



New York City Department of
Environmental Protection

Long-Term Land Acquisition Plan

2012 to 2022

Prepared by
NYC DEP Bureau of Water Supply
Division of Watershed Lands & Community Planning
Land Acquisition Program

**Submitted to NYS DOH, NYS DEC and US EPA
in accordance with the 2007 FAD**

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Long-Term Land Acquisition Plan 2012 to 2022

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Executive Summary

Since 1997, the City has operated a Land Acquisition Program (LAP) in the Catskill-Delaware System which seeks to acquire land and conservation easements for watershed protection. LAP is a key component of the City's Watershed Protection Program, which seeks to increase watershed protection and avoid filtration of the world's largest surface water supply. This **Long-Term Land Acquisition Plan 2012 to 2022** is being submitted in accordance with the 2007 FAD to detail the City's proposed approach to land acquisition under the next Water Supply Permit.

Section III has a detailed evaluation of **LAP progress to date**, including the following highlights:

- Through LAP, the City has **protected over 96,000 acres of land** in the one million acre Catskill-Delaware System, increasing the percentage of protected lands from 24 percent to 34 percent of the basin land area. That percentage is over 40 percent using either of two alternative metrics which weight the level of protected lands by reservoir diversions or by basin contribution to supply;
- As of July 1, 2009, the City and WAC have **signed or closed 1,172 transactions**, resulting in the protection of over 61,000 acres in fee simple and 35,000 acres with conservation easements;
- So far, **LAP has acquired 17 percent of lands solicited**. The success rate is a more impressive 26 percent in Priority Areas 1 and 2, where solicitations started first; and
- In the critical **West Branch reservoir basin**, **LAP has acquired 8,300 acres**, raising the level of protected land from 15 percent to 47 percent.

Section V identifies the following **Goals** to guide our efforts from 2012 to 2022:

- **Continue the proven real estate methods** that have guided the program since 1997;
- **Increase the percentage of protected lands in the Cat-Del System** as a whole, with a particular emphasis on non-terminal reservoir basins with less than 30 percent protected lands, specific sub-basins with a low percentage of protected lands and reservoir basins that are expected to provide a large contribution to future water supply;
- Develop parcel selection procedures to **maximize the water quality benefit of acquisitions**;
- **Build on our existing programs to promote City lands as a working landscape** in partnership with local communities; and
- Develop strategies to **promote the wise use of acquisition resources** over the long-term.

To achieve these goals, we identify regional **Areas of Focus** based primarily on the current level of protection in a sub-basin or basin. This will allow LAP to focus its solicitation efforts and resources on acquisition in those areas where it can provide the most water quality benefit. Several methods and strategies will be employed to focus LAP solicitation and acquisition within these areas:

- Develop a **variable solicitation schedule** that will result in more frequent attempts to contact landowners in Areas of Focus;
- **Identify additional opportunities to solicit for fee simple acquisition** on properties adjacent to existing City lands and smaller vacant lots with stream buffers; and
- Incorporate the Areas of Focus and level of protection into our **conservation easement standards** to make the best use of this valuable but resource intensive land protection tool.

Section I – Introduction

The mission of the City’s Land Acquisition Program (LAP) is to acquire fee simple and conservation easement interests to protect environmentally-sensitive land in the New York City watershed as a part of the City’s overall Watershed Protection Program. LAP is a key component of the City’s efforts to increase watershed protection and avoid filtration of the Catskill-Delaware (Cat-Del) System, which provides water to over 9 million residents of the City and nearby communities in New York State. Since its creation in the 1990s, LAP has protected, through acquisition, over 96,000 acres of land in the 1 million-acre Cat-Del System. Together with lands protected by the State and other entities, these acquisitions have raised the level of permanently protected land in the Cat-Del System from 24 percent in 1997 to 34 percent today.

Land acquisition is an anti-degradation strategy, which can reduce the threat of adverse water quality impacts associated with future development. As such, LAP complements a wide variety of successful remediation strategies employed by the City which have already improved water quality in the Cat-Del System. LAP has operated under an evolving set of strategies, policies and approaches since 1997; this Long-Term Plan addresses the methods and strategies which will guide the City in the continuation of this critical watershed protection program over the ten years from 2012 to 2022.

Section II of this Plan provides an overview of LAP, including its regulatory context, methods and guiding planning principles. Section III presents program-to-date status and a detailed analysis of the progress achieved over the program’s first 12 ½ years. Section IV provides an analysis of land use trends in the watershed. Sections V, VI and VII present a new Long-Term Strategy, with a discussion focusing on Goals (Section V), Strategies to Achieve these Goals (Section VI), and Basin Plans (Section VII). Unless otherwise noted, all program summary data presented in this Plan are as of July 1, 2009.

Section II – LAP Overview

A. Regulatory Context

The Land Acquisition Program grew out of the City’s response to the Federal Safe Drinking Water Act Amendments (1986) and Surface Water Treatment Rule (SWTR, 1989). As a result of an increased awareness of the threat posed by micro-organisms in unfiltered surface water systems, the SWTR required such public water supplies to either filter their supply or meet specific “filtration avoidance criteria.” The City, through its Department of Environmental Protection, sought to meet those criteria and avoid filtration through the development of a comprehensive Watershed Protection Plan for the Cat-Del System.

Under the SWTR, an applicant for filtration avoidance needs to “demonstrate through 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.” Ownership of watershed lands is a key component of the City’s ability to meet this condition. Prior to 1997, the City owned approximately 35,500 acres of land in the Cat-Del System (excluding reservoirs), and the State of New York owned another 202,000 acres, for a total protected land base of approximately 24 percent of the watershed land area. Since the early 1990s, the City has sought to increase those percentages through a robust land acquisition program.

DEP initially sought to establish a land acquisition program in the Cat-Del System as a condition of the first Filtration Avoidance Determination (FAD), issued by the US Environmental Protection Agency (EPA) in 1993. In August 1993 the City applied for a Water Supply Permit (WSP) from the NYS Department of Environmental Conservation (DEC). That application, and the City's concurrent efforts to promulgate new Watershed Rules and Regulations with the NYS Department of Health (DOH), met strong resistance from municipalities in the watershed. Many residents in these upstate communities saw these efforts as a threat to local economic development.

Over the ensuing three and a half years, the City, Federal and State regulators, local governments and environmental organizations engaged in wide-ranging, intensive and ultimately successful negotiations to reach a comprehensive New York City Watershed Memorandum of Agreement (MOA) in January 1997. Under this landmark agreement, the City agreed to undertake a wide array of programs to protect water quality while also supporting local economic development. The MOA called on the City to dedicate up to \$300 million for a land acquisition program in the Cat-Del System, and identified specific program parameters and acquisition procedures, as detailed below in Section II.B.

In January 1997, the City received a WSP issued by DEC, and the first closing under LAP occurred in October, 1997. The WSP was issued for a ten-year period (through January 2007), with a five-year renewal option (through January 2012). Since 1997, EPA has issued several FADs that have continued to place a strong emphasis on land acquisition. In 2007, EPA, in collaboration with DOH and DEC, issued a ten-year FAD that required the City to dedicate an additional \$241 million for land acquisition in the Cat-Del System. The 2007 FAD also required the City to apply for a new WSP in January 2010. As a prelude to that permit application, the FAD called for a "long-term land acquisition strategy...for the period from 2012 to 2022" to be submitted by September 30, 2009. This Long-Term Plan has been developed to meet that deliverable, and to describe the City's proposed approach to land acquisition under the WSP that it will apply for in 2010.

B. Real Estate Methods and Procedures

LAP utilizes a number of methods and procedures that were devised early in the program's development and are largely memorialized in the MOA and WSP. These methods and procedures govern the way the City contacts landowners, how appraisals are conducted, the real property rights to be acquired, provisions for public recreational access, and how the City pays property taxes on lands acquired. The City has a strong record of compliance with its MOA, FAD and WSP obligations. The key components of such compliance are as follows:

- 1. Willing Buyer / Willing Seller (MOA Paragraph 60)** – Landowners and the City must both enter into a proposed transaction on a strictly voluntary basis. Landowners are under no obligation to sell until and unless a contract of sale is executed.
- 2. Fair Market Value (MOA 61)** – Land and easements are appraised at fair market value by independent, certified NY State Appraisers commissioned by the City. The City's offers are based strictly on the results of these appraisals; landowners have the right to present their own appraisals which must be considered by the City's appraiser. Only under very limited circumstances (mortgage or tax foreclosure, legal judgment) can the City acquire land at below fair market value.
- 3. Solicitation (MOA 60, 64, 65 and Attachment Z)** – The City's obligation to diligently pursue acquisition is defined in Attachment Z of the MOA. Although the City retains the flexibility to decline to appraise a property upon inspection, the City is obligated (except in very

limited circumstances and subject to regulator approval) to pursue acquisition once an appraisal is ordered. Since 1997 under the MOA (and since 2002 pursuant to the FAD), the City has been required to meet a series of annual targets for landowner solicitation. The term “solicitation” includes both “original solicitation” in which the City makes the initial outreach to pursue acquisition of a property, and “re-solicitation”, in which the City makes subsequent attempts to contact a landowner, after being unable to make contact or reach agreement at the point of original solicitation.

4. Rights Acquired – Through LAP the City can acquire, or fund the acquisition of, three distinct types of property interests:

- a. ***Fee Simple*** – The City acquires land outright. This is the City’s preferred acquisition method. Fee simple acquisition results in the highest level of control, allows the City to consider recreational, natural resource management and other uses on the property acquired, and makes the most efficient use of City staff resources.
- b. ***Watershed Conservation Easements*** – In cases where landowners want to retain ownership and exclusive use of their land, conservation easements (“CEs”) allow the City to limit future development through the acquisition of perpetual deeded rights. Although initial acquisition costs are lower than for fee simple purchases, CEs involve significantly higher long-term costs for monitoring and potential enforcement of deed provisions. CE purchases are pursued on larger properties whose owners are not interested in selling a fee simple interest.
- c. ***Watershed Agricultural Easements*** - The City also funds the acquisition of CEs on farms by the Watershed Agricultural Council (WAC). These CEs, which require the farmer to have a Whole Farm Plan that governs best management practices for agricultural uses, allow for a diversity of farm-related uses but preclude most other types of development.

5. Property Taxes (MOA 79 and 80) – The City pays property taxes on all land and CEs acquired under LAP, including any lands under watershed agricultural CEs that are not agriculturally-exempt.

