

New York City Department of Environmental Protection  
Bureau of Water Supply

## **Wetlands Protection Strategy**

March 31, 2018

*Prepared in accordance with Section 4.8 of the NYSDOH  
2017 Filtration Avoidance Determination*



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# 1. Introduction

Wetlands provide a suite of functions that extend well beyond their boundaries and are important for maintaining the high quality of surface waters in the New York City Water Supply System. Wetlands intercept and detain peak stormwater runoff and stream flow to help abate flood flows and control erosion. They improve water quality by filtering sediments and removing nutrients and pollutants through biotic and abiotic processes. Wetlands also prevent erosion, provide stream baseflow, and play a role in the carbon cycle, with some types sequestering significant amounts of carbon. In addition to these direct benefits to the water supply, wetlands also provide fish and wildlife habitat and provide opportunities for recreation, aesthetic appreciation, and education.

Recognizing these important functions and values, DEP developed a Wetlands Protection Strategy in 1996, which has been updated with each subsequent Filtration Avoidance Determination (FAD) to build new or enhanced goals upon past accomplishments (Appendix A). This document updates the New York City Department of Environmental Protection's (DEP's) 2012 Wetlands Protection Strategy pursuant to 4.8 of the 2017 FAD.

## 1.1 Mission and Goals

**The mission of DEP's Wetlands Program is to protect wetlands and the suite of ecosystem services they provide to help maintain the high quality of surface waters in the New York City Watershed.** DEP strives to provide information on the extent and characteristics of wetlands throughout the watershed to inform numerous protection strategies, and achieve the following goals:

- 1) **Characterize the status, trends, conditions, and functions of wetlands throughout the watershed, including those on City lands.** DEP maintains current National Wetlands Inventory (NWI) maps for the watershed, and gathers field data to understand the types and characteristics of these ecosystems. All of this information is key to identifying wetlands for protection through the multiple strategies listed below, and setting reference standards for restoration, establishment, and other management projects.
- 2) **Leverage existing regulatory programs at all jurisdictional levels to ensure wetland protection in the watershed.** In addition to implementing the Watershed Rules and Regulations, which prohibit many activities within limiting distances to wetlands, DEP also reviews federal, State, and municipal wetland permit applications as well State Environmental Quality Review Act (SEQRA) submittals. DEP coordinates with New York State Department of Environmental Conservation (NYSDEC), United States Army Corps of Engineers (USACOE), and various municipalities to ensure that permitted activities avoid, minimize, and appropriately mitigate wetland impacts in the watershed. DEP also reviews proposed changes to federal, State, and municipal regulations, and frequently advocates to maintain or improve the level of watershed wetland protection.

- 3) **Protect wetlands through the Land Acquisition Program (LAP).** DEP's LAP relies on the NWI maps and other data sources to identify parcels that have wetlands and other water features to protect through acquisition by simple fee or conservation easement. As of December 2017, the LAP has protected 2,894 acres or 19% of wetlands mapped in the Catskill/Delaware watershed.
- 4) **Protect wetlands through stewardship on City-owned lands.** The Wetlands Program reviews land management and construction projects on City lands. DEP's interdisciplinary approach to forest management ensures that all wetland features within forest management project areas on City lands are protected through best management practices. The Wetlands Program also reviews capital construction plans, land use permits and other proposed activities on City lands to avoid wetland impacts. Using data from reference wetlands as a benchmark, the Wetlands Program also oversees the design, implementation, monitoring, and management of wetland mitigation projects for unavoidable impacts.
- 5) **Engage with the public and stakeholders to foster appreciation of wetland functions and values to encourage responsible wetlands stewardship on private lands.** DEP works with partners to promote wetland stewardship through the Stream Management Program (SMP) and Watershed Agricultural Council (WAC) programs. DEP also conducts outreach to engage the public through means such as wetland hikes, press releases, pop up events, fairs, and expos. These events focus on the broad suite of services that wetlands provide, the importance of preserving them, and ways for landowners to become involved in proper stewardship.

## 1.2 Scope

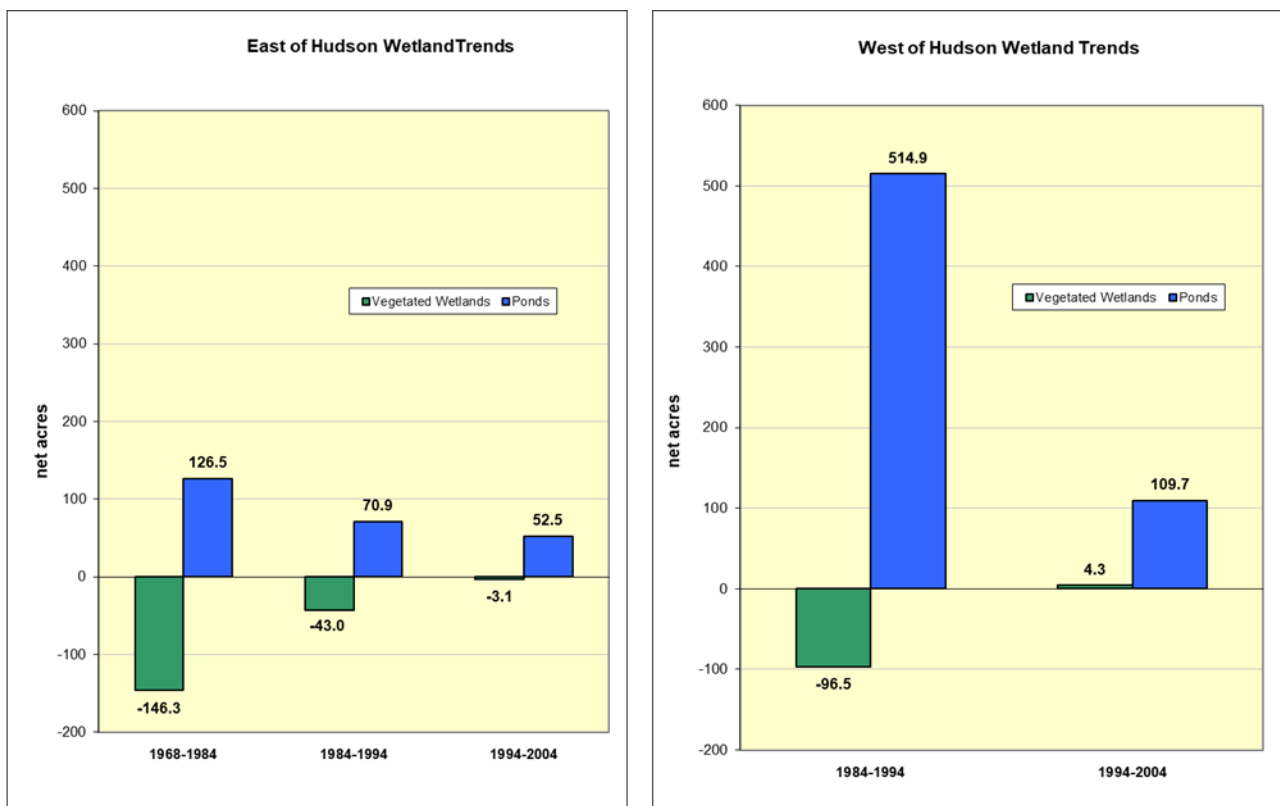
While there are many definitions of wetlands, most were developed for specific regulatory purposes and can therefore be limited in applicability. The U.S. Fish and Wildlife Service (USFWS) promulgated a definition in 1979 for the NWI that is perhaps the most comprehensive and suitable for broad applications, such as this strategy.

