



Estimated Use of Water in the United States, 1965

GEOLOGICAL SURVEY
CIRCULAR 556

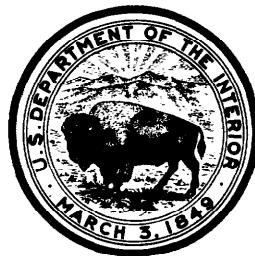
Estimated Use of Water in the United States, 1965

By C. Richard Murray

GEOLOGICAL SURVEY CIRCULAR 556



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



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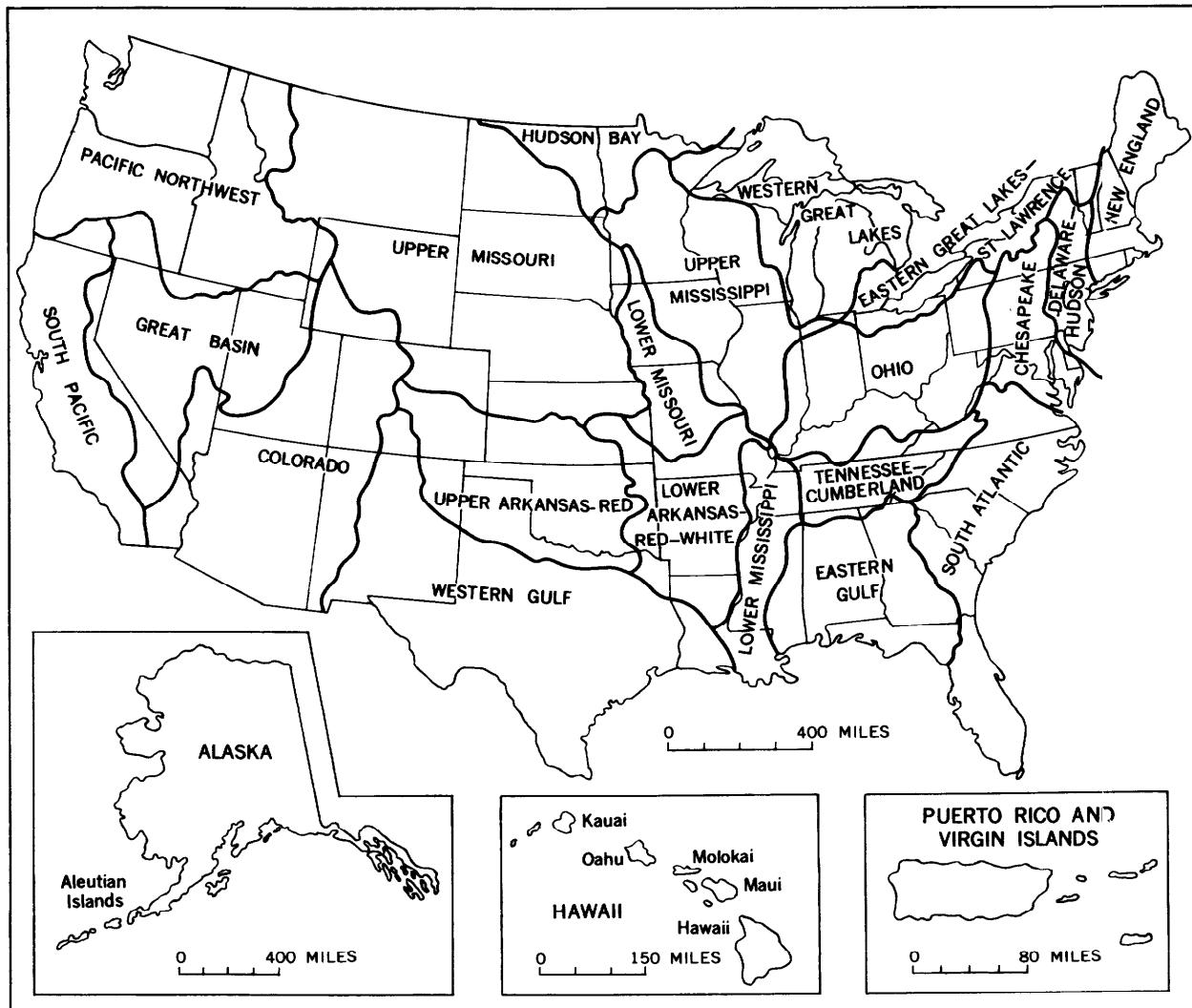


Figure 1—Water-use regions of the United States.

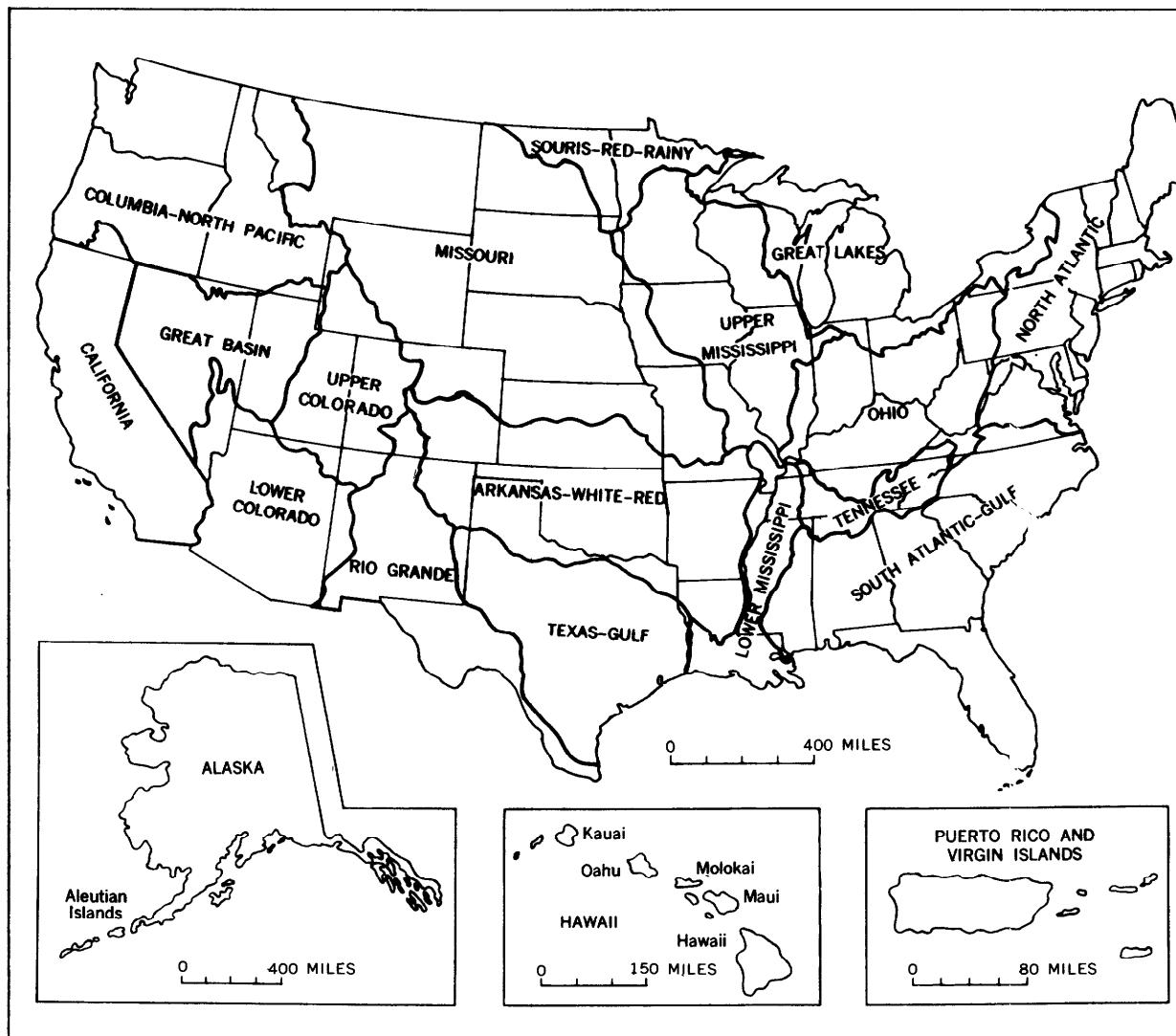


Figure 2.—Water Resources Council regions of the United States.