C. Planning Principles

The Cat-Del watershed (see Figure 1, page 30) spans just over 1 million acres draining into nine reservoirs in eight upstate counties. The identification of the most important parcels for acquisition within this vast watershed is an ongoing process based on a number of geographic, topographic and real estate factors. LAP first prioritizes property for solicitation on the basis of its location within the water supply system, followed by site-specific characteristics. These principles are embodied in the Priority Area and Natural Features Criteria provisions of the MOA:

1. Priority Areas – The basins and sub-basins comprising the Cat-Del System were assigned to Priority Areas (as depicted in Figure 1) as follows:

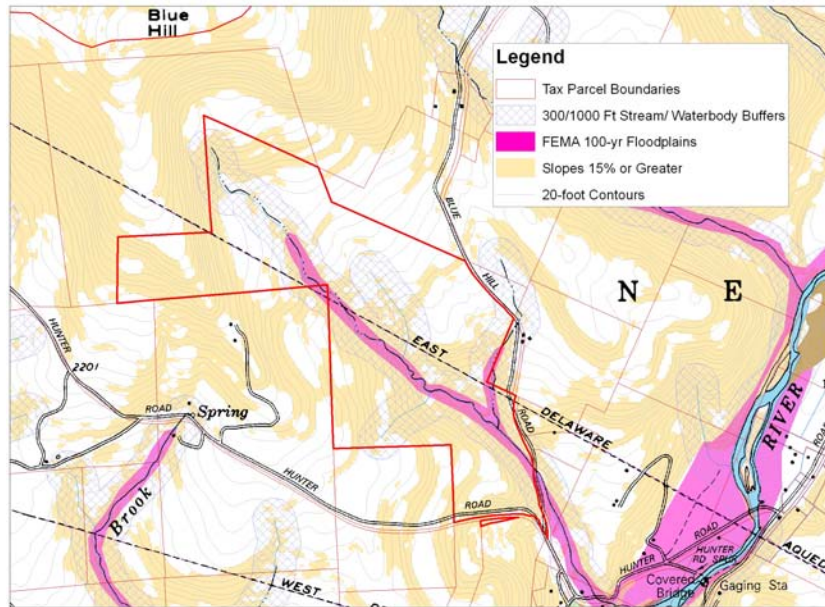
- a. ***Priority 1A*** – Sub-basins within 60-day travel time to distribution located near reservoir intakes;
- b. ***Priority 1B*** – All other sub-basins within 60-day travel time to distribution;
- c. ***Priority 2*** – All remaining sub-basins in terminal reservoir basins;
- d. ***Priority 3*** – Sub-basins in non-terminal reservoir basins with existing water quality problems; and
- e. ***Priority 4*** – All other sub-basins in non-terminal reservoir basins.

The MOA required that the City solicit at least 355,050 acres in accordance with a schedule that reflected LAP's priorities both in timing (higher priority areas were solicited first) and in percentage of eligible lands solicited (ranging from 95 percent of eligible lands in Priority 1A and 1B to 50 percent of eligible lands in Priority 4).

Following the new funding commitments contained in the 2007 FAD, the City's 2008 to 2010 Solicitation Plan called for an additional 90,000 acres of new solicitation. These additional acres were solicited primarily in Priority Areas 3 and 4 (since Priority 1 and 2 had already been almost entirely solicited), effectively raising the level of solicitation in those Priority Areas above the levels specified in the MOA.

2. Natural Features Criteria – These criteria, as defined in MOA 63, establish a set of hydrologic and topographic features, one or more of which must be present on a property in order to qualify for acquisition in Priority Areas 2, 3 or 4. LAP uses the DEP Geographic Information System (GIS) to overlay these features onto digitized tax parcels as part of the parcel evaluation process, as shown in Figure 2:

Figure 2: **Sample GIS Map showing Natural Features Criteria**



3. Out-Basin Plan – In 2000 LAP issued its Out-Basin Plan, which detailed a strategy for solicitation in Priority Areas 3 and 4. This strategy included the following key components:

- a. **Parcel Ranking** – LAP developed a GIS-based ranking system that utilized three equally-weighted components (property size, percent surface water features and slope characteristics) to rank each parcel for its solicitation potential. The equal weights mean that, for example, a 300-acre parcel with steep slopes and a small amount of stream buffer would be ranked about equal to a 60-acre parcel with moderate slopes, and several streams or wetlands. Both parcels would be ranked higher than a 60-acre parcel with steep slopes and no stream buffer.
- b. **Distance to Reservoir** – The distance of a parcel to the reservoir is not a predominant factor in determining its desirability for solicitation. Rather, the distance from the stream network and slopes on the property (both incorporated into the parcel ranking

system) are considered determinative factors. This approach is based on the fact that pollutants which enter the stream network during storm events (when most pollutant transport occurs) are likely to enter the reservoir rapidly regardless of the distance along the stream network to the reservoir.

These planning principles have guided LAP solicitation so as to maximize the water quality benefit of lands acquired. The discussion of program-to-date results and the level of protected lands in the Cat-Del System (Section III) emphasizes the importance of *where* those lands are located within the watershed. This Plan recommends a general continuation of the guidelines developed in 1997, although the Long-Term Strategy (see Sections V, VI and VII) will make specific modifications to reflect the results of LAP acquisitions to-date, land use trends and real estate market conditions.

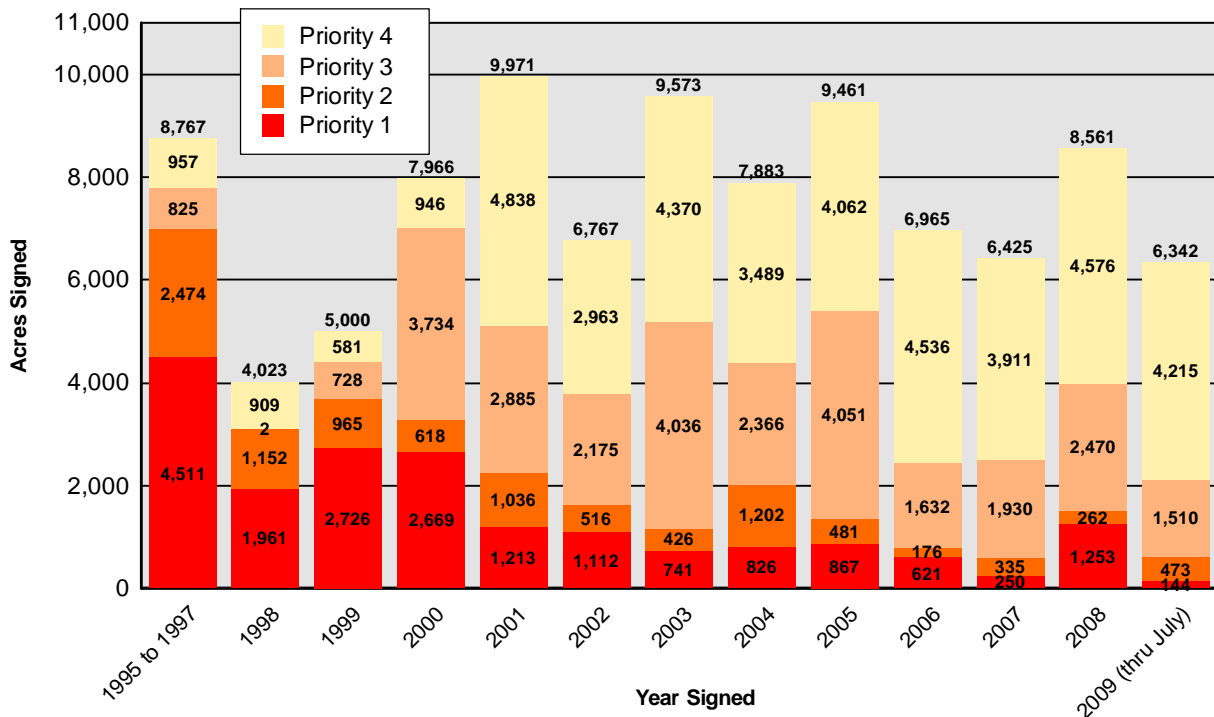
Section III - Program Status as of July 1, 2009

A. Program-to-Date Activity

As of July 1, 2009, LAP (including WAC) had acquired a total of 97,704 acres in the Cat-Del System.¹ Reaching this point has involved over 1,150 separate real estate transactions, an average of about two transactions per week and about 7,800 acres per year.

1. Trends over Time - Since 1997, LAP acquisitions have proceeded on a steady basis, influenced by the location of solicitations, real estate market trends and program development initiatives.

Figure 3: Acres Acquired by Priority Area and Year

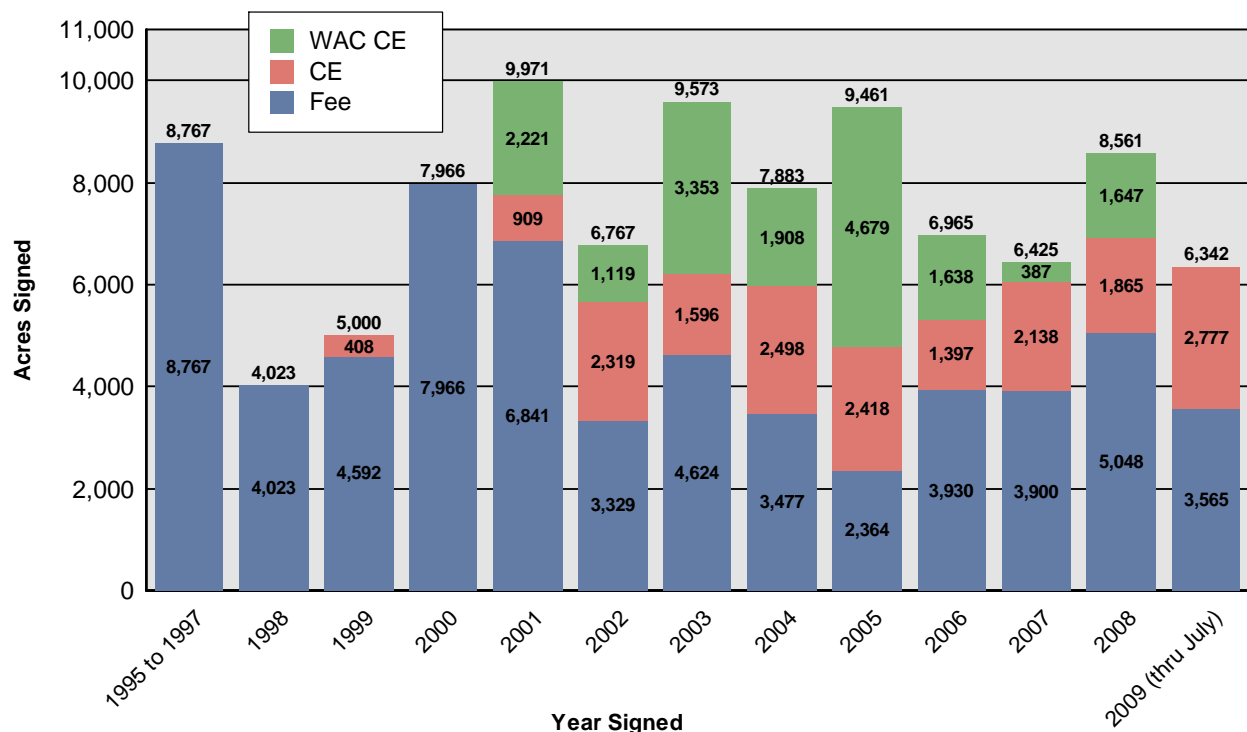


¹ This total, and the totals in Tables 1 and 3, include about 1,000 acres acquired outside the watershed boundary or in the Croton System as a part of Cat-Del acquisitions.

As shown in Figure 3, contracts signed from 1995 through 2000 were focused in Priority Areas 1 and 2 (predominately in Putnam and Ulster Counties). After 2000, the volume shifted to Priority Areas 3 and 4, where the majority of acquisitions continue to occur.

Examining yearly activity by real estate type (Figure 4) shows the impact of program development activities. Fee acquisitions dominated during the early years of LAP. The first two contracts to acquire CEs were signed in 1999, but that program component did not become fully established until 2001. Since 2001, LAP has signed between 900 and 2,700 acres in easements each year. Similarly, the WAC CE program did not sign its first contract until 2001 but has subsequently secured 90 CEs. Together, the DEP and WAC CE programs have contributed about 35 percent of the total acres protected under LAP (see Table 1, page 7).

