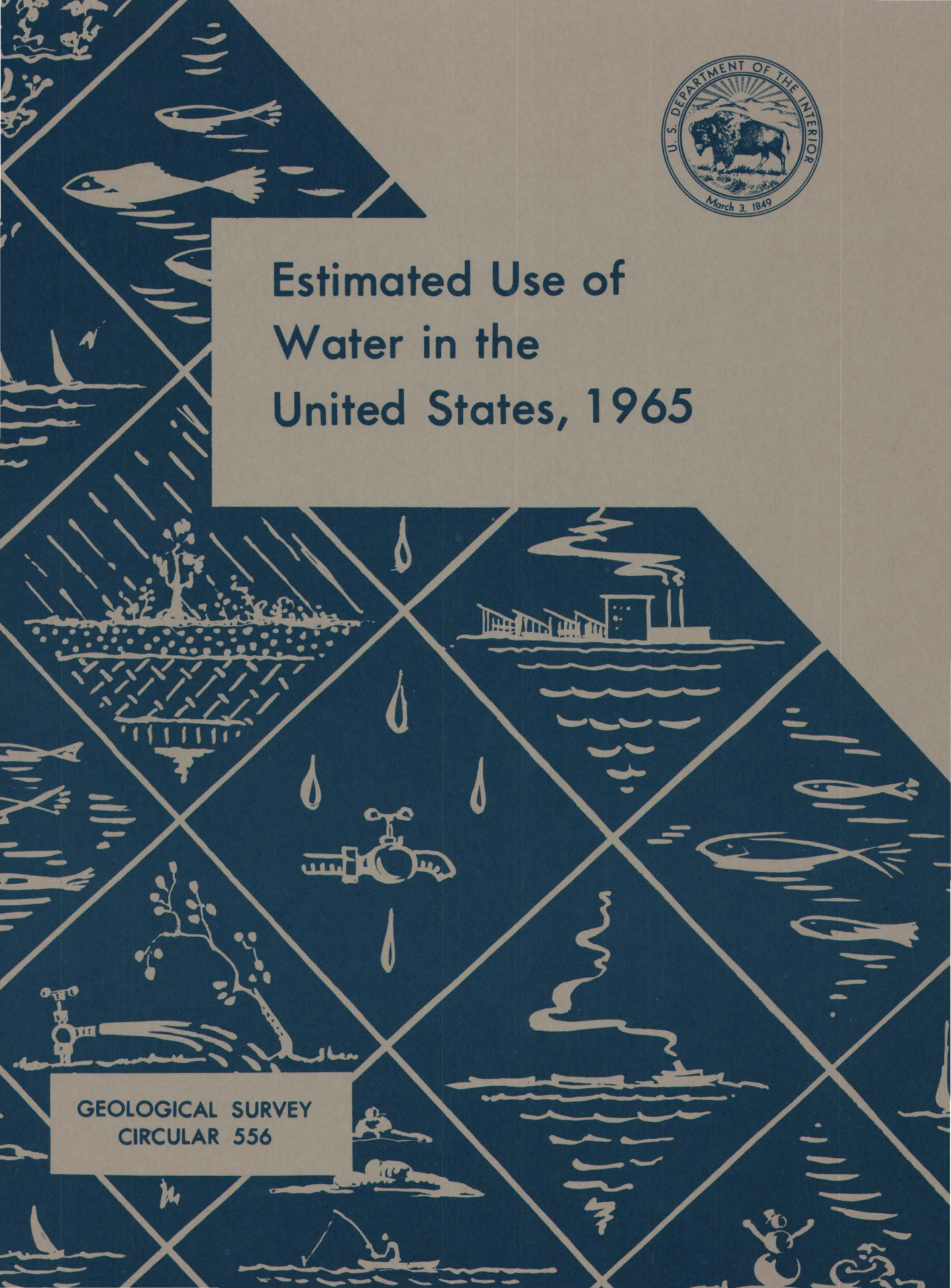
Estimated Use of Water in the United States, 1965



GEOLOGICAL SURVEY
CIRCULAR 556

Estimated Use of Water in the United States, 1965

By C. Richard Murray

GEOLOGICAL SURVEY CIRCULAR 556

Washington 1968

United States Department of the Interior
WALTER J. HICKEL, *Secretary*

Geological Survey
William T. Pecora, *Director*

First printing 1968

Second printing 1969

Free on application to the U.S. Geological Survey, Washington, D.C. 20242

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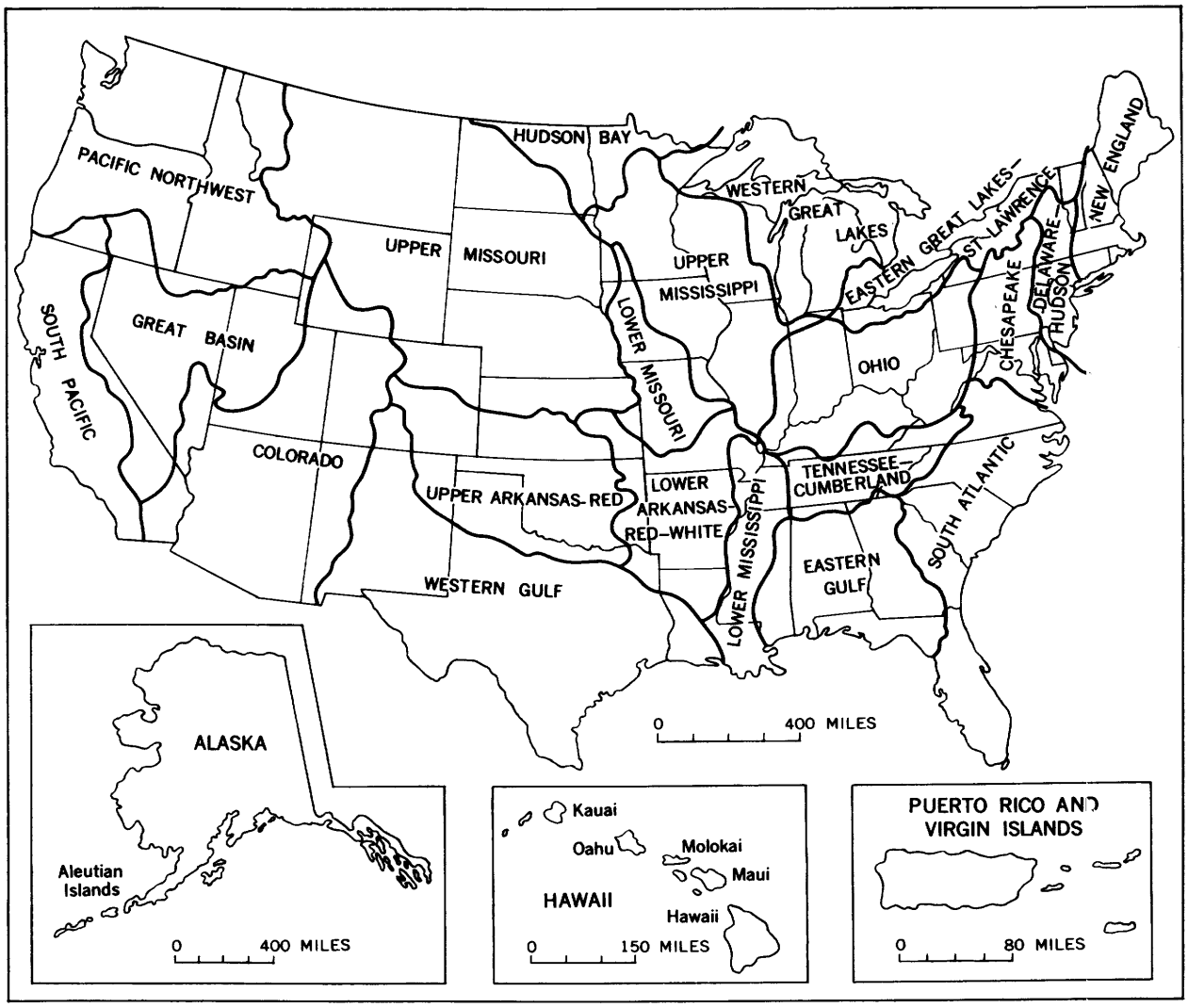

Figure 1 — Water-use regions of the United States.

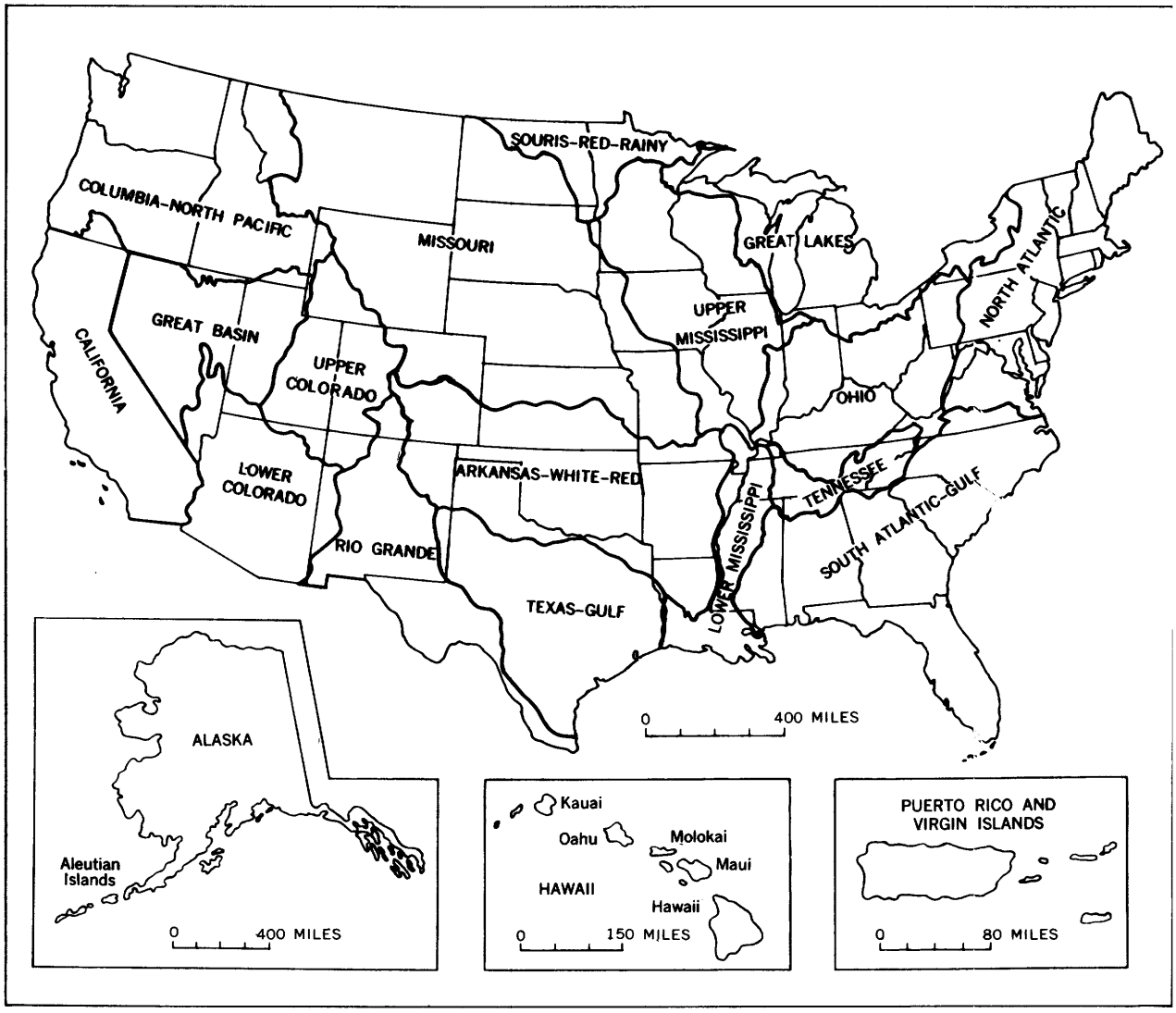

Figure 2.—Water Resources Council regions of the United States.

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ABSTRACT

Estimates of water use in the United States for 1965 indicate that an average of about 310 bgd (billion gallons per day) were withdrawn for public-supply, rural domestic and livestock, irrigation, and industrial (including thermoelectric power) uses—that is, about 1,600 gallons per capita per day. This represents an increase of 15 percent over the withdrawal of 270 bgd reported for 1960. Fresh water withdrawals for thermoelectric power generation increased nearly 25 percent during the 5 years, and saline water withdrawals increased 33 percent. An additional 2,300 bgd was used for hydroelectric power generation (waterpower), which also represented a 15-percent increase in 5 years. The quantity of water consumed—that is, water made unavailable for further possible withdrawal because of evaporation, incorporation in manufactured products, and other causes—was estimated to average 78 bgd for 1965, an increase of about 28 percent since 1960.

Estimates made of the quantities of water withdrawn from surface and ground-water sources indicate withdrawals of 61 bgd of ground water, of which nearly 0.5 bgd was saline, and 250 bgd of surface water, of which 44 bgd was saline. The estimated amount of saline water used by industry increased 36 percent from 1960 to 1965. In addition to surface and ground water sources, reclaimed sewage supplied two-thirds of a billion gallons per day, mainly to irrigation and industry.

The average annual streamflow in the United States is approximately 1,200 bgd, about four times the amount withdrawn for all purposes (except hydroelectric power) in 1965, and more than 15 times the estimated quantity of water consumed. However, comparisons of supply and demand in many river basins show that repeated use of the water is made, and at times in some basins all the available supply is consumed.

In addition to tabulations of water-use data by States and by the water-use regions previously used, water-use tables are also given for the regions recently defined by the Water Resources Council for its national assessment.

INTRODUCTION

Periodic assessments of withdrawal from available water sources not only show the changes in volume of water used but also indicate trends in water use. Studies of these trends provide information relative to the quantity and quality of water available for future use. Water-use data include both the purpose for which the water is used and the quantities used for each purpose; each type of use has a different effect on the available supply and on the remaining supply. Water used for irrigation, for example, is subject to pollution by pesticides and fertilizers, and a large part of the water withdrawn is lost through evaporation. Water used by industry commonly picks up pollutants of various types depending on the product produced, but, in general, only a small amount of water is consumed—that is, removed permanently from the supply.

District offices of the U.S. Geological Survey submitted water-use data for 286 areas. The data were tabulated according to States and water-resources regions. Two principal regional breakdowns of the United States were used; the first was that used in previous water-use reports (fig. 1) and the second was that made by the Water Resources Council (fig. 2).

RECENT INVESTIGATIONS

As water-use information is of wide interest, data on water use are available from a large number of sources. These sources include Federal, State, and local governmental agencies, private businesses, and individuals. Many of these parties have compiled water-use data into reports covering their particular field of interest, and for the country as a whole the U.S. Geological Survey has assembled and combined much of the data for 1950, 1955, and 1960 into general reports (MacKichan, 1951, 1957; MacKichan and Kammerer, 1961b). Information on public supplies is published by the U.S. Public Health Service (1964a, 1964b), the American Water Works Association (1964a, 1964b, and 1967), and the Geological Survey in the report by Durfor and Becker (1964).

Information on agricultural water use is published by the U.S. Bureau of the Census (1967). Estimates of irrigated acreage in each State are given annually by "Irrigation Engineering and Maintenance" (1965).

A report on water use in manufacturing in 1964 was published by the U.S. Bureau of the Census (1966). Water use in the mineral industries is reported in the information circular series of the U.S. Bureau of Mines as follows: Gilkey and Beckman (1963), Edgerton (1965), Gilkey and Stotelmeyer (1965, 1967), Buttermore (1966), Kaufman and Nadler (1966), Kerns (1964, 1965), Holmes (1966), Hale (1966). Other data on water use in manufacturing

was collected by the California Department of Water Resources (1964) and by the National Association of Manufacturers (1965).

The Geological Survey has analyzed the water requirements of various industries. Mussey (1955) studied water use in the pulp and paper industry, Conklin (1965a, 1965b), in the carbon-black industry and the aluminum industry, and Mussey (1957, 1961), in the rayon and acetate-fiber industry and the copper industry. Durfor (1963) studied water use in the styrene, butadiene, and synthetic-rubber industries, Otts (1963), in the petroleum refining industry, and Walling and Otts (1967), in the iron and steel industry. Woodward (1957) discussed water supply and water use in 1955 and evaluated the adequacy of the potential supply for meeting the anticipated needs of industry by 1980.

Reports of the U.S. Federal Power Commission (1961, 1964, 1965) gave information on hydroelectric and thermoelectric power in the United States.

MacKichan and Kammerer (1961a, 1961b) estimated water use in the Southeast river basins and in the United States in 1960. Randall (1961) prepared a bibliography on water-use data from information obtained during the 1960 water-use study. McGuinness (1963), as part of his treatise on ground water in the United States, summarized water supply and water use in 1961 and gave special emphasis to the role of ground water in the national water situation. Piper (1965) examined the adequacy of water supply to meet demand not only for the present but also for conditions, as he foresees them, in the year 2000. Nace (1967), in a broad look at the total requirements of water for mankind's development, emphasized the need for improving water management. C. H. Hardison, Surface Water Branch, U.S. Geological Survey prepared data on water supply in the Water Resources Council regions of the United States, which are being used by the Water Resources Council (1968). Busby (1966) and Langbein and others (1949) have made comprehensive studies on runoff in the United States.

PRESENT INVESTIGATION

This report presents estimates, based on data from many sources, of the amount of water diverted and consumed, by categories of water use, in the United States and Puerto Rico. No attempt was made in 1965 to estimate the small quantities for the Virgin Islands. Available supplies are compared with demands. Water use is reported by States and by two different sets of major river basins or regions (figs. 1 and 2) for the following categories: public supplies, rural domestic and livestock, irrigation, self-supplied industrial (including thermoelectric power production), and hydroelectric power generation. (Thermoelectric power is electrical energy generated in steam-electric plants including those that use nuclear fuel.) Source of the water (ground, surface, and reclaimed sewage) is given as determined by the district offices of the Geological Survey. In general, the district offices supplied the information for the irrigation, public supplies, and self-supplied industrial studies. Data for livestock, rural domestic, hydroelectric, and thermoelectric water uses were computed in the Washington office with information pertinent to local areas supplied by the district offices. The water-use data for livestock were based on the 1964 Census of Agriculture of the U.S. Bureau of the Census (1967). Water use for generating hydroelectric power was computed from statistics published by the U.S. Federal Power Commission (1964, 1965). The Federal Power Commission (1961, 1965) published the data on water used in steam-electric plants in 1959 and on power generated in 1965; these data were used in estimating the water used for thermoelectric power generation as shown in this report. J. C. Kammerer proposed tables 1 through 4, 30, and 32 and figures 5, 9, and 11, and C. H. Hardison furnished data on water supply.

TERMINOLOGY

The meaning of most terms used in this series of water-use reports have been summarized by Gertel (1962). When the term "water use" appears in this report, withdrawal use (the amount of water withdrawn from its source) is implied; this is equivalent to "intake" or "water requirement" as used in industry and agriculture, respectively. If the water is used more than once by recycling, it will do the work of a greater quantity of water; the amount of this greater quantity, which is commonly called the "gross water use," is not evaluated in this report. If, however, the water is returned to a stream, lake, aquifer, or other source and then withdrawn anew, the summation of successive withdrawals gives the total withdrawal use.

The terms "water consumed," "consumptive use," or "consumption," as used in this report, refer to that part of the water withdrawn that is no longer available because it has been either evaporated, incorporated into products and crops, consumed by man or livestock, or otherwise removed from the water environment. Water that is discharged into salt water bodies after being used, and is not recoverable from a practical standpoint, is not classed as consumed. Water with more than one thousand parts per million dissolved solids is classed as "saline" irrespective of the nature of the minerals present. In order for water to be classified as "reclaimed sewage" (also referred to as "other water" to distinguish it from that withdrawn from ordinary ground and surface water resources), the effluent from a sewage treatment plant must be diverted before it reaches a natural waterway and becomes part of the streamflow; otherwise, it is classed as a surface-water withdrawal.