Estimated Use of Water in the United States, 1965

By C. Richard Murray

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of water use in the United States for 1965 indicate that an average of about 310 bgd (billion gallons per day) were withdrawn for public-supply, rural domestic and livestock, irrigation, and industrial (including thermoelectric power) uses—that is, about 1,600 gallons per capita per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Estimates made of the quantities of water withdrawn from surface and ground-water sources indicate withdrawals of 61 bgd of ground water, of which nearly 0.5 bgd was saline, and 250 bgd of surface water, of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, Ott (1963), in the petroleum refining industry, and Walling and Ott (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 Gerte¹ (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

¹Also 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 1.70 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

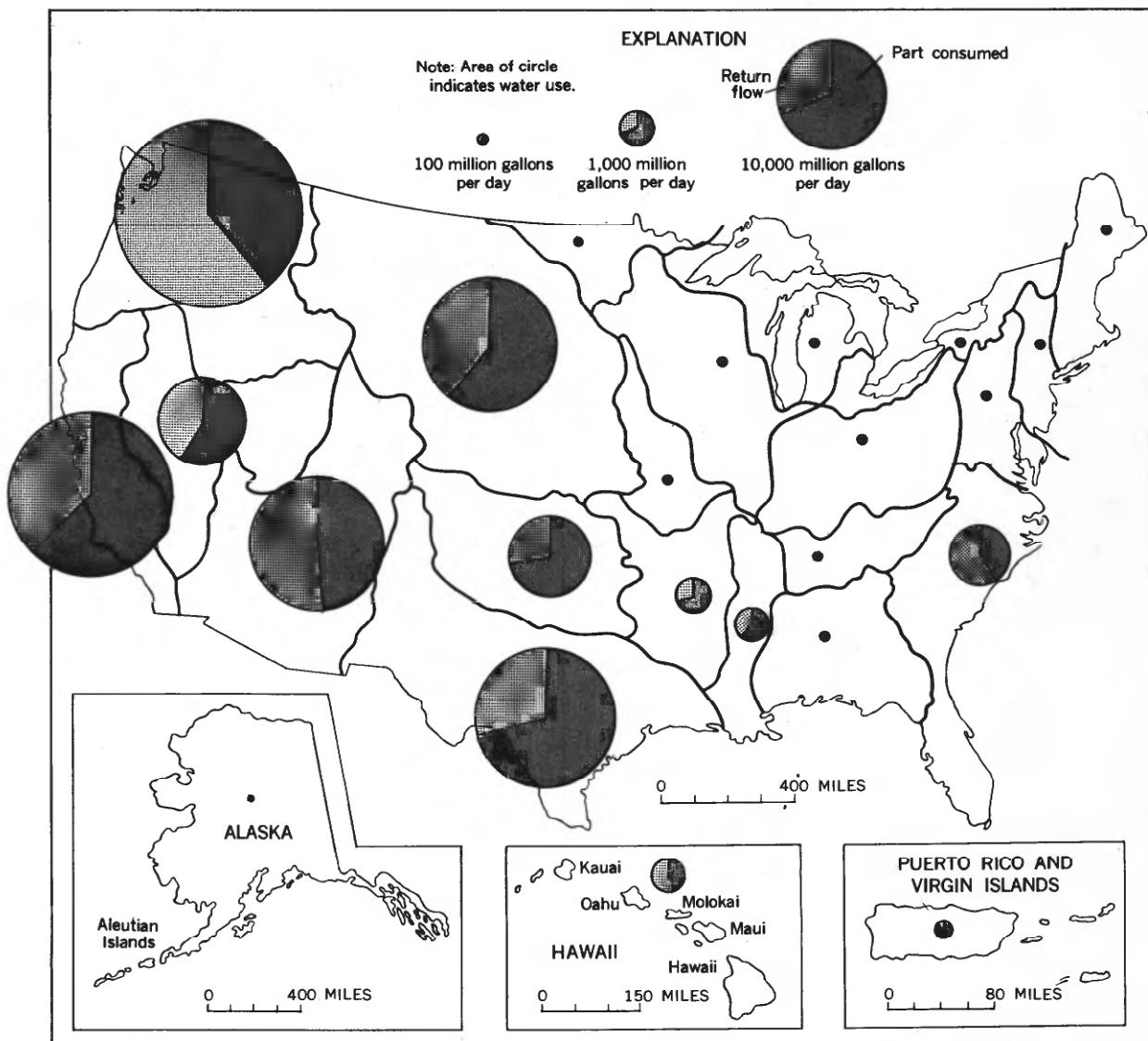


Figure 3.—Irrigation water withdrawals by water-use regions, 1965.

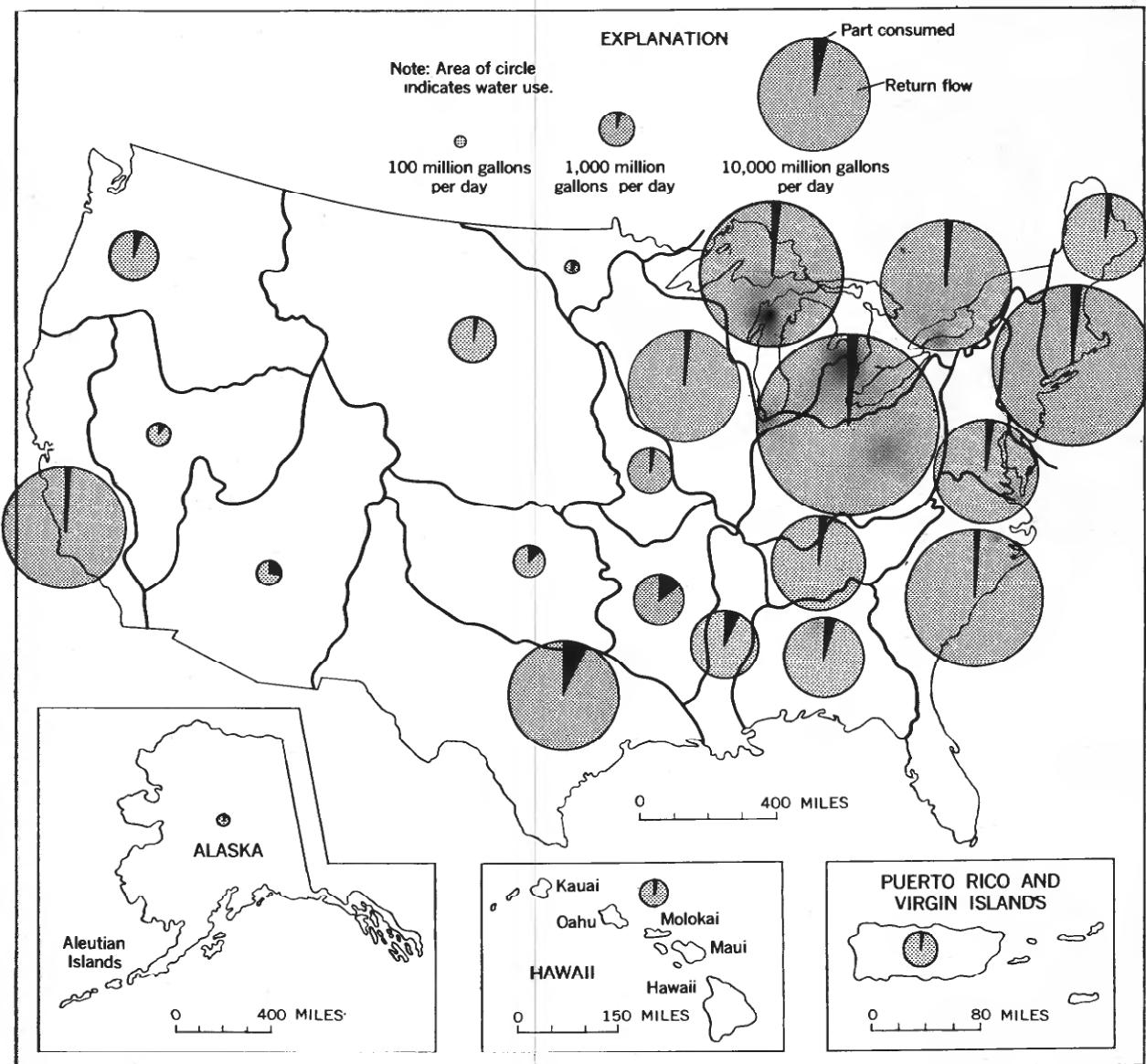


Figure 4.—Self-supplied industrial water withdrawals by water-use regions, 1965.

