or four year time frame.

Initiative 3: Adopt Water Shortage Rates

DEP is conducting a rate study to study the various options for establishing a framework for setting and implementing a water shortage rate in the event of a water supply shortage that is consistent with the provisions in the current Drought Emergency Rules and proposed Water Supply Shortage Rules. DEP will evaluate recommendations for a proposed water shortage rate that can meet the following objectives:

- Provide an effective tool to communicate the seriousness of a water shortage emergency;
- Facilitate compliance and water use reductions using mandatory and voluntary restrictions;
- Recover the additional costs of mitigating the water shortage;

The proposed water shortage rate will have to be compatible with DEP's billing system. Over the next year, testing of the proposed water shortage rates will commence to ensure feasibility of implementation prior to making rate recommendations to the Water Board.

Initiative 4: Update Rules and Plan to Allow for Planned Infrastructure Repairs

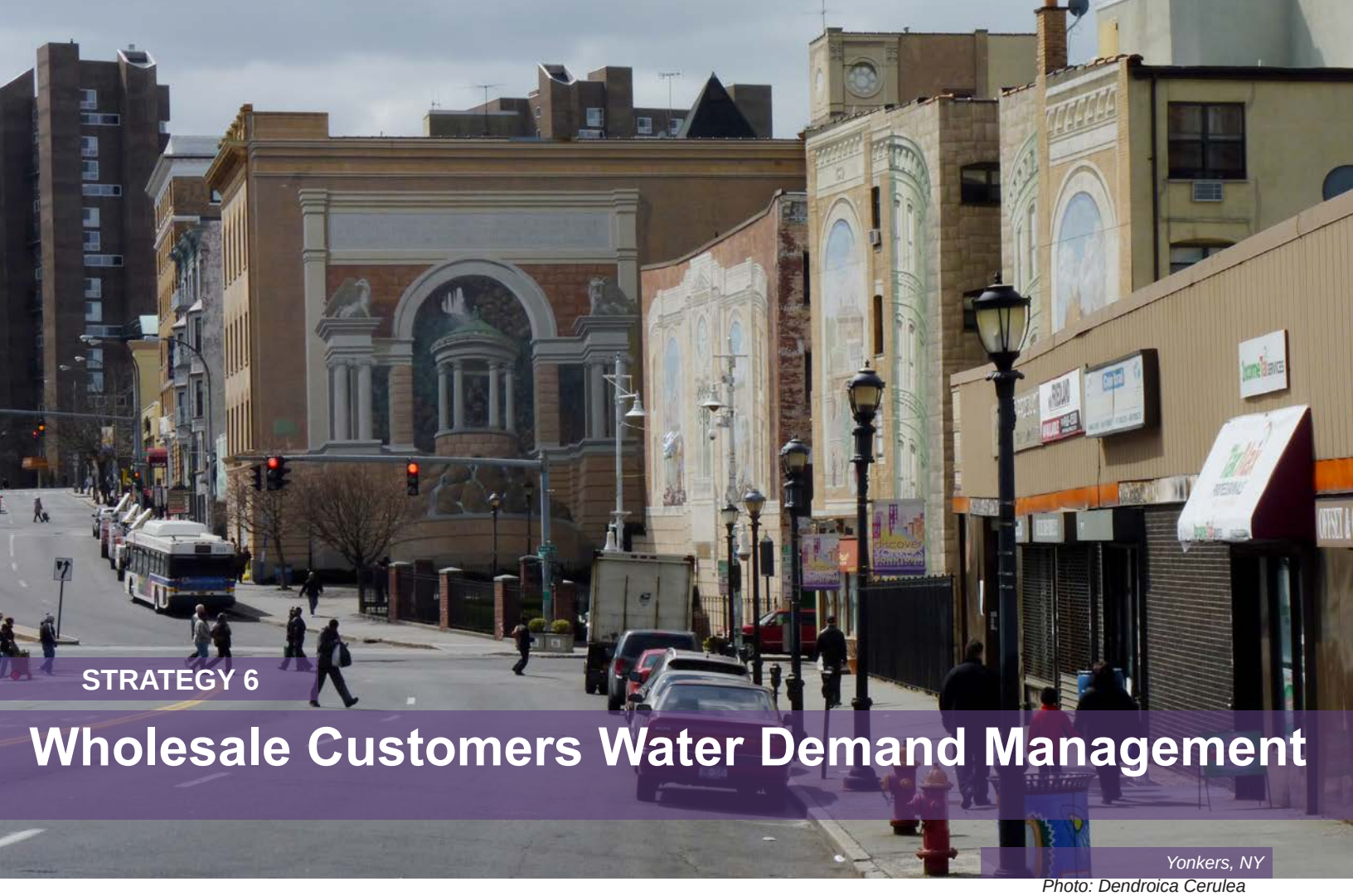
DEP is in the process of amending the "Drought Emergency Rules" (15 RCNY Chapter 21) to address water shortage emergencies due to circumstances other than natural conditions (e.g., infrastructure repairs), as well as add, remove, and change certain water use prohibitions during the different stages of water shortage emergencies to better reflect DEP's current understanding of citywide water use. Changes may include: authorizing DEP to impose water use restrictions for reasons other than natural conditions; revising water use restrictions during a water emergency based on updated information on water use; amending the definitions section; clarifying the criteria and the process for applying for exemptions from water use restrictions; authorizing the Commissioner to recommend and request that the Water Board adopt an water shortage rate that encourages water conservation during a water shortage emergency; amending signage requirements during water shortage emergencies; and changing restrictions for certain activities during different stages of a water shortage emergency.

