

# NEW YORK WATER-USE PROGRAM AND DATA, 2000

## **Water-Use Program in New York**

The U.S. Geological Survey (USGS) has been publishing estimates of water use every five years since 1950 in the “Estimated use of water in the United States” circular series. In 1978, the Congress expanded the water-use activities of the USGS by establishing the National Water-Use Information Program (NWUIP). The water-use program in New York is part of the NWUIP and is based on a cooperative agreement between the 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) collects a wide variety of data elements relating to public-water supplies such as the name and location of the suppliers and the amount of water withdrawn. This valuable information is provided to the water-use program.

The information summarized in this fact sheet has been published in U.S. Geological Survey Circular 1268, “Estimated use of water in the United States in 2000” which can be accessed at <http://water.usgs.gov/watuse>. The 2000 data (by county) as well as previous years’ data can also be found at that site.

## **Water-Resources Management in New York**

The NYSDEC regulates the development of water resources to protect public health, safety, or welfare. It is responsible for administering the State’s environmental-quality and natural-resource programs, including resource management and project 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 oversees the quantity and quality of water supplied by public 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 extensive computer files containing data collected from the State’s community and noncommunity water systems.

Other federal, State, local, and private agencies and groups investigate various aspects of water use and distribution in New York and contribute to the body of knowledge regarding water resources. Data from the NYSDOH and the NYSDEC have been combined with information from other sources to develop the New York water-use data base.

## Water Use In New York, 2000

“Water withdrawal” refers to the removal of water from the ground or its diversion from a surface-water source for use. Withdrawals of fresh and saline surface water and fresh ground water during 2000 were included in this study. The categories considered in this data compilation are public-water supply; deliveries to domestic from public-water suppliers and domestic self-supplied; industrial; thermoelectric-power generation; and irrigation. Saline withdrawals were included for the categories of industrial, mining, and thermoelectric-power generation. Saline water is a significant percentage of total withdrawals for the category of thermoelectric-power generation.

The categories of withdrawal for which data were compiled for the 2000 calendar year do not include some of the categories that were addressed in 1995 and published in USGS Circular 1200, “Estimated use of water in the United States in 1995”. For the 2000 compilation, emphasis was placed on ensuring the quality of data that were collected, rather than attempting to address all categories and data elements on a national scale. Categories that were included in 1995 but not in 2000 are commercial; livestock; mining; the non-withdrawal categories of hydroelectric-power generation, wastewater treatment and public-water supply deliveries to commercial and industrial users. Any comparison made between 1995 and 2000 data need to be made with these category differences in mind. In 1995, the categories of commercial, livestock, and mining were about 280 Mgal/d (million gallons per day) of freshwater and 2.7 percent of total freshwater withdrawals. In addition, the report, “New York water-use program and data, 1995”, U. S. Geological Survey Fact Sheet 014-02, concentrated on freshwater and did not include saline-surface water withdrawals in the

