ESTIMATED FRESHWATER WITHDRAWALS AND USE IN NEW YORK, 1985

By Bruce M. Linsey and Deborah S. Snavely Lumia

Figure 3A--Ground-water withdrawals,

Figure 4A--Ground-water withdrawals,

Figure 5A--Ground-water withdrawals,

Figure 6A--Ground-water withdrawals,

in million gallons per day

> 0.60

> 0.40 - 0.60

> 0.30 - 0.40

> 0.10 - 0.30

0.00 - 0.10

in million gallons per day

> 5.00

> 2.00 - 5.00

> 1.00 - 2.00

> 0.30 - 1.00

0.00 - 0.30

in million gallons per day

> 10.00

> 5.00 - 10.00

> 3.00 - 5.00

> 2.00 - 3.00

0.00 - 2.00

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(in million gallons per day)

withdrawals

9,037 Industrial

Public water

Agriculture

electric

power

and mining 2,100

1,660

in million gallons per day

> 20.00

> 5.00 - 20.00

> 2.00 - 5.00

> 1.00 - 2.00

0.00 - 1.00

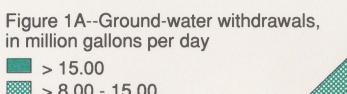
INTRODUCTION

Water use in New York can be divided into five categories: public supply, domestic and commercial, industrial and mining, agriculture and irrigation, and thermoelectric powerplant cooling. This report presents a summary of estimated freshwater withdrawals and use in New York in 1985. Total estimated withdrawals in all categories of use are depicted by county in figures 1A and 1B; estimated withdrawals for each of five individual categories are depicted separately in figures 3 through 7. Locations of the counties and major surface-water bodies are shown in figure 2. Figure 8 summarizes the estimated distribution and use of freshwater within the State.

GROUND-WATER AND SURFACE-WATER WITHDRAWALS

Ground-water withdrawal is the removal of water from the ground through a well or through a spring. The water is taken from pores in unconsolidated rocks and fractures in bedrock, and brought to the surface for use.

Ground-water withdrawals in 1985 accounted for 12.1 percent of all freshwater withdrawals in New York (fig. 1A). Long Island relies heavily on ground water; other users of considerable quantities of ground-water are widely distributed throughout the State. Figure 1A depicts total ground-water withdrawals in New York in 1985 by county; table 1A gives the amounts, in Mgal/d (millions of gallons per day), for each category.



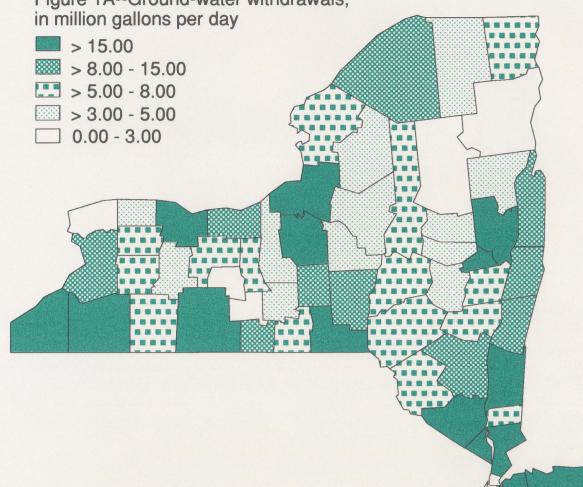
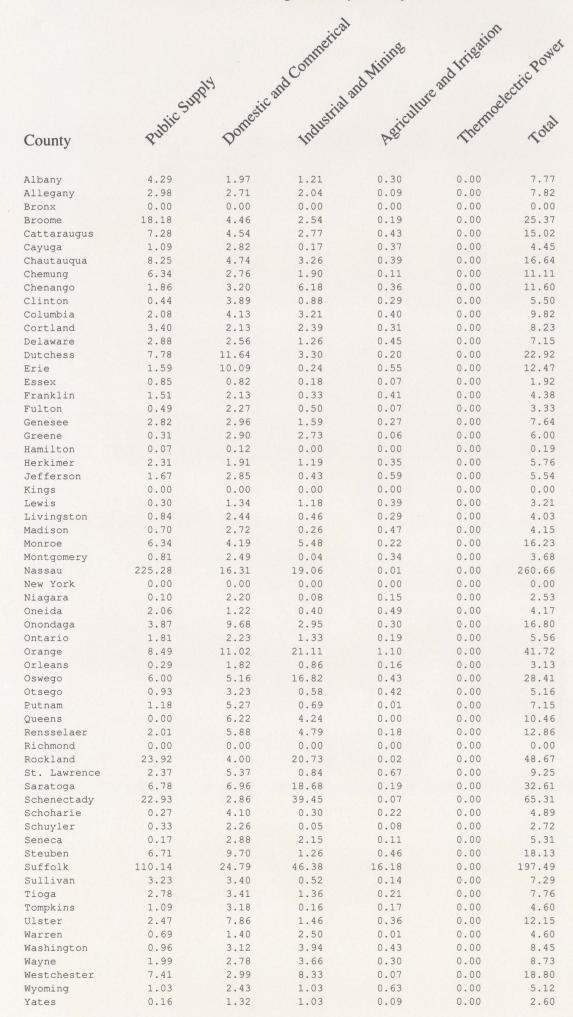