Figure 4: **Acres Acquired by Real Estate Type and Year**



Figures 3 and 4 both show the general impact of the real estate market on LAP activity. Looking specifically at City signings of fee simple acquisitions (those most reflective of overall market conditions), LAP activity had an early peak in 2000 and 2001, reflecting a stable, slowly rising market at a time when LAP fee acquisition efforts were firmly established. Following September 11, 2001, the real estate market began a period of rapid growth from 2002 through 2007. LAP fee acquisitions moderated during this period (ranging between 2,300 and 4,600 acres per year), as sellers were able to consider competing (and often higher) purchase offers from private buyers. Since its peak in 2007-2008, the market has leveled or dropped, particularly with respect to the volume of private sales in the marketplace. In this weakened market environment, LAP purchase offers have received more favorable responses, and fee acquisitions have increased noticeably.

2. Acquisitions by Real Estate Type - As shown in Figure 4, fee simple acquisitions have comprised the majority of LAP acres protected, but CEs (both City and WAC) are an increasingly important component of overall program activity. Looking at program-to-date totals by real estate Type (see Table 1, below) reveals significant distinctions between fee and CE acquisitions. Fee simple acquisitions, comprising 82 percent of the 1,171 total projects, average 65 acres in size and have an average price per acre of \$3,885. In contrast, City CEs (averaging 153 acres at a cost of \$2,049/acre) and WAC CEs (averaging 188 acres at a cost of \$1,258/acre) are significantly larger and less costly to acquire on a per acre basis.

Table 1: **Signed Contracts by R.E. Type**

<u>R.E. Type</u>	<u>Number of Parcels</u>	<u>Acres</u>	<u>Average Size</u>	<u>Purchase Price</u>	<u>Average Price/Acre</u>
Fee	963	62,426	65	\$242,505,795	\$3,885
CE	119	18,324	154	\$37,546,641	\$2,049
WAC CE	90	16,954	188	\$21,330,278	\$1,258
Program Totals	1,172	97,704	83	\$301,382,714	\$3,085

3. Acquisition Cost by Location - The cost of acquisition varies dramatically depending on the location of a property within the watershed. Since acquisition costs have also risen over time, and the level of LAP activity has varied over time and location (as shown in Figure 3), program-to-date average cost or geographic cost averages can be misleading. The best way to compare cost variation across the Cat-Del System is to look at similar properties (by size) during the same, limited timeframe. Table 2 depicts the value of fee simple appraisals between 10 and 50 acres from 2003 to the present:

Table 2: **Fee Simple Appraisals, 10 to 50 acres, between 2003 and 2009**

<u>District</u>	<u>Market Area</u>	<u>Total Acres Appraised*</u>	<u>Total Value</u>	<u>Average Price per Acre</u>
EOH	Kensico (Westchester)	62	\$14,746,250	\$237,002
	West Branch (Putnam)	891	\$16,190,550	\$18,178
WOH	Ashokan (Ulster)	2,317	\$19,033,413	\$8,214
	Schoharie (Greene/Schoharie)	3,146	\$18,872,319	\$5,998
	Rondout & Neversink (Ulster/Sullivan)	1,097	\$5,273,167	\$4,807
	Pepacton & Cannonsville (Delaware)	5,240	\$19,341,038	\$3,691

* Includes all fee appraisals ordered, whether offers were accepted or not

4. Success rates - As discussed in Section II.B.3 above, regulatory mandates for LAP have consisted of solicitation requirements, not acquisition targets. However the program's effectiveness can be measured by its success in converting solicitations into signed contracts. Success rates provide a useful metric to evaluate program effectiveness over time, by method of solicitation, property type and location.

Table 3: **Success Rates by Priority Area**

	<u>Solicited</u>	<u>City Acres Acquired</u>	<u>City Success Rate</u>	<u>WAC Acres Acquired</u>	<u>Total Acres Acquired</u>	<u>Purchase Price</u>	<u>Average Price/ Acre</u>
Priority 1A	14,407	4,933	34%	0	4,933	\$33,594,647	\$6,811
Priority 1B	52,359	13,006	25%	954	13,960	\$101,026,696	\$7,237
Priority 2	43,139	10,115	23%	0	10,115	\$28,315,484	\$2,799
Priority 3	121,855	21,065	17%	7,277	28,343	\$50,673,638	\$1,788
Priority 4	243,637	31,631	13%	8,723	40,354	\$87,772,248	\$2,175
Totals	475,397	80,750	17%	16,954	97,704	\$301,382,714	\$3,085

The higher success rates in Priority Areas 1A, 1B and 2 are the result of two factors: First, the City has been soliciting land in these higher Priority Areas far longer than in Priority Areas 3 and 4, and success rates climb over time as landowners that had previously been uninterested decide to sell. Second, market values in Priority Areas 1 and 2 are higher, and program experience has shown that higher appraised values result in higher acceptance rates.

B. Program Effectiveness - Level of Protection

Land acquisition is an anti-degradation tool that does not have any immediate impact on water quality. Further, it is impossible to predict with certainty whether or how a property protected by LAP might have been developed, and how such development would have impacted water quality. For these reasons, direct measures of the effectiveness of LAP in the context of watershed protection are not possible. However a careful analysis of the location and level of LAP-acquired and other protected lands in the context of the Cat-Del System provides a clear picture of the program’s effectiveness and suggests future areas of emphasis.

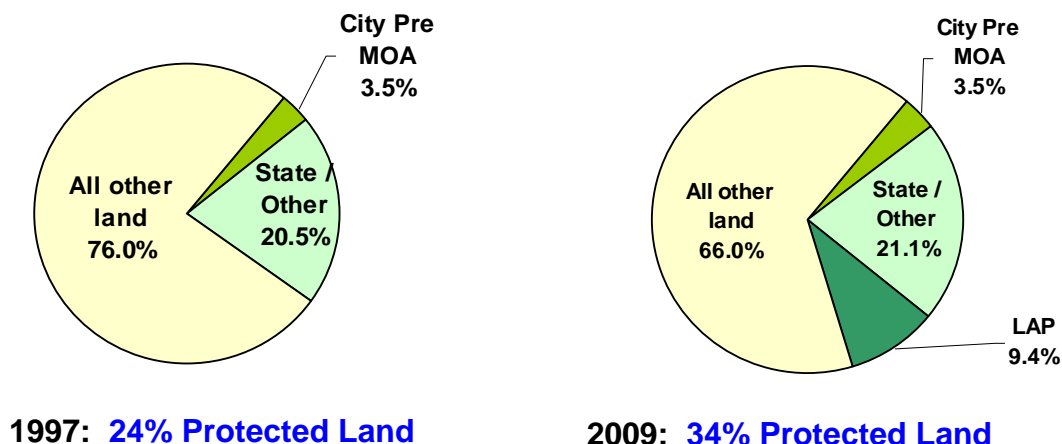
In order to fully evaluate the level of protected lands in the Cat-Del System, LAP has conducted extensive research to confirm ownership and the “protected” status of lands and CEs owned by the State, other governmental entities and land trusts.

1. Overall Level of Protection - Prior to the commencement of acquisitions under LAP, the City owned about 35,500 acres of buffer lands surrounding the nine reservoirs of the Cat-Del System. These lands (excluding the reservoirs) comprised about 3.5 percent of the system land area. The State of New York owned another 202,000 acres, mostly in the Catskill Forest Preserve. Together with about 8,000 acres protected by municipalities or private conservation groups, this protected land represented about 24 percent of the Cat-Del System.

As shown in Figure 1 (page 30), these protected lands were clustered in two distinct locations: 1) around the reservoirs, in buffer lands varying in width from a few hundred to a few thousand feet from the reservoir, and 2) in the Catskill Forest Preserve, the large State land holdings that comprise a significant proportion of the Rondout, Ashokan, Pepacton and Schoharie Basins.

Under LAP, the City has increased its ownership of protected lands from 35,500 (3.5 percent of the Cat-Del System) to 132,500 (13 percent). Together with State and Other Protected Lands, the Cat-Del System currently has 34 percent protected land, as shown below in Figure 5:

Figure 5: **Protected Land in the Cat-Del System, 1997 vs. 2009**



This figure illustrates a signal achievement of the Land Acquisition Program. Through a continuation of existing policies (with the modifications presented in this Plan) the percentage of protected lands is expected to grow substantially between now and 2022.

2. Protected Land by Reservoir Basin - The overall level of protected lands in the Cat-Del System is more impressive if viewed by reservoir basin. The vast size of the City’s water supply, with multiple terminal² reservoirs in each of two complimentary systems (three if the Croton System is included) implies that the level of protection within the system should be judged partly by *where* the protected lands are located. A simple example helps to illustrate this point:

Consider a hypothetical 150,000 acre watershed with two reservoirs, “South” and “North.” “South” is a terminal basin of 50,000 acres that is 20 percent protected (10,000 acres), while “North” is a larger, non-terminal basin that is 100,000 acres in size and 50 percent protected (50,000 acres). The overall level of protection is 40 percent, *but most of that protected land is located in the less critical, non-terminal reservoir*. If, on the other hand, that protected land was evenly divided, with 30,000 acres in each basin, the overall level of protection remains at 40 percent but the *effective level of protection* is higher, because a higher proportion of the terminal basin is protected:

Table 4: **Effective Level of Protection (example)**

<i>Scenario 1</i> (Non-Terminal more protected)	<u>Reservoir</u>	<u>Basin Land Area</u>	<u>Protected Land</u>	<u>Percent Protected</u>
	“South” (Terminal)	50,000	10,000	20%
	“North” (Non-Terminal)	100,000	50,000	50%
	Total	150,000	60,000	40%

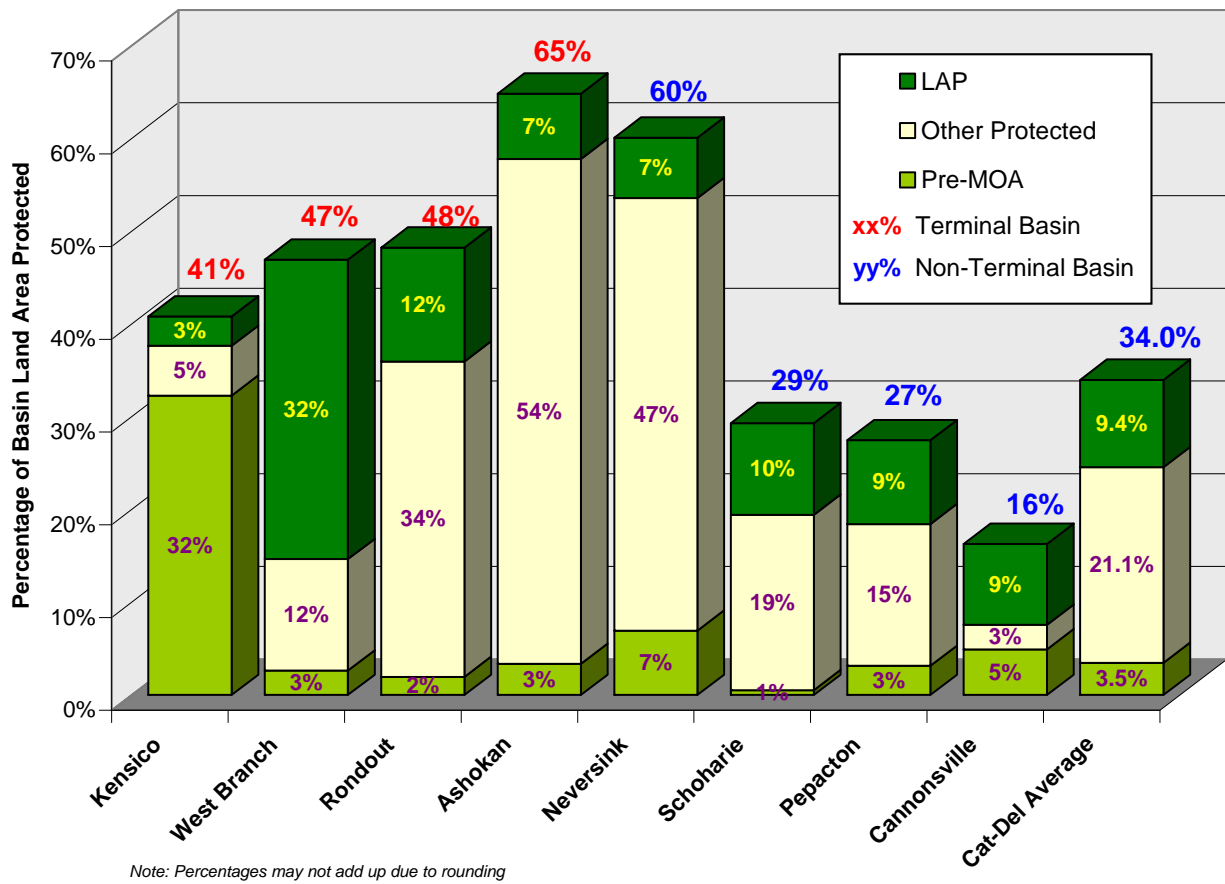
<i>Scenario 2</i> (Terminal more protected)	<u>Reservoir</u>	<u>Basin Land Area</u>	<u>Protected Land</u>	<u>Percent Protected</u>
	“South” (Terminal)	50,000	30,000	60%
	“North” (Non-Terminal)	100,000	30,000	30%
	Total	150,000	60,000	40%