Initiative 5: Provide Customers with Easy and Timely Access to Water Usage Data

DEP is working to give customers more information on their water consumption. Giving consumption information to customers empowers them to spot inefficiencies such as leaks quickly via the My DEP Account web portal.

More than 324,000 customers have signed up for My DEP Account where customers can view their water usage, bills, and payment history online. Small customers can view four meter readings a day, while larger customers can see their readings on an hourly basis. This information allows customers to monitor their consumption and be more aware of their consumption patterns.

DEP has also included an option in My DEP Account that allows customers to receive a leak alert if their consumption triples for five consecutive days. This alert helps customers identify leaks and fix them, saving them water and money. Larger customers can customize their leak parameters. Over 208,000 customers have signed up for leak alerts.



STRATEGY 6

Wholesale Customers Water Demand Management

Yonkers, NY
Photo: Dendroica Cerulea

Initiative 1: Water Demand Management Plans for 10 largest customers

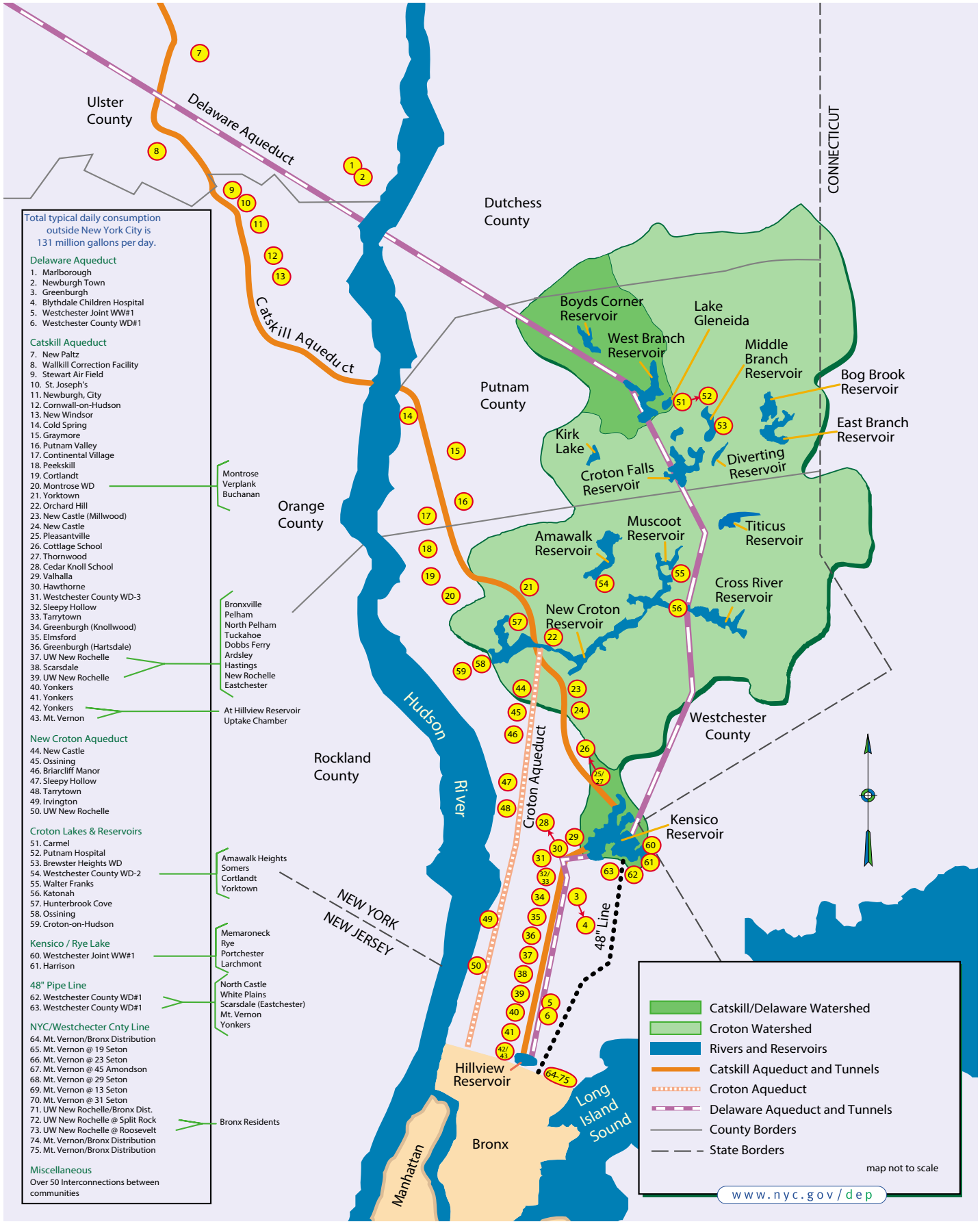
While DEP is working to reduce consumption in NYC, it is also working to help its wholesale customers located north of NYC develop water demand management plans. DEP's upstate wholesale customers account for approximately 10% of DEP's total consumption of 1.1 billion gallons per day. DEP has begun working with the 10 largest upstate wholesale customers to provide assistance in the development of water demand management plans that will help these customers identify a 5% reduction in consumption by the end of calendar year 2015. DEP will then work with these customers to help them implement measures that will achieve this 5% reduction from 2016 to 2019.

Initiative 2: Implement Planned Demand Management Measures

After working with the ten largest customers to produce water demand management plans, DEP will work with these 10 largest customers to implement the measures identified in the plans to achieve a 5% reduction in consumption. DEP plans to work with them over a three year time frame to implement the measures identified in the water demand management plans. As the 10 largest customers account for 90% of the total upstate wholesale consumption, or approximately 101 MGD per day, achieving a 5% reduction in this consumption by 2019 would give DEP a reduction in consumption of 5 MGD.

Initiative 3: Develop Water Demand Management Plans with remaining customers

When the ten largest customers have produced water demand management plans and started implementing the measures identified in the plans that will lead to a 5% reduction in their consumption, DEP will identify a path forward to develop and implement demand management plans with the remaining wholesale customers.