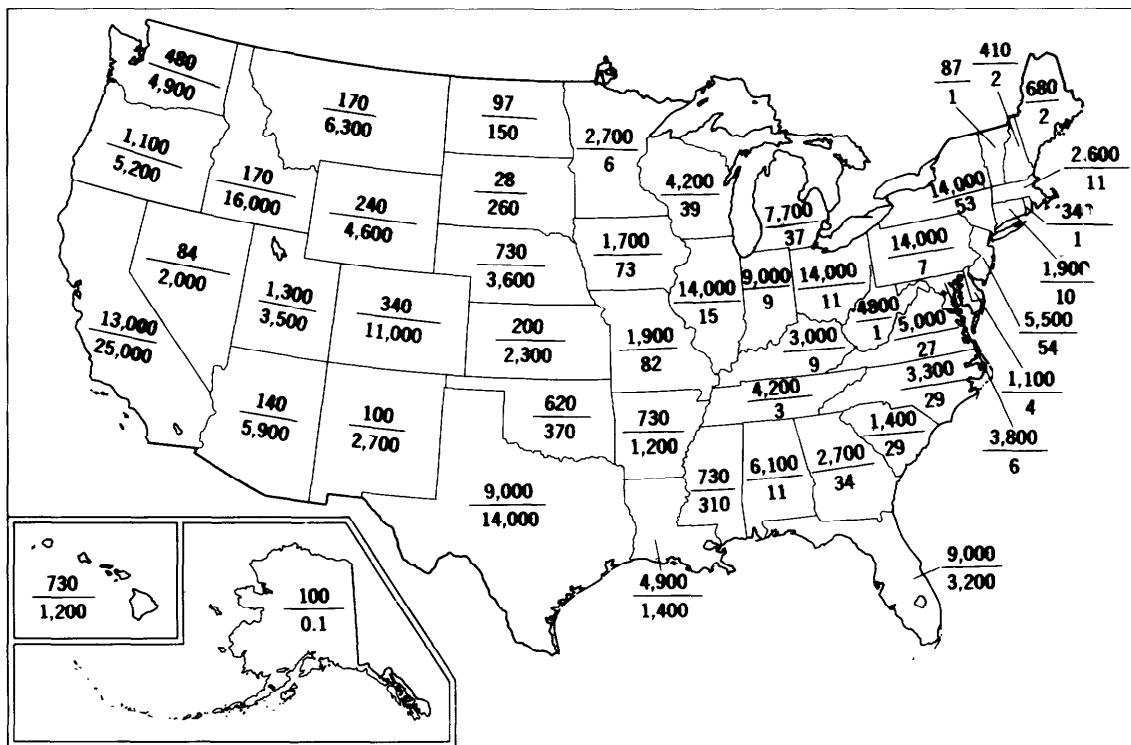


Figure 5.—Self-supplied industrial water withdrawals (upper number) and irrigation water withdrawals (lower number), by States, in million gallons per day, 1965.
[Figure by J. C. Kammerer]

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

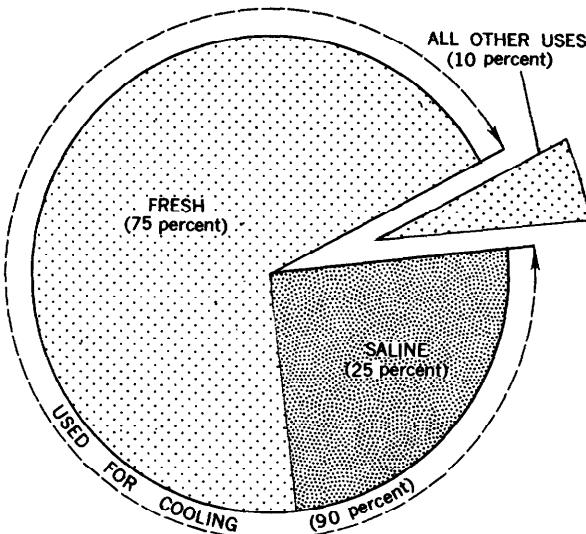


Figure 6.—Characteristics of industrial water use, 1965.

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

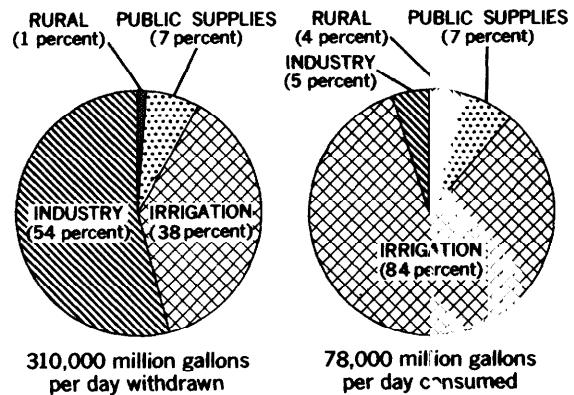


Figure 7.—Water withdrawal and consumption in 1965, by category.

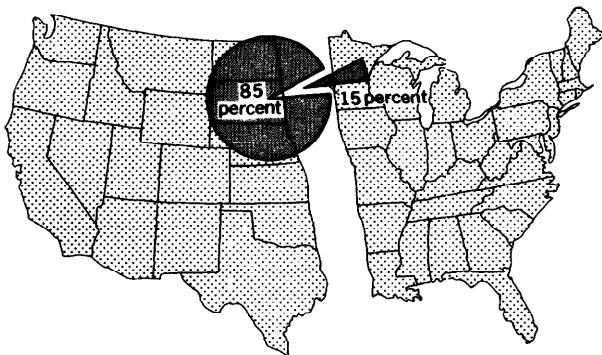


Figure 8.—Water consumption in the 17 Western States and the 31 Eastern States, 1965.

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

¹Includes water losses in system.

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

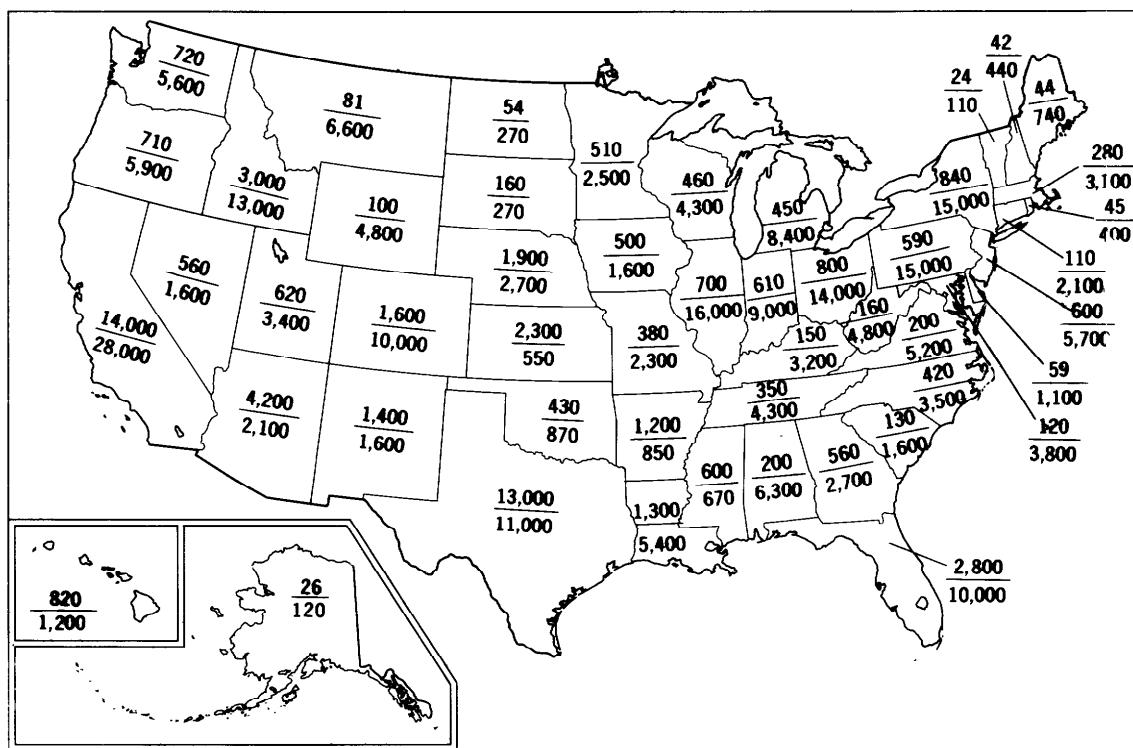


Figure 9.—Total water withdrawals by States (excluding hydroelectric power) from ground-water sources (upper number) and from surface-water sources (lower number), in million gallons per day, 1965. [Figure by J. C. Kammerer]

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 con-

sumption 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

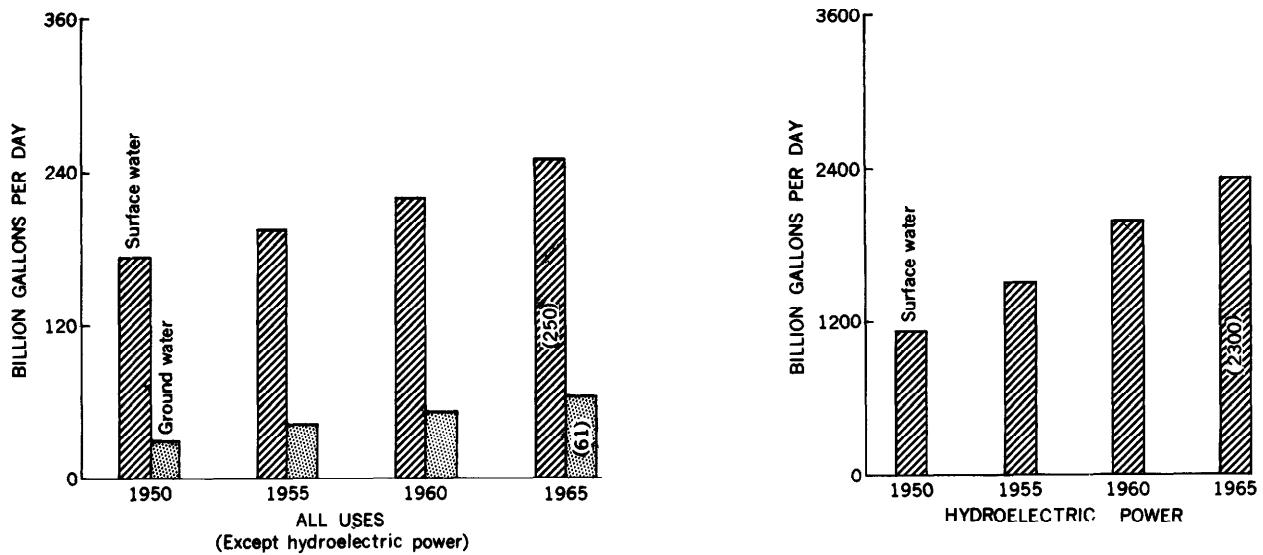


Figure 10.—Trends in use of water for hydroelectric power and in all other withdrawal uses combined, 1950–65.

