

NEW YORK WATER-USE PROGRAM AND DATA, 1995

WATER-USE PROGRAM IN NEW YORK

The water-use program in New York is part of the National Water-Use Information Program (described on page 2) and is based on a cooperative agreement between the U.S. Geological Survey (USGS) and the New York State Department of Environmental Conservation (NYSDEC). Together, the NYSDEC and USGS collect, compile, and store water-use data to provide a data base that is useful for water-resources management. The New York State Department of Health (NYSDOH) also collects a variety of data elements relating to public-water supplies and provides this information to the water-use program.

WATER-RESOURCES MANAGEMENT IN NEW YORK

The NYSDEC regulates the construction of, improvements to, and development of water resources to protect the public health, safety, or welfare. The NYSDOH has responsibilities pertaining to public-supply systems. Many other Federal, State, local, and private agencies and groups regulate various aspects of water use and distribution in New York and contribute to the body of knowledge regarding water resources.

NYSDEC is responsible for administering the State's environmental-quality and natural-resource programs, including resource management and planning; establishing water-quality standards and classifications; issuing permits for water supply; monitoring water quality; administering municipal wastewater-treatment programs; and administering the New York State Pollutant Discharge Elimination System Program, which regulates point-source wastewater discharges.

The NYSDOH is the State agency concerned with public-water supply systems. It is responsible for ensuring that public water is safe to drink; to that end it has developed protective water-supply rules and regulations. The agency occasionally undertakes or commissions studies of the status and needs of the State's water-supply systems and maintains and updates computer files containing data collected from the State's community and noncommunity water systems.

Data from the NYSDEC and the NYSDOH have been combined with information from many other sources to develop the New York water-use data base.

NATIONAL WATER-USE INFORMATION PROGRAM

The U.S. Geological Survey (USGS) has been publishing estimates of water use every five years since 1950. In 1978, the Congress expanded the water-use activities of the USGS by establishing the National Water-Use Information Program (NWUIP) to meet the need for a single source of uniform information on water use. The NWUIP is a Federal-State cooperative program designed to collect, store, and disseminate water-use information nationally and locally using standardized categories. Without adequate information on the amount of water used, where it is used, and how it is used, planners and managers cannot resolve many critical water problems involving resource allocations, environmental impact, energy development, and water quality. The National Water-Use Information Program is designed to meet the need for a reliable water-use data base.

OBJECTIVES OF THE NATIONAL WATER-USE INFORMATION PROGRAM

Objectives of the National Water-Use Information Program are to:

1. Determine on a national level how much surface water and ground water is withdrawn and for what purposes, how much of this water is consumed during use, and how much water is returned after use.
2. Develop and refine computerized data bases to store and retrieve the water-use information.
3. Devise and apply new methods and techniques to improve the collection, analysis, and dissemination of water-use information.
4. Make this information available to the public, including those involved in establishing water-resources policy.

WATER-USE CATEGORIES

The NWUIP has established several water-use categories for which information is being obtained. These categories include public-water supply, domestic, commercial, industrial, agricultural, irrigation, thermoelectric, and hydroelectric power, among others. Each State has the option of compiling data for additional categories, depending upon the specific needs of the State and (or) other agencies.

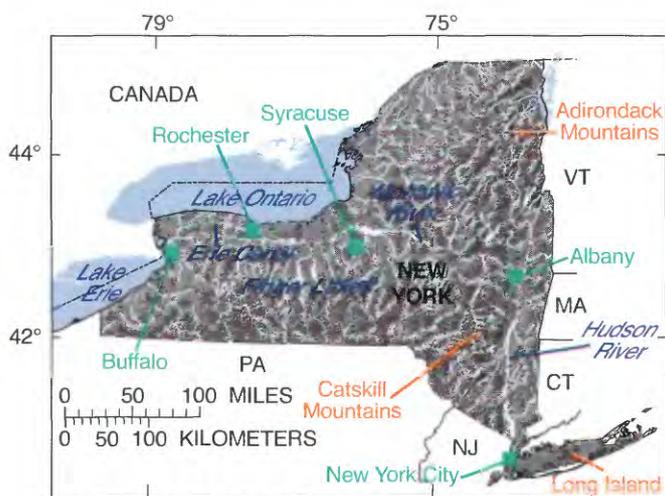
WATER USE IN NEW YORK, 1995

“Water withdrawal” refers to the removal of water from the ground or its diversion from a surface-water source for use. In 1995, about 10,230 Mgal/d (million gallons per day) of freshwater was withdrawn from New York’s rivers, streams, lakes, and aquifers for all uses combined; this withdrawal represents an average of more than 560 gal/d (gallons per day) for each resident of the State.

