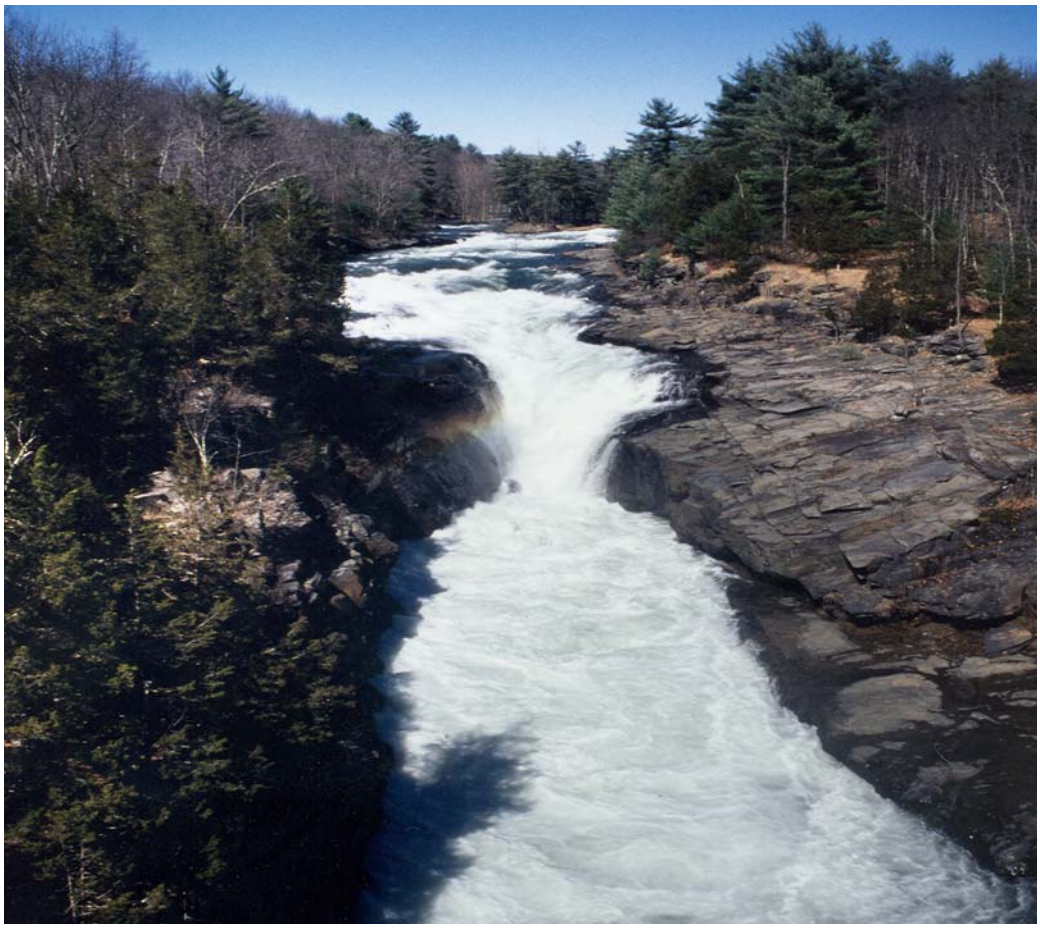
Making the Grade: New York City Department of Environmental Protection's Drinking Water Protection Programs



Clean Drinking Water Coalition's First Annual DEP Report Card

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Acknowledgments

The Clean Drinking Water Coalition (CDWC) – the Catskill Center for Conservation and Development, New York Public Interest Research Group Fund, Inc. (NYPIRG), and Riverkeeper, Inc. – prepared the 2008 New York City Drinking Water Report Card (*Making the Grade*: *New York City Department of Environmental Protection's Drinking Water Protection Programs*). This Report Card is intended to present the status of the New York City Department of Environmental Protection's (DEP) progress on safeguarding the drinking water supply for more than nine million New Yorkers and working with watershed communities to ensure its continued protection.

This report was made possible by the Robert Sterling Clark Foundation and the Scherman Foundation, leaders in supporting the monitoring and oversight of New York City's watershed protection efforts. We greatly appreciate the support of our program officers, Laura Wolff of Robert Sterling Clark and Mike Pratt of the Scherman Foundation.

The primary authors of the report are CDWC Members Cathleen Breen, NYPIRG's Watershed Protection Coordinator, and James L. Simpson, Riverkeeper's Watershed Attorney. Deborah Meyer DeWan, The Catskill Center for Conservation and Development's Interim Executive Director, and Leila Goldmark, Staff Attorney & Watershed Program Director, provided invaluable input and guidance.

To prepare this report, the CDWC relied on DEP's Filtration Avoidance Determination deliverables for program status, individual interviews with government regulators, watershed partners and stakeholders, as well the CDWC's own experience. In the end, the grades are based on the evaluations of the CDWC and do not reflect any individual agency or watershed interviewee's perspective. In addition to grading the programs, the report contains recommendations for improving watershed protection programs and strengthening partnerships with watershed communities.

Cover photo credit: Carolyn Newkirk took this picture of the Ashokan spillway.

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Executive Summary

In 1997, New York State, New York City, United States Environmental Protection Agency (EPA), upstate communities and environmental organizations (including the Clean Drinking Water Coalition (CDWC) – The Catskill Center for Conservation and Development, New York Public Interest Research Group Fund, Inc. (NYPIRG), and Riverkeeper, Inc.) joined together to sign an agreement to protect the unfiltered drinking water supply that more than nine million residents of New York City and upstate communities use daily. This agreement, the historic 1997 Watershed Memorandum of Agreement (MOA), bringing with it open space conservation and stronger land use controls, established a working partnership and framework for watershed protection that is both cost effective and environmentally protective. We believe that, if implemented effectively, this agreement is the best means to preserve the water supply, the upstate economy, and the Catskills environment.

Why a report card? The goal of this New York City Watershed Report Card is to evaluate the progress of the New York City Department of Environmental Protection's (DEP) efforts in safeguarding the drinking water supply for millions of New Yorkers and working with watershed communities. We also hope to spotlight certain programs and watershed protection efforts that need greater financial support. According to Robert F. Kennedy, Jr., Riverkeeper's Chief Prosecuting Attorney and a participant in the MOA negotiations, "The City ought to devote resources to protection that are commensurate with its role as trustees and with the value of the watershed to this and future generations."

By discovering where the problematic environmental conditions exist in the watershed, efforts can be targeted to areas that are in most need of protection or restoration.

Speaking for himself about the ten years since the MOA, Perry Shelton, recently retired Catskill Watershed Corporation (CWC) president and former chair of the Coalition of Watershed Towns who led the negotiations for upstate communities, said:

> "I think we've made great progress. We started fighting regulations – now we're getting septic systems replaced. This watershed program is something we can all be proud of. It's important to keep communication going. We have to work at it together. But if there is more we could do, let's hear from the people of the watershed and do it."

Some of our Watershed Report Card key findings include:

1. **Catskill Turbidity:** Turbidity is a significant issue in the Catskill watershed, and the greatest threat to the continuation of filtration avoidance. DEP must expeditiously provide a new multi-level intake structure at Schoharie Reservoir to control turbidity in the Catskill system.

2. **Stream Management Program:** Although DEP attributes the bulk of the turbidity problem to the natural landscape of the Catskill region where clay soils are eroded by heavy runoff events, human activity causes channel modifications and land use changes that can induce or exacerbate erosion. Significant funding and effort must be put into the existing Stream Management Program.

3. **Surface Water Treatment Rule (SWTR) Objective Criteria Compliance:** Overall, we think they are doing well, but a big risk is how to deal with the turbidity problem from the Catskills. Granted DEP performs more tests than required, but we believe DEP should include pharmaceutical and personal care products in its screening.

4. **West-of-Hudson Land Acquisition:** DEP should settle on payment of reasonable real property taxes to West-of-Hudson municipalities. DEP should also make must greater use of land trusts.

5. **Croton Land Acquisition**: DEP should step up its efforts to acquire land in the Croton Watershed. A multi-barrier approach is needed for the Croton Watershed.

6. **Septic System Remediation & Replacement Program:** Even with additional funding, the limited number of qualified workers constrains the number of septic systems that can be addressed. DEP should coordinate with state and local educational facilities to support training programs that would add to the eligible workforce.

7. **East-of-Hudson Non-Point Source Management – MS4 Permits:** DEP, working with New York State Department of Environmental Conservation and local municipalities, should aggressively pursue formation of a public benefit corporation, akin to the Catskill Watershed Corporation, to assist with MS4 permit compliance in the East-of-Hudson Watershed.

8. **Sand and Salt Storage**: This successful program improved the storage of sand, salt and other road de-icing materials West-of-Hudson. However, DEP should begin to move beyond conventional de-icing materials and provide funding for the use of alternative de-icing materials.

9. **Education/Outreach:** City should increase and continue support of Catskill Watershed Corporation and Watershed Agricultural Council education and outreach programs. These programs have proven effective in building awareness on the need for and benefits of watershed protection and stewardship.

10. **MOA's Spirit of Cooperation:** While it has come a long way, DEP should strive to realize the new era of partnership and cooperation the MOA ushered in.

Introduction

As parties to the negotiations of and signatories to the 1997 Watershed Memorandum of Agreement (MOA), the Clean Drinking Water Coalition (CDWC) – The Catskill Center for Conservation and Development, New York Public Interest Research Group Fund, Inc. (NYPIRG), and Riverkeeper, Inc. – is committed to overseeing the continued protection of New York City's most valuable asset: its drinking water.

This report card on the status of the City's compliance with the MOA and EPA's watershed protection mandates embodied in the filtration waivers allows for a review of the City's progress to date and the opportunity to provide valuable input into current and future programs to ensure that the drinking water supply for more than nine million New Yorkers remains high quality.

While we've learned that New Yorkers are used to having safe, clean drinking water for a low cost, other municipalities have not been so fortunate. Because their water sources are polluted, many have to subject their drinking water to intensive and expensive purification processes. As we know, failure to protect drinking water sources carries a threat to public health and a large price tag in terms of capital and maintenance expenditures for treatment systems.

According to EPA, "for a drinking water system to qualify for filtration avoidance, the system cannot be the source of a waterborne disease outbreak, must meet source water quality limits for coliform and turbidity" and other standards and "requires that a watershed control program be implemented to minimize microbial contamination of the source water. This program must characterize the watershed's hydrology, physical features, land use, source water quality and operational capabilities. It must also identify, monitor and control manmade and naturally occurring activities that are detrimental to water quality. The watershed control program must also be able to control activities through land ownership or written agreements."

If New York City fails to demonstrate that it can continue to successfully protect the source of 90% of its water supply, the Catskill/Delaware (Cat/Del) system, from pollution, then EPA will likely order City officials to build a filtration plant. And the price is steep: the cost of filtration for the Cat/Del is estimated at $5-10 billion for construction with operating costs at $300 million a year. The practical consequences of that decision will be that water rates will rise even higher, threatening tens of thousands of housing units, especially in the City's poorest neighborhoods. Badly needed funds will be drained from police, infrastructure, health care, culture, transportation, fire, sewage and other City services. And, worst of all, there is no guarantee that a filtration plant will preserve public health.

In addition, the New York City Watershed is a State, if not a national, treasure that must be protected in a comprehensive manner. The MOA recognizes this goal, and also recognizes that drinking water protection and protection of the economic vitality and social character of communities within the New York City Watershed are not inconsistent

goals. Indeed, the MOA strove to usher in a new era of partnership and cooperation to achieve these goals.

The City's $1.5 billion investment to date in watershed protection has paid off: New York continues to enjoy some of the cleanest and least expensive drinking water in the world. New York City's drinking water supply requires continued vigilance if we are to succeed in protecting this immense natural resource. New York City has continued to provide safe drinking water to its residents and, as a result of the MOA's partnership programs, there has been progress over the years that has enhanced watershed protection. However, there have been failures too that need to be identified and addressed in order for the watershed protection program to reach its full potential and critically important goals.

Background

The New York City Watershed (NYC Watershed) comprises only 4.2% of New York State's lands yet provides up to 1.5 billion gallons a day of unfiltered drinking water for over 9 million residents. The NYC Watershed, which the New York City Department of Environmental Protection (DEP) manages, extends 125 miles north and west of the City and includes nearly 2,000 square miles across eight counties: Westchester, Putnam, and Dutchess on the east side of the Hudson River and Delaware, Ulster, Green, Schoharie, and Sullivan in the Catskill Mountains west of the Hudson. Three distinct systems comprise the NYC Watershed: Croton, Catskill, and Delaware systems. These gravity-fueled delivery systems, constituting 19 reservoirs, three controlled lakes, a portion of Esopus Creek, and miles and miles of aqueducts, are admired internationally and considered a modern wonder of the world.

Croton: The Croton system, the oldest and smallest of the three water supply systems, is entirely east of the Hudson River. It began service in 1842 and provides about 10% of the total daily system demand, and up to 30% during drought conditions. The approximately 375-square-mile Croton system consists of the Amawalk, Bog Brook, Cross River, Croton Falls, Diverting, East Branch, Middle Branch, Muscoot, New Croton and Titicus Reservoirs and three controlled lakes on the Croton River with tributaries and branches extending into Westchester, Putnam and Dutchess Counties in New York and into Fairfield County in Connecticut. Croton water flows by gravity from New Croton Reservoir to Jerome Park Reservoir in the Bronx via the New Croton Aqueduct.

Catskill: The approximately 571-square-mile Catskill system, completed in 1927, provides about 40% of total system demand. This system consists of the Ashokan and Schoharie Reservoirs (and their drainage basins), the Shandaken Tunnel, a portion of Esopus Creek, and the Catskill Aqueduct connecting the Ashokan and Kensico Reservoirs. Water from the Catskill system flows from the Schoharie Reservoir to Esopus Creek via the Shandaken Tunnel, empties into the Ashokan, and is then conveyed 92 miles via the Catskill Aqueduct to the Kensico Reservoir where it mixes with water from the Delaware system. This water flows to the Hillview Reservoir for distribution throughout New York City.

Delaware: The approximately 1,010-square-mile Delaware system, completed in 1967, provides about 50% of total system demand. The Delaware consists of the Cannonsville, Pepacton, Neversink, and Rondout Reservoirs west of Hudson, and Boyds Corner, West Branch, and Kensico Reservoirs east of Hudson. Water collects in the Cannonsville, Pepacton, and Neversink Reservoirs and flows from each via separate aqueducts to the Rondout Reservoir. The Delaware Aqueduct then carries the water 70 miles to either Boyds Corner Reservoir or West Branch Reservoir in Putnam County before heading south to the Kensico Reservoir, then to the Hillview Reservoir in Yonkers for distribution.