Table 1A--Ground-water withdrawals. in million gallons per day



State Total 534.91 255.83 272.46 31.82

Base from New York State Executive Department,

Division of Equalization and Assessment

Surface-water withdrawal is the diversion of water from an open body of water, such as a river or lake. Surface-water withdrawals accounted for 87.9 percent of all freshwater withdrawals in New York in 1985 (fig. 1B). Major surface-water withdrawals are made in counties bordering Lakes Ontario and Erie, where the water is needed for powerplant cooling, and in southeastern New York, which contains reservoirs of the New York City water-supply system. Figure 1B depicts total surface-water withdrawals in New York in 1985 by county; table 1B gives the amounts, in Mgal/d, for each category.

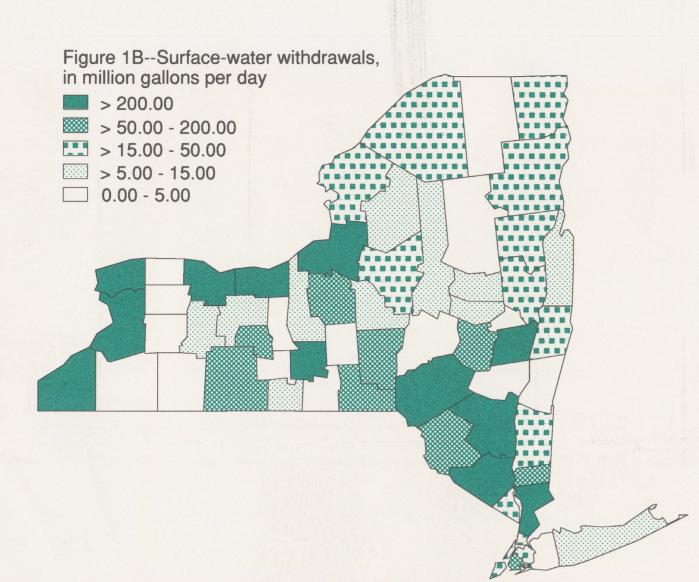
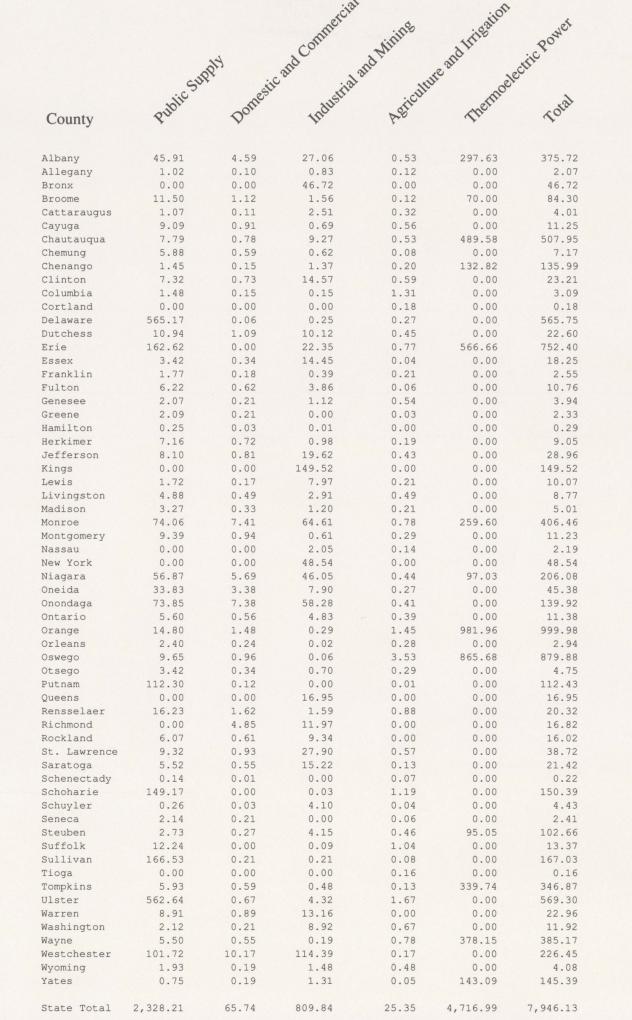
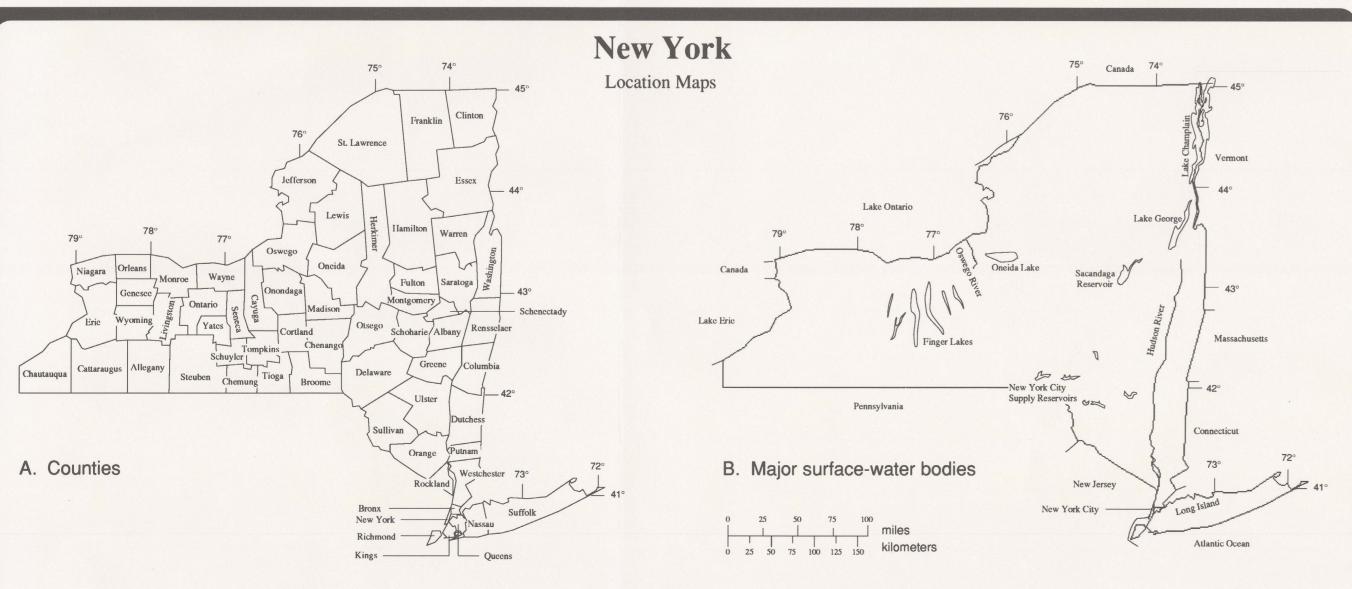