Water obtained from a water utility that serves the general public is classed as a "public supply;" if a public supply is either not available or not used, the water is "self-supplied." Individual families and small communities not served by a water utility are classed as "rural" with regard to water use. The term "nonwithdrawal uses" includes the "flow uses" defined by Wollman (1960): "The term refers to water used within recognized stream channels. Hydroelectric power production has been arbitrarily included as

Table 1.—*Hydraulic equivalents*

[Equivalent values, to three significant figures, are on the same horizontal line]

Million gallons per day (mgd)	Billion gallons per day (bgd)	Thousand acre-feet per year	Thousand cubic feet per second	Thousand gallons per minute	Million cubic meters per day
1.0	0.001	1.12	0.00155	0.694	0.00379
1,000	1.0	1,120	1.55	694	3.79
.893	.000893	1.0	.00138	.620	.00338
646	.646	724	1.0	449	2.45
1.44	.00144	1.61	.00223	1.0	.00545
264	.264	296	.409	184	1.0

a flow use, although purists object to such classification. Other flow uses are navigation, sport fishing habitat, fresh water discharge into estuarine areas in order to maintain proper salinity, and the disposition and dilution of waste water." In this report, however, "hydroelectric power" (synonomous with "waterpower" in earlier reports) is included with withdrawal uses, and the term "off-channel uses" has been used to represent withdrawal uses excluding water withdrawn for hydroelectric power generation. The evaluation of other nonwithdrawal uses, whether flow uses, as defined by Wollman, or onsite uses, such as evaporation from reservoirs, is outside the scope of this report.

Water-use data are reported as the average quantities used daily as derived from the annual use. The average use is generally expressed in million gallons per day (mgd) to two significant figures; however, the amount of water for irrigation is also given in units of 1,000 acre-feet per year. An acre-foot of water is the amount required to cover an acre (43,560 square feet) to the depth of one foot (43,560 cubic feet). A thousand of such units per year is very roughly equal to a flow of a million gallons per day for a year (1,000 acre-feet per year equals 0.89 mgd). Common equivalents of these units are given in table 1.

WITHDRAWAL USES

The purposes for which water is withdrawn from the ground, a river, lake, bay, reservoir, sewage treatment discharge flume, or other source generally fall into a few well defined categories and subcategories. The categories of water use shown in the tables in this report are public supply, rural domestic and livestock, irrigation, self-supplied industrial (with subcategories for thermoelectric power and air conditioning), and hydroelectric power. For each of these categories, estimates are made both of total withdrawals and of the part that is consumed.

PUBLIC SUPPLIES

Water withdrawals by public supplies in 1965 have been estimated at 23.6 bgd or an average of 155 gpd for each individual served. (See tables 4–7.) These estimates include distribution losses which are significant quantities in some systems. In 1965 about 153 million people in the United States and Puerto Rico received water for domestic use from public supplies. Public supplies also furnish water to industrial and commercial establishments, institutions, military facilities, and public or governmental facilities. Commerce and industry received about 7.5 bgd, a third of the total withdrawn by public supplies. Estimates indicate that approximately 10 percent of the water used by commerce and industry was for air conditioning. About 22 percent of the total withdrawals for public supply is estimated to have been consumed. One-third of the water withdrawn for public supplies was from wells and springs, and the other two-thirds was from surface-water sources.

RURAL USES

The amount of water used in 1965 by the 42 million individuals with self-supplied domestic water (termed "rural domestic") was about 2.3 bgd, and the amount of water used by livestock was about 1.7 bgd. About 95 percent of rural domestic water was ground water, but only about 59 percent of the water used by livestock was ground water. Only about one-fifth of the 4 bgd used by rural dwellings and livestock is estimated to have been available for subsequent use. The amount of water consumed by rural domestic and livestock uses was about equal—that is, 1.6 bgd each. Estimates of water withdrawn for rural domestic use were made for two groups—those with running water in the home and those without running water. A per capita use for each group in each State was either supplied by the district office or assumed as 50 gallons per capita per day for those with running water and 10 gallons per capita per day for those without running water. Values suggested by district offices are shown in table 2.

Table 2.—*Per capita rates of rural domestic water use, by States, 1965*

State	With running water (gpd)	Without running water (gpd)
Arizona	100	10
California	80	20
Connecticut	70	10
Delaware	60	10
Florida	100	10
Hawaii	75	15
Idaho	100	20
Indiana	60	10
Kansas	75	15
Kentucky	55	5
Nebraska	60	10
Nevada	100	10
New Hampshire	60	12
New Jersey	60	10
New York	60	10
North Carolina	100	10
Oregon	75	10
Puerto Rico	25	10
South Dakota	55	25
Washington	75	10
Wisconsin	70	10
All other States	50	10

Table 3.—*Per capita rates of water use by livestock, in gallons per capita per day, 1965*

	Milk cows	Beef cattle	Horses, mules	Hogs	Sheep	Goats	Chickens	Turkeys
Arizona	30							
Arkansas	30	15	15	2			0.05	0.08
California	25	15	15					
Colorado	15	11		1.3			.09	.18
Connecticut							.05	.08
Kentucky	40	8	12					.10
Maryland	35		12	4				
Missouri	30	20						.08
Nevada		6						
New Mexico	25			2			.05	
North Carolina	60	30	30	6			.12	.3
South Dakota	35	15	12	5			.10	.15
All other States	20	10	10	3	2	2	.04	[1].06

[1] Also used for ducks.

Water withdrawal for livestock use was computed from the U.S. Bureau of the Census (1967) livestock population count of 1964 by using per capita rates for livestock and poultry, as suggested by the district offices and as shown in table 3.

In general, the rates used for the 12 States shown exceed those for the other States by 50 to 100 percent. Head counts of horses and mules, goats, and ducks were not reported in the 1964 Census of Agriculture, so numbers reported in the 1954 or 1959 censuses were used as a basis for calculating 1965 water withdrawals for these animals.

IRRIGATION

The withdrawal of water for irrigation in the United States and Puerto Rico in 1965 was estimated as 130 million acre-feet. (See tables 11–13 and figs. 3 and 5.) This was an average rate of 120 bgd, and the water was used on irrigated farms containing approximately 44 million acres of land. It is estimated that about 27 million acre-feet of water was lost in conveyance (24 bgd) and 74 million acre-feet (65 bgd) was consumed by irrigation. About one-fourth of the irrigation water in the United States was ground water and three-fourths was surface water. Reclaimed sewage amounted to about one-half of one percent of the total irrigation water. It is estimated that about one-fourth of the water withdrawn, or about one-third of that reaching the fields, was returned to ground water or surface water sources for possible additional use. About 20 percent of the water withdrawn was lost before reaching the fields. An undetermined part of the conveyance loss (seepage to ground-water or surface-water sources) is included in the amount available for additional use, but the remainder was transpired or evaporated.

Because of the variation in climate, soil conditions, and irrigation methods throughout the United States, average values for irrigation water use based on information shown in this report have little application to any particular area. Originally, irrigation was restricted almost wholly to the Western States; however, irrigation use has increased substantially in the Eastern States and, in 1965, the 31 Eastern States used more than 10 percent of the total amount of water withdrawn for irrigation in the United States (figs. 3 and 5). Arkansas, Florida, and Louisiana accounted for much of the Eastern States' irrigation water withdrawals.

SELF-SUPPLIED INDUSTRIAL WATER

The amount of self-supplied industrial water (which excludes that obtained from public supplies) in the United States and Puerto Rico in 1965 is estimated as 170 bgd (tables 14–16). Most of the water was used in the eastern half of the United States (figs. 4 and 5). Use of saline water for cooling has increased rapidly and in 1965 amounted to about one-fourth of the total industrial withdrawals. Nearly three-fourths of the industrial water was used by thermoelectric power plants using fossil (coal or petroleum) and nuclear fuels. Ground water supplied about 5 percent of the amount withdrawn by industry, reclaimed sewage furnished a fraction of a percent, and surface water provided the remainder. Most of the water withdrawn by industry was returned to a source for possible subsequent use. Estimates indicate that thermoelectric power plants consumed less than one-half of 1 percent of the water withdrawn and that other industries consumed about 7½ percent, giving a combined consumption figure of about 2 percent for all types of industry in 1965.

About 97 percent of the water used for thermoelectric power generation was used for cooling, and about 70 percent of the water used by other industries was used for cooling. For all industries combined, 90 percent of the water was used for cooling and 10 percent served the numerous other needs of industry, including air conditioning (fig. 6).

Water withdrawals by thermoelectric power plants (fossil fuel and nuclear plants) operated by electric utilities are tabulated separately from withdrawals by other industries such as manufacturing, mining, military bases, and public institutions. (See tables 14–19.) Water used for the latter purposes includes the nonpublic supply part of water used for air conditioning shown in tables 20 and 21. An unusual industrial water use is supply for fish ponds and hatcheries. In 1965 the fish growing industry in Arkansas withdrew about 180 mgd, nearly 50 percent of the State's industrial water use, and consumption of water for fish growing in Arkansas amounted to 50 to 100 percent of withdrawals, depending on the method of operation used and type of fish raised. Water withdrawn by fish hatcheries and log ponds in Oregon in 1965 was estimated to be the same as it was in 1960, about 600 mgd; however, only about 2½ percent, or 16 mgd, of this water was consumed.

THERMOELECTRIC POWER

Very large quantities of water are required to remove the large amount of heat needed to condense steam in

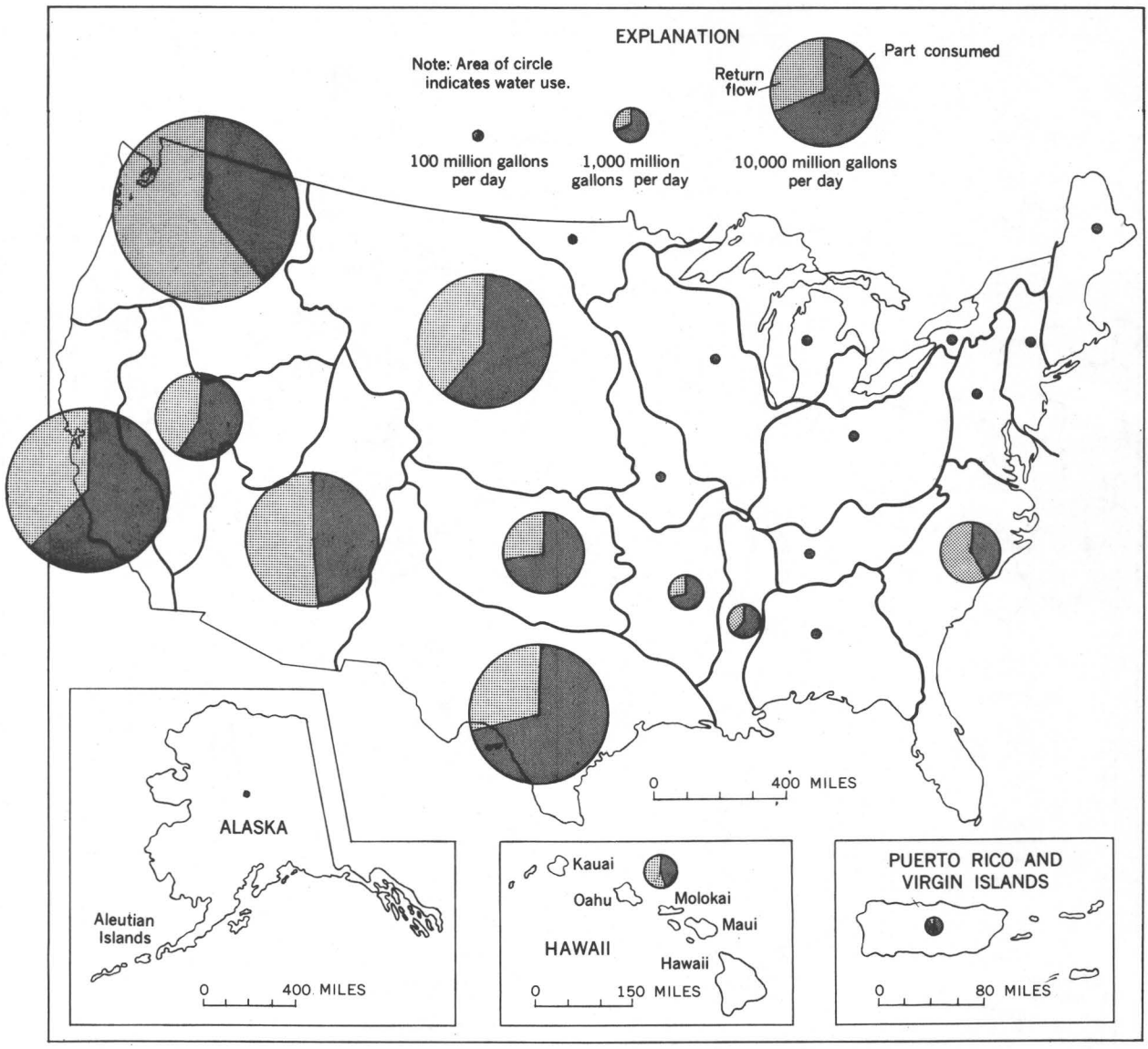

Figure 3.—Irrigation water withdrawals by water-use regions, 1965.

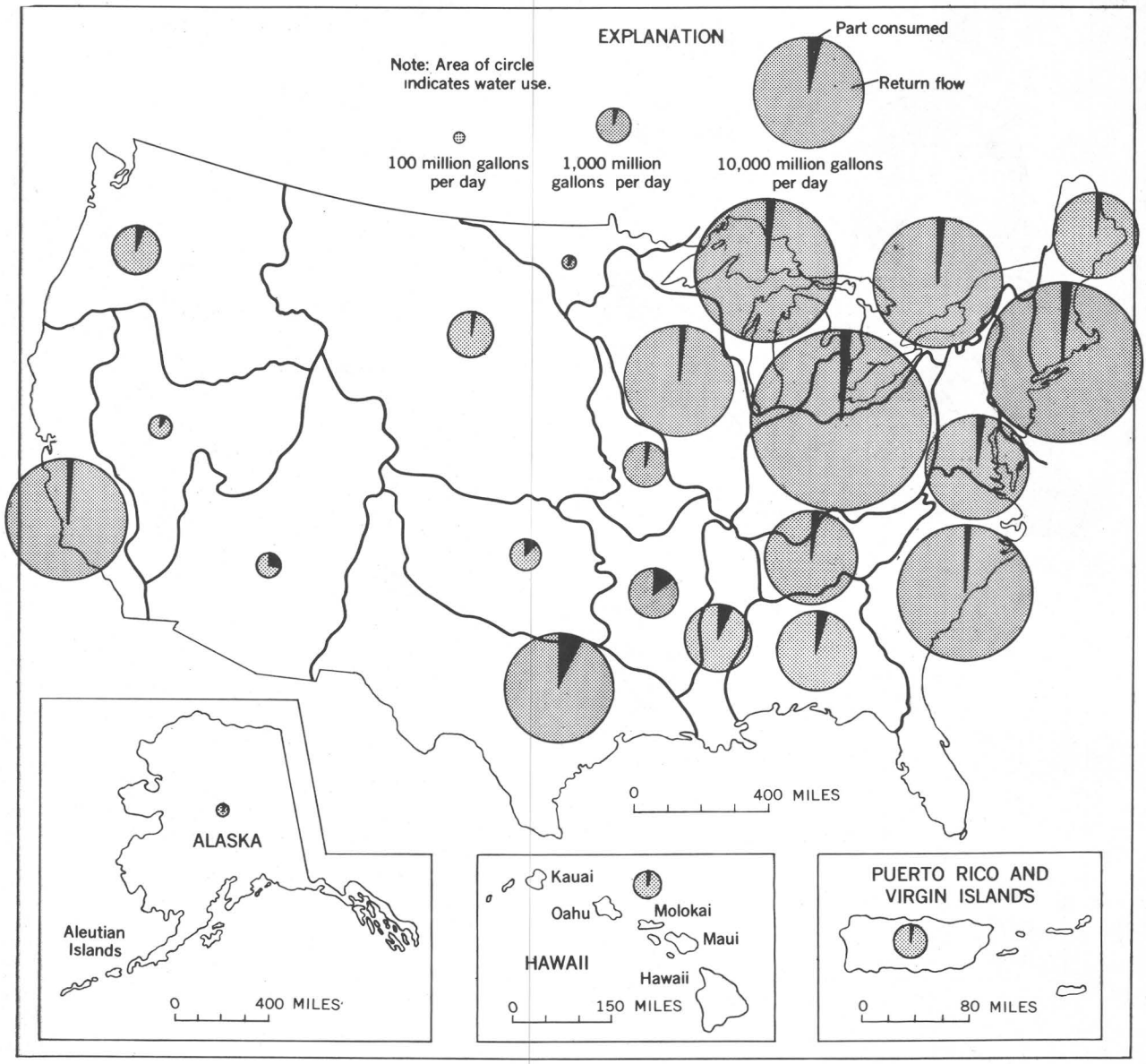

Figure 4.—Self-supplied industrial water withdrawals by water-use regions, 1965.

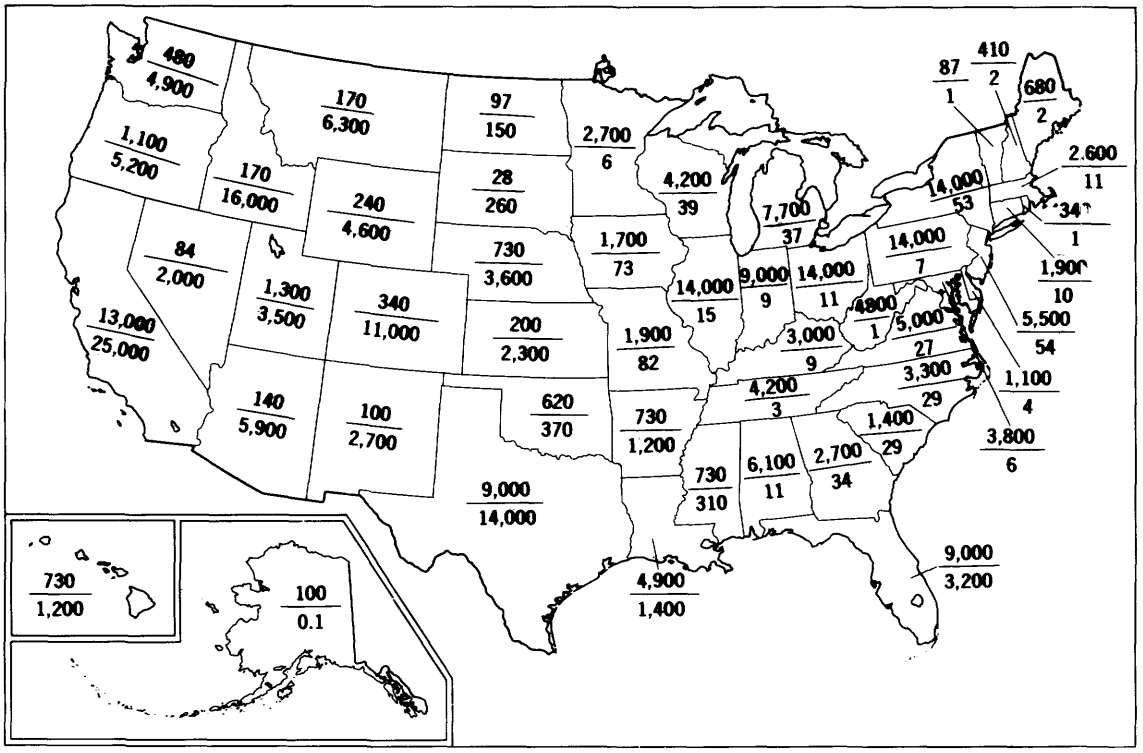

Figure 5.—Self-supplied industrial water withdrawals (upper number) and irrigation water withdrawals (lower number), by States, in million gallons per day, 1965.
[Figure by J. C. Kammerer]

thermoelectric power plants. (See tables 17–19.) Many power plants are located where large quantities of water are available. If the supply is limited, however, provisions are made to remove part of the absorbed heat from the cooling water so that the water can be effectively reused. Cooling ponds or towers are commonly used for this purpose. The quantity of water required per kilowatt hour of electricity generated depends on the number of times the cooling water is reused and on the designed permissible temperature rise within the condensers. In a flow-through operation with no recirculation, more than 100 gallons may be required for each kilowatt hour of power produced, whereas if the water is reused many times, a fraction of a gallon may be sufficient. Little water is consumed where no recycling takes place but, with additional passes through a thermoelectric plant, a large percentage of the water is consumed. With repeated reuse, the temperature of the water increases, and the water is less desirable for additional use, particularly for cooling purposes. About 99 percent of the water used in thermoelectric power plants in 1965 was self-supplied from surface water sources, and only a fraction of one percent was obtained from public supplies. Approximately 97 percent of the water withdrawn for thermoelectric power production was used for condenser cooling (tables 17–19). In recent years, sites along the coasts have been used to a greater extent for power plant locations; saline water constituted about 28 percent of the estimated withdrawals for thermoelectric power generation in 1965.

