

Water Withdrawals in Illinois, 1995

Introduction

The State of Illinois has an abundant but finite supply of surface water and ground water. Water-use information aids in the planning and management of water resources. Water-use data serve the needs of governmental agencies, public water-supply operators, water-resource managers, and researchers for assessing current water-use patterns and anticipating future water demands.

Every 5 years since 1950, the U.S. Geological Survey (USGS) has compiled estimates of water use for each State in the Nation and Puerto Rico. This series of compilations is used to develop and evaluate trends in water use and plan for more effective uses of the Nation's water resources in the future. This report presents water-withdrawal data, aggregated by county and water-use category, for the State of Illinois for 1995; these data were assembled for the 5-year national compilation effort by the USGS.

Definition of terms is critical in understanding water-use data. Water-withdrawal data are documented or estimated quantities of water withdrawn from surface-water or ground-water sources for public supply, commercial establishments, industrial and mining activities, irrigation and stock watering, or thermoelectric-power generation, for example. The amount of water withdrawn and the amount used in a county may not be equal because of public-supply deliveries; in Illinois, water withdrawn from a particular source is sometimes transported many miles and across county lines before being provided to the user.

Illinois Water-Use Program

The Illinois Water-Use Program is part of the USGS National Water-Use Information Program. The National Water-Use Information Program is a cooperative program with State and local governments designed to collect, store, analyze, and disseminate water-use information at local and national levels to a wide variety of government agencies, private organizations, universities, industries, and the

general public. The national cooperative program began in 1977 to meet the need for a single source of uniform information on water use and to serve as the focal point for water-use information. The National Water-Use Information Program is funded through the Federal-State Cooperative Program of the USGS with available Federal-State cooperative matching funds to support water-use information activities in the Nation.