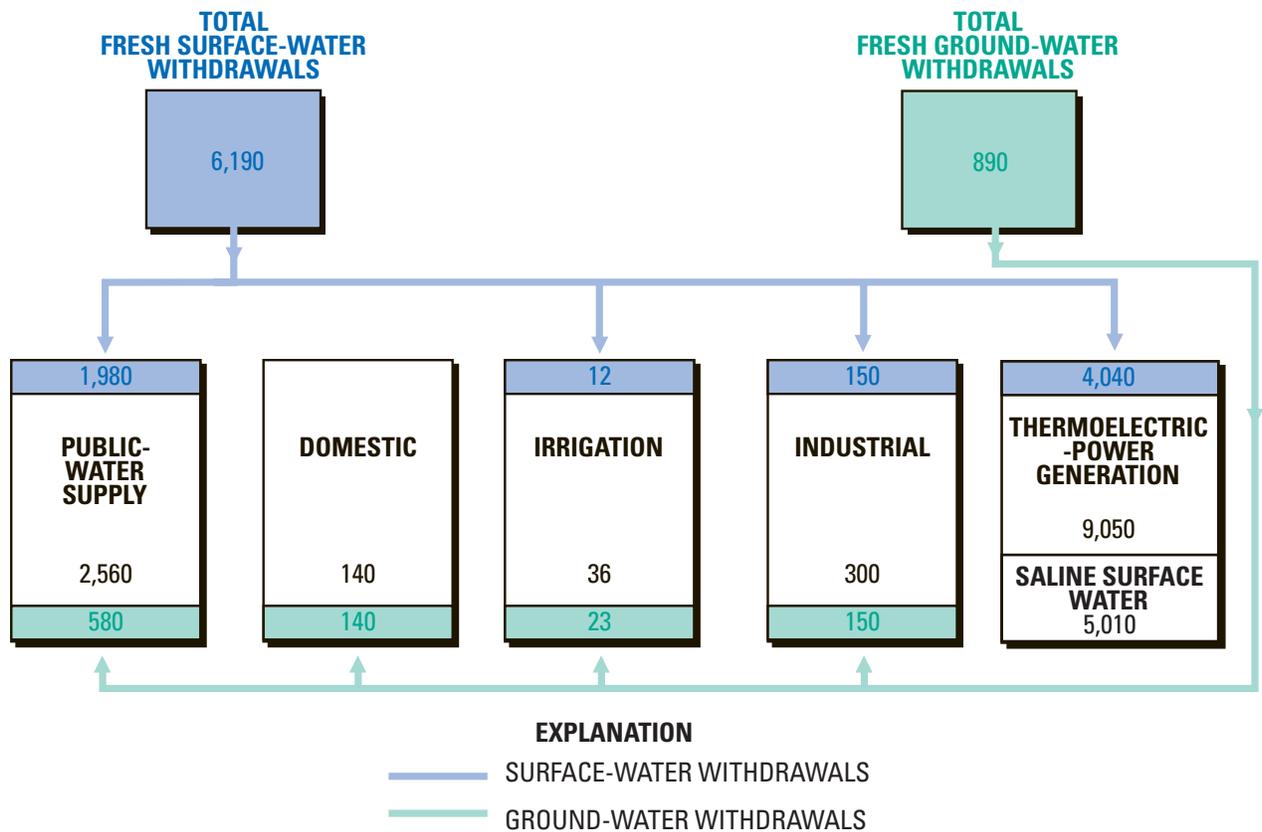
figures. Any comparison between the 1995 and 2000 figures need to be made with this in mind.

In 2000, about 12,100 Mgal/d (million gallons per day) of fresh surface and ground water and saline surface water were withdrawn from New York’s rivers, streams, lakes, estuaries, bays, and aquifers for the categories addressed. Freshwater withdrawals comprised about 7,080 Mgal/d of this total. With a total population of 18,980,000 people in New York State, the total freshwater withdrawals represent an average of more than 370 gal/d (gallons per day) per capita. The amounts of fresh surface water, ground water, saline surface water, and total amounts of water withdrawn by categories of water use in New York during 2000 are shown in figure 1.

Many of New York’s large population centers have developed along major rivers and lakes (fig. 2); as a result, more than 87 percent of the freshwater withdrawals in 2000 were from surface-water bodies (6,190 Mgal/d). More than 65 percent of fresh surface-water withdrawals were for thermoelectric-power generation, and about 32 percent were by public-water suppliers. Of the 890 Mgal/d of ground water withdrawn in 2000 statewide, 65 percent was withdrawn by public-water suppliers, and about 16 percent each by industrial and domestic users (fig. 3).

