

WATERSHED MANAGEMENT: CONSIDERING GROUNDWATER AND DEPENDENT ECOSYSTEMS

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New York's watersheds are under threat from pollution, aging infrastructure, habitat loss and fragmentation, as well as loss of agricultural and forestry land. To address these issues the New York Department of State (Department) provides hands-on professional assistance and, through Title 11 of the Environmental Protection Fund, matching grants for the preparation and implementation of watershed management plans. The Department's guidebook, *Watershed Plans: Protecting and Restoring Water Quality*, sets forth a framework for the characterization of the physical attributes of a watershed, identification and assessment of impairments and threats, analysis of gaps, and opportunities for improvement in local laws and practices to control nonpoint pollution and to protect water resources. Following this approach, with the Department's oversight, 37 intermunicipal watershed management plans have been completed or are underway throughout the state, covering 11,500 square miles, 21% of the state's land area, and involving 53 counties and over 458 communities. Led by municipalities, with the participation of other local and state agencies, and the increased involvement of Soil and Water Conservation Districts, the development of watershed plans continues to seek public input. The process benefits from the place-base knowledge of dedicated local residents, business owners, and non-governmental organizations, while considering state goals for water quality and availability.

Watershed characterization can go beyond the relationship between overland flow and surface water quality to arrive at a fuller representation of hydrology, reflecting the movement of water under the surface of the land, as well as over it. Many opportunities exist to further explore the connections between land cover, groundwater discharge, and dependent ecosystems including springs, groundwater-fed streams, certain wetlands, lakes, and nearshore coastal waters. As such, better knowledge of groundwater hydrology through watershed characterization can contribute to the protection of biodiversity. The watershed planning framework can also be used to prioritize adaptive responses to prepare for changes in the frequency and intensity of precipitation, including identification of forested areas providing flood attenuation functions.

Watershed analyses can draw upon many sources of data, including remote sensing, modeling, agency records, and the knowledge of local residents. Analysis of soils, land use, land cover and underlying geology, have been used to identify areas that are potentially vulnerable to groundwater contamination. These can be used to help refine management practices to be more protective and to help guide future activities into the most suitable locations.

In the Mohawk River Watershed, the preparation of a watershed management plan, led by the Mohawk Watershed Coalition of Conservation Districts, will use GIS technology combined with the expertise of project partners to perform suitability analyses to identify opportunities to reduce nonpoint pollution, encourage groundwater recharge and protection, promote habitat restoration, advance green infrastructure, and guide growth.

New sources of data are being integrated into the planning process as they are made available. As data are increasingly gathered regarding major water withdrawals, under Title 33 of ECL Article 15, New York will gain a greater understanding of groundwater resources, which can be applied to decision-making at the regional scale to meet the demands for drinking water, industry, and ecosystems.

Increasingly, watershed management plans across the state will need to address not only water quality but also water availability for both humans and ecosystems. The Department of State will continue to support the intermunicipal watershed management planning approach that is illustrated by the Mohawk River example. This effort has a strong component of public participation, builds upon the existing knowledge base and, where necessary, involves the collection and assessment of new data critical to forming successful adaptive management strategies.