² A terminal reservoir is a reservoir which, under certain operating conditions, is the last reservoir prior to distribution. In the Cat-Del System there are four terminal reservoirs: Kensico, West Branch, Ashokan and Rondout. Terminal basins are of greater concern for protection because they are the final “stop” before water is delivered to the consumer.

The same acreage of protected lands (60,000) affords a higher degree of watershed protection in Scenario 2 because all of the water from the North basin flows into the South Basin; with an under-protected terminal basin, clean water yielded from the non-terminal basin can be degraded upon entering the terminal reservoir.

In practice, the Cat-Del System, and its distribution of protected lands, more closely resembles Scenario 2, in which the terminal reservoir basins have a higher percentage of protected lands than the non-terminal basins:

Figure 6: **Protected Land as a Percentage of Basin Land Area**



In order to reflect the importance of terminal reservoir basins in the evaluation of protected lands, LAP has developed an alternative metric which directly incorporates the total volume of water diverted³ from each reservoir to develop a “Diversion-Weighted Level of Protected Land.” Using this metric, acres in terminal reservoirs receive a higher weighting because those acres afford protection not just for the volume of water contributed by overland flow within its own basin, but also for water from upstream reservoirs:

³ “Diverted” water refers to water which exits the reservoir via an aqueduct to be delivered to the next reservoir or to the distribution system.

Table 5: **Diversion-Weighted Level of Protected Land**

<u>System</u>	<u>Reservoir</u>	Percent Protected Land	Average Annual Diversions 1992 to 2008 (mg)	Percentage of Total Diversions	Cumulative Diversion-Weighted Average
Delaware	Cannonsville	16.3%	52,629	3.7%	0.6%
	Pepacton	27.5%	116,631	8.1%	2.2%
	Neversink	60.1%	44,447	3.1%	1.9%
	Rondout	48.2%	261,629	18.2%	8.8%
	West Branch	46.9%	281,744	19.6%	9.2%
Catskill	Schoharie	29.3%	67,734	4.7%	1.4%
	Ashokan	64.8%	174,758	12.1%	7.9%
	Kensico	40.8%	439,029	30.5%	12.5%
Cat-Del Totals		34.0%	1,438,602	100.0%	44.3%

Another useful metric to characterize the level of protection in the Cat-Del System incorporates weighting based on the contribution of each reservoir basin to overall supply. Historical supply data from 1992 to 2007 show that 47.1 percent of total supply comes from the Pepacton and Ashokan Basins:

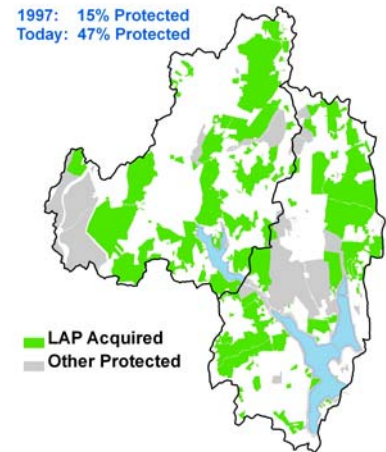
Table 6: **Supply-Weighted Level of Protected Land**

<u>System</u>	<u>Reservoir</u>	Percent Protected Land	Average Annual Contribution to Supply 1992 to 2007 (mg)	Percentage of Total Supply	Cumulative Supply-Weighted Average
Delaware	Cannonsville	16.3%	52,629	11.9%	1.9%
	Pepacton	27.5%	116,631	26.3%	7.2%
	Neversink	60.1%	44,447	10.0%	6.0%
	Rondout	48.2%	43,480	9.8%	4.7%
	West Branch	46.9%	19,770	4.5%	2.1%
Catskill	Schoharie	29.3%	67,734	15.3%	4.5%
	Ashokan	64.8%	92,298	20.8%	13.5%
	Kensico	40.8%	6,876	1.5%	0.6%
Cat-Del Totals		34.0%	443,866	100.0%	40.6%

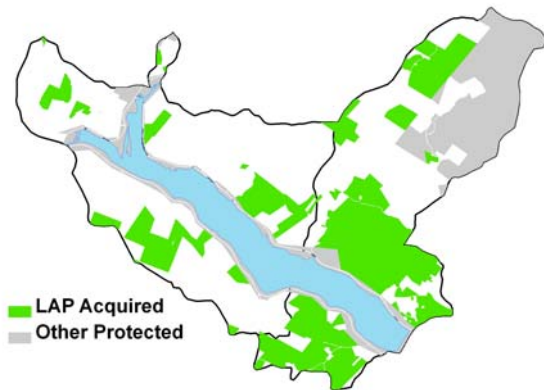
The distribution of protected lands in the Cat-Del System is a driving force in the development of this Long-Term Plan. The three measures of the level of protection in the Cat-Del System presented above show that the distribution of protected lands supports the City’s overall protection goals. Looking forward, LAP can augment the high current level of protection in terminal basins, and in basins with a high contribution to supply, through an increased focus on basins and sub-basins with lower levels of protection. While solicitation will continue throughout the watershed, including in highly-protected Priority Areas 1A, 1B and 2, LAP will fine-tune its solicitation schedules and project design policies to emphasize acquisitions in the less-protected parts of the watershed.

3. Success Stories - As described above, LAP has protected approximately 9.4 percent of the Cat-Del System, raising the overall level of protection to 34 percent. Within that system-wide result lie specific areas where LAP has had an even more dramatic impact. Areas of concentrated success can be attributed to a variety of factors, including the duration of solicitations, market conditions, property configurations and socioeconomic factors.

West Branch/Boyd's Corner: These two connected reservoir basins are located East-of-Hudson, but serve as a terminal reservoir basin for the Delaware System. They are located in Putnam County, which was the second fastest growing county in NY State between 1990 and 2000. The rapid suburbanization of these two critical basins was a serious concern in the mid-1990s. The City's Pre-MOA buffer around the reservoirs is very narrow (totaling 683 acres) and the combined total of City, municipally- and State-protected lands was only 15% of the total basin land area in 1997.

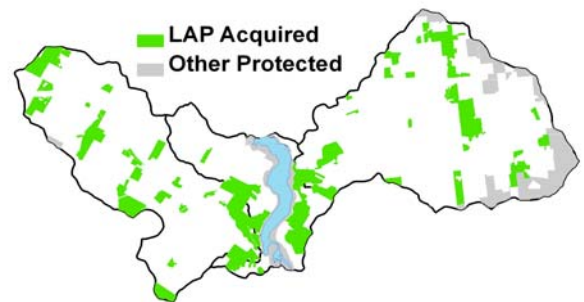


Due to fortuitous timing and a ready supply of large properties with willing sellers, LAP has now acquired over 8,300 acres of land, raising the level of protection by the City and others from 15 percent to 47 percent. These purchases, most of which were completed before 2001 at a cost of about \$78 million total, probably represent LAP's most important regional achievement.



Rondout Direct Tributaries: Like West Branch, Rondout is a terminal basin in the Delaware System, and it too has very narrow buffer lands (totaling 1,222 acres) around the reservoir. Unlike West Branch, the Rondout Basin is characterized by rural (rather than suburban) and forested land uses. The northern portions of the basin are largely State-owned land, but the sub-basins containing the direct tributaries to the reservoir (excluding Chestnut Creek and Rondout Creek) were much less protected as of 1997, with a total of 19 percent protected land. LAP has acquired over 6,700 acres in these sub-basins, raising the level of protection to 45 percent.

Schoharie Direct Tributaries: The Schoharie Reservoir also has a very narrow strip of Pre-MOA buffer lands totaling 1,038 acres. LAP acquisitions adjoining that buffer, as well as in the Bear Kill and Manor Kill sub-basins, have increased the level of protection from 7 percent in 1997 to 21 percent today.



Other notable areas of success include the following:

<u>Sub-Basin(s)</u>	<u>1997 Protected Acres (%)</u>	<u>2009 Protected Acres (%)</u>
Beaver Kill / Little Beaver Kill sub-basins (Woodstock)	7,521 (28%)	12,842 (48%)
Batavia Kill Main Stem and tributaries (Greene Co.)	3,352 (9%)	8,247 (22%)
East Branch Delaware River Headwaters (Roxbury)	813 (3%)	6,175 (19%)

Section IV – Land Use Trends in the Cat-Del System

Land use patterns in the Cat-Del System vary widely according to location, but the period since 1997 has been generally characterized by stability. The biggest change in land use since 1998 is the increase in protected lands from 24 percent to 34 percent of the basin land area.

A. East-of-Hudson

Land use in the Kensico and West Branch/Boyd’s Corner reservoir basins consists primarily of medium-density residential uses.

The Kensico basin has the highest residential density in the Cat-Del System, averaging about 50 residential units per 100 acres of basin land area. Most of this development occurred prior to 1990. With very little available vacant land remaining for development, Kensico has seen little new development in the past 12 years, although in some cases owners have replaced smaller residences with new larger “McMansions.”

In contrast to Kensico, the West Branch and Boyd’s Corner basins in Putnam County have experienced rapid residential development and population growth in recent years. Between 1990 and 2000 Putnam County was the second fastest growing county in New York State, increasing in population from 83,941 to 95,745, or 14.1 percent⁴. In keeping with this pace of development, the period since the inception of LAP saw an increase of approximately 300 residential units in these basins, and demand for housing remains strong. This growing population has created a strong demand for additional commercial development, but most of the commercially-zoned areas serving the population in these basins are located outside the Cat-Del System.