While geographically distinct, these systems are interrelated and allow DEP to transfer water from one system to another in order to have some flexibility in controlling flows and distribution. A remarkable engineering feat, about 95% of the total water supply is delivered to the distribution system by gravity; only 5% is electrically pumped to maintain desired delivery pressures. New York City operates the nation's largest municipal water system, and one of the last to remain unfiltered.

Unfiltered Water Supply

Under the Safe Drinking Water Act's (SDWA) 1989 Surface Water Treatment Rule (SWTR), drinking water taken from surface water sources must be filtered to remove microbial contaminants. However, the law allows the U.S. Environmental Protection Agency (EPA) to grant a waiver, a Filtration Avoidance Determination (FAD), from this requirement if water suppliers demonstrate "[t]hrough ownership and/or written agreements with landowners within the watershed that it can control all human activities which may have an adverse impact on the microbiological quality of the source water."

Catskill/Delaware: Following intense multi-year negotiations, numerous stakeholders signed the landmark 1997 Watershed Memorandum of Agreement (MOA). The MOA has been described as the legal equivalent of the Hoover Dam; it comprises nearly 1,000 pages of text and attachments (including the five-year 1997 FAD). The MOA settled lawsuits regarding New York City's use of eminent domain in the NYC Watershed, and was also in response to EPA's demand that New York City take steps to protect the quality of its drinking water. Signed by over 90 parties including EPA, Governor George Pataki, Mayor Rudolph Giuliani, local elected officials from the watershed regions, land trusts and the Clean Drinking Water Coalition, the MOA called for the spending of more than $1.5 billion over ten years to: a) purchase parcels of land close to critical reservoirs; b) upgrade infrastructure, including sewage treatment plants and stormwater drains; c) comply with new Watershed Rules and Regulations; and d) construct a comprehensive monitoring program to assess water quality. The MOA also established critical partnership programs, and formed the Catskill Watershed Corporation, a not-for-profit corporation to manage many of these programs. Additionally, the MOA established funding for Westchester and Putnam Counties to develop a Croton Plan.

By agreeing to meet the requirements spelled out in the MOA, the City was then able to satisfy federal water quality standards and, as a result, EPA continued to conditionally waive the requirement that New York City filter Catskill/Delaware water, the source of 90% of its water supply. EPA granted another five-year FAD in 2002 and a ten-year FAD in 2007.

Croton: A 1992 stipulation with NYSDOH provided for the construction of a full-scale water treatment facility to filter Croton System water. The stipulation has been superseded by a 1998 federal court Consent Decree which requires the City to design and construct such a facility. The City is currently building the Croton Filtration Plant in the Bronx.

As articulated by the Catskill Watershed Corporation in its annual report ten years after the signing of the MOA: "The MOA redefined what it means to live the Watershed, to be a steward of water bound for half the state's population….the MOA offered a bridge over troubled waters, a means of quieting the ghosts of bitter history in a quest for a mutually beneficial future. Ten years later, it is still a work a progress, but there is no denying how very much has been accomplished."

Methodology

The analysis for this report card was based on the Clean Drinking Water Coalition's (CDWC) experience in monitoring the efforts of the DEP since the signing of the 1997 Watershed Memorandum of Agreement (MOA.) In addition to our extensive oversight these past years, to better understand how DEP has functioned as a partner throughout the NYC Watershed, we reached out to 23 NYC Watershed partners, stakeholders, and regulators including representatives of DEP, EPA, NYS Department of Health, the Catskill Watershed Corporation and watershed town representatives. (See Appendix A.) Their input afforded us an invaluable look into how well DEP works with the watershed community in implementing the programs of both the MOA and subsequent federal filtration avoidance determinations (FAD). We also reviewed dozens of reports, including the MOA, the three recent FADs, and DEP's FAD progress reports. (See Appendix A.)

Clearly, the grades are based on our own opinions and do not reflect any individual interviewee's opinions. Although we sought input from different watershed stakeholders, ultimately the CDWC determined the "grade" assigned each area.

When deciding on a grade, the CDWC looked at whether or not DEP had complied with the program's requirements as stipulated in the MOA or FADs; whether compliance was timely; whether funding for the program was adequate; whether DEP worked well in partnerships where applicable; and whether DEP was putting best efforts into the program.

We believe the report card provides effective watershed reporting and represents useful and relevant information synthesized from large volumes of data. The brief and simple layout enables the report card to be used by the public as well as resource agencies, municipalities and other interested groups.

GRADING SUMMARY

Surface Water Treatment Rule Objective Criteria Compliance	GRADE: A
Septic System Remediation & Replacement Program	GRADE: A-
Septic Maintenance Program	GRADE: B
Sewer Extension Program	GRADE: B
Alternate Design and Other Septic Programs	GRADE: B
New Sewage Treatment Infrastructure Program	GRADE: B
Community Wastewater Management Program	GRADE: B+
WWTP Upgrade Program	GRADE: C-
Stormwater Retrofit Programs	GRADE: A
Future Stormwater Controls Program	GRADE: B
Waterfowl Management Program	GRADE: A
Catskill/Delaware Watershed Land Acquisition	GRADE: B-
Croton Watershed Land Acquisition	GRADE: C-
Land Management Program	GRADE: B-
Watershed Agricultural Program	GRADE: A
Watershed Forestry Program	GRADE: B+
Stream Management Program	GRADE: B
Riparian Buffer Protection Program	GRADE: A
Wetlands Protection Program	GRADE: B+
East of Hudson Non-Point Source Management Program	GRADE: C+
Kensico Water Quality Control Program	GRADE: A
Catskill Turbidity Control	GRADE: C

Sand and Salt Storage	GRADE: A-
Watershed Monitoring Program	GRADE: A
Multi-Tiered Water Quality Modeling Program	GRADE: B
Geographic Information System	GRADE: B+
Watershed Rules & Regulations & Other Enforcement/Project Review	GRADE: B
Wastewater Treatment Plant Inspection Program	GRADE: A-
Catskill/Delaware Filtration Facility and UV Disinfection Facility	GRADE: A
Waterborne Disease Risk Assessment Program	GRADE: A
Cross Connection Control Program	GRADE: A-
Administration	GRADE: B+
Education and Outreach	GRADE: B

FAD Section 2: Surface Water Treatment Rule (SWTR) Objective Criteria Compliance

GRADE: A

2002 FAD

- DEP to report monthly reports on specific water quality sampling
- DEP to report monthly on operational status of Kensico Reservoir, West Branch Reservoir, and Hillview Reservoir
- DEP shall not introduce Croton Falls or Cross River source water into the Catskill/Delaware water supply system without approval of EPA and NYSDOH

2007 FAD

- DEP to report monthly on specific water quality sampling
- DEP to report monthly on operational status of Kensico Reservoir, West Branch Reservoir, and Hillview Reservoir
- DEP to provide report on compliance with Stage 2 Disinfection Byproducts Rule by June 2010
- DEP shall not introduce Croton Falls or Cross River source water into the Catskill/Delaware water supply system without approval of EPA and NYSDOH, and DEP to report on water quality data from these reservoirs by March 2010

Purpose: The Surface Water Treatment Rule (SWTR), which EPA adopted in 1989, requires that all surface water suppliers provide filtration unless certain source water quality, disinfection, and site-specific avoidance criteria are met. The water supplier, in this case DEP, must also comply with the Total Coliform Rule (TCR) and the Disinfectant and Disinfection Byproducts Rule. In order to qualify for a waiver from filtration, a water supplier must meet certain objective water quality criteria, including numeric requirements for turbidity, coliform bacteria, and disinfection byproducts. DEP seeks to accomplish this through water quality sampling and monitoring.

Progress: DEP's testing is more extensive than federal or state law requires and therefore complies with SWTR, TCR & other federal regulations. Each year DEP collects tens of thousands of samples in the watershed and in the distribution system. In 2007, DEP collected a total of 49,647 samples and conducted a total of 612,098 analyses.
During 2005, there were two brief instances when water quality in the Kensico Reservoir exceeded turbidity levels, but the instances did not violate the SWTR. DEP dealt with these occurrences through operational changes, including increased disinfection and aqueduct shutdown. EPA and NYSDOH characterized these as "short-term spikes in turbidity." No interviews hinted at any problems meeting the objective criteria.

Recommendation: Overall, we think they are doing well, but the big risk is how to deal with the turbidity problem from the Catskills. Granted DEP performs more tests than required, but we believe it should include pharmaceutical and personal care products in its screening.

FAD Section 3: Environmental Infrastructure

3.1 Septic & Sewer Programs

1997 MOA

- City to provide $13.6 million for Septic Program Funds to be used to inspect, pump-out, and replace or upgrade existing septic systems
- Catskill Watershed Corporation (CWC) to administer funds and prioritize areas for septic rehabilitation or replacement

Purpose: Due to the relatively low density of development West-of-Hudson, as opposed to East-of-Hudson, septic systems are the primary means of sanitary treatment/disposal. During MOA negotiations, it was estimated that there were approximately 22,000 residential septic systems throughout the West-of-Hudson Watershed. Because many of these systems are older and were not designed in accordance with current regulations, they are prone to failure and pose a water quality threat. The MOA and EPA therefore require DEP to identify failing residential septic systems and to prioritize their rehabilitation or replacement throughout the watershed.

The Septic and Sewer Programs contain four elements, each discussed and graded separately:

(i) Septic Remediation and Replacement Program;
(ii) Septic Maintenance Program;
(iii) Sewer Extension Program; and
(iv) Alternate Design and Other Septic Programs

Septic System Remediation & Replacement Program **GRADE: A-**

1997 MOA • City to provide $13.6 million in Septic Program Funds
2002 FAD Requirements • DEP to execute contract changes with CWC including funding to address 300 septic systems per year • DEP to report semi-annually on program implementation
2007 FAD Requirements • Program expanded to include commercial systems operated by small businesses; City to provide $4 million for first five-year period to remediate/replace commercial systems (City obligated to provide additional funding for second five year period) • Program now includes cluster systems serving more than one residence; City to provide $2 million for cluster systems and report on implementation • Funding, focus, and prioritization to be re-evaluated prior to start of second five-year period • Implement septic programs East-of-Hudson • City to report semi-annually on implementation

Purpose: The Septic System Remediation and Replacement Program, consisting of four sub-programs (1. Priority Area Program, 2. Hardship Program, 3. Septic Monitoring Program, and 4. Reimbursement Program), was established to provide for pump-outs and inspections of septic systems serving single or two-family residences in the West-of-Hudson Watershed, to upgrade substandard systems and to rehabilitate or replace systems that are failing or are reasonably likely to fail in the near future.

Progress: DEP has committed $54.6 million since 1997 and with CWC administering the program, a total of 2,616 septic systems have been repaired, replaced or managed since program inception. The 2007 FAD included two new programs: a pilot effort to make money available for small commercial entities and money for small cluster systems. On December 31, 2007 DEP reported that it had identified 13 population clusters located in environmentally sensitive areas that may include candidates for/in need of cluster septic systems as a solution to inadequate onsite systems.

Recommendation: Initially the program got off to a rocky start in part because of inadequate funding; however, CWC overcame that obstacle by borrowing money from the Future Stormwater Controls program. Yet, even with additional funding, the number of septics that can be addressed is constrained by the limited number of qualified workers. On average only 240-250 septic system projects can be undertaken in a year. DEP should coordinate with state and local educational facilities to support training programs that would add to the eligible workforce.

Septic Maintenance Program **GRADE: B**

2002 FAD Requirements • DEP to execute Septic Maintenance Program contract with CWC to address septic system operation and maintenance • DEP to submit CWC program rules for Septic Maintenance Program • DEP to report semi-annually on Septic Maintenance Program
2007 FAD Requirements • DEP to work with CWC to continue and enhance program • DEP to work with CWC to modify rules to include pump-outs for septic systems within cluster systems • DEP to report semi-annually on Septic Maintenance Program

Purpose: This program started in the 2002 FAD. The Septic Maintenance Program is a voluntary reimbursement program intended to minimize septic system failures through regular pump-outs and maintenance. The program is open to homeowners in the West-of-Hudson Watershed who installed or replaced septic systems after January 1, 1997. With $1.5 million in funding, the program is voluntary and reimburses homeowners 50% of eligible costs to pump-out septic tanks.

Progress: In 2007, the program subsidized 60 septic tank pump-outs bringing the total number of septic system pump-outs since program inception to 295.

Recommendation: We believe the program has not reached full potential. Awareness of the program is an issue and increased education and outreach is needed to promote this program.

Sewer Extension Program **GRADE: B**

1997 MOA

- City to provide $10 million in Sewer Extension Funds to construct extensions to sewers serving City-owned WWTPs; funds used solely for costs to design, construct, and install sewer extensions serving City-owned WWTPs
- Municipalities must adopt a sewer use ordinance to qualify for funding
- City shall serve as program manager and disburse funds

2002 FAD Requirements

- Execute contracts for program in five communities (Hunter, Neversink, Roxbury/Grand Gorge, Shandaken/Pine Hill, and Middletown/Margaretville)
- Assist communities in adoption of sewer use ordinances
- Submit information assuring that future growth in service area will not exceed capacity of the connected WWTP
- Assess potential extensions of areas not selected for program by analyzing whether and how septic systems in those areas should be addressed
- Report semi-annually on program implementation

2007 FAD Requirements

- Complete construction of sewer extension projects in five communities (Roxbury/Grand Gorge, Shandaken/Pine Hill, Neversink, Margaretville, and a new extension in the Village of Hunter - Showers Road)
- Report semi-annually on program implementation, including adoption of sewer use ordinances

Purpose: This program was implemented to protect water quality by connecting existing residences and businesses to the sewer system serving City-owned WWTPs in areas where onsite septic systems are failing or likely to fail.

Progress: On January 31, 2008, DEP reported that the main success of the past year included commencing construction on sewer extensions in the Town of Neversink; moving forward with planning and design for an extension in the Town of Shandaken (near Hamlet of Pine Hill); and taking preliminary steps for an extension in the Town of Hunter.

Roxbury: DEP finished a second bidding process in early 2007, but the contractor withdrew in July 2007. DEP will re-bid the project in early 2008.

Neversink: DEP awarded a bid in February 2007 and construction started in June 2007; DEP expects construction to be complete by December 31, 2008.

Margaretteville/Middletown: DEP is reassessing whether to continue the program in these communities because of delays in obtaining necessary easements before starting

construction. The municipalities did adopt new sewer use laws last year, but DEP states they have made little progress providing necessary easements. DEP cannot estimate when construction might commence.

Shandaken: In late 2007 DEP and the Town signed an agreement to implement the program. This authorized design and construction of a sewer extension along Route 28 from the City's Pine Hill WWTP south for approximately three quarters of a mile. Plans are now 60% complete, and DEP expects construction to start in spring 2009 and to be completed in December 2009.

