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Water Use in Arkansas, 2005

Scientific Investigations Report 2007–5241

U.S. Department of the Interior
U.S. Geological Survey

Cover photograph. Irrigation well in northeastern Arkansas (photograph by Ralf Montanus, U.S. Geological Survey, 2007).

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Contents

Figures

Tables

Conversion Factors and Datums

Multiply	By	To obtain
meter (m)	3.281	foot (ft)
cubic meter (m^3)	35.31	cubic foot (ft^3)
kilometer (km)	0.6214	mile (mi)
square kilometer (km^2)	247.1	square mile (mi^2)
cubic meter per second (m^3/s)	35.31	cubic foot per second (ft^3/s)
kilogram (kg)	2.205	pound (lb)

Temperature in degrees Celsius (˚C) may be converted to degrees Fahrenheit (˚F) as follows:

$$˚F = (1.8 \times ˚C) + 32$$

Vertical coordinate information is referenced to the National Geodetic Vertical Datum of 1929 (NGVD of 1929).

Water Use in Arkansas, 2005

By Terrance W. Holland

Abstract

The water-use program in Arkansas is a cooperative effort between the Arkansas Natural Resources Commission and the U.S. Geological Survey to inventory water use. During 2005, the amount of water withdrawn from ground- and surface-water sources in Arkansas was estimated to be 11,455 million gallons per day (Mgal/d). Of this amount, about 7,510 Mgal/d (66 percent) was from ground-water and about 3,946 Mgal/d (34 percent) was from surface-water sources.

Approximately 93 percent of the population (2.6 million people) in Arkansas was served by public supply systems during 2005. These systems withdrew approximately 404 Mgal/d. Most of the water, 66 percent, was from surface-water sources. The statewide average for per-capita residential use from public supply systems was 157 gallons per day and increased about 35 percent between 1965 and 2005.

The largest use of water was for irrigation (8,265 Mgal/d), which accounted for 92 percent (6,942 Mgal/d) of the ground water withdrawn in Arkansas and 72 percent of the total withdrawals (both ground water and surface water). The next largest use category is thermoelectric generation (1,997 Mgal/d), followed by public supply (404 Mgal/d) and duck (hunting) clubs (269 Mgal/d). The withdrawal categories of domestic, commercial, industrial, mining, livestock, and aquaculture each withdrew less than 260 Mgal/d.

Introduction

Water is one of Arkansas' most valuable natural resources. Much of the State's agriculture and industry is dependent upon having an adequate supply of quality water. The Arkansas Natural Resources Commission (ANRC) conducts an annual inventory of the ground- and surface-water withdrawals in Arkansas in cooperation with the U.S. Geological Survey (USGS). Data collected during this inventory are shared by State and Federal agencies to document the State's total water use and to facilitate planning the most effective use of Arkansas' water resources for the economic and social well being of the people of Arkansas and the Nation.

Every 5 years since 1950, the USGS has conducted an inventory of water use in the United States (MacKichan, 1951, 1957; MacKichan and Kammerer, 1961; Murray, 1968; Murray and Reeves, 1972, 1977; Solley and others, 1983, 1988, 1993, 1998; Hutson and others, 2004). In 1978, the USGS initiated the National Water-Use Information Program to establish a nationwide water-use database. In 1985, the ANRC and the USGS began a water-use program that provides for the collection, storage, and dissemination of accurate water-use information for Arkansas within a consistent national framework.

Ground- and surface-water sources are important in Arkansas. Major aquifers are present in alluvial deposits and in the Cockfield Formation, Cane River Formation, Sparta Sand, and Memphis Sand of Claiborne Group; Wilcox Group (undifferentiated); Nacatoch Sand; Tokio Formation; Trinity Group; and rocks of Paleozoic age (undifferentiated) (Petersen and others, 1985). Hereafter, these aquifers are referred to as the Mississippi River Valley alluvial aquifer, aquifers in other alluvial deposits, Cockfield aquifer, Cane River aquifer, Sparta-Memphis aquifer, Wilcox aquifer, Claiborne aquifer, Nacatoch aquifer, Tokio aquifer, Trinity aquifer, and Paleozoic aquifer. Major surface-water sources include the Arkansas, Saline, and Ouachita Rivers, and Beaver, Bull Shoals, Maumelle, and Winona Lakes (fig. 1).