Table 1B--Surface-water withdrawals in million gallons per day





0.00 1,095.02

WITHDRAWALS AND USE

PUBLIC SUPPLY

Public-supply systems withdraw, treat, and distribute water to users. In New York, nearly 1,800 public-supply systems provided water to about 16 million people (89 percent of the State's total population) in 1985. The largest 235 systems (13 percent of the systems) provided water to 95 percent of the State's population served by public-supply systems (New York State Senate Research Service, 1985, p. 9). About 40 percent of the State's water suppliers purchase all or part of their water. the State's water suppliers purchase all or part of their water from other public suppliers. New York City, for example, sells water to municipalities in the counties in which the city reservoirs are located (New York State Senate Research Service,

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Most people in New York are served by publicly owned water systems. Investor-owned systems supply about 1.7 million people and range in size from systems that serve 25 people to one system that serves more than 500,000 people on Long Island (New York State Senate Research Service, 1985, p. 11).

Total public-supply withdrawals in 1985 were 2,860 Mgal/d, of which 2,330 Mgal/d was from surface-water sources and 535 Mgal/d was from ground-water sources. Nearly 74 percent of the people served are supplied by surface-water systems. Except for the New York City reservoirs, from which some water is transported more than 100 miles, the areas of most intensive withdrawal are near large cities. intensive withdrawal are near large cities.

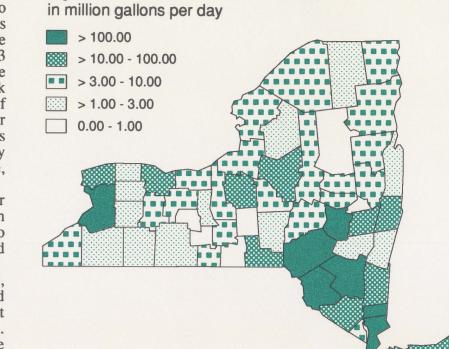


Figure 3B--Surface-water withdrawals,

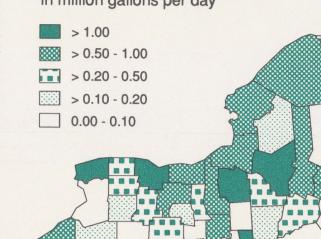
DOMESTIC AND COMMERCIAL

Domestic and commercial water users receive water from public-supply systems or are self supplied. Combined total use in 1985 was 2,170 Mgal/d. Included in this category is 100 Mgal/d for public uses, such as fire fighting and street cleaning, and water lost during conveyance from public water-treatment plants to the points of use. Domestic use was about 1,660 Mgal/d, of which 1,470 Mgal/d was from public-supply systems that served 89 percent of the population. The remaining 11 percent of the population withdrew 191 Mgal/d from their own wells or springs. Consumptive use (water that is removed from the system without being returned immediately) was estimated to be 166 Mgal/d.

The counties that have the greatest numbers of people who use wells or springs for supply also contain large urban centers. For example, Erie, Onondaga, Saratoga, Rensselaer, Dutchess, Orange, and Ulster Counties have populations of 50,000 or more that supply their own domestic water; all of these counties contain major urban centers.

ystems. Consumptive use was estimated to be 40 Mgal/d continues to expand its service-oriented commercial enterprises.

Figure 4B--Surface-water withdrawals, in million gallons per day



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Commercial withdrawals and deliveries in New York in 1985 were about 410 Mgal/d, of which about 130 Mgal/d was self-supplied, and about 280 Mgal/d provided by public-supply Domestic and commercial water uses made up 24 percent of total statewide use in 1985. This category is increasing as New York

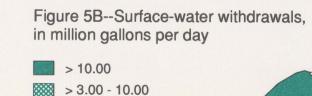
INDUSTRIAL AND MINING In 1985, water withdrawals and deliveries for industrial and mining use were 2,100 Mgal/d, of which 49.6 Mgal/d was surface water for mining; the remaining surface water and

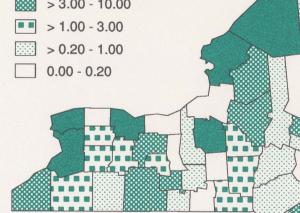
(270 Mgal/d). The remaining 48.6 percent (1,020 Mgal/d) was provided by public suppliers The surface-water withdrawals for industry are principally in and around major cities. The greatest demands for ground water

ground water was for industry. Of the 2,100 Mgal/d withdrawn

by mines and industrial users, about 38.6 percent was surface

water (810 Mgal/d), and 12.9 percent was ground water





by industry are in Schenectady, Orange, and Rockland Counties, and in Nassau and Suffolk Counties on Long Island.