Hunter (Showers Road): In Fall 2007 initial steps were taken to start planning, with preliminary planning started in February 2008. DEP expects construction to start in Spring 2010.

Recommendation: There have been significant delays in the program and the rate at which these projects could be completed was overestimated. Sewer extensions are needed when failing septic systems cannot be repaired or replaced and full Wastewater Treatment Plants (WWTPs) are not practical. However, although the program is limited, careful monitoring is important given the concern that sewer extensions might induce sprawl development, particularly along the sensitive Route 28 corridor.

Alternate Design and Other Septic Programs **GRADE: B**

1997 MOA

- City to provide $3 million in Alternate Septic Funds for design, construction and installation of alternate design septic systems
- Funds to be used solely for design, construction, and installation costs of fill material and/or pumping apparatus in connection with the alternate design septics, where required solely to comply with the DEP Watershed Regulations
- CWC to administer and disburse funds; CWC may disburse no more than $3 million in total

2007 FAD Requirements

- This provision did not exist in the 2002 FAD
- City shall complete MOA obligation to fund eligible incremental costs to comply with DEP Watershed Regulations septic provisions, to the extent they exceed State and federal requirements
- City to report annually on implementation of program

Purpose: The Alternate Design Septic Systems Program provides $3 million to pay for the importation of fill material and/or pumping apparatus for construction of a septic system where required solely by DEP or its delegate in order to comply with the Watershed Rules and Regulations.

Progress: This is one of the least active programs. CWC reports that they get about one application every six months, and DEP reports that no applications were processed in 2007. The applications relate primarily to situations regarding poor soil percolation rates, or when a septic system is within a restricted buffer zone.

Recommendation: There has been little demand for this program, and very few applications that CWC has processed. CWC should be allowed to transfer funds from this program to other programs, consistent with the MOA.

3.2 New Sewage Treatment Infrastructure Program GRADE: B

1997 MOA

- City to provide $75 million in New Infrastructure Funds
- Funds may be used only in seven identified communities to construct new WWTPs or community septics
- NYS Environmental Facilities Corporation (NYSEFC) to administer and disburse New Infrastructure Funds allocated for new WWTPs or community septics
- CWC to administer and disburse New Infrastructure Funds allocated for creation of septic districts

2002 FAD

- DEP to work with identified communities to meet milestones
- DEP to assist communities with sewer use ordinances
- DEP to report semi-annually on implementation of New Infrastructure Program

2007 FAD

- DEP to ensure sufficient funding for Phoenicia and Hubbell Corners projects
- DEP ordered to work with communities and provide approvals in timely manner
- FAD established time frame to complete projects
- DEP to report semi-annually on progress in meeting milestones

Purpose: The MOA instituted a New Sewage Treatment Infrastructure Program through which the City will fund construction of new WWTPs or community septic systems, or the creation of new septic system districts for areas that are experiencing water quality problems due to failing individual residential septic systems. Existing private, commercial, and institutional WWTP flows in priority communities will be considered for diversion to regional WWTPs. The MOA identified, and prioritized, seven critical communities for this program: Hunter, Fleischmanns, Windham, Andres, Roxbury, Phoenicia and Prattsville.

Progress: The funding mandate in the 2007 FAD results from EPA and NYSDOH identifying funding required to address newly identified needs. Seven communities are in various stages of completing new WWTPs and they are all progressing. Roxbury and Andes are totally complete. Windham, Hunter, Fleischmanns, and Prattsville are functionally completed; remaining issues are some lateral sewage connections.

In Phoenicia, on February 3, 2007, residents rejected the referendum on the proposed sewer district formation. DEP, in coordination with State and Federal regulators, has extended the period by which Shandaken/Phoenicia would establish a sewer district until June 30, 2008. This time frame will allow the Town to work with constituents to gain the support needed for the project. Funding for the project ($17 million) is being maintained by DEP.

In Hubbell Corners, execution of the design/construction contract agreement will occur based on approval of the New Infrastructure Program Change Order authorizing an additional $1.5 million. The Change Order has been approved by CWC and is being processed. Upon notification of Advice of Award, NYSEFC will execute the design/construction contract language necessary to initiate the project.

Recommendation: The program has had serious delays, but significant progress has been made in the last few years to allow for the completion of six out of seven WWTPs (minor work remains). Overall, the program is finally moving along and we recommend that DEP to continue to complete the projects.

3.3 Community Wastewater Management Program GRADE: B+

1997 MOA

- New Infrastructure Funds (City to provide $75 million) also used to construct community septics and/or new WWTPs in 15 identified communities (known as the 8-22 communities from MOA ¶ 122)
- MOA established funding priorities

2002 FAD

- DEP to provide sufficient block grant funding to enable wastewater solutions for 5 prioritized communities
- City to execute contract with CWC for implementation of the program for these 5 communities
- DEP to report semi-annually on implementation, and quarterly on progress in meeting milestones

2007 FAD

- DEP to provide sufficient funding to complete projects in Bloomville, Boiceville, Hamden, Delancey, Ashland, and to complete construction in 3 additional communities
- DEP to (upon project approval) provide balance of block grant to CWC to improve flow of funding
- EPA, NYSDOH, and DEP will monitor adequacy of funding, and will specifically evaluate funding needs for 3 additional communities
- During second Five Year Period, City to provide sufficient additional funding to complete project for the five remaining communities as per the MOA
- DEP to report semi-annually on progress in meeting milestones
- DEP to convene meetings with EPA, NYSDOH, NYSDEC, and DEP to discuss progress, as needed/requested

Purpose: The Community Wastewater Management Program (CWMP) provides funding for the design and construction of community septic systems, including related sewer collection systems, and/or creation of septic maintenance districts in identified West-of-Hudson communities. CWMP also provide for septic system replacement, rehabilitation, and upgrades as well as operation and maintenance of the districts.

Progress: The CWC approved CWMP Rules in 2004 and retained an engineering firm to work with each of the participating communities. CWMP initially addressed wastewater needs in five communities – Bloomville, Boiceville, Hamden, DeLancey, and Bovina. In 2006, a sixth community, Ashland, was added to the program. The next three communities the 2007 FAD identifies are: Trout Creek, Lexington, and South Kortright. These communities will be solicited for participation in the CWMP during 2008. DEP agreed to provide an additional $37.2 million in funding to complete existing CWMP

projects and fund three additional CWMP projects. This brings total program funding to $53.2 million.

Projects are complete in Bovina and DeLancey. DEP expects construction to begin in Hamden and Bloomville in Spring 2008. The engineering firm hired by CWC is developing a preliminary WWTP drawing for Boiceville. For Ashland, GIS mapping is complete; CWC, DEP and the community need to reach an agreement on block grant amount and an approved project.

Recommendation: Despite initial delays and substantially underestimating the costs, the projects are now moving forward quickly. DEP should continue to work with watershed partners to ensure completion of the projects. We note that CWC, under its own initiative, played a pivotal role in moving this program forward.

3.4 WWTP Upgrade Program **GRADE: C-**

1997 MOA

- City to provide $75 million to upgrade all existing WWTPs in the watershed
- City to provide $5 million in SPDES Upgrade Funds
- SPDES Upgrade Funds to assist existing WWTPs to upgrade unreliable/failing equipment to facilitate the WWTP meeting its SPDES conditions, and where such upgrade is not required solely by the Watershed Regulations
- DEP to consult with CWC on which upgrade projects to fund
- NYS Environmental Facilities Corporation to administer and disburse these funds
- $400,000 of Upgrade Funds to be used to correct infiltration and inflow problems

2002 FAD

- DEP to work with NYSDEC to issue modified SPDES permit for subsurface discharging WWTPs
- DEP to work with NYSDEC to modify and issue SPDES permits for decommissioning and connection of existing WWTPs to other WWTP facilities
- DEP to report monthly on progress of all surface and subsurface WWTP upgrades

2007 FAD

- City to provide an additional $1 million in funding to pay for SPDES Upgrades at existing WWTPs in the West-of-Hudson watershed
- DEP to work with NYSDEC to modify and issue SPDES permits for decommissioning and connection of existing WWTPs to other WWTP facilities
- DEP to provide an upgrade schedule for a WWTP facility within 60 days of a determination that such upgrade is required per DEP's Watershed Regulations
- East of Hudson upgrades (Croton Falls and Cross River basins) now included in compliance schedule
- DEP to report monthly on milestones for both West-of-Hudson and East-of-Hudson milestones

Purpose: The Wastewater Treatment Plant (WWTP) Compliance/Upgrade Program is the main component of the City's management of enhanced point source pollution control in the NYC Watershed. Although the MOA created two separate programs, this program encompasses both regulatory upgrades and State Pollutant Discharge Elimination System (SPDES) upgrades. As part of this program, 102 non-City-owned WWTPs were to be upgraded to meet all of the requirements of the Watershed Rules and Regulations that go beyond the requirements of State and federal law, and SPDES permits modified to be consistent with the Watershed Rules & Regulations.

For existing WWTPs, regulatory upgrades typically include the following: sand filtration, disinfection (for plants with surface discharges, or with subsurface discharges greater than 30,000 gpd), phosphorus removal, and, for plants with surface discharges microfiltration or an approved equivalent. In some cases, instead of onsite upgrades of

existing WWTPs, the WWTP Upgrade Program decommissions existing WWTPs and connects them to new sewage treatment facilities which comply with the Watershed Rules and Regulations.

Progress: By the end of 2007, upgrades affecting 97% of the total flow for non-City-owned plants West-of-Hudson were functionally complete and operations began; upgrades representing 2% of total flow were in construction phase. Two projects represented the remaining 1% of the flow, one of which was finalizing design, while the other is awaiting the completion of the Boiceville Community Wastewater Project so that it could be connected to it. For the East-of-Hudson Croton Falls and Cross Rivers Basins WWTPs, upgrades affecting 82% of the total flow are functionally complete. In 2007, DEP disbursed $26.96 million to the 60 non-FAD projects in the East-of-Hudson watershed bringing the total committed to $151 million. Upgrades at City-owned plants, which accounted for more than one-third of the flow, were completed in 1999.

DEP will pay to put in new equipment and, for "public" WWTPs will pay for O&M for so long as the equipment remains required solely by the Watershed Regulations and not otherwise required by State or federal law. The Operation and Maintenance (O&M) payments with private owners were more difficult than envisioned. DEP will pay to put in new equipment and O&M for "useful life" (30 years or so). The Coalition of Watershed Towns (CWT) thinks the City should pay for upgrade and O&M in perpetuity and filed a lawsuit.

Recommendation: Although the plant upgrades are finally moving along, the low grade reflects the protracted timeframe required to meet this program, which was an integral part of the 1997 MOA. After pressure from the Watershed Inspector General, this program moved forward. However, DEP is still falling behind on the non-FAD East-of-Hudson upgrades and should step up efforts to upgrade these plants. While not a FAD requirement, these plants must be upgraded, as they are a requirement within the Watershed Rules and Regulations. For the O&M costs, DEP should agree to fund the costs for all of the plants upgraded in the watershed as directed in the MOA.

3.5 Stormwater Programs

MOA and FAD stormwater programs consist of a Stormwater Retrofit Program and a Future Stormwater Controls Program.

Stormwater Retrofit Programs **GRADE: A**

1997 MOA

- City to provide $7.625 million in Stormwater Retrofit Funds
- These funds to be used to pay costs of implementing stormwater best management practices (BMPs) to address existing stormwater runoff in areas with impervious surfaces to reduce pollutant loading and/or erosion
- CWC to administer and disburse the Stormwater Retrofit Funds
- CWC and DEP to prioritize and select sites for stormwater BMPs

2002 FAD

- DEP to provide additional funding to Stormwater Retrofit Program to sustain the program's historical project activity level
- City to fund and develop a new component of the Stormwater Retrofit Program that will support community-wide stormwater infrastructure assessments and planning
- City to develop and implement strategy to address stormwater emergencies on non-City owned land
- City to report annually on implementation of the program

2007 FAD

- DEP to provide additional funding to sustain the program's historical project activity level
- City to continue to fund this program to support performance of community-wide infrastructure assessments and planning
- DEP to work with CWC

Purpose: The Stormwater Retrofit Program, administered jointly by the CWC and DEP, is to support the design, construction and maintenance of measures called best management practices (BMPs) that address existing sources of stormwater runoff in the Catskill/Delaware Watershed where it's necessary to correct or reduce existing erosion and/or pollution.

Progress: On January 31, 2008, DEP reported that the total program budget had risen to $20,541,800: $15,048,050 for capital expenditures, $2,993,750 for maintenance activities, and $2,500,000 to conduct community-wide stormwater infrastructure assessment and planning initiatives. During the period from 2002 through 2007, CWC and DEP reviewed and approved for funding fifty-eight construction grants for a total of $10,644,579. Thirty-four projects have been completed utilizing $5,719,934 of program

funds, focusing on street drainage, stormwater separation, and stormwater treatment and highway maintenance activities.

Planning and assessment project applications now have an "open" enrollment period. Completed projects provide a basis for future capital construction projects. During the period through 2007, 15 planning and assessment projects were reviewed and approved with a total funding allocation of $549,549. As of January 31, 2008, 5 planning and assessment projects have been completed, for a total expenditure of $164,760.

Recommendations: This is a competitive grant program to provide funds to correct or reduce water quality problems associated with erosion or substandard stormwater management conditions existing on or before January 21, 1997. While the program got off to a slow start, CWC has reworked the program and now anybody can apply at anytime, which allows them to review and address issues more effectively. They also reduced the match program to 5% from 15% and even waived some overarching requirements for the program. Despite a slow start, this program is moving along well and should continue to address BMP issues.

Future Stormwater Controls Program **GRADE: B**

1997 MOA

- City to provide $31.7 million in New Stormwater Funds (commonly referred to as the Future Stormwater Controls Program)
- Funds used to implement new stormwater measures pursuant solely to requirements of DEP's Watershed Regulations
- CWC to administer and disburse these funds
- CWC may transfer New Stormwater Funds to (i) New Infrastructure Funds (to fund community septics); (ii) Septic Program Funds (to rehabilitate septic systems); (iii) Stormwater Retrofit Funds (to implement stormwater BMPs); and (iv) Stream Corridor Funds (to implement stream corridor protection)
- CWC must transfer funds if principal and earnings exceed $20 million

2002 FAD

- City to continue to provide support through existing funding commitments
- City to develop and implement strategy to address stormwater emergencies on non-City owned land
- City to report annually on program

2007 FAD

- DEP to complete MOA obligation to fund eligible incremental costs of DEP's Watershed Regulations
- City to enter into contract with CWC to provide additional funding, during the first five-year period, for one additional engineering position at CWC
- City to review effectiveness of new position and make recommendation to EPA/NYSDOH of whether to continue during second five year period; primacy agency to make final determination whether to continue
- City to report annually on Future Stormwater Controls Program implementation

Purpose: The Future Stormwater Controls Program pays for the incremental costs of stormwater measures required solely by NYC Watershed Regulations. It provides funds for the design, construction and maintenance of stormwater measures included in stormwater pollution prevention plans and individual residential stormwater plans for new construction after May 1, 1997. The MOA mandated a tremendous amount of funding for this program. There are two separate programs to help offset compliance with the NYC Watershed Regulations: (i) the CWC administered program reimburses municipalities and large businesses 100%, and small businesses 50% for eligible costs; and (ii) the City reimburses low income housing projects and single family homeowners 100% and small businesses 50% for eligible costs.

