

## Section 4 – Background

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## 4. Background

### 4.1. Introduction

“A science of land health needs, first of all, a base datum of normality, a picture of how healthy land maintains itself as an organism.” Aldo Leopold, A Sand County Almanac

The New York City water supply system consists of unfiltered surface water sources (1,969 square miles) that supply an average of 1.3 billion gallons per day of drinking water to more than nine million people in the New York City metropolitan area. The West Branch Delaware River and the Cannonsville Reservoir *watershed* covers 455 square miles and accounts for 28% of the Catskill/Delaware Watersheds. This area (**Figure 4.1**) supplies approximately 50% of the city’s drinking water. The New York City Department of Environmental Protection (NYCDEP) is the City agency with primary responsibility for oversight of the operation, maintenance and management of the water supply infrastructure and the protection of these watersheds.<sup>1</sup>

### 4.2. NYCDEP Filtration Avoidance Determination

The Safe Drinking Water Act (SDWA) amendments of 1986 required the United States Environmental Protection Agency (USEPA) to develop criteria under which filtration would be required for public surface drinking water supplies. In 1989, USEPA promulgated the Surface Water Treatment Rule (SWTR), which requires all public water supply systems supplied by unfiltered surface water sources to either provide filtration or meet a series of water quality, operational and watershed control criteria (filtration avoidance criteria).<sup>2</sup>

As a result, the NYCDEP filed for and received a conditional, renewable Filtration Avoidance Determination (FAD) in May 1997 (after a series of conditional waivers and a FAD beginning in 1993) under which the NYCDEP now operates its water supply system. The FAD is periodically reviewed and evaluated by the USEPA and the New York State Department of Health.

Central to maintaining the FAD are a series of partnership programs between New York City and the upstate communities, as well as a set of rules and regulations administered by the NYCDEP. As required in the FAD, this Stream Corridor Management Plan is being developed and implemented under the NYCDEP’s Stream Management Program (SMP).

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<sup>1</sup> New York City’s 2001 Watershed Protection Program Summary, Assessment and Long-term Plan, December 2001. Section 1, pages 1-6. Also published on NYCDEP Website: <http://www.ci.nyc.ny.us/html/dep/html/fadplan.html> (Verified 8-26-04)

<sup>2</sup> Ibid. paraphrased.



Figure 4.1 Catskill/Delaware Watersheds of New York City Water Supply System

### **4.3. Stream Corridor Management Program Contract Development**

Following the January 1996 flood event, which produced significant stream and infrastructure damage throughout the Catskills, it was recognized that a program to repair isolated streambanks would not effectively address the systemic causes of stream channel *instability* that exacerbate streambank *erosion*, compromise water quality and degrade *aquatic habitat*. In consultation with its watershed partners, the City of New York developed a stream management strategy to be implemented by its Stream Management Program (SMP). Its overall mission is to restore stream *stability* and stream ecological integrity by facilitating the long-term stewardship of Catskill streams and *floodplains*. As described in **Section 3**, local concerns about excessive stream erosion and flooding complement NYCDEP's concerns about water quality, making the partnership between NYCDEP and the Delaware County Soil & Water Conservation District (DCSWCD) a natural choice.

The main stem and tributaries of the West Branch were considered of significant priority by NYCDEP to be included in a first tier of projects to develop a comprehensive Stream Corridor Management Plan (SCMP) and DCSWCD was the appropriate agency with the legal mandate and experience to undertake this task. From 1999—2000, DCSWCD negotiated with NYCDEP to develop a SCMP contract for the West Branch of the Delaware River and its tributaries.

The contract was executed on 7/19/00 and an Order to Commence Work was issued to the DCSWCD on 9/12/00. The contract period was from 10/6/00 to 10/5/04, with funding (not to exceed \$1,218,433) supplied by the NYCDEP and the US Army Corps of Engineers (USACOE). The primary tasks were to assess conditions of the entire main stem of the West Branch, and use the information gathered to develop a plan for the long-term stewardship of the basin. Two hundred thousand dollars of the contract sum would be used for construction and leveraging outside funds for one or more demonstration restoration projects.