More freshwater is withdrawn by thermoelectric plants than for any other water-use category. Of the freshwater withdrawals within New York, about 64 percent were made by fossil-fuel and nuclear power plants; about 32

percent were for public-water supply, domestic, and commercial categories; and about 3 percent were for agricultural, irrigation, and industrial use.

Many of New York’s large population centers have developed along major rivers and lakes (fig. 1); as a result, more than 90 percent of the withdrawals in 1995 were from surface-water bodies (9,230 Mgal/d). More than 70 percent of surface-water withdrawals were for thermoelectric-power generation, and about 27 percent were by public-water suppliers (fig. 2). Of the 1,000 Mgal/d of ground water withdrawn in 1995 statewide, 55 percent was withdrawn by public-water suppliers, and 28 percent was withdrawn for domestic and commercial uses (fig 2).



Base from U.S. Geological Survey
 Digital Elevation Model data, 1:250,000, 1983
 Universal Transverse Mercator projection, Zone 18.

Figure 1. Major population centers on rivers and lakes of New York. (County locations are shown in fig. 3).

Total withdrawals, and total surface-water and ground-water withdrawals, in New York are plotted in figure 3 by county. The categories of public-water supply and thermoelectric power account for the largest withdrawals (greater than 100 Mgal/d in an individual county). These withdrawals consist entirely or mostly of surface water except in Nassau and Suffolk Counties on Long Island, where ground water is the sole source of freshwater. Delaware, Putnam, Schoharie, Sullivan, Ulster, and Westchester Counties, in the southeastern part of the State (fig. 3), provide surface water to the aqueducts that supply drinking water to New York City. In 1995, the average amount of water delivered to New York City from these counties exceeded 1,300 Mgal/d. Other counties with large withdrawals in 1995 were Onondaga County, south of Lake Ontario, where public-supply withdrawals exceeded 140 Mgal/d, mostly from surface-water bodies, and Monroe and Erie Counties, in western New York, which had large surface-water withdrawals for public supply (123 Mgal/d in Monroe County and 214 Mgal/d in Erie County) and for thermoelectric plants (177 Mgal/d in Monroe County and 835 Mgal/d in Erie County). All of the remaining eight counties with total withdrawals exceeding 100 Mgal/d had large withdrawals for thermoelectric-power generation. The only counties in which ground-water withdrawals exceeded 100 Mgal/d were Nassau and Suffolk on Long Island; these withdrawals were for public supply.

1995 WITHDRAWALS AND DELIVERIES, BY WATER-USE CATEGORY

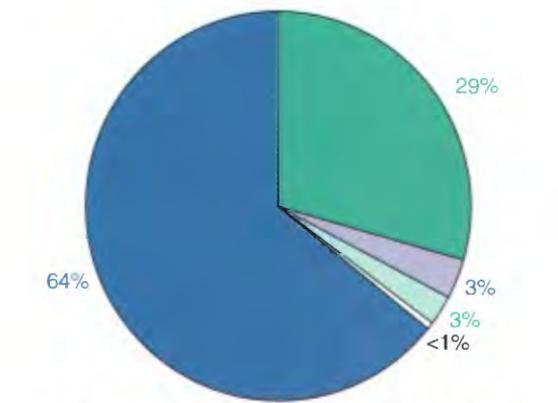
A facility or user may withdraw water from a surface source or an underground source, may receive water from a public-water supplier, or may do both. When water flows from a public-water supply to a customer (user), it is known as a “public-water supply delivery.” The amounts of surface water, ground water, and total amounts of water withdrawn by categories of water use in New York during 1995 are shown in figure 4, which also indicates the amount of water withdrawn by public suppliers and the amount delivered by public suppliers to other water-use categories. The discrepancy between public-water supply withdrawals and deliveries to customers is attributed to “public use” (such as street washing and fire protection), conveyance loss (or gain), or unaccounted-for discrepancies such as those resulting from meter error. The values presented in figure 4 indicate that the public-water suppliers withdrew about 3,000 Mgal/d and delivered 2,580 Mgal/d to domestic, commercial, and industrial users, and about 420 Mgal/d was lost, unaccounted for, or used for public purposes.