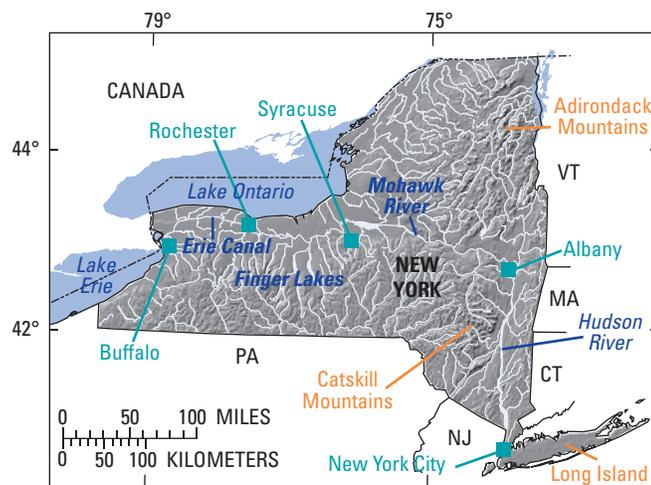
More freshwater is withdrawn by thermoelectric plants than for any other water-use category. Of the freshwater withdrawals within New York, about 57 percent were made by fossil-fuel and nuclear powerplants; about 36 percent were for public-water supply; about 4.2 percent was by industrial users, 2.0 percent by domestic users, and about 0.5 percent was for irrigation (fig. 3).

Total withdrawals, total surface-water and fresh ground-water withdrawals, in New York are plotted in figure 4, by county. The categories of public-water supply and thermoelectric power account for the withdrawals that exceed 100 Mgal/d per county. The counties that have public-water supply withdrawals that exceed 100 Mgal/d are: Delaware (453 Mgal/d), Ulster, Nassau, Erie, Sullivan, Westchester, Suffolk, Putnam, and Schoharie (115 Mgal/d). These large withdrawals are from surface water except in Nassau and Suffolk Counties on Long Island, where groundwater is the sole source of freshwater. Delaware, Putnam, Schoharie, Sullivan, Ulster,



Values are in million gallons per day.  
 Values inside the box represents the total withdrawals for that category.  
 Note: Values may not add to totals because of rounding.

**Figure 1.** Withdrawals of fresh and saline surface water and fresh ground water in New York, 2000, by category.



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

**Figure 2.** Major population centers on rivers and lakes of New York (county locations are shown in fig. 4).

and Westchester Counties, in the southeastern part of the State, (fig. 4) provide surface water to the aqueducts that supply drinking water to New York City. In 2000, the average amount of water delivered to New York City from these counties averaged 1,260 Mgal/d. Erie County, in western New York, had withdrawals totaling 176 Mgal/d of fresh surface water for public-water supply.

More freshwater and more total water is withdrawn for the generation of thermoelectric power than for any other water-use category. All of the withdrawals are of surface water. Seven counties have total thermoelectric withdrawals that exceed 500 Mgal/d: Queens (1,690 Mgal/d), Westchester, Oswego, Suffolk, Erie, Orange, and Rockland (560 Mgal/d). The counties of Oswego, Erie, and Orange withdrew only fresh surface water for thermoelectric plants. Their sources of water were Lake Ontario (Oswego County), Niagara River (Erie County), and the Hudson River (Orange County). Queens, Westchester, Suffolk, and Rockland withdraw only saline surface water for the production of thermoelectric power. The sources of saline surface water for the thermoelectric plants in the counties of Queens, Westchester, Suffolk, and Rockland are the estuaries of the Hudson River and East River and bays of the Atlantic Ocean (Long Island Sound and the eastern shore of Jamaica Bay).