This report describes water use in Arkansas based on the total withdrawals from ground- and surface-water resources by county for 2005. Ten categories of water use are described in this report—public supply, domestic (self-supplied), commercial (self-supplied), industrial (self-supplied), mining, livestock, aquaculture, irrigation, duck (hunting) clubs, and thermoelectric power generation. Water-use trends in Arkansas from 1965 to 2005 and sources of ground-water withdrawals also are described.

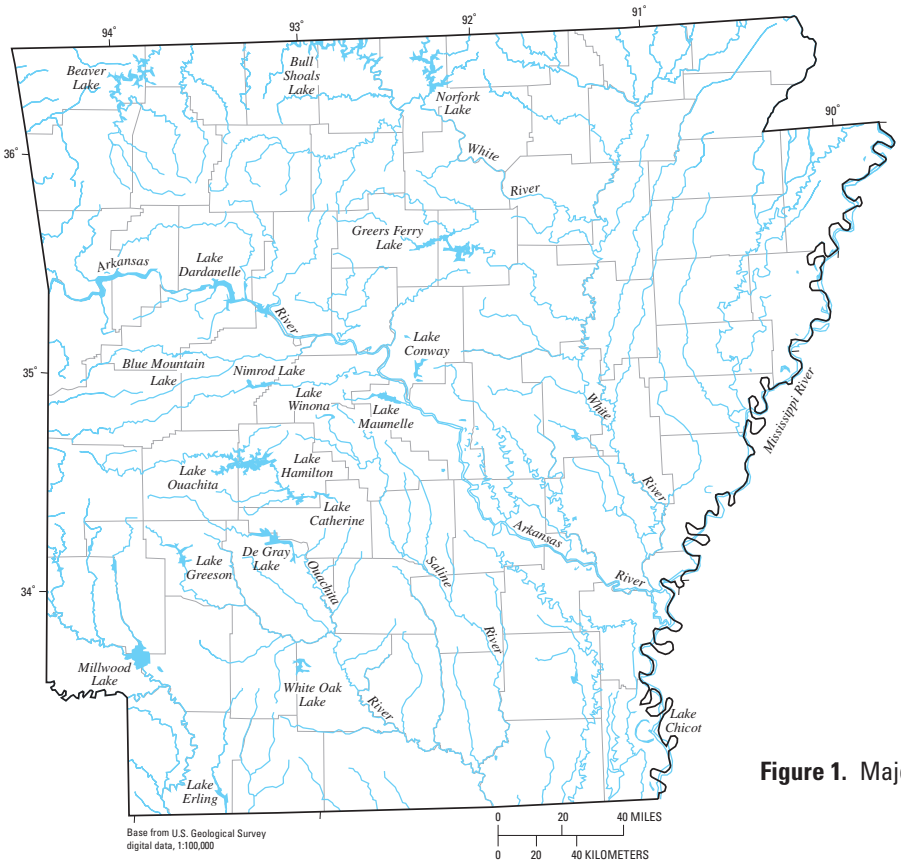

Figure 1. Major surface-water sources.

Data-Collection Methods

Site-specific water-use data for several categories are collected and compiled annually by the ANRC in cooperation with the USGS. Water users that withdraw 1 acre-foot or more of surface water per year or wells with the capability of pumping 50,000 gallons per day (gal/d) or more of ground water are required by Arkansas law to report their withdrawals to the appropriate reporting agency. Data for the irrigation, livestock, aquaculture, and duck (hunting) clubs categories are reported through the Conservation District offices in selected counties (fig. 2). Water-use data for each of the other categories are reported directly to the ANRC. Site-specific water-use data for irrigation, livestock, duck (hunting) clubs, public supply, commercial, industrial, mining, and power generation are stored in the Arkansas Water-Use Data Base (WUDBS) maintained by USGS (http://ar.water.usgs.gov/wateruse.html). Information about amounts of water withdrawn, sources of water, how the water was used, and how much water was returned is available to water-resources managers and policy makers through WUDBS.