PUBLIC-WATER SUPPLY

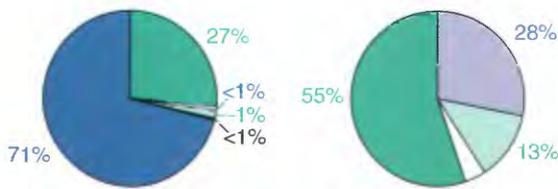
In 1995, public-water suppliers withdrew about 3,000 Mgal/d; of this amount, 2,450 Mgal/d was surface water, and 550 Mgal/d was ground water. About 16.21 million people were served by public-water supply systems; 86 percent of these deliveries (about 2,220 Mgal/d) were to households and commercial facilities, and 14 percent (about 360 Mgal/d) was delivered to industrial facilities. About 14 percent of the total public-water supply withdrawals (about 420 Mgal/d) represented public use, conveyance loss, and unaccounted-for water.

DOMESTIC AND COMMERCIAL WATER USE

Domestic and commercial users in New York together withdrew about 340 Mgal/d of freshwater, 81 percent (280 Mgal/d) of which was ground water and 19 percent (65 Mgal/d) was surface water. About 1.92 million people in New York are supplied by their own ground-water systems. Domestic and commercial users received about 2,220 Mgal/d from public-water suppliers. The domestic (residential) category represents water used for household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering



A. Total Withdrawals (10,230 Mgal/d)



B. Surface-water Withdrawals (9,230 Mgal/d)

C. Ground-water Withdrawals (1,000 Mgal/d)

EXPLANATION

- THERMOELECTRIC - POWER GENERATION
- PUBLIC-WATER SUPPLY
- DOMESTIC AND COMMERCIAL
- INDUSTRIAL
- AGRICULTURAL AND IRRIGATION

Figure 2. Total withdrawals, surface-water withdrawals, and ground-water withdrawals in New York in 1995, by water-use category.

lawns and gardens. The commercial category represents water used primarily by facilities for sanitary purposes, cleaning, and air conditioning and includes facilities associated with a wide range of enterprises, including retail, commerce, health and beauty services, restaurants and hotels, as well as institutions such as hospitals and schools. In New York, the types of facilities that are the most numerous in the commercial category are financial, legal, real estate, and communication services; these facilities operated more than 126,000 offices in New York State in 1995. The types of commercial facilities that use the most water in New York when totaled as a group are

hospitals, nursing homes, rest homes, and medical offices; these groups used nearly 49 Mgal/d in 1995.

INDUSTRIAL USE

Industrial users are estimated to have withdrawn nearly 260 Mgal/d of freshwater in 1995, about half of which was surface water, and half was ground water. Public-water suppliers delivered an additional 360 Mgal/d to industrial users. The industry with the largest number of facilities statewide was printing and publishing (1,043 facilities), but the industrial group that used the most water is related to chemicals and allied products such as the manufacture of organic and inorganic chemicals, plastics, manmade fibers, drugs, detergents, and perfumes. The chemical-product groups withdrew more than 49 Mgal/d in New York in 1995. Much of the water delivered to industries from public-water suppliers is used for sanitary purposes in the production plants.

AGRICULTURAL USE AND IRRIGATION

Water use for agriculture and irrigation in New York amounted to less than 1 percent of the total freshwater withdrawals in 1995. About 64 Mgal/d was withdrawn for agriculture and irrigation, of which 35 Mgal/d was used for nonirrigation agricultural purposes, and about 29 Mgal/d for irrigation. Nearly equal amounts of ground water and surface water were used for irrigation, whereas 65 percent of the water used for nonirrigation agricultural purposes was ground water.

THERMOELECTRIC-POWER GENERATION

In 1995, more total water and more surface water—6,560 Mgal/d of fresh surface water—was withdrawn for the generation of thermolectric power than for any other purpose (fig. 2). Ten counties withdrew more than 100 Mgal/d for thermolectric-power generation. The three counties with the largest thermolectric power withdrawals were Orange, Chautauqua, and Oswego (fig. 3); the withdrawals in each of these counties by thermolectric power plants exceeded 1,000 Mgal/d. The fossil-fuel power plants, which generated almost twice as much power as the nuclear power plants, used more than 3.5 times as much water as the nuclear plants. New York State in 1995 had 49 thermolectric plants using fossil fuel and 5 nuclear power plants.