## **2000 Withdrawals by Water-Use Category**

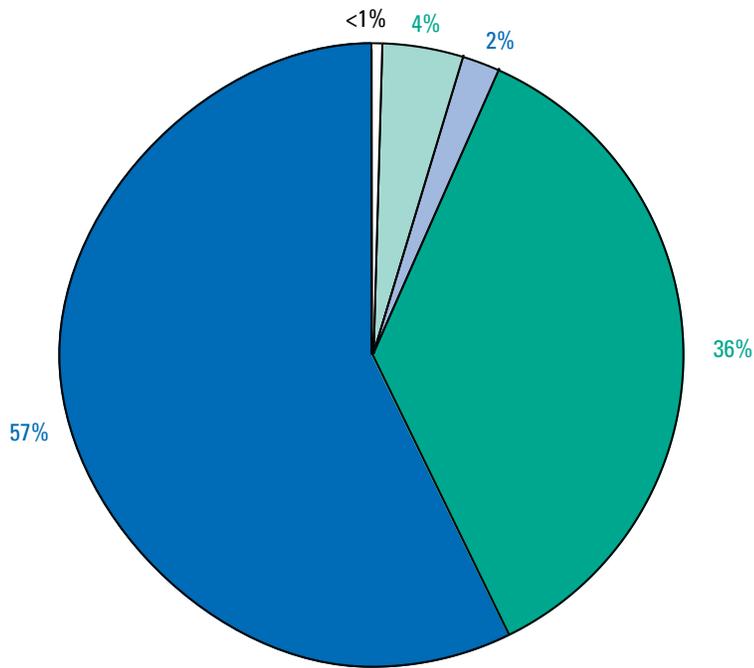
### **Thermoelectric Power Generation**

In 2000, more total water, more surface water, and more saline water were withdrawn for the generation of thermoelectric power than for any other purpose – 4,040 Mgal/d of fresh surface water and 5,010 Mgal/d of saline surface water (fig. 1). Fifteen counties account for more than 96 percent of the total withdrawals for thermoelectric-power generation. The sources of fresh water for thermoelectric plants are Lake Ontario (six plants), the Hudson River (two plants), Niagara River (one plant), Lake Erie (one plant), and Cayuga Lake, one of the Finger Lakes (one plant). Seven of the fifteen counties are in southeastern New York or are on Long Island and had saline

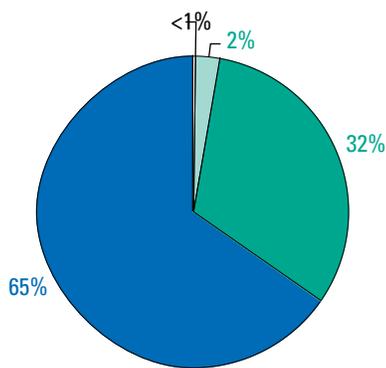
water withdrawals. The sources of saline water are harbors, bays, and sounds of the Atlantic Ocean (six plants), the East River (five plants), and the Hudson River estuary (four plants). The two counties having the largest withdrawals are Queens and Westchester which together withdrew 2,780 Mgal/d of saline surface water. In 1995, data from 49 thermoelectric plants using fossil fuel and 5 nuclear power plants were compiled from various data sources; in 2000, only data from the 32 larger plants were used – 27 plants using fossil fuel and 5 nuclear power plants. These plants had extensive withdrawal and ancillary data in a single data base maintained by the Energy Information Administration of the U.S. Department of Energy. The decision was made to use consistent data from one source that represented the 32 largest plants. In the future an analysis will be made to determine whether or not the smaller plants represent withdrawals sufficient enough to warrant further data collection from other data sources.

### **Public-Water Supply**

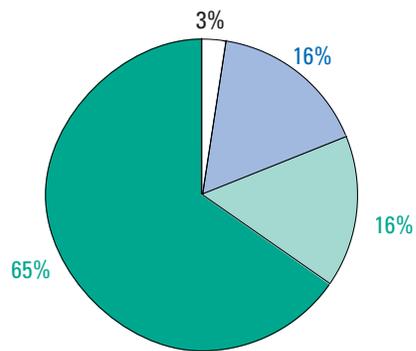
A public-water supply is a publicly- or privately-owned facility that withdraws and furnishes water to at least 25 people or has a minimum of 15 connections. A community water system serves year-round residents. For 2000, the New York State Department of Health provided information for almost 3,000 community public-water supply systems. Public suppliers provide water to a variety of customers, such as domestic or industrial users. In 2000, public-water suppliers withdrew about 2,560 Mgal/d; of this amount, 1,980 Mgal/d was surface water, and 580 Mgal/d was ground water. About 17,100,000 people were served by public-water supply systems. The counties withdrawing more than 25 Mgal/d of ground water for public supply are: Broome, Nassau, Queens, Schenectady, and Suffolk. Nassau and Suffolk Counties together withdrew about 308 Mgal/d of ground water for public-water supplies. Withdrawals of surface water for public supply in the Counties of Delaware, Erie, Monroe, Putnam, Schoharie, Sullivan, Ulster, and Westchester total about 1,620 Mgal/d or 82 percent of the State's total withdrawals of surface water for public supply.