Because of incomplete reporting, in some cases it is necessary to supplement these data with data from other sources. These sources include public agencies, industries, public utilities, other organizations, and individuals. Principal contributors include the Arkansas Agricultural Experiment Station, Arkansas Department of Environmental Quality, Arkansas Department of Health, Arkansas Department of Parks and Tourism, Arkansas Electric Cooperative, Arkansas Geological Survey, Arkansas Industrial Development Commission, Entergy Arkansas, Arkansas State Highway and Transportation Department, the Cooperative Extension Service, National Agricultural Statistics Service, Natural Resources Conservation Service, Southwest Power Administration, U.S. Army Corps of Engineers, U.S. Department of Energy, and the U.S. Fish and Wildlife Service.

Estimates are made by the USGS based on population (U.S. Bureau of Commerce, 2005) and average consumptive-use rates (Holland, 1987) for water-use categories for which data are not available or are incomplete. After sufficient data are collected from all available sources, these data are aggregated by county for each water-use category and by aquifer for each county.

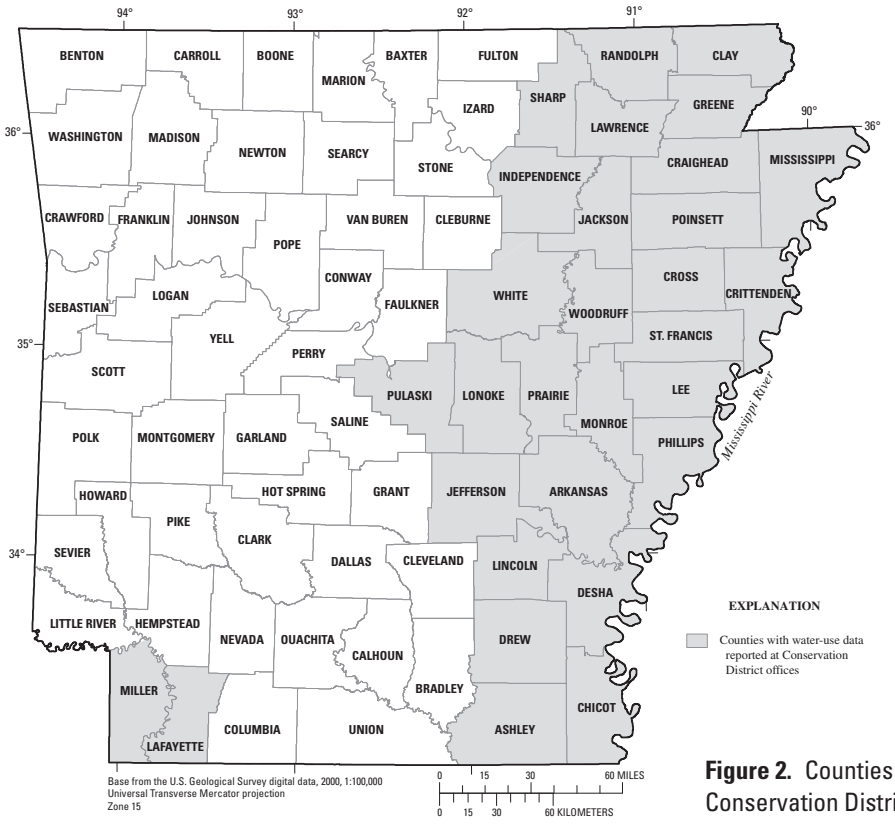

Figure 2. Counties where selected water-use data are reported at Conservation District offices.

Water Use by Category and Withdrawals by Source

During 2005, total withdrawals from ground-water and surface-water sources in Arkansas were 11,455 Mgal/d (table 1, most water-use values listed in discussions in rest of report are rounded to whole numbers). This is an increase of about 31 percent from the total of 8,767 Mgal/d withdrawn in 1995 (Holland, 1999) and about a 4.5 percent increase from that used (10,963 Mgal/d) in 2000 (Holland, 2004). Of the total withdrawn in 2005, about 66 percent (7,510 Mgal/d) was from ground water, and the remaining 34 percent (3,946 Mgal/d) was from surface water. The largest total withdrawals generally occurred in eastern Arkansas and in counties along major rivers (fig. 3). The five counties with the largest total water use are Pope, Arkansas, Poinsett, Cross, and Lonoke, in order of decreasing use (table 1). The largest ground-water users were in eastern Arkansas (fig. 4). The highest ground-water use (682 Mgal/d) occurred in Poinsett County primarily for irrigation (table 1). The highest surface-water use occurred from the Arkansas River in Pope County primarily for thermoelectric power generation (1,163 Mgal/d) (table 1, fig. 5).