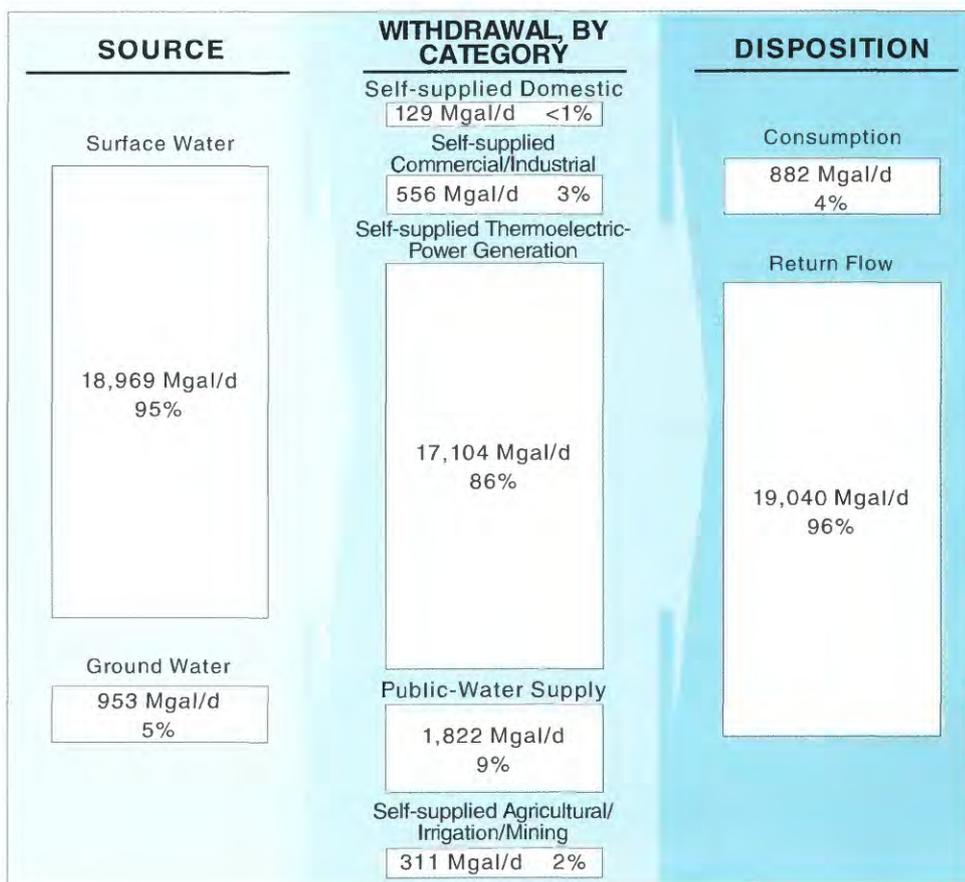


Figure 1. Source, withdrawal by category, and disposition of water withdrawn in Illinois, 1995.

The Illinois Water-Use Program is the result of the cooperative efforts of the Illinois State Water Survey (ISWS), the Illinois Environmental Protection Agency (IEPA), and the USGS. The ISWS obtains water-withdrawal and delivery data from questionnaires that are sent annually to municipal, commercial, industrial, thermoelectric-power, and mining users of water throughout the State. The IEPA obtains wastewater-return data by mandate of the National Pollutant Discharge Elimination Program of the U.S. Environmental Protection Agency. The USGS transfers the ISWS data, aggregated by county and hydrologic unit, into the Aggregated Water-Use Data System (AWUDS) of the USGS. The USGS transfers the IEPA wastewater-return data and ISWS site-specific public-water supply withdrawals into the Site-Specific Water-Use Data System (SSWUDS) of the USGS. Water use for self-supplied domestic and livestock needs, and irrigation is estimated and aggregated by county and hydrologic unit (drainage basin) by the USGS and entered into AWUDS. Reservoir evaporation is estimated and aggregated by hydrologic unit by the USGS and entered into AWUDS.

Statewide data for Illinois have been published every 2 years since 1978 by the ISWS and USGS. Various other reports, several of which are listed at the end of this report, have presented water-use data for specific areas of Illinois or have included information developed during special projects.

Water Withdrawals

During 1995, water withdrawals from surface-water sources (such as rivers, lakes, and reservoirs) and ground-water sources (such as springs and wells open to aquifers) in Illinois averaged an estimated 19,922 million gallons per day (Mgal/d). The source, use, and disposition of water in Illinois are shown in figure 1. In 1995, about 95 percent of the water withdrawn in Illinois was from surface-water sources.

Thermoelectric-power generation represented the largest category of withdrawals (86 percent) in Illinois in 1995

(fig. 1). Nearly all of this water was withdrawn from surface-water sources.

The largest withdrawal of water, excluding withdrawals for thermoelectric-power generation, was by public-water suppliers (65 percent) (fig. 2). Self-supplied withdrawals for industrial use (16 percent) was the second largest withdrawal, excluding withdrawals for thermoelectric-power generation. Self-supplied domestic withdrawals account for about 5 percent of the water withdrawals.

About 1,822 Mgal/d was withdrawn by public-water suppliers for delivery and use by domestic, commercial, industrial, and thermoelectric-power generation customers. In 1995, the population of Illinois was 11.83 million. Public-water suppliers served about 10.40 million people, or about 88 percent of the population.

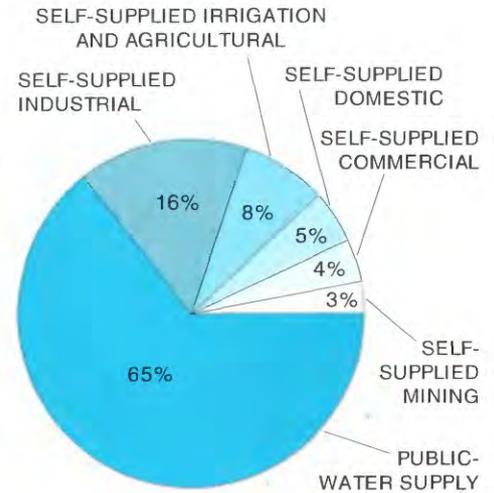


Figure 2. Water withdrawals, by category, in Illinois in 1995, excluding withdrawals by thermoelectric-power generators. (Percentages do not sum to 100 percent because of rounding.)