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 de-

signed 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.

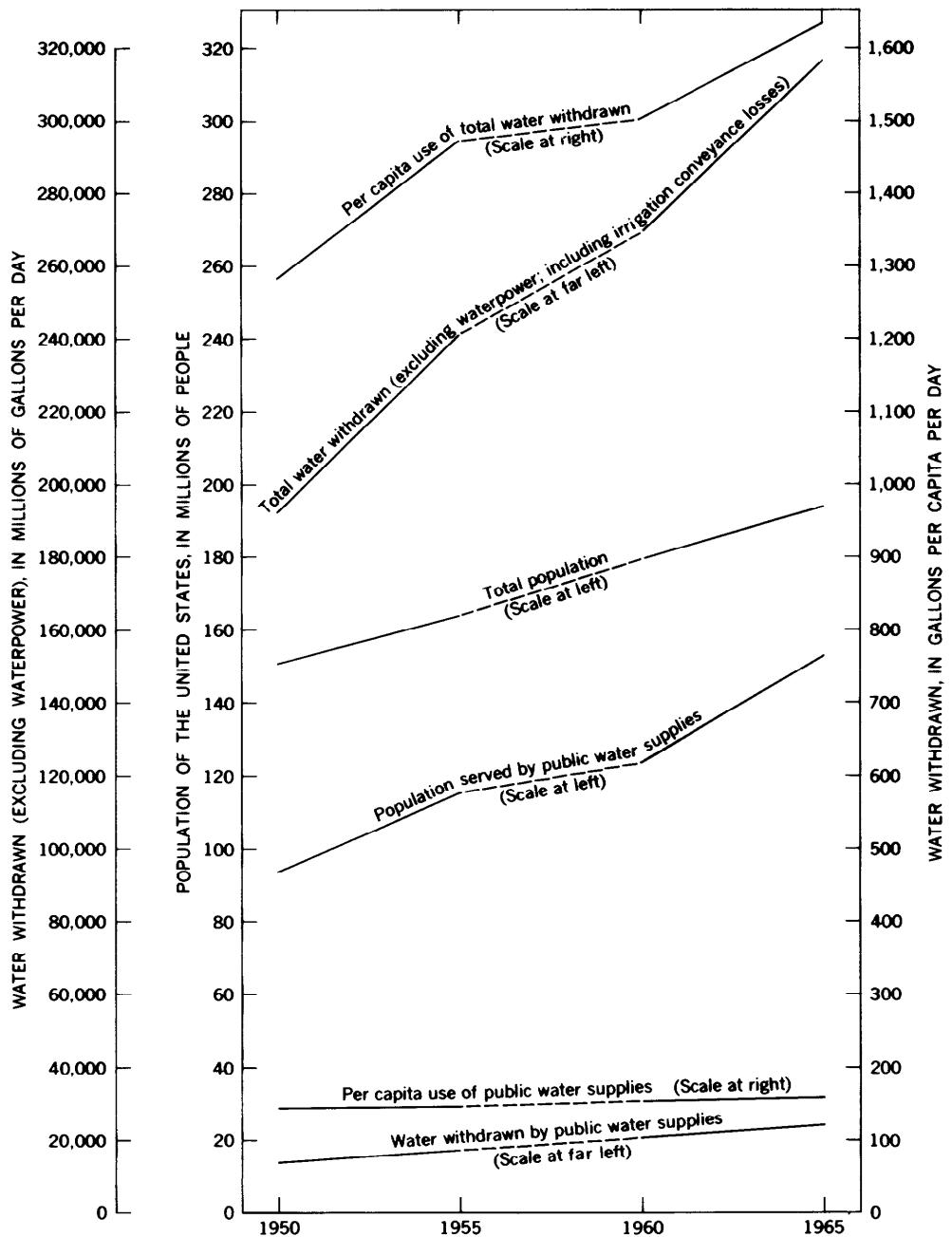


Figure 11.—Trends in population and withdrawals of water in the United States, 1950-65. Data for 1950 and 1955 do not include Alaska and Hawaii.
[Figure by J. C. Kammerer]

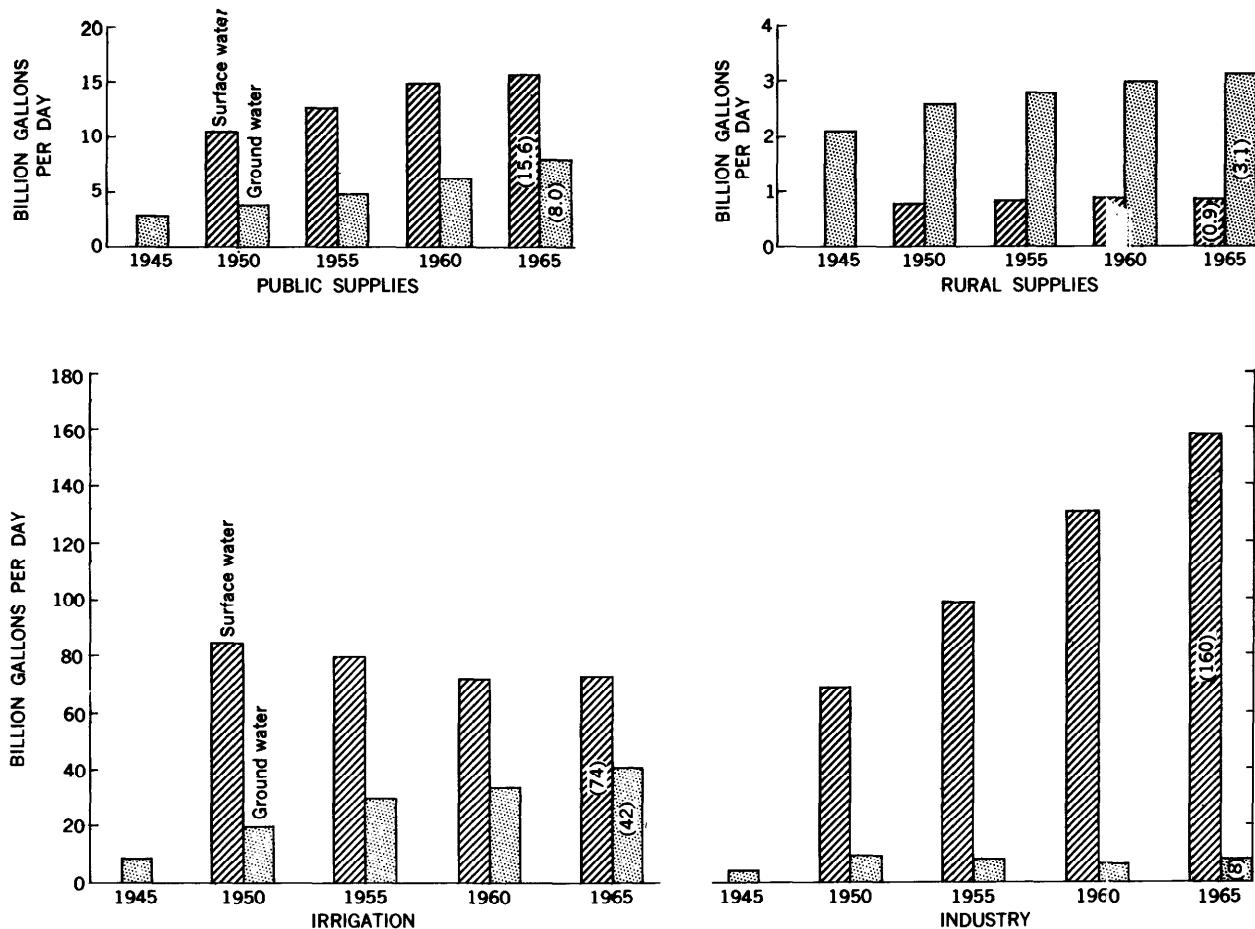


Figure 12.—Trends in use of water for public supplies, rural supplies, irrigation, and industry, 1945–65.

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. Linaweaer 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).

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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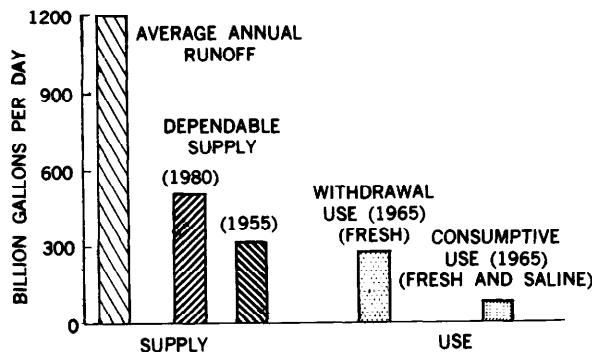


Figure 13.—Water supply and demand in the 48 conterminous States.