**A. Total Freshwater Withdrawals (7,080 Mgal/d)**



**B. Fresh Surface-water Withdrawals (6,190 Mgal/d)**

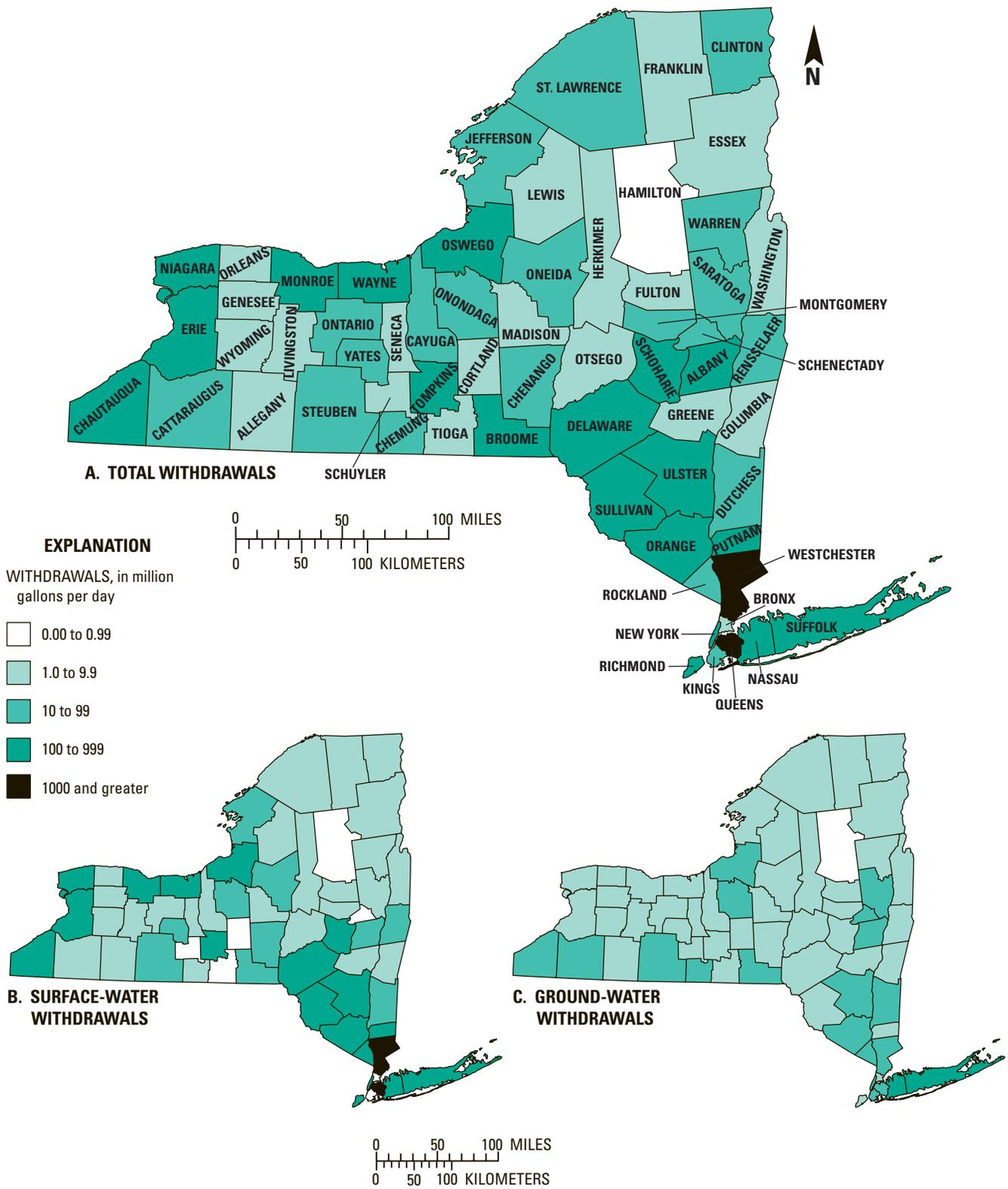


**C. Fresh Ground-water Withdrawals (890 Mgal/d)**

**EXPLANATION**

- THERMOELECTRIC-POWER GENERATION
- PUBLIC-WATER SUPPLY
- DOMESTIC
- INDUSTRIAL
- IRRIGATION

**Figure 3.** Total freshwater withdrawals, fresh surface-water withdrawals, and fresh ground-water withdrawals in New York in 2000, by water-use category.