Distribution of Water Withdrawals

Range of total water withdrawals, by county, in Illinois for 1995 are shown in figure 3. The counties of the densely

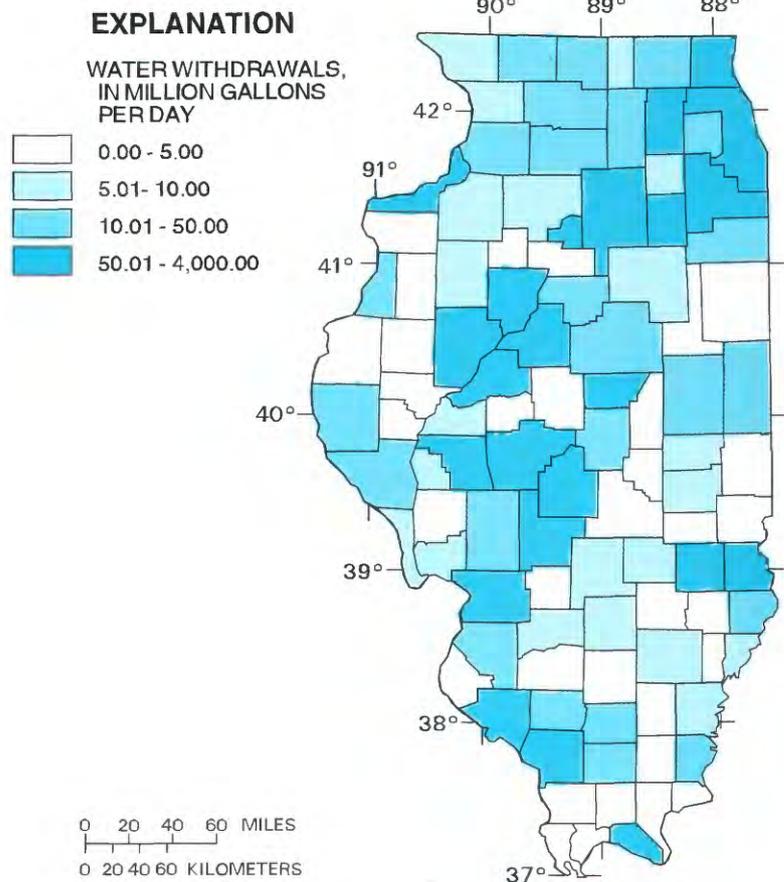


Figure 3. Total withdrawals of water in Illinois, by county, 1995.