The USFWS defines wetlands as "*lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. ...Wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.*" (Cowardin et al. 1979). This definition includes both vegetated wetland types such as marshes and swamps, and nonvegetated wetland types such as ponds, shallow river bottoms, and lakeshores. This definition does not include deepwater habitats such as lakes and reservoirs where the depth of standing water is greater than 6.6 feet. While regulatory programs in this strategy apply only to those wetlands within their

defined jurisdiction, this USFWS definition provides the framework for the remaining voluntary and mapping and research programs.

### 1.3 Current Status and Recent Trends

According to the most recent NWI, wetlands comprise approximately 9,565 acres (1%) of the West of Hudson (WOH) watershed, and 15,355 acres (6%) of the East of Hudson (EOH) watershed. While the nation and New York State have lost over half of their wetland acreage since European settlement, the rate of wetland loss has slowed markedly due to increased awareness and the onset of the Clean Water Act (CWA) in the 1970s (Dahl, 1990; Dahl and Allord, 1997). The East of Hudson Watershed lost an estimated 1.1% of its vegetated wetland base between 1968 and 1984, 0.3% between 1984 and 1994, and then 0.02% between 1994 and 2004 (Tiner et al., 1999; Tiner et al., 2005). The West of Hudson Watershed lost 1.4% of its vegetated wetland base between 1984 and 1994, and experienced a net gain of 0.06% between 1994 and 2004 (Tiner, 2008). While these rates are estimates, limited to what can be documented through photointerpretation, they do demonstrate a decline in vegetated wetland loss for the period of record. National trends also show a decreased rate of vegetated wetland loss, from 1.4% between 1986 and 1997, and 0.5% loss between 1998 and 2004. Also similar to national trends, there was also an increase in ponds throughout the watershed as well, with a lower rate of increase in the latter time periods (Dahl, 2006; Dahl, 2011) (Figures 1.1 and 1.2).



Figures 1.1 and 1.2. Net losses and gains of vegetated wetlands and ponds in the East and West of Hudson Watersheds, based on analysis of NWI data and aerial photography.

## 2. Wetlands Mapping and Monitoring

DEP's wetlands mapping and monitoring programs provide information on the status, trends, and characteristics of watershed wetlands in support of regulatory and voluntary protection programs.

### 2.1 Wetlands Mapping

DEP has maintained spatial information on the extent and characteristics of wetlands within the watershed through partnership with the USFWS NWI Program. The NWI was first completed for the watershed in 1996 using 1:58,000 scale photography and was updated in 2005 using 2003 and 2004 1:40,000 scale aerial photography. Numerous delineations completed over the intervening years by DEP for its reference wetland monitoring, forestry, and other programs have revealed that the NWI often underestimates the extent of wetlands. This is expected since NWI maps are based on photointerpretation, and therefore less accurate than field-based measures. Nonetheless, DEP has endeavored to increase the accuracy and completeness of wetland maps for the watershed, since these maps provide an informative baseline for regulatory review, land acquisition, forestry, and numerous other programs.

In 2015, DEP completed a pilot study demonstrating that incorporation of Light Detection and Ranging (LiDAR) derived datasets and high resolution aerial photography into Object Based Image Analysis followed by manual editing increases the completeness and accuracy of wetland mapping. The study included 15, approximately 800-hectare, pilot areas located both EOH and WOH. The mapped acreage of vegetated wetlands increased by 136% WOH and 74% EOH as compared to the NWI in these areas (DEP, 2015). Feature accuracy was determined to be 93% for the East of Hudson, and 87% for the West of Hudson pilot areas, as compared to 77% and 78% for the current NWI, respectively. Feature accuracy refers to the correct identification of an area as wetland or upland on the map.

The pilot also demonstrated that examination of LiDAR-derived topography and local resolution hydrography significantly improves the ability to detect the connectivity of wetlands to the surface water system. Using these data sources, surface water connections could be detected for 98% of the wetland acreage in the pilot, as opposed to 65% when using lower resolution stream databases. This is a significant finding, as connectivity to surface waters is linked to both wetland function and federal jurisdictional status.

Given these promising findings, DEP will expand the pilot study to produce updated NWI-compliant maps for the entire watershed. Based on the pilot, the acreage of vegetated wetlands mapped in the NWI may more than double WOH, and increase by roughly 75% EOH. This will benefit implementation of many programs, from providing better base maps for review of wetland permit applications and other land use proposals to identifying additional parcels with significant wetlands for acquisition. These data will also provide a new baseline for and increase the accuracy of future wetland trends analyses.

## 2.2 Reference Wetlands Monitoring

Reference wetlands provide region-specific data on the characteristics of relatively undisturbed, self-sustaining wetlands, for use as a benchmark for wetland assessment, trends analysis, and to guide wetland restoration, creation, or enhancement projects. DEP has collected vegetation, soils, and hydrologic data from 18 reference wetlands comprising 117 acres throughout the Catskill/Delaware watersheds for over a decade (Figures 2.1 and 2.2).



