Watershed Rules and Regulations for Protection of Drinking Water in New York

Public Health Law Article 11, §1100 authorizes the New York State Department of Health (NYSDOH) to promulgate regulations "for the protection from contamination of any or all public supplies of potable waters and water supplies of the state ... and their sources within the state…." [1] . The regulations are known as watershed rules and regulations. While these regulations have not been updated in many years for most supplies, other regulations have been implemented to address water quality risks such as hazardous waste disposal, storage of fuel oil and chemicals, and pesticide applications, that were not fully recognized when this law was first adopted. This article describes the history and central focus of the watershed rules and regulations and provides perspective on the current regulatory environment, as well as a brief discussion about other options for protecting drinking water sources.

Background

Protection of water sources used for potable water supplies is one of the most important priorities for protecting human health. Historically, people recognized a connection between contaminated water and illness, even before it was understood how water caused some widespread diseases.

Prior to 1854, however, the dominant theory was that diseases such as cholera were caused by "miasma" in the air.[2] John Snow, considered one of the founding fathers of modern epidemiology, theorized that cholera reproduced in the human body and was spread through contaminated water. Snow was able to demonstrate the role and significance of water supply in the Soho, London cholera outbreak in 1854. Snow's findings inspired fundamental changes in the water and waste systems of London, which led to similar changes in other cities, and a significant improvement in general public health around the world.

As water sources in and near cities and other settlements became polluted, abandoning local sources in favor of using water from more distant watersheds in sparsely-populated landscapes was a solution for obtaining cleaner supplies. After a major cholera epidemic in 1832 and an increasing demand for industrial water use and after years of debate, New York City's water supply reservoirs in the Croton River basin north of the city were constructed in the mid-1800s. Prior to construction of the Croton Aqueduct system, New Yorkers got their water from cisterns, wells, natural springs, and other bodies of water. Larger sources for the city were tapped later, beginning in 1915 when the city started receiving water from the Catskill mountains through the Catskill Aqueduct after the Ashokan Reservoir was completed.[3] New York City's water supply is one of very few in the state that does benefit from updated watershed regulations to enable comprehensive protection of water sources specifically through the state's public health laws. There are other laws and regulations are critical elements of the watershed protection programs for this supply.

After the emergence of more modern medical and scientific perspectives on the causes of infectious water-borne diseases in the mid-1800s, policies and practices to keep sanitary waste separated from drinking water sources became a central element of public health programs, and this has been among the most important advances in human history for reducing rates of illness and mortality. But even before the real causes of these health risks were understood to be microbial pathogens, laws and policies for managing human and animal wastes to prevent contamination of drinking water sources were enacted in some parts of the U.S. Legislation was passed to protect water supplies in Philadelphia and Baltimore, in 1803 and 1808, respectively.[4] New York State's law authorizing watershed rules and regulations was adopted in 1885, with additional provisions approved in 1909. This state law allows the NYSDOH (formed in 1900 to succeed the 'Board of Health') to promulgate regulations to protect specific public water supplies and their sources from

[1] Rodenhausen, May 13, 2015

[2] Mapping the 1854 London Cholera Outbreak, https://www.udel.edu/johnmack/frec682/cholera/

[3] Soll, 2013

[4] Porter, 2006

contamination. To implement rules for any given water supply, the NYSDOH must enact separate regulations for that particular water system and its sources.[5]

Based on what was known in the early 1900s, these regulations generally addressed pollution sources such as privies, cesspools, garbage, animal manure, dead animals, and industrial discharges. They also often addressed fishing, boating, ice cutting, and camping. The early regulations did not address a wide range of risks to water quality that are better understood today as significant for protecting drinking water, such as sediment, fertilizer, pesticides, road salt, oil and grease, pharmaceuticals etc., some of which didn't even exist or were not widely-used at the time. Over time, watershed rules and regulations were adopted by the NYSDOH for additional water supplies and generally the regulations adopted up through about 1972 included provisions similar to the earliest ones. There are at least 250 individual water supply systems for which the NYSDOH has promulgated regulations since the state law was enacted in 1885, and most regulations were adopted the 1920s to the 1950s. (Wilson, 2015.)

NYSDEC and Protection of Water Supplies

Other state regulations have been enacted over the years to protect water resources, under the authority of the New York State Department of Environmental Conservation (NYSDEC). The NYSDEC was formed in 1970 as the successor to other state programs and commissions. Some NYSDOH programs were shifted to the NYSDEC's purview.

Article 15, Title 15 in the Environmental Conservation Law (ECL)[6], states that NYSDEC "may regulate the supply of water for public use from both surface and groundwater resources".[7] While NYSDOH remains the state agency that is specifically charged with regulating and overseeing public water supplies, regulations for protecting water quality have been adopted by the NYSDEC under their authority in the ECL and many of the regulations are directly relevant to protecting human health.