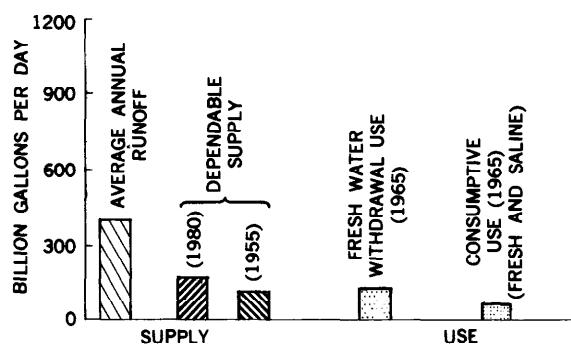


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ESTIMATED USE OF WATER IN THE UNITED STATES, 1965

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

ESTIMATED USE OF WATER IN THE UNITED STATES, 1965

Zero quantities may indicate insufficient information for making an estimate.

²Includes public use.

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

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 North-west.	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

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

²Includes public use.

³Including Puerto Rico.

ESTIMATED USE OF WATER IN THE UNITED STATES, 1965

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

¹Regional figures have not been compensated for those areas where insufficient information was available for estimating air conditioning use.²Includes public use.³Including 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			Withdrawn			Livestock use			Withdrawn			Domestic and livestock uses			
	Withdrawn		Con- sumed	Withdrawn		All water	Livestock use		Con- sumed	Withdrawn		All water	Con- sumed			
	Surface water	Ground water		Sur- face water	Ground water		Sur- face water	Ground water		Sur- face water	Ground water					
Alabama -----	0	58	.58	58	58	.4	17	18	.2	35	34	0	1.5	76	93	.4
Alaska -----	1.5	5.8	7.3	5.1	5.0	8.9	14	14	14	29	29	14	5.5	14	19	19
Arizona -----	.5	4.6	5.2	31	16	13	29	29	29	34	44	16	44	60	60	60
Arkansas -----	0	31	31	50	48	34	82	82	44	57	57	110	110	170	170	94
California -----	9.0	79	88													
Colorado -----	1.3	8.9	10	2.0	14	1.9	30	27	15	15	27	15	25	40	40	29
Connecticut -----	.9	45	46	46	.4	1.9	2.3	2.3	1.4	2.0	1.0	.2	4.7	49	49	49
Delaware -----	0	5.2	5.2	5	.2	2.0	2.2	2.2	.2	12	21	18	8.2	95	100	1.5
Florida -----	.1	120	120	79	8.2	8.2	21	18	18	24	28	26	24	88	110	83
Georgia -----	0	84	84	79	24	4.1										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	18				12	29	41	23
Illinois -----	12	80	92	64	15	48	62	62	62				27	130	150	130
Indiana -----	12	82	94	66	15	26	41	40	40				27	110	130	110
Iowa -----	.3	41	41	7.0	20	130	150	150	150				21	170	190	160
Kansas -----	4.9	36	41	41	29	31	60	60	60				34	68	100	101
Kentucky -----	16	49	65	39	34	3.4	38	37	37				50	52	100	76
Louisiana -----	0	33	33	33	11	12	23	23	23				11	45	56	56
Maine -----	1.0	9.4	10	3.1	2.1	1.4	3.5	3.5	3.5				11	11	14	6.7
Maryland -----	0	33	33	33	.5	10	11	11	11				.5	43	44	44
Massachusetts -----	1.9	36	38	34	1.6	1.1	2.7	2.4	2.4				3.5	37	41	36
Michigan -----	0	100	100	21	5.3	21	27	21	21				5.3	120	130	42
Minnesota -----	0	49	49	49	7.3	61	69	62	62				7.3	110	120	110
Mississippi -----	0	40	40	36	22	15	37	37	37				22	54	77	72
Missouri -----	13	33	46	21	84	21	28	110	110				97	61	160	120

ESTIMATED USE OF WATER IN THE UNITED STATES, 1965

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	Con-	Sur-	Ground	All	Sur-	Ground	All	Sur-	Con-
Montana -----	.3	10	10	10	15	18	34	33	15	28	44	44
Nebraska -----	0	22	22	22	6.2	6.8	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	8.3	8.2	4.6	47	52
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	42	76	120	120	120	42	130	170	170
Utah -----	.2	22	22	11	.9	28	29	29	15	1.1	50	51
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		Con- sumed	Withdrawn		Con- sumed	Withdrawn		Con- sumed
	Surface water	Ground water		All water	Surface water		All water	Surface water	
New England-----	4.9	95	100	84	5.8	5.6	11	11	94
Delaware-Hudson	.6	150	150	30	6.9	12	19	7.5	43
Chesapeake -----	.6	120	120	58	16	25	41	17	95
South Atlantic-----	.6	420	420	370	32	56	87	80	440
Eastern Gulf-----	0	130	130	120	39	24	63	62	200
Tennessee-Cumberland -----	3.4	87	90	84	32	19	51	50	130
Ohio -----	38	220	260	180	69	51	120	110	290
Eastern Great Lakes	9.5	130	140	58	12	22	34	32	90
St. Lawrence -----	4	140	140	45	12	38	50	45	90
Western Great Lakes -----	.1	13	14	14	6.2	14	20	19	33
Hudson Bay-----								6.3	
Upper Mississippi-----	16	190	200	100	56	260	310	300	400
Upper Missouri -----	5.1	72	77	72	96	170	270	260	340
Lower Missouri-----	7.2	22	30	13	64	35	99	91	100
Lower Mississippi -----	.9	57	58	52	21	18	39	38	90
Upper Arkansas-Red -----	3.2	35	38	34	44	33	77	76	110
Lower Arkansas-Red-White	2.9	61	64	59	49	24	73	71	130
Western Gulf-----	.3	51	52	49	70	98	170	70	210
Colorado -----	2.4	17	19	13	13	18	31	26	39
Great Basin -----	.1	27	28	17	13	25	37	21	38
South Pacific -----	8.8	76	85	48	45	32	78	42	90
Pacific Northwest -----	6.2	95	100	75	33	24	57	53	160
Hawaii -----	.3	1	.4	.4	2.8	.5	3.3	3.0	3.6
Alaska -----	1.5	5.9	7.3	.4	0	.2	.2	1.5	.5
Puerto Rico and Virgin Islands -----	3.9	.7	4.6	4.1	5.3	.9	6.2	5.6	4.1
United States 1 -----	120	2,200	2,300	1,600	740	1,000	1,700	1,600	3,200
									3,200

¹Including Puerto Rico.

ESTIMATED USE OF WATER IN THE UNITED STATES, 1965

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

¹ Including Puerto Rico.

