



**Environmental  
Protection**

Cas Holloway, Commissioner

# **WATER CONSERVATION REPORT**

## **ANNUAL UPDATE**

June 2011





# **WATER CONSERVATION REPORT**

## **ANNUAL UPDATE**

June 2011

<b>INTRODUCTION</b>	<b>1</b>
<b>SUMMARY</b>	<b>3</b>
<b>PROGRAM UPDATE</b>	<b>5</b>
<b>Automatic Meter Reading</b>	<b>5</b>
<b>Water Use Rules</b>	<b>6</b>
<b>Water Efficiency Programs</b>	<b>7</b>
<b>Water Reuse Programs</b>	<b>9</b>
<b>Education Programs</b>	<b>11</b>
<b>Tracking and Projecting Water Demand</b>	<b>13</b>
<b>PROGRAM ACCOMPLISHMENTS</b>	<b>15</b>
<b>NEXT STEPS</b>	<b>17</b>
<b>APPENDIX</b>	<b>19</b>
<b>GLOSSARY</b>	<b>27</b>



# INTRODUCTION

---

The New York City water supply system is an integrated network of 19 reservoirs and three controlled lakes. The system delivers approximately one billion gallons of water per day to over eight million users. With the city's population expected to rise to 9.1 million by 2030, conservation will continue to have an important role in meeting demands for water. It is important to note that, although population growth has increased demand for housing, energy, and transportation, total water consumption has been declining and is lower today than it was 50 years ago.

In 1985, DEP began installing meters in residential properties. This allowed both DEP and the customers to understand actual consumption. Once rates based on metering were established, customers were able to understand and reduce their consumption. In 1994, DEP continued with its water efficiency efforts and launched the world's largest toilet rebate program in response to increasing water use and wastewater flows in the 1980's.

DEP has continued to work with regulators and other agencies over the years to monitor and support conservation efforts (see the Plan Accomplishments section). Although there is an ample supply of water in the region, DEP continues to use conservation methods whenever they are cost effective and do not conflict with other important agency goals. Although current levels of water consumption are near historic lows, it is important to maintain these gains to prepare for the Delaware Aqueduct repair and increased volatility that may occur due to climate change, and to create additional storage in our sewer system for storm water.



# SUMMARY

---

This document is to report on the current Water Conservation Program first issued by the New York City Department of Environmental Protection (DEP) in December 2006. A more detailed update to the current program is being submitted in a separate document to fulfill the requirements for the Water Supply Permit. This document contains detailed information on the history and operation of the water supply and wastewater treatment systems as well as historic information on water conservation efforts. This report provides information on recent activities on both ongoing DEP and external conservation efforts.

## 1 Automated Meter Reading

DEP began the installation of a citywide fixed-network AMR system in August 2008 with the start of installation work for Data Collection Units (DCU) around the city as part of New York City Department of Information, Technology and Telecommunication's NYCWiN citywide wireless system. Replacement of most pre-1998 water meters and installation of the AMR devices or Meter Transmission Units (MTUs) on all water meters began the first week of March 2009 with substantial completion expected by the end of 2011. By the end of 2009 DCU coverage of all boroughs with the exception of Staten Island was complete and 180,700 MTUs had been installed, 2% ahead of schedule. As this report was being written in May 2011 the project passed the 80% completion mark. DEP began offering website access to customers of their consumption data during summer 2010 and an email Leak Notification service in late 2010.

## 2 Water Use Rules

New water supply rules took effect on June 22, 2009. The changes address several water quality and leak prevention issues in addition to a number of technical and procedural changes. Another round of updates and revisions are under way in 2011.

## 3 Water Efficiency Programs

DEP implements a number of programs to promote efficient use of water and detect, target, and fix leaking components in the water system. System specific programs, such as leak notification, management programs are designed to monitor the distribution and open hydrant emergency response system. In addition to the water saving kits and residential surveys, new requirements, such as the "Green Codes" and Local Law 86 are making buildings more water efficient.

## 4 Water Reuse Programs

Several properties in NYC have implemented water reuse initiatives and have taken advantage of the Comprehensive Water Reuse Program rate, which provides for a discounted water and sewer rate in mixed use or residential buildings. Additionally, state and local guidance has become available or is in the process of being developed.

## 5

### *Education Programs*

DEP's Bureau of Communications and Intergovernmental Affairs (BCIA) continues to conduct a variety of education and public outreach programs on water and water efficiency directed at both students and adults.

## 6

### *Tracking and Projecting Water Demand*

DEP's Bureau of Environmental Planning and Analysis (BEPA) tracks and analyzes current and past water consumption trends, which are largely based on the consumption data dating from 2001 to the present. Consumption is estimated for each available borough, block and lot and verified through various analytical methods. As a part of this effort, BEPA also tracks this data against water supply, distribution, and wastewater flows.

This data is used in conjunction with various planning efforts within the agency, such as emergency preparedness, study of DEP's rate structure, and projecting future water use.

# PROGRAM UPDATE

## 1 Automated Meter Reading

DEP began to install rooftop Data Collection Units (DCUs) in August 2008 and was 80% complete by the end of 2009. As of June 2011, network completion was 92% with most of the remaining DCUs to be installed in central Staten Island. The network provides close to double redundancy so coverage has been provided for almost all of Brooklyn, Queens, the Bronx, and Manhattan.

Wide-scale installation of the transmitters (MTUs) on water meters, and the replacement of approximately 50% of pre-1997 small meters, began on March 5, 2009, in Brooklyn and Queens, in mid-March 2009 in Manhattan, early April 2009 in the Bronx, and July 1, 2009 in Staten Island. By mid-2011 666,900 MTUs had been installed (80%) and work is proceeding at about 800-1,000 MTUs per day.

The system generates a 98+% actual read rate with the remaining 2% attributable mostly to installation errors, defective MTUs and meters that will be corrected. Most MTUs are programmed to read the meter and transmit the read four times a day. Meters two inches and larger are being read once an hour and transmitting four times a day. Installation of the AMR system will not only improve customer service and collections but will increase the volume of water use data by orders of magnitude. DEP will move from having meters read four times a year with an 85% actual read rate overall, to four times a day (for most customers) or hourly (for larger customers) with a 98%+ actual read rate. In late 2010 DEP began to introduce a leak notification service for one-to-three family properties covered by the AMR system. Email notifications are sent to customers whose accounts show a dramatic short-term increase in consumption.

DEP is making effort to install MTUs in apartment buildings that are physically metered but are still billed under the flat-rate or frontage system so the building owners or managers can better understand their water use. Those buildings are 90% complete by mid-May 2011.

DEP began making AMR readouts available to customers through its website during summer 2010.

### Additional information:

<http://www.waterefficiency.net/january-february-2010/ami-in-nyc.aspx>

[http://www.nyc.gov/html/dep/html/water\\_and\\_sewer\\_bills/amr\\_about.shtml](http://www.nyc.gov/html/dep/html/water_and_sewer_bills/amr_about.shtml)



Left: Older meters were read up to four times a year.

Right: The Automated Meter Reader transmits real time data several times a day.

## 2 Water Use Rules

DEP completed revisions in Rules of the City of New York (RCNY) Title 15 Chapter 20, "Rules Governing the Supply and Use of Water" which took effect on June 22, 2009. The proposed changes related to water conservation and quality include the following requirements:

1. Any lead or galvanized metal service pipe be completely replaced, rather than repaired, if it leaks. This is aimed at speeding the replacement of these types of services both for water quality purposes and to reduce distribution system losses.
2. Water meters, service pipes and associated valves and fittings be manufactured of a "no lead" alloy.
3. Public fountains and sprays must have automatic shutoffs.
4. A requirement that the water service pipe to a vacant building be disconnected after one year of vacancy and empowerment of DEP to perform the work and charge the owner if the owner does not act. This is aimed at reducing leakage from service pipes.

DEP began internal study for a new round of rule changes in 2010 and expects to conduct a public hearing process in 2011. While most of the likely changes concern technical specifications related to water meters and the new AMR system, expansion of the requirement for individual metering of new condominiums and optional individual metering of larger condominiums is a conservation-related issue raised for discussion.



Public fountains and sprays are required to have automatic shutoff.

# 3 Water Efficiency Programs

## Leak Notification Program

The Leak Notification Program is a new initiative that allows DEP to proactively alert customers to potential water leaks on their property. The program gives customers the opportunity to sign up online to receive email notifications when their water use increases significantly over a period of several days, enabling homeowners to quickly respond to potential leaks and fix them before they become a serious billing problem.