B. West-of-Hudson

1. **Population** - In contrast to the fast growth in Putnam County, population growth West-of-Hudson (WOH) was generally low, except for Sullivan County:

Table 7: Population within NYC Watershed by County 1990 to 2008, West-of-Hudson⁴

<u>County</u>	<u>1990 Population</u>	<u>2000 Population</u>	<u>Percent Change 1990 to 2000</u>	<u>2008 Population</u>	<u>Percent Change 2000 to 2008</u>
Delaware	25,137	25,679	2%	24,998	-3%
Greene	9,024	9,407	4%	9,764	4%
Schoharie	1,083	1,134	5%	1,110	-2%
Sullivan	2,287	2,735	20%	3,002	10%
Ulster	9,356	9,872	6%	10,260	4%
Totals	46,887	48,827	4%	49,134	1%

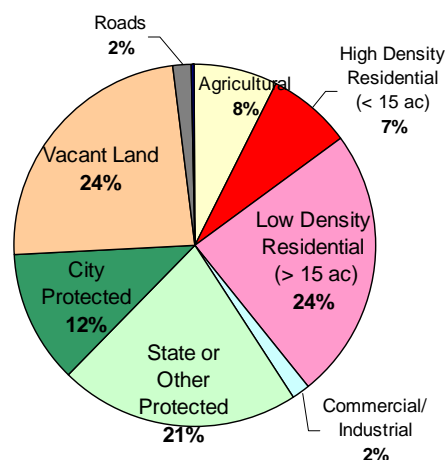
⁴ US Census (1990, 2000; Demographics Now, 2008), adjusted by DEP; County populations within the watershed were estimated using town population, pro-rated using the proportion of the town’s residences within the watershed.

Population growth in Delaware County, which contains about half of the WOH population, was essentially flat during the period from 1990 to 2008, while Greene, Sullivan and Ulster Counties experienced somewhat higher population growth. These census counts understate the actual pace of residential growth in the watershed, since population counts exclude seasonal or second-home residents. The 2000 Census of Housing shows that the percentage of total housing units used for “seasonal, recreational or occasional use” averages about 20 to 25 percent in the WOH District.

2. Land Use - An examination of land use across the WOH shows the rural character of the region. “Urban” uses, including residential lots under 15 acres, and commercial /industrial parcels comprised less than 10 percent of the total. In contrast, about 48 percent of the land consists of privately-owned vacant land and residential parcels over 15 acres.

Table 8: **West-of-Hudson Land Use Based on 2008 Town Assessment Data**

<u>Land Use Category</u>	<u>Parcels</u>	<u>Acres</u>
Agriculture	865	74,812
High Density Residential (< 15 ac.)	29,085	72,739
Low Density Residential (> 15 ac.)	4,438	241,546
Commercial / Industrial	3,377	16,236
State or Other Protected	1,664	212,094
City Protected *	2,561	116,459
Vacant Land	17,298	237,019
Roads +	n.a.	16,814
No Data	690	3,542
Total	59,978	991,261



* Includes Pre-MOA (excluding reservoirs) and Closed Fee , Closed CE and Closed WAC CE

+ Road rights-of-way, determined by subtracting the sum of the parcel data from total basin land area

3. Agriculture - Agricultural land WOH is focused almost exclusively in the Cannonsville, Pepacton and Schoharie Basins, particularly in the Cannonsville basin in the towns of Hamden, Delhi, Kortright, Stamford, Bovina and Harpersfield. In these towns, dairy farming has traditionally been a dominant feature of the local landscape. From the standpoint of watershed protection, farms are critical in that they are typically comprised of relatively large contiguous holdings of land with moderate slopes, extensive road frontage and significant surface water features. DEP’s Watershed Protection Program has recognized the critical importance of these working landscapes, and the City has devoted significant resources to the Whole Farm Program and the WAC CE Program.

While this prominent role of agriculture in the local economy continues, agriculture, and dairy farming in particular, has been in decline in recent years. An examination of data from the USDA’s Census of Agriculture, conducted every five years on a county-wide level, portrays a consistent downward trend in agriculture for counties in the watershed as well as other nearby counties:

Table 9: **Agricultural Data by County, 1997, 2002 and 2007** ⁵

<u>County</u>	----- Number of Farms -----			--- Average Farm Size (acres) ---		
	<u>1997</u>	<u>2002</u>	<u>2007</u>	<u>1997</u>	<u>2002</u>	<u>2007</u>
Delaware	848	788	747	231	243	222
Greene	292	342	286	176	169	155
Schoharie	600	579	525	194	195	182
Sullivan	383	381	323	159	167	156
Ulster	500	532	501	149	157	150

Counties outside the watershed

<u>County</u>	<u>1997</u>	<u>2002</u>	<u>2007</u>	<u>1997</u>	<u>2002</u>	<u>2007</u>
Broome	627	588	580	150	167	149
Chenango	977	960	908	202	198	195
Columbia	545	498	554	219	240	192
Otsego	1,023	1,028	980	214	201	180

Looking exclusively within the watershed, land coded agricultural⁶ using the town assessment data for the WOH has declined from 123,000 acres in 1998 to approximately 88,000 acres today⁷.

4. Residential Development Trends - As shown in Table 8, residential development comprises over 314,000 acres in the WOH District, making it the most common private land use on an acreage basis. Given national and regional socioeconomic and land use trends, residential development is currently the primary land use to which vacant lands in the watershed are converted. LAP fair market value appraisals confirm this, in that residential use is consistently listed as the “highest and best use” for almost all watershed land. For these reasons, an understanding of the patterns of residential development in the watershed is important for acquisition planning.

Some town assessment rolls contain the “year built” for each residential lot. This data can be used to evaluate the pace and characteristics of residential development over time. The 2008 town assessment data, as provided to the NYS Office of Real Property Services, shows 15 WOH towns with year-built data for 85 percent or more of the residential parcels.⁸

Table 10: **Median Parcel Size over Time for Residential Lots by County, Sample Towns**

<u>County</u>	<u>Year Built</u>	<u>Number of Residences Built</u>	<u>Median Size (acres)</u>
Delaware (4 Towns)	Before 1960	2,647	0.5
	1960 to 1969	473	1.8
	1970 to 1979	790	3.7
	1980 to 1989	1,225	5.6
	1990 to 1999	442	5.9
	2000 or later	370	7.2

⁵ US Dept of Agriculture, 2002 and 2007; data is for entire county, including portions outside the NYC Watershed.

⁶ Property Use Codes 100 through 189, NYS Office of Real Property Services.

⁷ Agricultural land in 2008 includes 74,812 acres per assessor’s code (see Table 8) plus most, but not all of the land currently in WAC CE’s. Approximately 80 percent or 13,200 acres of the WAC CE lands are coded agricultural.

⁸ The 15 towns are as follows: Andes, Kortright, Middletown and Walton (Delaware County); Ashland, Hunter, Jewett, Lexington, Prattsville and Jewett (Greene County); Neversink (Sullivan County) and Hurley, Olive, Wawarsing and Woodstock (Ulster County). In the remaining WOH towns, year built data is completely missing or available for less than 85 percent of the residential parcels.

Table 10: (continued)

<u>County</u>	<u>Year Built</u>	<u>Number of Residences Built</u>	<u>Median Size (acres)</u>
Greene (6 Towns)	Before 1960	2,238	1.0
	1960 to 1969	498	1.1
	1970 to 1979	1,012	1.1
	1980 to 1989	1,575	1.3
	1990 to 1999	564	3.2
	2000 or later	791	2.6
Sullivan (Town of Neversink)	Before 1960	314	2.6
	1960 to 1969	188	2.0
	1970 to 1979	213	2.1
	1980 to 1989	218	2.2
	1990 to 1999	127	3.3
	2000 or later	87	4.1
Ulster (4 Towns)	Before 1960	1,219	1.7
	1960 to 1969	309	1.3
	1970 to 1979	415	2.0
	1980 to 1989	391	3.1
	1990 to 1999	169	3.9
	2000 or later	154	4.3

The data from these 15 towns provides a representative sample to evaluate both the timing and size of land parcels devoted to residential use. Two trends are clear:

- The median size of residential lots has increased over time, particularly since 1990. This trend reflects the increased proportion of residential construction for second homeowners, and development activity skewed away from traditionally denser hamlet areas; and
- The volume of residential development since 1990 has moderated from the levels seen in the 1960's, 70's and 80's.

Both of these trends support the observation that the strong real estate market in recent years has not resulted in large-scale subdivision activity as was often the case in previous decades.

Section V – Long-Term Plan Goals

This Long-Term Plan covers the ten-year period from 2012 to 2022. As discussed in Section III, LAP acquisitions since 1997 have increased protected lands in the Cat-Del System from 24 percent to 34 percent of the system land area. More importantly, the spatial distribution of those protected lands, which are disproportionally found in the terminal reservoir basins of the Cat-Del System, provide a firm foundation for LAP's efforts over this coming ten-year period.

This Plan was developed through a careful evaluation of program activity, regional land use and economic trends, as presented above, with input from other stakeholders, including the City's regulators, local elected officials in the watershed and the environmental community. As a result of these evaluations and input, five specific goals have been identified:

1) Continue LAP's proven real estate methods that have resulted in the acquisition of over 96,000 acres in the Cat-Del System since 1997.

Since 1997, LAP and WAC have acquired over 1,150 parcels using the real estate and planning methods described in Section II. These methods, continued through 2022, can be expected to yield additional acreage of protected lands, with a continuing emphasis on preserving lands with a high water quality protection value.

2) Increase the percentage of protected lands in the Cat-Del System as a whole, with a particular emphasis on:

- **Non-terminal reservoir basins with less than 30 percent protected lands;**
- **Specific sub-basins with a relatively low percentage of protected lands; and**
- **Reservoir basins that are expected to provide larger contributions to future water supply.**

While widespread solicitation over the period from 2012 to 2022 is sure to increase the percentage of protected lands system-wide, specific basins and sub-basins merit focused solicitation efforts based on some combination of their location within the system as a whole, the basin or sub-basin's level of protection, and a basin's anticipated contribution to future water supply. These "Areas of Focus" are identified in Section VI, along with specific strategies that will concentrate LAP and WAC acquisition efforts on these areas.

3) Develop parcel selection procedures to maximize the water quality benefit of acquisitions.

LAP is committed to soliciting parcels whose acquisition provides the maximum possible water quality benefit relative to other parcels. This can be accomplished through a combination of regional strategies, such as focusing on under-protected basins and sub-basins, as well as parcel-specific considerations.

The parcel ranking system that has served as a general guide to parcel selection in the non-terminal basins (see Section II.C.3, page 4) will be augmented by incorporating a new GIS stream network, expected to be completed in 2011. This new layer, to be developed using a high resolution LiDAR-generated⁹ topographic model, should provide a more accurate and complete stream network for input into the ranking process. Development potential will also be more fully incorporated into the ranking system through the addition of a new road frontage factor.

Parcel selection under this Plan will primarily consist of iteratively evaluating the 375,000 acres already solicited but not yet acquired, since few of the remaining unsolicited acres merit pursuit. The ranking system will be used in conjunction with the regional Areas of Focus to prioritize LAP efforts to acquire a significant portion of these remaining solicited acres.

⁹ LiDAR, or Light Detection and Ranging, is a laser-based remote sensing technology that can be used to develop high resolution terrain models.

4) Build on our existing programs to promote City Lands as a working landscape in partnership with local communities.

Many local communities have consistently expressed how important recreational access, forestry and agriculture are to their local economy, which has historically been focused on these land-dependent activities. Under the MOA, the City committed to consider recreational access for lands acquired in fee simple. Since 1997, DEP has expanded the use of City fee lands that support local economic vitality while maintaining its obligation to protect water quality. Increased recreational access, in partnership with DEC, has been at the forefront of these changes.

These efforts have gained a measure of acceptance, even among traditionally skeptical communities in the West-of-Hudson watershed. The City's continued commitment to expand the use of City lands holds the potential to further improve community support for land acquisition, which can bolster the City's acquisition efforts through 2022.

5) Develop strategies to promote the wise use of acquisition funds over the long-term.