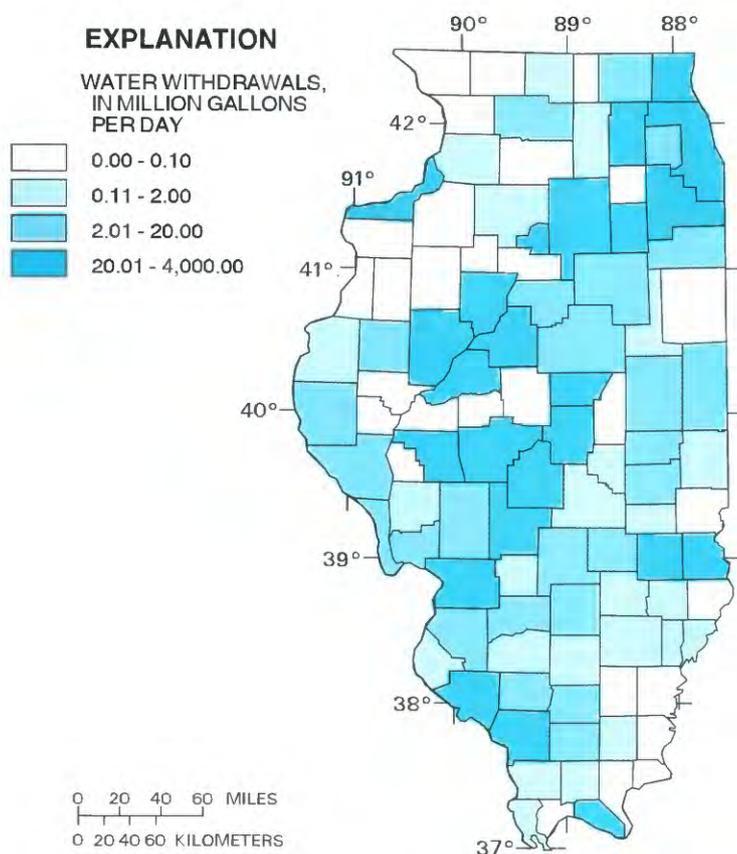


Figure 4. Total withdrawals of surface water in Illinois, by county, 1995.

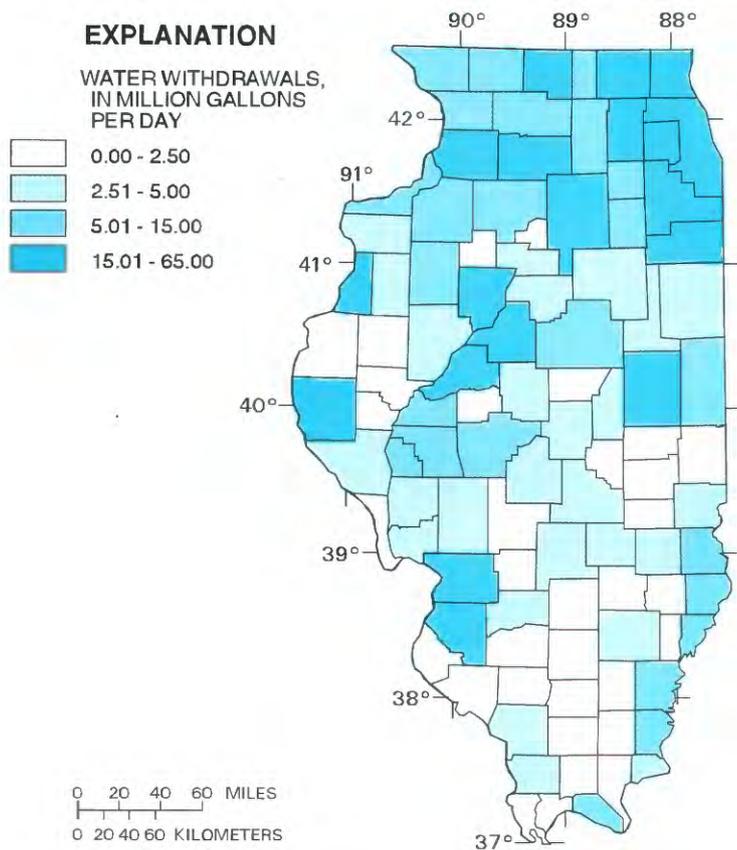


Figure 5. Total withdrawals of ground water in Illinois, by county, 1995.

populated Chicago metropolitan area in northeastern Illinois compose an area with large amounts of water withdrawals. Surface-water withdrawals, by county, are shown in figure 4. Most of the counties with large withdrawals of surface water contain one or more thermoelectric-power generation plants. Ground-water withdrawals, by county, are shown in figure 5. Most of the counties with large ground-water withdrawals include metropolitan areas underlain by productive aquifers or agricultural areas with large amounts of irrigation.

Water Returns and Consumption

In 1995, the disposition of water used in Illinois (19,922 Mgal/d) is shown in figure 1. About 96 percent of the water withdrawn is returned to the ground- or surface-water source through direct discharge or through sewage-treatment facilities. Water withdrawn for thermoelectric-power generation generates the largest amount of unconsumed water returns and the largest amount of consumed water in Illinois because of the large volume of water withdrawn. Water withdrawn for domestic use generates the next largest amount of return flows; irrigation consumes the next largest amount of water.