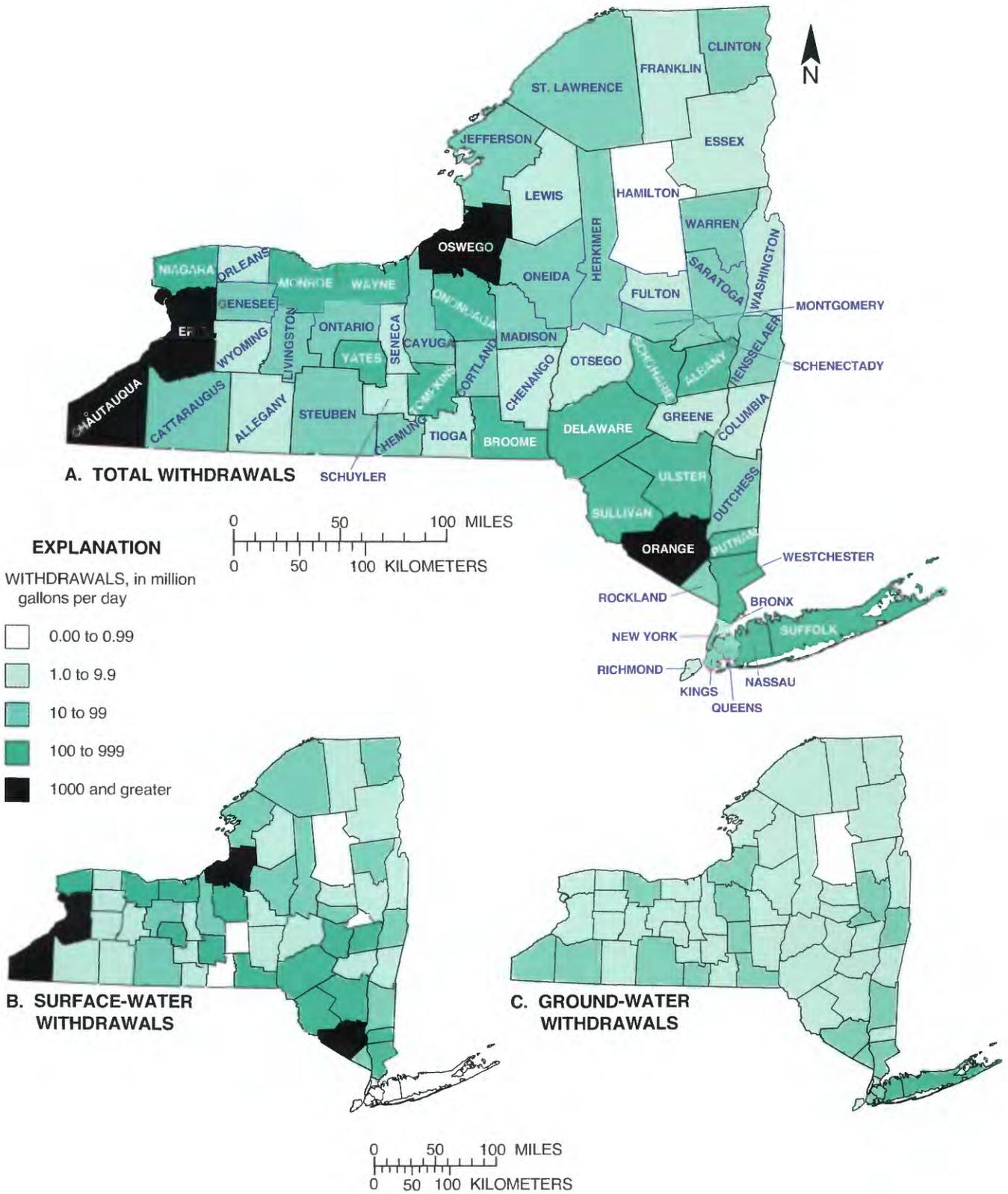


Figure 3. Total withdrawals, surface-water withdrawals, and ground-water withdrawals in New York in 1995, by county.