A contract was executed in July 2000 and work commenced in December 2000, with a project term of December 2000 to December 2004. Subsequently, the project was extended to December 2005.),

### **4.4. Project Partners**

When planning around any shared resource there are many different points of view, concerns, practices and regulations. To accomplish the goals and objectives described in **Section 3**, a communication network (advisory committee) was developed among the landowners and agencies that live, work near, or otherwise enjoy the streams and rivers in the basin.

#### **4.4.1. Project Advisory Committee**

In January of 2001 DCSWCD held a project information meeting to introduce the Stream Corridor Management Program (SCMP) to prospective members of a Project Advisory Committee (PAC). Formed in March 2001, the committee has gradually expanded, each member bringing their own unique experiences and historical perspectives to the group. The PAC has met several times to review and discuss information collected by the SMP and to advise SCMP as needed.

Early in the program, the staff and PAC identified stakeholders among the approximately 2,230 *riparian* landowners in the West Branch basin. This stakeholders list includes project partners, various categories of landowners and businesses, special interest groups, agencies, local municipal boards and highway departments, regulators, schools, media, and others interested in stream management. The PAC and Stakeholder lists are included at the end of this section.

#### **4.4.2. Initial Landowner Contact**

Initial landowner contact included a letter mailed to the 692 riparian landowners along the main stem of the West Branch, in early summer 2001, that briefly described the project and requested their support. This was followed by another letter and a release form sent to main stem landowners in the Towns of Stamford, Harpersfield and Kortright, seeking their permission to perform river assessments along their property. In early 2002, similar letters and release forms went out to West Branch main stem residents in the Towns of Delhi, Hamden and Walton. Landowners were overwhelmingly receptive in allowing the work to be performed. SCMP maintained close contact with local landowners wherever stream data collection was being performed.

#### **4.4.3. Landowner Surveys**

Landowner perception of stream management issues was considered crucial to the success of the SCMP. Past and current management practices, the reasons for these practices and their successes and failures was considered valuable information for use with planned assessments, and would play an important role in future management recommendations. Important information was also gained as to where landowners were trapped into never ending cycles of stream maintenance, which would assist in the development of future management priorities and public outreach.

In May 2002 and again in April 2003, surveys addressing the perceptions of riparian landowners about their stream and its possible management alternatives were performed along the West Branch main stem and the main stems of the major sub-basin tributaries (see **Map 5.2**). The Town's of Harpersfield, Kortright, Stamford and the Kidd Brook *tributary* in the Town of Delhi were surveyed in 2002; Hamden, Bovina, Walton, Meredith and the remainder of Delhi were surveyed in 2003. Using two survey areas facilitated the survey process and coincided with the areas of the watershed being assessed during the 2002 and 2003 field seasons. The survey form was slightly modified for the 2003 survey to facilitate data compilation. The results of both surveys were

combined and used to support efforts of the SCMP, NYCDEP and the PAC to determine landowner concerns, target further research, and make plan recommendations.

Of 1037 surveys distributed, 230 were filled out and returned (a 22% return rate). Six land ownership classes were recognized for solicitation: permanent residence (44%), vacant/forested land (17%), agriculture (14% - representing 62% of the land base), seasonal residence (14%), business (7%), and government/public service (4%). Of the surveys returned, respondents were 50% permanent residents, 20% seasonal residents, 18% farmers, 6% businesses, 3% government/public servants, and 3% vacant/forested landowners. Of the permanent residents responding, 79% had lived in the basin 20 years or more, while 97% had 10 years or more of residency. 47% of the seasonal residents responding had lived here for 20 years or more, while 77% had 10 or more years of residency.