AIR CONDITIONING

Data on the quantity of water used for air conditioning in the United States are incomplete, but from available information, the quantity used in 1965 is estimated as 1.7 bgd (tables 20–22), of which 760 mgd (tables 5–7) was derived from public supplies. The remaining 1,000 mgd (57 percent) is part of the total self-supplied industrial water (tables 14–16). The length of the air-conditioning season varies with latitude; in the Northern States a high summer demand for air conditioning combined with other seasonal demands, such as lawn watering, frequently causes large peak loads in public-supply systems, but demand for air conditioning exists through a greater part of the year in the Southern States.

HYDROELECTRIC POWER

Although the rate of increase in power generation by hydroelectric power plants has been much lower than that for thermoelectric power plants, the water withdrawn for this purpose by electric utilities amounted to 2,300 bgd in 1965. From 1950 to 1965 a steady increase in the quantity of water used for hydroelectric power occurred (fig. 10). For this period an average annual increase of about 80 bgd is indicated; however, from 1960 to 1965, the average yearly increase amounted to only about 60 bgd. Thermoelectric power plants undoubtedly will produce an increasing share of the electric power as hydroelectric sites

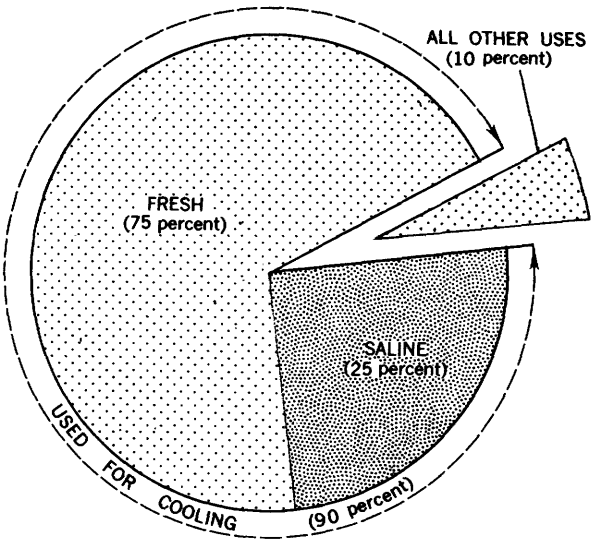

Figure 6.—Characteristics of industrial water use, 1965.

become scarce and as the use of nuclear fuel becomes more efficient, but hydroelectric plants will continue to be important in power networks because of their ability to supply large amounts of power, on short notice, to meet peak power demands.

Estimates of the quantity of water used by hydroelectric power plants are derived from the U.S. Federal Power Commission (1964, 1965) data on the gross static head of individual hydroelectric power plants throughout the United States, their average annual power generation, the average annual power generation for each State, and the hydroelectric power generation for each month of the year by States. Quantities of water used to produce hydroelectric power within each water-use subregion were determined by assuming that a plant operated with a 70 percent efficiency and that each plant produced power during 1965 in the proportion that its average annual power generation bears to the average annual power generation of the State in which it is located. Plants not listed as of January 1, 1964, generally were not considered, so their water withdrawals would appear as pertaining to the listed plants. Nearly all the water passing through hydroelectric power plants is returned to the source; however, evaporation losses from storage reservoirs and from reservoirs required to provide hydraulic head at the plants decrease the amount of water available for diversion. As evaporation loss from reservoirs is a nonwithdrawal use, it is not evaluated in this report. An indication of the magnitude of this loss is given by the fact that estimated losses from principal reservoirs and regulated lakes in the 17 Western States, irrespective of purpose, is about 11 bgd (Meyers, 1962)—one-half of one percent of hydroelectric water diversions in the United States, 4 percent of all withdrawal uses, and about 15 percent of the estimated quantity of water consumed.

SUMMARY

The estimated withdrawal of 310 bgd for all purposes (excluding hydroelectric power) in 1965 (tables 26–28) is about 15 percent greater than the 1960 withdrawal estimated by MacKichan and Kammerer (1961b). It indicates an average per capita use throughout the United States of

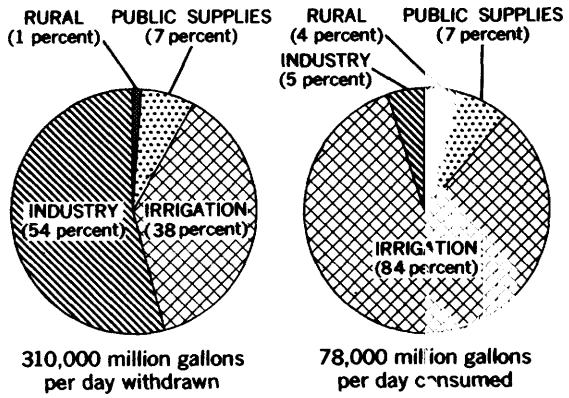

Figure 7.—Water withdrawal and consumption in 1965, by category.

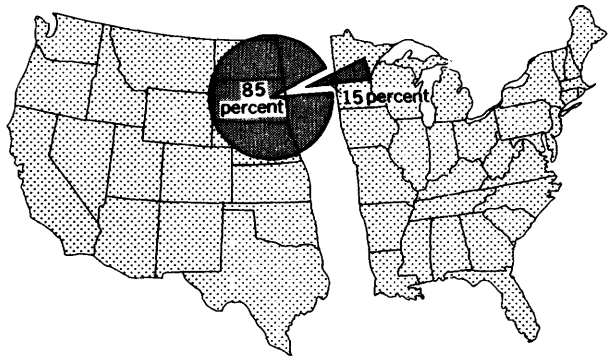

Figure 8.—Water consumption in the 17 Western States and the 31 Eastern States, 1965.

Table 4.—*Per capita water withdrawal and water consumption, by composite regions (western and eastern-central water-use regions), in gallons per day, 1965*

[All per capita data in this table have been rounded to two significant figures]

	Public supplies only			Estimated total population 1965 (millions)	All withdrawal uses		
	Population served (millions)	All uses	Domestic and public uses only [1]		Excluding water-power	Including water-power	Water consumed, all uses
14 eastern and central water-use regions	107.6	140	92	144.7	1,200	9,700	69
7 western water-use regions	41.7	200	150	48.0	3,100	25,000	1,400
50 States	152.5	160	110	193.7	1,600	13,000	400

[1] Includes water losses in system.

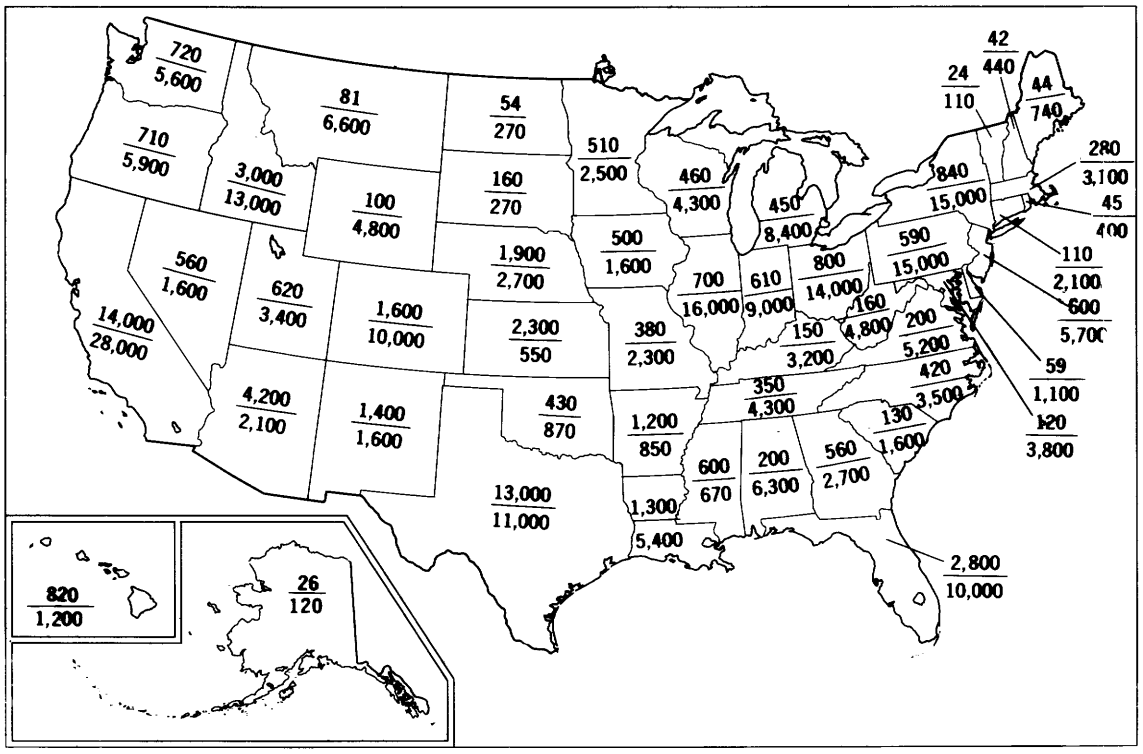

Figure 9.—Total water withdrawals by States (excluding hydroelectric power) from ground-water sources (upper number) and from surface-water sources (lower number), in million gallons per day, 1965. [Figure by J. C. Kammerer]

1,600 gpd. Figure 7 indicates that, of the water withdrawals (excluding hydroelectric use), industry uses 54 percent; irrigation, 38 percent; public supplies, 7 percent; and rural domestic and stock, 1 percent. Of the estimated 78 bgd consumed, irrigation accounted for 84 percent; public supplies, 7 percent; industry, 5 percent; and rural uses, 4 percent (fig. 7). Within the conterminous United States, the 17 Western States consumed 85 percent of the water, while only 15 percent was consumed by the 31 Eastern States (fig. 8). On a per capita basis and separated on a composite regional basis (western and combined eastern and central regions), public supplies, domestic uses, off-channel uses, all withdrawal uses, and water consumption are shown in table 4.

In 1965 an average of about 60 bgd of fresh ground water, 0.5 bgd of saline ground water, 210 bgd of fresh surface water, and 44 bgd of saline surface water was withdrawn for off-channel uses. Withdrawals (excluding hydroelectric use) of ground water and surface water, by States, are shown in figure 9.

NONWITHDRAWAL USES

Nonwithdrawal uses, which are often classified as flow uses and onsite uses (Gertel, 1962, p. 6), generally do not lend themselves to quantitative determination in contrast to withdrawal uses which can be measured directly. However, they are important, and they affect the quantity and quality of water available for withdrawal uses. Onsite consumption by evaporation in reservoirs and regulated lakes results from establishment and operation of water projects, primarily withdrawal types. Eliasberg (1960) evaluated present and future withdrawals, losses, and flows as affected by storage in 22 major water-resources regions of the United States. Piper (1965) analyzed the relationship of supply, withdrawal and nonwithdrawal uses, and consumption; he presented suggestions and alternatives for management of water supplies extending to the year 2000. Nace (1967) called attention to the fact that the primary concern in many highly developed, industrialized humid areas is rationally managing the total water resource (including all precipitation) and protecting its quality since waste dilution and disposal (a nonwithdrawal use) is by far the largest use of freerunning water in such an environment. Navigation, recreation, and conservation of fish and wildlife are other important nonwithdrawal uses that require consideration in water-resources management.

TRENDS IN WATER USE, 1950–65

Table 29 shows the estimated amount of water withdrawn in 1950, 1955, 1960, and 1965 for the various use categories and the indicated percentage increases in each category for the period 1960 to 1965. Data for 1960 and earlier are from MacKichan and Kammerer (1961b). Table 30 shows source of supply, withdrawals, and consumption on a composite regional basis. Figure 10 shows the amount of surface water withdrawn in 1950, 1960, and 1965 for hydroelectric power and the relative amounts of surface

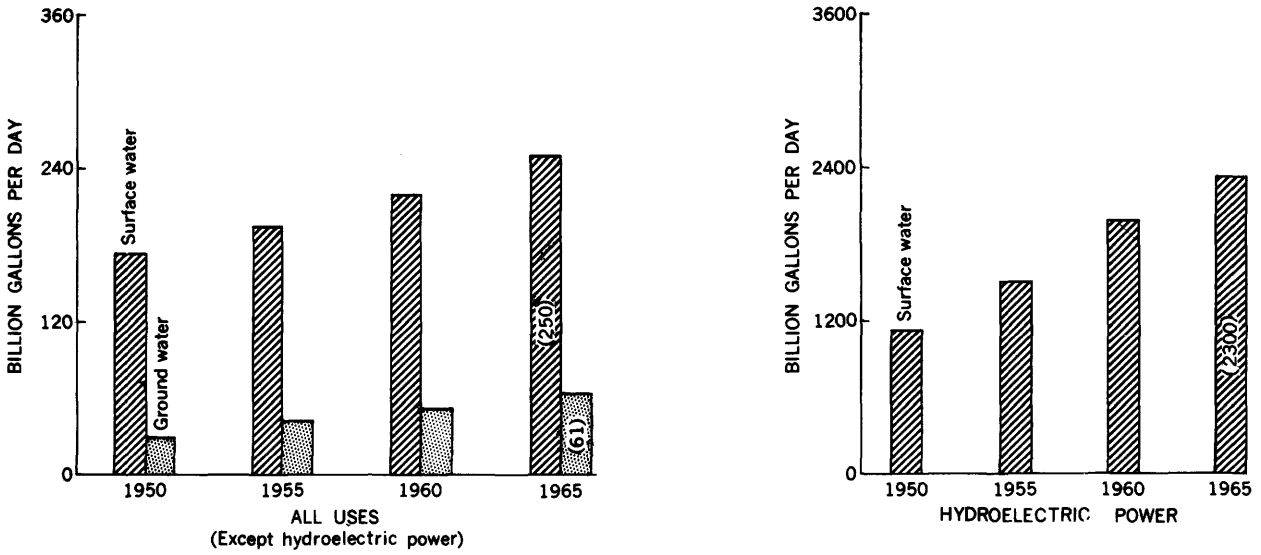

Figure 10.—Trends in use of water for hydroelectric power and in all other withdrawal uses combined, 1950–65.

water and ground water estimated to have been withdrawn during 1950, 1955, 1960 and 1965 for all other uses. The figures for 1950 include estimated conveyance loss to make them comparable with figures for the later years. The quantities show a fairly uniform gain between each quinquennial survey and an overall increase of 15 percent during the last 5-year period. Figure 11 shows trends in total withdrawal use (excluding hydroelectric power), total population, persons served by public water supplies, water withdrawn by water utilities, per capita use from public supplies, and per capita use of total water withdrawn (excluding hydroelectric power).

From table 29, it appears that self-supplied industrial water use increased 21 percent during the 5-year period, 1960–65. This represents a 19 percent increase in fresh water and 30 percent increase in saline water used in thermoelectric power plants, a 12 percent increase in fresh water and 61 percent increase in saline water used in other industries, or an overall increase of 17 percent in fresh water and 35 percent in saline water used for all industries (fig. 12). Estimates of water use by thermoelectric power plants were based primarily on plant information collected by the U.S. Federal Power Commission (1961) in 1959 but modified wherever possible to show new plants constructed since then.

The full impact of reduced water requirements for producing a kilowatt hour of electricity by more intensive reuse of water through recycling in the more recently designed plants may not be shown by tables 14 through 19. Water withdrawals by individual plants vary greatly as some use only a fraction of a gallon per kilowatt hour of power developed and others use in excess of 150 gallons. The average withdrawal for the United States as shown in the 1965 tables on thermoelectric power is 52.5 gallons per kilowatt hour. The average shown in the 1960 report (MacKichan and Kammerer, 1961b) was 60.7 gallons per kilowatt hour. As the U.S. Federal Power Commission (1961) showed about 52 gallons withdrawal per kilowatt hour for 1959, both the above figures may be high, perhaps by as much as 20 percent. A new survey of water use in thermoelectric power plants is needed to measure the effect of the retirement of older plants and the construction of plants designed to use smaller quantities of water for condenser cooling through use of cooling towers or ponds.

The major exception to gradually increased usage (fig. 12) is surface water used for irrigation, which showed declines from 1950 to 1960 and little change from 1960 to 1965. The total quantity of water estimated to have been withdrawn for irrigation increased approximately in proportion to the estimated acreage increase —13 percent from 1960 to 1965. Based on total withdrawals for irrigation, the average depth of water required was about the same—2.95 feet in 1965 and 3.05 feet in 1960. Estimates of ground water used by industry vary irregularly (fig. 12), probably because of limited accuracy in estimating the small quantities involved.

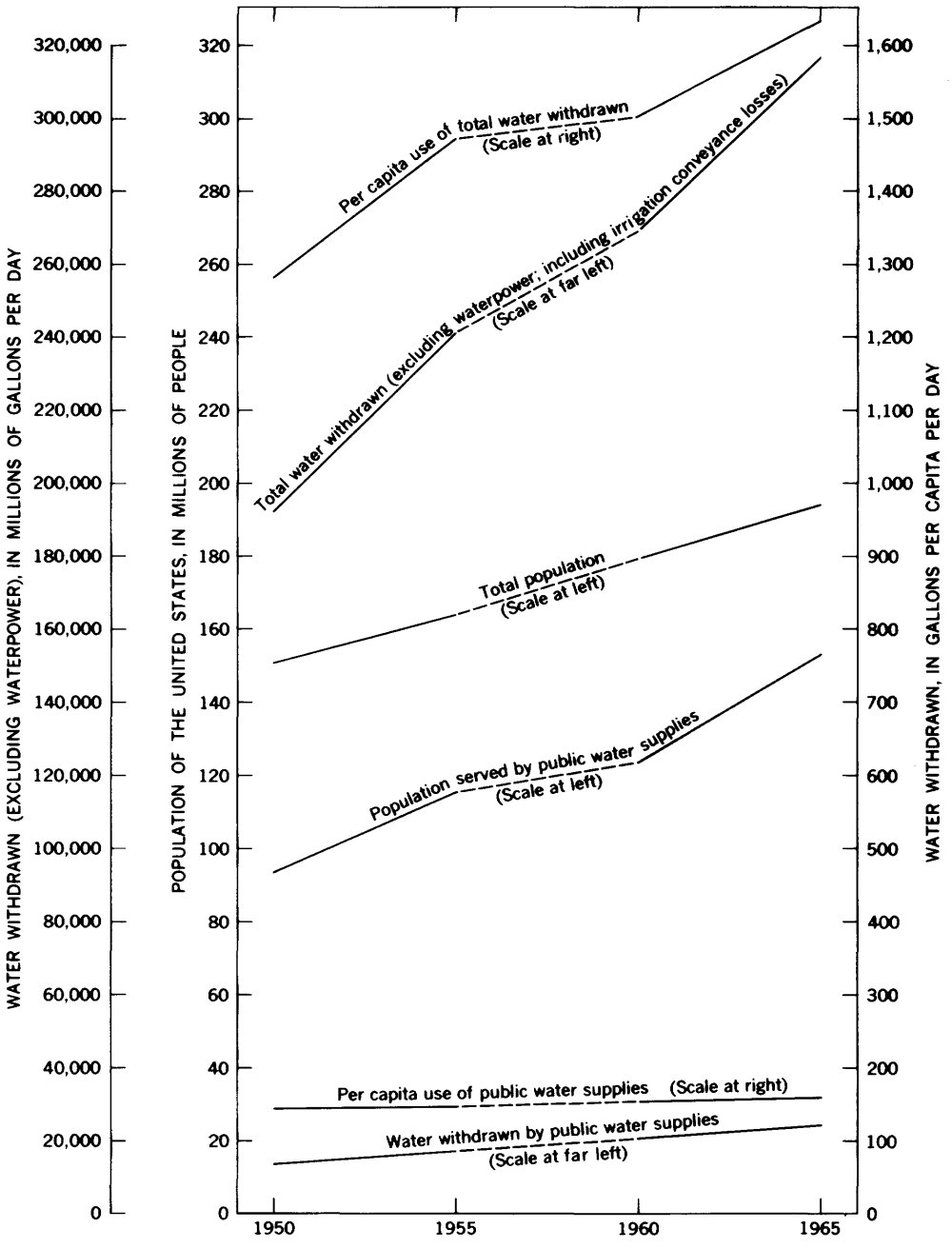

Figure 11.—Trends in population and withdrawals of water in the United States, 1950–65. Data for 1950 and 1955 do not include Alaska and Hawaii.
[Figure by J. C. Kammerer]