Figure 2.1. Wetland monitoring sites in the New York City in the West of Hudson watershed, including 18 reference wetlands and 6 recently added vernal pool sites.



Figure 2.2. Reference scrub-shrub wetland in the Schoharie Basin. Note the monitoring well in the far left.

In 2014, DEP summarized data from its monitoring program to provide a benchmark for hardwood, hemlock hardwood, scrub-shrub, and emergent wetlands in the watershed (DEP, 2014). This report provides region-specific knowledge that will benefit future wetland assessment, restoration, creation, trend analysis, and education efforts in the watershed. DEP will analyze vegetation data collected from these sites in 2016 and 2017 to assess trends in these systems since the original data collection in 2004 and 2005.

DEP will also evaluate and refine its monitoring program to ensure that the extent and types of reference wetlands reflect the distribution of wetlands in the watershed. Based on the current NWI, roughly 45% of the WOH vegetated wetlands are in the Cannonsville and Pepacton basins yet contain only 10% of DEP's reference wetlands (Figure 2.3). Evaluation of the reference wetland data also shows that forested wetlands are well represented in DEP's monitoring program, yet emergent and scrub-shrub wetland types are not (Figure 2.4). DEP will add reference wetlands to under-represented areas of the watershed and include additional wetland types. DEP has already made some strides in this realm, as the reference program has been expanded to include 10 seasonal pool wetlands.



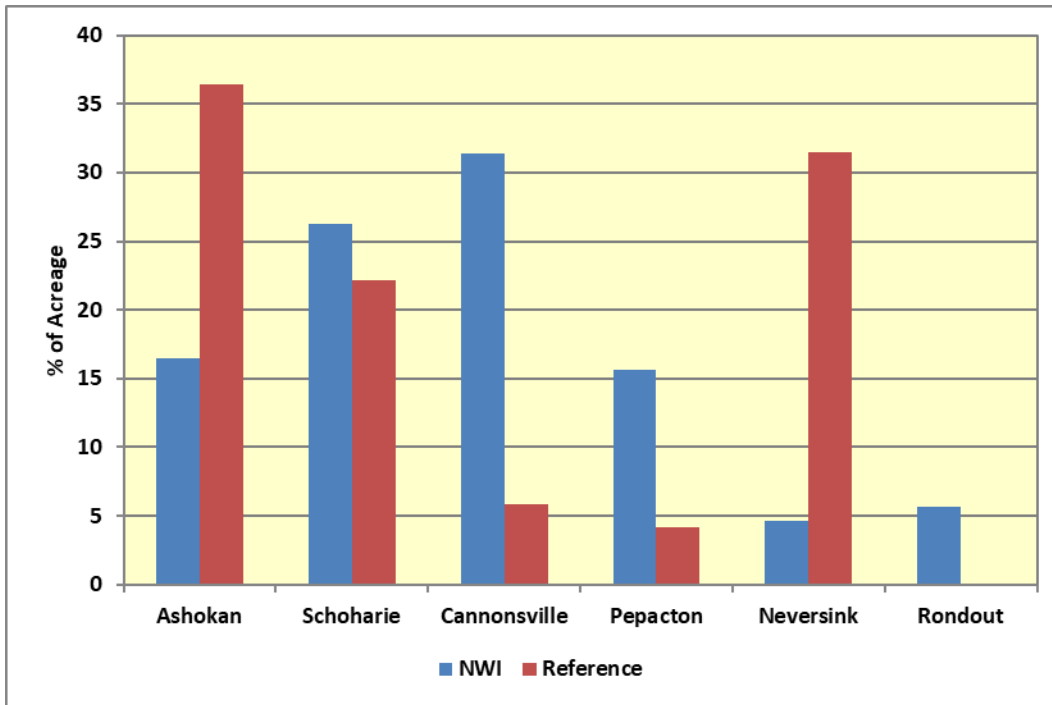


Figure 2.3. The distribution of DEP reference and NWI wetlands among reservoir basins.

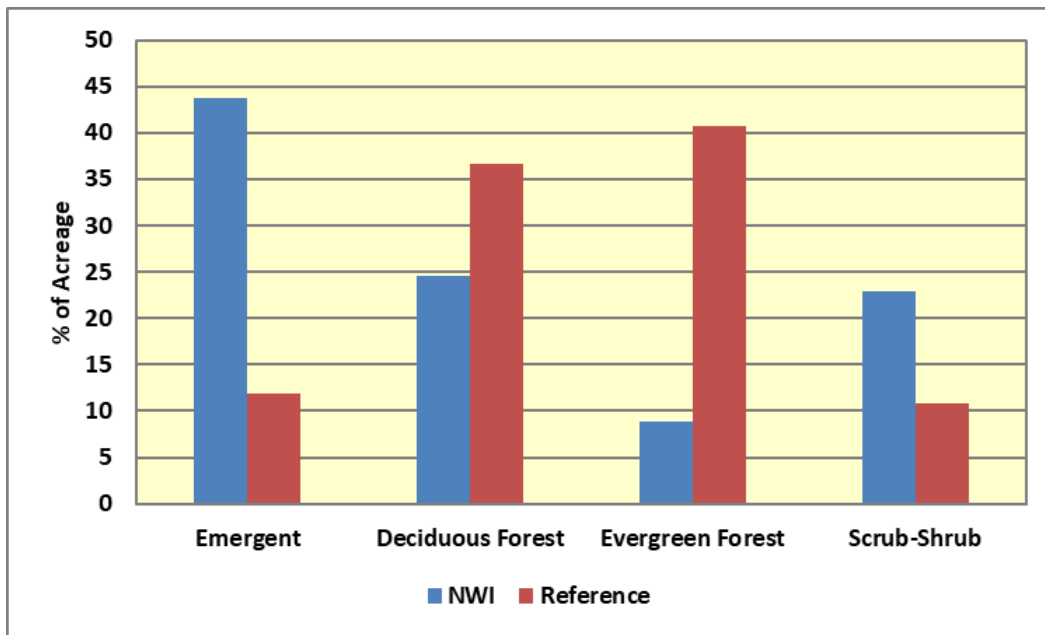


Figure 2.4. The proportion of cover types within the NWI versus the DEP reference wetland population.