As shown in Table 2 (page 7), acquisition costs vary tremendously within the Cat-Del system. Further, the high cost areas (Kensico, West Branch and Ashokan, in descending order) correspond in large part to the basins that now have the highest percentage of protected lands. Therefore the incremental protection value of acres acquired in the less-protected basins WOH is higher than the value of acquiring acreage in more expensive, highly protected basins. For these reasons, LAP's parcel selection strategy will more directly consider cost and levels of protection.

LAP is still committed to pursuing the acquisition of compelling parcels – those with significant development potential in close proximity to surface water features – wherever they are found. However LAP does not intend to focus on acquisition of properties in higher-valued basins if those properties have limited development potential and/or are in less sensitive locations with respect to water quality.

Section VI – Strategies to Achieve these Goals

The five goals outlined above will be implemented using solicitation and project design strategies that will vary by region and property type. Those strategies are outlined below. Section VII provides basin-specific plans for the application of these strategies.

A. Areas of Focus

Areas of Focus have been developed to identify basins and sub-basins which warrant additional attention for solicitation based on current levels of protection, success rates, contribution to water supply and other factors.

1. Less-Protected Reservoir Basins - The Schoharie, Pepacton and Cannonsville basins are the largest basins in the Cat-Del System, together comprising some 720,000 acres or over 70 percent of the system land area. They contain about 75 percent of the remaining solicited land. For this reason, any acquisition strategy from 2012 to 2022 will necessarily be focused on these

three basins. The fact that these three non-terminal basins also contain the lowest percentage of protected lands (as shown in Figure 6 and Tables 5 and 6) provides further justification for this focus.

2. Critical Sub-Basins - Each reservoir basin is comprised of discrete sub-basins whose location, topography and land use patterns vary in ways that greatly influence the water quality leaving each reservoir. LAP has identified several categories of sub-basins whose characteristics merit heightened focus:

a. Sub-Basins Near Intake - Sub-basins which drain directly into a reservoir near intakes¹⁰ are particularly sensitive because an inflow of pollutants from even a small sub-basin at these locations can have a large impact on the overall quality of water leaving the reservoir. This factor, identified by the City through study of the Malcolm Brook sub-basin at the Kensico intake, was reflected in the Priority Area 1A designations for basins within 60-day travel time. LAP plans to extend this concept to specific sub-basins in Priority Areas 3 and 4.

As shown in Section III.B.3, LAP has had particular success in raising the level of protection in several of these areas, including Rondout 1A and the sub-basins near Schoharie Reservoir. In other basins, such as Pepacton and Cannonsville, sub-basins near intake have had low success rates. The latter sub-basins merit careful attention, and LAP will develop specific strategies, as further discussed in Section VII, to improve our success rates in these areas.

b. Less-Protected Sub-Basins – While basin-wide protection levels provide a useful tool to evaluate system-wide progress, the distribution of protected lands on a sub-basin level reveals patterns masked at the basin level. As shown in Figure 7 (page 31), sub-basins with less than 20 percent protected lands are primarily located in the Pepacton and Cannonsville Basins. In cases where these sub-basins are also located near intakes (such as the Tremper Kill, Bryden Hill and Bryden Lake sub-basins north of the Pepacton Reservoir), protection efforts are particularly critical.

3. Contribution to Future Supply - The LAP Priority Areas emphasize travel time to distribution as a primary concern for water quality protection. The success of LAP to date in increasing protected lands in Priority Areas 1 and 2 allows us to add additional factors going forward to prioritize future acquisitions to build on this success. One such factor is the proportion of source water originating from each reservoir basin.

Basin size, meteorological factors and topography combine to endow each basin with a base annual flow, but the vast size and configuration of the Cat-Del System provide DEP with flexibility in determining the day-to-day mix of basin sources to meet daily supply needs. Bureau of Water Supply (BWS) Operations staff take advantage of this flexibility to meet multiple objectives including water quality, reserved storage for drought protection and mandated downstream releases. Historical contributions to supply in the Cat-Del System are presented in Table 11.

Long-term planning by BWS has identified several trends which will influence future supply rates. These trends, including turbidity control measures for the Catskill System, improved water quality

¹⁰ *Intakes* are the point where water leaves the reservoir and enters an aqueduct for transport towards distribution.

in the Cannonsville Basin and the pending completion of the Croton Filtration Plant will result in supply shifts that should be taken into consideration in planning LAP’s solicitation strategy. As shown in Table 11, the Ashokan and Pepacton basins will continue to provide the most supply, with increased projected for Rondout, Cannonsville and especially the Ashokan basin (highlighted in blue).

Table 11: **Historical and Projected Future Contributions to Overall Supply**

<u>System</u>	<u>Reservoir</u>	<u>Historical Average Contribution 1992 to 2008 (mgd)</u>	<u>Projected Future Contribution under Modified Reservoir Operations¹¹</u>
Delaware	Cannonsville	52,629 (11.9%)	48,655 (12.4%)
	Pepacton	116,631 (26.3%)	88,685 (22.7%)
	Neversink	44,447 (10.0%)	31,795 (8.1%)
	Rondout	43,480 (9.8%)	48,366 (12.4%)
	West Branch	19,770 (4.5%)	10,534 (2.7%)
Catskill	Schoharie	67,734 (15.3%)	54,183 (13.9%)
	Ashokan	92,298 (20.8%)	102,047 (26.1%)
	Kensico	6,876 (1.5%)	6,589 (1.7%)

In practice, these three Areas of Focus (Less-Protected Basins, Critical Sub-Basins and Contribution to Future Supply) overlap to some degree. For example, the sub-basins north of Pepacton Reservoir qualify in all three categories and therefore will be Areas of “High” Focus, while certain sub-basins in Schoharie Basin that already have a high percentage of protected land only qualify on the basis of one factor (Less-Protected Basins) and will receive less focus.

B. Property-Type Strategies

As discussed above, LAP expects to continue to re-solicit most of the 375,000 acres of solicited land not yet acquired. The vast majority of these solicited parcels are comprised of vacant land over 20 acres in size or residential parcels over 30 acres with slope or surface water features that merit protection for water quality protection. However some marginal parcels previously solicited will not be actively pursued, and some new lands will be solicited, according to the criteria detailed below:

1. Parcels Adjoining Previously-acquired Land – Parcels adjoining lands acquired in fee simple should continue to be identified and solicited to support multiple program objectives, including management efficiency, increased utility for working landscape partnerships and recreational opportunities. The importance of these program objectives will result in the solicitation of some connecting parcels that would not otherwise merit consideration based solely on water quality criteria. The identification of these parcels will be continually updated as new acquisitions occur.

2. Smaller Vacant Parcels in Proximity to Surface Water Features – The Cat-Del System includes over 1,000 vacant parcels of between 10 and 20 acres, taken alone or in small assemblages. On one hand, many of these lots lack the steep slopes or proximity to streams associated with significant water quality impacts. However other small lots, especially those in

¹¹ *Projected Future Contribution* evaluated using the BWS OASIS model and is subject to change. Total Cat-Del diversions in these projections are lower than in the 1992 to 2008 data due to a projected increase in the use of Croton System supply upon completion of the Croton Filtration Plant.

proximity to streams, merit protection. Program experience since 1997 has also shown that the management burden of smaller fee lots is relatively minimal, particularly compared with CEs. For these reasons, LAP will identify more small lots near water for solicitation, particularly in Areas of Focus. This strategy will enable LAP to maximize the water quality impact of its acquisitions.

3. **Conservation Easements** – In contrast to fee simple acquisitions, CEs require a significant ongoing dedication of resources for annual monitoring and occasional enforcement. Despite these long-term costs, CEs provide a unique tool to protect lands (particularly those with residences) whose owners are not interested in selling their land outright. Under the Long-Term Plan, CE guidelines will include an assessment of the natural features criteria, development potential and location of the proposed CE in the context of the regional protection goals discussed above:

- a. ***Properties in well-protected Basins and Sub-Basins*** – In locations where protected lands already comprise a high percentage of the basin and/or sub-basin area, potential CE's between 75 and 100 acres will be evaluated to ensure that their development potential and proximity to surface water features merit proceeding with the acquisition;
- b. ***Properties in Areas of Focus*** – LAP will develop guidelines to acquire smaller CEs (under 75 acres) in less-protected basins and sub-basins, particularly where land use patterns result in a higher degree of landowner interest in CEs in comparison to fee simple acquisition. In **Areas of High Focus**, such as the sub-basins north of the Pepacton Reservoir in Andes and Colchester, smaller parcels will be more likely to be pursued than in other areas; and
- c. ***Compelling Properties*** – LAP will continue to pursue CEs on properties over 100 acres with significant development potential and proximity to surface water throughout the watershed.

Size, natural features, development potential and location will be the primary programmatic criteria used to make decisions to pursue a particular CE, but other factors will continue to be considered although in ways that may vary from past practice depending on the level of protection in a given area. These factors include the size and configuration of tax parcels comprising the CE, the presence or absence of other CE's on adjoining or nearby lands, and an analysis of the landowner's stated plans for future use of the property.

C. Solicitation Procedures

Under the Long-Term Plan, LAP will modify certain solicitation procedures at the margins to achieve the goals identified above, particularly regarding acquisitions in Areas of Focus and cost-benefit analysis. Under these new procedures, some parcels previously solicited may no longer be pursued, and in other cases new properties will be identified for solicitation:

1. **Continue to Solicit Significant Parcels Throughout the Cat-Del System** – The revised parcel ranking system and qualitative review will be used to clearly identify properties throughout the Cat-Del System that have a combination of significant development potential and a water quality sensitive location. As discussed below, these properties will be solicited on a regular basis.

2. **Develop Variable Solicitation Schedules** – LAP will fine-tune its overall solicitation schedule to support the priorities identified in this Plan. Since the start of formal re-solicitation in 2005, efforts to re-contact landowners have varied based primarily on the result of the most recent solicitation. Thus LAP has reviewed previous "Offer Refused" properties annually, re-contacted "Non-Responders" every two years and re-contacted "Owner Not Interested" parcels every five

years. Under the Long-Term Plan, these procedures will be replaced with solicitation schedules that reflect the Plan's new priorities:

- a. ***Re-Solicit every one to two years***
 - i. Parcels in Areas of High Focus
 - ii. Significant Parcels
- b. ***Re-Solicit every two to three years***
 - i. Other parcels in Areas of Focus
- c. ***Re-Solicit every four years***
 - i. All other parcels

3. Owner Initiated Contacts – Historically, about 30 percent of land is solicited as a result of owner-initiated contacts. These “call-ins”, which can occur on previously-solicited lands or “new” lands, have a high success rate due to owner motivation. LAP will seek to develop policies to encourage landowner-initiated contacts and will evaluate these properties in accordance with the strategies discussed above. Owner contacts on land not previously solicited will continue to be evaluated on a case-by-case basis, and are expected to result in a significant number of acquisitions.

D. Other Program Components and Improvements

The discussion above has primarily focused on solicitation and project design strategies that will govern LAP over the period covered by this Plan. A number of additional program features will impact how the Long Term goals identified in Section V are achieved:

1. Ongoing Discussions to Expand Designated Areas – The Coalition of Watershed Towns (CWT) challenged the increase in LAP funding under the 2007 FAD, substantially beyond the \$300 million level agreed to by the parties to the MOA, through litigation, among other contexts. In an effort to resolve the CWT's objections, and to seek input from interested parties as anticipated by the FAD prior to its application for a new WSP in 2010, the City has engaged in ongoing negotiations with the CWT, Delaware County and other stakeholders. The primary emphasis of these negotiations to date has been to expand the geographic extent and rules governing “Designated Areas” as defined in MOA Paragraph 68. Under the MOA, West of Hudson towns were given the opportunity to identify these Designated Areas, including villages, hamlets, village extension areas and industrial/commercial areas, and to determine, by resolution, whether to exclude the City's acquisition of property in fee simple in these areas. The intent of the Designated Areas was to “...provide reasonable opportunities for growth in and around existing population centers.”