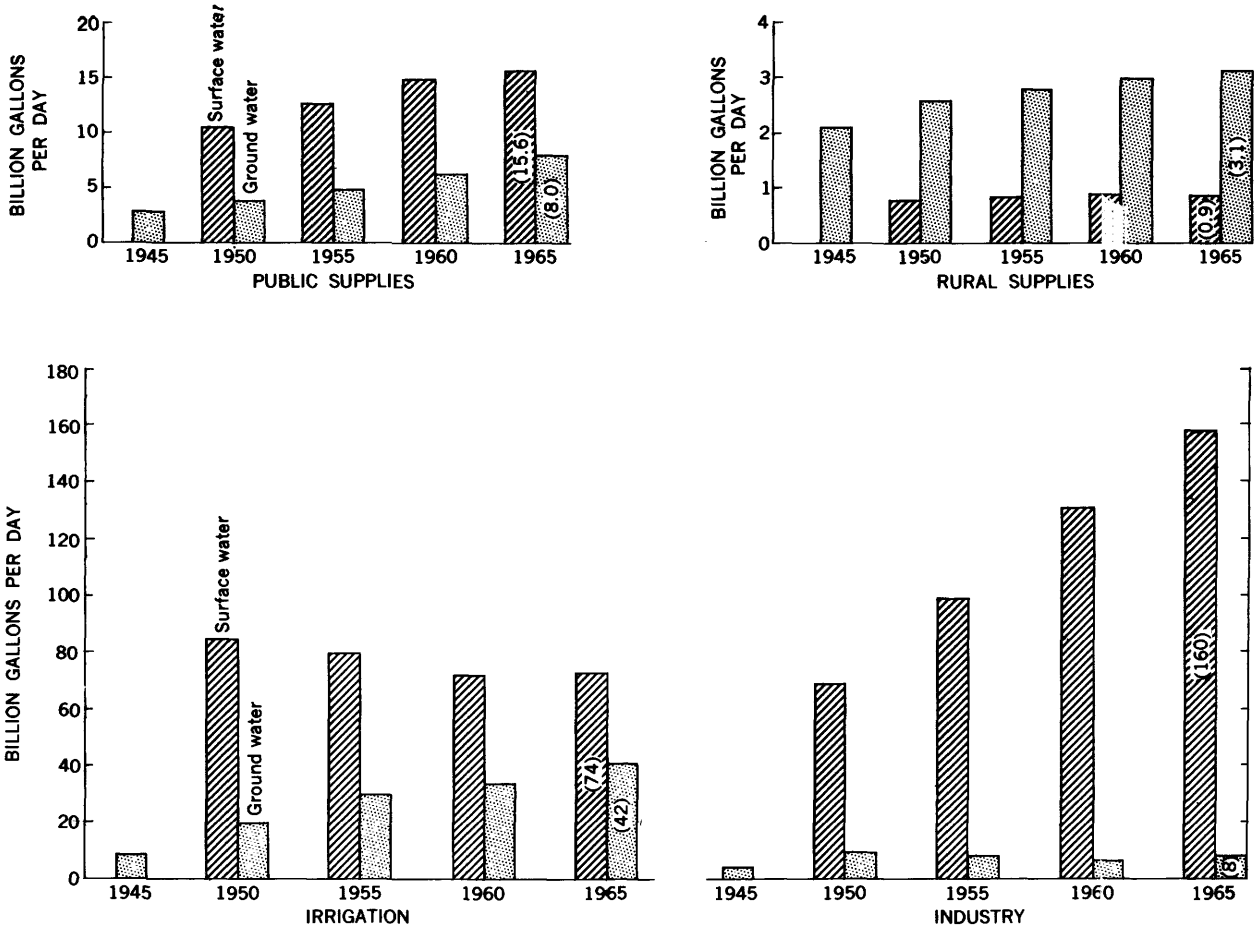

Figure 12.—Trends in use of water for public supplies, rural supplies, irrigation, and industry, 1945–65.

SUPPLY AND DEMAND

Based on water-use estimates from 1950 to 1965 and no major departure from trends, projections to 1980 were obtained. Withdrawal of water for rural domestic and stock purposes probably will show little change from 1965 to 1980; however, when irrigation is included, the total agricultural use is increasing about 1.5 percent annually. By 1980 the annual increase should drop to about 1 percent. Water use for public supplies is increasing about 2.8 percent per year at present but probably will drop to about 2 percent per year. The present annual increase in water withdrawals for industry is about 3.5 percent but probably will decrease to about 2.5 percent. The increase for off-channel use (total withdrawal use less hydroelectric power use) is about 3 percent per year but, by 1980, it probably will be about 2 percent.

Piper (1965) and Nace (1967) are among those who have discussed the factors involved in assessing the adequacy of supply for meeting demands at a particular time and place. The use of average values for supply and demand will support only generalized conclusions; however, this procedure has been necessary when data for detailed studies of water withdrawals in a short time and for a small area have been unavailable. Recently Anderson and Watson (1967) studied diurnal fluctuations of water use within homes in Louisville, Ky. Linaweaver and others (1967) investigated residential water use in 41 urban subdivisions within the United States and evaluated the factors affecting the quantities and times of withdrawals. Such water resources research studies make it possible to increase the accuracy of water-use estimates

In analyzing estimates of water withdrawals, an important consideration is that water may be used and the unconsumed part returned to a source and then withdrawn again. This process may be repeated many times in which case the sum of the withdrawals may become greater than the primary available supply. Chemical, physical, bacteriological, or thermal pollution may increase with each withdrawal, and the quality of residual water may become a more important factor than the quantity of water.

In table 31 general relationships between water supply, withdrawal, and consumption are shown by water-use regions. Additional relationships using different indices of available supply are shown in table 32. The average runoff

in the United States amounts to 1,200 bgd; however, because of irregularities from year to year in the amount of precipitation and the variation in runoff from month to month, only a part of this average quantity can be used. The annual flow which is exceeded in 90 percent of the years, and the daily flows which are available 50 or 90 percent of the time, can be determined statistically to give measures of the dependability of the supply. The regional values of average runoff and annual flow exceeded in 90 percent of the years shown in table 31 were obtained by adapting computations made by C. H. Hardison for the Water Resources Council (1968) to the regions shown. The dependable supply can be increased by various methods, such as constructing storage reservoirs, recharging ground water, and reducing evaporation and transpiration. Estimates of dependable supply on a regional basis for 1980 resulting from such measures given by Woodward (1957) have also been shown in table 31.

Figure 13 shows supply, withdrawal use, and consumptive use relationships for the conterminous United States. Similar comparisons are given for the 17 Western States in figure 14. Water withdrawals and consumption by composite (western and eastern-central) water-use regions are shown in table 30, and, by water-use regions, in table 32. The figures in tables 30 through 32 indicate that withdrawal use and consumptive use are approaching the dependable supply in the arid West, where irrigation withdraws and consumes large quantities of water; on the other hand, industry withdraws much water but consumes relatively little in the humid East (figs. 3–5). Although local shortages may be masked by averaging figures for whole areas or regions, some acute shortages can be detected in western areas from the regional figures given in tables 31 and 32. In the Colorado and Great Basin regions surface-water withdrawals amount to 70 and 55 percent, respectively, of the average runoff, and in the Upper Missouri, Upper Arkansas, Western Gulf, Colorado, Great Basin, and South Pacific regions, about 50 percent of the water withdrawn is consumed. Consumption may exceed the estimated average runoff in areas such as the High Plains of New Mexico and Texas (primarily Western Gulf water-use region) where ground water is withdrawn at rates exceeding recharge. Extraction of large quantities of ground water or repeated withdrawals of surface water occur in several of these regions with the result that total fresh water withdrawals exceed the estimated dependable supply as given by Woodward (1957).

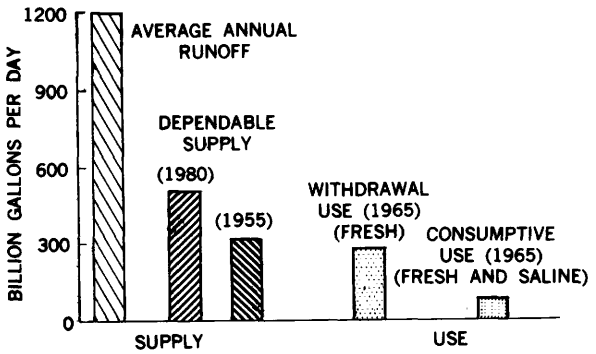

Figure 13.—Water supply and demand in the 48 conterminous States.

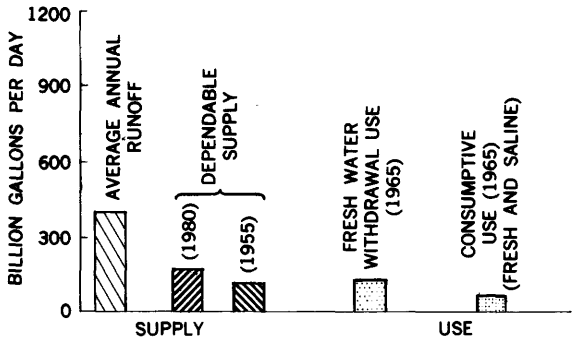

Figure 14.—Water supply and demand in the 17 Western States.

Because of rapidly expanding industrial development, both in thermoelectric power generation and other industries, net increases in industrial water withdrawals are likely to occur each year for the foreseeable future. Based on trends shown by the quinquennial water-use studies, it is estimated that yearly increases in industrial water use will be about 3.5 percent in the mid-sixties and gradually decline to about 2.5 percent by 1980.

Increases which take place in nonwithdrawal, onsite uses, such as evaporation from storage reservoirs, and the necessity in some areas of maintaining a minimal in-channel flow, will mean that the supply remaining for withdrawal uses will be less than in 1965. Therefore, even though the rate of annual increase in off-channel water uses may drop gradually from about 3 percent to 2 percent over the 25-year period from 1955 to 1980, improvement in water management methods, particularly in the critical regions, will be required to obtain maximum benefits from the available water resources. Increase in storage, reuse, interbasin transfers of water, and decrease in natural losses will become increasingly important methods of water management.

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Table 5.—*Water used for public supplies, by States, 1965*

[Partial figures may not add to totals because of independent rounding]

State	Population served			Water withdrawn				Water delivered				Water consumed (mgd)
								Industrial and commercial uses			Domestic use and losses[2] (mgd)	
	Ground water (thousands)	Surface water (thousands)	All water (thousands)	Ground water (mgd)	Surface water (mgd)	All water (mgd)	Per capita (gpd)	Air conditioning[1] (mgd)	Except air conditioning (mgd)	All uses (mgd)		
Alabama	823	1,220	2,040	100	180	280	137	11	83	94	190	65
Alaska	29	56	85	12	20	32	372	0	7.0	7.0	25	7.0
Arizona	1,160	358	1,520	170	53	220	148	11	22	33	190	110
Arkansas	533	587	1,120	54	73	130	113	.2	43	44	83	21
California	7,450	9,830	17,300	1,900	2,100	4,000	231	110	570	680	3,300	1,300
Colorado	309	1,420	1,730	60	300	360	211	9.5	70	80	280	88
Connecticut	204	1,960	2,160	44	260	300	140	7.4	130	130	170	91
Delaware	220	190	410	18	31	49	119	1.8	22	24	25	6.3
Florida	4,320	486	4,800	640	68	710	148	21	70	91	620	160
Georgia	789	1,620	2,410	98	280	380	153	14	120	140	240	54
Hawaii	660	45	705	100	8.0	110	156	.9	38	39	71	38
Idaho	384	103	487	94	23	120	240	1.4	56	58	59	6.9
Illinois	2,490	6,210	8,700	290	1,500	1,800	207	90	440	530	1,300	180
Indiana	1,430	1,770	3,200	180	270	440	139	44	200	240	200	110
Iowa	1,470	402	1,870	150	47	200	104	1.2	56	57	140	19
Kansas	1,030	615	1,640	140	140	280	173	3.4	100	100	180	110
Kentucky	248	1,270	1,520	22	180	200	135	12	110	120	86	20
Louisiana	1,250	1,490	2,740	120	240	360	130	0	69	69	290	180
Maine	153	599	752	17	76	93	124	1.0	32	33	60	19
Maryland	231	2,590	2,820	33	320	360	126	12	47	60	300	22
Massachusetts	1,130	3,470	4,600	160	510	670	146	13	270	280	390	35
Michigan	1,190	4,880	6,100	180	720	900	147	28	480	510	390	180
Minnesota	1,230	1,200	2,430	120	140	260	107	12	93	100	160	50
Mississippi	912	297	1,210	110	34	150	121	4.8	39	44	100	50
Missouri	771	2,620	3,390	67	410	480	142	25	210	240	240	90
Montana	151	321	472	29	71	100	212	4.8	22	27	73	45
Nebraska	682	377	1,060	110	66	180	166	4.0	76	80	96	11
Nevada	245	148	393	68	44	112	285	1.1	16	17	95	62

New Hampshire	242	321	563	25	45	70	124	1.2	19	20	50	3.5
New Jersey	2,700	3,470	6,160	270	460	730	119	59	160	220	510	230
New Mexico	760	119	879	92	19	110	127	1.1	13	14	97	53
New York	3,610	12,300	15,900	480	1,800	2,300	142	110	580	680	1,600	380
North Carolina	382	1,800	2,180	66	250	320	145	2.1	20	22	290	22
North Dakota	184	182	366	14	19	33	90	0	2.6	2.6	30	14
Ohio	2,350	5,620	7,970	270	860	1,100	142	0	500	500	640	110
Oklahoma	527	1,330	1,850	54	170	230	124	16	56	71	160	91
Oregon	305	1,100	1,400	62	200	260	187	1.0	110	110	150	58
Pennsylvania	1,350	8,130	9,480	130	1,300	1,400	146	32	670	700	690	140
Puerto Rico	318	2,060	2,370	19	120	140	59	2.1	1.7	3.8	140	21
Rhode Island	151	642	793	17	84	100	127	5.0	25	30	71	20
South Carolina	359	1,130	1,490	37	230	260	177	5.8	110	120	150	40
South Dakota	288	125	413	27	16	43	104	3.0	12	15	28	16
Tennessee	1,250	1,420	2,660	160	210	370	139	4.9	110	120	250	88
Texas	5,820	3,630	9,450	660	580	1,200	131	42	340	380	860	470
Utah	601	227	828	110	130	230	283	5.8	5.5	11	220	50
Vermont	39	213	252	5.1	25	30	120	.5	8.5	9.0	29	1.5
Virginia	341	2,080	2,420	50	240	290	121	16	120	130	160	32
Washington	990	1,470	2,460	250	590	840	341	2.5	440	440	400	130
West Virginia	292	844	1,140	27	85	110	98	.3	52	52	60	6.4
Wisconsin	1,360	1,470	2,830	180	270	440	157	22	180	200	240	44
Wyoming	129	110	239	24	27	51	214	1.2	8.2	9.4	42	24
District of Columbia.	0	802	802	0	150	150	182	6.9	53	60	86	15
United States[3]	55,800	96,700	152,600	8,070	15,900	23,600	155	780	7,000	7,800	16,000	5,200

[1]Zero quantities may indicate insufficient information for making an estimate.
[2]Includes public use.
[3]Including Puerto Rico.

Table 6.—*Water used for public supplies, by water-use regions, 1965*

[Partial figures may not add to total because of independent rounding]

Region	Population served			Water withdrawn				Water delivered				Water consumed (mgd)
								Industrial and commercial uses			Domestic use and losses[2] (mgd)	
	Ground water (thousands)	Surface water (thousands)	All water (thousands)	Ground water (mgd)	Surface water (mgd)	All water (mgd)	Per capita (gpd)	Air conditioning[1] (mgd)	Except air conditioning (mgd)	All uses (mgd)		
New England	1,870	6,810	8,680	260	950	1,200	139	28	460	480	720	160
Delaware-Hudson	6,370	16,800	23,200	740	2,300	3,100	132	180	840	1,000	2,100	590
Chesapeake	1,210	5,780	6,980	150	840	1,000	142	35	340	370	620	91
South Atlantic	5,080	5,220	10,300	750	780	1,500	148	45	330	380	1,100	260
Eastern Gulf	2,010	2,410	4,430	250	370	610	139	20	160	190	430	120
Tennessee-Cumberland	612	1,830	2,440	79	270	350	143	5.3	93	98	250	67
Ohio	4,320	8,510	12,800	500	1,200	1,700	132	52	720	770	940	210
Eastern Great Lakes-St. Lawrence	786	9,840	10,600	88	1,600	1,700	155	26	800	830	910	270
Western Great Lakes	2,490	8,190	10,700	320	1,800	2,100	196	110	700	810	1,300	250
Hudson Bay	167	197	364	15	21	35	97	.2	7.3	7.5	28	11
Upper Mississippi	5,050	4,110	9,160	570	580	1,200	131	51	380	430	770	170
Upper Missouri	1,990	2,330	4,320	290	480	770	178	20	230	250	520	210
Lower Missouri	590	1,170	1,760	50	150	200	113	7.9	83	91	110	34
Lower Mississippi	2,170	1,410	3,580	250	220	470	131	4.5	120	120	350	180
Upper Arkansas-Red	1,590	1,250	2,830	180	190	370	132	15	82	98	280	130
Lower Arkansas-Red-White	906	1,720	2,630	88	220	310	119	7.9	91	99	220	110
Western Gulf	6,390	3,480	9,870	740	560	1,300	131	39	340	380	920	510
Colorado	1,540	632	2,170	280	130	410	189	14	35	49	360	190

Great Basin	772	332	1,110	150	160	310	281	6.7	29	36	280	84
South Pacific	7,260	9,750	17,000	1,800	2,100	3,900	230	100	560	670	3,200	1,300
Pacific Northwest.	1,680	2,740	4,420	410	840	1,200	271	7.0	600	600	600	210
Hawaii	660	45	705	100	8.0	110	156	.9	38	39	71	38
Alaska	29	56	85	12	20	32	372	0	7.0	7.0	25	7.0
Puerto Rico	318	2,060	2,370	19	120	140	59	2.1	1.7	3.8	140	21
United States[3]	55,800	96,700	152,600	8,070	15,900	23,600	155	780	7,000	7,800	16,000	5,200

[1]Regional figures have not been compensated for those areas where insufficient information was available for estimating air conditioning use.
[2]Includes public use.
[3]Including Puerto Rico.

Table 7.—*Water used for public supplies, by Water Resources Council regions, 1965*

[Partial figures may not add to total because of independent rounding]

Water Resources Council region	Population served			Water withdrawn				Water delivered				Water consumed (mgd)
								Industrial and commercial uses			Domestic use and losses[2] (mgd)	
	Ground water (thousands)	Surface water (thousands)	All water (thousands)	Ground water (mgd)	Surface water (mgd)	All water (mgd)	Per capita (gpd)	Air conditioning[1] (mgd)	Except air conditioning (mgd)	All uses (mgd)		
North Atlantic	9,510	31,000	40,500	1,200	4,300	5,500	135	250	1,700	2,000	3,500	860
South Atlantic-Gulf	7,070	6,330	13,400	990	990	2,000	148	56	420	480	1,500	360
Great Lakes	3,230	17,700	21,000	400	3,400	3,800	181	140	1,500	1,600	2,200	520
Ohio	4,390	9,160	13,500	510	1,300	1,800	132	53	740	790	1,000	230
Tennessee	542	1,180	1,730	71	180	250	147	4.0	67	71	180	46
Upper Mississippi	5,050	4,110	9,160	570	580	1,200	131	51	380	430	770	160
Lower Mississippi	2,480	1,410	3,900	270	230	500	266	4.5	120	130	370	200
Souris-Red-Rainy	167	197	364	15	21	35	97	.2	7.3	7.5	28	11
Missouri	2,580	3,500	6,070	340	630	970	159	28	310	340	620	240
Arkansas-White-Red	2,670	2,970	5,640	310	420	730	129	25	180	200	520	260
Texas-Gulf	4,580	3,160	7,740	510	460	970	126	36	320	350	620	350
Rio Grande	1,330	322	1,650	160	94	250	154	.9	15	16	240	110
Upper Colorado	74	166	240	19	34	53	221	.8	3.9	4.7	48	14
Lower Colorado	1,390	392	1,780	230	66	290	163	12	25	37	260	150
Great Basin	622	323	945	110	160	270	284	5.5	23	29	240	69
Columbia-North Pacific	1,680	2,740	4,420	410	840	1,200	271	7.0	590	600	600	210
California	7,480	9,830	17,300	1,900	2,100	4,000	231	110	570	680	3,300	1,300
Alaska	29	56	85	12	20	32	372	0	7.0	7.0	25	7.0
Hawaii	660	45	705	100	8.0	110	156	.9	38	39	71	38
Puerto Rico	318	2,060	2,370	19	120	140	59	2.1	1.7	3.8	140	21
United States[3]	55,800	96,700	152,600	8,070	15,900	23,600	155	780	7,000	7,800	16,000	5,200

[1] Regional figures have not been compensated for those areas where insufficient information was available for estimating air conditioning use.