Of the agricultural respondents, 88% use their streams in their livelihood, and nearly 80% enjoy the stream view. Among all other residents, over 80% enjoy both their stream view and wildlife viewing. Nearly 70% felt that stream conditions are good to excellent. Respondents who enjoy fishing were about equally divided between those who felt stream conditions had improved, deteriorated or remained consistent over time. Their primary concern was with streambank erosion (over 60%). Moderate concerns include flooding of property and government regulation of private property rights (35% each). Minor concerns include the time required to obtain permits for stream-work, pollution from upstream, time and money required for proper stream care and washout of roads and bridges (20-26%). Over 40% indicated they had been affected by flooding multiple times, but only 27% indicated flooding as a frequent problem, while 44% thought flooding was a minor problem. 33% had never been affected by flooding. Some felt that *gravel* deposits need to be removed as a solution to flooding, while a few others felt that stream bank maintenance is necessary to maintain their streams. Over 30% felt that stream management decisions should be shared between landowners and local government, and 30% felt stream management decisions should rest with the local Soil & Water Conservation District. Survey forms, reports and summary tables are included in **Appendix 1**.



**Figure 4.2** Example of streambank riprap above County Route 2 bridge in Delancey

The summary of responses listed above indicates that residents generally enjoy viewing their streams and stream conditions are good. Responding residents are genuinely concerned with erosion, and flooding is a moderate concern. Some respondents feel that some sort of maintenance is necessary to protect property and several have indicated concerns with obtaining permits and money to perform stream related work.

Additionally, several landowners with a long family history of living on the West Branch were asked to further share their experiences with living and working along the river. Due to the agricultural nature of the basin, most of these landowners were 3<sup>rd</sup> to 8<sup>th</sup> generation farmers. Approximately 80% of these respondents had experienced annual flooding with some indicating conditions have worsened since the January 1996 flood (see Section 3.8.3). Maintenance activities, generally consisting of the construction or maintenance of *berms* and/or dumped stone or riprap, were undertaken by 84% of the respondents. Generally, 30-40% of respondents had concerns with continuing erosion, widening of the river, increasing incidences of gravel bars, and difficulties with obtaining regulatory permits. An average of 36% of respondents appreciate the importance of floodplain function and natural river processes and have either natural or man-made buffers along at least some of their river frontage. Approximately 33% of the responding farmers prefer to mow or crop to the river's edge.

#### **4.5. Watershed Agricultural Council**

The Watershed Agricultural Council (WAC) was formed in 1992 to assist the NYCDEP in the development and implementation of voluntary watershed protection programs that include agriculture and forestry, with the overall objective of safeguarding and improving source water quality in the New York City watershed region through various conservation programs. Two programs pertinent to stream management are the Watershed Agricultural Program (WAP) and the Watershed Forestry Program, further described below. Further information is available on the WAC website: [www.nycwatershed.org](http://www.nycwatershed.org) (Verified 12-07-04)

##### **4.5.1. Watershed Agricultural Program**

WAP is a contractual partnership between WAC and the following agencies: Delaware County Soil & Water Conservation District, USDA Natural Resources Conservation Service (NRCS) and Cornell Cooperative Extension (CCE). These partner agencies develop and implement Whole Farm Plans (WFP) that address goals documented in the United States Environmental Protection Agency's Filtration Avoidance Determination (see **Section 4.2**) and the WAC contract with New York City. WAP program staff consists of NRCS planners, agronomists and engineers, DCSWCD civil engineering technicians and technicians, and CCE crop, livestock, and nutrient management specialists.

WAP teams work collectively to plan and implement agricultural Best Management Practices (BMPs) as an integrated system on each participating farm in both large and small farm programs in the Catskill/Delaware Watersheds. These water quality BMPs are designed and constructed to NRCS standards and specifications and include: barnyard management systems, manure storage, roof runoff management, grazing systems, livestock water systems, livestock trails, comprehensive nutrient management, diversions, and crop rotation, to name a few. The Conservation Reserve Enhancement Program, implemented by USDA through WAP, is a very important riparian buffer program for land under agricultural production, further described in **Section 6.3.2**). Other practices

not covered by NRCS standards are designed and implemented by a team of WAC engineers and technicians.