## Leak Management

DEP's Bureau of Water and Sewer Operations (BWSO) continues to investigate infrastructure leaks and replace water mains as necessary. DEP has around the clock response teams and leak detection crews that use cutting edge technology to locate and repair leaking valves and pipes.



Field crews are assigned to monitor leaks in each borough.

## Open Hydrant Emergency Response

DEP's BWSO has a field team dedicated to monitoring unauthorized fire hydrant use and closing full flowing hydrants, particularly during the summer peak days. Additionally, DEP repaired approximately 14,000 fire hydrants in 2010.

DEP works with FDNY to make sprinkler caps available to the public for relief from heat and to reduce flow.



## Water Saving Kits and Residential Surveys

DEP continues to offer free water saving kits to homeowners as well as free walk-through surveys of private homes to identify leaks and install low-flow showerheads, faucet aerators, and toilet displacement bags.

## Multi-Family Conservation Program

The Water Board currently offers a Multi-Family Conservation Program (MCP). Under MCP, owners of housing consisting of six or more dwelling units are offered a fixed charge per dwelling unit in lieu of metered billing. Owners are required to cooperate on conservation efforts and invest in low-flow plumbing and fixtures.

## Green Codes

Mayor Bloomberg, Council Speaker Quinn and the U.S. Green Building Council sponsored a wide-ranging review of the city's Building Code to meet environmental and green building goals. The cooling system amendment which prohibits the use of potable water for most once-through cooling systems went into effect January 1, 2011, as did an amendment that requires alarms and sub-meters to detect water leaks and monitor usage on water equipment.

Two other changes will become mandatory July 1, 2012: one that lowers the maximum water consumption flow rate or quantity for certain plumbing fixtures and allows the installation of dual-flush toilets; and a law requiring drinking fountains in commercial buildings to have a separate faucet designed to fill a container with water.

The code changes apply to new construction and the repair or replacement of existing structures and fittings.

## Local Law 84 and Benchmarking for City Buildings

As of May 1, 2010 city buildings are required to be benchmarked in coordination with the Department of Citywide Administrative Services (DCAS) with respect to energy use, and with DEP with respect to water use. Benchmarking of water use is not required unless the building was equipped with automatic meter reading equipment by DEP for the entirety of the previous calendar year.

## Local Law 86 and LEED® Rating Systems

Local Law 86 (LL86) of 2005, the NYC green building law, was enacted on October 3rd, 2005. The requirements of LL86 may apply to projects where construction is directly managed by city agencies as well as to projects managed by non-city entities, such as cultural organizations, state agencies and private developers, that receive a certain amount of city funding. These projects must achieve at a minimum 20 to 30% potable water use reduction below the standards of the U.S. Environmental Protection Agency Energy Policy Act of 1992 (EPA Act 1992) as well as a minimum Silver rating under the US Green Building Council's Leadership in Energy and Environmental Design (LEED®) rating systems program.

Office buildings can achieve a LEED Water Efficiency (WE) credit 3.1 for 20% water reduction through the use of low flow plumbing fixtures on efficient buildings. More efficient buildings can achieve WE credit 3.2 for 30% water reduction. For landscaping and irrigation, a LEED WE Credit 1.1 can be achieved for reducing potable water used for building irrigation by 50%. Ultra efficient and innovative buildings could obtain the additional WE credit 1.2 for reducing the potable water for irrigation by 100%.

## 4 Water Reuse Programs

### Comprehensive Water Reuse Program

On July 1, 2004 the New York City Water Board created the Comprehensive Water Reuse Program (CWRP) rate which provides for a discounted water/sewer rate for mixed use or residential buildings that recycle water using a “blackwater” or “greywater” recycling system as well as meeting fixture and appliance efficiency requirements. One year later the qualifications for the rate were expanded to buildings which recycle blackwater or combinations of greywater and stormwater or greywater and district steam condensate.

Water reuse system at the Solaire



There are several buildings in New York City that have taken advantage of this water rate incentive and include:

- The Solaire Building, Battery Park City, Manhattan, NY
- The Helena Building, 601 West 57th Street, Manhattan, NY
- Goldman Sachs, 200 Water Street, Manhattan, NY
- The Visionaire Building, Battery Park City, Manhattan, NY
- The Tribeca Green Building, Battery Park City, Manhattan, NY

At least two other properties have installed water cycling systems but either did not apply for or did not qualify for the CWRP

- Queens Botanical Garden Visitor and Administration Building, 43-50 Main Street, Flushing, Queens, NY
- Riverhouse Building, 1 Rockefeller Park, Manhattan, NY

## New York State Reuse Guidance

In November of 2010, the DEC released “Potential Reuses of Greywater and Reclaimed Wastewater in New York State.” This document can be found here:

[http://www.dec.ny.gov/docs/water\\_pdf/waterresue.pdf](http://www.dec.ny.gov/docs/water_pdf/waterresue.pdf)

As stated in the 2011 PlaNYC update, the New York State DEC is expected to release a report to guide regulatory decisions on reuse in the near future, and NYC would work within the State’s comprehensive standards to encourage reuse, remove barriers in local building codes, conduct cost/benefit analysis, establish long-term compliance management and maintenance requirements, and, where appropriate, provide incentives.

### Rain Barrel Giveaway Program

The Rain Barrel Giveaway Program was launched in September 2010. DEP distributed 1,000 rain barrels in the spring and summer of 2008 and 2009 in Queens and Brooklyn. In 2011, a total of 1,000 free rain barrels were distributed in the Bronx, Brooklyn, Queens and Staten Island to single- and two-family homeowners. The rain barrels connect directly to the existing downspout to collect water for watering lawns and gardens, which often account for up to 40% of a household’s summer water consumption in areas with single-family homes. Using the stored water can reduce the demand on the city’s water supply during the summer’s hottest days. Rain barrels also help reduce localized street flooding, stormwater runoff that enters the city’s sewer system and the demand on the city’s drinking water system during drought conditions. More information on the NYC Green Infrastructure Plan can be found here:

[http://www.nyc.gov/html/dep/html/stormwater/nyc\\_green\\_infrastructure\\_plan.shtml](http://www.nyc.gov/html/dep/html/stormwater/nyc_green_infrastructure_plan.shtml)



## 5 Education Programs

In order to help educate the public and raise awareness about water conservation, DEP has developed, through its Bureau of Communications and Intergovernmental Affairs (BCIA), a comprehensive public education and outreach program. This program has been running for many years and has several integrated components that address a wide range of topics through a multiple media approach, as described below. Furthermore, any future programs directed at demand and use reductions will be tied to the implementation of a major public information campaign on the value of water and water infrastructure such that any inconveniences, costs and sacrifices can be seen in the context of their civic benefit.

### School Programs

DEP continues to develop and implement education programs to help make young people and adults aware of the importance of New York City's water resources. DEP provides opportunities to learn about water supply, wastewater treatment, and stewardship activities at the new Visitor Center at Newtown Creek, and through inquiry-based lessons, staff development workshops for teachers and administrators, printed materials, assistance for curriculum development, and student research projects. DEP continues to administer its annual Water Resources Art and Poetry contest for K-12 students. Additional information about DEP's educational programs can be found here:

[http://www.nyc.gov/html/dep/html/environmental\\_education/index.shtml](http://www.nyc.gov/html/dep/html/environmental_education/index.shtml)

### Public Events

In 2010, DEP continued to participate in public events including table top displays and outreach at fairs, festivals, and concerts. Other events included displays and outreach at greenmarkets and farmers markets, NYC Fashion Week and the "Clean Streets = Clean Beaches" events. In April 2010, DEP opened the Visitor Center at Newtown Creek, located at the Newtown Creek Wastewater Treatment Plant in Greenpoint, Brooklyn. The Visitor Center is an important resource for young people and adults to learn about New York City's water systems. In 2010, DEP also hosted professional development workshops for formal and non-formal educators through the Summer Science Discovery Institute, Bronx River Alliance, and the Queens Museum of Art, where participants learned about creative ways to incorporate the study of water resources into their curriculum using activities focusing on the NYC water supply system and the importance of conserving water.

#### HEAT Team

In 2010, DEP continued to implement the Hydrant Education Action Team (HEAT), which was initiated in 2007 to address the problems associated with the illegal use of fire hydrants. The program targets those communities that historically have the highest number of open fire hydrants. Manhattan Community Board 12 (Washington Height/Inwood), Bronx Community Board 4 (Concourse) and Bronx Community Board 5 (Fordham).

