

Watershed Management for Urban Water Supply The New York City Experience

THE purpose of this case study series is to familiarize Missions and Regional Bureaus with practical approaches to integrated water resources management (IWRM) that have proven to be successful in USAID field programs.

Acknowledgments

This report was produced by the USAID Water Team with information provided by Meg Findley and Vahid Alavian.

Keywords

Drinking water supply; U.S. government experience; watershed management

Introduction

The New York City water supply system delivers 1.4 billion gallons of high-quality drinking water to 9 million people every day. The development and implementation of ways to manage such a large urban water supply that are both affordable and environmentally sound serve as a successful example of the integrated water resources management process. The sources of New York City's water supply exist in the Croton and Catskill/Delaware watershed systems, which together span 1,969 square miles, some 200 miles from the city. Land use in the watershed is diverse. Much of the land is forested (61 percent of which is privately owned), and there are 500 farms and 60 towns located within the watershed. Forestry and agricultural activities support the local economy. The variety of land and water use in the area affects water quality for downstream stakeholders in the city of New York.

In 1989, the city was faced with finding an affordable way to comply with the federal Safe Drinking Water Act, which required filtration of the water from the Catskill/Delaware system (which provides 90 percent of the consumed water). With an estimated cost of \$8 billion to build the necessary filtration plants, the city set out to explore more affordable options to ensure the delivery of high-quality drinking water to New York City residents.

The city proposed a comprehensive, long-range watershed protection program aimed at integrating a variety of management options — some of which specifically targeted the farming and dairy industries — to protect and improve water quality. In response to this proposal, the U.S. Environmental Protection Agency (EPA) waived the filtration requirement in 1993. Dairy and livestock farmers in the upland areas immediately expressed concern that some of the plan's watershed regulations would threaten local livelihoods and the revenue of both farmers and the forest products industry. They solicited assistance from the Farm Bureau; the New York Department of Agriculture and Markets; the New York Water Resources Institute at Cornell University; and other local, state, and federal agencies to explore non-regulatory alternatives that would protect the farmers' interests while also maintaining the superior quality of the city's water supply. Based on a participatory review process, the Watershed Agricultural Program was implemented in 1994. This program was the first upstream/downstream collaboration to link water quality protection goals with an economic objective — preservation of the watershed's farming economy.



The New York City watershed

The entire watershed protection program, at an estimated cost of \$507 million, provided a substantial savings compared to the cost of filtration. An added benefit is that the watershed ecosystem gains long-term protection. This case study can serve as an example of watershed management that involves stakeholders at both the regional and community level.

Approach

The objective of this IWRM process is to improve the economic viability of farm and forestland ownership, farming communities, and the forest products industry in ways compatible with water quality protection and sustainable landscape management. The variety of stakeholders in

this process represents foresters, landowners, rural townships, environmentalists, loggers, farmers, government officials, technical agencies, and businesses.

This diverse group of stakeholders recommended an array of solutions that are technical, environmental, institutional, and social in nature and that constitute the Watershed Development Program currently in effect. The solutions were designed to simultaneously maintain the forested and agricultural landscape, to encourage sustainable forest and agricultural management, to protect water quality, and to enhance local economic opportunities. They included education and outreach; conservation easements on working landscapes; development of a user-friendly field manual for landowners, foresters, timber harvesters, farmers, and industry; economic incentives to implement best management practices (BMPs), including improved tax laws; efforts to foster an improved business climate; and new technologies and management techniques.

Why Use New York City as a Case Study?

- Illustrates a multifaceted strategy to protect and improve water quality for a variety of stakeholders
- Successfully integrates upstream and downstream users
- Shows that voluntary partnerships can protect water quality as effectively as regulatory restrictions
- Implements locally based (community) watershed protection programs
- The Whole Farm management concept shows how a variety of best management practices can be integrated
- Links water quality protection goals with economic objectives
- Underscores the importance of a comprehensive, long-range watershed protection program

The watershed protection program is composed of the following elements.

- Land Acquisition and Stewardship Program. The city is acquiring undeveloped land near reservoirs, wetlands, and water-courses, or land that is otherwise water-quality sensitive. The city plans to spend between \$240 million and \$310 million over the next 10 years. Many of these parcels are opened for hiking, cross-country skiing, and snowshoeing, which enhances the recreational value of the area.
- Partnership programs. Foresters, landowners, environmentalists, loggers, farmers, government officials, technical agencies, and businesses have partnered together to provide local leadership to the Watershed Agricultural Program and the Watershed Forestry Program. These participatory programs ensure that the needs of all stakeholders are met, while simultaneously meeting federal drinking water standards. The programs have promoted environmentally sustainable Whole Farm management techniques and BMPs.
- Wastewater management. The New York City Department of Environmental Protection (DEP) is working to construct new, centralized sewage systems, and to inspect and rehabilitate septic systems.
- Stormwater management measures. This includes a variety of actions, such as stream corridor protection projects and improved storage of sand, salt, and de-icing materials.
- Changes in policy and regulation.
- Environmental education and outreach programs.

This is an ongoing process. Management activities are monitored in concert with water quality to track the effect of land use and BMPs on the ability to meet water quality standards without filtration. Current monitoring projects are also collecting data, which will be used to better tailor

management activities and BMPs to specific farm units. It can be expected that this will further reduce costs to long-term watershed management.

Results

- The program resulted in a portfolio of non-regulatory, integrated alternatives that focused on local leadership, environmental monitoring and education, and voluntary participation in pollution prevention and control.
- Interdependence of long-term watershed protection and enhanced profitability of privately owned agricultural and forestry land was maintained and enhanced.
- The Watershed Memorandum of Agreement (signed in 1997) united the watershed communities, New York City, New York State, the EPA and the environmentalists.
- Although this participatory program is voluntary, 287 out of 350 eligible farms in the Croton Watershed were enrolled in the program in 1997.
- By spending a fraction of the cost of filtration, New York City is able to maintain a long-term supply of high-quality drinking water while preserving ecosystem values and the upstate economy that depend on the watershed resources.

Additional Information

Internet Web Sites

Catskill Watershed Corporation (<http://www.cwconline.org>)

U.S. Environmental Protection Agency Office of Water, New York City Water Supply System (<http://www.epa.gov/OWOW/watershed/ny>)

New York City Department of Environmental Protection (<http://www.ci.nyc.ny.us/dep>)

Watershed Forestry Program (<http://www.nycwatershed.org>)

References

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Lessons Learned

The key to success of this program is stakeholder involvement in a participatory process guided by local leadership. Other lessons that can be drawn from this case and applied to similar situations elsewhere include the following.

- Local leadership is central to successful participatory programs.
- Early buy-in from farmers who usually mistrust regulators is essential.
- Reduction of nutrients, pollutants, and pathogens in the management of upland agricultural runoff is important. Efforts to control the source of pollutants (such as barnyard areas, silage systems, stored manure, sheds containing chemicals, and animal disease), runoff from landscapes (via stormwater control measures), and watercourse protection (such as streambank buffer strips) are all successful approaches in the city's watershed protection program.
- Whole Farm management that integrates a variety of BMPs is an affordable means of sustainable agriculture, in terms of both conserving farm resources and protecting sources of drinking water. For example, more efficient use of fertilizer reduces costs and nutrient concentrations in water. Improved sanitary conditions for livestock reduces disease in animals and pathogens in drinking water.
- What happens upstream in a watershed can have a profound impact on conditions downstream. A pitfall to avoid is the disconnect often observed between economic development policies and sustainable management policies.