Progress: As of January 31, 2008, the City has fulfilled its funding obligations to CWC; $31,700,000 has been paid. As of that date, $ 2.6 million has been allocated to

construction, $113,750.79 to maintenance funding, $10 million transferred to other eligible watershed protection programs, and over $18 million remains to be allocated. In February 2008, CWC Board approved a contract in which DEP provides CWC $240,000 over five years for a CWC stormwater technical assistant to assist applicants in complying with DEP regulations and coordinate with CWC regarding eligible funding. The City has yet to approve this contract. CWC intends to hire from within and acknowledges the difficulty in hiring and retaining professional engineers.

Recommendation: This is a demand-driven program and, to date, it is under utilized and over funded, which is why money is always borrowed from it. In approving stormwater plans, DEP should clearly identify "City-only requirements" to help applicants and CWC identify which costs can be paid from the Future Stormwater Fund. Going forward, DEP and DEC should allow CWC to be involved in discussions and meetings regarding stormwater plans to better determine which costs are eligible for funding from the Future Stormwater Fund.

FAD Section 4: Protection and Remediation Programs

4.1 Waterfowl Management Program **GRADE: A**

1997 FAD

- DEP to continue to implement Waterfowl Management Program in the Kensico Reservoir basin (first instituted in 1993)

2002 FAD

- DEP will conduct bird monitoring at Ashokan, Rondout and West Branch Reservoirs biweekly at a minimum, with the expectation that this frequency will increase
- DEP will conduct bird monitoring at Croton Falls and Cross River Reservoirs on a biweekly basis, with increased monitoring prior to use of a reservoir pump system
- DEP will implement Avian Management component at Ashokan, Rondout, and West Branch Reservoirs based on specific criteria
- DEP will implement Avian Management component at Croton Falls and Cross River Reservoirs one month prior to City's use of the Reservoirs' pump stations
- DEP to report annually on implementation and analysis of all elements

2007 FAD

- Program expanded to include Hillview Reservoir
- DEP will perform avian population monitoring
- DEP to continue active bird harassment in Kensico, and "as needed" in West Branch, Rondout, Ashokan, Cross River, Croton Falls, and Hillview Reservoirs
- DEP to submit annual summary of Watershed Management Program, including implementation and analysis of all program elements

Purpose: The management of waterbird populations at coliform-restricted reservoirs throughout the New York City water supply is essential to meet stringent water quality regulations, as stated in the SWTR of 1991. The Waterfowl Management Program was established to quantify and reduce the level of pollutant impact associated with birds on the water supply. The objective is to minimize fecal coliform loads to the reservoirs through three activities: (i) bird population monitoring; (ii) bird deterrence activities; and (iii) bird harassment.

Progress: In its July 2007 annual report, DEP concluded that low waterbird counts at the Kensico Reservoir and other reservoirs (those managed "as needed") can be attributed directly to a variety of bird dispersal techniques. DEP believes when these dispersal tools (motorboats, Husky Airboats, and pyrotechnics) are used in concert, they result in the most effective means of bird reduction over large open areas of drinking water. As of July 2007, it remains inconclusive whether a tolerable number of waterbirds can be considered acceptable at the Kensico before water quality is compromised; therefore, the

objective of the Waterfowl Management Program is to continue with the elimination of all roosting birds during the bird migratory seasons for the Kensico and on as "as needed" basis for reservoirs that source to the Kensico.

DEP also reported that a fish deterrence mechanism might decrease bird activity, particularly at the effluent structures at the Ashokan, Rondout, West Branch, and Kensico Reservoirs. DEP has determined that boat and pyrotechnic harassment measures were often futile when the food was available to the birds. DEP has incorporated the construction of such a system in its new Waterfowl Management contract expected to begin August 1, 2007. Fecal coliform levels still indicate there is a strong seasonal relationship at Kensico, West Branch, Rondout, Ashokan and Croton Falls Reservoirs.

Recommendation: Overall, this is a successful program that now should be enhanced and expanded. The Ashokan Reservoir had real problems with roosting birds and the program has been useful to reduce this population. Now, the Pepacton Reservoir as well as the other reservoirs within 60-day travel time should have similar programs.

4.2 Land Acquisition Program

The Land Acquisition Program (LAP) is split between the Catskill/Delaware Watersheds and the Croton Watershed. We discuss and grade each program separately.

Catskill/Delaware Watershed Land Acquisition **GRADE: B-**

1997 MOA and FAD

- FAD required DEP to immediately and continuously implement the LAP described in detail in the MOA
- City to commit $250 million for land acquisition in the Catskill/Delaware Watershed
- MOA mandates "willing buyer/willing seller" acquisition process and forbids City from using eminent domain to acquire land under the LAP
- MOA established specific solicitation goals and priority areas

2002 FAD

- DEP to continue to implement the LAP in accordance with MOA
- City to resolicit landowners, especially in high priority areas
- Established additional, detailed solicitation requirements
- EPA and NYSDOH to determine whether DEP will establish an additional $50 million for land acquisition, bringing aggregate to $300 million
- City to report quarterly on land acquisition efforts

2007 FAD

- City to continue the LAP with several modifications and enhancements
- City to provide an additional $241 million in new funding
- City to develop strategy to use land trusts and other NGOs to identify and help City acquire land
- DEP to provide additional $6 million to Watershed Agricultural Council for conservation easement pilot program on forested portions of non-agriculture land
- City to provide additional $500,000 in Local Consultation Funds to allow West-of-Hudson towns and villages to review and comment on proposed acquisitions
- City to reevaluate solicitation plan; must solicit at least 50,000 acres annually
- City to request/apply for water supply permit from NYSDEC covering a ten-year term, by January 21, 2010
- Report semi-annually on the LAP

Purpose: Land acquisition is one of the most effective and important tools in watershed protection. Unlike the City's Watershed Rules and Regulations, which curb current pollutant loading, land acquisition prevents future contamination of the water supply. The goal of this program is to ensure that undeveloped, environmentally sensitive lands remain protected and that the watershed as a whole continues to be a source of high-quality drinking water. To date, the City has pursued land acquisition using three

techniques: (i) fee simple acquisitions (outright purchases); (ii) conservation easements; (iii) and Watershed Agricultural Easements (the City funds conservation easements purchased by the Watershed Agricultural Council (WAC) on property that is actively farmed). The MOA established a priority ranking for land acquisition, based upon the location of land with respect to the reservoirs and a set of natural features criteria.

The 2007 FAD imposed several new requirements on DEP, including the new $241 million commitment and development of a plan to increase the use of land trusts.

Progress: DEP has increased the amount of land it owns or has under its control since the signing of the MOA. In 1996, roughly 3.5% of the watershed was owned by the City; today, roughly 11.5% is City-controlled or owned. As of December 2007, the program had protected 83,096 acres of land in the Catskill/Delaware Watershed through the acquisition by fee simple and of conservation easements, bringing the total acres under City control to 118,605 acres.

Solicitation:

DEP met the MOA solicitation requirement of 355,050 acres in 2004. The 2007 FAD required a new solicitation plan, which established benchmarks for 2007 of 30,000 acres for new solicitations (land previously unsolicited) and 56,500 acres for resolicitation. These goals were met and exceeded during 2007. As of 2008, a combined solicitation and resolicitation goal of 86,500 acres was exceeded by 19,012 (22%), bringing the solicitation total to 105,512 acres.

DEP's 2007 Land Trust Strategy:

DEP reports that of the 900 land transactions since 1997, only 1% have involved land trusts. In its recent Land Trust Strategy, the DEP announced plans to allocate $44.25 million from the City's existing commitment to fund the Land Trust Strategy.

DEP's new strategy is its first step to expand partnerships with land trusts and other NGOs, with the principal goal to protect more land. DEP envisions: (i) land trusts used to acquire land and then convey it to DEP (particularly foreclosures, land from non-responsive landowners, and smaller parcels abutting DEP land); (ii) land trusts acquiring land to hold long-term; (iii) land trusts acquiring conservation easements and holding them; and (iv) using land trusts to help with public outreach, capacity building, and land trusts monitoring/managing DEP lands.

Recommendations:

Tax Payments:

DEC should settle on payment of reasonable real property taxes to West-of-Hudson municipalities. In November 2007, the CWC passed a resolution declaring tax

assessment litigation over City-owned property "the most important issue presently facing the West-of-Hudson Watershed."

Increase Use of Land Trusts:

DEP should make must greater use of land trusts. DEP reports that of the 900 land transactions since 1997, only 1% involved land trusts. DEP reports it is difficult for land trusts to function side-by-side with DEP because of the complexity of the program and the City's administrative requirements. We believe that Land Trusts purchasing lands that will then be turned over to the City does not violate the spirit of the MOA. Therefore, DEP should revise its 2007 Land Trust Strategy so that a land trust can independently acquire land and subsequently transfer it to DEP. If the City considers the Land Trusts to be an agent of the City, then they should execute a Memorandum of Understanding with land trusts to clarify this issue. There should be confirmation for West-of-Hudson towns that land the City acquires through a land trust will not be tax exempt.

Conservation Easements:

The advantage of conservation easements is reduced capital protection costs. Conservation easements protect twice as many acres per dollar, and stewardship costs are much cheaper than for fee acquisition lands. Also, the continued private ownership helps maintain the local economic base. DEP's easement program in the Catskill/Delaware Watersheds includes 95 easements, equaling 13,837 acres closed or under contract. The limitation is that easements are often seen as only a partial solution. The current easement language does not have broad appeal for landowners and should be amended to make them more user-friendly.

We note that DEP conservation easements differ from WAC conservation easements. DEP's conservation easements are generally standard conservation easements; however, WAC's conservation easements are dual-purpose easements that seek to protect water quality while also protecting agricultural land and the regional farming economy. Even though WAC is a stand-alone entity, DEP exerts tremendous control over WAC because of DEP funding. A concern in the farming community is that WAC easements take a long time (18-24 months) to process. DEP should give WAC greater freedom to execute conservation easements.

Croton Watershed Land Acquisition **GRADE: C-**

1997 MOA and FAD • City to commit $10 million over ten years to acquire land in the Croton Watershed • MOA established specific solicitation goals and priority areas
2002 FAD • City to continue to implement Land Acquisition Program (LAP) in accordance with MOA

Purpose: Land acquisition is one of the most effective and important tools in watershed protection.

Progress: While the MOA originally committed the City to provide $10 million for acquisition, over time that fund was increased to $38.5 million, with all of this money nearly spent. As of February 2008, acquisition efforts in the Croton Watershed have virtually ended. A total of 23 projects (1,620 acres) were acquired using these funds, with two projects (286 acres) remaining under contract yet to close. In addition, approximately 850 acres were protected using NYC funding from sources external to the LAP's Croton funding source, primarily from Water Quality Infrastructure Program (WQIP) funds.

Recommendation: DEP should step up its efforts to acquire land in the Croton Watershed. DEP's willingness to work in partnership with others is welcomed in the Croton Watershed, and should serve as an example for future land acquisitions. DEP should also be willing to accept conservation easements in the Croton Watershed, something it has recently declined to do.

A multi-barrier approach must be reinstituted in the Croton Watershed. We note that while the City has spent $38.5 million on land acquisition in the Croton Watershed, property values East-of-Hudson are typically much higher than those West-of-Hudson. This sum is a mere fraction of the now estimated $2.8 billion for the Croton filtration plant. Moreover, protecting land through the LAP is entirely consistent with the goal of maintaining a multi-barrier approach to protect New York City drinking water in the Croton Watershed. Source water protection will also help reduce the filtration plant's future maintenance and operations costs.

4.3 Land Management Program GRADE: B-

2007 FAD

- 2007 FAD contained a new land management section, in recognition of the City's growing holdings of watershed land, that expanded stewardship responsibilities for conservation easements
- City must monitor water supply lands, monitor and enforce conservation easements, maintain a watershed land information system, develop and submit a forest management plan (EPA, NYSDOH, and NYSDEC have the right to comment on this plan)
- City must submit annual reports on all aspects of the land management plan

Purpose: Shortly after signing the MOA, the City owned 84,000 acres of water supply lands, but by 2012 this landholding is expected to reach 150,000 acres held in fee, and 20,000 acres held in easements. Given this sharp increase in City-owned lands, it is imperative that these lands are well managed in order to control activities harmful to the drinking water supply. As part of the program, all City-owned lands are inspected as per the DEP Monitoring of City-owned Water Supply Policy. The policy not only outlines procedures for inspections but also addresses boundary maintenance, encroachments, hazards, and improvements. The types of property inspections are broken down into four categories, which include full inspections, focused inspections, site visits, and aerial inspections. Another component of property management is the painting of property boundary lines.

Progress: This is a new FAD requirement. The City intends that its management approach will have six areas of concentration: (i) property management; (ii) natural resources (managing forests and wildlife); (iii) recreational use (opening up City lands for public use, such as fishing, hunting, and hiking); (iv) land acquisition assistance; (v) land use permits for City lands; and (vi) conservation easements (monitoring the City's easements).

In its recent FAD annual report, DEP outlined a strategy to meet this new FAD requirement, including utilizing its geographic information system (GIS) technology (Watershed Land Information System – WaLIS).

Recommendations: We hope DEP follows through on this program. We believe this is a welcome FAD requirement, although it is too soon to tell how far they have come in meeting its goals.

DEP recently proposed amendments to its recreational rules to allow greater public access and use. This is a positive change, but it took years of discussion with DEP to achieve. While DEP initially failed to consider options in the spirit of cooperation that the MOA embodies and requires, it has since been open to discussing the issue with the Watershed communities, CWC, other stakeholders and the NYSDEC, and has made significant progress, for which we commend them.

Recently, DEP agreed to discuss planning a pilot program to allow increased boating access on the Cannonsville Reservoir. We support the need to maintain and enhance the economic vitality and social character of the Watershed communities. However, we also understand the need for water quality protection. Achieving this balance was perhaps the MOA's greatest accomplishment. We urge DEP to continue to strike this balance as it formulates this pilot program.