Figure 6B--Surface-water withdrawals,

Agricultural water use includes water for dairy operations, feed lots, fish farming, and other farm uses. In 1985, freshwater withdrawals for agriculture and irrigation amounted to 0.6 percent of the total freshwater withdrawals Statewide. They were the smallest of the categories of offstream use. About 19 Mgal/d was withdrawn for agriculture; about 38 Mgal/d was withdrawn for irrigation. About 50 percent of the water used for irrigation was ground water and 50 percent was surface water; 62.7 percent of the water used for agriculture purposes was

AGRICULTURE AND IRRIGATION

Most of the large surface-water withdrawals for irrigation were from Lakes Erie and Ontario and from sources in the middle and lower Hudson valley. Of the total ground-water withdrawn for irrigation in New York, 83 percent was in Suffolk County.

The primary agricultural use of water in 1985 was for dairy operations in southwestern New York and in central New York from St. Lawrence and Jefferson Counties south to Delaware

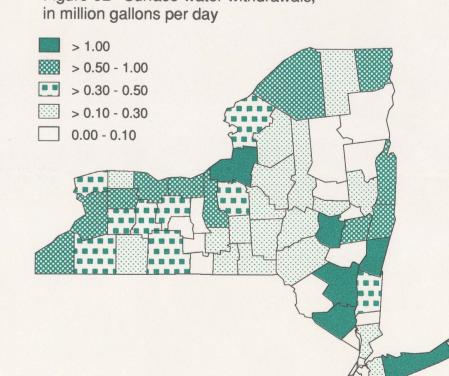


Figure 7--Surface-water withdrawals, in

THERMOELECTRIC POWERPLANT COOLING Figure 8--Estimated freshwater use in New York, 1985

In 1985, fossil-fueled and nuclear powerplants withdrew a total of 4,720 Mgal/d of freshwater (and an additional 6,150 Mgal/d of saline surface water) for cooling. Fossil-fueled powerplants generated three times more power than nuclear powerplants—60,700 GWh (gigawatt hours) compared to 20,800 GWh. The consumptive use for fossil-fueled powerplants was 84 Mgal/d, whereas consumptive use for nuclear powerplants (through evaporation) was about 2,230 Mgal/d.

The areas of most intense withdrawals for thermoelectric power are the counties bordering Lakes Erie and Ontario, the Oswego River basin (Oswego County), Tompkins County, and the Hudson

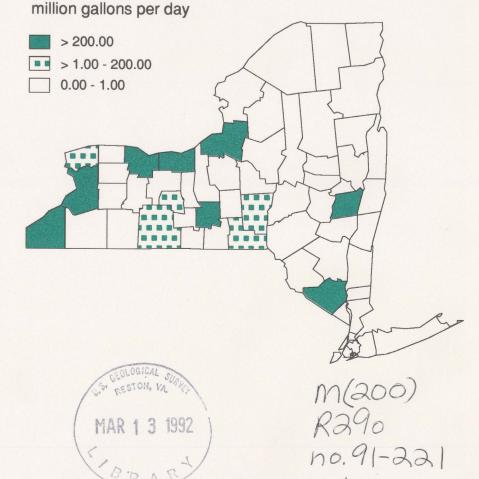
Surface water is the sole source of water for thermoelectric power cooling. No ground water is withdrawn for this purpose in New York.

SELECTED REFERENCES

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Solley, W.B., Merk, C.F., and Pierce, R.R., 1988, Estimated use of water in the United States in 1985: U.S. Geological Survey Circular 1004, 80 p.



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Figure 2--Location maps showing: A. Counties B. Major surface-water bodies