In the current negotiations, the CWT requested and the City has tentatively agreed that each WOH town could identify additional “Expansion Areas” for future growth. The parties have agreed that such expansion areas are appropriate given the relatively small size of the MOA Designated Areas (which are already largely developed) and the increased scope of LAP. In addition, the City and the CWT have tentatively agreed, subject to acceptance by the regulatory agencies, that these Expansion Areas would be off-limits to all LAP acquisitions (including City and WAC CEs), not just to fee simple purchases as was previously the case.

As of this writing, 17 watershed towns have proposed Expansion Areas totaling about 39,000 acres. The City, together with the State, EPA, and several environmental groups have worked diligently with CWT, the watershed counties, and individual towns to balance community

concerns with water quality protection needs in determining the appropriate scope of each town's proposal. Currently the parties have agreed on the location of Expansion Areas in nine towns which have proposed 8,000 acres, while discussion is continuing on another eight towns whose current proposals total about 31,000 acres.

While a number of issues besides the specific Expansion Area proposals remain to be agreed on, the parties are optimistic that an agreement can be reached. The City is confident, based on the outline of this tentative agreement, that LAP can meet its regulatory commitments amid a renewed spirit of cooperation and partnership with local communities.

2. WAC Conservation Easement Program – The discussions in Sections II through IV have clearly highlighted the importance of agriculture to the landscape and economy of significant portions of the WOH District. The WAC CE Program provides critical support to farming in the watershed while protecting these sensitive lands from the potential impact of non-farm development. The EPA and DOH have recognized the importance of the WAC CE Program by requiring a series of increases in funding by the City, from the initial commitment of \$20 million in the MOA to \$70 million today. This level of funding is expected to ensure that the program can continue its current success and have adequate resources to meet the expected level of demand for CEs in the future.

As a part of this Plan, the City and WAC have identified several areas where the Program can be enhanced:

- a. **WAC Governance Procedures** – In accord with comments from the City and local stakeholders, WAC has initiated a comprehensive review of its internal governance procedures in areas including board composition, voting procedures, transparency and dispute resolution. This review is expected to be completed soon, and promises to streamline WAC operations and strengthen local partnerships.
- b. **Database and GIS Upgrades** – WAC has hired an outside consultant to develop an integrated database and GIS system which promises to improve planning, communications and record-keeping within WAC and with its partners, including local Soil and Water Districts and the City.
- c. **Coordinated Solicitation Planning** – The City and WAC are committed to developing an improved solicitation framework that will allow WAC solicitations to directly complement the City's solicitation plan and to support the goals in this Plan.
- d. **Small Farms** – LAP and WAC have had ongoing discussions aimed at closing a program gap focused on small-scale farm operations. In recent years a number of small specialty farms have been established in the watershed. In some cases the size and nature of the small farms do not fit well into current program parameters for either WAC or City CEs. WAC and the City will pursue modifications to fill this gap.

3. Land Trust Initiative - The 2007 FAD requires the City to “substantially increase the use of land trusts and other non-government organizations to identify and help the City acquire eligible lands”, and to prepare a strategy that outlines the City's plans to do so. Accordingly, DEP issued its Land Trust Strategy in November 2007, as well as a 2008 annual summary of efforts taken in accordance with the Strategy. Of the program areas described in those documents or subsequently pursued, those that are the most promising for long-term implementation at this time appear to be:

- a. ***Solicitations of landowners by land trusts*** - One land trust has been engaged to solicit 30 non-responsive landowners in the West Branch basin, and a second has stated an interest in doing so in the Ashokan basin. The goal is to convert non-responding landowners into sellers.
- b. ***Acquisitions by land trusts of properties to be conveyed to DEP*** - A number of “pass-through” transactions have been successfully completed and/or signed to date, and this process is expected to continue to generate roughly one or two successful projects per year.
- c. ***Acquisition of conservation easements by land trusts*** - Some landowners may be willing to encumber their land with CEs if a land trust, rather than the City, is the “grantee” (owner and long-term monitor and enforcer of the CE). The City is aware of two such instances, and is working with a land trust to develop a process through which City funds could be used by the land trust to acquire CEs for long-term ownership and stewardship – pursuant to the City’s MOA and FAD obligations.
- d. ***Strengthening of land trust capacity*** - The City has developed a process to offer financial support for events and forums that are hosted by land trusts in the watershed. These events are designed to increase landowner interest in selling real property interests. The City is also seeking other such ways to strengthen land trust capacities to work in the watershed. The City will continue to pursue development of this area, with the long-term goal of increasing landowner awareness of and interest in land protection options.
- e. ***Support of watershed, aquifer, and well-head protection plans by local municipalities*** - The City continues to explore opportunities to fund technical assistance and land acquisitions by local governments. The result would be land that is protected using City funds, but owned and managed by local municipalities.

All of these pending program areas appear likely to result in permanent protection of lands that would otherwise not be protected, which is the over-arching goal for developing partnerships with land trusts. Given this prospect of success, DEP will continue to work on developing and strengthening such relationships and programs with land trust partners.

4. Conservation Easement Language - The language that comprises the deed of conservation easement is critical to landowner acceptance of the City’s CE program. To date more than 100 landowners have sold over 16,000 acres of easements to the City, with many more being actively negotiated. This success can be attributed in part to the City’s efforts to revise language over time in order to find a balance between landowner acceptance and defensible protection and enforcement provisions. Since 1999 (when the first model easement document was finalized), certain language improvements have been made; the following are just a few examples among many:

- a. Language pertaining to activities within building envelopes (which contain residential uses) was highly restrictive in the first model easement, and has been relaxed to include only minimal restrictions.
- b. In situations where a property is both under a DEP easement and enrolled in any NYS DEC-managed forestry program, language has been revised to reduce potential conflicts, thereby allowing landowners to avoid penalties that DEC might otherwise be required to issue for non-compliance with harvest or management plans.
- c. Agricultural use was prohibited in early versions of the City’s CE, but after recognizing that many landowners wished to engage in small-scale gardening or to maintain a few

domesticated animals, the model CE was revised to allow certain farming uses “as-of-right on” areas smaller than ten acres. This revision was made in consultation with WAC in order to ensure that both CE programs remained coordinated.

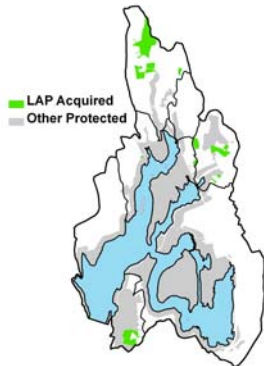
Thus, success of the City’s CE program – like other such CE programs – has depended in large part on careful balancing of the needs of both the City and the landowner. Further refinements of terms are being considered as of the writing of this Plan, and such evolution of language can be expected to continue during the period covered by this Plan.

5. Landowner Outreach and Public Relations – As a transaction-driven program, the success of LAP depends in large part on landowner perceptions and the information they receive regarding LAP and the NYC watershed. Efforts to improve LAP’s communications strategy can result in a greater volume of landowner-initiated solicitations, which historically have a much higher success rate than City-initiated contacts. Another goal of our communications strategy is to provide a counter-balance to enhance local press coverage. The following components of a success outreach strategy will be pursued:

- a. Improved web-based outreach and information sources;
- b. Utilization of land trusts in Education and Outreach;
- c. Regularly-scheduled local meetings to present LAP to landowners; and
- d. Greater use of print and broadcast media to reach watershed audiences.

Section VII – Basin Plans

A. Kensico Basin



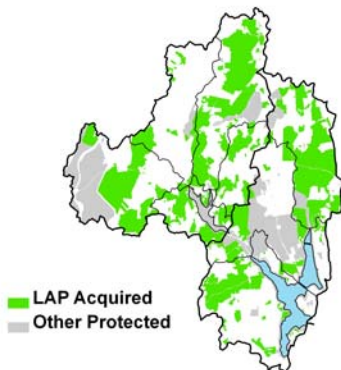
Overview:

Land Area:	6,406 acres
Acres Solicited:	1,072 acres
Acres Acquired:	207 acres
LAP Costs to Date:	\$34,083,000
Success Rate:	19 %
Protected Land (City, State, Other)	41 %
Comparative Costs:	Very High
Predominant Land Uses:	Suburban Residential Office / Institutional

Kensico, the terminal basin of the Catskill System, is located in a densely populated suburban area of Westchester County barely 15 miles north of New York City. Very little undeveloped land remains available for acquisition. While acquisition of certain parcels with significant development potential is warranted, the City can best manage future water quality in this critical basin through targeted remediation programs such as non-point source programs, septic repair and waterfowl management. Specific acquisition strategies will include:

- *Pursue significant parcels near streams;*
- *Pursue partnerships with other private and governmental bodies to offset high acquisition costs; and*
- *Cease solicitation of small, isolated parcels and parcels distant from streams.*

B. West Branch / Boyd’s Corner Basins



Overview:

Land Area:	25,830 acres
Acres Solicited:	14,834 acres
Acres Acquired in Basin:	8,338 acres
LAP Costs to Date:	\$78,660,000
Success Rate:	56 %
Protected Land (City, State, Other)	47 %
Comparative Costs:	High
Predominant Land Uses:	Suburban Residential

West Branch Reservoir is the terminal basin of the Delaware System, and 50 percent of average daily supply flows through its intake. The basin is characterized by medium and low density suburban development and high acquisition costs. Since 1997 LAP has acquired over 32 percent of the basin land area. The remaining solicited lands include several significant properties and a number of smaller vacant or low-density residential lots. Specific strategies:

- *Continue pursuit of significant parcels; and*
- *Evaluate smaller parcels for adjacency, development potential and proximity to streams.*

C. Ashokan Basin



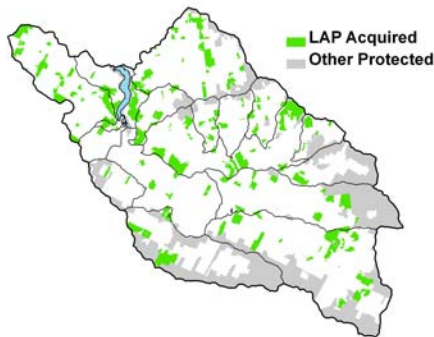
Overview:

Land Area:	155,299 acres
Acres Solicited:	46,716 acres
Acres Acquired:	10,952 acres
LAP Costs to Date:	\$34,366,000
Success Rate:	23 %
Protected Land (City, State, Other)	65 %
Comparative Costs:	Moderately High
Predominant Land Uses:	Forested Rural Low-Density Residential Forest Preserve

Over 82,000 acres of state-owned Forest Preserve land give Ashokan the highest percentage of protected land of all basins in the Cat-Del System. The southeastern portion of the basin, in the towns of Woodstock, Olive and Hurley, comprise a strong market for low- and medium-density residential development. Ashokan provides over 20 percent of daily supply and has been the focus of significant study with regard to turbidity associated with native soils and storm events. Specific strategies:

- *Areas of Focus: Entire Basin (large contribution to future supply);*
- *Continue regular solicitation of most lands previously solicited; and*
- *Selectively reduce solicitation of dry, steep and isolated building lots.*