4.4 Watershed Agricultural Program (WAP) GRADE: A

1997 MOA and 1997 FAD

- 1997 FAD identified that the City provided the Watershed Agricultural Council $35 million to fund the WAP through 1999
- 1997 FAD required continuation of the WAP and an evaluation every two years

2002 FAD

- Clarified when a Whole Farm Plan is "substantially implemented"
- Established a schedule for individual Whole Farm Plans to be complete
- Recognized the Small Farms Program
- DEP to submit a five year plan
- DEP to evaluate WAP biennially, and submit other reports

2007 FAD

- 90% of all active large farms in West-of-Hudson watershed must have substantially implemented Whole Farm Plans
- City to enhance WAP through three new commitments: (i) City to evaluate potential of Precision Feed Management Program; (ii) City to continue Nutrient Management Credit in Cannonsville basin; and (iii) City to provide additional $250,000 for stewardship of Watershed Agricultural Easements
- City to continue farmer education and outreach
- City to submit comprehensive annual report and five-year plan
- City to prepare programmatic strategy for BMP replacement
- City to submit a Small Farms Assessment Report
- City to solicit 200 new acres in Conservation Reserve Enhancement Program (CREP) annually
- City to develop new Whole Farm Plans and Forest Management Plans in East-of-Hudson Watershed
- City to continue acquiring Farm Easements under the Land Acquisition Program
- City to publish draft agricultural regulations

Purpose: The overall objective is to prevent pollution and improve water quality by reducing pollutant runoff from farms (non-point source pollution) through implementation of best management practices (BMPs). The NYC-funded Watershed Agricultural Program (WAP) was developed jointly by New York City and the farm community in 1992 in order to avoid the need for regulatory controls on agricultural operations in the Watershed. WAP is administered locally by the Watershed Agricultural Council (WAC) and uses funds provided in large part by DEP. A secondary objective of the WAP is to conduct scientific research in support of BMPs utilized in the Watershed. The program is based on voluntary farmer participation in the development and implementation of Whole Farm Planning.

Progress: WAC has exceeded its 85% large farm participation goal and is actively implementing its Small Farms Program. As of 2007, 293 out of 307 commercial farms signed up for the program – a 95.7% participation rate. Of these large and commercial farms, 288 farms have started implementation and 243 have substantially implemented Whole Farm Plans (79.4%).

For small farms, as of 2007, WAC had approved 55 Whole Farm Plans, and 41 of these have commenced BMP implementation. A total of 595 BMPs have been implemented on small farms to date at a cost of more than $2 million.

On January 31, 2008, DEP submitted its WAP five-year plan in accordance with the 2007 FAD. The main objective of the five-year plan, covering the period of 2008 to 2012, is to complete the transition from the initial period of farm planning and implementation to focusing on maintenance of plans and the thousands of BMPs and systems implemented through the program.

This five-year plan identified four tasks in support of non-point source protection: (i) support and monitor BMP's West-of-Hudson; (ii) implement new or replace BMPs West-of-Hudson; (iii) develop new Whole Farm Plans West-of-Hudson; and (iv) develop new Whole Farm Plans East of Hudson. On February 28, 2008, DEP affirmed it had made the Nutrient Management Credit available to 80 farms in the Cannonsville basin, covering over 25,000 acres, for the first five-year period of the 2007 FAD.

Croton Agricultural Program:

The 2007 FAD includes a new East-of-Hudson goal of no less than six Whole Farm Plans per year. Since the 2007 FAD was issued in July, WAC has approved five new Whole Farm Plans for East-of-Hudson farms. To date, a total of 38 Whole Farm Plans have been approved on East-of-Hudson farms through 2007, of which 33 have commenced implementation. During 2007, a total of 52 BMPs were implemented on East-of-Hudson farms at a cost of $262,147. To date, a total of 277 BMPs have been implemented on East-of-Hudson farms at a cost of $1.55 million.

Recommendations: This program is doing well and WAC has effectively managed this voluntary program. Phosphorus and pathogens from manure disposal was the key issue and the goal was to keep the topsoil on farmland and teach farmers to do farming a new way. The other key issue was preservation--protect farms to keep from them being developed. Now, the program is at a crossroads because many BMPs are old and will soon be in need of rehabilitation or replacement. Also, maintenance contracts with farmers will expire soon. We believe that as they go forward the emphasis should be on prioritizing BMPs so that the critical ones can be addressed first. In addition, given the success of the entire program, we believe greater effort should be placed on keeping farms in business. Through these WAC programs, farms have been key players in protecting water quality and that should be encouraged.

4.5 Watershed Forestry Program

GRADE: B+

1997 MOA

- City to provide $500,000 in Forestry Funds for a Forest Management Program West-of-Hudson
- Forestry Funds used solely to fund forestry projects and programs to promote forestry practices that protect the drinking water supply from run-off and other pollution
- Watershed Agricultural Council (WAC) to administer and disburse Forestry Funds

2002 FAD

- City to continue Forestry Program and report semi-annually on logger training, research and education, Forest Management Planning, and BMP implementation
- City to evaluate implementation status of forest management plans annually

2007 FAD

- Continue enrolling eligible landowners in WAC forestry program and develop new Forest Management Plans; continue evaluating implementation status; complete and evaluate Management Assistance Program (MAP) pilot; expand MAP on a watershed-wide basis
- BMP implementation: complete road BMP projects and forestry BMPs annually
- Logger and Forester Training: conduct workshops and support annual training
- Model Forest Program: continue research/development, conduct education events, and establish East of Hudson model forest
- Watershed Forestry Education Program: conduct annual programs; support annual invasive species education programs
- Submit annual Watershed Forestry Program report
- Submit annual five-year implementation status report of WAC Forest Management Plans
- Submit MAP pilot project evaluation report on December 31, 2008

Purpose: The primary objective of this program is to maintain unfragmented forested land and promote the use of management practices to prevent non-point source pollution during timber harvests. Forests cover more than three-quarters of the Watershed land area; however, landowners face continual pressure to sell or convert parcels for development and other less desirable uses. In addition, invasive pests, plants and pathogens threaten the long-term ecological health of forests. The Forestry Program is a voluntary partnership between the City and the forestry community that supports and maintains well-managed forests as a beneficial land cover for water quality protection.

Progress: Because the program is voluntary, a good measure of success is the ongoing degree of participation. After the 2002 FAD, the program grew in scope. To date, 684

plans have been completed covering 121,458 total acres, of which an estimated 94,800 acres are forested. These figures include 50 plans covering East-of-Hudson properties. Over 1,500 loggers and foresters have attended one of WAC's 150 professional training workshops, and several thousand people (landowners, local officials, teachers/students, community groups, etc.) have participated in forestry education programs since the signing of the MOA.

Management Assistance Program (*MAP*):

In 2005, WAC initiated the MAP as a two-year pilot project. The MAP provides Watershed landowners up to $2,500 in funding to implement certain forestry practices recommended in their WAC plans, such as timber stand improvement, tree planting (including tree shelters and deer fencing), riparian improvements and wildlife improvements. To date, 115 projects have been approved. Of those, 7 were cancelled by landowners and 70 have been completed.

Model Forests:

During 2007, WAC partnered with SUNY College of Environmental Science and Forestry (ESF), Cornell Cooperative Extension, Frost Valley YMCA, DEC, and others to coordinate and support the following three watershed model forests: Lennox Model Forest (Delaware County), Frost Valley Model Forest (Ulster County), and Siuslaw Model Forest (Greene County). DEP supports the continuation of the model forest program, with a renewed focus on selecting sites that promote interpretive education and watershed forestry demonstrations.

Recommendation: We commend WAC for their partnerships and increased educational programs and encourage it to increase these efforts. However, we believe DEP should support amending the state tax benefits for forest management, the 480a program, to allow for preservation of forest lands as well. We are pleased to see that Mount Nimham in Putnam County is no longer considered a viable area given its close proximity to the nearby Amawalk Reservoir and strong environmental and community opposition.

4.6 Stream Management Program

GRADE: B

1997 MOA

- City to provide up to $3 million in Stream Corridor Funds for West-of-Hudson stream corridor protection
- Stream Corridor Funds used solely to implement stream corridor protection projects West-of-Hudson, such as streambank stabilization and fish habitat improvements
- City to administer the $3 million in Stream Corridor Funds; DEP shall select projects and allocate funds
- CWC to administer and disburse and Stream Corridor Funds transferred from New Stormwater Funds and Alternate Septic Funds

2002 FAD

- Included enhanced Stream Management Program with additional focus on restoration projects, stream management plan completion, and scientific review
- Established detailed schedule to complete Stream Management Plans and Restoration Projects for specific streams, including the Esopus and Schoharie Creeks
- City to submit semi-annual reports on status of Stream Management Program
- City to submit a final Stream Management Program evaluation
- City to submit detailed report by July 2004 on efforts to protect riparian buffer areas including acquisition, CREP, watershed regulations, stream management plan, and forestry program

2007 FAD

- DEP to complete/submit outstanding 2002 FAD deliverables
- Current FAD places greater emphasis on implementation of stream management plan recommendations through establishment of a new funding program (to be established by March 31, 2008)
- Program enhanced through addition of seven new stream restoration projects and two new Stream Management Plans
- Established detailed schedule to complete Stream Management Plans and restoration projects
- City to provide at least $2 million for implementation of stream management plan recommendation in Ashokan basin
- City to develop and distribute flood insurance rate maps for West-of-Hudson watershed with NYSDEC
- City to submit annual report evaluating overall progress
- City to submit biennial "action plan" for implementing stream management plan recommendations
- City to submit Conine Water Quality Report by December 31, 2012
- City to convene semi-annual progress meetings with EPA, NYSDOH and NYSDEC

Purpose: The overall objective of the Stream Management Program is to increase stream system stability through development and implementation of stream management plans and demonstration projects, and to enhance long-term stream stewardship through increased community participation. The program is included in the FAD, because EPA expects that stabilizing streams will provide multiple environmental benefits including overall water quality improvement and turbidity reduction through decreased streambank erosion. The program has five goals: (i) create stream management that is watershed-scale, multi-objective, and community-based; (ii) promote a stream stewardship ethic; (iii) prepare and implement Stream Management Plans in priority basins; (iv) implement stream restoration demonstrating BMPs in priority basins; and (v) develop and distribute regional stream morphology databases to support stream management decisions.

Progress: DEP and its partners have completed 8 of 9 stream management plans and 11 stream restoration demonstration projects. Since 1997, DEP and its partners have overseen or assisted 26 stream restoration projects applying natural channel design principles in the West-of-Hudson Watershed. DEP has contracted with each of the four counties in the West-of-Hudson Watershed to evaluate local stream corridor conditions and inventory programmatic or policy constraints to advancing regional sound stream management principles, and develop stream management plans. The program has completed the East Branch Delaware Stream Management Plan and associated demonstration stream restoration project at Margaretville, and the Conine stream restoration project in the Batavia Kill watershed.

Recommendation: This critical program has not achieved previous FAD deliverables nor reached its full potential largely due to inadequate funding and staffing. Although DEP attributes the bulk of the turbidity problem to the natural landscape of the Catskill region where clay soils are eroded by heavy runoff events, human activity causes channel modifications and land use changes that can induce or exacerbate erosion. Thus, significant funding and effort must be put into the existing Stream Management Program.

4.7 Riparian Buffer Protection Program GRADE: A

2007 FAD

- DEP to continue existing programs protective of riparian buffers, including watershed regulations, farm and forest programs, land acquisition, and stream management
- DEP to evaluate Conservation Reserve Enhancement Program (CREP), including recommendation for better distribution of CREP throughout watershed
- DEP to develop streamside assistance program throughout watershed to provide technical assistance to streamside landowners
- DEP to require enhanced management agreements for all current and future stream restoration projects
- DEP to develop enhanced education, outreach, and marketing strategy for riparian landowners
- DEP to report annually on all elements of Riparian Buffer Protection Program

Purpose: This is a new initiative under the 2007 FAD, committing the City to continue riparian buffer protection efforts through existing programs as well as initiating selected program enhancements. Enhancements will be watershed-wide in scope, focusing on improving riparian buffer protections along privately owned streams. Communication between landowners and riparian buffer protection experts, along with coordination of the other watershed protection programs, is essential to success of Riparian Buffer Protection. This program will focus on riparian landowners who are not covered by other riparian protection programs.

Progress: The program has just started, and despite DEP's reluctance to include this in the FAD, they are making headway.

Recommendation: This program represents the progressive idea of tying together several programs, and also serves as an important catchall. In the spirit of cooperation that the MOA embodies, DEP must demonstrate a willingness to work cooperatively with the Catskill Watershed Corporation (CWC) for this program to succeed. Land trusts can also play an integral role in securing conservation easements on riparian buffers and DEP should actively work with them.

4.8 Wetlands Protection Program

GRADE: B+

2002 FAD

- DEP to complete Wetland Characterization and Preliminary Assessment of Wetland Function methodology for all Catskill/Delaware basins
- DEP to complete wetland mapping and trend analysis
- DEP to submit annual reports on implementation of Wetlands Protection Program
- Upon completion of Stream Management Plans, DEP shall identify which riparian areas are critical to water quality protection and provide funding to ensure long-term protection
- DEP shall consult with U.S. Fish & Wildlife Service (USFWS) to determine whether wetland projects are eligible for USFWS programs; if so, DEP shall provide funding to assist implementation

2007 FAD

- DEP to continue implementation of Wetlands Program
- DEP to continue monitoring West-of-Hudson reference wetlands to assess wetland functions
- Continue review of federal, State, and municipal wetland permit applications to ensure wetland impacts in the watershed are avoided, minimized or mitigated to preserve water quality functions
- Revise Wetlands Protection Strategy by December 31, 2007 to reflect programmatic changes in 2007 FAD
- Complete West-of-Hudson Status and Trends Study
- Review and revise 1993 MOU between DEP and NYSDEC related to Article 24 freshwater wetland permit to enhance coordination between the agencies
- Report annually on Wetlands Strategy

Purpose: Wetlands play a major role in watershed protection. Critical functions include the ability to maintain good surface water quality in watercourses and reservoirs and to improve degraded water. Wetlands also moderate peak runoff, recharge groundwater and maintain baseflow in watershed streams. The City's Wetlands Protection Strategy includes research and mapping programs, wetland status and trends, wetland monitoring and functional assessment, land acquisition, and watershed agricultural programs.