[2] Includes public use.

[3] Including Puerto Rico.

Table 8.—*Water for rural use, in million gallons per day, by States, 1965*

[Partial figures may not add to totals because of independent rounding]

State	Domestic use				Livestock use				Domestic and livestock uses			
	Withdrawn			Consumed	Withdrawn			Consumed	Withdrawn			Consumed
	Surface water	Ground water	All water		Surface water	Ground water	All water		Surface water	Ground water	All water	
Alabama	0	58	58	58	17	18	35	34	17	76	93	93
Alaska	1.5	5.8	7.3	.4	0	.2	.2	0	1.5	6.0	7.5	.4
Arizona	.5	4.6	5.2	5.1	5.0	8.9	14	14	5.5	14	19	19
Arkansas	0	31	31	31	16	13	29	29	16	44	60	60
California	9.0	79	88	50	48	34	82	44	57	110	170	94
Colorado	1.3	8.9	10	2.0	14	16	30	27	15	25	40	29
Connecticut	.9	45	46	46	.4	1.9	2.3	2.3	1.4	47	49	49
Delaware	0	5.2	5.2	.5	.2	2.0	2.2	1.0	.2	7.2	7.4	1.5
Florida	.1	120	120	79	8.2	12	21	18	8.2	95	100	83
Georgia	0	84	84	79	24	4.1	28	26	24	88	110	110
Hawaii	.3	.1	.4	.4	2.8	.5	3.3	3.0	3.1	.6	3.7	3.4
Idaho	1.1	19	20	4.9	11	9.8	21	18	12	29	41	23
Illinois	12	80	92	64	15	48	62	62	27	130	150	130
Indiana	12	82	94	66	15	26	41	40	27	110	130	110
Iowa	.3	41	41	7.0	20	130	150	150	21	170	190	160
Kansas	4.9	36	41	41	29	31	60	60	34	68	100	101
Kentucky	16	49	65	39	34	3.4	38	37	50	52	100	76
Louisiana	0	33	33	33	11	12	23	23	11	45	56	56
Maine	1.0	9.4	10	3.1	2.1	1.4	3.5	3.5	3.1	11	14	6.7
Maryland	0	33	33	33	.5	10	11	11	.5	43	44	44
Massachusetts	1.9	36	38	34	1.6	1.1	2.7	2.4	3.5	37	41	36
Michigan	0	100	100	21	5.3	21	27	21	5.3	120	130	42
Minnesota	0	49	49	49	7.3	61	69	62	7.3	110	120	110
Mississippi	0	40	40	36	22	15	37	37	22	54	77	72
Missouri	13	33	46	21	84	28	110	100	97	61	160	120

Table 8.—*Water for rural use, in million gallons per day, by States, 1965*—Continued

State	Domestic use				Livestock use				Domestic and livestock uses			
	Withdrawn			Consumed	Withdrawn			Consumed	Withdrawn			Consumed
	Surface water	Ground water	All water		Surface water	Ground water	All water		Surface water	Ground water	All water	
Montana	.3	10	10	10	15	18	34	33	15	28	44	44
Nebraska	0	22	22	22	6.2	68	74	73	6.2	90	96	96
Nevada	1.0	9.2	10	8.2	5.3	1.7	7.0	4.3	6.3	11	17	12
New Hampshire	.1	6.2	6.3	4.5	.9	.5	1.4	1.4	1.0	6.6	7.8	5.9
New Jersey	.4	36	36	11	1.1	1.9	3.0	2.1	1.5	38	39	13
New Mexico	.5	5.1	5.6	2.6	32	33	65	64	32	38	71	67
New York	0	130	130	13	12	22	33	30	12	150	160	43
North Carolina	0	230	230	230	8.8	41	50	47	8.8	270	280	280
North Dakota	.2	12	12	12	20	10	30	30	20	22	42	42
Ohio	21	84	100	94	14	24	38	37	35	110	140	130
Oklahoma	2.7	23	26	23	41	4.5	45	45	44	28	71	68
Oregon	3.8	35	39	35	19	.8	20	18	23	36	59	53
Pennsylvania	0	100	100	10	14	14	28	23	14	110	130	34
Puerto Rico	3.9	.7	4.6	4.1	5.3	.9	6.2	5.6	9.2	1.6	11	9.7
Rhode Island	1.0	3.9	4.8	1.4	.2	.2	.4	.3	1.2	4.1	5.1	1.8
South Carolina	0	43	43	43	4.6	3.7	8.3	8.2	4.6	47	52	51
South Dakota	2.7	11	14	14	33	54	87	86	36	65	100	100
Tennessee	0	48	48	48	21	9.1	30	30	21	57	78	78
Texas	0	51	51	51	42	76	120	120	42	130	170	170
Utah	.2	22	22	11	.9	28	29	15	1.1	50	51	26
Vermont	.4	7.0	7.4	6.6	2.7	2.7	5.4	4.9	3.1	9.7	13	12
Virginia	1.6	82	84	50	11	8.2	19	15	13	90	100	66
Washington	1.0	39	40	33	5.0	12	17	17	6.0	51	57	50
West Virginia	.6	28	28	28	6.6	.6	7.2	7.1	7.2	29	36	35
Wisconsin	0	82	82	8.2	14	59	72	72	14	140	160	80
Wyoming	.3	3.9	4.2	4.2	15	3.2	18	17	15	7.1	22	21
District of Columbia	0	0	0	0	0	0	0	0	0	0	0	0
United States[1]	120	2,200	2,300	1,600	740	1,000	1,700	1,600	860	3,200	4,000	3,200

[1]Including Puerto Rico.

Table 9.—*Water for rural use, in million gallons per day, by water-use regions, 1965*

[Partial figures may not add to totals because of independent rounding]

Region	Domestic use				Livestock use				Domestic and livestock uses			
	Withdrawn			Consumed	Withdrawn			Consumed	Withdrawn			Consumed
	Surface water	Ground water	All water		Surface water	Ground water	All water		Surface water	Ground water	All water	
New England	4.9	95	100	84	5.8	5.6	11	11	11	100	110	94
Delaware-Hudson	.6	150	150	30	6.9	12	19	13	7.5	160	170	43
Chesapeake	.6	120	120	58	16	25	41	38	17	140	160	95
South Atlantic	.6	420	420	370	32	56	87	80	32	440	470	440
Eastern Gulf	0	130	130	120	39	24	63	62	39	160	200	190
Tennessee-Cumberland	3.4	87	90	84	32	19	51	50	36	110	140	130
Ohio	38	220	260	180	69	51	120	120	110	270	380	290
Eastern Great Lakes St. Lawrence	9.5	130	140	58	12	22	34	32	22	150	170	90
Western Great Lakes	.4	140	140	45	12	38	50	45	12	180	190	90
Hudson Bay	.1	13	14	14	6.2	14	20	19	6.3	27	34	33
Upper Mississippi	16	190	200	100	56	260	310	300	72	450	520	400
Upper Missouri	5.1	72	77	72	96	170	270	260	100	240	350	340
Lower Missouri	7.2	22	30	13	64	35	99	91	71	57	130	100
Lower Mississippi	.9	57	58	52	21	18	39	38	22	75	96	90
Upper Arkansas-Red	3.2	35	38	34	44	33	77	76	47	68	120	110
Lower Arkansas-Red-White	2.9	61	64	59	49	24	73	71	52	85	140	130
Western Gulf	.3	51	52	49	70	98	170	170	70	150	220	210
Colorado	2.4	17	19	13	13	18	31	26	15	35	50	39
Great Basin	.1	27	28	17	13	25	37	21	14	52	66	38
South Pacific	8.8	76	85	48	45	32	78	42	54	110	160	90
Pacific Northwest	6.2	95	100	75	33	24	57	53	40	120	160	130
Hawaii	.3	.1	.4	.4	2.8	.5	3.3	3.0	3.1	.6	3.7	3.6
Alaska	1.5	5.9	7.3	.4	0	.2	.2	.1	1.5	6.1	7.6	.5
Puerto Rico and Virgin Islands	3.9	.7	4.6	4.1	5.3	.9	6.2	5.6	3.9	.9	4.8	4.1
United States[1]	120	2,200	2,300	1,600	740	1,000	1,700	1,600	860	3,200	4,000	3,200

[1]Including Puerto Rico.

Table 10.—*Water for rural use, in million gallons per day, by Water Resources Council regions, 1965*

[Partial figures may not add to totals because of independent rounding]

Water Resources Council region	Domestic use				Livestock use				Domestic and livestock uses			
	Withdrawn			Consumed	Withdrawn			Consumed	Withdrawn			Consumed
	Surface water	Ground water	All water		Surface water	Ground water	All water		Surface water	Ground water	All water	
North Atlantic	6.6	380	390	190	34	47	81	69	40	430	470	250
South Atlantic-Gulf	.3	540	540	490	68	79	150	140	68	620	680	630
Great Lakes	9.8	260	270	100	22	57	79	72	31	320	350	170
Ohio	41.	240	280	200	80	54	130	130	120	300	420	330
Tennessee	.3	64	64	61	21	16	37	36	21	80	100	97
Upper Mississippi	16	190	200	100	56	260	310	300	72	450	520	400
Lower Mississippi	.9	63	64	58	23	22	45	44	24	84	110	100
Souris-Red-Rainy	.1	13	14	14	6.2	14	20	19	6.4	27	34	33
Missouri	12	94	110	85	160	210	370	360	170	300	470	440
Arkansas-White-Red	6.1	98	100	96	93	60	150	150	100	160	260	250
Texas-Gulf	0	33	33	33	37	53	90	89	37	87	120	120
Rio Grande	.3	9.9	10	7.1	31	38	69	68	31	48	79	75
Upper Colorado	2.1	3.6	5.7	2.5	9.4	1.8	11	9.8	12	5.3	17	12
Lower Colorado	.1	9.5	9.6	5.4	3.2	16	19	16	3.3	26	29	24
Great Basin	.8	26	27	15	6.0	23	29	16	6.8	49	56	44
Columbia-North Pacific	6.2	95	100	75	35	24	59	55	42	120	160	130
California	9.0	81	90	51	50	34	84	45	59	110	170	96
Alaska	1.5	5.8	7.3	.4	0	.1	.2	0	1.5	6.0	7.5	.4
Hawaii	.3	.1	.4	.4	2.8	.5	3.3	3.0	3.1	.6	3.7	3.4
Puerto Rico	3.9	.7	4.5	4.1	5.3	.9	6.2	5.6	9.2	1.6	11	9.7
United States[1]	120	2,200	2,300	1,600	740	1,000	1,700	1,600	860	3,200	4,000	3,200

[1] Including Puerto Rico.

Table 11.—*Water used for irrigation, by States, 1965*

[Partial figures may not add to totals because of independent rounding]

State	Acres irrigated (1,000's of acres)	Total water withdrawn (1,000 ac-ft per year)				Conveyance loss (1,000 ac-ft/yr)	Consumptive use (1,000 ac-ft/yr)	Total water withdrawn (million gallons per day)				Conveyance loss (mgd)	Consumptive use (mgd)
		Surface water	Ground water	Other water	All water			Surface water	Ground water	Other water	All water		
Alabama	26	10	2.6	0	13	0	13	9.1	2.3	0	11	0	11
Alaska	.2	0	.1	0	.1	0	.1	0	.1	0	.1	0	.1
Arizona	1,200	2,200	4,300	63	6,600	1,300	3,300	2,000	3,900	56	5,900	1,200	2,900
Arkansas	1,300	240	1,100	0	1,300	91	910	210	950	0	1,200	81	810
California	8,500	16,000	12,000	440	28,000	5,600	17,000	14,000	11,000	400	25,000	5,000	15,000
Colorado	3,900	11,000	1,600	0	13,000	1,500	6,300	9,900	1,500	0	11,000	1,300	5,700
Connecticut	34	11	.6	0	11	0	11	9.5	.5	0	10	0	10
Delaware	14	1.2	2.8	0	4.0	0	4.0	1.1	2.5	0	3.6	0	3.6
Florida	1,200	2,200	1,300	0	3,500	600	1,500	2,000	1,200	0	3,200	540	1,300
Georgia	150	21	17	0	38	0	38	18	15	0	34	0	34
Hawaii	150	640	660	0	1,300	200	590	580	590	0	1,200	180	530
Idaho	3,500	15,000	3,100	0	18,000	5,100	6,100	13,000	2,800	0	16,000	4,500	5,400
Illinois	25	8.1	8.9	0	17	4.3	17	7.2	7.9	0	15	3.8	15
Indiana	25	6.0	4.0	0	10	0	10	5.4	3.6	0	9.0	0	9.0
Iowa	87	29	53	0	82	0	82	26	47	0	73	0	73
Kansas	1,200	320	2,200	0	2,500	340	2,200	280	2,000	0	2,300	310	1,900
Kentucky	30	7.7	2.0	.2	9.9	0	9.9	6.9	1.8	.2	8.9	0	8.9
Louisiana	580	810	760	0	1,600	280	1,000	730	680	0	1,400	250	890
Maine	7.0	2.8	0	0	2.8	0	2.8	2.5	0	0	2.5	0	2.5
Maryland	15	4.9	1.8	.1	6.8	0	6.8	4.4	1.6	.1	6.1	0	6.1
Massachusetts	24	1.2	9.6	1.2	12	0	12	1.1	8.6	1.1	11	0	11
Michigan	98	22	19	0	41	0	41	20	17	0	37	0	36
Minnesota	24	2.7	3.8	0	6.4	0	6.5	2.4	3.4	0	5.8	0	5.8
Mississippi	150	140	220	0	350	35	180	120	190	0	310	32	160
Missouri	76	5.5	86	0	92	0	74	4.9	77	0	82	0	66
Montana	2,200	7,100	0	0	7,100	1,400	5,000	3,300	0	0	6,300	1,300	4,400
Nebraska	3,100	2,200	1,800	0	4,000	750	2,900	1,900	1,600	0	3,600	670	2,600
Nevada	730	1,700	520	0	2,200	510	1,300	1,500	460	0	2,000	460	1,200
New Hampshire	5.2	2.0	.3	0	2.3	0	2.3	1.8	.3	0	2.1	0	2.1
New Jersey	100	14	46	0	60	0	59	12	41	0	54	0	53

Table 11.—*Water used for irrigation, by States, 1965*—Continued

State	Acres irrigated (1,000's of acres)	Total water withdrawn (1,000 ac-ft per year)				Conveyance loss (1,000 ac-ft/yr)	Consumptive use (1,000 ac-ft/yr)	Total water withdrawn (million gallons per day)				Conveyance loss (mgd)	Consumptive use (mgd)
		Surface water	Ground water	Other water	All water			Surface water	Ground water	Other water	All water		
New Mexico	1,000	1,700	1,400	25	3,100	410	1,600	1,500	1,200	22	2,700	370	1,500
New York	68	26	34	0	60	0	60	23	30	0	53	0	53
North Carolina	95	22	10	0	32	.1	32	20	9.1	0	29	.1	29
North Dakota	79	160	8.5	0	170	53	120	150	7.6	0	150	47	110
Ohio	26	8.9	3.8	0	13	0	12	7.9	3.4	0	11	0	11
Oklahoma	420	110	300	0	410	0	290	94	270	0	370	0	260
Oregon	1,700	5,300	510	3.2	5,800	1,700	2,500	4,700	450	2.9	5,200	1,500	2,200
Pennsylvania	23	7.1	.5	0	7.6	0	7.6	6.3	.4	0	6.7	0	6.7
Puerto Rico	96	180	100	0	280	28	250	160	93	0	250	25	230
Rhode Island	1.3	.6	.1	0	.7	0	.6	.5	.1	0	.6	0	.5
South Carolina	43	22	10	0	32	0	32	20	9.0	0	29	0	29
South Dakota	150	230	59	0	290	110	140	210	53	0	260	94	120
Tennessee	8.6	3.0	.4	0	3.5	0	3.5	2.7	.4	0	3.1	0	3.1
Texas	7,900	2,800	13,000	0	16,000	3,200	13,000	2,500	12,000	0	14,000	2,800	11,000
Utah	1,200	3,400	450	58.	3,900	780	2,600	3,100	400	52	3,500	700	2,400
Vermont	2.2	.8	0	0	.9	0	.9	.7	0	0	.7	0	.7
Virginia	54	20	10	0	30	0	29	18	9.1	0	27	0	26
Washington	1,200	5,200	320	0	5,500	1,300	2,500	4,600	290	0	4,900	1,200	2,200
West Virginia	2.5	1.4	.1	.1	1.5	0	1.5	1.2	.1	.1	1.4	0	1.4
Wisconsin	85	3.4	40	0	43	.7	33	3.0	36	0	39	.6	29
Wyoming	1,500	5,100	30	0	5,100	1,500	2,200	4,600	27	0	4,600	1,300	2,000
District of Columbia.	0	0	0	0	0	0	0	0	0	0	0	0	0
United States[1]	44,000	83,000	46,000	590	130,000	27,000	74,000	74,000	42,000	530	120,000	24,000	66,000

[1]Including Puerto Rico.

Table 12.—*Water used for irrigation, by water-use regions, 1965*

[Partial figures may not add to totals because of independent rounding]

Region	Acres irrigated (1,000's of acres)	Total water withdrawn (1,000 ac-ft per year)				Conveyance loss (1,000 ac-ft/yr)	Consumptive use (1,000 ac-ft/yr)	Total water withdrawn (million gallons per day)				Conveyance loss (mgd)	Consumptive use (mgd)
		Surface water	Ground water	Other water	All water			Surface water	Ground water	Other water	All water		
New England	72	18	11	1.2	29	0	29	16	9.5	1.1	26	0	26
Delaware-Hudson	160	24	81	0	110	0	100	22	72	0	94	0	94
Chesapeake	57	20	11	.1	32	0	31	18	10	.1	28	0	28
South Atlantic	1,400	2,200	1,400	0	3,600	600	1,500	2,000	1,200	0	3,200	540	1,400
Eastern Gulf	130	26	21	0	46	1.9	43	23	19	0	42	1.7	39
Tennessee-Cumberland.	26	9.2	1.1	0	10	0	10	8.2	1.0	0	9.2	0	9.2
Ohio	63	19	6.4	.3	26	.3	25	17	5.7	.3	23	.3	23
Eastern Great Lakes-St. Lawrence.	49	24	4.8	0	29	0	29	22	4.3	0	26	0	26
Western Great Lakes.	100	22	24	0	46	.4	43	20	21	0	41	.4	39
Hudson Bay	20	26	2.6	0	29	9.4	20	24	2.3	0	26	8.4	17
Upper Mississippi	160	28	67	0	96	4.3	86	25	60	0	85	3.8	77
Upper Missouri	8,300	15,000	3,000	0	18,000	3,700	11,000	13,000	2,700	0	16,000	3,300	9,800
Lower Missouri	53	15	36	0	51	.2	51	14	32	0	46	.2	45
Lower Mississippi	540	220	620	0	840	71	530	200	550	0	750	63	470
Upper Arkansas-Red.	3,000	2,300	4,200	0	6,400	890	4,600	2,000	3,700	0	5,700	790	4,100
Lower Arkansas-Red-White.	1,200	250	880	0	1,100	78	800	230	780	0	1,000	70	710
Western Gulf	8,600	6,300	14,000	25	20,000	3,700	15,000	5,600	13,000	23	18,000	3,300	13,000
Colorado	3,600	13,000	4,800	64	18,000	3,400	9,000	12,000	4,300	57	16,000	3,000	8,100
Great Basin	2,200	5,400	1,500	57	7,000	1,500	4,100	4,800	1,300	51	6,200	1,300	3,700
South Pacific	8,000	12,000	11,000	440	24,000	4,700	15,000	11,000	10,000	400	22,000	4,200	13,000
Pacific Northwest	6,100	25,000	3,700	3.3	29,000	7,900	11,000	22,000	3,300	2.9	26,000	7,000	10,000
Hawaii	150	640	660	0	1,300	200	590	580	590	0	1,200	180	530
Alaska	.2	0	.1	0	.1	0	.1	0	.1	0	.1	0	.1
Puerto Rico	96	180	100	0	280	28	250	160	93	0	250	25	230
United States[1]	44,000	83,000	46,000	590	130,000	27,000	74,000	74,000	42,000	530	120,000	24,000	66,000

[1]Including Puerto Rico.