ESTIMATED USE OF WATER IN THE UNITED STATES, 1965

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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)	Con- sump- tive use (1,000 ac-ft/yr)	Total water withdrawn (million gallons per day)			Convey- ance loss (mgd)	Con- sump- tive use (mgd)
		Surface water	Ground water	All water			Surface water	Ground water	Other water		
Alabama -----	26 .2	10 0	2.6 .1	0 .1	13 0	0 .1	9.1 0	2.3 0	11 .1	0 0	11 .1
Alaska -----	1,200 2,200	4,300 63	6,600 0	1,300 0	3,300 0	2,000 0	3,900 0	56 .1	5,900 .1	1,200 0	2,900 0
Arizona -----	1,300 240	1,100 0	1,300 0	91 0	910 0	210 0	950 0	0 0	1,200 0	81 0	810 0
Arkansas -----	8,500 16,000	12,000 440	28,000 0	5,600 0	17,000 0	14,000 0	11,000 0	400 0	25,000 0	5,000 0	15,000 0
Colorado -----	3,900 11,000	1,600 0	13,000 0	1,500 0	6,300 0	9,900 0	1,500 0	0 0	11,000 0	10 0	10 0
Connecticut -----	34 11	.6 0	11 0	0 0	4.0 0	0 0	1.1 0	9.5 .5	0 0	3.6 0	3.6 0
Delaware -----	14 1.2	2.8 0	0 0	4.0 0	0 0	4.0 0	1.1 0	2.5 0	0 0	0 0	0 0
Florida -----	1,200 2,200	1,300 0	3,500 0	600 0	1,500 0	2,000 0	1,200 0	0 0	3,200 0	540 0	1,300 0
Georgia -----	150 21	17 0	38 0	0 0	38 0	18 0	15 0	0 0	34 0	0 0	34 0
Hawaii -----	150 640	660 0	1,300 0	200 0	590 0	580 0	590 0	0 0	1,200 0	180 0	530 0
Idaho -----	3,500 15,000	3,100 0	18,000 0	5,100 0	6,100 0	13,000 0	2,800 0	0 0	16,000 0	4,500 0	5,400 0
Illinois -----	25 8.1	8.9 0	0 0	17 0	4.3 0	17 0	7.2 0	7.9 0	0 0	15 0	15 0
Indiana -----	25 6.0	4.0 0	0 0	10 0	0 0	10 0	5.4 0	3.6 0	0 0	9.0 0	9.0 0
Iowa -----	87 29	53 0	82 0	0 0	82 0	26 0	47 0	0 0	73 0	0 0	73 0
Kansas -----	1,200 320	2,200 0	2,500 0	340 0	2,200 0	280 0	2,000 0	0 0	2,300 0	310 0	1,900 0
Kentucky -----	30 7.7	2.0 .2	9.9 0	0 0	9.9 0	6.9 0	1.8 .2	0 0	8.9 0	0 0	8.9 0
Louisiana -----	580 810	760 0	1,600 0	280 0	1,000 0	730 0	680 0	0 0	1,400 0	250 0	890 0
Maine -----	7.0 2.8	0 0	2.8 0	0 0	2.8 0	2.5 0	0 0	0 0	2.5 0	0 0	2.5 0
Maryland -----	15 4.9	1.8 .1	6.8 0	0 0	6.8 0	4.4 0	1.6 .1	0 0	6.1 0	0 0	6.1 0
Massachusetts -----	24 1.2	9.6 1.2	12 0	0 0	12 0	1.1 0	8.6 1.1	0 0	11 0	0 0	11 0
Michigan -----	98 22	19 0	41 0	0 0	41 0	20 0	17 0	0 0	37 0	0 0	36 0
Minnesota -----	24 2.7	3.8 0	6.4 0	0 0	6.5 0	2.4 0	3.4 0	0 0	5.8 0	0 0	5.8 0
Mississippi -----	150 140	220 0	350 0	35 0	180 0	120 0	190 0	0 0	310 0	32 0	160 0
Missouri -----	76 5.5	86 0	92 0	0 0	74 0	4.9 0	77 0	0 0	82 0	0 0	66 0
Montana -----	2,200 7,130	3 0	7,100 0	1,400 0	5,300 0	3,300 0	0 0	0 0	6,300 0	1,300 0	4,400 0
Nebraska -----	3,100 2,200	1,800 0	4,000 0	750 0	2,900 0	1,900 0	1,600 0	0 0	3,600 0	670 0	2,600 0
Nevada -----	730 1,700	520 0	2,200 0	510 0	1,300 0	1,500 0	460 0	0 0	2,000 0	460 0	1,200 0
New Hampshire -----	5.2 2.0	.3 0	2.3 0	0 0	2.3 0	1.8 .3	0 0	0 0	2.1 0	0 0	2.1 0
New Jersey -----	100 14	46 0	60 0	0 0	59 0	12 0	41 0	0 0	54 0	0 0	53 0

ESTIMATED USE OF WATER IN THE UNITED STATES, 1965

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)	Con- sump- tive use (1,000 ac-ft/yr)	Total water withdrawn (million gallons per day)			Convey- ance loss (mgd)	Con- sump- tive use (mgd)	
		Surface water	Ground water	All water			Surface water	Ground water	Other water			
New Mexico -----	1,000	1,700	1,400	25	3,100	410	1,600	1,500	22	2,700	370	1,500
New York -----	68	26	34	0	60	0	60	23	0	53	0	53
North Carolina -----	95	22	10	0	32	.1	32	20	9.1	0	29	1
North Dakota -----	79	160	8.5	0	170	53	120	150	7.6	0	150	47
Ohio -----	26	8.9	3.8	0	13	0	12	7.9	3.4	0	11	0
Oklahoma -----	420	110	300	0	410	0	290	94	270	0	370	0
Oregon -----	1,700	5,300	7.1	3.2	5,800	1,700	2,500	4,700	4.50	2.9	5,200	1,500
Pennsylvania -----	23	.7	.5	0	7.6	0	7.6	6.3	.4	0	6.7	0
Puerto Rico -----	96	180	100	0	280	.7	250	160	93	0	250	25
Rhode Island -----	1.3	.6	.1	0	.7	0	.6	.5	.1	0	.6	0
South Carolina -----	43	22	10	0	32	0	32	20	9.0	0	29	0
South Dakota -----	150	230	59	0	290	110	140	210	53	0	260	94
Tennessee -----	8.6	3.0	.4	0	3.5	0	3.5	2.7	.4	0	3.1	0
Texas -----	7,900	2,800	13,000	0	16,000	3,200	13,000	2,500	12,000	0	14,000	2,800
Utah -----	1,200	3,400	450	58.	3,900	780	2,600	3,100	400	52	3,500	700
Vermont -----	2.2	.8	0	0	.9	0	.9	.7	0	0	.7	0
Virginia -----	54	20	10	0	30	0	29	18	9.1	0	27	0
Washington -----	1,200	5,200	320	0	5,500	1,300	2,500	4,600	290	0	4,900	1,200
West Virginia -----	2.5	1.4	.1	.1	1.5	0	1.5	1.2	.1	.1	1.4	0
Wisconsin -----	85	3.4	40	0	43	.7	33	3.0	36	0	39	.6
Wyoming ----- District of Columbia.	1,500	5,100	30	0	5,100	1,500	2,200	4,600	27	0	4,600	1,300
United States ¹ -----	44,000	83,000	46,000	590	130,000	27,000	74,000	42,000	530	124,000	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)	Con- sump- tive use (1,000 ac-ft/yr)	Total water withdrawn (million gallons per day)			Convey- ance loss (mgd)	Con- sump- tive use (mgd)
		Surface water	Ground water	Other water			Surface water	Ground water	Other water		
New England -----	72	18	11	1.2	29	0	29	16	9.5	1.1	26
Delaware-Hudson -----	160	24	81	0	110	0	100	22	72	0	94
Chesapeake -----	57	20	11	.1	32	0	31	18	10	.1	28
South Atlantic -----	1,400	2,200	1,400	0	3,600	600	1,500	2,000	1,200	0	540
Eastern Gulf -----	130	26	21	0	46	1.9	43	23	19	0	1,400
Tennessee-Cumberland -----	26	9.2	1.1	0	10	0	10	8.2	1.0	0	42
Ohio -----	63	19	6.4	.3	26	.3	25	17	5.7	.3	1.7
Eastern Great Lakes-St. Lawrence -----	49	24	4.8	0	29	0	29	22	4.3	0	39
Western Great Lakes-Hudson Bay -----	100	22	24	0	46	.4	43	20	21	0	4
Upper Mississippi -----	160	28	67	0	29	9.4	20	24	2.3	0	8.4
Upper Missouri -----	8,300	15,000	3,000	0	18,000	3,700	11,000	13,000	2,700	0	77
Lower Missouri -----	53	15	36	0	51	.2	51	14	32	0	45
Lower Mississippi -----	540	220	620	0	840	71	530	200	550	0	470
Upper Arkansas-Red -----	3,000	2,300	4,200	0	6,400	890	4,600	2,000	3,700	0	4,100
Lower Arkansas-Red-White -----	1,200	250	880	0	1,100	78	800	230	780	0	710
Western Gulf -----	8,600	6,300	14,000	25	20,000	3,700	15,000	5,600	13,000	23	13,000
Colorado -----	3,600	13,000	4,800	64	18,000	3,400	9,000	12,000	4,300	57	8,100
Great Basin -----	2,200	5,400	1,500	57	7,000	1,500	4,100	4,800	1,300	51	3,700
South Pacific -----	8,000	12,000	11,000	440	24,000	4,700	15,000	11,000	10,000	400	4,200
Pacific Northwest -----	6,100	25,000	3,700	3.3	29,000	7,900	11,000	22,000	3,300	2.9	10,000
Hawaii -----	150	640	550	0	1,300	.1	200	590	580	0	.1
Alaska -----	.2	0	100	0	280	.1	0	250	160	93	0
Puerto Rico -----	96	180	0	0	27,000	28	250	0	0	250	230
United States ¹ -----	44,000	83,000	46,000	590	130,000	27,000	74,000	42,000	530	120,000	66,000

¹Including Puerto Rico.