#### **4.5.2. Watershed Forestry Program**

WAC administers the Watershed Forestry Program with funding from the U. S. Forest Service and NYCDEP to address forestry needs within the Catskill/Delaware Watersheds. Community-based forestry groups and foresters provide technical support with the New York State Department of Environmental Conservation. The program encourages private forest landowners to actively manage their forests using sustainable best management practices and offers information and technical assistance to help them reach their goals, while observing practices that ensure the preservation of water quality.

The program offers training for consulting foresters and loggers and partners with the New York Logger Training's "Trained Logger Certification" program to help timber harvesters learn about a range of topics from safety and first aid to sustainable forestry to BMPs for water quality. The program also encourages forest land owners to develop and implement Forest Management Plans and provides technical assistance and some cost-sharing for implementation of forest management and riparian forest BMPs.

The Watershed Forestry Program also coordinates four model forests throughout the watershed that integrate research, demonstration, continuing education and public outreach. The Lennox Memorial Forest, the lone model forest in the Cannonsville basin, is a 140-acre site located south of Delhi and was completed in 2001. After viewing an educational kiosk that connects healthy forests to clean water, visitors travel a two-mile demonstration road with interpretive signs that highlight erosion control BMPs and fourteen silvicultural treatments. A number of deer "exclosures" are installed at the Lennox Forest to help research the effects of deer grazing on forest regeneration.

With funding from the USDA Forest Service Economic Action Program, eligible wood-based businesses in the NYC Watershed regions East and West of the Hudson River are awarded grants through the Forestry Grants Program to assist in a variety of projects ranging from web-site design and marketing to apprenticeship programs and new equipment. The results are improved safety and efficiency, cutting-edge wood technology and innovative marketing campaigns, all of which emphasize WAC's goal that forestry remain a viable enterprise to protect water and to bolster economic vitality in watershed communities.

#### **4.6. Delaware County Action Plan**

The Delaware County Action Plan (DCAP) was formulated in 1999 to address water quality issues in the New York City watershed. DCAP is a comprehensive strategy developed to meet the needs of Delaware County as a result of the Cannonsville basin being designated a phosphorus-restricted basin. DCAP coordinates with public and private agencies (listed below) to develop water quality initiatives and seek funding for implementation.

DCAP lead agencies include the DCSWCD and the following Delaware County Governmental Departments: Planning, Public Works, Watershed Affairs and Economic Development, and the New York State Water Resources Institute (WRI). Other DCAP participants include: Delaware County: Industrial Development Agency, Chamber of Commerce, and Cornell Cooperative Extension; Regional: Catskill Watershed Corporation, Watershed Agricultural Council and NYCDEP; New York State Departments: Environmental Conservation, Health, State, Agriculture and Markets, Soil and Water Conservation Committee, and Cornell University researchers. Federal Agencies: Environmental Protection Agency, Department of Agriculture, Natural Resources Conservation Service, and Army Corps of Engineers.

DCAP adopted a multiple barrier approach to address potential pollutants, particularly phosphorus. The barriers utilized are called the Initial Source Barrier, the Transport Barrier and the Stream Corridor Barrier. Current components of DCAP include management programs for stormwater and flooding, highway runoff, on-site septic systems, precision livestock feeding, forage management, SCMP<sub>r</sub>, and *monitoring* and modeling of best management practices to assess phosphorus reduction. By coordinating all water quality efforts under the DCAP umbrella, these programs are working together to collectively reduce pollutants entering watercourses and to improve overall water quality. The following categories demonstrate DCAP effectiveness to date:

### **Stream Corridor Management**

The SCMP<sub>r</sub> has completed the following assessments:

- Rosgen Level II for the West Branch and Town Brook main stems.
- Evaluation of land use and riparian vegetation communities for the West Branch main stem.
- Cursory evaluation of stream conditions in proximity to road and bridge infrastructure.