Progress: On December 31, 2007 DEP issued its Wetlands Protection Strategy update, pursuant to the 2007 FAD. In it DEP stated its intent to continue and advance its 2002 Wetlands Protection Program. DEP stated its revised strategy combines wetlands mapping and research with regulatory and voluntary programs. Of the 14,046 acres of wetlands in the Catskill/Delaware Watershed, DEP has acquired or protected 1,662 acres. Of the 16,290 acres of wetlands in the Croton Watershed, DEP has acquired or protected 100 acres.

Recommendation: State law protects only wetlands greater than 12.4 acres in size or those that a specially designated as being of "unusual local importance"; DEP should continue to fill the gap by protecting wetlands that do not meet this size requirement. Wetlands protection in the West-of-Hudson Watershed needs to be jumpstarted as most wetlands are in floodplains. The U.S. Army Corps of Engineers (ACOE) is the primary enforcer of wetlands, and both the NYSDEC and DEP should get ACOE involved earlier in the project review process. There needs to be greater coordination among agencies and municipalities for wetlands that don't qualify for State protection.

Additionally, DEP should acquire more wetland properties in the Croton Watershed.

4.9 East of Hudson Non-Point Source Management Program GRADE: C+

1997 MOA

- City to provide $68 million in East-of-Hudson Water Quality Funds to support a program of water quality investments East-of-Hudson
- East-of-Hudson Funds used solely to pay costs of sewage diversion projects, water quality measures identified in Croton Plan, replacement of subsurface sewage treatment systems, community septic systems, stormwater BMPs, new sand and salt storage facilities, stream bank stabilizations, and other purposes DEP approves
- East-of-Hudson Funds distributed to Westchester County ($38 million) and Putnam County ($30 million)

2002 FAD

- DEP to implement East-of-Hudson program elements for West Branch, Boyd's Corner, Croton Falls and Cross River Reservoir basins
- City to work with U.S. Department of Agriculture to implement Conservation Reserve Enhancement Program (CREP) East of Hudson
- City to complete and submit impervious surfaces report
- City to complete and implement Croton Watershed Strategy
- DEP to aggressively implement Watershed Rules and Regulations
- DEP to report semi-annually on implementation of strategy
- DEP to submit conceptual and final East-of-Hudson Non-point Source Management Plan
- DEP to report semi-annually on implementation of East-of-Hudson Non-point Source Plan

2007 FAD

- DEP to continue East-of-Hudson stormwater facility maintenance
- FAD detailed schedule of stormwater remediation and retrofit projects
- DEP to assess and prioritize East-of-Hudson stormwater projects on DEP-owned land
- DEP to complete stormwater mapping and inspection
- DEP to establish a $4.5 million program to address stormwater pollution in Croton Falls and Cross River basins and upstream basins; funds used for grants to stormwater districts to reduce stormwater loading; completed projects may be used to comply with NYSDEC requirements for Municipal Separate Storm Sewer Systems (MS4)
- EPA and NYSDOH to entertain joint proposal from DEP and DEC to allocate part of the $4.5 million towards a public benefit corporation to assist with MS4 compliance
- DEP to continue East-of-Hudson Septic Program
- DEP to submit East-of-Hudson Non-point Source Report annually

Purpose: This program addresses non-point source pollution in the Catskill/Delaware Watershed basins located East-of-Hudson. DEP's comprehensive plan was designed to reduce non-point sources of pollution. Other elements of the plan include efforts by the City (Croton Watershed Strategy) and Westchester and Putnam counties to provide for integrated watershed management to improve water quality in these reservoirs. The East-of-Hudson Non-point Source Pollution Control Plan targets the following: (i) long-term operation and maintenance of stormwater management facilities; (ii) stormwater data collection; (iii) assessment and prioritization of criteria (to construct stormwater facilities on City property); and (iv) reduction of potential pathogen risk (through a septic repair program).

Progress: DEP released its annual East-of-Hudson non-point source report in January 2008. In it, DEP reported that Putnam County allocated $3.85 million of its East-of-Hudson Water Quality Funds to repair or replace septic systems. To date the County has sent 3,000 mailings and completed 70 repairs.

DEP completed East-of-Hudson stormwater mapping and inspections in December 2007, although there were delays due to contractor issues and the results were incomplete. DEP expects final mapping to be complete March 31, 2008, three months behind schedule. DEP has notified municipalities that it will make GIS mapping and inspection information available to them so they can plan effectively for MS4 Phase II compliance. DEP's mapping to date shows several illicit "tap-ins" in Carmel, NY.

For stormwater, DEP reported that of 30 small stormwater remediation sites selected, construction is complete at seven. DEP reported that five large stormwater remediation projects are under final review.

The non-point sources targeted for remediation programs included wastewater, stormwater, turf management chemicals, and hazardous materials.

Recommendation: DEP and DEC should aggressively pursue formation of a public benefit corporation, akin to the Catskill Watershed Corporation, to assist with MS4 permit compliance in the East-of-Hudson Watershed. This would ensure consistency in the East-of-Hudson Watershed and reduce costs for watershed municipalities. DEP has expressed it is support of this concept and now DEP, DEC and the East-of-Hudson municipalities should actively work together to bring about this corporation's formation. While MS4 requirements are those of federal and State law, DEP should strive to play an active role in this regional entity. This would further the spirit of cooperation the MOA embodies, and would be an efficient mechanism for watershed protection East-of-Hudson.

DEP should actively encourage phosphorus-free fertilizer East-of-Hudson.

DEP should aggressively pursue its East-of-Hudson Septic Program. For example, Putnam County completed only 70 septic repairs despite 3,000 mailings to homeowners. DEP should play a more active role in awareness of this program.

4.10 Kensico Water Quality Control Program GRADE: A

1997 FAD

EPA and the City agreed on nine Kensico related remediation projects:

- Stormwater Control – structural and non-structural stormwater management practices for reducing discharges of coliform and suspended solids from priority streams
- Sediment dredging around Delaware Shaft 18 and the Catskill Upper Effluent Chamber
- Installation of a curtain wall between the Catskill Upper Effluent Chamber and Malcolm Brook
- Waterfowl and gull management
- Wastewater evaluation and control
- Groundwater monitoring
- Surface Water (reservoirs and streams) monitoring
- Kensico water quality model
- Public education and outreach

2002 FAD

- DEP to continued implementation of Kensico Water Quality Control Program
- FAD contained detailed milestones for completion of surveys, remediations, and planning documents
- City to submit semi-annual Kensico Watershed Management Report
- City to report annually on monitoring data, and status of Kensico model

2007 FAD

- DEP to maintain non-point management facilities within Kensico basin
- DEP to sample stormwater BMPs
- DEP to submit draft Kensico Action Plan (KAP) for EPA approval; complete final KAP
- DEP to evaluate KAP proposals for remediation and develop schedule to implement
- DEP to begin Septic Repair Program
- DEP to request Westchester County install Sanitary Sewer monitoring system
- DEP to visually inspect West Lake sewer extension
- DEP to continue Westchester County Airport and Route 120 Corridor coordination
- DEP to conduct wind-induced turbidity assessment
- DEP to submit Kenisco Programs annual and semi-annual reports

Purpose: The Kensico Reservoir in central Westchester County is the terminal reservoir for the Catskill/Delaware water supply system. Because it provides the last impoundment of Catskill/Delaware water before it enters the City's distribution system,

protection of this reservoir is of critical importance. The overall objective of the Kensico modeling and remediation program is to identify the source of contaminants and institute appropriate source prevention and remediation measures. The 1997 FAD established a multi-faceted program to protect the watershed and improve water quality. It required semi-annual reporting on progress, including presentation, discussion and analysis.

In the 2007 FAD, EPA stated that the City is to institute new watershed protection and remediation programs to ensure continued success of past efforts, and provide for new water protection initiatives targeting stormwater and wastewater pollution. To achieve the broad goals of reducing non-point source pollution in the Kensico, the City will focus on: (i) long-term operation and maintenance; (ii) complete assessment of Kensico; and (iii) reduce potential risk.

Progress: In January 2008 DEP submitted its Kensico Water Quality Control Program Annual Report. DEP reported that fecal coliform and turbidity levels in the aqueducts were well below federal limits for 2007. However, as in previous years, there were multiple times when total coliform exceeded the DEP guideline. DEP reports that the Waterfowl Management Program provides the most cost-effective means for fecal coliform reductions. DEP reported it also used water quality models to assist in managing turbidity levels in the Kensico, due to concerns from elevated Catskill turbidity. DEP made operational decisions based on these models to reduce Catskill Aqueduct flow in order to prevent the use of alum treatment. DEP also installed 45 BMPs that have been effective in reducing fecal coliform and turbidity loading. The turbidity curtain at the Kensico Reservoir also appears to be functioning well.

Recommendation: The program is doing very well. Given the importance of the Kensico Reservoir, it has a high level of attention from regulators and watershed stakeholders. While the program has benefited from the improved SEQRA division, continued and thorough environmental review of proposed development projects is critical.

4.11 Catskill Turbidity Control GRADE: C

2002 FAD

- City to implement Catskill Turbidity Control Program
- City to augment stream management program to reduce turbidity
- City to complete Schoharie Reservoir dredging
- City to conduct comprehensive analysis of structural alternatives at Schoharie Reservoir to reduce turbidity entering Esopus Creek, with detailed schedule
- DEP to work with NYSDEC to develop sediment transport model for Schoharie and Esopus basins
- DEP to work with NYSDEC on release management strategy for water from Schoharie to Esopus and Ashokan Reservoir
- DEP to submit report identifying turbidity sources in Schoharie basin
- DEP to expand water quality telemetry system for Schoharie and Shandaken Tunnel
- DEP to report annually on implementation
- DEP to convene semi-annual meetings with EPA, NYSDOH, and NYSDEC to review progress

2007 FAD

- DEP to complete Schoharie Reservoir dredging
- DEP to complete implementation of Phase II Schoharie Reservoir recommendations, as approved by EPA, NYSDEC, and NYSDOH
- DEP to conduct analysis of structural alternatives at Ashokan Reservoir (Phase III Study)
- DEP to submit final report upon completion of Phase III study
- DEP to develop plan to implement feasible, cost effective measures identified in Phase III by March 31, 2008
- DEP to convene semi-annual meetings with EPA, NYSDOH, and NYSDEC to review progress on Catskill turbidity control efforts

Purpose: The Catskill Turbidity Control Program was developed to address elevated turbidity in the Catskill watershed. A court decision required DEP to obtain a SPDES permit for the Shandaken Tunnel, which contains certain mandates to control turbidity in the Esopus Creek. Recently, turbidity resulting from extreme weather events has overwhelmed the capacity of reservoirs to remove it effectively. EPA considers these types of turbidity events as the greatest threat to filtration avoidance.

Progress: DEP has completed Phase I, II and III studies of Catskill turbidity. EPA has expressed concern over the adequacy of certain models used in these studies. Dredging of the Schoharie, first required to be complete in December 2005, was delayed two years. In December 2007 DEP completed the Phase III Catskill Turbidity Control Study, which studied cost-effective measures to reduce turbidity in the Ashokan Reservoir and turbidity entering Kensico Reservoir from the Catskill Aqueduct. Alternatives for the

Ashokan include a new release structure from the Ashokan's West Basin, better water storage in the East Basin, and controlled water withdrawal from the East Basin. The Phase III study establishes the basis for a Phase III Implementation Plan which was to be submitted on March 31, 2008, but has now been extended to July to allow for careful review of the modeling.

In February 2008 DEP announced it would begin operating the Ashokan Waste Channel to draw turbid water from the Ashokan's West Basin and discharge it to the lower Esopus Creek, bypassing the Catskill aqueduct. DEP expects to divert 250 million gallons per day, as needed.

The City also completed an analysis of structural alternatives for turbidity control at the Schoharie Reservoir (Phase II Study). DEP has decided, for now, against using a multi-level intake structure to control turbidity. As justification for this decision, DEP has explained that the FAD directs them to factor cost into its decision-making process, and has expressed its belief that turbidity from the Shandaken Tunnel is not an issue from a FAD/SWTR perspective.

Recommendation: Turbidity is a significant issue in the Catskill watershed, and the greatest threat to the continuation of filtration avoidance. Turbidity is a problem that impacts the health and safety of the entire drinking water supply. Not only do turbid conditions change the composition of aquatic communities, the organic particulates may harbor microorganisms, which may increase the risk of waterborne diseases. Turbidity from the Shandaken Tunnel also remains a significant source of turbidity for Esopus Creek. As a conduit for water from the Schoharie Reservoir to the Ashokan Reservoir, Esopus Creek is part of the Catskill system. Additionally, what happens to the Esopus is also part of our assessment of DEP as a player in the Catskills and how their watershed operations affect other resources.

DEP's proposal merely to use modified reservoir operations to reduce turbidity – despite the fact that a multi-level intake has been demonstrated to achieve superior results during summer months – is entirely inadequate. Continued reliance on chemical treatment (alum) must not be allowed to continue.

DEP must expeditiously provide a new multi-level intake structure at Schoharie Reservoir to control turbidity in the Catskill system. We recognize DEP's Phase II turbidity study reached different conclusions, but according to a 2003 NYS Watershed Inspector General's report, "These facilities allow for the withdrawal of water at different depths which can vary significantly in temperature and turbidity. Multi-level intake structures are now standard for similar reservoirs throughout the nation. The current intake from the Schoharie Reservoir, however, is a single level opening located on the very bottom of the reservoir. DEP must also implement additional corrective measures as needed, monitor frequently for turbidity, and provide adequate funding for implementation of these measures."

4.12 Sand and Salt Storage **GRADE: A-**

1997 MOA • City to provide $10.25 million in Sand and Salt Funds to improve sand and salt storage West-of-Hudson, and to assist local municipalities comply with NYC Watershed Regulations • Catskill Watershed Corporation (CWC) to administer and disburse funds
2007 FAD • DEP to execute contract with CWC by 2/28/08 to continue program • DEP to contribute $500,000 in funding to be used to assist institutional entities (e.g. colleges, schools, and hospitals) in complying with NYC Watershed Rules and Regulations governing sand and salt storage

Purpose: This program improved the storage of sand, salt and other road de-icing materials West-of-Hudson to better protect water quality and to assist local governments comply with the NYC Watershed Rules and Regulations. West-of-Hudson communities requested the program be continued and expanded to include institutional entities to assist schools, hospitals, and licensed camps comply with the sand and salt storage rules.

Progress: The original funds in this successful program have all been spent. DEP agreed in the 2007 FAD to provide $500,000 to continue this program, but has neither executed a contract with CWC nor disbursed funds.

Recommendation: Given this program's objective, it is run well and is being expanded to include institutional facilities. However, DEP should continue begin to move beyond conventional materials and provide funding for the use of alternative, more environmentally benign de-icing materials.