Water-Withdrawal Changes in Northeastern Illinois

Recent shifts by public-water suppliers from ground-water sources to surface-water sources have occurred in northeastern Illinois (fig. 6). Recent increases in water withdrawals from Lake Michigan, made possible through the 1980 modification of the U.S. Supreme Court decree regulating the use of water from the Great Lakes, have been used to provide water to public-water suppliers in Cook, Du Page, and Lake Counties who have abandoned water wells. The large decrease in ground-water withdrawal in Du Page County from 1990 to 1995 with no corresponding increase in surface-water withdrawal reflects the deliveries of water from adjacent Cook County. The additional surface-water withdrawals in Kane County came from the Fox River. In the eight-county Chicago metropolitan area (Cook, Du Page, Grundy, Kane,

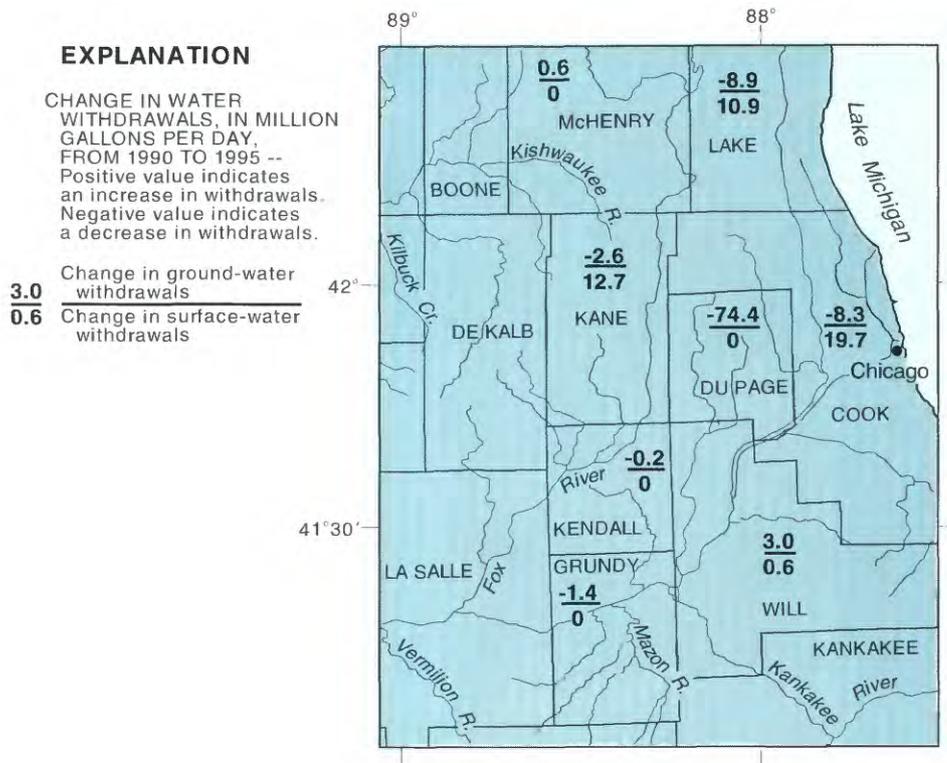


Figure 6. Change in surface-water and ground-water withdrawals by public-water suppliers from 1990 to 1995 in the eight-county Chicago metropolitan area.

Kendall, Lake, McHenry, and Will Counties), ground-water withdrawals decreased by 92.2 Mgal/d from 1990 to 1995; surface-water withdrawals increased by 43.9 Mgal/d during the same period. Therefore, total water withdrawals by public-water suppliers decreased by 48.3 Mgal/d in the eight-county Chicago metropolitan area.

Acknowledgments

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—Charles Avery

Suggestions for Further Reading

Avery, Charles, 1995, Reversal of declining ground-water levels in the Chicago area: U.S. Geological Survey Fact Sheet FS-222-95, 2 p.

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region, 1991-95: Illinois State Water Survey Circular 182, 45 p.

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