The SCMP<sub>r</sub> has also implemented a full geomorphic demonstration restoration project to evaluate the effectiveness of natural stream channel design practices and principles. (see **Section 6, Findings** for a detailed description of the assessments and project)

This information is being integrated with other DCAP efforts, particularly the stormwater management and highway maintenance programs, to further enhance the effectiveness of these local water quality initiatives, further described below:

### **Stormwater Management**

The Delaware County Planning Department (DCPD) has developed the following long-term management programs:

- Inventory, Assessment and Evaluation of Stormwater Sources and Infrastructure  
**Goal:** to identify all point and non-point sources of stormwater in village and hamlet areas and manage them to reduce their impact on water quality.

**Work Completed:**

- A detailed evaluation of stormwater sources and conveyance systems is underway in the Cannonsville basin using *GPS* to locate stormwater infrastructure and culvert outfalls in hamlets and villages. A *Geographic Information Systems* (GIS) database has been created combining this information with soils, land use and topographic datasets. (The local infrastructure in the Pepacton basin has been completed to date).
- Pilot projects of stormwater collection, conveyance and treatment methods have been implemented in the villages of Stamford, Delhi and Walton.
- Local Implementation and Municipal Plan Development
  - Goals:** to work with each municipality to develop local initiatives for water quality protection through stormwater management and demonstrate the role of water quality to community economic development; also, to develop Stormwater Management Plans consistent with the NYCDEP Watershed Regulations and Phase II EPA Stormwater Regulations.

**Work Completed:**

- Failing components of stormwater infrastructure in Bovina Center have been assessed and replaced.
- Stormwater Management Plan finalized for the Village of Walton.
- Stormwater Management Plan under way for the Village of Delhi.
- Planning for source water protection.

**Highway Management Activities**

The Delaware County Department of Public Works (DCDPW) completed an inventory and assessment of storm drainage infrastructure along county highways in 1999 and continues to maintain a comprehensive inventory and assessment program for all pipes and their conditions. DCDPW has since evaluated alternative repair strategies for culverts that have reached the end of their useful life. These alternatives include culvert cut and cover practices; line inverts of existing pipes with concrete; and slip line existing pipes and fill interstitial space.

Ongoing management practices include: 1) Sediment removal from culverts and catch basins with a vacuum truck; made possible with the help of a 75% grant from the CWC 2) In-place road culvert stabilization, which includes slip lining failed culverts (when feasible) to minimize sedimentation caused by traditional excavation and replacement. 3) De-icing material control, which includes installation of modern control equipment on material spreaders to facilitate precise metering of de-icing materials. 4) All new structures (drop inlets) installed by DCDPW include sumps. These new structures are part of routine maintenance practices and capital improvement projects.

DCDPW currently has a stormwater retrofit project underway on County Route 6 in Bovina Center. Construction of this project is scheduled to be completed in 2005. DCDPW is also currently evaluating a retrofit project at the main DCDPW offices and shop complex on Page Avenue in the Village of Delhi. DCDPW has been working with the Village to continue two stormwater collection systems into one treatment system. For

this project natural treatment systems are being evaluated, however there is currently no projected construction schedule.

DCDPW along with the assistance of DCPD has inventoried and cataloged all major drainage features on county highways using GPS and a GIS database. The databases are kept up to date with continual updates from DCDPW crews after maintenance and repairs to any infrastructure. DCPD maintains and houses the databases and provides continuous support to DCDPW on this program.

As a result of Delaware County's efforts to improve stormwater, DCPD along with DCDPW developed a town highway management program. DCPD has been successful at securing moneys from the New York State Department of State (NYS DOS) to inventory town highways and all associated infrastructure and drainage systems. Data has been collected using GPS in the towns of Davenport, Andes and Kortright. The inventories have been cataloged through a GIS database and all infrastructure in has been mapped. DCPD along with DCDPW has continued to seek funding to continue phase two of developing the town highway management plans. Phase two requires an engineer assessment and evaluation of the infrastructure and the development of a multi-year capital investment plan. There is currently a grant proposal into the NYS DOS to develop one complete highway management plan from inventory through assessment and including a capital investment plan for the Town of Walton.