DEP will focus first on its portfolio of City-owned lands to identify additional reference wetland sites. Since the onset of the reference wetlands monitoring program in 2003, DEP has nearly more than doubled acreage of wetlands acquired West of Hudson (Figure 2.5). Examination of these sites will also provide field scale characterizations of our wetland holdings, potentially identifying reference standard conditions as well as stewardship needs and opportunities.

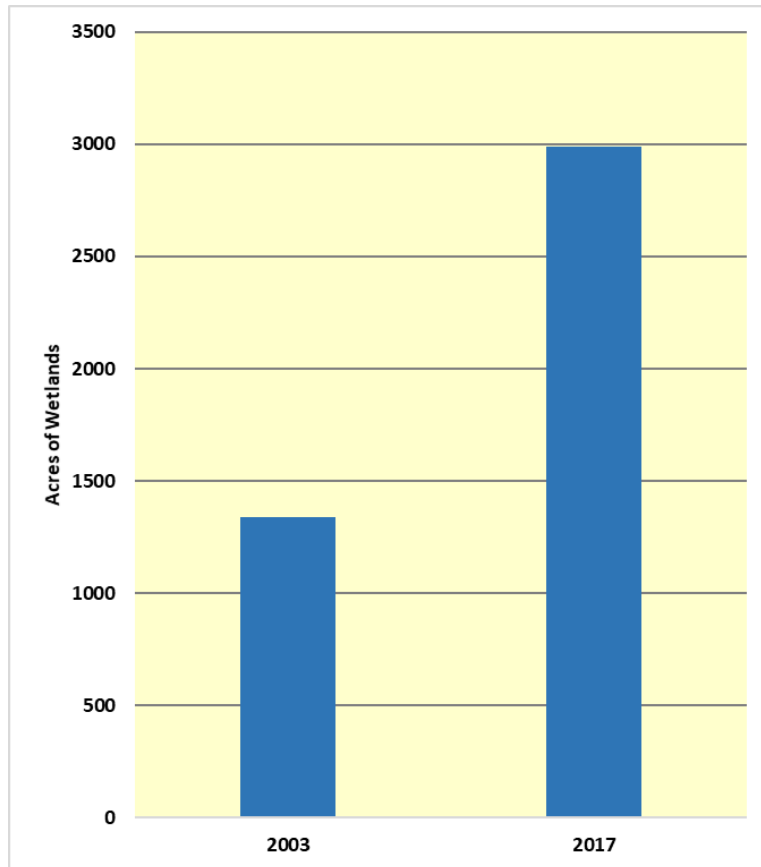


Figure 2.5. Wetland acreage acquired by LAP as of 2003 and 2017.

Data collected from reference wetlands provides information on the range of conditions exhibited by natural wetlands in the watershed. This provides regional standards for assessing the condition of natural wetlands while reviewing wetland permit applications and other land use proposals, as well as for designing and assessing wetland restoration or creation projects. DEP has employed data from the reference program to guide design of wetland mitigation sites for its own capital projects, and to review mitigation details proposed by others. Reference wetlands also provide ‘ground-truth’ information for wetlands mapping efforts such as the LiDAR pilot study. Reference data also provide benchmarks for assessing long term trends in wetland floristic quality, hydroperiod, and associated functions, which may be attributed to factors such as land use and climate change.

### **3. Regulatory Reviews**

The existing framework of municipal, State, and federal regulations provide an important mechanism for protecting wetland resources in the watershed. As the extent of jurisdiction varies among regulatory authorities, reviewing applications pending before multiple agencies enables DEP to assess a broad range of regulated activities. DEP will therefore continue its review of federal, State, and municipal wetland permit applications in the watershed, as well as proposals subject to review under the SEQRA and the New York City Watershed Rules and Regulations (WR&Rs). All reviews are coordinated internally to ensure an interdisciplinary review of wetland, water quality, and regulatory issues.

DEP relies upon GIS data sources such as the NWI, NYSDEC Freshwater Wetlands maps, aerial photography, and LiDAR-derived topography and hydrography to review the proposed activities. DEP assesses proposals to determine potential wetland and water quality impacts, and to determine if authorization is required pursuant to the WR&Rs. In cases where a proposal may adversely impact wetlands or water quality, DEP issues comments suggesting design alternatives and practices to avoid, minimize, and mitigate the impacts. In cases where impacts are unavoidable, DEP reviews the extent, location, type, and design of proposed mitigation to ensure that impacts are appropriately offset in the watershed.

DEP also reviews proposed changes to regulations, rules, and other documents promulgated by federal, State, and municipal agencies and provide comment when there is significant potential to impact wetland regulation in the watershed.

#### **3.1 United States Army Corps of Engineers Permit Reviews**

DEP reviews Individual Permit Applications submitted to the USACOE pursuant to Section 404 of the CWA, which regulates discharges of dredged or fill material into waters of the United States, including wetlands. There is generally no size threshold for federally-regulated activities, though smaller discharges may be authorized under the Nationwide Permit Program (NWP). Under current federal guidance, isolated wetlands currently lack CWA protection, and intermittently connected waters must be evaluated on a case-by-case basis to determine federal jurisdiction (USEPA and USACOE, 2008). CWA protection of waters of the United States is important, particularly in the WOH watershed, where DEP estimates that 60% of wetlands do not meet criteria for State protection under Article 24, and only one town (Woodstock) has enacted local wetland regulations.

DEP will continue its long record of reviewing and issuing comments on proposals to modify the CWA program. On at least eight separate occasions since 2003, DEP has provided input to the federal government on issues surrounding federal wetland jurisdiction under the Clean Water Act in light of United States Supreme Court's decisions in *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*, 531 U.S. 159 (2001) and *Rapanos v. United States*, 547 U.S. 715 (2006) (Appendix A). These decisions left significant uncertainty surrounding the jurisdiction of non-navigable waters and their adjacent wetlands. For all of these occasions, DEP drew heavily on the findings of its wetland mapping, reference wetland monitoring, and local resolution National Hydrography data to provide the City of New York with comments regarding

the extent and function of wetlands potentially impacted by these Supreme Court decisions and subsequent proposed rules and guidance documents. In all cases, the City indicated its support for broad federal jurisdiction over streams and wetlands, the protection of which is critical to maintaining the high quality of the water supply.