Total typical daily consumption outside New York City is 131 million gallons per day.
Delaware Aqueduct
1. Marlborough
2. Newburgh Town
3. Greenburgh
4. Blythdale Children Hospital
5. Westchester Joint WW#1
6. Westchester County WD#1
Catskill Aqueduct
7. New Paltz
8. Wallkill Correction Facility
9. Stewart Air Field
10. St. Joseph's
11. Newburgh, City
12. Cornwall-on-Hudson
13. New Windsor
14. Cold Spring
15. Graymore
16. Putnam Valley
17. Continental Village
18. Peekskill
19. Cortlandt
20. Montrose WD
21. Yorktown
22. Orchard Hill
23. New Castle (Millwood)
24. New Castle
25. Pleasantville
26. Cottlage School
27. Thornwood
28. Cedar Knoll School
29. Valhalla
30. Hawthorne
31. Westchester County WD-3
32. Sleepy Hollow
33. Tarrytown
34. Greenburgh (Knollwood)
35. Elmsford
36. Greenburgh (Hartsdale)
37. UW New Rochelle
38. Scarsdale
39. UW New Rochelle
40. Yonkers
41. Yonkers
42. Yonkers
43. Mt. Vernon
Montrose
Verplank
Buchanan
Bronxville
Pelham
North Pelham
Tuckahoe
Dobbs Ferry
Ardsley
Hastings
New Rochelle
Eastchester
At Hillview Reservoir
Uptake Chamber
New Croton Aqueduct
44. New Castle
45. Ossining
46. Briarcliff Manor
47. Sleepy Hollow
48. Tarrytown
49. Irvington
50. UW New Rochelle
Croton Lakes & Reservoirs
51. Carmel
52. Putnam Hospital
53. Brewster Heights WD
54. Westchester County WD-2
55. Walter Franks
56. Katonah
57. Hunterbrook Cove
58. Ossining
59. Croton-on-Hudson
Amawalk Heights
Somers
Cortlandt
Yorktown
Kensico / Rye Lake
60. Westchester Joint WW#1
61. Harrison
Memaroneck
Rye
Portchester
Larchmont
48" Pipe Line
62. Westchester County WD#1
63. Westchester County WD#1
North Castle
White Plains
Scarsdale (Eastchester)
Mt. Vernon
Yonkers
NYC/Westchecter Cnty Line
64. Mt. Vernon/Bronx Distribution
65. Mt. Vernon @ 19 Seton
66. Mt. Vernon @ 23 Seton
67. Mt. Vernon @ 45 Amondson
68. Mt. Vernon @ 29 Seton
69. Mt. Vernon @ 13 Seton
70. Mt. Vernon @ 31 Seton
71. UW New Rochelle/Bronx Dist.
72. UW New Rochelle @ Split Rock
73. UW New Rochelle @ Roosevelt
74. Mt. Vernon/Bronx Distribution
75. Mt. Vernon/Bronx Distribution
Bronx Residents
Miscellaneous
Over 50 Interconnections between communities
Ulster County
Dutchess County
Putnam County
Orange County
Rockland County
Westchester County
CONNECTICUT
NEW YORK
NEW JERSEY
Delaware Aqueduct
Catskill Aqueduct
Croton Aqueduct
48" Line
Hudson River
Boyds Corner Reservoir
West Branch Reservoir
Lake Gleneida
Middle Branch Reservoir
Bog Brook Reservoir
East Branch Reservoir
Kirk Lake
Croton Falls Reservoir
Diverting Reservoir
Amawalk Reservoir
Muscoot Reservoir
Titicus Reservoir
New Croton Reservoir
Cross River Reservoir
Kensico Reservoir
Hillview Reservoir
Long Island Sound
Manhattan
Bronx
Catskill/Delaware Watershed
Croton Watershed
Rivers and Reservoirs
Catskill Aqueduct and Tunnels
Croton Aqueduct
Delaware Aqueduct and Tunnels
County Borders
State Borders
map not to scale
www.nyc.gov/dep