FAD Section 5: Watershed Monitoring, Modeling & GIS

5.1 Watershed Monitoring Program **GRADE: A**

1997 Water Quality Surveillance Monitoring Program • This report, not the MOA, describes the monitoring program in detail
2002 FAD • DEP to submit revised monitoring program plan • DEP to submit annual research objectives report • DEP to submit Comprehensive Water Quality/Program Evaluation Report every five years and post on DEP website • DEP to submit periodic monitoring reports • DEP to report annually on long-term monitoring for *Giardia* cysts and *Cryptosporidum* cysts
2007 FAD • DEP to participate in annual educational seminars on watershed monitoring • DEP to coordinate annual Pathogen Working Group to discuss latest research • DEP to submit updated Integrated Monitoring Plan by October 2008 • DEP to submit Watershed Water Quality Annual Reports in July • DEP to submit mid-term report on watershed surveillance results for pathogens • DEP to submit Watershed Protection Program Summary and Assessment Report covering first five year period, March 31, 2011 • DEP to submit Watershed Protection Program Summary and Assessment Report covering second five year period, March 31, 2016

Purpose: DEP conducts monitoring throughout the NYC Watershed. Monitoring is necessary to support DEP's watershed management programs and can be used to evaluate the effectiveness of FAD and MOA programs. Data DEP generates from monitoring, along with other scientific findings, will be used to conduct the City's assessment of the effectiveness of the watershed program.

Progress: The City has provided all required reports and appears to have a comprehensive program. In January 2008 DEP released its mid-term Pathogen Surveillance Report. In it, DEP reported that of the 21 WWTP samples collected West-of-Hudson, two samples were positive for *Cryptosporidium* and two were positive for *Giardia*. DEP also reported that at the Kensico Reservoir monitoring *Cryptosporidium* was not found in any of the upstate key point reservoir effluents for this sampling period. *Giardia* was detected on two occasions at the Pepacton and Neversink effluents, on four occasions at the Cannonsville effluent, and on six occasions at the Schoharie effluent for this sampling period. In addition, preliminary findings in 2007 suggest that Schoharie Creek has a higher *Giardia* concentration when moving downstream, whereas no differences in *Cryptosporidium* concentration are evident.

DEP is studying whether protozoa and other indicator microbial organisms attach to particulate matter in streams during storm and base flow conditions in the Kensico watershed. DEP believes this will help DEP identify the transport potential of these organisms by determining if they settle to the bottom of Kensico Reservoir or are transported across the reservoir into the aqueducts leading to distribution. Results of stormwater sampling indicate that a significant fraction of both bacterial indicator organisms and a protozoan indicator organism could potentially be removed by sedimentation.

The program established an objective-based water quality monitoring network and the Integrated Monitoring Report reviewed three programs: hydrology, limnology & pathogens.

Recommendation: Overall, the program is going well and DEP has been diligent in taking thousands of samples. The New York State Department of Health should continue to monitor this program closely.

5.2 Multi-Tiered Water Quality Modeling Program GRADE: B

2002 FAD

- DEP to report on expansion of Nutrient Management Eutrophication Modeling, and models to assess adequacy of TMDLs
- DEP to integrate/link several submodels, including Kensico model into Catskill/Delaware model
- DEP to implement TMDL-related modeling activities

2007 FAD

- DEP to continue model improvements, testing, applications to support watershed management, and provide support for Catskill Turbidity Control Program
- DEP to use turbidity models to support operational decisions in response to unfavorable turbidity
- DEP to meet with local municipalities upon request to present results of modeling
- DEP to submit annual status report
- DEP to submit report on modeling analysis in March 2011 Assessment Report

Purpose: Goals of the program include using models to evaluate watershed management programs, reservoir operations, and long-term water supply planning. Models have been used to evaluate effectiveness of various programs to control eutrophication in the Delaware system and to predict turbidity transport in the Catskill system and the Kensico Reservoir.

Progress: In October 2007, DEP reported on using modeling to aid in operational decisions; using models to analyze possible effects of watershed management programs on Schoharie Reservoir turbidity; planning undertaken for possible studies of the effects of climate change on the water supply; and expansion of Nutrient Management Eutrophication Modeling System to all Catskill/Delaware reservoirs.

The Nutrient Management Eutrophication Modeling System (NMEMS) performs a quantitative analysis of the trophic state of the reservoirs. In July 2007, DEP reported that NMEMS had been set up and used to evaluate the implementation of MOA programs for the Cannonsville and the Pepacton Reservoir Systems, and that NMEMS has been set up to work with the remaining Catskill/Delaware System reservoirs.

Recommendation: While we remain concerned about DEP's use of modeling to make operational decisions to control turbidity in the Schoharie Reservoir, the overall modeling program appears to meet expectations.

5.3 Geographic Information System (GIS) GRADE: B+

2002 FAD • DEP to report semi-annually on progress in using GIS for watershed applications, data dissemination to stakeholders and the public • DEP to report on GIS data availability through Internet
2007 FAD • DEP to continue to utilize GIS capabilities to support watershed protection • DEP to report annually on progress in using GIS for watershed applications, data dissemination to stakeholders and the public

Purpose: DEP's Geographic Information System (GIS) is designed for watershed management applications and remote sensing. DEP is able to generate hundreds of maps per month to help support program objectives. The GIS program's mission is to support and protect the water supply. The program uses tools to analyze land use, estimate effects of particular watershed programs on long-term water quality, and support modeling throughout the watershed.

Progress: DEP has the ability to create a wide range of data and has stated that GIS is used to create, store, visualize, and analyze spatial data of the watershed in support of existing FAD and MOA programs. DEP utilizes GIS resources for hardcopy mapping, geographic analyses, spatial data acquisition and development, visualization and analysis of remotely sensed imagery, data collection using Global Positioning System (GPS) technologies, and water quality modeling.

DEP's GIS system has grown substantially and experienced expanded use since the 2002 FAD. Several DEP divisions now use GIS applications for diverse program activities. The City's 2006 Watershed Program Assessment indicates that thousands of GIS hardcopy and digital maps were used to implement and review FAD programs.

Recommendation: This program appears to have met expectations successfully, and remains and an important element of the City's watershed protection program. However, while DEP does create excellent maps and other data, DEP must do a better job sharing this information with the public and should make this information available on its website.

FAD Section 6: Regulatory Programs

6.1 Watershed Rules & Regulations (WR&Rs) & Other Enforcement/Project Review

GRADE: B

1997 MOA and FAD

- MOA resulted in revised WR&Rs in 1997
- 1997 FAD required DEP to implement the revised WR&Rs

2002 FAD

- DEP to encourage applicants to attend pre-application conferences on proposed stormwater pollution prevention plans (SPPPs), and submit designs early
- DEP to continue to work with NYSDOT on a pilot program that encourages efficient use of appropriate de-icing materials in the Watershed
- DEP to develop internal DEP guidance for SEQRA participation, and update on roles of City staff in SEQRA review
- DEP to implement two-year pilot Stormwater Enforcement Coordination Pilot Program
- DEP to improve coordination of stormwater enforcement with NYSDEC
- DEP to take timely enforcement action against WWTP non-compliance
- DEP to substantially implement recommendations from Septic Siting Study
- DEP to report on status of DEP regulatory enforcement actions in Catskill/Delaware watershed basins and Croton Falls and Cross River basins
- DEP to report annually on implementing program commitments

2007 FAD

- DEP to enforce the WR&Rs and other applicable regulations
- DEP to review BMP monitoring data and BMP effectiveness
- DEP to work with NYSDEC to improve coordination of stormwater enforcement and compliance between agencies and NY Attorney General's office
- DEP to submit report on project review activities regarding ongoing and proposed development projects, including summary of all projects and SEQRA status with maps; make up-to-date summary table available on DEP's website
- DEP to submit report on DEP's regulatory enforcement actions
- DEP to conduct roundtable with EPA, NYSDOH, and NYSDEC regarding proposed changes to WR&Rs
- DEP to develop guidance document for complying with WR&R stormwater provisions
- DEP to report annually on analyses used to determine phosphorus-restricted and coliform-restricted status of each reservoir

Purpose: DEP is to report to EPA on any enacted or planned modifications to WR&Rs and include a timeline, and to report on activities in Catskill/Delaware and Croton Falls

and Cross River basins. Security is important and DEP has significantly increased the number of police patrols in the watershed, increased police presence at key watershed locations, and has worked closely with Army Corps of Engineers (ACOE) on comprehensive programs.

Progress: The primary component of overall watershed protection strategy has been the enforcement of WR&Rs. DEP reviews development projects to ensure compliance with WR&Rs.

Enforcement:

- DEP Police have taken a larger role in patrolling for and detecting violations of WR&Rs and have expanded police numbers. DEP Police, in addition to 520 hours of mandatory state police training, now get 320 hours of training in environmental law and sciences and 170 hours practical field training in environmental and infrastructure protection.

Recommendation: Revised WR&Rs must be implemented and enforced; the outstanding issue is the lack of movement on increased penalties. The City is working on legislation that would increase the penalties for violation of the regulations.

Development Project Review and SEQRA:

- DEP has specific East-of-Hudson and West-of-Hudson divisions, but still needs to improve project review in SEQRA and East-of-Hudson projects must have a full review to be effective.

Enforcement:

- DEP's willingness to sue is important and they have strengthened the program and had a real boost to enforcement.

Winter Road Deicer Policy:

- DEP should better inform municipalities that DEP provides testing for appropriate deicers.

6.2 Wastewater Treatment Plant (WWTP) Inspection Program

GRADE: A-

2002 FAD

- DEP to perform monitoring and inspections in all WWTPs discharging in the Catskill/Delaware Watershed, submit results quarterly
- DEP to continue implementation of MOU to ensure timely enforcement
- DEP to prepare "lessons learned" report on microfiltration
- DEP to report semi-annually on DEP's Technical Support Plan to assist WWTP owners

2007 FAD

- DEP to perform monitoring and inspections in all WWTPs discharging in Catskill/Delaware Watershed, submit results quarterly
- DEP to continue implementation of MOU to ensure timely enforcement
- DEP to prepare "lessons learned" report on microfiltration
- DEP to report annually on DEP's Technical Support Plan to assist WWTP owners

Purpose: This program constitutes the onsite inspection, sample monitoring, compliance assistance, and enforcement of State Pollutant Discharge Elimination System (SPDES) permits of all WWTPs discharging in the Watershed. An EPA-approved Memorandum of Understanding (MOU) between DEP and DEC coordinates the program. The MOU established the Watershed Enforcement Coordination Committee (WECC) to address non-compliance through formal enforcement and/or compliance assistance.

Progress: The MOU ensures successful implementation of this key program. The goal of the WECC is to insure that all significant non-compliance is addressed through technical assistance or enforcement. This has resulted in a significant non-compliance rate under 5%, down from about 20% when the program started in 1993. DEP submitted their "lessons learned" report on microfiltration and completed the report on a technical support plan. DEP reported no enforcement actions for the 4th Quarter 2007.

Recommendation: Overall, the program works well and operations at WWTPs in the watershed have improved. This program represents a good example of an effective collaborative approach of the type the MOA envisioned. DEP has independent tests and monitoring, provides technical guidance and has a good permit enforcement model. While DEC is credited for effective enforcement, the key to the program's success is working cooperatively, which DEP should continue to do.

FAD Section 7: Catskill/Delaware Filtration Facility and UV Disinfection Facility

GRADE: A

1997 FAD • DEP to proceed with design for Catskill/Delaware filtration plant • DEP to update design biennially
2002 FAD • DEP to issue Catskill/Delaware filtration plant update report biennially • DEP to commit to schedule for study, design, and construction of Ultra Violet (UV) disinfection facility for Catskill/Delaware water supply
2007 FAD and 2007 Administrative Order on Consent (AOC) • DEP to issue Catskill/Delaware filtration plant update design report biennially • DEP agreed to extended schedule for UV Disinfection plant construction • DEP has monthly reporting obligation for UV facility construction

Purpose: As part of the "dual-track" approach, the FAD requires not only substantial watershed protection measures but also that the City plan for a Catskill/Delaware filtration plant. As a condition of relief from completing final filtration plant design, DEP agreed to perform biennial updates. In this way, should the FAD ever be revoked, a current preliminary design will expedite construction of a filtration plant. The 2002 FAD required the City to move forward with design and construction of a UV disinfection plant as an additional barrier to enhance the City's water protection efforts.

Progress: On February 7, 2007, DEP and EPA entered into the AOC, which requires full UV disinfection of the Catskill/Delaware water supply by August 31, 2012. DEP received only one bid for general construction; this bid was substantially higher than previous cost estimates for the project. DEP issued a notice to proceed in early 2008. The scope of work for the site preparation contract was substantially complete by end of 2007. In September 2007 DEP completed a preliminary design update for a 2,110 mgd ozone/direct filtration facility for the Catskill/Delaware water supply.

Recommendation: This project has been moving forward despite having only 1 bidder on the UV plant and the bid coming in significantly higher than expected—budgeted for $700-800 million, but bid at $1.1-$1.2 Billion. Given this increase in initial costs, it is imperative that DEP carefully monitor all costs associated with this project to prevent cost overrides.

FAD Section 8: In-City Programs

8.1 Waterborne Disease Risk Assessment Program **GRADE: A**

1997 FAD • DEP to maintain system to detect presence of waterborne disease outbreaks and to report any outbreaks
2002 FAD • DEP to review epidemiological studies analyzing relationship of tap water to gastro-intestinal illness • DEP to prepare semi-annual and annual reports on program • DEP to implement "Cryptosporidium Action Plan"
2007 FAD • DEP to continue to operation program • DEP to implement "Cryptosporidium Action Plan" • In case of an "event", DEP to provide surveillance information to NYSDOH or EPA • DEP to notify NYSDOH and EPA whenever the City notifies DEP of signs of community illness likely to come from drinking water • DEP to cooperate with NYSDOH and EPA on turbidity action plan • DEP to submit mid-term and annual reports

Purpose: The overall objective of the Waterborne Disease Risk Assessment Program is to track incidence of and gather epidemiological data on two waterborne diseases: giardia and cryptosporidiosis. The program administered jointly by DEP and the Department of Health and Mental Hygiene, tracks incidences of these diseases and develops a system to detect disease outbreaks and determine possibility of transmission. Surveillance is critical to alert health care professionals and to prevent a widespread outbreak.