The Street Teams distribute HEAT flyers and posters to provide the community with important information about the dangers of illegally open hydrants. During this process, the Street Teams promote the use of sprinkler caps and educate the community on their importance and where to obtain them. The teams suggest alternative methods of staying cool, such as going to a local park or pool. Community awareness not only gives everyone a chance to learn about the HEAT mission, but to experience it as well. By having people in the community take part in these activities, they also become stakeholders.

## Water Conservation Seminars for Building Managers

DEP and the Department of Housing Preservation and Development co-sponsor a series of three-hour seminars on water conservation, water/sewer billing and the transition to metered billing. The classes are free.

The seminars cover:

- Basics of water/sewer billing (flat-rate and metered billing)
- Transition to metered billing
- How to measure and account for water/sewer costs
- Toilets, showers, boilers, hot water heaters and other equipment
- Managing and account for water use

The seminar presentation can be downloaded from DEP website:

[http://www.nyc.gov/html/dep/html/ways\\_to\\_save\\_water/wcclasses.shtml](http://www.nyc.gov/html/dep/html/ways_to_save_water/wcclasses.shtml)

## Promotional Items

DEP has provided promotional items such as magnets, bumper stickers, bookmarks, rulers, stickers, book covers, sponges, and beach toys with environmental education related messages. These items will be distributed at school and public events to reinforce water conservation messages.

## Website

DEP website addresses water conservation in institutional, regulatory, and public education programs throughout its content and across all of the target audiences. The public education component of the website enhances the myriad of DEP public education programs by providing easy internet access to event schedules, educational materials for teachers and students, downloadable promotional information such as flyers and posters, reading lists, project descriptions, and the host of information associated with DEP Public Education Programs.

A direct link to Conservation outreach materials and water saving tips can also be found on DEP's website at:

[http://www.nyc.gov/html/dep/html/ways\\_to\\_save\\_water/index.shtml](http://www.nyc.gov/html/dep/html/ways_to_save_water/index.shtml)

## Social Media

DEP has started Facebook, Twitter, and Flickr accounts to communicate with the general public about NYC water related news and issues.

<http://www.facebook.com/nycwater>

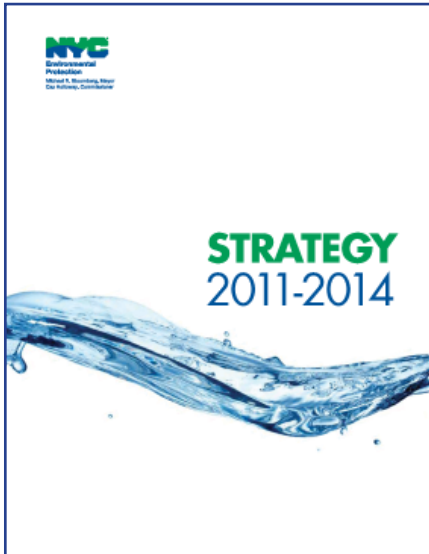
<http://twitter.com/nycwater>

<http://www.flickr.com/photos/nycep>



## Publications

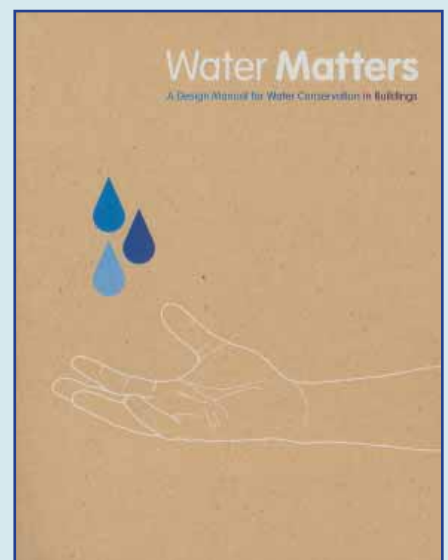
The wide array of DEP environmental education related material will continue to be produced and updated, as necessary, for distribution to students and teachers at public events, and on the DEP website



### Water Conservation Manual

In 2011, the NYC Department of Design and Construction (DDC) has released a water conservation manual, *Water Matters: A Design Manual for Water Conservation in Buildings*. This manual is primarily concerned with water aspects of the sustainable design, construction and operation of City buildings controlled by the DDC.

The manual offers guidance on plumbing fixtures, mechanical, plumbing and energy systems, optimum performance, owner furnished equipment, fire protection, and new technologies to achieve water saving goals.



## 6 Tracking and Projecting Water Demand

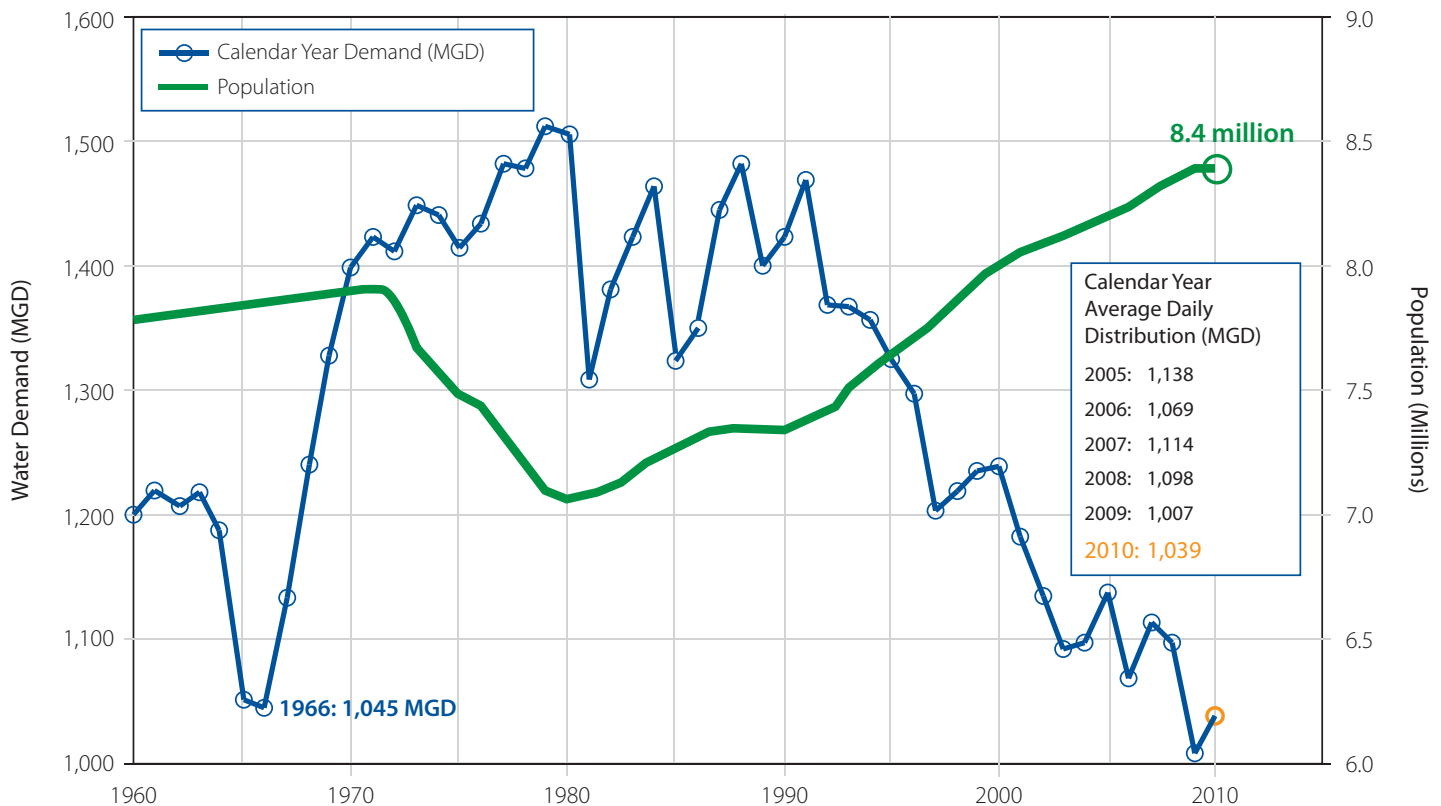
New York City water consumption has continued to decline despite increases in population as shown in figure below (2009 water consumption was 1,008 mgd, lowest since the drought of record). Some of this is attributed to colder and wetter summers in more recent years. It is reasonable to assume that water usage will remain stable or even continue to decline over the near term due to increasing rates and customers' ability to better track usage via AMR. Volumetric meter-based billing is a water conservation pricing mechanism and water use can be expected to decrease in response to the increasing cost of water. This overall trend could be affected by a number of factors including year-to-year temperature swings and potential droughts, which tempers consumption through restrictions.