The DEC's authority to regulate wastewater discharges is based on the Federal Clean Water Act (CWA) enacted in 1972, and its authority for some of the other regulations noted above is also based on other Federal laws. The CWA establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. The basis of the CWA was enacted in 1948 and was called the Federal Water Pollution Control Act, but the Act was significantly reorganized and expanded in 1972. "Clean Water Act" became the Act's common name with amendments in 1972.

The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained. The U.S. Environmental Protection Agency (USEPA) National Pollutant Discharge Elimination System (NPDES) permit program controls discharges. Point sources are discrete conveyances such as pipes or man-made ditches. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an permit

In 1975, the USEPA authorized New York State to implement the National Pollutant Discharge Elimination System (NPDES) program to regulate all wastewater discharges to surface waters. The state's Environmental Conservation Law (ECL) established the SPDES program and provides NYSDEC with additional legal authority to regulate wastewater discharges to groundwater. The SPDES permits are issued pursuant to Article 17 of the ECL and state regulations to 6 NYCRR Part 750. The NYSDEC regulations on discharges of domestic and industrial sources of wastewater through the State Pollutant Discharge Elimination System permit program (SPDES) are very important for watershed protection.

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[5] Hennigan 1991 and 2006

[6] Protection of Waters Program ARTICLE 15, ENVIRONMENTAL CONSERVATION LAW IMPLEMENTING REGULATIONS 6NYCRR PART 608 http://www.dec.ny.gov/permits/6042.html

[7] Rodenhausen, May 13, 2015

NYSDOH has their own authority to regulate most wastewater discharges to groundwater for onsite systems (septic systems) that discharge less than 1,000 gallons per day (GPD) of wastewater, based on part 75A of the state's sanitary code (this is a different section of law from the authority for watershed rules and regulations). Between 1,000-10,000 GPD, wastewater discharges to groundwater in New York are actually regulated as part of the SPDES program, however in 1984, NYSDEC and NYSDOH adopted an interagency memorandum of agreement specifying that the NYSDOH would administer the review and approval of permits for these discharges in many cases. Permit reviews and oversight for wastewater discharges above 10,000 GPD to groundwater, and for all discharges to surface waters, are the purview of NYSDEC alone with respect to protecting ambient water quality in the environment.[8] (NYS DEC website, no date.) Some of the other DEC regulations that are directly relevant to protecting drinking water address pesticide control, hazardous waste management, bulk storage of chemicals and petroleum, the Protection of Waters Regulatory permitting program, and recently enacted regulations to minimize discharge of phosphorus and the resulting eutrophication and water quality impacts from lawn fertilizer and dishwasher detergent.[9]

Protection of Water Supplies at the Local Level

New York has a strong home rule legal framework that gives local municipalities control over most land use planning and development decisions within their own jurisdiction. But unlike most laws that enable local governments to control land use and related activities, the enactment of watershed rules and regulations by NYSDOH under NYS Public Health Law Article 11, §1100, allows local governments to regulate certain activities occurring *in other municipalities* where their water sources are located. Through this extraterritorial authority, where one community's reservoir or parts of its watershed are located in another municipality, under this legal mechanism, the municipality that owns the water supply can have certain inspection and enforcement powers for regulated activities in the relevant watershed.[10] At the same time, because both NYSDEC and NYSDOH can have authority over certain activities involving land use and discharges of pollutants into waterbodies, their authority can sometime overlap. This has created challenges in the past both internally for each department and in terms of inter-agency coordination. Because NYSDOH regulations can give specific authority to local government to have a role in administering regulations that affect land use in a separate municipality, the administration of watershed rules by NYSDOH can present complications for local and state government. Perhaps these complications lead to the NYSDOH focusing resources on other priorities rather than the review and enactment of new or updated watershed regulations.

Current Status of Watershed Rules and Regulations in New York

In most cases, the NYSDOH watershed rules and regulations for individual water supplies in the state have not been updated in many years. Regulations that are part of the landmark legal agreement for the protection of New York City's reservoirs, which was finalized on January 21, 1997, are the most notable exception. This Memorandum of Agreement (MOA) and the programs it enabled, including comprehensive regulations, a land acquisition program in the watersheds surrounding the city's reservoirs, wastewater and stormwater infrastructure upgrades, and other initiatives, were critically important for New York City's ability to win approval from the U.S. Environmental Protection Agency and the NYSDOH for avoiding construction of a massive and costly water filtration plant. This filtration avoidance determination (FAD) is one of only a few in the U.S. where a water supply system using surface sources has been allowed to avoid filtering its water. Generally filtration was mandated for all systems using water from surface water sources or directly influenced by them under updated provisions of the Federal Surface Water Treatment Rule, promulgated under the Safe Drinking Water Act. *The Rules and Regulations for the Protection from Contamination,*