Other activities include creation of *wetlands* towards the establishment of a mitigation bank on county-owned property in Walton, and research investigating the use of chipped passenger car tire chips as a medium to remove dissolved phosphorus from stormwater.

Additional information is available on the DCAP website:  
<http://www.co.delaware.ny.us/depts/h2o/dcap.htm> (Verified 12-07-04)

#### **4.7. Catskill Watershed Corporation**

The Catskill Watershed Corporation (CWC) is a not-for-profit local development corporation with a dual goal: to protect the water resources of the New York City watershed west of the Hudson River, while preserving and strengthening communities located in the region. The CWC was formed in January 1997 with the signing of the New York City Memorandum of Agreement between City, State, federal, local and environmental entities. To help offset the costs and restrictions of increased regulations and land purchases by the city, CWC is charged with developing and implementing several city-funded programs including residential septic rehabilitation, replacement and maintenance, community wastewater management, planning and installation of stormwater controls, road salt storage, public education and economic development. CWC also consults on recreational uses of city lands, tax assessment issues, and wastewater treatment plants planned for several watershed communities. These programs are intended to protect the quality of the water which sustains 9 million residents of New York City and its suburbs, while at the same time preserving and strengthening the rural communities within the 5-county Catskill and Delaware Watersheds. Further information is available on the CWC website: [www.cwconline.org](http://www.cwconline.org) (Verified 12-07-04).

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## **West Branch Stakeholders**

### **Delaware County Departments**

Emergency Services  
Planning  
Public Works  
Watershed Affairs  
DCSWCD

### **Local Organizations**

Catskill Revitalization Corporation  
Chambers of Commerce

### **Business Entities**

Campgrounds  
Contractors  
Developers  
Farmers  
Hunting and Fishing Guides  
Foresters  
Golf courses  
Realtors  
Ski slopes  
Other local businesses

### **Local Governing/Planning Boards and Highway Departments**

Bovina, Town of	Kortright, Town of
Delhi, Town of	Meredith, Town of
Franklin, Town of	Stamford, Town of
Hamden, Town of	Stamford, Village of
Harpersfield, Town of	Walton, Town of
Hobart, Village of	Walton, Village of

### **Regional Entities**

Catskill Watershed Corporation  
Catskill Center for Conservation and Development  
Cornell Cooperative Extension  
Delaware River Basin Commission  
New York City Department of Environmental Protection  
New York Farm Bureau  
Watershed Resource Institute

### **State Entities**

New York Department of State  
New York State Department of Environmental Conservation  
New York State Department of Transportation  
New York State Emergency Management Office  
New York State Office of Parks, Recreation, and Historic Preservation  
New York State Soil and Water Conservation Committee  
State University of New York at Delhi

### **Federal Entities**

Federal Emergency Management Agency  
National Oceanic and Atmospheric Administration  
United States Department of Agriculture  
Natural Resources Conservation Service

United States Forest Service  
United States Army Corps of Engineers  
United States Department of the Interior  
United States Environmental Protection Agency  
United States Fish and Wildlife Service  
United States Geological Survey

**Special Interest Groups**

4-H clubs  
Anglers  
Canoers/boaters  
Future Farmers of America groups  
Scouting groups  
Trout Unlimited

**Other Interests**

Allen Residential Center	Riparian landowners
Churches	Schools
Non-riparian landowners	Seasonal riparian landowners
Phoenix House	Water consumers (local, NYC)
Public utilities	Water recreation interests

**Media**

Catskill Mountain News	The Daily Star
Country Folks	The Reporter Company
County Shopper	Tri-Town News
Delaware County Times	WBNG TV - Binghamton
Deposit Courier	WCDO Radio
Hancock Herald	WDHI Radio
Local cable network – Delhi	WDLA Radio
Local cable network – Walton	WDOS Radio
Mirror Recorder	WIYN Radio
Mountain Eagle News	
Stamfordword.com	