DEP uses water demand analysis and projections for many purposes including water supply and wastewater infrastructure planning, revenue analysis, dependability, assessing the effects of new growth and rezoning, and understanding the effects of water demand on agency operations. DEP uses technologies such as Microsoft SQL Server, SAS, and ESRI ArcGIS to create statistical and GIS models.

Upcoming work initiatives include integrating the 2010 US Census data, tracking top water users, and further understanding the unaccounted-for water (UAW). Although, there is no universally applied or accepted definition of UAW, in 1996, AWWA recommended changing industry standard for UAW from 15% to 10%; the EPA has endorsed 10%. States that have water loss policies (33) have UAW standards ranging from 7.5% to 20%, with 15% being the most common. The standard is disputed because methodologies to determine UAW are varied and inconsistent. Definitions range from "unmetered water" to "water losses" (e.g. leaks).

DEP will continue to track water demand, analyze system-wide performance and improve our understanding of the system. Examples of these analyses are included in the Appendix.

### Historical Water Distribution & Population



# PROGRAM ACCOMPLISHMENTS

---

## Installation of Locking Hydrant Caps

**1993:** DEP began installing locking caps on approximately 40% of the fire hydrants in the city.

## Accelerated Water Metering

**1985:** New York City passed Local Law 53/1985 to required metering of all new residential construction and metering during substantial renovation of residential properties.

**1985:** The New York City Water Board established a requirement of metering as a condition of receiving water and sewer service from the city. Penalties were established for failing to meter and in 1999 and 2000 DEP issued notices to unmetered properties requiring them to either install a meter or be subjected to a 100% surcharge on their annual flat-rate water/sewer bill. Initially, about 35,000 properties were surcharged but that number decreased to about 8,200 by the end of 2009.

**1988:** DEP issued the first in a series of meter installation contracts that bring the city to almost 90% metered by 1998.

**2003:** DEP issued the first of an ongoing series of systematic large meter replacement contracts.

**2007:** DEP and NYC DoITT issue an RFP for a citywide AMR system.

## City-Wide Conservation Program (Toilet Rebate Program)

**1994 – 1997:** DEP conducted a citywide Toilet Rebate Program that replaces 1.3 million toilets and reduced consumption by approximately 90 MGD.

## NYCHA Toilet Replacements

**1993 – 2005:** The New York City Housing Authority replaced toilets in all developments in the Newtown Creek, Wards Island and North River drainage areas and replaced toilets in “City/State” developments during DEP’s Toilet Rebate Program.

## Quarterly Water/Sewer Billing

**1995:** DEP assumed responsibility of water/sewer billing from the Department of Finance and commissioned a new billing system that instituted quarterly billing for all metered customers. In 2011 DEP began working on the new billing system.

## Rate Study

**2008-2009:** The Water Board hired a consultant in 2008 to examine advantages and disadvantages of several conservation rates, examine practical issues that must be addressed to implement a stormwater rate and research possible incentives for green infrastructure. The study benchmarked NYC's rate structure against other municipalities across the country, researched the types of stormwater, fixed/variable, and other rate structures implemented elsewhere, and identified data needs required to more fully understand the implications of potential implementation in NYC. The study was released in late 2009 and can be found through DEP's website:

[http://www.nyc.gov/html/dep/pdf/water\\_board/waterboard\\_rate\\_study\\_12182009.pdf](http://www.nyc.gov/html/dep/pdf/water_board/waterboard_rate_study_12182009.pdf)

## Ongoing Program Metrics for 2010

### Water Surveys and Conservation Kits

Private Home Water Surveys	4,808
Apartment Surveys	24,308
Small Commercial Water Surveys	734
Home Water Saving Kits Distributed	1,423
Estimated Water Savings (MGD)	2.4

### Water Mains

Water Mains Surveyed (Miles)	3,696
Water Mains Replaced (Miles)	19.98
Estimated Water Savings (MGD)	4.62

### Hydrants

Hydrants Repaired	14,378
Hydrants Replaced	1,309
Hydrants Maintenance	2,455

### Water Meters

Meters Installed (Unmetered Properties)	256
Meters Replaced	1,870

# NEXT STEPS

---

## Voucher-Based Fixture Incentive Program

DEP is planning a limited voucher-based toilet replacement program currently scheduled for 2014-2015. Software to allow online applications for both the Multifamily Conservation Program (MCP) and the toilet replacement vouchers was designed in 2008-2009. A first phase will target high-consumption apartment buildings. If continuation or expansion of the effort is desired as part of Water for the Future program, the software can easily be modified to accommodate such an expansion.

## Large Meter Replacements

The goal is to replace or rebuild meters three inches and larger to recover lost revenues and prepare for both emergency and non-emergency implementation of new rate structures.

DEP has begun a systematic effort to replace the city's 30,000 largest meters on regular industry recommended cycles over the next 10 years. This effort will increase the number of large customers on metered billing and could save millions in otherwise lost revenue. Accurate billed water readings could send price signals to encourage more efficient use of water.

## Performance Based Competitive Bids for Demand Reductions

The RFEI issued in 2007 was mentioned in the 2007 and 2008 editions of this report. An RFP will be prepared during 2012 for possible use in a pilot solicitation.

## Public Building Fixture Replacements

This program would replace toilets, urinals and possibly other fixtures in city-owned buildings, starting with schools but possibly extending to other occupancy types. To ensure completion by DEP target date, DEP intends to begin design work by early 2012 and construction by late 2014. This initiative will be consistent with PlaNYC Water Conservation Initiative 13.

## End of Frontage Billing

The New York City Water Board currently plans to end traditional flat-rate water and sewer billing on July 1, 2012. At that time, as many as 20,000 apartment buildings (perhaps half of which are New York City Housing Authority (NYCHA) developments) will have made a decision to move either to metered billing or to the MCP rate which carries specific water conservation requirements. Detailed background is provided by the water conservation seminar presentation used by DEP:

[http://www.nyc.gov/html/dep/html/ways\\_to\\_save\\_water/wcclasses.shtml](http://www.nyc.gov/html/dep/html/ways_to_save_water/wcclasses.shtml)

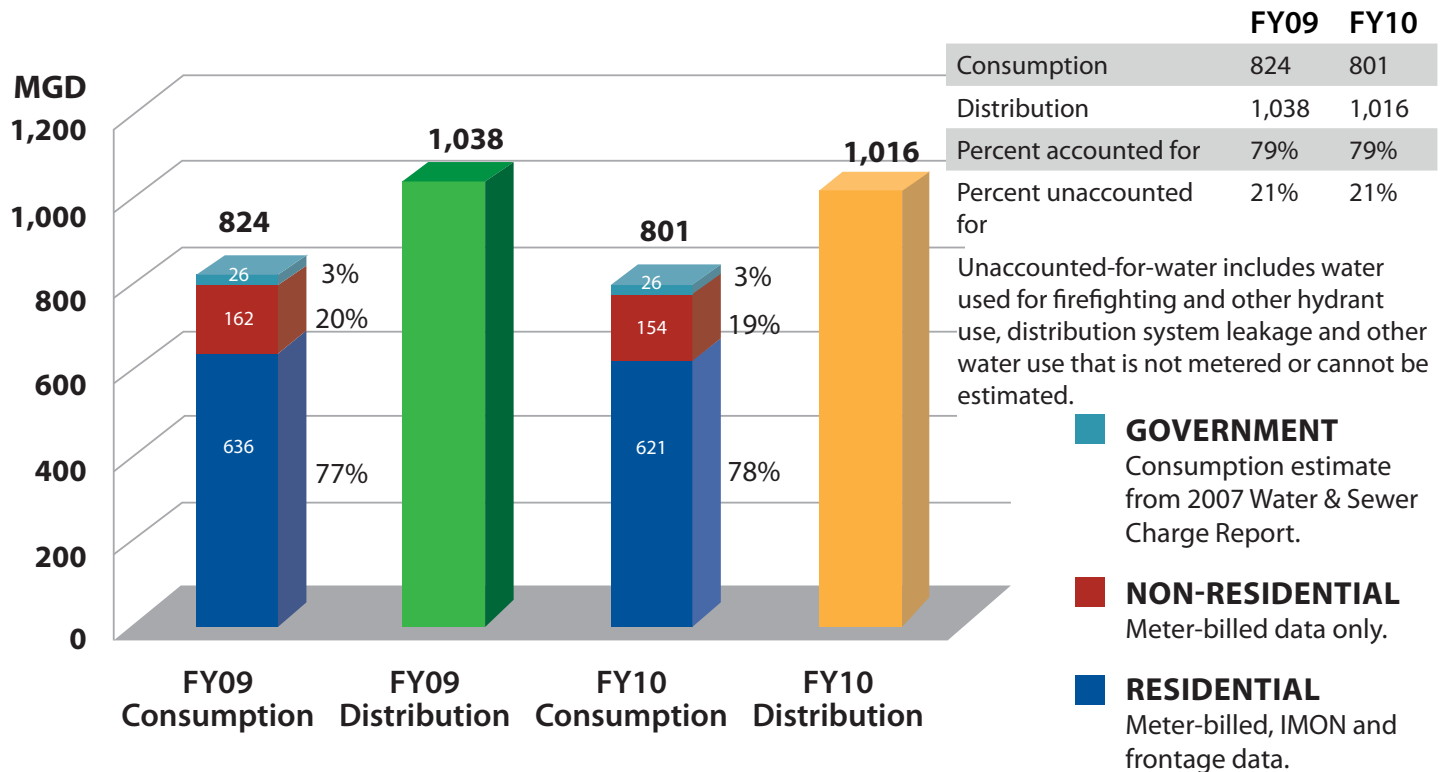
The MCP Guidelines can be found on DEP website:

[http://www.nyc.gov/html/dep/html/customer\\_services/propmngmt.shtml](http://www.nyc.gov/html/dep/html/customer_services/propmngmt.shtml)



# APPENDIX

## Consumption vs. Distribution, FY09-FY10



## Unaccounted-for-Water (UAW)

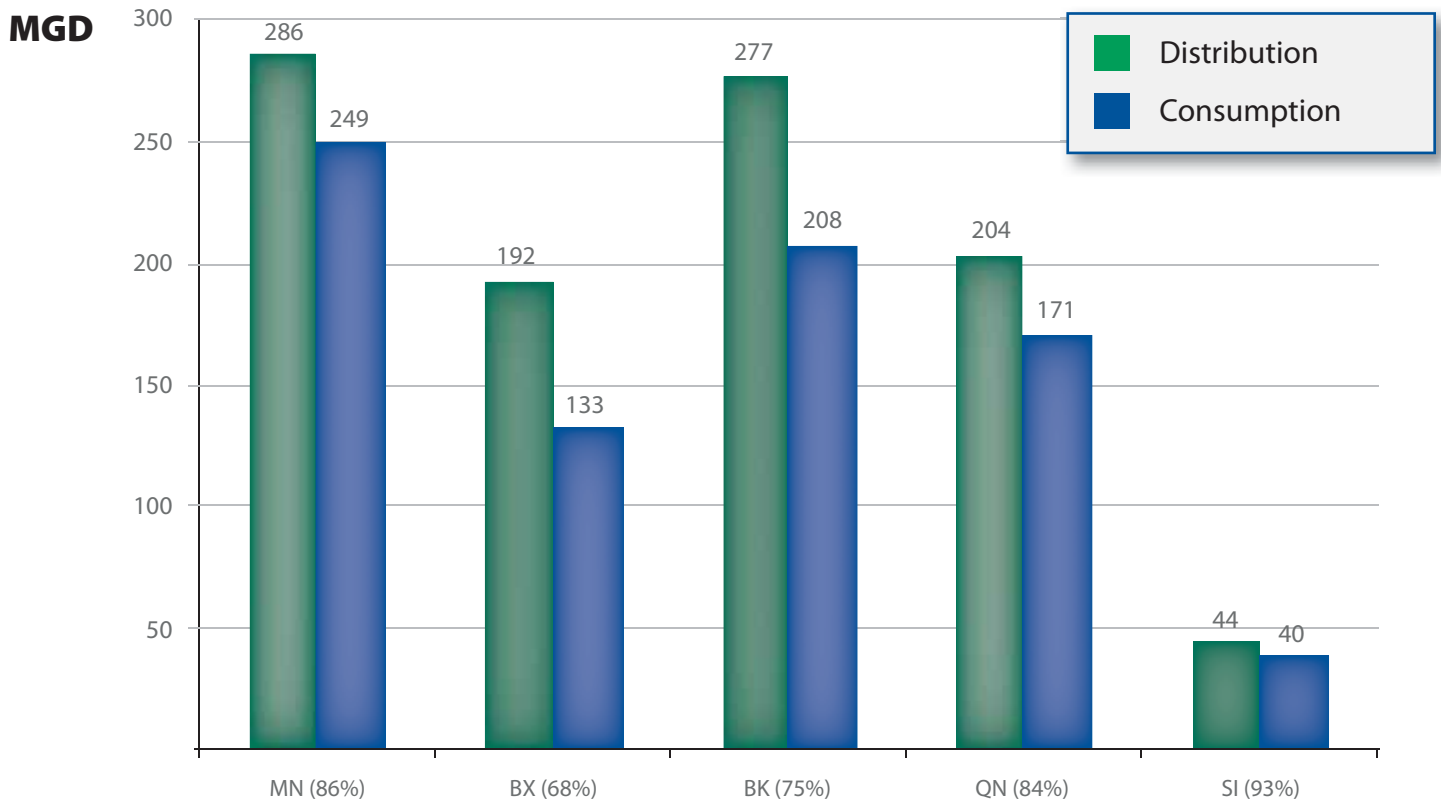
There is no universally applied or accepted definition of unaccounted-for water. In 1996, AWWA recommended changing industry standard for UAW from 15% to 10% of total; EPA has endorsed 10%. States that have water loss policies (33) have UAW standards ranging from 7.5% to 20%, with 15% being the most common. The Standard is disputed because methodologies to determine UAW are varied and inconsistent.

- Definitions range from “unmetered water” to “water losses” (e.g. leaks).
  - for NYC metered water is 52% for meter-billed only and 63% including meter-billed plus metered frontage.
- Some definitions of unmetered use distinguish between authorized use (e.g. fire protection) and unauthorized use (leaks).
- Some definitions allow for water that is metered or confidently estimated (consistent with how it is defined in this report).

In New York State (NYS Water Conservation Manual)

- No specific standard – range of 10% to 15% cited
- Distinguishes between:
  - authorized metered water use.
  - authorized unmetered water use (firefighting, public buildings and landscaping, other).
  - unaccounted for water (leaks, meter error).

# Consumption vs. Distribution by Borough, FY10



**NOTE:** BWSO borough data sum to 1,003 MGD, while BWS distribution is 1,016 MGD due to variability in meters.

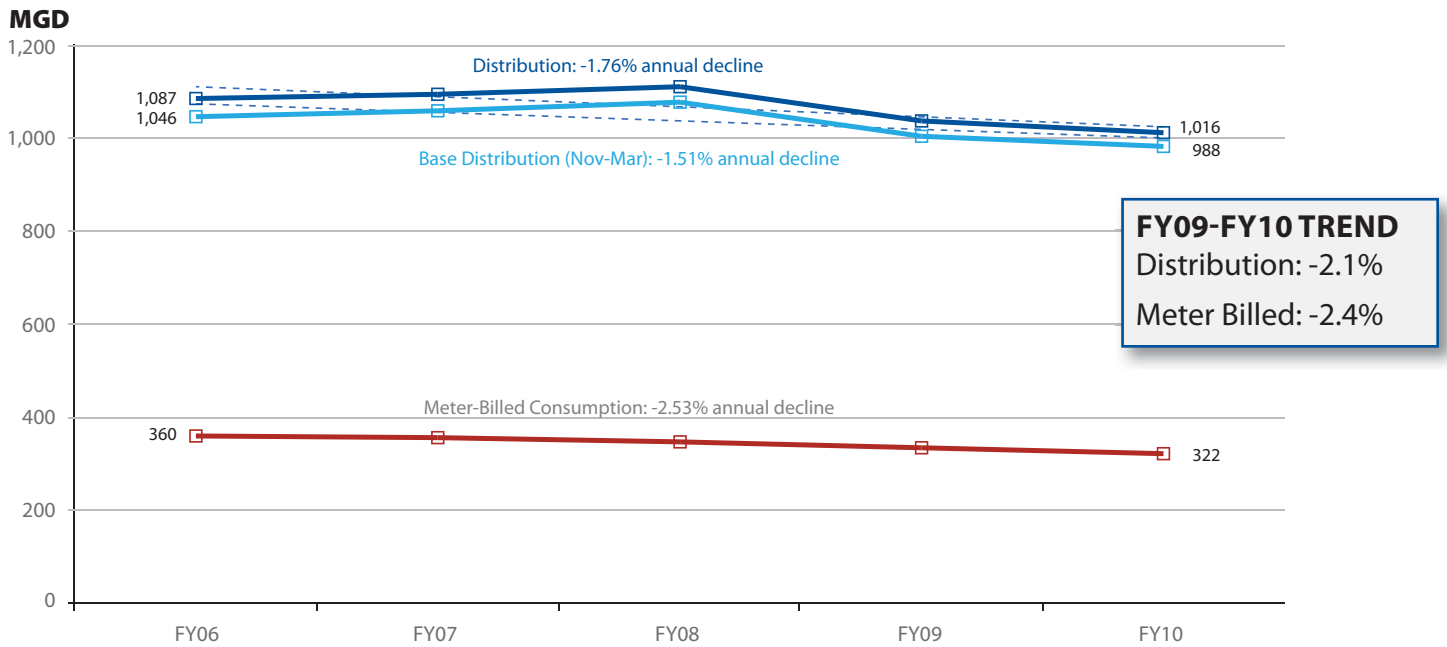
# Meter-Billed Consumption Changes, FY09-FY10