[8] Ambient refers to open waters such as rivers, lakes and streams, as opposed to closed water supply systems that distribute treated water or wastewater http://water.epa.gov/learn/training/standardsacademy/upload/module_humanhealth.pdf

[9] Wilson, 2015

[10] Rodenhausen, May 13, 2015

Degradation and Pollution of the New York City Water Supply and it's Sources became effective on May 1, 1997 and were amended in 2010. [11]

The City of Syracuse water supply system is the only other system in New York that has received a FAD, in this case for water from Skaneateles Lake, the primary water source used by the City. Syracuse is one of the only other communities for which the NYSDOH watershed rules and regulations have been updated to address a broader range of concerns. Still, however, the central focus of the filtration requirement, and of the filtration avoidance programs for the few systems that have FADs, remains on minimizing risk from infectious disease caused by microbial pathogens. Because the microbial risks from bacterial pathogens that were widespread in the past (especially cholera and typhoid) have been largely eliminated by disinfection of water, a high priority for these FADs is minimizing risk from several microbial parasites, including *Cryptosporidium* and *Giardia.*

In addition to the watershed regulations and related programs for water supplies serving New York City and Syracuse, another notable example where watershed rules and regulations are being used in New York is by the Canandaigua Lake Watershed Commission. This Commission is made up of five municipalities that use the lake for drinking water. While these municipalities filter their water, the watershed rules in place here have not been updated for many years. Nevertheless the regulations are the basis for an active watershed inspection and enforcement program for onsite wastewater systems and other potential pollution sources.[12]

For most other communities in New York for which much older watershed rules and regulations are still in place, it's not clear whether they are still being applied. As noted above, other regulations have supplanted the need for focusing only on this mechanism to protect water sources, and the policy and political challenges of administering extraterritorial land use controls is another issue. Also, according to state law, the enactment of new or updated watershed rules requires that NYSDOH follow the State Administrative Procedures Act, which is a very time-consuming process.[13] With other provisions for drinking water supply systems in place, including filtration and disinfection steps in the treatment process and ongoing monitoring programs for treated water, most water supplies are in fact quite safe from a public health perspective.

Given all of these challenges, in the last several years the NYSDOH has focused its available resources for drinking water protection on addressing several types of contaminants and risks about which less is known, including what are described as contaminants of emerging concern. These include pharmaceuticals and personal care products, e.g., soaps and cosmetics, and others. (U. S. Environmental Protection Agency, no date.) A nationwide study done in 1999 and 2000 by the United States Geological Survey (USGS) found low levels of drugs such as antibiotics, hormones, contraceptives and steroids in 80% of the rivers and streams tested.[14] Another set of risks gaining increasing attention are harmful algal blooms (HABs) which are often composed of microorganisms known as cyanobacteria, some of which have the potential to produce toxins that can cause adverse health effects in humans and animals through the contamination of waterways used for recreational purposes and as drinking water supplies.[15] When conditions are right for these species to thrive – generally in warmer weather and where waterbodies have abundant nutrient sources to support plant and algae growth – cyanobacteria can grow to form harmful algal blooms, and NYS DOH and NYS DEC have recently increased resources for research, monitoring and outreach on these issues.

Conclusion

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[11] Soll, 2013. New York City website

[12] Ontario County Soil and Water Conservation District

[13] Wilson, 2012

[14] Drugs in New York's Waters http://www.dec.ny.gov/chemical/45083.html

[15] http://www2.epa.gov/nutrient-policy-data/cyanobacteriacyanotoxins

Based on the original focus of watershed rules and regulations primarily to protect drinking water consumers from infectious disease risks, these regulations appear effective as water supplies in New York are generally safe. If updating the NYSDOH watershed rules for other places is considered in future, the 1997 MOA for New York City's system is a template that can potentially be a useful starting point for watershed programs because it necessarily addressed some of the interagency challenges outlined above. (Porter, 2015.) However, at this time intermunicipal collaboration is an alternative available to communities without necessarily requiring state action and an important option that's encouraged by the NYSDOH and other agencies to enable a higher level of watershed protection for water sources. (Wilson, 2015.) Certain programs of the state's Department of State and the NYS DEC provide grants that support intermunicipal watershed planning, and existing state law allows municipalities to enter into intermunicipal agreements that can enable collaborative use of their legal authority to protect water resources. (Rodenhausen, May 13, 2015.) As population grows and other trends unfold, and as more is learned about some of the water quality risks recognized more recently (e.g., harmful algal blooms and contaminants of emerging concern), state and local programs for watershed protection will inevitably have to continue evolving and adapting. The leadership and active involvement of community officials and stakeholders who manage and depend upon local water supplies will be important for maintaining the quality and safety of drinking water sources.

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This Project has been funded in part by a grant from the New York State Environmental Protection Fund through the New York Department of Environmental Conservation.

November 2015