ESTIMATED USE OF WATER IN THE UNITED STATES, 1965

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	All water			Surface water	Ground water	Other water				
North Atlantic -----	300	65	100	1.3	170	0	170	58	92	1.2	150	0	150
South Atlantic -----	1,600	2,300	1,400	0	3,700	600	1,600	2,000	1,200	0	3,300	540	1,400
Gulf -----	150	46	27	0	74	.4	71	41	24	0	66	.4	64
Great Lakes -----	67	20	6.6	.3	27	.3	27	18	5.9	.2	24	.3	24
Ohio -----	22	7.9	.9	0	8.8	0	8.8	7.1	.8	0	7.9	0	7.9
Tennessee -----	160	28	67	0	95	4.3	86	25	60	0	85	3.8	77
Upper Mississippi-----	990	960	1,200	0	2,200	330	1,400	860	1,100	0	2,000	300	1,200
Lower Mississippi-----	20	26	2.6	0	29	9.4	19	23	2.3	0	26	8.4	17
Souris-Red-Rainy -----	8,400	15,000	3,000	0	18,000	3,700	11,000	13,000	2,700	0	16,000	3,300	9,800
Missouri -----	6,200	2,500	9,000	0	12,000	1,800	8,600	2,200	8,000	0	10,000	1,600	7,700
Arkansas-White-Red -----	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	1,300	.1	0	.1	0	.1	0	0	.1
Hawaii -----	150	640	660	0	280	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	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 con- sumed	
	Ground water		Surface water		Ground and Sur- face 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		Fresh	Saline	Sewage	All water		
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 con- sumed	
	Water withdrawn							
	Ground water		Surface water		Ground and Sur- face 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	

¹Including Puerto Rico.

in million gallons per day, by States 1965—Continued

Other uses								All industrial uses				
Water withdrawn								Water withdrawn				Water consumed
Ground water		Surface water		Sew-age	All water		Fresh	Saline	Sew-age	All water	Water consumed	
Fresh	Saline	Fresh	Saline		Fresh	Saline						
38	0	200	33	0	240	33	24	1,300	150	0	1,400	26
12	1.9	12	1.0	0	24	2.9	11	25	2.9	0	20	12
130	0	760	0	0	890	0	180	4,200	0	0	4,200	180
400	2.2	620	3,200	7.4	1,000	3,200	390	4,400	4,600	7.4	9,000	540
52	3.5	120	5.1	0	170	8.6	22	320	8.6	0	1,300	25
9,1	0	25	0	0	34	0	1.6	87	0	0	87	1.6
51	0	680	72	0	730	72	1.4	3,700	1,300	0	5,000	9.4
140	0	300	30	0	450	30	16	450	30	0	480	16
100	.4	2,000	0	0	2,100	.4	140	4,800	.4	0	4,800	140
89	0	260	0	0	350	0	8.6	4,200	0	0	4,200	9.6
40	.9	21	.1	0	61	1.0	8.4	240	1.0	0	240	11
.8	0	.6	0	0	1.4	0	.3	210	0	0	210	.3
6,800	360	30,000	8,400	140	37,000	8,800	3,400	130,000	45,000	140	170,000	,800

Table 15.—*Self-supplied industrial water,*
 [Partial figures may not add to]

Region	Thermoelectric power (electric utility) use							Water con- sumed	
	Water withdrawn								
	Ground water		Surface water		Ground and Sur- face 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	

¹Including Puerto Rico.

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

Other uses								All industrial uses				
Ground water		Surface water		Sew- age	All water		Water con- sumed	Water withdrawn				Water con- sumed
Fresh	Saline	Fresh	Saline		Fresh	Saline		Fresh	Saline	Sew- age	All water	
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 con- sumed	
	Water withdrawn							
	Ground water		Surface water		Ground and Sur- face 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	

¹Including Puerto Rico.

ESTIMATED USE OF WATER IN THE UNITED STATES, 1965

37

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

totals because of independent rounding]

Other uses								All industrial uses				
Ground water		Surface water		Sew-age	All water		Water consumed	Water withdrawn				Water consumed
Fresh	Saline	Fresh	Saline		Fresh	Saline		Fresh	Saline	Sew-age	All water	
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

ESTIMATED USE OF WATER IN THE UNITED STATES, 1965

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

ESTIMATED USE OF WATER IN THE UNITED STATES, 1965

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

ESTIMATED USE OF WATER IN THE UNITED STATES, 1965

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		Public supplies		Self-supplied and public supplies			
	Surface water	Ground water	Fresh	Saline	Surface water	Ground water	Fresh	Saline	Public	supplies		
	Fresh	Saline										
New England -----	870	3,400	0	0	0	4,200	27	0	6	33	3	
Delaware-Hudson -----	5,700	8,700	0	0	0	14,000	950	360	8	1,300	25	
Chesapeake -----	3,400	2,400	0	0	0	5,800	110	12	0	120	2	
South Atlantic -----	7,000	7,200	9	80	2	14,000	48	0	1	54	7	
Eastern Gulf -----	3,800	380	7	0	8	4,200	2	0	0	2	5	
Tennessee-Cumberland -----	6,100	0	0	0	0	6,100	420	0	0	420	8	
Ohio -----	19,000	0	39	0	21	19,000	670	0	1	680	17	
Eastern Great Lakes-St. Lawrence --	8,900	0	0	0	0	8,900	330	0	0	330	5	
Western Great Lakes -----	11,000	0	0	0	6	11,000	430	0	0	440	6	
Hudson Bay -----	64	0	1	0	0	65	0	0	0	0	1	
Upper Mississippi -----	13,000	0	2	0	2	13,000	230	0	7	4	240	
Upper Missouri -----	990	0	58	0	30	1,100	1	0	0	0	27	
Lower Missouri -----	1,200	0	2	0	0	1,200	6	0	2	1	26	
Lower Mississippi -----	1,600	340	51	0	1	2,000	0	0	21	3	9	
Upper Arkansas-Red -----	540	0	29	0	5	540	0	0	2	0	19	
Lower Arkansas-Red-White -----	1,200	6	5	0	0	1,200	0	0	0	0	24	
Western Gulf -----	2,900	1,400	510	0	5	4,700	61	0	13	2	154	
Colorado -----	88	0	19	0	1	110	0	0	1	0	33	
Great Basin -----	170	0	0	0	0	170	3	0	1	4	2	
South Pacific -----	660	10,000	300	0	130	12,000	0	0	10	10	18	
Pacific Northwest -----	5	0	0	0	0	5	0	0	0	0	0	
Hawaii -----	41	500	31	21	0	600	0	0	0	0	0	
Alaska -----	1	1	1	0	0	3	0	0	0	0	0	
Puerto Rico -----	0	940	0	0	0	940	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 and public supplies
	Self-supplied		Public supplies		Self-supplied		Public supplies				
	Surface water	Ground water	Fresh	Saline	Surface water	Ground water	Fresh	Saline			
North Atlantic -----	12,000	15,000	0	0	0	27,000	1,100	370	8	27	1,500
South Atlantic-Gulf -----	9,200	6,800	16	80	10	16,000	31	0	1	1	33
Great Lakes -----	20,000	0	0	0	6	20,000	760	0	0	7	770
Ohio -----	19,000	0	39	0	21	19,000	710	0	1	2	720
Tennessee -----	5,600	0	0	0	0	5,600	390	0	0	0	390
Upper Mississippi -----	13,000	0	2	0	2	13,000	230	0	7	4	240
Lower Mississippi -----	1,800	340	52	0	2	2,200	0	0	24	3	27
Souris-Red-Rainy -----	64	0	1	0	0	65	0	0	0	0	1
Missouri -----	2,200	0	60	0	30	2,300	7	0	2	1	10
Arkansas-White-Red -----	1,700	6	41	0	5	1,800	0	0	3	0	3
Texas-Gulf -----	2,500	1,400	310	0	3	4,200	61	0	7	2	70
Rio Grande -----	170	0	190	0	1	360	0	0	3	0	3
Upper Colorado -----	80	0	0	0	0	80	0	0	0	0	18
Lower Colorado -----	2	0	18	0	1	21	0	0	1	0	15
Great Basin -----	170	0	0	0	0	170	3	0	0	1	4
Columbia-North Pacific -----	5	0	0	0	0	5	0	0	0	0	0
California -----	660	10,000	300	0	130	12,000	0	0	0	10	10
Alaska -----	1	1	0	0	0	3	0	0	0	0	0
Hawaii -----	41	500	31	21	0	600	0	0	0	0	0
Puerto Rico -----	0	940	0	0	0	940	0	0	0	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	United States ¹	1,000	780	1,800
Nebraska	1.0	4.0	5.0				

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

¹Including 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	Columbia-----			
Tennessee -----	45	4.0	49	North Pacific-----	39	7.0	46
Upper Mississippi---	27	51	78	California -----	59	110	170
Lower Mississippi --	22	4.5	26	Alaska -----	.6	0	.6
Souris-Red-Rainy ---	2.0	.2	2.2	Hawaii -----	1.0	.9	1.9
Missouri -----	18	28	46	Puerto Rico -----	.6	2.1	2.7
Arkansas-White Red-----	32	25	57	United States ¹ -----	1,000	780	1,800
Texas-Gulf -----	120	36	160				
Rio Grande -----	1.2	.9	2.1				

¹Including 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	United States ¹ -----	2,300,000	2,600,000
Nebraska -----	21,000	24,000			

¹Including 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-		
South Atlantic -----	130,000	150,000	White -----	26,000	29,000
Eastern Gulf-----	81,000	91,000	Western Gulf -----	9,500	11,000
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-----			South Pacific -----	69,000	77,000
St. Lawrence -----	180,000	200,000	Pacific Northwest -----	800,000	900,000
Western Great Lakes -----	96,000	110,000	Hawaii -----	360	410
Hudson Bay-----	2,700	3,000	Alaska -----	750	840
Upper Mississippi-----	200,000	220,000	Puerto Rico -----	510	580
Upper Missouri -----	110,000	130,000	United States ¹ -----	2,300,000	2,600,000
Lower Missouri -----	6,900	7,800			

¹Including 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	Alaska -----	750	840
Souris-Red-Rainy -----	2,700	3,000	Hawaii -----	360	410
Missouri -----	120,000	130,000	Puerto Rico -----	510	570
Arkansas-White-Red -----	28,000	31,000	United States ¹ -----	2,300,000	2,600,000
Texas-Gulf -----	7,900	8,800			

¹Including Puerto Rico.