Consumption dropped 2.4% citywide, but declines ranged from 0.5% in the Bronx to 4.8% in Staten Island.

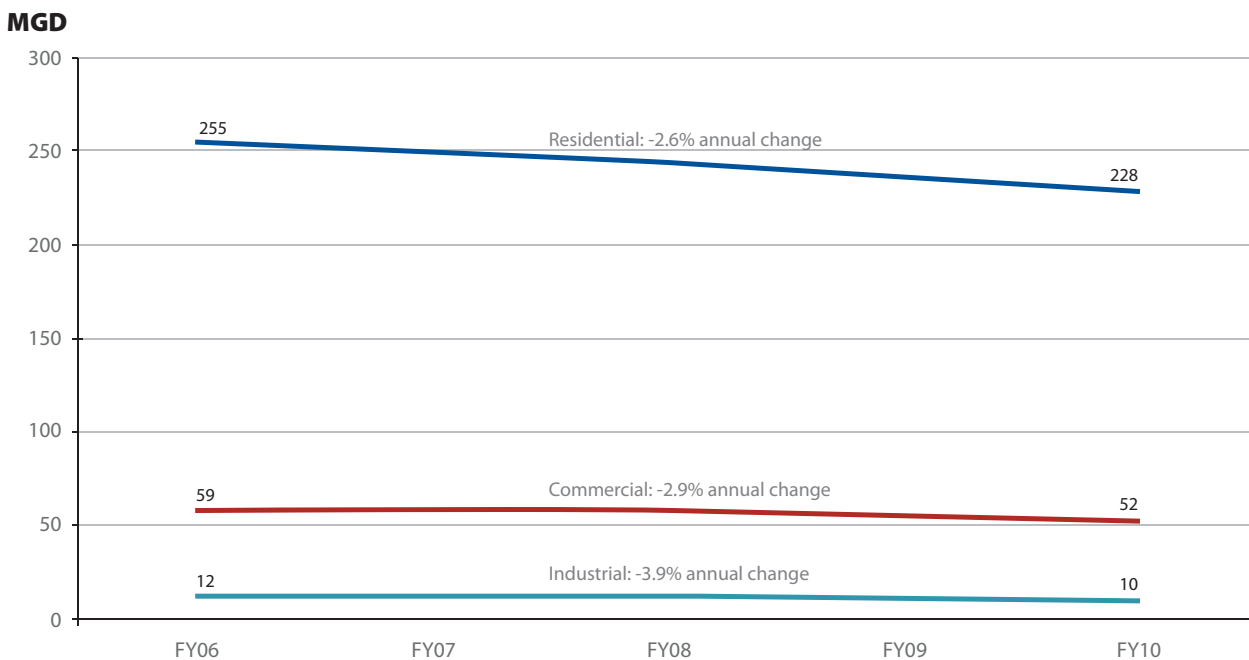
	FY09	FY10	Percent Change
Citywide	529,952,796	517,452,640	-2.4%
Manhattan	168,423,991	164,389,915	-2.4%
Bronx	57,838,968	57,563,040	-0.5%
Brooklyn	132,466,265	129,731,058	-2.1%
Queens	137,797,914	133,914,637	-2.8%
Staten Island	33,425,658	31,826,990	-4.8%

**NOTE:** In order to develop a consistent comparison, the consumption dataset in the table above includes only those customers that have been on meter billing in both FY09 and FY10.