DEP will also continue to review proposed changes to the NWP and associated regional conditions upon the regular five-year renewal cycle.

### **3.2 New York State Department of Environmental Conservation Wetland Permit Reviews**

Through a Memorandum of Understanding (MOU) with the NYSDEC (updated in 2010), certain Freshwater Wetland and Stream Disturbance permit applications are forwarded to DEP for “Major” projects in the watershed. Addendum A of the MOU stipulates a limited number of “Minor” activities for which applications will be sent to DEP for review. DEP also checks the Environmental Notice Bulletin weekly for pending State wetland permit applications for projects in the watershed. DEP will continue to work with NYSDEC to ensure the protection of State-regulated wetlands and buffer areas in the watershed.

Unlike federal wetland regulation, State wetland regulation under Article 24 is limited to wetlands 12.4 acres in size or larger, except in limited cases where a wetland has been demonstrated to be of ‘Unusual Local Importance’. NYSDEC also regulates a 100-foot adjacent area extending from the wetland’s edge. Regulated wetland areas are shown on NYSDEC’s Freshwater Wetlands Maps, which were updated for the watershed based on 2004 NWI data. These map updates increased the extent of regulated Freshwater Wetlands in the watershed by nearly 7,000 acres, and all wetlands adjacent to reservoirs in the EOH watershed were designated as state regulated wetlands of ‘Unusual Local Importance’. Based on current NWI and NYSDEC Freshwater Wetland data sources, approximately 77% and 38% of the wetland acreage in the EOH and WOH watersheds, respectively, is regulated by NYSDEC. Upon completion, DEP will assess the LiDAR-updated NWI to determine if there are additional wetlands in the watershed that meet the Article 24 12.4 acre threshold.

### **3.3 Municipal Application Reviews**

Some municipalities in the EOH watershed voluntarily forward local wetland applications for DEP review. In addition, Connecticut State law (Conn. Gen. Stat. Sec. 22a-42f) requires that applicants in the Connecticut portions of the New York City Watershed forward to DEP a notice that a local wetland permit application has been submitted. Thus, DEP reviews a number of local wetland permit applications pending before various EOH municipalities.

While the scope of regulated activities and areas varies among municipalities, local ordinances often afford the most protection. Many municipalities regulate wetlands smaller than the State’s 12.4 acre threshold, and are not constrained by the jurisdictional limits of federal regulations that potentially exclude isolated and intermittently connected wetlands from regulation. DEP will continue to review and comment on municipal wetland permit applications.

To better inform their regulatory and management efforts, DEP will also provide all watershed towns with updated NWI data upon completion of the LiDAR-based map updates.

### **3.4 State Environmental Quality Review Act**

SEQRA provides DEP with a mechanism, separate from the City's WR&Rs, to become involved early in the process to review and comment on projects that may impact water quality. This provides DEP with a mechanism to review proposed activities over which DEP would otherwise not have a review and comment opportunity. DEP strives to become involved early in the SEQRA process and remain involved until the Lead Agency's negative declaration or DEP issuance of findings after the acceptance of the Environmental Impact Statement (EIS) by the Lead Agency. During the environmental review process, DEP exercises its status as an involved or interested agency to address a broad range of wetland protection and management issues. Utilizing information generated in the Wetland Mapping and Research Programs, along with other site-specific information, DEP conducts a thorough assessment of potential wetland impacts. When appropriate, DEP will advocate for a positive declaration and further environmental review if deemed necessary to prevent degradation of on-site wetlands.

### **3.5 DEP Application Reviews**

The WR&R provide an important level of wetland protection by prohibiting activities such as the installation of subsurface sewage treatment systems and petroleum storage tanks and the construction of certain impervious surfaces within limiting distances to watercourses and wetlands that are included in New York State Freshwater Wetland Maps in the watershed. The regulations also require the preparation of stormwater pollution prevention plans for certain projects thereby preventing the discharge of untreated stormwater runoff from new development into watercourses and NYSDEC-mapped wetlands.

## **4. Land Acquisition Program**

DEP's LAP seeks to protect water quality by reducing future potential for development and related impacts in environmentally sensitive areas within the watershed through acquisition of fee simple and conservation easements. DEP accomplishes land preservation through acquisition of real property interests directly from sellers, and with partners such as WAC and the Catskill Center for Conservation and Development (CCCD). WAC, under contract with DEP, purchases conservation easements on farms in the watershed, many of which contain wetland resources. CCCD administers the Streamside Acquisition Program, securing purchase contracts to buy land to which LAP takes title. Acquisition of both fee simple and conservation easements provide wetlands with protection from development in perpetuity, by restricting various activities in and around wetlands (Section 5).

As part of its acquisition toolkit, LAP uses multifaceted selection criteria to identify parcels for acquisition that maximize water quality benefits. The presence of wetlands larger than five acres is just one of the many criteria used by DEP to pursue vacant parcels. Using such criteria, DEP has protected 2,894 acres (19%) of the 15,190 acres of wetlands mapped in the NWI and

NYS Freshwater wetland maps in the Catskill/Delaware watershed since 1997 (Table 4.1). The majority (74%, 2,156 acres) of the wetland acreage was acquired through fee simple, with 16% (432 acres) through conservation easements acquired by DEP, and 10% (306 acres) through easements acquired by WAC.

Description	Acres	% of Total Watershed Acreage	% of Total Land Acquired	% of Total Wetlands or Deepwater Habitats in System
<b>For Catskill/Delaware (Ashokan, Schoharie, Rondout, Neversink, Pepacton, Cannonsville, West Branch, Boyd Corners, Kensico basins):</b>				
Total Acreage of Entire Watershed	1,048,661			
Total Acreage of Wetlands (both NWI and DEC-regulated) in Entire Watershed (excluding Deepwater Habitats**)	15,190	1.45%		
Total Acreage of Deepwater Habitats in Entire Watershed	28,335	2.70%		
Total Acreage of Wetlands and Deepwater Habitats in Entire Watershed	43,526	4.15%		
Total Lands Under Contract or Closed by NYCDEP as of 12/31/17†*:	144,445	13.77%		
<i>Within those total lands under contract or closed:</i>				
Total Acreage of Wetlands (both NWI and DEC-regulated, excluding Deepwater Habitats**)	2,894		2.00%	19.05%
Total Acreage of Deepwater Habitats**	188		0.13%	0.66%
Total Acreage of Wetlands and Deepwater Habitats**	3,082		2.13%	7.08%
<b>For Croton:</b>				
Total Acreage of Entire Watershed	212,700			
Total Acreage of Wetlands (both NWI and DEC-regulated) in Entire Watershed (excluding Deepwater Habitats**)	20,025	9.41%		
Total Acreage of Deepwater Habitats in Entire Watershed	10,808	5.08%		
Total Acreage of Wetlands and Deepwater Habitats in Entire Watershed	30,834	14.50%		
Total lands under contract or closed by NYCDEP as of 12/31/17†*:	1,984	0.93%		
<i>Within those total lands under contract or closed:</i>				
Total Acreage of Wetlands (both NWI and DEC-regulated, excluding Deepwater Habitats**)	97.1		4.89%	0.48%
Total Acreage of Deepwater Habitats**	1.6		0.08%	0.02%
Total Acreage of Wetlands and Deepwater Habitats**	98.7		4.97%	0.32%