Table 13.—*Water used for irrigation, by Water Resources Council regions, 1965*

[Partial figures may not add to totals because of independent rounding]

Water Resources Council region	Acres irrigated (1,000's of acres)	Total water withdrawn (1,000 ac-ft per year)				Conveyance loss (1,000 ac-ft/yr)	Consumptive use (1,000 ac-ft/yr)	Total water withdrawn (million gallons per day)				Conveyance loss (mgd)	Consumptive use (mgd)
		Surface water	Ground water	Other water	All water			Surface water	Ground water	Other water	All water		
North Atlantic	300	65	100	1.3	170	0	170	58	92	1.2	150	0	150
South Atlantic Gulf	1,600	2,300	1,400	0	3,700	600	1,600	2,000	1,200	0	3,300	540	1,400
Great Lakes	150	46	27	0	74	.4	71	41	24	0	66	.4	64
Ohio	67	20	6.6	.3	27	.3	27	18	5.9	.2	24	.3	24
Tennessee	22	7.9	.9	0	8.8	0	8.8	7.1	.8	0	7.9	0	7.9
Upper Mississippi	160	28	67	0	95	4.3	86	25	60	0	85	3.8	77
Lower Mississippi	990	960	1,200	0	2,200	330	1,400	860	1,100	0	2,000	300	1,200
Souris-Red-Rainy	20	26	2.6	0	29	9.4	19	23	2.3	0	26	8.4	17
Missouri	8,400	15,000	3,000	0	18,000	3,700	11,000	13,000	2,700	0	16,000	3,300	9,800
Arkansas-White-Red	6,200	2,500	9,000	0	12,000	1,800	8,600	2,200	8,000	0	10,000	1,600	7,700
Texas-Gulf	3,800	1,500	6,500	5.6	8,000	1,600	6,200	1,300	5,800	5.0	7,100	1,400	5,500
Rio Grande	2,300	4,200	3,000	20	7,200	1,100	4,400	3,700	2,700	18	6,400	950	3,900
Upper Colorado	1,700	7,200	15	0	7,200	1,000	3,600	6,400	14	0	6,400	930	3,200
Lower Colorado	1,200	2,300	4,400	64	6,800	1,400	3,500	2,100	4,000	57	6,100	1,200	3,100
Great Basin	1,800	4,300	1,000	57	5,400	1,100	3,400	3,900	890	51	4,800	1,000	3,000
Columbia-North Pacific	6,400	25,000	3,700	3.3	29,000	8,000	11,000	23,000	3,300	2.9	26,000	7,200	10,000
California	8,800	17,000	12,000	440	29,000	5,900	17,000	15,000	11,000	400	26,000	5,200	16,000
Alaska	.2	0	.1	0	.1	0	.1	0	.1	0	.1	0	.1
Hawaii	150	640	660	0	1,300	200	590	570	590	0	1,200	180	530
Puerto Rico	96	180	100	0	280	28	250	160	93	0	250	25	230
United States[1]	44,000	93,000	46,000	590	130,000	27,000	74,000	74,000	42,000	530	120,000	24,000	66,000

[1]Including Puerto Rico.

Table 14.—*Self-supplied industrial water,*

[Partial figures may not add to

State	Thermoelectric power (electric utility) use						
	Water withdrawn						Water consumed
	Ground water		Surface water		Ground and Surface water		
	Fresh	Saline	Fresh	Saline	Fresh	Saline	
Alabama	0	0	5,300	0	5,300	0	0
Alaska	1	0	1	1	2	1	0
Arizona	18	0	2	0	20	0	15
Arkansas	6	0	420	0	420	0	5
California	300	0	660	10,000	960	10,000	18
Colorado	1	0	150	0	150	0	9
Connecticut	0	0	370	1,200	370	1,200	1
Delaware	4	0	0	590	4	590	4
Florida	11	80	1,900	6,100	1,900	6,200	4
Georgia	0	0	1,500	280	1,500	280	0
Hawaii	31	21	41	500	72	520	0
Idaho	0	0	0	0	0	0	0
Illinois	8	0	13,000	0	13,000	0	4
Indiana	2	0	6,400	0	6,400	0	6
Iowa	2	0	1,500	0	1,500	0	21
Kansas	25	0	60	0	85	0	33
Kentucky	0	0	2,800	0	2,800	0	5
Louisiana	24	0	1,900	340	1,900	340	13
Maine	0	0	0	180	0	180	0
Maryland	0	0	510	1,700	510	1,700	0
Massachusetts	0	0	440	1,600	440	1,600	2
Michigan	0	0	5,800	0	5,800	0	4
Minnesota	0	0	1,300	0	1,300	0	2
Mississippi	56	0	120	300	180	300	11
Missouri	5	0	1,600	0	1,600	0	9
Montana	0	0	54	0	54	0	0
Nebraska	53	0	640	0	690	0	1
Nevada	1	0	27	0	28	0	0
New Hampshire	0	0	93	140	93	140	0
New Jersey	1	0	1,100	2,900	1,100	2,900	9
New Mexico	5	0	14	0	19	0	16
New York	3	0	4,700	5,700	4,700	5,700	10
North Carolina	0	0	2,900	32	2,900	32	1
North Dakota	1	0	83	0	84	0	2
Ohio	37	0	9,000	0	9,000	0	7
Oklahoma	4	0	510	6	510	6	17
Oregon	0	0	5	0	5	0	0
Pennsylvania	0	0	8,800	0	8,800	0	6
Puerto Rico	0	0	0	940	0	940	1
Rhode Island	0	0	0	300	0	300	0

in million gallons per day, by States, 1965

totals because of independent rounding]

Other uses								All industrial uses				
Water withdrawn							Water consumed	Water withdrawn				Water consumed
Ground water		Surface water		Sewage	All water			Fresh	Saline	Sewage	All water	
Fresh	Saline	Fresh	Saline		Fresh	Saline						
18	0	780	0	0	790	0	82	6,100	0	0	6,100	82
7.1	0.	95	0	0	100	0	3.8	100	1.0	0	100	3.8
99	0	17	0	0	120	0	37	140	0	0	140	52
180	0	130	0	0	310	0	160	730	0	0	730	160
480	140	52	540	.5	530	680	110	1,500	11,000	.5	13,000	120
49	6.3	120	8.0	0	170	14	29	320	14	0	340	38
17	0	60	190	0	78	190	6.1	440	1,400	0	1,900	7.1
27	0	23	470	0	51	470	1.2	55	1,100	0	1,100	5.2
730	.2	170	61	0	900	61	78	2,800	6,200	0	9,000	130
360	0	270	340	0	630	340	26	2,100	620	0	2,700	26
65	16	51	0	0	120	16	4.1	190	540	0	730	4.1
91	0	78	0	0	170	0	12	170	0	0	170	12
240	34	1,500	0	0	1,800	34	41	14,000	34	0	14,000	45
310	5.9	2,200	0	0	2,600	6.3	100	9,000	6.3	0	9,000	110
130	0	55	.4	0	180	.4	19	1,700	0	0	1,700	40
84	.4	26	0	0	110	.4	25	200	.4	0	200	58
78	.6	180	.3	0	260	.9	44	3,000	.9	0	3,000	48
340	51	2,200	0	0	2,600	51	500	4,500	400	0	4,900	520
16	0	440	37	0	460	37	29	460	220	0	680	29
40	0	450	820	130	620	820	130	1,100	2,500	130	3,800	130
77	0	380	140	0	460	140	30	890	1,700	0	2,600	32
110	14	1,800	0	0	1,900	14	54	7,700	14	0	7,700	58
270	0	1,100	0	0	1,400	0	110	2,700	0	0	2,700	110
180	0	71	0	0	250	0	36	430	300	0	730	47
160	5.8	150	0	0	310	5.8	30	1,900	5.8	0	1,900	39
24	0	92	0	0	120	0	18	170	0	0	170	18
35	0	7.8	0	0	42	0	1.3	730	0	0	730	2.3
25	2.7	28	0	1.2	52	2.7	28	80	2.7	1.2	84	28
10	0	160	0	0	170	0	9.0	260	140	0	410	9.0
230	9.0	460	830	0	690	840	170	1,800	3,700	0	5,500	180
73	0	9.1	0	0	82	0	55	100	0	0	100	71
160	15	1,600	1,400	0	1,800	1,400	130	6,500	7,100	0	14,000	140
70	0	270	0	0	340	0	33	3,300	32	0	3,300	34
3.1	6.7	3.3	0	0	6.4	6.7	3.2	90	6.7	0	97	5.2
390	0	4,200	0	0	4,600	0	140	14,000	0	0	14,000	150
24	46	27	11	0	51	57	22	560	63	0	620	39
160	0	950	0	0	1,100	0	48	1,100	0	0	1,100	48
350	0	4,500	50	0	4,900	50	200	14,000	50	0	14,000	210
38	1.7	140	130	0	180	140	9.8	180	1,100	0	1,300	11
24	.4	21	0	0	45	.4	4.4	45	300	0	340	4.8

Table 14.—*Self-supplied industrial water,*

State	Thermoelectric power (electric utility) use						
	Water withdrawn						Water consumed
	Ground water		Surface water		Ground and Surface water		
	Fresh	Saline	Fresh	Saline	Fresh	Saline	
South Carolina	0	0	1,000	120	1,000	120	2
South Dakota	0	0	1	0	1	0	1
Tennessee	0	0	3,300	0	3,300	0	1
Texas	520	0	2,900	1,400	3,400	1,400	160
Utah	0	0	140	0	140	0	3
Vermont	0	0	53	0	53	0	0
Virginia	0	0	2,900	1,200	2,900	1,200	8
Washington	0	0	0	0	0	0	0
West Virginia	0	0	2,700	0	2,700	0	1
Wisconsin	0	0	3,900	0	3,900	0	1
Wyoming	1	0	170	0	170	0	3
District of Columbia	0	0	200	0	200	0	0
United States [1]	1,100	100	91,000	36,000	92,000	36,000	410

[1] Including Puerto Rico.

in million gallons per day, by States 1965—Continued

Other uses								All industrial uses				
Water withdrawn							Water consumed	Water withdrawn				Water consumed
Ground water		Surface water		Sewage	All water			Fresh	Saline	Sewage	All water	
Fresh	Saline	Fresh	Saline		Fresh	Saline						
38	0	200	33	0	240	33	24	1,300	150	0	1,40	26
12	1.9	12	1.0	0	24	2.9	11	25	2.9	0	2	12
130	0	760	0	0	890	0	180	4,200	0	0	4,20	180
400	2.2	620	3,200	7.4	1,000	3,200	390	4,400	4,600	7.4	9,00	540
52	3.5	120	5.1	0	170	8.6	22	320	8.6	0	1,30	25
9.1	0	25	0	0	34	0	1.6	87	0	0	8	1.6
51	0	680	72	0	730	72	1.4	3,700	1,300	0	5,00	9.4
140	0	300	30	0	450	30	16	450	30	0	48	16
100	.4	2,000	0	0	2,100	.4	140	4,800	.4	0	4,80	140
89	0	260	0	0	350	0	8.6	4,200	0	0	4,20	9.6
40	.9	21	.1	0	61	1.0	8.4	240	1.0	0	24	11
.8	0	.6	0	0	1.4	0	.3	210	0	0	21	.3
6,800	360	30,000	8,400	140	37,000	8,800	3,400	130,000	45,000	140	170,00	,800

Table 15.—*Self-supplied industrial water,*

[Partial figures may not add to

Region	Thermoelectric power (electric utility) use						
	Water withdrawn						Water consumed
	Ground water		Surface water		Ground and Surface water		
	Fresh	Saline	Fresh	Saline	Fresh	Saline	
New England	0	0	870	3,400	870	3,400	3
Delaware-Hudson	8	0	6,700	9,100	6,700	9,100	25
Chesapeake	0	0	3,600	2,400	3,600	2,400	2
South Atlantic	10	80	7,100	7,200	7,100	7,300	7
Eastern Gulf	7	0	3,800	380	3,800	380	5
Tennessee-Cumberland	0	0	6,500	0	6,500	0	8
Ohio	40	0	19,000	0	20,000	0	17
Eastern Great Lakes-St. Lawrence	0	0	9,200	0	9,200	0	5
Western Great Lakes	0	0	11,000	0	11,000	0	6
Hudson Bay	1	0	64	0	65	0	1
Upper Mississippi	9	0	13,000	0	13,000	0	27
Upper Missouri	58	0	990	0	1,100	0	27
Lower Missouri	3	0	1,200	0	1,200	0	4
Lower Mississippi	71	0	1,600	340	1,700	340	19
Upper Arkansas-Red	31	0	540	0	570	0	28
Lower Arkansas-Red-White	6	0	1,200	6	1,200	6	20
Western Gulf	520	0	2,900	1,400	3,400	1,400	150
Colorado	20	0	88	0	110	0	33
Great Basin	0	0	170	0	170	0	2
South Pacific	300	0	660	10,000	960	10,000	18
Pacific Northwest	0	0	5	0	5	0	0
Hawaii	31	21	41	500	72	520	0
Alaska	1	0	1	1	2	1	0
Puerto Rico	0	0	0	940	0	940	1
United States[1]	1,100	100	91,000	36,000	92,000	36,000	410

[1]Including Puerto Rico.

in million gallons per day, by water-use regions, 1965
totals because of independent rounding]

Other uses								All industrial uses				
Water withdrawn							Water consumed	Water withdrawn				Water consumed
Ground water		Surface water		Sewage	All water			Fresh	Saline	Sewage	All water	
Fresh	Saline	Fresh	Saline		Fresh	Saline						
140	0.4	1,100	360	0	1,200	360	79	2,100	3,700	0	5,800	82
480	13	2,000	2,700	0	2,500	2,700	300	9,200	12,000	0	21,000	330
220	0	1,200	890	130	1,400	890	170	5,000	3,300	130	8,400	170
1,000	.2	890	380	0	1,900	380	120	9,000	7,500	0	16,000	170
300	0	1,100	55	0	1,400	55	140	5,200	430	0	5,600	150
55	0	1,100	0	0	1,100	0	180	7,700	0	0	7,700	190
880	26	7,600	.7	0	8,500	26	400	28,000	26	0	28,000	420
90	13	4,000	0	0	4,100	13	130	13,000	13	0	13,000	140
280	12	4,700	0	0	4,900	12	230	16,000	12	0	16,000	240
7.3	3.8	98	0	0	100	3.8	8.9	170	3.8	0	170	9.9
620	18	1,000	0	0	1,600	18	58	14,000	18	0	14,000	85
170	9.5	110	6.1	0	280	16	54	1,400	16	0	1,400	81
100	0	65	0	0	170	0	17	1,400	0	0	1,400	21
350	40	1,500	0	0	1,800	40	300	3,500	380	0	3,900	310
120	21	97	13	1.5	220	34	58	750	34	1.5	780	86
280	40	340	1.0	0	620	41	270	1,800	47	0	1,900	290
540	2.2	1,200	3,200	5.9	1,700	3,200	550	5,200	4,600	5.9	9,800	700
130	2.7	57	0	1.2	180	2.7	66	290	2.7	1.2	290	99
96	8.2	160	5.1	0	260	13	42	430	13	0	440	44
450	140	85	540	.5	540	680	100	1,500	11,000	.5	13,000	120
400	0	1,300	30	0	1,700	30	83	1,700	30	0	1,700	83
65	16	51	0	0	120	16	4.1	190	540	0	730	4.1
7.1	0	95	0	0	100	0	3.8	100	1.0	0	100	3.8
38	1.7	140	130	0	180	140	9.8	180	1,100	0	1,300	11
6,800	360	30,000	8,400	140	37,000	8,800	3,400	130,000	45,000	140	170,000	3,800

Table 16.—*Self-supplied industrial water,*

[Partial figures may not add to

Water Resources Council region	Thermoelectric power (electric utility) use						
	Water withdrawn						Water consumed
	Ground water		Surface water		Ground and Surface water		
	Fresh	Saline	Fresh	Saline	Fresh	Saline	
North Atlantic	8	0	13,000	15,000	13,000	15,000	31
South Atlantic-Gulf	17	80	9,200	6,800	6,800	6,900	11
Great Lakes	0	0	20,000	0	20,000	0	11
Ohio	40	0	20,000	0	20,000	0	17
Tennessee	0	0	5,900	0	5,900	0	8
Upper Mississippi	9	0	13,000	0	13,000	0	27
Lower Mississippi	76	0	1,800	340	1,900	340	20
Souris-Red-Rainy	1	0	64	0	65	0	1
Missouri	61	0	2,200	0	2,300	0	31
Arkansas-White-Red	42	0	1,700	6	1,800	6	54
Texas-Gulf	320	0	2,600	1,400	2,900	1,400	140
Rio Grande	190	0	170	0	360	0	11
Upper Colorado	0	0	120	0	120	0	18
Lower Colorado	19	0	2	0	21	0	15
Great Basin	0	0	170	0	170	0	2
Columbia-North Pacific	0	0	5	0	5	0	0
California	300	0	660	10,000	960	10,000	18
Alaska	1	0	1	1	2	1	0
Hawaii	31	21	41	500	72	520	0
Puerto Rico	0	0	0	940	0	940	1
United States[1]	1,100	100	91,000	36,000	92,000	36,000	410

[1]Including Puerto Rico.

in million gallons per day, by Water Resources Council regions, 1965

totals because of independent rounding]

Other uses								All industrial uses				
Water withdrawn							Water consumed	Water withdrawn				Water consumed
Ground water		Surface water		Sewage	All water			Fresh	Saline	Sewage	All water	
Fresh	Saline	Fresh	Saline		Fresh	Saline						
860	14	4,700	4,000	130	5,500	4,000	560	19,000	19,000	130	38,000	590
1,300	0.2	1,600	430	0	2,900	430	260	12,000	7,300	0	19,000	270
360	25	8,700	0.7	0	9,000	25	360	29,000	25	0	29,000	370
890	26	7,700	0.7	0	8,600	27	410	29,000	26	0	29,000	430
49	0	1,000	0	0	1,100	0	170	7,000	0	0	7,000	180
620	18	1,000	0	0	1,600	18	58	14,000	18	0	14,000	85
470	40	2,100	0	0	2,600	40	450	4,500	380	0	4,900	470
7.3	3.8	98	0	0	100	3.8	1.7	170	3.8	0	170	2.7
270	9.5	180	6.1	0	450	16	71	2,700	16	0	2,700	100
400	61	440	14	1.5	840	75	330	2,600	81	1.5	2,700	380
340	2.0	570	3,100	2.2	910	3,100	350	3,800	4,500	2.2	8,300	490
75	0.2	7.9	130	3.7	83	130	46	440	130	3.7	580	57
8.1	1.7	30	0	0	38	1.7	7.9	160	1.7	0	170	26
110	0	27	0	1.2	140	0	51	160	0	1.2	160	66
65	6.2	140	5.1	0	200	11	36	370	11	0	390	38
400	0	1,400	30	0	1,800	30	83	1,800	30	0	1,800	83
480	140	85	540	.5	570	680	110	1,500	11,000	.5	13,000	130
7.1	0	95	0	0	100	0	3.8	100	1.0	0	100	3.8
65	16	51	0	0	120	16	4.1	190	540	0	730	4.1
38	1.7	140	130	0	180	130	9.8	180	1,100	0	1,300	11
6,800	360	30,000	8,400	140	37,000	8,800	3,400	130,000	45,000	140	170,000	3,800

Table 17.—*Water used for electric utility generation of thermoelectric power, in million gallons per day, by States, 1965*

[Partial figures may not add to totals because of independent rounding]