# Distribution & Consumption Trends, FY06-FY10

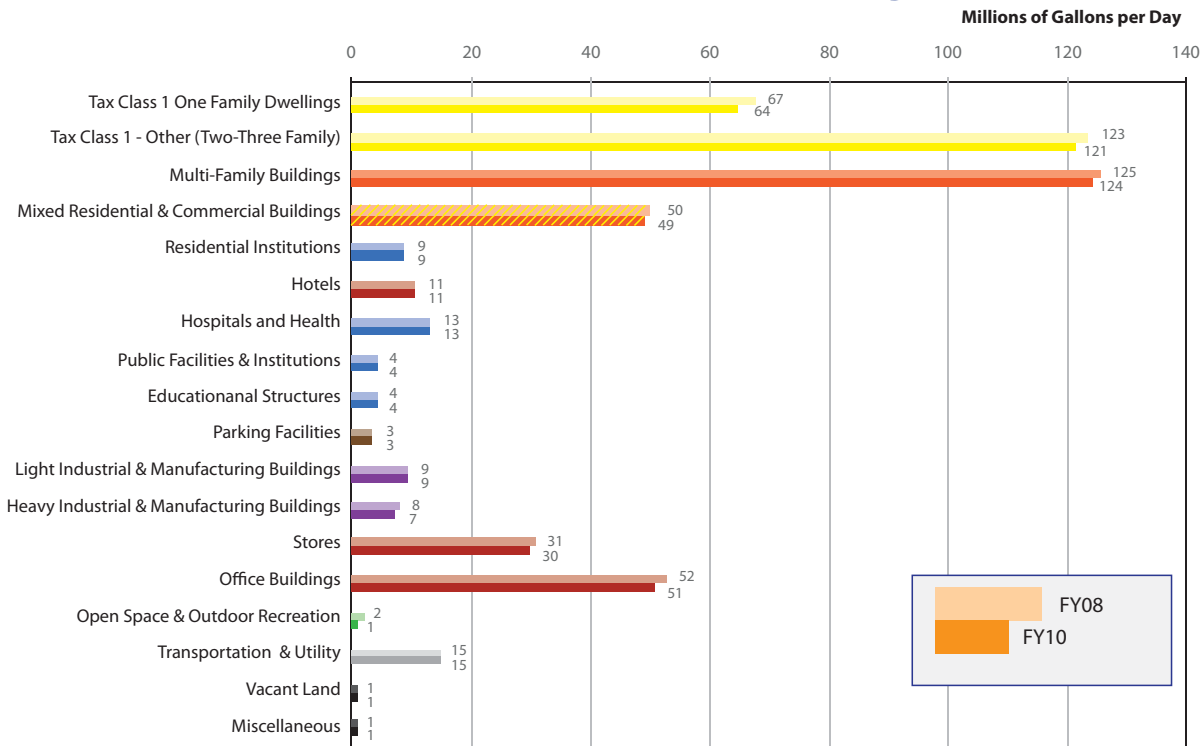


## Meter-Billed Consumption Trends for Selected Land Uses, FY06-FY10

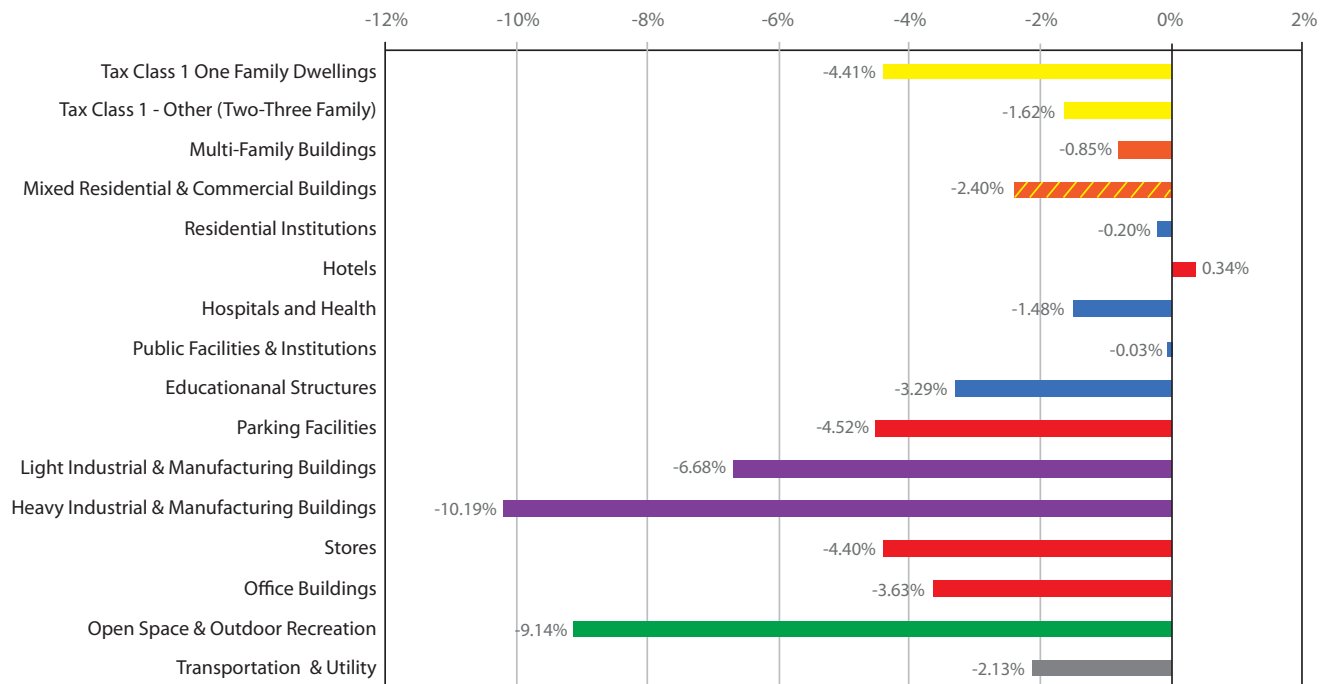


**NOTE:** In order to develop a consistent trendline, the consumption dataset includes only customers that have been on meter billing since FY06. Additional customers have gone to meter billing since FY06, but are not included in this analysis. For reference purposes, meter billed customers consumed 524 MGD in FY10.

# Meter-Billed Consumption Changes, FY09-FY10



# Percent Changes, FY09-FY10



**NOTE:** In order to develop a consistent comparison, the consumption dataset includes only those customers that have been on meter billing in both FY09 and FY10 (530 MGD and 517 MGD respectively). Actual consumption by meter billed customers was 533 MGD in FY09 and 524 MGD in FY10.

# Meter-Billed Account Statistics, FY10

Average Daily Consumption	Mean	10th Pctl	25th Pctl	50th Pctl	75th Pctl	90th Pctl
---------------------------	------	-----------	-----------	-----------	-----------	-----------

## RESIDENTIAL LAND USES: DAILY CONSUMPTION PER HOUSING UNIT

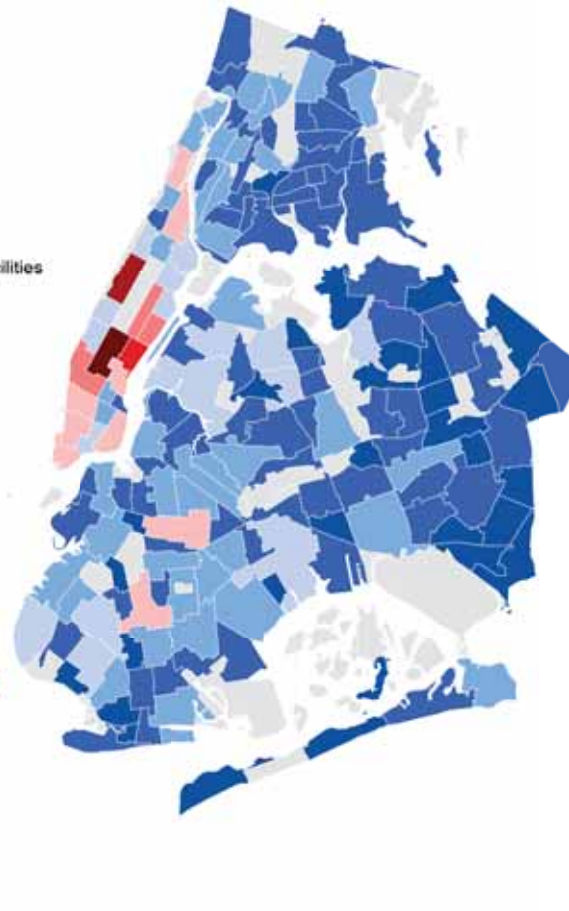
1. One Family Dwellings	210	69	116	180	264	364
2. Two-Three Family Dwellings	168	55	90	140	211	300
3. Multi-Family Dwellings	153	49	83	128	192	272
4. Mixed Residential & Commercial Buildings	214	19	65	136	249	448

## NON-RESIDENTIAL LAND USES: DAILY CONSUMPTION PER BBL

6. Hotels	19,705	997	3,621	9,362	21,136	41,256
7. Hospitals and Health	18,832	108	401	1,270	6,711	42,195
11a. Light Industrial & Manufacturing Buildings	1,211	28	92	278	895	2,909
11b. Heavy Industrial & Manufacturing Buildings	1,678	26	79	246	782	2,383
12. Stores	1,964	49	157	593	1,901	4,860
13. Office Buildings	7,505	65	186	77	5,063	19,376
15. Transportation & Utility	28,115	24	116	668	9,669	42,551

# Accounted-for Consumption by Neighborhood

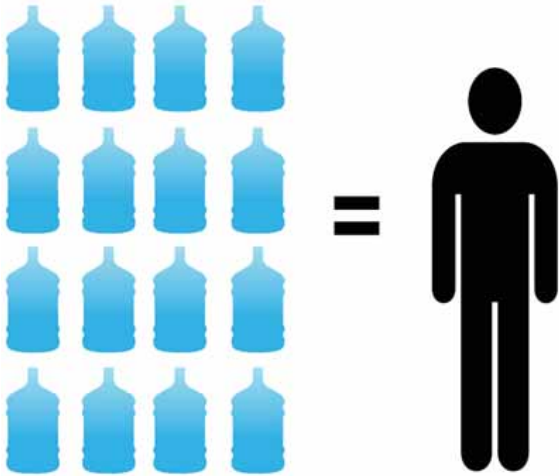
FY10 Average Daily Neighborhood Consumption (gal)



With an average daily consumption of 25 MGD, Midtown Manhattan uses more water than any other neighborhood, followed by the Upper West Side at 14 MGD and Turtle Bay at 13 MGD.

# Per Capita Consumption, FY09-FY10

- City-wide residential consumption per capita was 77 GPD in FY10, while meter-billed consumption per capita was 65 gpd.
- Customers living in new development used 63 GPD.



WE 1: New Yorkers use the equivalent of 16 water cooler bottles of water in their homes, everyday.

## Per Capita Consumption, All Residential Development, GPD

Land Use	FY09		FY10	
	All Billing Types	Meter-Billed Accounts	All Billing Types	Meter-Billed Accounts
1. One Family Dwellings	71	70	69	67
2. Two & Three Family Dwellings	66	65	66	64
3. Multi-Family Buildings	78	57	77	56
<b>All Residential Development</b>	<b>79</b>	<b>66</b>	<b>77</b>	<b>65</b>