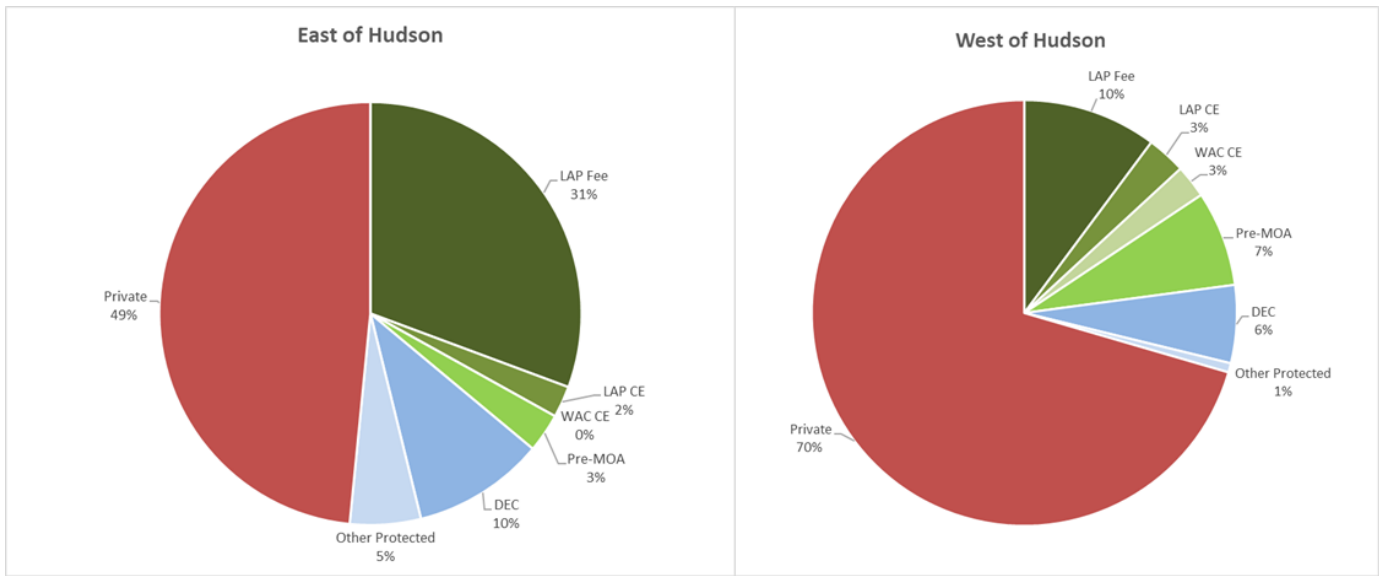
\* Source: WLCP GIS, December 31, 2017. Note: Acres are calculated directly from areas of GIS polygons and therefore may not match exactly other acreage totals submitted by DEP. Watershed statistics calculated from LiDAR-derived 1m basin boundaries updated in 2014.

\*\* Categories considered "Deepwater Habitats" include reservoirs or large lakes (L1), unconsolidated bottom (L2UB), riverbeds (RUB & RRB) or streambeds (RSB). Categories considered wetlands include Palustrine Systems and exclude the Deepwater Habitats classes as well as all upland (U), and unconsolidated shore (L2US).

† Includes fee, conservation easements, and WAC farm and forest easements. Excludes non-LAP and pre-MOA land.

Statistics produced by T. Spies, BWS WPP GIS, 1/31/2018

Lands owned by the City prior to 1997 (pre-MOA) in the Catskill/Delaware watershed contain an additional 973 acres of wetlands, with an additional 1,269 acres of wetlands located on lands owned and protected by NYS, municipalities, or land trusts. Together, this amounts to nearly 34% of wetlands in the Catskill/Delaware watershed being located within protected lands. Roughly 50% of mapped wetlands in EOH Catskill/Delaware (Kensico, Boyd Corners, West Branch) basins are on protected lands, versus 30% in the WOH watershed (Figures 4.1 and 4.2)



Figures 4.1 and 4.2. The proportion of wetlands on private and protected lands in Catskill/Delaware basins.

DEP has acquired numerous wetlands that are smaller than 12.4 acres, which are therefore unregulated by NYSDEC. Based on NWI and NYS Freshwater wetland maps, an estimated 21% of LAP-acquired wetland acreage in the EOH Catskill/Delaware basins, and 60% in the WOH watershed, is not regulated by NYSDEC. Acquisition of non-NYSDEC regulated wetlands is significant, given the future uncertainty of the scope of wetlands protected under the federal CWA. This is particularly relevant WOH, where only one town has enacted municipal wetland regulations. Further, the majority (77%) of the mapped wetland acreage EOH is state regulated, compared to 39% WOH. DEP estimates that 14% of the non-NYSDEC regulated wetland acreage in the Catskill/Delaware watershed is protected on LAP (11%) and pre-MOA (3%) City lands.

DEP will continue to protect wetlands through acquisition as it continues to implement its LAP in accordance with the 2017 FAD. DEP will revisit solicitation criteria as LAP's long term plan is evaluated, and will consider additional means to identify significant wetlands, additional protection of which may be warranted under current regulatory frameworks.