**Figure 4.** Total fresh and saline withdrawals, fresh and saline surface-water withdrawals, and fresh ground-water withdrawals in New York in 2000, by county.

## **Domestic Water Use**

The domestic (residential) category represents water used for household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, and watering lawns and gardens. A domestic user may have a supply of water, such as a well or surface-water intake, may have water delivered from a public-water supplier, or may have both. In New York in 2000, about 1,890,000 people had their own water supply. It is assumed that domestic supplies are ground water, although it is known that a small percentage of homes have surface-water intakes. No data base of domestic water use exists for New York and the withdrawals are estimated using approximately 75 gallons per day per person for each person not served by a public-supply system. Domestic users in New York withdrew an estimated 140 Mgal/d of ground water.

## **Industrial Use**

The industrial water-use category includes manufacturing and processing, such as steel mills, logging operations, food processing, oil refining, and the production of chemicals, plastics, drugs, detergents, and fibers, among many other things. There is no statewide data base of industrial water use in New York State and industrial withdrawals are estimated based upon the number of employees in each industry type. A data base of industries listing the number of employees per industry by county in New York State was purchased. The number of employees was multiplied by a coefficient of 'water use per employee' by industry type that had been developed from a multitude of sources by the water-use program in New York. The estimates were made using information for more than 10,100 industries. Industrial users are estimated to have withdrawn about 300 Mgal/d of freshwater in 2000, about half of which was surface water and half was ground water. The counties having the largest industrial withdrawals were Erie, Kings,

Monroe, Nassau, New York, Onondaga, Queens, Suffolk, and Westchester. Together these counties withdrew an estimated 170 Mgal/d of freshwater for industrial use which is more than 56 percent of the total industrial withdrawals during 2000.

## **Irrigation**

Withdrawals for irrigation in New York amounted to less than 1 percent of the total freshwater withdrawals. In 2000, about 36 Mgal/d was estimated to be withdrawn for irrigation use, of which, 12 Mgal/d was surface water and about 23 Mgal/d was ground water. There is no statewide data base of water use for irrigation and the withdrawals were estimated using the number of acres irrigated, the crop type, and an application rate. Irrigation requirements vary according to the amount of precipitation, the crop grown, the soil type, and the length of the growing season, among other things. New York had approximately 80,600 irrigated acres in 2000. The counties in New York that had the largest withdrawals for irrigation are Allegany, Nassau, Orange, Steuben, Suffolk, and Ulster which, together, withdrew about 25 Mgal/d of freshwater for irrigation, or about 71 percent of the state total.

## **New York Water Use in Perspective**

New York ranked eighth in the United States in 2000 in total withdrawals (fresh and saline water); the States that exceeded New York in total withdrawals are those that have large populations (such as California and Texas) and (or) use large quantities of water for irrigation (such as Florida and Idaho). Of the categories considered for the 2000 compilation, New York did not have nationally significant withdrawals for either irrigation or industrial water use.

New York ranked third after California and Texas in withdrawals of freshwater for public supply, in the withdrawal of fresh surface water for public-water supply, in total population, and in number of people served by public-water supplies. New York ranked sixth in total withdrawals for the generation of thermoelectric power and total surface-water withdrawals. Finally, New York ranked fourth in withdrawals of ground water for public supply.

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

Director  
USGS New York Water  
Science Center  
425 Jordan Road  
Troy, N.Y. 12180

Director, Division of Water  
New York State Department of  
Environmental Conservation  
625 Broadway  
Albany, N.Y. 12233

This fact sheet and related information can be found on the web at  
<http://ny.usgs.gov> and at <http://water.usgs.gov/watuse>.