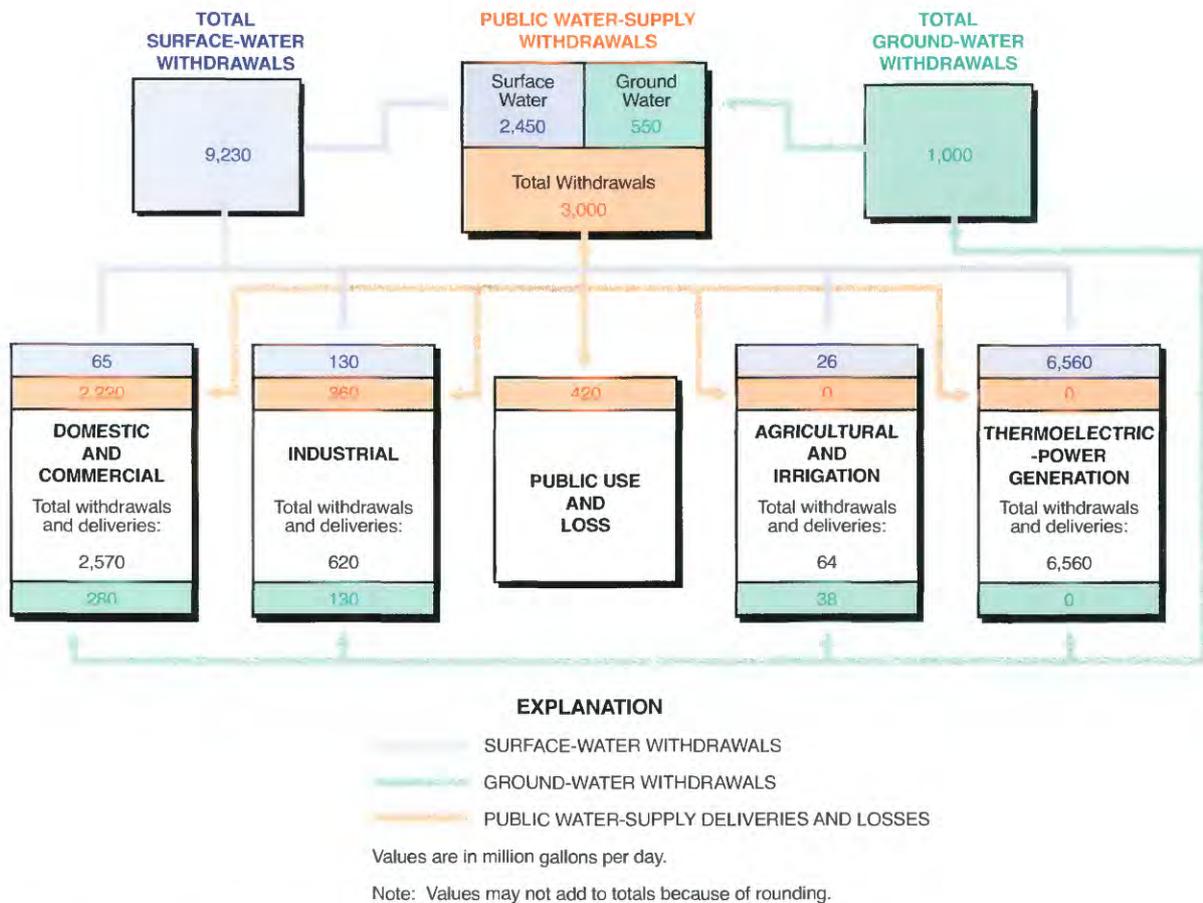


Figure 4. Withdrawals and public-water supply deliveries in New York, 1995.

NEW YORK WATER USE IN PERSPECTIVE

New York ranked ninth in the United States in 1995 in total withdrawals; the States that exceeded New York in total withdrawals were those that are large (such as California) and (or) that use large quantities of water for irrigation (such as Colorado). In 1995, New York ranked third in total population after California and Texas, but 40th in per-capita withdrawal rates (about 560 gal/d per person). New York's relatively small per-capita withdrawals, compared to those of other States, are the result of the large total population and the low rates of withdrawal for irrigation.

New York also ranked third in total withdrawals for public supply after California and Texas, and sixth in fresh-water withdrawals for the generation of thermoelectric power. New York ranked ninth in total surface-water withdrawals, but was second only to California in surface-water withdrawals for public-water supply. New York ranked 16th in total ground-water withdrawals and 5th in withdrawals of ground water for public supply.

SUGGESTION FOR FURTHER READING

Solley, W.B., Pierce, R.R., and Perlman, H.A., 1998, Estimated use of water in the United States in 1995: U.S. Geological Survey Circular 1200, 71 p.

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Additional information on water use in New York State and sources and methods used in the data compilation can be obtained from:

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