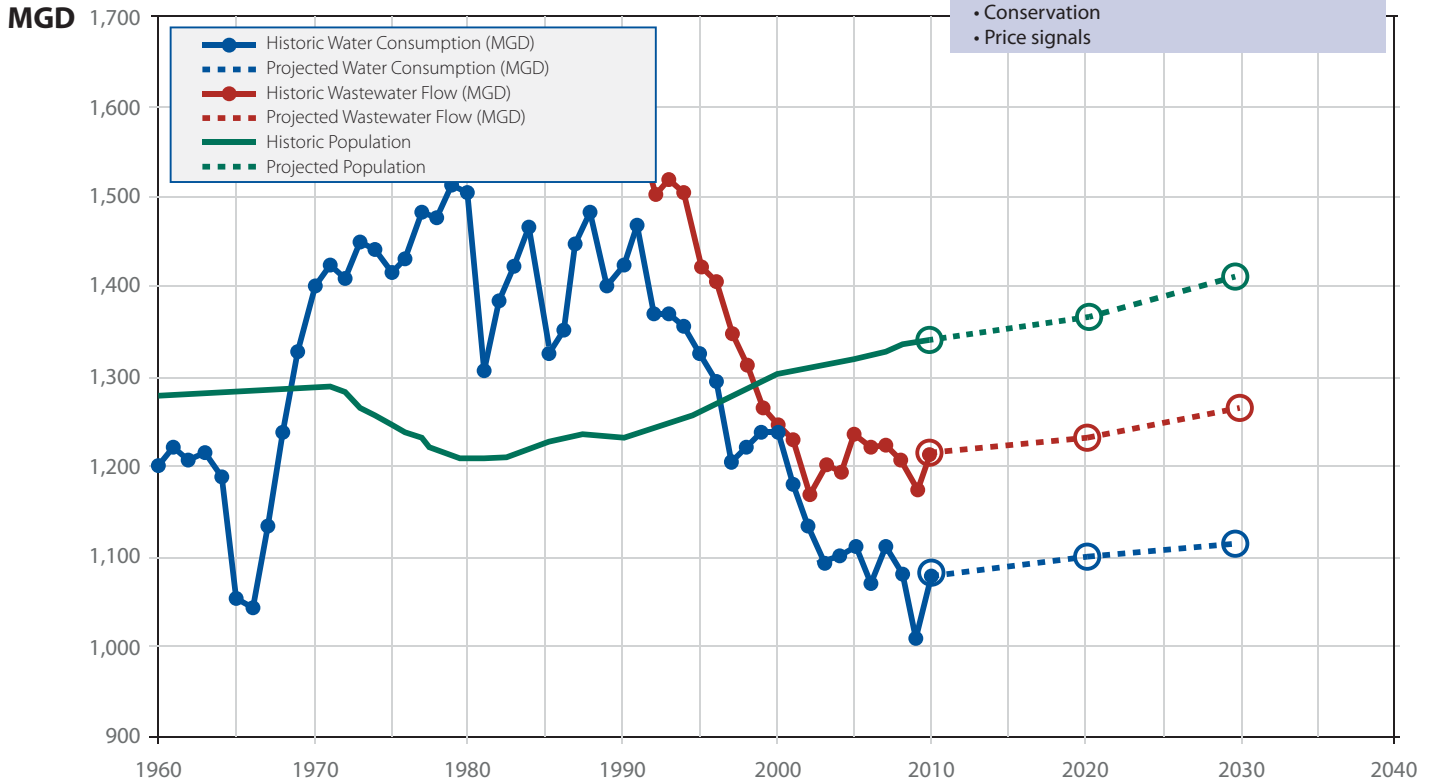
## Per Capita Consumption, New Development Only (1996-2010 Construction), GPD

Land Use	FY09	FY10
1. One Family Dwellings	74	73
2. Two & Three Family Dwellings	67	70
3. Multi-Family Buildings	44	47
<b>All Residential New Development</b>	<b>61</b>	<b>63</b>

# Distribution & WWTP Flow Projections

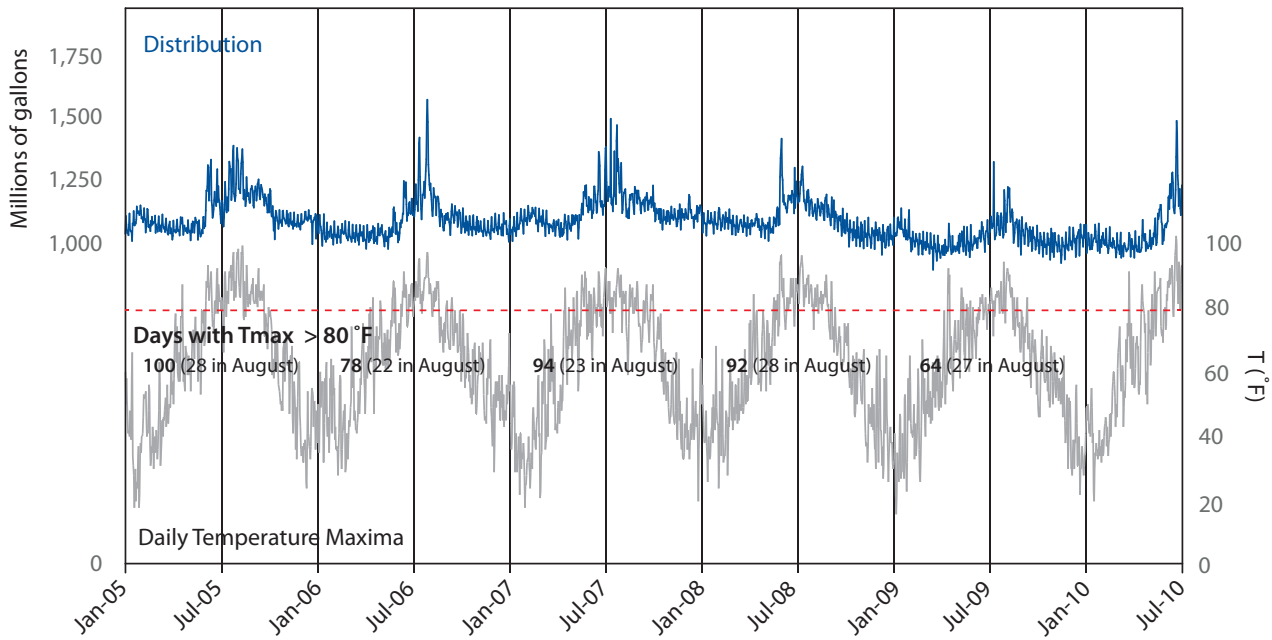
Overall consumption is expected to remain stable at 1.1 billion gallons per day for the next 10 to 20 years, despite increasing population.

- Factors influencing year to year fluctuations:
- Temperature
  - Drought
  - Conservation
  - Price signals



**NOTE:** Wastewater data are dry weather flows. 2010 demand and wastewater flow data are averages for calendar years 2005-2009.

# Distribution & Daily Temperature Maxima, 2005-2010



**NOTE:** Distribution increases markedly with increasing temperatures.

# ABBREVIATIONS & ACRONYMS USED IN THIS REPORT

---

AMR	Automated Meter Reading
BMP	Best Management Practices or Green Infrastructure
CIP	Capital Improvement Plan
CSO	Combined Sewer Overflow
CWRP	Comprehensive Water Reuse Program
CY	Calendar Year
DCU	Data Collection Unit (AMR)
DDC	Department of Design and Construction
DEC	New York State Department of Environmental Conservation
DEP	New York City Department of Environmental Protection
DoITT	New York City Department of Information Technology and Telecommunications
DRBC	Delaware River Basin Commission
FY	Fiscal Year (July 1 – June 30)
GCPD	Gallons per Capita per Day
HCF	Hundred Cubic Feet
HPD	New York City Department of Housing Preservation and Development
LF	Linear Feet
MGD	Millions of Gallons per Day
MTU	Meter Transmitter Unit (AMR)
NYCHA	New York City Housing Authority
RCNY	Rules of the City of New York
RFEI	Request for Expressions of Interest
RFP	Request for Proposals
RWS	Residential Water Survey
SCA	School Construction Authority
WWTP	Wastewater Treatment Plant

# Contact People for Issues in this Report

## New York City Water Metering; Customer-Oriented Water Conservation Programs Requests for the original Water Conservation Plan

Warren Liebold, Bureau of Customer Services | [wliebold@dep.nyc.gov](mailto:wliebold@dep.nyc.gov) | (718) 595-4657

## Water Demand

Vlada Kenniff, Bureau of Environmental Planning and Analysis | [vladas@dep.nyc.gov](mailto:vladas@dep.nyc.gov) | (718) 595-4364

## Distribution System Metering

Odd Larsen, Bureau of Water and Sewer Operations | [olarsen@dep.nyc.gov](mailto:olarsen@dep.nyc.gov) | (718) 595-5751

## Upstate System and Customer Metering

Paul Aggarwal, Bureau of Water Supply | [paggarwal@dep.nyc.gov](mailto:paggarwal@dep.nyc.gov) | (914) 773-4456

## Education Programs

Kim Estes-Fradis, Bureau of Communication and Intergovernmental Affairs | [kestes-fradis@dep.nyc.gov](mailto:kestes-fradis@dep.nyc.gov) | (718) 595-3506