Progress: In 2007, the City reported a *preliminary* count of 854 cases of giardiasis, and 106 cases of cryptosporidiosis reported to the City's Health Department. There was no evidence of a drinking water-related outbreak in New York City. The City currently has four types of outbreak detection systems in operation, each one tracking a different indicator of gastrointestinal illness (GI) in the community; however, these systems are not specific to giardiasis or cryptosporidiosis nor are they specific for other waterborne illness. City has also been utilizing three separate systems for monitoring sales of anti-diarrheal medication: one tracks the weekly volume of sales of nonprescription anti-diarrheal medications at a major drug store chain; an additional pharmacy system tracks daily sales of non-prescription anti-diarrheal medications at another drug store chain; and a third system tracked retail pharmacy data obtained from the National Retail Data Monitor. Despite changes in pharmacy/drug store chain management, the City has

continued this important program. DEP has effectively used its GIS capabilities to track relevant information, such as emergency room visits with reported diarrheal symptoms, within the 5 boroughs of New York City**.**

Recommendation: DEP has successfully met EPA's expectations and there has been no evidence of a waterborne disease outbreak. Key to the success of this program is the reporting of suspected cases. DEP should step up its efforts to inform and update health care providers throughout the City.

8.2 Cross Connection Control Program GRADE: A-

2002 FAD

- City to report semi-annually on implementation of Cross Connection Control Program

2007 FAD

- DEP to respond to cross connection control complaints
- DEP to initiate enforcement for non-compliant hazardous premises
- DEP to approve 400 backflow prevented plans per year
- DEP to perform 300 to 450 inspections of hazardous premises per year
- DEP to submit semi-annual and annual reports

Purpose: The primary objective of this program is to avoid any potential for backflow from within premises to the water supply. Cross connections in a drinking water source are a potential source of contamination. Backflow can be caused by improper connections or excessive back pressure on the system.

Progress: The City has achieved or exceeded most of the FAD goals. DEP has accelerated the program by eliminating an initial enforcement letter and now allows for a direct DEP Order. DEP also now concentrates efforts on "high hazard" inspections and enforcement.

Recommendation: In general, the program is running well; however, there is still a need for more City inspectors. Preventing backflow of water from entities such as hospitals, funeral homes and industrial sites into the drinking water delivery system is critical.

FAD Section 9: Administration **GRADE: B+**

2002 FAD • City must identify actual filled staff positions compared to available positions for each division and section involved in the watershed program, and confirm adequate resource levels • DEP to provide notification whether City budget includes sufficient funding to meet FAD obligations • DEP, with City's OMB, to make annual presentation to EPA on amount of money appropriated for watershed protection programs and adequacy to meet FAD objectives
2007 FAD • City must identify actual filled staff positions compared to available positions for each division and section involved in the watershed program, and confirm adequate resource levels • DEP to provide notification whether City budget includes sufficient funding to meet FAD obligations • DEP, with City's OMB, to make annual presentation to EPA on amount of money appropriated for watershed protection programs and adequacy to meet FAD objectives

Purpose: DEP must maintain a certain level of staffing, funding and expertise and identify which are actual filled positions versus available positions. They must also confirm that they have adequate resources and, if not, discuss actions taken to rectify.

Progress: In its 2007 annual report DEP detailed its current budgeted staff versus actual staff. For its Water Quality Division there were 236 budgeted positions versus 216 actual staff; for DEP Upstate Police there were 215 budgeted DEP Police versus 206 actual staff; for Watershed Protection and Planning there were 137 budgeted positions versus 127 actual staff; for Management Services & Budget there were 27 budgeted positions versus 23 actual staff; for East-of-Hudson Operations there were 123 budgeted positions versus 113 actual staff; and for West-of-Hudson Operations there were 123 budgeted positions versus 119 actual staff. The total reported for the Bureau of Water Supply is 947 budgeted positions versus 885 actual staff (92% filled).

Recommendation: Despite the FAD's reporting requirements, there is still a lack of sunlight on DEP's operations. For example, DEP should publish an organizational chart on its website showing its basic structure. In addition, DEP should provide line-of-duty injury benefits to DEP police. The City provides this to NYPD officers, and the State provides this to NYSDEC police and park rangers.

FAD Section 10: Education and Outreach **GRADE: B**

2002 FAD • DEP to continue to improve its website by developing an area for the public to learn more about activities and projects of the watershed program • City to report annually on program implementation
2007 FAD • DEP to continue outreach activities, including program specific efforts (e.g., stream management and the CWC), website updates, and school-based education efforts • DEP required to strengthen its partnership with local officials, and assess watershed stewardship training/educational needs of local officials

Purpose: The objective of this program is to advance the overall watershed program and achieve watershed protection through substantial stakeholder involvement. The program must be understood, accepted, and embraced by both those who live in the watershed ("upstate" residents) and those who drink the water "downstate." Both are vital partners.

Progress: DEP continues to make progress in this program. Implementation has been greatly enhanced through DEP's effective partnerships with the CWC and the WAC. Highlights include active DEP participation at public events; support for Watershed Agriculture Council programs, including the "Pure Catskills" buy local campaign; support for forestry technical training; and CWC's very active teacher training and student programs– providing watershed education grants to schools both upstate and downstate. Since the 1997 MOA, approximately $1.8 million in grants have been awarded to schools promoting watershed education programs for K-12 students, representing 242 watershed education grants in partnership with NYC DEP. Through this program, thousands of students have learned the science, history and value of this most critical resource. Many of these grants have been implemented through innovative partnerships between schools and non-profits, such as Trout in the Classroom conducted by Trout Unlimited, Streamwatch offered by The Catskill Center and the Arm-of-the-Sea Theater production, "City That Drinks the Mountain Sky."

Recommendations: In the West-of-Hudson, the CWC- and WAC-implemented education and outreach programs should receive continued and increased support from the City, having demonstrated their enormous effectiveness in building awareness of the need for and benefits of watershed protection and stewardship. DEP should increase efforts and do more to promote itself, its programs, and its partnerships throughout the watershed. It is our experience that the "us versus them" attitude that persists in some areas of the watershed can be addressed through increased education and outreach. DEP should be commended for giving grants to local communities and schools and should ensure continued adequate funding.

APPENDIX A

Interview List

All interviews were conducted either in-person or via telephone between March 13, 2008 and May 2, 2008

David S. Warne, Assistant Commissioner, Bureau of Water Supply, New York City Department of Environmental Protection

Philip Sweeney, Director, New York City Watershed Oversight Program, U.S. Environmental Protection Agency, Region 2

Roger C. Sokol, Ph.D., Section Chief, New York City Watershed Protection, New York State Department of Health

Thomas Snow, Jr., New York City Watershed Coordinator, New York State Department of Environmental Conservation

Phil Bien, Watershed Inspector General, Office of New York State Attorney General (OAG)

Charlie Silver, NYC Watershed Inspector General Scientist, Office of New York State OAG

William Harding, Executive Director, Watershed Protection and Partnership Council, New York State Department of State

Perry Shelton, Former President, Board of Directors, Catskill Watershed Corporation

Alan Rosa, Executive Director, Catskill Watershed Corporation

Tim Cox, General Counsel, Catskill Watershed Corporation

Tom O'Brien, Executive Director, Watershed Agricultural Council

Jeff Baker, Attorney, Coalition of Watershed Towns

Kevin Young, Attorney, Coalition of Watershed Towns

Dean Frazier, Commissioner, Delaware County Department of Watershed Affairs

Amy Kenyon, Board President, Farm Catskills

Gina D'Agrossa, Director, Westchester County Water Agency

Ed Barnett, Putnam County Watershed Information Coordinator

Mary Beth Murphy, Supervisor, Town of Somers, Westchester County

Michael Griffin, Supervisor, Town of Patterson, Putnam County

Jennifer Grossman, Vice President for Land Acquisition, Open Space Institute

Alan White, Catskill Mountain Program Director, The Nature Conservancy

Paul Gallay, Executive Director, Westchester Land Trust

Leslie Wright, New York State Program Director, Trust for Public Land

Document List

We reviewed the following documents while preparing this report:

1997 Watershed Memorandum of Agreement

USEPA, *1997 Filtration Avoidance Determination*

USEPA, *2002 Filtration Avoidance Determination*

New York Attorney Generals Office and Watershed Inspector General's Office, *Clean Water – Clean Creek; A Proposal for a Multiple Level Water Intake Structure in the Schoharie Reservoir to Improve Drinking Water Quality, Protect the Esopus Creek, and Expand the New York City Water Supply*, September 2003

DEP, *2006 DEP Long-Term Watershed Protection Program*, December 2006

USEPA and NYSDOH, *Report on the City of New York's Progress in Implementing the Watershed Protection Program, and Complying with the Filtration Avoidance Determination*, August 21, 2006

USEPA, *2007 Filtration Avoidance Determination*

FAD Deliverables

DEP, *Filtration Avoidance Annual Report For the period January 1 through December 31, 2007*, March 2008

DEP, *Report on implementation of Septic Maintenance Program*, January 31, 2008

DEP, *Report on implementation of the Septic Remediation and Replacement Program,* January 31, 2008

DEP, *Report on areas/small hamlets, within current septic priority areas, that may be candidates for/in need of cluster systems*, December 31, 2007

DEP, *Report on Sewer Extension Program*, January 31, 2008

DEP, *Report on New Sewage Treatment Extension Program*, January 31, 2008

DEP, *Report on Community Wastewater Management Program*, January 31, 2008

DEP, *Wastewater Treatment Plant Upgrade Program – Quarterly Report*, January 29, 2008

DEP, *Stormwater Retrofit Program – Semi-Annual Report*, January 31, 2008

DEP, *A Programmatic Strategy to Augment Land Acquisition in the NYC Watershed Through Increased Participation of Land Trusts*, November 15, 2007

DEP, *Land Acquisition Program – Report on Solicitation Plan*, January 15, 2008

DEP, *Land Acquisition Program Status Report – Specific Deliverables*, February 25, 2008

DEP, *Watershed Agricultural Program Five Year Plan*, January 31, 2008

DEP, *Watershed Agricultural Program – WAC Nutrient Management*, February 28, 2008

DEP, *Watershed Forestry Program Evaluation - Report Five-Year Implementation Status of Forest Management Plans*, January 31, 2008

DEP, *Stream Management Program – Schoharie Stream Management Project (County Route 13A)*, December 2007

DEP, *Wetlands Protection Program Wetlands Protection Strategy Update*, December 31, 2007

DEP, *East of Hudson Nonpoint Source Pollution Control Program - Annual Report*, January 2008

DEP, *East of Hudson Stormwater Mapping and Inspection*, December 2007

DEP, *Annual Report for the Kensico Water Quality Control Program*, January 2008

DEP, *Pathogen Mid-Term Surveillance Report on Giardia spp., Cryptosporidium spp., and Human Enteric Viruses*, January 29, 2008

DEP, *Wastewater Treatment Plant Compliance Inspection Reports Summary – 4th Quarter 2007*, January 31, 2008

DEP, *Report on sample monitoring of NYC-owned and non-City-owned WWTPs discharging in the CAT/DEL watershed Fourth Quarter 2007*, January 31, 2008

DEP, *Cross Connection Control Program - Annual Report - January to December 2007*, January 31, 2008

DEP, *Catskill Turbidity Control Study, Phase III Final Report*, December 31, 2007

DEP, *Wastewater Treatment Plant Upgrade Program Quarterly Progress Report*, October 26, 2007

DEP, *Stream Management Program - Draft Local Funding Program Plan for Enhanced Implementation of Stream Management Plan Recommendations*, September 30, 2007

DEP, *Review of Turbidity, Wind Speed and Direction Data Collected at or near the Catskill Lower Effluent Chamber, Kensico Reservoir*, August 2007

DEP, *Kensico Watershed Rehabilitation Reimbursement Program and Septic Survey Data*, October 2007

DEP, *Multi Tiered Water Quality Modeling Program Annual Status Report*, October 31, 2007

DEP, *Filtration Avoidance 6.1.2 Enforcement Actions For the period July 1 through September 30, 2007 (Third Quarter)*, October 2007

DEP, *Filtration Avoidance 6.1.1 Project Activities For the period July 1 through September 30, 2007 (Third Quarter)*, October 2007

DEP, *Wastewater Treatment Plant Compliance Inspection Reports Summary – 3rd Quarter 2007*, October 23, 2007

DEP, *Report on sample monitoring of NYC-owned and non-City-owned WWTPs discharging in the CAT/DEL watershed Third Quarter 2007*, October 31, 2007

DEP & DOHMH, *Waterborne Disease Risk Assessment Program 10th Semi-Annual Report (for January – June 2007)*, August 31, 2007

DEP, Report on *New Sewage Treatment Infrastructure Program*, July 30, 2007

DEP, *Waterfowl Management Program - Annual Report*, July 31, 2007

DEP, *Watershed Forestry Program Semi-Annual Report For the period January 1 through June 30, 2007*, July 31, 2007

DEP & DOHMH, *Waterborne Disease Risk Assessment Program 2006 Annual Report*, May 31, 2007

DEP, *Annual Report on FAD Budget and Staffing*, July 31, 2007

DEP, *Catskill Turbidity Control Study, Phase II Final Report*, September 30, 2006

APPENDIX B

Acronyms

ACOE	U.S. Army Corps of Engineers
BMPs	Best Management Practices
BWS	Bureau of Water Supply
CATLEFF	Catskill Lower Effluent Chamber
CREP	Conservation Reserve Enhancement Program
CWC	Catskill Watershed Corporation
CWMP	Community Wastewater Management Program
DEL18	Delaware Shaft 18
DEP	New York City Department of Environmental Protection
DOHMH	New York City Department of Health and Mental Hygiene
EOH	East-of-Hudson
EPA	U.S. Environmental Protection Agency
FAD	Filtration Avoidance Determination
GCSWCD	Greene County Soil & Water Conservation District
GIS	Geographic Information System
GPS	Global Positioning System
GWLF	Generalized Watershed Loading Function
KAP	Kensico Action Plan
LAP	Land Acquisition Program
MAP	Management Assistance Plan
mgd	Million gallons per day
MOA	1997 Watershed Memorandum of Agreement
MOU	Memorandum of Understanding
NMEMS	Nutrient Management Eutrophication Modeling System
NTU	Nephelometric Turbidity Unit
NWI	National Wetlands Inventory
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
NYSEFC	New York State Environmental Facilities Corporation
SEQRA	State Environmental Quality Review Act
SNC	Significant non-compliance
SPDES	State Pollutant Discharge Elimination System
SPPP	Stormwater pollution prevention plan
SWTR	Surface Water Treatment Rule
TCR	Total Coliform Rule
USFWS	United States Fish and Wildlife Service
UV	Ultraviolet
WAC	Watershed Agricultural Council
WAP	Watershed Agricultural Program
WDRAP	Waterborne Disease Risk Assessment Program
WECC	Watershed Enforcement Coordination Committee

WFP	Whole Farm Plan
WOH	West-of-Hudson
WQIP	Water Quality Infrastructure Program
WR&Rs	Watershed Rules and Regulations
WWTPs	Wastewater treatment plants