## **5. Wetland Stewardship on City lands**

The City has made a significant investment in purchasing water supply lands and conservation easements. Since 1997, DEP has acquired over 140,000 acres of land in the Catskill/Delaware watershed, and holds an additional 61,373 acres of pre-MOA lands. These lands contain roughly 3,867 acres of NWI and State-mapped wetlands. Stewardship of the natural resources on these lands, including wetlands, is critical to achieving the long-term goal of source water protection. DEP ensures that any activities conducted on watershed lands are protective of wetlands.

### **5.1 Conservation Easements**

Approximately 5% of the wetland acreage in the Catskill/Delaware watershed is held on DEP (3%) and WAC conservation easement (2%) parcels. DEP conservation easements impose certain restrictions on the cutting of trees or woody vegetation, establish limits on the number of livestock and their locations, and prohibit surface disturbance in wetlands and streams unless prior written approval is given for specified activities. Conservation easement parcels are routinely monitored to ensure that potential impacts to wetlands and riparian areas are avoided; enforcement actions are taken as required. In many cases, activities that violate the DEP easement also violate NYSDEC regulations, so that enforcement efforts benefit from and reinforce NYSDEC actions.

DEP (2010) also developed *A Landowner's Guide to Good Forestry Practices on a DEP Conservation Easement* that details best management practices for timber harvesting in wetlands and wetland buffer areas and addresses watercourse and riparian buffer protection on conservation easements. DEP will also continue to review proposed forest management projects on conservation easements.

### **5.2 DEP Forest Management Program**

The City has significant forestland holdings and continues to acquire forestlands for the protection of the water supply. A comprehensive watershed Forest Management Plan was completed in 2011 through a partnership with the U.S. Forest Service. The plan sets forth the management goals, strategies and guidelines to direct the long-term management of the watershed forest resources for the enhancement and protection of the water supply. The forest management plan includes conservation practices (CPs) to ensure that sensitive natural resources, including wetlands, are appropriately protected during forest management operations.

DEP conducts an interdisciplinary review of its proposed forest management projects on City lands to ensure compliance with the CPs for long-term stewardship of the forest including its natural and cultural resources. As part of this review, DEP wetland scientists delineate on-site wetlands, which are treated as exclusion zones in which no disturbance is permitted under normal circumstances (Figure 5.1). Moreover, the 100-foot-wide area surrounding wetlands is considered a special management zone, within which limits are placed on tree removal and equipment operation.





Figure 5.1 Wetland delineated within a forest management project area in the Ashokan Basin.

### **5.3 Construction Projects on City Lands**

In addition to reviewing proposals for projects on private lands under federal, State, and municipal regulations and the Watershed Rules and Regulations, DEP also conducts a thorough review of its own construction projects on City lands. Projects range from small infrastructure improvements to culverts, roads, and bridges, to larger-scale projects such as construction of the Catskill/Delaware UV facility. Wetland program staff also review Land Use Permit applications submitted by third parties for projects on City lands.

Wetland program staff review construction plans to ensure that wetlands are appropriately delineated and shown on site plans. Projects are reviewed to ensure that wetland impacts are avoided on City lands, and that unavoidable impacts are minimized and appropriately mitigated. In cases where mitigation is required, DEP staff assist with site selection, review site plans, and monitor the success of the sites post construction. DEP staff draws information from the reference wetland program to guide the design of and establish performance standards for mitigation sites. In recent years, DEP has constructed mitigation sites on City lands for impacts incurred during construction of the Catskill/Delaware UV plant and the Route 28A realignment project (Figure 5.2)



Figure 5.2 Wetland mitigation area constructed in the town of North Castle, Kensico Basin.

## **6. Partnership and Outreach**

DEP engages with the public and stakeholders to foster appreciation of wetland functions and values to encourage responsible wetland stewardship on private lands. Partnerships forged through the Stream Management and Watershed Agricultural Programs afford outreach and stewardship opportunities. DEP also conducts outreach through multiple means to promote public appreciation of the broad suite of ecosystem services that wetlands provide and the importance of preserving them.

### **6.1 Stream Management Program**

The mission of DEP's SMP is to restore stream system stability and ecosystem integrity by encouraging long-term stewardship of streams and floodplains in the Catskill and Delaware watersheds. DEP has partnered with County Soil and Water Conservation Districts, Cornell Cooperative Extension of Ulster County, and local stakeholders to develop and implement stream management plans and their recommendations for Catskill and Delaware streams. The partners and their stakeholder councils implement priority projects under Annual Action Plans. These plans provide opportunities for wetland education, protection, restoration, or enhancement. They characterize wetland resources, based on the NWI or through additional field survey, and if necessary, consultation with the DEP Wetlands Program. Stream management plans describe the roles that wetlands play for water quality, habitat, and flood mitigation, include wetlands on stream corridor maps, and identify priority stream restoration areas that often include wetlands. Stream feature inventories (SFIs) identify where floodplains have become disconnected from streamflow through streambed incision and seek to restore that hydrologic connection. From the SFIs, stream restoration projects are identified. For restoration projects that include wetland

management or construction, the SMP consults the Wetlands Program for technical guidance on appropriate desired future conditions, design, and best practices.

The SMP also implemented the Catskill Streams Buffer Initiative (CSBI) whose primary goal is to inform and assist landowners in stewardship of privately-owned, primarily nonagricultural riparian areas, which often include wetlands. DEP and its county partner agency assist private, riparian landowners by providing 1) Riparian Corridor Management Plans to create awareness about riparian management issues for individual properties, 2) best management practice design and installation, and 3) educational materials and actions needed by landowners to understand the critical role of stream buffers on their property and how to maintain buffers in optimal functioning condition. To date, the CSBI has completed 197 riparian buffer projects spanning 107.83 acres and over 17 miles of stream length; these projects installed nearly 140,542 native plants. For projects that involve wetland management, CSBI consults the Wetlands Program for wetland characterization, technical guidance on best practices, and guidance for communicating concepts to landowners. In 2017, CSBI began to work towards partnering with the U.S. Department of Agriculture Conservation Reserve Enhancement Program to assist landowners.