D. Schoharie Basin



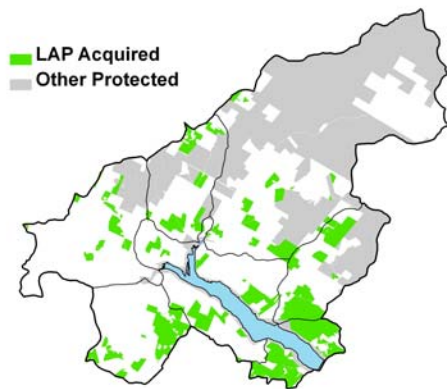
Overview:

Land Area:	200,895 acres
Acres Solicited (City):	95,777 acres
Acres Acquired (City):	19,001 acres
Success Rate (City):	20 %
WAC Acres Acquired:	843 acres
LAP Costs to Date:	\$57,385,000
Protected Land (City, State, Other)	29 %
Comparative Costs:	Moderately High
Predominant Land Uses:	Forested Rural Ski-oriented Residential Forest Preserve

The eastern portion of Schoharie has experienced higher levels of development than found in most other parts of the West-of-Hudson due to proximity to the Thruway and several large ski areas. This growth has resulted in higher land values and an increasingly high LAP success rate. The southern portion of the basin includes a high percentage of State Land. Specific strategies:

- *Continue regular solicitation of most lands previously solicited;*
- *Areas of Focus: Entire Basin (less-protected);*
- *Areas of High Focus: Johnson Hollow Brook and Schoharie Creek sub-basins (less-protected sub-basins); and*
- *Tailor CE solicitation based on the level of protection in a given sub-basin.*

E. Rondout Basin



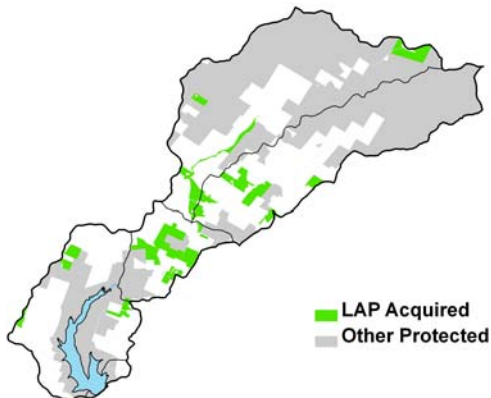
Overview:

Land Area:	59,003 acres
Acres Solicited (City):	30,379 acres
Acres Acquired (City):	6,290 acres
Success Rate (City):	21%
WAC Acres Acquired:	954 acres
LAP Costs to Date:	\$14,373,000
Protected Land (City, State, Other)	48 %
Comparative Costs:	Moderate
Predominant Land Uses:	Forested Rural Low & Medium Density Residential Forest Preserve

Rondout is characterized by State Forest Preserve lands to the north, very low-density residential uses to the southeast and hamlet development in the Town of Neversink to the southwest. LAP has experienced a low success rate in the Town of Neversink, possibly due to expectations of new casino-oriented development opportunities in Sullivan County. Specific strategies:

- *Continue regular solicitation of most lands previously solicited;*
- *Areas of Focus: Chestnut Creek and Red Brook sub-basins (less-protected); and*
- *Implement higher thresholds for CE acquisition (size, development potential) in sub-basins to the north.*

F. Neversink Basin



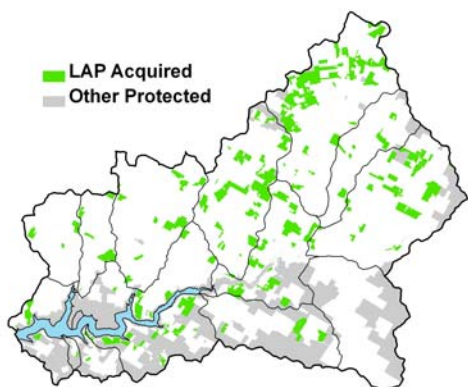
Overview:

Land Area:	57,410 acres
Acres Solicited (City):	22,147 acres
Acres Acquired (City):	3,229 acres
Success Rate (City):	15 %
WAC Acres Acquired:	508 acres
LAP Costs to Date:	\$4,482,000
Protected Land (City, State, Other)	60 %
Comparative Costs:	Moderate
Predominant Land Uses:	Forest Preserve Institutional Open Space Low Density Residential

After Ashokan, Neversink boasts the highest percentage of protected land in the Cat-Del System, The headwaters of the East and West Branches of the Neversink River are largely comprised of forest preserve and large private forested lands, and the absence of any significant population centers results in superior water quality. Specific strategies:

- *Continue solicitation of most lands previously solicited; and*
- *Implement higher thresholds for CE acquisition (size, development potential).*

G. Pepacton Basin



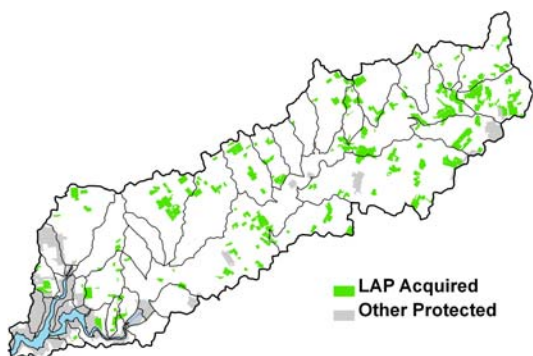
Overview:

Land Area:	232,276 acres
Acres Solicited (City):	121,590 acres
Acres Acquired (City):	18,531 acres
Success Rate (City):	15 %
WAC Acres Acquired:	2,481 acres
LAP Costs to Date:	\$40,602,000
Protected Land (City, State, Other)	27 %
Comparative Costs:	Low
Predominant Land Uses:	Low Density Residential Agricultural Forest Preserve

The sub-basins south of the reservoir contain extensive state land holdings. To the east, medium and low density residential land predominates in Middletown. The sub-basins north of the reservoir in Andes, Colchester and Hamden are characterized by a high proportion of low density residential land. Specific strategies:

- *Areas of Focus: Entire Basin (less-protected, high contribution to future supply);*
- *Areas of High Focus: Sub-basins north of reservoir (near intake and low percentage of protected land);*
- *Continue solicitation of most lands previously solicited; and*
- *Implement higher thresholds for CE acquisition (size, development potential) in sub-basins south of the reservoir.*

H. Cannonsville Basin



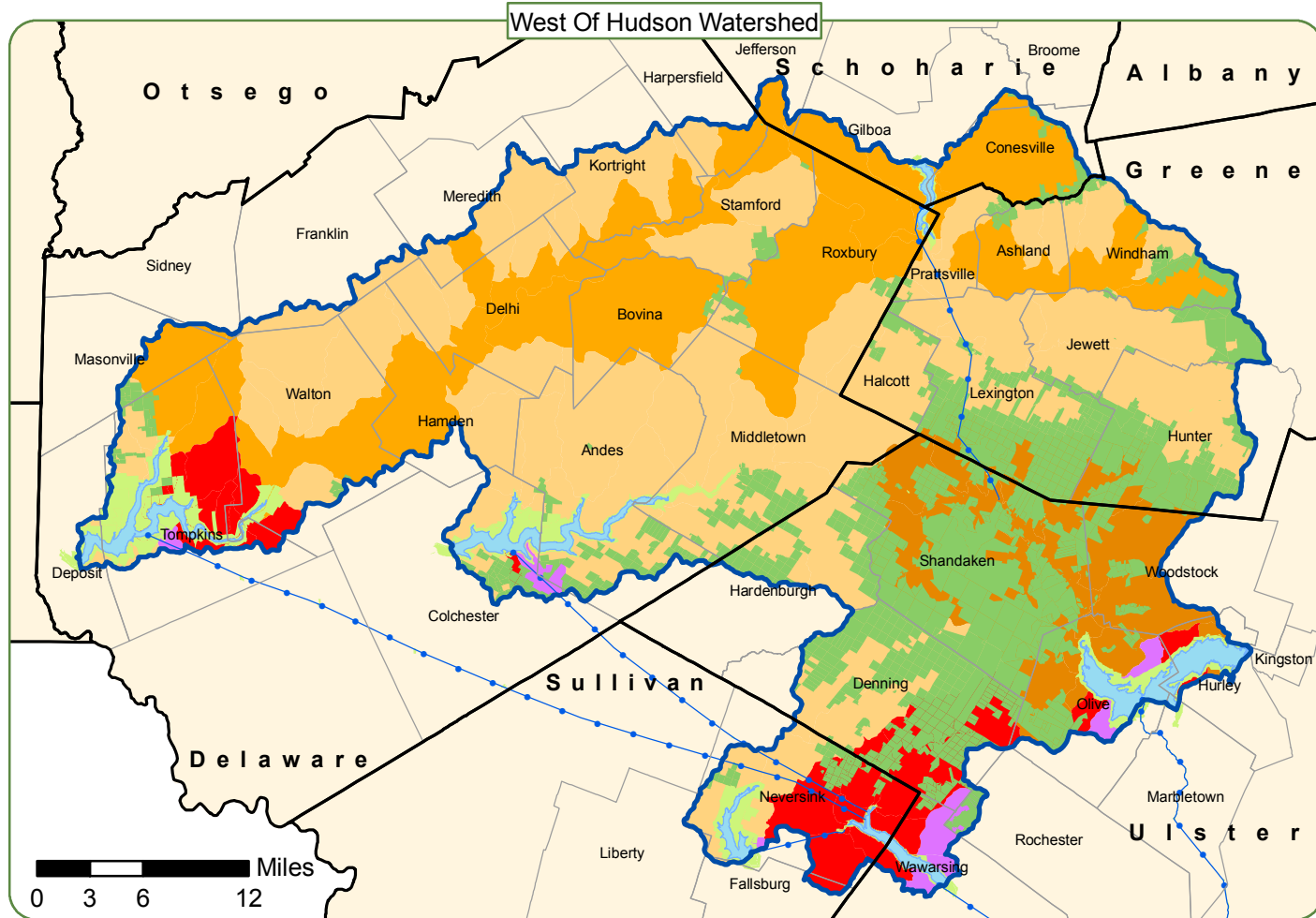
Overview:

Land Area:	286,377 acres
Acres Solicited (City):	142,624 acres
Acres Acquired (City):	12,791 acres
Success Rate (City):	9 %
WAC Acres Acquired:	12,168 acres
LAP Costs to Date:	\$37,465,000
Protected Land (City, State, Other)	16 %
Comparative Costs:	Low
Predominant Land Uses:	Agricultural Low /Medium Density Residential

The Cannonsville basin contains the majority of agricultural lands in the Cat-Del System, as well as a number of larger villages and hamlets. In addition, State land comprises only 2 percent of the land, much less than other WOH basins. The LAP success rate (10 percent) is low, due to the more recent onset of LAP solicitation activity (compared to other basins) and low values. Cannonsville has been the focus of a number of successful water quality remediation programs, and as a result the use of its source water for future supply is projected to rise. Specific strategies:

- *Continue regular solicitation of most lands previously solicited;*
- *Areas of Focus: Entire Basin (less-protected, contribution to future supply); and*
- *WAC CEs will continue to play a critical role in land protection.*

Figure 1: Cat-Del System Priority Areas



Priority Area

- 1A
- 1B
- 2
- 3
- 4

Legend:

- City-Owned Land (Pre-MOA)
- State-Owned Land
- County Boundary
- Town Boundary
- Watershed Boundary
- Reservoirs
- Aqueduct

Inset Map: Shows the watershed's location within the Northeastern United States, bordered by New York, Massachusetts, Connecticut, Pennsylvania, and New Jersey.

Data Sources:
 Mapped Features: NYC DEP GIS, 1999-2009
 Produced by DLP, 9/1/09