State	Condenser cooling						Other uses					Water consumed
	Self-supplied				Public supplies	Self-supplied and public supplies	Self-supplied			Public supplies	Self-supplied and public supplies	
	Surface water		Ground water				Surface water		Ground water fresh			
	Fresh	Saline	Fresh	Saline			Fresh	Saline				
Alabama	5,100	0	0	0	0	5,100	210	0	0	0	210	0
Alaska	1	1	1	0	0	3	0	0	0	0	0	0
Arizona	2	0	17	0	0	19	0	0	1	0	1	15
Arkansas	420	0	5	0	0	420	0	0	1	0	1	5
California	660	10,000	300	0	130	12,000	0	0	0	10	10	18
Colorado	150	0	0	0	31	180	0	0	0	0	0	9
Connecticut	360	1,200	0	0	0	1,600	4	0	0	2	6	1
Delaware	0	550	0	80	0	550	0	41	4	0	45	4
Florida	1,900	6,100	10	0	10	8,100	0	0	1	1	2	4
Georgia	1,500	280	0	21	0	1,700	0	0	0	0	0	0
Hawaii	41	500	31	0	0	600	0	0	0	0	0	0
Idaho	0	0	0	0	0	0	0	0	0	0	0	0
Illinois	13,000	0	0	0	1	13,000	320	0	8	2	320	4
Indiana	6,100	0	2	0	26	6,100	0	0	0	1	320	6
Iowa	1,500	0	2	0	1	1,500	25	0	0	3	28	21
Kansas	60	0	25	0	0	85	0	0	0	0	0	33
Kentucky	2,600	0	0	0	0	2,600	130	0	0	0	130	5
Louisiana	1,900	340	1	0	0	2,200	0	0	23	2	25	13
Maine	0	180	0	0	0	180	1	0	0	1	2	0
Maryland	500	1,700	0	0	0	2,200	12	3	0	1	16	0
Massachusetts	410	1,600	0	0	0	2,000	22	0	0	2	24	2
Michigan	5,600	0	0	0	0	5,600	190	0	0	3	200	4
Minnesota	1,300	0	0	0	0	1,300	3	0	0	0	3	2
Mississippi	120	300	56	0	0	480	0	0	0	0	0	11
Missouri	1,600	0	3	0	2	1,600	2	0	2	1	7	9
Montana	54	0	0	0	0	54	0	0	0	0	0	0
Nebraska	640	0	53	0	0	690	0	0	0	0	0	1

Nevada	27	0	1	0	1	29	1	0	0	0	0	0
New Hampshire	93	140	0	0	0	240	0	0	0	0	0	0
New Jersey	1,100	2,900	0	0	0	4,000	10	0	1	4	15	9
New Mexico	14	0	5	0	0	19	0	0	0	0	0	16
New York	3,800	5,400	0	0	0	9,200	930	327	3	12	1,300	10
North Carolina	2,900	32	0	0	0	3,000	20	0	0	0	20	1
North Dakota	82	0	1	0	0	83	1	0	0	0	1	2
Ohio	8,600	0	37	0	0	8,700	360	0	0	1	360	7
Oklahoma	510	6	2	0	3	520	0	0	2	0	2	17
Oregon	5	0	0	0	0	5	0	0	0	0	0	0
Pennsylvania	8,600	0	0	0	1	8,600	190	0	0	5	190	6
Puerto Rico	0	940	0	0	0	940	0	0	0	1	1	1
Rhode Island	0	300	0	0	0	300	0	0	0	1	1	0
South Carolina	1,000	120	0	0	0	1,100	8	0	0	0	8	2
South Dakota	1	0	0	0	0	1	0	0	0	0	0	1
Tennessee	3,100	0	0	0	0	3,100	210	0	0	1	210	1
Texas	2,800	1,400	510	0	6	4,700	61	0	10	2	73	150
Utah	140	0	0	0	0	140	3	0	0	1	4	3
Vermont	53	0	0	0	0	53	0	0	0	0	0	0
Virginia	2,900	1,200	0	0	0	4,100	71	0	0	1	72	8
Washington	0	0	0	0	0	0	0	0	0	0	0	0
West Virginia	2,600	0	0	0	0	2,600	66	0	0	0	66	1
Wisconsin	3,800	0	0	0	0	3,800	110	0	0	1	110	1
Wyoming	170	0	1	0	0	180	0	0	0	0	0	3
District of Columbia	190	0	0	0	0	190	12	0	0	0	12	0
United States[1]	88,000	35,000	1,100	100	210	125,000	3,300	370	57	59	3,800	410

[1]Including Puerto Rico.

Table 18.—*Water used for electric utility generation of thermoelectric power, in million gallons per day, by water-use regions, 1965*

[Partial figures may not add to totals because of independent rounding]

Region	Condenser cooling						Other uses					Water consumed
	Self-supplied				Public supplies	Self-supplied and public supplies	Self-supplied			Public supplies	Self-supplied and public supplies	
	Surface water		Ground water				Surface water		Ground water fresh			
	Fresh	Saline	Fresh	Saline			Fresh	Saline				
New England	870	3,400	0	0	0	4,200	27	0	0	6	33	3
Delaware-Hudson	5,700	8,700	0	0	0	14,000	950	360	8	17	1,300	25
Chesapeake	3,400	2,400	0	0	0	5,800	110	12	0	3	120	2
South Atlantic	7,000	7,200	9	80	2	14,000	48	0	1	2	54	7
Eastern Gulf	3,800	380	7	0	8	4,200	2	0	0	0	2	5
Tennessee-Cumberland	6,100	0	0	0	0	6,100	420	0	0	0	420	8
Ohio	19,000	0	39	0	21	19,000	670	0	1	2	680	17
Eastern Great Lakes-St. Lawrence	8,900	0	0	0	0	8,900	330	0	0	4	330	5
Western Great Lakes	11,000	0	0	0	6	11,000	430	0	0	3	440	6
Hudson Bay	64	0	1	0	0	65	0	0	0	0	0	1
Upper Mississippi	13,000	0	2	0	2	13,000	230	0	7	4	240	27
Upper Missouri	990	0	58	0	30	1,100	1	0	0	0	1	26
Lower Missouri	1,200	0	2	0	0	1,200	6	0	2	1	9	4
Lower Mississippi	1,600	340	51	0	1	2,000	0	0	21	3	24	19
Upper Arkansas-Red	540	0	29	0	5	540	0	0	2	0	2	28
Lower Arkansas-Red-White	1,200	6	5	0	0	1,200	0	0	1	0	1	20
Western Gulf	2,900	1,400	510	0	5	4,700	61	0	13	2	76	154
Colorado	88	0	19	0	1	110	0	0	1	0	1	33
Great Basin	170	0	0	0	0	170	3	0	0	1	4	2
South Pacific	660	10,000	300	0	130	12,000	0	0	0	10	10	18
Pacific Northwest	5	0	0	0	0	5	0	0	0	0	0	0
Hawaii	41	500	31	21	0	600	0	0	0	0	0	0
Alaska	1	1	1	0	0	3	0	0	0	0	0	0
Puerto Rico	0	940	0	0	0	940	0	0	0	1	1	1
United States[1]	88,000	35,000	1,100	100	210	125,000	3,300	370	57	59	3,800	410

[1] Including Puerto Rico.

Table 19.—*Water used for electric utility generation of thermoelectric power, in million gallons per day, by Water Resources Council regions, 1965*

[Partial figures may not add to totals because of independent rounding]

Water Resources Council region	Condenser cooling						Other uses					Water consumed
	Self-supplied				Public supplies	Self-supplied and public supplies	Self supplied			Public supplies	Self-supplied and public supplies	
	Surface water		Ground water				Surface water		Ground water fresh			
	Fresh	Saline	Fresh	Saline			Fresh	Saline				
North Atlantic	12,000	15,000	0	0	0	27,000	1,100	370	8	27	1,500	31
South Atlantic-Gulf	9,200	6,800	16	80	10	16,000	31	0	1	1	33	11
Great Lakes	20,000	0	0	0	6	20,000	760	0	0	7	770	11
Ohio	19,000	0	39	0	21	19,000	710	0	1	2	720	17
Tennessee	5,600	0	0	0	0	5,600	390	0	0	0	390	8
Upper Mississippi	13,000	0	2	0	2	13,000	230	0	7	4	240	27
Lower Mississippi	1,800	340	52	0	2	2,200	0	0	24	3	27	20
Souris-Red-Rainy	64	0	1	0	0	65	0	0	0	0	0	1
Missouri	2,200	0	60	0	30	2,300	7	0	2	1	10	30
Arkansas-White-Red	1,700	6	41	0	5	1,800	0	0	3	0	3	54
Texas-Gulf	2,500	1,400	310	0	3	4,200	61	0	7	2	70	140
Rio Grande	170	0	190	0	1	360	0	0	3	0	3	11
Upper Colorado	80	0	0	0	0	80	0	0	0	0	0	18
Lower Colorado	2	0	18	0	1	21	0	0	1	0	0	15
Great Basin	170	0	0	0	0	170	3	0	0	1	4	2
Columbia-North Pacific	5	0	0	0	0	5	0	0	0	0	0	0
California	660	10,000	300	0	130	12,000	0	0	0	10	10	18
Alaska	1	1	1	0	0	3	0	0	0	0	0	0
Hawaii	41	500	31	21	0	600	0	0	0	0	0	0
Puerto Rico	0	940	0	0	0	940	0	0	0	1	1	1
United States[1]	88,000	35,000	1,100	100	210	125,000	3,300	370	57	59	3,800	410

[1] Including Puerto Rico.

Table 20.—*Water withdrawn for air conditioning, in million gallons per day, by States, 1965*

[Partial figures may not add to totals because of independent rounding. Zero quantities may indicate insufficient information for making an estimate]

State	Self-supplied industrial	Public supplies	All water	State	Self-supplied industrial	Public supplies	All water
Alabama	12	11	23	Nevada	1.2	1.1	2.3
Alaska	.6	0	.6	New Hampshire	8.0	1.2	9.2
Arizona	9.3	11	20	New Jersey	180	59	240
Arkansas	2.4	.2	2.6	New Mexico	.4	1.1	1.5
California	59	110	170	New York	64	110	170
Colorado	16	9.5	26	North Carolina	11	2.1	13
Connecticut	5.0	7.4	12	North Dakota	0	0	0
Delaware	.1	1.8	1.9	Ohio	.4	0	.4
Florida	28	21	49	Oklahoma	2.4	16	18
Georgia	3.2	14	17	Oregon	34	1.0	35
Hawaii	1.0	.9	1.9	Pennsylvania	160	32	190
Idaho	.3	1.4	1.7	Puerto Rico	.6	2.1	2.7
Illinois	3.7	90	94	Rhode Island	4.4	5.0	9.4
Indiana	28	44	72	South Carolina	7.3	5.8	13
Iowa	.1	1.2	1.3	South Dakota	0	3.0	3.0
Kansas	3.3	3.4	6.7	Tennessee	44	4.9	49
Kentucky	22	12	34	Texas	150	42	190
Louisiana	12	0	12	Utah	4.8	5.8	11
Maine	.1	1.0	1.1	Vermont	1.7	.5	2.2
Maryland	26	12	38	Virginia	.3	16	16
Massachusetts	23	13	36	Washington	4.7	2.5	7.2
Michigan	6.9	28	35	West Virginia	.7	.3	1.0
Minnesota	20	12	32	Wisconsin	16	22	38
Mississippi	12	4.8	17	Wyoming	0	1.2	1.2
Missouri	5.8	25	31	District of Columbia	0	6.9	6.9
Montana	0	4.8	4.8				
Nebraska	1.0	4.0	5.0	United States[1]	1,000	780	1,800

[1]Including Puerto Rico.

Table 21.—*Water withdrawn for air conditioning, in million gallons per day, by water-use regions, 1965*

[Partial figures may not add to totals because of independent roundings. Regional figures have not been compensated for those areas where insufficient information was available for estimating air conditioning use]

Region	Self-supplied industrial	Public supplies	All water	Region	Self-supplied industrial	Public supplies	All water
New England	40	27	67	Lower Mississippi	22	4.5	26
Delaware-Hudson	270	180	450	Upper Arkansas-Red	19	15	34
Chesapeake	48	35	83	Lower Arkansas-Red-White	13	7.9	21
South Atlantic	40	45	85	Western Gulf	120	39	160
Eastern Gulf	24	20	44				
Tennessee-Cumberland	48	5.3	53	Colorado	11	14	25
Ohio	140	52	190	Great Basin	6.7	6.7	13
Eastern Great Lakes-St. Lawrence	20	26	46	South Pacific	58	100	160
Western Great Lakes	26	110	140	Pacific Northwest	39	7.0	46
Hudson Bay	2.0	.2	2.2	Hawaii	1.0	.9	1.9
				Alaska	.6	0	.6
Upper Mississippi	27	51	78	Puerto Rico	.6	2.1	2.7
Upper Missouri	15	20	35				
Lower Missouri	3.3	7.9	11	United States[1]	1,000	780	1,800

[1]Including Puerto Rico.

Table 22.—*Water withdrawn for air conditioning, in million gallons per day, by Water Resources Council regions, 1965*

[Partial figures may not add to totals because of independent roundings. Regional figures have not been compensated for those areas where insufficient information was available for estimating air conditioning use]

Water Resources Council region	Self supplied industrial	Public supplies	All water	Water Resources Council region	Self supplied industrial	Public supplies	All water
North Atlantic	360	250	610	Upper Colorado	1.1	0.8	1.9
South Atlantic-Gulf	63	56	120	Lower Colorado	9.7	12	22
Great Lakes	45	140	180	Great Basin	5.3	5.5	11
Ohio	140	53	190				
Tennessee	45	4.0	49	Columbia-North Pacific	39	7.0	46
Upper Mississippi	27	51	78	California	59	110	170
Lower Mississippi	22	4.5	26				
Souris-Red-Rainy	2.0	.2	2.2	Alaska	.6	0	.6
Missouri	18	28	46	Hawaii	1.0	.9	1.9
Arkansas-White Red	32	25	57	Puerto Rico	.6	2.1	2.7
Texas-Gulf	120	36	160	United States[1]	1,000	780	1,800
Rio Grande	1.2	.9	2.1				

[1]Including Puerto Rico.

Table 23.—*Water used for hydroelectric power, by States, 1965*

State	Mgd	1,000's of acre-ft per year	State	Mgd	1,000's of acre-ft per year
Alabama	130,000	150,000	Nevada	4,400	4,900
Alaska	750	840	New Hampshire	24,000	27,000
Arizona	22,000	24,000	New Jersey	1,200	1,400
Arkansas	11,000	12,000	New Mexico	300	340
California	100,000	110,000	New York	210,000	230,000
Colorado	3,100	3,400	North Carolina	56,000	63,000
Connecticut	3,900	4,400	North Dakota	18,000	20,000
Delaware	0	0	Ohio	520	590
Florida	12,000	13,000	Oklahoma	11,000	12,000
Georgia	43,000	49,000	Oregon	210,000	240,000
Hawaii	360	410	Pennsylvania	33,000	38,000
Idaho	86,000	97,000	Puerto Rico	510	580
Illinois	13,000	14,000	Rhode Island	45	50
Indiana	4,100	4,600	South Carolina	60,000	67,000
Iowa	95,000	110,000	South Dakota	28,000	31,000
Kansas	990	1,100	Tennessee	140,000	160,000
Kentucky	49,000	55,000	Texas	11,000	12,000
Louisiana	0	0	Utah	4,100	4,600
Maine	61,000	69,000	Vermont	15,000	16,000
Maryland	16,000	18,000	Virginia	21,000	24,000
Massachusetts	16,000	18,000	Washington	470,000	530,000
Michigan	67,000	75,000	West Virginia	19,000	22,000
Minnesota	30,000	34,000	Wisconsin	88,000	99,000
Mississippi	0	0	Wyoming	5,900	6,600
Missouri	9,000	10,000	District of Columbia	26	29
Montana	75,000	84,000			
Nebraska	21,000	24,000	United States[1]	2,300,000	2,600,000

[1]Including Puerto Rico.

Table 24.—*Water used for hydroelectric power, by water-use regions, 1965*

Region	Mgd	1,000's of acre-ft per year	Region	Mgd	1,000's of acre-ft per year
New England	110,000	130,000	Lower Mississippi	0	0
Delaware-Hudson	34,000	38,000	Upper Arkansas-Red	1,800	2,000
Chesapeake	53,000	59,000	Lower Arkansas-Red-White	26,000	29,000
South Atlantic	130,000	150,000	Western Gulf	9,500	11,000
Eastern Gulf	81,000	91,000			
Tennessee-Cumberland	280,000	310,000	Colorado	57,000	64,000
Ohio	39,000	44,000	Great Basin	8,400	9,400
Eastern Great Lakes-St. Lawrence	180,000	200,000	South Pacific	69,000	77,000
Western Great Lakes	96,000	110,000	Pacific Northwest	800,000	900,000
Hudson Bay	2,700	3,000	Hawaii	360	410
Upper Mississippi	200,000	220,000	Alaska	750	840
			Puerto Rico	510	580
Upper Missouri	110,000	130,000			
Lower Missouri	6,900	7,800	United States[1]	2,300,000	2,600,000

[1]Including Puerto Rico.

Table 25.—*Water used for hydroelectric power, by Water Resources Council regions, 1965*

Water Resources Council region	Mgd	1,000's of acre-ft per year	Water Resources Council region	Mgd	1,000's of acre-ft per year
North Atlantic	230,000	260,000	Rio Grande	1,600	1,800
South Atlantic-Gulf	210,000	230,000	Upper Colorado	3,100	3,500
Great Lakes	260,000	290,000	Lower Colorado	25,000	28,000
Ohio	67,000	74,000	Great Basin	4,900	5,500
Tennessee	250,000	280,000	Columbia-North Pacific	800,000	900,000
Upper Mississippi	200,000	220,000	California	100,000	110,000
Lower Mississippi	0	0			
Souris-Red-Rainy	2,700	3,000	Alaska	750	840
			Hawaii	360	410
Missouri	120,000	130,000	Puerto Rico	510	570
Arkansas-White-Red	28,000	31,000			
Texas-Gulf	7,900	8,800	United States[1]	2,300,000	2,600,000

[1]Including Puerto Rico.