## **6.2 Watershed Agricultural Program**

The Watershed Agricultural Program is a voluntary partnership between DEP and WAC whose main goal is to reduce nonpoint pollution associated with agriculture. WAP activities that benefit wetland protection include the development and implementation of whole farm plans, and the establishment of riparian buffers through the Conservation Reserve Enhancement Program (CREP). Wetland areas are identified in the development of whole farm plans, and best management practices are recommended for water quality protection. Currently, there are 264 active participating farms with whole farm plans WOH, which include more than 83,000 acres and there are 67 active whole farm plans on EOH farms with close to 8,000 acres.

CREP allows watershed farmers to retire environmentally sensitive riparian cropland and marginal pastureland from production and helps establish streamside buffers by annual rental payments and cost sharing for the implementation of BMPs. There are currently 1843 acres of riparian buffers containing over 200 acres of NWI wetlands established by CREP in the watershed.

## **6.3 Watershed Forestry Program**

The Watershed Forestry Program is a partnership between DEP, WAC, the U.S. Forest Service, and the upstate community to maintain well-managed, privately-owned working forests within the watershed. Administered by WAC, the Watershed Forestry Program promotes good forest stewardship through development and implementation of forest management plans. These plans include best management practices to protect wetlands during and after timber harvest. The Forestry Program also offers training for loggers and foresters, and educational programs for teachers, students, and watershed landowners to raise awareness about proper stewardship of forests and the natural resources such as wetlands within them.

The Forestry Program provides funding to watershed landowners to help them enroll their forested land under New York’s Forest Tax Law, which helps lower their property taxes. WAC develops forest management plans for landowners enrolled in this program. These plans identify all watercourses and wetlands, and prohibit harvesting in designated wetlands. To date, WAC has helped landowners enroll and re-enroll over 290 properties covering more than 49,000 forested acres in New York’s Forest Tax Law. Pursuant to the 2017 FAD, the City will continue to partner with WAC to enroll lands in this program.

## 6.4 Outreach

In addition to the multiple opportunities provided by the above-listed partnership programs, DEP conducts a number of outreach efforts to foster wetlands appreciation and stewardship in the watershed. DEP wetland scientists provide hands on learning experiences by hosting interpretive hikes on City-owned wetlands and pop up educational events at popular locations in the watershed. DEP also partners with SUNY Ulster to provide outdoor laboratories for field ecology courses on City-owned wetlands, and employs student interns to assist on various wetland mapping and monitoring efforts.

DEP presents various aspects of the Wetlands Program at numerous public forums and professional symposia and conferences, and through distribution of its educational pamphlet ‘*Wetlands in the Watersheds of the New York City Water Supply System*’ (DEP, 2009). DEP will update its wetland outreach materials as new wetland data become available through the LiDAR wetland mapping project.



Figure 6.1. DEP wetland scientist demonstrating amphibian life to SUNY Ulster interns at a reference wetland in the Schoharie Basin.

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# **Appendix A**

## **Timeline of Wetlands Program Highlights**

<b>Wetlands Program Timeline</b>	
1996	Promulgation of DEP's first Wetlands Protection Strategy
1996	Completion of the National Wetlands Inventory
1999	Reference Wetlands Monitoring initiated East of Hudson
1999	East of Hudson Wetland Status and Trends Report completed 1968-1994
1999	USFWS Watershed-based Preliminary Assessment of Wetlands Functions (W-PAWF) pilot project completed EOH
1999	In-house Wetland Training provided for DEP Regulatory Staff
2001	First revision of the Wetlands Protection Strategy
2001	DEC Freshwater map amendments WOH
2002	USFWS W-PAWF pilot project completed WOH
2002	Critical Resource Designation granted for East of Hudson Watershed
2002	Issued comments on proposed modification and reissuance of Nationwide Permit Program
2003	Issued comments on USEPA, USACE ANPR on the CWA Regulatory definition of WOTUS
2004	Reference Wetlands Monitoring initiated West of Hudson
2004	USFWS WPAWF completed watershed-wide
2004	Report on Findings of Reference Wetland Monitoring EOH
2004	DEC Freshwater map amendments EOH, Westchester County
2004	Issued Comments on USACE Draft Compensatory Mitigation Guidelines and Mitigation Checklist
2005	In-house Wetland Training provided for DEP Regulatory Staff
2005	NWI Update Completed
2005	East of Hudson Wetland Status and Trends Report updated 1994-2004
2006	DEC Freshwater map amendments EOH, Putnam & Dutchess Counties
2006	Report on West of Hudson Wetland Water Quality Functional Assessment completed
2006	City of New York Brief of <i>amicus curiae</i> submitted to the US Supreme Court for Rapanos and Carabell v USACE et al.
2006	Issued comments on USEPA, USACE Guidance Regarding Clean Water Act Jurisdiction after Rapanos
2006	Issued comments on USEPA, USACE Proposed Rule on Compensatory Mitigation for Losses of Aquatic Resources
2006	Issued comments on proposed modification and reissuance of Nationwide Permit Program
2007	Second revision of the Wetlands Protection Strategy
2008	West of Hudson Status and Trends Completed 1984-2004
2008	Issued comments on USEPA, USACE Guidance Regarding Clean Water Act Jurisdiction after Rapanos
2009	Addendum A of DEC DEP MOU updated for Article 24 and 15 reviews
2009	Publication of updated educational pamphlet on Wetlands in the Watershed of the New York City Water Supply System
2010	DEP Forest Management Conservation Practices established
2010	Esopus Creek Wetland Mapping Project Completed
2011	Vernal pools added to reference wetland monitoring program
2011	Issued comments on proposed modification and reissuance of Nationwide Permit Program
2011	Issued comments on USEPA USACE draft guidance on identifying waters protected by the CWA
2012	Third revision of the Wetlands Protection Strategy
2013	Issued comments on USEPA Science Advisory Board Report "Connectivity of streams and wetlands to downstream waters"
2014	Reference Wetland Conditions Summary Report Completed
2014	Issued comments on the USEPA proposed rule regarding the definition of WOTUS under the CWA
2015	Completion of LiDAR-based Wetlands Mapping Pilot Study
2016	Issued comments on proposed modification and reissuance of Nationwide Permit Program
2016	Reference Wetland Vegetation Resampling completed
2017	Issued comments on USEPA proposed rule to rescind the definition of WOTUS
2017	Issued comments on USACE solicitation for comment on regulations for repeal, replacement, or modification
2017	DEP staff appointed to New York Interagency Review Team for Wetland Banking and In lieu Fee Mitigation