ESTIMATED USE OF WATER IN THE UNITED STATES, 1965

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	Popu- lation 1,000's	Per capita use (gpd)	Water withdrawn						All sources			Excluding convey- ance losses	Water con- sumed	
			Including irrigation conveyance losses						All sources					
			Ground water			Surface water			Sew- age	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	250	
Alaska	267	540	26	0	26	120	1,0	120	0	140	1,0	140	11	
Arizona	1,575	4,000	4,200	0	4,200	2,100	0	2,100	56	6,300	0	6,300	3,100	
Arkansas	1,941	1,100	1,200	0	1,200	850	0	850	0	2,100	0	2,100	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	
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	
Connecticut	2,832	790	110	0	110	700	1,400	2,100	0	810	1,400	2,200	2,200	
Delaware	503	2,300	59	0	59	55	1,100	1,100	0	110	1,100	1,200	1,200	
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	
Georgia	4,391	730	560	0	560	2,000	620	2,700	0	2,600	620	3,200	3,200	
Hawaii	710	2,800	780	37	820	670	500	1,200	0	1,500	540	2,000	1,800	
Idaho	693	23,000	3,000	0	3,000	13,000	0	13,000	0	16,000	0	16,000	12,000	
Illinois	10,641	1,600	670	34	700	16,000	0	16,000	0	16,000	34	17,000	17,000	
Indiana	4,893	2,000	600	5.9	610	9,000	0	9,000	0	9,600	5.9	9,600	9,600	
Iowa	2,758	770	500	0	500	1,600	0	1,600	0	2,100	0	2,100	2,100	
Kansas	2,248	1,600	2,300	.4	2,300	550	0	550	0	2,800	0	2,800	2,200	
Kentucky	3,173	1,000	150	.6	150	3,200	.3	3,200	.2	3,300	.9	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	
Maine	986	800	44	0	44	520	220	740	0	570	220	780	780	
Maryland	3,534	1,200	120	0	120	1,300	2,500	3,800	130	1,500	2,500	4,100	4,100	
Massachusetts	5,365	620	280	0	280	1,300	1,700	3,100	1.1	1,600	1,700	3,300	110	
Michigan	8,317	1,100	430	14	450	8,400	0	8,400	0	8,800	14	8,800	310	
Minnesota	3,532	360	510	0	510	2,500	0	2,500	0	3,100	0	3,100	280	
Mississippi	2,309	550	600	0	600	370	300	670	0	970	300	1,300	330	
Missouri	4,492	590	370	5.8	380	2,300	0	2,300	0	2,700	5.8	2,700	320	

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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
Pennsylvania -----	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

¹Including Puerto Rico.

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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	Per capita use (gpd)	Population, 1,000's	Water withdrawn						Water consumed					
			Including irrigation conveyance losses											
			Ground water	Surface water	Fresh	Saline	Fresh and saline	Sewage	All sources	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
Maryland -----	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-----	13,327	1,100	330	13	340	15,000	0	15,000	0	15,000	13	15,000	15,000	520
St. Lawrence -----	13,503	1,300	800	12	810	17,000	0	17,000	0	18,000	12	18,000	18,000	600
Western Great Lakes -----	682	390	52	3.8	56	210	0	210	0	260	3.8	270	270	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	50	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

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	Popu- lation 1,000's	Per capita use (gpd)	Water withdrawn								Water con- sumed	
			Including irrigation conveyance losses				All sources					
			Ground water		Surface water		Sew- age	Fresh and saline	Fresh and saline	Exclud- ing convey- ance losses		
			Fresh	Saline	Fresh	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	
South Atlantic-Gulf -----	21,998	1,100	4,200	80	4,300	14,000	7,300	21,000	0	18,000	7,400	
Great Lakes -----	26,336	1,300	1,100	25	1,100	31,000	0	31,000	0	33,000	25	
Ohio -----	19,701	1,600	1,700	26	1,800	29,000	.7	29,000	.2	31,000	27	
Tennessee -----	3,107	2,400	200	0	200	7,200	0	7,200	0	7,400	0	
Upper Mississippi -----	13,212	910	1,700	18	1,700	14,000	0	14,000	0	16,000	18	
Lower Mississippi -----	5,540	1,300	2,000	40	2,100	5,000	350	5,400	0	7,000	380	
Jouris-Red-Rainy -----	6,82	390	53	3.8	56	210	0	210	0	260	3.8	
Missouri -----	8,204	2,500	3,700	11	3,700	17,000	4.1	17,000	0	21,000	14	
Arkansas-White-Red -----	8,026	1,700	8,900	61	9,000	5,000	20	5,000	1.5	14,000	81	
Texas-Gulf -----	8,490	1,900	7,100	2.0	7,100	5,000	4,400	9,400	7.2	12,000	4,500	
Rio Grande -----	1,877	3,900	3,200	.2	3,200	4,000	130	4,100	21	7,200	130	
Upper Colorado -----	3,354	19,000	48	1.7	50	6,600	0	6,600	0	6,700	1.7	
Lower Colorado -----	1,848	3,600	4,300	0	4,300	2,200	0	2,200	58	6,600	0	
Great Basin -----	1,163	4,600	1,100	6.2	1,100	4,300	5.1	4,300	51	5,400	11	
Columbia-North Pacific-----	5,745	5,100	4,200	0	4,200	25,000	30	25,000	2.9	29,000	30	
California -----	18,456	2,300	14,000	140	14,000	18,000	11,000	29,000	400	32,000	11,000	
Alaska -----	267	540	26	0	26	120	1.0	120	0	140	1.0	
Hawaii -----	710	2,800	780	37	820	670	500	1,200	0	1,500	540	
Puerto Rico -----	2,633	630	150	1.7	150	430	1,100	1,500	0	580	1,100	
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	

¹Including 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)-----	1110,000	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)-----	1200,000	240,000	270,000	310,000	15
Hydroelectric power-----	1,100,000	1,500,000	2,000,000	2,300,000	15

¹Including 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)	Public supplies	Rural domestic livestock	Irrigation ¹	Thermal-electric power (electric utility) use	Other self-supplied industrial use	Total withdrawals	Sources of water withdrawn			Water consumed, total	Water used for hydroelectric power
							Ground, fresh	Ground, saline	Surface, saline		
							Reclaimed sewage	Surface, saline	Surface, saline		
<u>1965</u>											
14 eastern and central water-use regions	144.8	15	2.9	5.4	110	36	160	14	0.25	120	27
7 western water-use regions	48.0	8.3	1.1	110	<.01	8.9	150	45	.18	83	16
Alaska	.3	.03	.01	<.01	.10	.14	.03	0	.12	<.01	.5
Hawaii	.7	.11	<.01	1.2	.59	.14	2.0	.78	.04	.67	.5
Total, 50 States	193.8	24	4.0	120	2130	445	2,4310	60	.47	210	43
Puerto Rico	2.6	.14	<.01	.25	3.94	.32	1.7	.15	<.01	.43	1.1
<u>1960</u>											
50 States	179.3	21	3.6	110	100	38	270	50	.38	190	31
<u>1955</u>											
48 States	164	17	63.6	110	72	39	240	47	.65	180	18
<u>1950</u>											
48 States	150.7	14	3.6	110	77	200	834	34	.9	170	—

¹Including conveyance losses.

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

³Entirely saline water.

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

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

⁶Revised.

⁷Including an estimated 30 bgd in irrigation conveyance losses.

⁸Including an estimated 5 bgd in irrigation conveyance losses.

⁹Including an estimated 25 bgd in irrigation conveyance losses.

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

Region	Area ¹ (1,000's sq mi)	Average runoff ¹ Inches per year	Bgd	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 with- drawn ³ , 1965 (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	22	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	35	19	10	20	15
Lower Missouri -----	55	7.4	19	433	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	1	7	4.5	5	2.9
Lower Arkansas-Red-White -----	115	14	79	20	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 -----	3,530	-----	-----	-----	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)	Runoff (streamflow)				Fresh water withdrawn (excluding water power)		Water consumed ¹		
		Average (1931-60)			Available 50 percent of time (bgd)	Available 90 percent of time (bgd)	1960 (bgd)	1965 (bgd)	1965 (bgd)	
		(inches per year)	(1,000 cfs)	(bgd)			(7)	(8)	(9)	
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	1.3	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	9.0	3.8	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	34.5	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	14	31.7	20	25	14	20
Colorado -----	11	1.4	26	17	31.7	3.3	14	17	8.4	14
Great Basin -----	10	1.1	15	9.6	2.1	3.5	7.0	6.9	3.8	6.5
South Pacific -----	23	12	96	62	16	3.9	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

¹Includes some saline water.²Included in total for Upper Missouri region.³Streamflow 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).