Table 26.—*Summary of water withdrawn except for hydroelectric power, in million gallons per day, by States, 1965*

[Partial figures may not add to totals because of independent rounding]

State	Population 1,000's	Per capita use (gpd)	Water withdrawn											Water consumed
			Including irrigation conveyance losses										Excluding conveyance losses	
			Ground water			Surface water			Sewage	All sources				
			Fresh	Saline	Fresh and saline	Fresh	Saline	Fresh and saline		Fresh	Saline	Fresh and saline		
Alabama	3,486	1,900	200	0	200	6,300	0	6,300	0	6,500	0	6,500	6,500	250
Alaska	267	540	26	0	26	120	1.0	120	0	140	1.0	140	140	11
Arizona	1,575	4,000	4,200	0	4,200	2,100	0	2,100	56	6,300	0	6,300	5,100	3,100
Arkansas	1,941	1,100	1,200	0	1,200	850	0	850	0	2,100	0	2,100	2,000	1,100
California	18,403	2,300	14,000	140	14,000	17,000	11,000	28,000	400	31,000	11,000	42,000	37,000	17,000
Colorado	1,986	6,000	1,600	6.3	1,600	10,000	8.0	10,000	0	12,000	14	12,000	11,000	5,800
Connecticut	2,832	790	110	0	110	700	1,400	2,100	0	810	1,400	2,200	2,200	160
Delaware	503	2,300	59	0	59	55	1,100	1,100	0	110	1,100	1,200	1,200	17
Florida	5,796	2,300	2,700	80	2,800	4,100	6,100	10,000	0	6,800	6,200	13,000	13,000	1,600
Georgia	4,391	730	560	0	560	2,000	620	2,700	0	2,600	620	3,200	3,200	220
Hawaii	710	2,800	780	37	820	670	500	1,200	0	1,500	540	2,000	1,800	570
Idaho	693	23,000	3,000	0	3,000	13,000	0	13,000	0	16,000	0	16,000	12,000	5,500
Illinois	10,641	1,600	670	34	700	16,000	0	16,000	0	16,000	34	17,000	17,000	370
Indiana	4,893	2,000	600	5.9	610	9,000	0	9,000	0	9,600	5.9	9,600	9,600	330
Iowa	2,758	770	500	0	500	1,600	0	1,600	0	2,100	0	2,100	2,100	290
Kansas	2,248	1,600	2,300	.4	2,300	550	0	550	0	2,800	0	2,800	2,500	2,200
Kentucky	3,173	1,000	150	.6	150	3,200	.3	3,200	.2	3,300	.9	3,300	3,300	150
Louisiana	3,560	1,900	1,200	51	1,300	5,100	340	5,400	0	6,300	400	6,700	6,400	1,600
Maine	986	800	44	0	44	520	220	740	0	570	220	780	780	57
Maryland	3,534	1,200	120	0	120	1,300	2,500	3,800	130	1,500	2,500	4,100	4,100	200
Massachusetts	5,365	620	280	0	280	1,300	1,700	3,100	1.1	1,600	1,700	3,300	3,300	110
Michigan	8,317	1,100	430	14	450	8,400	0	8,400	0	8,800	14	8,800	8,800	310
Minnesota	3,532	360	510	0	510	2,500	0	2,500	0	3,100	0	3,100	3,100	280
Mississippi	2,309	550	600	0	600	370	300	670	0	970	300	1,300	1,200	330
Missouri	4,492	590	370	5.8	380	2,300	0	2,300	0	2,700	5.8	2,700	2,700	320

Montana	703	9,500	81	0	81	6,600	0	6,600	0	6,700	0	6,700	5,400	4,500
Nebraska	1,459	3,100	1,900	0	1,900	2,700	0	2,700	0	4,600	0	4,600	3,900	2,700
Nevada	470	4,800	560	2.7	560	1,600	0	1,600	1.2	2,200	2.7	2,200	1,700	1,300
New Hampshire	673	720	42	0	42	300	140	440	0	340	140	490	490	20
New Jersey	6,781	950	590	9.0	600	2,000	3,700	5,700	0	2,600	3,700	6,300	6,300	470
New Mexico	1,014	3,000	1,400	0	1,400	1,600	0	1,600	22	3,000	0	3,000	2,600	1,700
New York	18,106	890	830	15	840	8,200	7,100	15,000	0	9,000	7,100	16,000	16,000	620
North Carolina	4,935	800	420	0	420	3,500	32	3,500	0	3,900	32	4,000	3,900	360
North Dakota	652	500	48	6.7	54	270	0	270	0	320	6.7	330	280	170
Ohio	10,203	1,500	800	0	800	14,000	0	14,000	0	15,000	0	15,000	15,000	400
Oklahoma	2,448	480	380	46	430	850	17	870	0	1,200	63	1,300	1,300	460
Oregon	1,938	3,400	710	0	710	5,900	0	5,900	2.9	6,600	0	6,600	5,100	2,400
Pennslyvania	11,583	1,300	590	0	590	15,000	50	15,000	0	15,000	50	15,000	15,000	390
Puerto Rico	2,633	630	150	1.7	150	430	1,100	1,500	0	580	1,100	1,700	1,600	270
Rhode Island	891	500	45	0	45	110	300	400	0	150	300	450	450	27
South Carolina	2,550	690	130	0	130	1,500	150	1,600	0	1,600	150	1,800	1,800	150
South Dakota	686	630	160	1.9	160	270	1.0	270	0	430	2.9	430	340	250
Tennessee	3,850	1,200	350	0	350	4,300	0	4,300	0	4,600	0	4,600	4,600	350
Texas	10,591	2,300	13,000	2.2	13,000	6,600	4,600	11,000	7.4	20,000	4,600	25,000	22,000	12,000
Utah	994	4,100	620	3.5	620	3,400	5.1	3,400	52	4,100	8.6	4,100	3,400	2,400
Vermont	404	320	24	0	24	110	0	110	0	130	0	130	130	15
Virginia	4,420	1,200	200	0	200	3,900	1,300	5,200	0	4,100	1,300	5,400	5,400	130
Washington	2,973	2,100	720	0	720	5,500	30	5,600	0	6,200	31	6,300	5,100	2,400
West Virginia	1,815	2,700	160	.4	160	4,800	0	4,800	.1	4,900	.4	4,900	4,900	190
Wisconsin	4,086	1,200	460	0	460	4,300	0	4,300	0	4,800	0	4,800	4,800	160
Wyoming	330	15,000	100	.9	100	4,800	.1	4,800	0	4,900	1.0	4,900	3,600	2,100
District of Columbia	802	440	1	0	1	350	0	350	0	350	0	350	350	15
United States[1]	196,411	1,600	61,000	470	61,000	210,000	44,000	250,000	670	270,000	45,000	310,000	290,000	78,000

[1]Including Puerto Rico.

Table 27.—*Summary of water withdrawn except for hydroelectric power, in million gallons per day, by water-use regions, 1965*

[Partial figures may not add to totals because of independent rounding]

Region	Population 1,000's	Per capita use (gpd)	Water withdrawn										Excluding conveyance losses	Water consumed
			Including irrigation conveyance losses											
			Ground water			Surface water			Sewage	All sources				
			Fresh	Saline	Fresh and saline	Fresh	Saline	Fresh and saline		Fresh	Saline	Fresh and saline		
New England	10,489	680	510	0.4	510	3,000	3,700	6,700	1.1	3,500	3,700	7,200	7,200	360
Delaware-Hudson	25,840	940	1,500	13	1,500	11,000	12,000	23,000	0	13,000	12,000	24,000	24,000	1,100
Chesapeake	9,486	1,000	520	0	520	5,600	3,300	8,900	130	6,300	3,300	9,600	9,600	390
South Atlantic	16,223	1,300	3,500	80	3,600	11,000	7,600	18,000	0	14,000	7,700	22,000	21,000	2,200
Eastern Gulf	7,527	880	730	0	730	5,300	430	5,700	0	6,000	430	6,400	6,400	490
Tennessee-Cumberland	4,471	1,800	240	0	240	7,900	0	7,900	0	8,200	0	8,200	8,200	400
Ohio	18,337	1,600	1,700	26	1,700	28,000	.7	28,000	.3	30,000	26	30,000	30,000	940
Eastern Great Lakes-St. Lawrence	13,327	1,100	330	13	340	15,000	0	15,000	0	15,000	13	15,000	15,000	520
Western Great Lakes	13,503	1,300	800	12	810	17,000	0	17,000	0	18,000	12	18,000	18,000	600
Hudson Bay	682	390	52	3.8	56	210	0	210	0	260	3.8	270	260	71
Upper Mississippi	13,212	1,200	1,700	18	1,700	14,000	0	14,000	0	16,000	18	16,000	16,000	730
Upper Missouri	5,780	3,300	3,500	9.5	3,500	15,000	4.1	15,000	0	19,000	14	19,000	16,000	10,000
Lower Missouri	2,424	730	240	0	240	1,500	0	1,500	0	1,800	0	1,800	1,800	200
Lower Mississippi	5,078	1,000	1,300	40	1,300	3,600	340	3,900	0	4,900	380	5,200	5,200	1,000
Upper Arkansas-Red	3,605	1,900	4,100	21	4,100	2,900	13	2,900	1.5	6,900	33	7,000	6,200	4,500
Lower Arkansas-Red-White	4,179	820	1,200	40	1,300	2,100	7.0	2,200	0	3,400	41	3,400	3,400	1,200
Western Gulf	11,055	2,700	14,000	2.2	14,000	10,000	4,600	15,000	28	25,000	4,600	30,000	26,000	14,000
Colorado	2,413	7,000	4,700	2.7	4,700	12,000	0	12,000	58	17,000	2.7	17,000	14,000	8,400
Great Basin	1,335	5,200	1,600	8.2	1,600	5,300	5.1	5,300	51	6,900	13	6,900	5,600	3,800
South Pacific	18,097	2,100	13,000	140	13,000	14,000	11,000	25,000	400	27,000	11,000	38,000	34,000	15,000
Pacific Northwest	5,738	5,000	4,200	0	4,200	24,000	31	25,000	2.9	29,000	31	29,000	22,000	10,000
Hawaii	710	2,800	780	37	820	670	500	1,200	0	1,500	540	2,000	1,800	570
Alaska	267	540	26	0	26	120	1.0	120	0	140	1.0	140	140	11
Puerto Rico	2,633	630	150	1.7	150	430	1,100	1,500	0	580	1,100	1,700	1,600	270
United States[1]	196,411	1,600	61,000	470	61,000	210,000	44,000	250,000	670	270,000	45,000	310,000	290,000	78,000

[1]Including Puerto Rico.

Table 28.—*Summary of water withdrawn except for hydroelectric power, in million gallons per day, by Water Resources Council regions, 1965*

[Partial figures may not add to totals because of independent rounding]

Water Resources Council region	Population 1,000's	Per capita use (gpd)	Water withdrawn										Excluding conveyance losses	Water consumed
			Including irrigation conveyance losses											
			Ground water			Surface water			Sewage	All sources				
			Fresh	Saline	Fresh and saline	Fresh	Saline	Fresh and saline		Fresh	Saline	Fresh and saline		
North Atlantic	48,062	910	2,500	14	2,500	22,000	19,000	42,000	130	25,000	19,000	44,000	44,000	1,800
South Atlantic-Gulf	21,998	1,100	4,200	80	4,300	14,000	7,300	21,000	0	18,000	7,400	25,000	25,000	2,700
Great Lakes	26,336	1,300	1,100	25	1,100	31,000	0	31,000	0	33,000	25	33,000	33,000	1,100
Ohio	19,701	1,600	1,700	26	1,800	29,000	.7	29,000	.2	31,000	27	31,000	31,000	1,000
Tennessee	3,107	2,400	200	0	200	7,200	0	7,200	0	7,400	0	7,400	7,400	330
Upper Mississippi	13,212	910	1,700	18	1,700	14,000	0	14,000	0	16,000	18	16,000	16,000	730
Lower Mississippi	5,540	1,300	2,000	40	2,100	5,000	350	5,400	0	7,000	380	7,100	7,100	2,000
Souris-Red-Rainy	682	390	53	3.8	56	210	0	210	0	260	3.8	270	260	64
Missouri	8,204	2,500	3,700	11	3,700	17,000	4.1	17,000	0	21,000	14	21,000	17,000	11,000
Arkansas-White-Red	8,026	1,700	8,900	61	9,000	5,000	20	5,000	1.5	14,000	81	14,000	12,000	8,500
Texas-Gulf	8,490	1,900	7,100	2.0	7,100	5,000	4,400	9,400	7.2	12,000	4,500	16,000	15,000	7,300
Rio Grande	1,877	3,900	3,200	.2	3,200	4,000	130	4,100	21	7,200	130	7,300	6,400	4,200
Upper Colorado	354	19,000	48	1.7	50	6,600	0	6,600	0	6,700	1.7	6,700	5,800	3,300
Lower Colorado	1,848	3,600	4,300	0	4,300	2,200	0	2,200	58	6,600	0	6,600	5,400	3,300
Great Basin	1,163	4,600	1,100	6.2	1,100	4,300	5.1	4,300	51	5,400	11	5,400	4,400	3,000
Columbia-North Pacific	5,745	5,100	4,200	0	4,200	25,000	30	25,000	2.9	29,000	30	29,000	22,000	11,000
California	18,456	2,300	14,000	140	14,000	18,000	11,000	29,000	400	32,000	11,000	43,000	38,000	17,000
Alaska	267	540	26	0	26	120	1.0	120	0	140	1.0	140	140	11
Hawaii	710	2,800	780	37	820	670	500	1,200	0	1,500	540	2,000	1,800	580
Puerto Rico	2,633	630	150	1.7	150	430	1,100	1,500	0	580	1,100	1,700	1,600	270
United States[1]	196,411	1,600	61,000	470	61,000	210,000	44,000	250,000	670	270,000	45,000	310,000	290,000	78,000

[1]Including Puerto Rico.

Table 29.—*Change in withdrawals, 1950-65*

[Estimates for 1950 and 1955 are for conterminous States only]

	1950 (mgd)	1955 (mgd)	1960 (mgd)	1965 (mgd)	Percent increase 1960 to 1965
Rural	3,600	3,600	3,600	4,000	11
Public supplies	14,000	17,000	21,000	24,000	14
Self-supplied industrial	77,000	110,000	140,000	170,000	21
Irrigation (except conveyance losses)	79,000	81,000	84,000	96,000	14
Irrigation (including conveyance losses)	[1]110,000	110,000	110,000	120,000	9
All uses (excluding conveyance losses)	170,000	210,000	250,000	290,000	16
All uses (including conveyance losses)	[1]200,000	240,000	270,000	310,000	15
Hydroelectric power	1,100,000	1,500,000	2,000,000	2,300,000	15

[1]Including an estimated 30 bgd in irrigation conveyance losses.

Table 30.—*Summary of estimated water withdrawal and consumption, in billion gallons per day, by composite (western and eastern-central) regions, 1950–65*

[Data for 1950–60 adapted from MacKichan (1951, 1957) and MacKichan and Kammerer (1961b). Partial figures may not add to totals because of independent rounding. Table by J. C. Kammerer]

	Total population, (millions)	Total water withdrawn (except for hydroelectric power)											Water consumed, total	Water used for hydroelectric power
		Public supplies	Rural domestic and livestock	Irrigation[1]	Thermoelectric power (electric utility) use	Other self-supplied industrial use	Total withdrawals	Sources of water withdrawn						
								Ground, fresh	Ground, saline	Surface, fresh	Surface, saline	Reclaimed sewage		
1965														
14 eastern and central water-use regions	144.8	15	2.9	5.4	110	36	160	14	0.25	120	27	0.1	10	1,200
7 western water-use regions	48.0	8.3	1.1	110	18	8.9	150	45	.18	83	16	.5	66	1,100
Alaska	.3	.03	.01	<.01	<.01	.10	.14	.03	0	.12	<.01	0	.01	.75
Hawaii	.7	.11	<.01	1.2	.59	.14	2.0	.78	.04	.67	.5	0	.57	.36
Total, 50 States	193.8	24	4.0	120	[2]130	[4]45	[2,4]310	60	.47	210	43	.7	77	2,300
Puerto Rico	2.6	.14	<.01	.25	[3].94	.32	1.7	.15	<.01	.43	1.1	0	.27	.51
1960														
50 States	179.3	21	3.6	110	100	38	270	[5]50	.38	[5]190	31	.1	61	2,000
1955														
48 States	164	17	[6]3.6	110	72	39	240	[6]47	.65	180	18	.2	----	1,500
1950														
48 States	150.7	14	3.6	[7]110	77		200	[8]34		[9]170		-----	----	1,100

[1]Including conveyance losses.

[2]Includes 34 bgd of saline water, of which 23 bgd was withdrawn in the eastern and central regions.

[3]Entirely saline water.

[4]Includes 8.5 bgd of saline water, of which 4.5 bgd was withdrawn in the eastern and central regions.

[5]Including conveyance losses, estimated to be in the same proportion as in 1955 with respect to source of water.

[6]Revised.

[7]Including an estimated 30 bgd in irrigation conveyance losses.

[8]Including an estimated 5 bgd in irrigation conveyance losses.

[9]Including an estimated 25 bgd in irrigation conveyance losses.

Table 31.—*Supply compared with demand, by water-use regions, 1965*

Region	Area[1] (1,000's sq mi)	Average runoff[1]		Estimated dependable[2] supply, 1980 (bgd)	Withdrawals[3] 1965 (bgd)	Water consumed 1965 (bgd)	Annual flow[1], in bgd, exceeded in 90 percent of years	Fresh surface water withdrawn[3], 1965 (bgd)
		Inches per year	Bgd					
New England	59	24	67	22	7.2	0.36	49	3.1
Delaware-Hudson	36	22	37	24	24	1.1	28	11
Chesapeake	56	16	43	12	9.6	.39	30	5.6
South Atlantic	165	13	100	75	22	2.2	59	11
Eastern Gulf	115	19	103		6.7	.52	68	5.2
Tennessee-Cumberland	70	19	65	22	8.2	.40	40	7.9
Ohio	133	16	102	40	30	.94	61	28
Eastern Great Lakes-St. Lawrence	42	16	31	33	15	.52	22	15
Western Great Lakes	77	11	40	36	18	.60	29	17
Hudson Bay	59	2.2	6.2	----------	.3	.07	3	.2
Upper Mississippi	190	7.2	65	31	16	.73	32	14
Upper Missouri	459	1.6	35	[4]33	19	10	20	15
Lower Missouri	55	7.4	19		1.8	.20	5	1.5
Lower Mississippi	60	17	48	25	5.2	1.0	27	.4
Upper Arkansas-Red	180	2.0	17	20	7	4.5	5	2.9
Lower Arkansas-Red-White	115	14	79		3.4	1.2	32	2.1
Western Gulf	330	3.0	44	20	30	14	17	10
Colorado	244	1.4	17	15	17	8.4	9	12
Great Basin	196	1.0	8.9	9	6.9	3.8	4	5.3
South Pacific	112	12	62	28	38	15	28	14
Pacific Northwest	270	16	210	70	29	10	148	24
Hawaii	6.4	------	--------	----------	2	.57	----------	.7
Alaska	590	------	--------	----------	.1	.01	----------	.1
Puerto Rico	3.4	------	--------	----------	1.7	.27	----------	.4
United States (conterminous)	3,020	8.3	1,200	515	314	77	710	210
Grand total	3,330	------	--------	----------	313	73	----------	210

[1]Adapted from unpublished data compiled by C. H. Hardison, U. S. Geological Survey.
[2]Woodward (1957), p. 49.
[3]Including some minor inter-regional diversions.
[4]Including Hudson Bay.

Table 32.—*Selected data on precipitation, runoff, and water use in the 21 water-use regions of the conterminous United States*

[Table by J. C. Kammerer]

Water use region	Average precipitation (inches per year) (1)	Runoff (streamflow)					Fresh water withdrawn (excluding water power)		Water consumed[1]	
		Average (1931–60)			Available 50 percent of time (bgd) (5)	Available 90 percent of time (bgd) (6)	1960 (bgd) (7)	1965 (bgd) (8)	1965 (bgd) (9)	2000 (bgd) (10)
		(inches per year) (2)	(1,000 cfs) (3)	(bgd) (4)						
New England	40	23	104	67	39	9.7	3.0	3.6	0.4	1.6
Delaware-Hudson	41	21	51	33	19	4.8	11	13	1.1	2.0
Chesapeake	41	16	67	43	32	8.4	5.2	6.3	.4	2.0
South Atlantic	54	13	155	101	126	31	9.5	14	2.2	12
Eastern Gulf		18	159	103			5.1	6.3	.5	
Tennessee-Cumberland	51	21	91	59	36	13	7.5	8.2	.4	.9
Ohio	42	16	167	108	46	9.4	24	30	.9	4.2
Eastern Great Lakes-St. Lawrence	36	16	54	35	19	3.7	13	15	.5	1.8
Western Great Lakes	29	11	62	40	32	12	16	18	.6	4.2
Hudson Bay	(2)	2.2	9.6	6.2	(2)	(2)	.2	.3	.1	(2)
Upper Mississippi	30	7.0	91	59	41	12	11	16	.7	5.6
Upper Missouri	17	1.6	54	35	[3]9.0	[3]1.8	19	19	10	21
Lower Missouri	35	7.5	31	20	5.8	.6	1.6	1.8	.2	1.5
Lower Mississippi	52	16	84	54	21	3.6	3.7	4.9	1.0	3.7
Upper Arkansas-Red	22	2.1	26	17	[3]4.5	[3].7	5.4	6.9	4.5	5.6
Lower Arkansas-Red-White	44	15	122	79	20	2.1	4.9	3.4	1.2	3.7
Western Gulf	24	2.9	68	44	[3]14	[3]1.7	20	25	14	20
Colorado	11	1.4	26	17	[3]1.7	[3].3	14	17	8.4	14
Great Basin	10	1.1	15	9.6	[3]2.1	[3].5	7.0	6.9	3.8	6.5
South Pacific	23	12	96	62	[3]16	[3]1.9	13	27	15	30
Pacific Northwest	24	17	323	209	76	21	29	29	10	15
Total or average	30	8.3	1,900	1,200	560	140	220	270	77	160

[1]Includes some saline water.

[2]Included in total for Upper Missouri region.

[3]Streamflow values may now be less than those given for the indicated percent of time because of significant increases in consumptive use since 1958.

Column:

1.—Adapted by Piper (1965, p. 11) from data of the U.S. Weather Bureau.

2, 3, and 4.—Adapted from unpublished data compiled by C. H. Hardison, U.S. Geological Survey.

5 and 6.—U.S. Senate, Select Committee on National Water Resources, Print No. 3, p. 12, 1960.

7.—From MacKichan and Kammerer (1961b), but including irrigation conveyance losses as part of the fresh water withdrawn.

8 and 9.—From table in this report.

10.—From Piper (1965, p. 18) as adapted from Eliasberg (1960); "off-channel" uses correspond to withdrawal uses in the present report (excluding hydroelectric power).

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