The distribution of total (both ground and surface) water use by category (fig. 6) illustrates the dominance of water use for irrigation in Arkansas. Irrigation also is the dominant category of ground-water use in Arkansas (fig. 7). Duck (hunting) club water use (269 Mgal/d) is the fourth largest category in Arkansas. Thermoelectric power generation, followed by irrigation, is the dominant category of surface-water use in Arkansas (fig. 8).

Table 1. Ground water, surface water, and total withdrawals by county for Arkansas, 2005.

[Mgal/d, million gallons per day]

County	Ground water (Mgal/d)	Surface water (Mgal/d)	Total (Mgal/d)
Arkansas	509.48	457.64	967.12
Ashley	156.30	75.97	232.27
Baxter	1.95	3.88	5.83
Benton	2.87	438.18	441.05
Boone	1.91	1.19	3.10
Bradley	1.78	0.08	1.86
Calhoun	0.53	0.04	0.57
Carroll	2.87	8.72	11.59
Chicot	249.53	70.39	319.92
Clark	0.51	6.07	6.58
Clay	471.05	10.20	481.25
Cleburne	0.41	8.35	8.76
Cleveland	0.73	0.20	0.93
Columbia	3.64	2.23	5.87
Conway	2.51	16.90	19.41
Craighead	365.03	44.68	409.71
Crawford	0.94	7.61	8.55
Crittenden	159.51	0.97	160.48
Cross	599.29	45.01	644.30
Dallas	1.47	0.03	1.50
Desha	304.34	109.27	413.61
Drew	77.40	13.41	90.81
Faulkner	2.40	14.81	17.21
Franklin	0.40	3.52	3.92
Fulton	1.96	0.48	2.44
Garland	0.32	19.56	19.88
Grant	2.60	0.10	2.70
Greene	223.63	3.90	227.53
Hempstead	4.02	8.34	12.36
Hot Spring	0.27	322.90	323.17
Howard	0.50	5.14	5.64
Independence	41.84	62.74	104.58
Izard	1.79	3.22	5.01
Jackson	383.12	22.58	405.70
Jefferson	279.71	70.27	349.98
Johnson	0.32	5.02	5.34
Lafayette	39.40	1.81	41.21
Lawrence	223.27	32.83	256.10
Lee	266.79	5.41	272.20
Lincoln	182.87	23.53	206.40
Little River	4.43	10.04	14.47
Logan	1.65	4.25	5.90
Lonoke	423.84	110.41	534.25
Madison	1.15	0.98	2.13
Marion	0.83	1.21	2.04
Miller	16.28	110.30	126.58
Mississippi	277.76	2.57	280.33
Monroe	290.04	26.41	316.45
Montgomery	0.70	0.82	1.52
Nevada	0.73	1.36	2.09
Newton	1.17	0.23	1.40
Ouachita	1.08	58.46	59.54
Perry	0.46	14.33	14.79
Phillips	208.51	1.78	210.29
Pike	0.48	1.21	1.69
Poinsett	682.31	90.48	772.79
Polk	1.17	2.39	3.56
Pope	2.09	1,162.81	1,164.90
Prairie	253.58	102.18	355.76
Pulaski	26.39	57.88	84.27
Randolph	102.51	38.88	141.39
Saline	2.29	6.98	9.27
Scott	2.35	0.45	2.80
Searcy	0.29	0.70	0.99
Sebastian	0.94	38.46	39.40
Sevier	1.74	0.82	2.56
Sharp	4.31	0.98	5.29
St. Francis	295.73	18.57	314.30
Stone	0.60	1.84	2.44
Union	15.55	10.65	26.20
Van Buren	0.41	2.60	3.01
Washington	1.35	2.50	3.85
White	48.59	42.93	91.52
Woodruff	267.00	84.47	351.47
Yell	2.37	7.42	9.79
Total	7,509.94	3,945.53	11,455.47

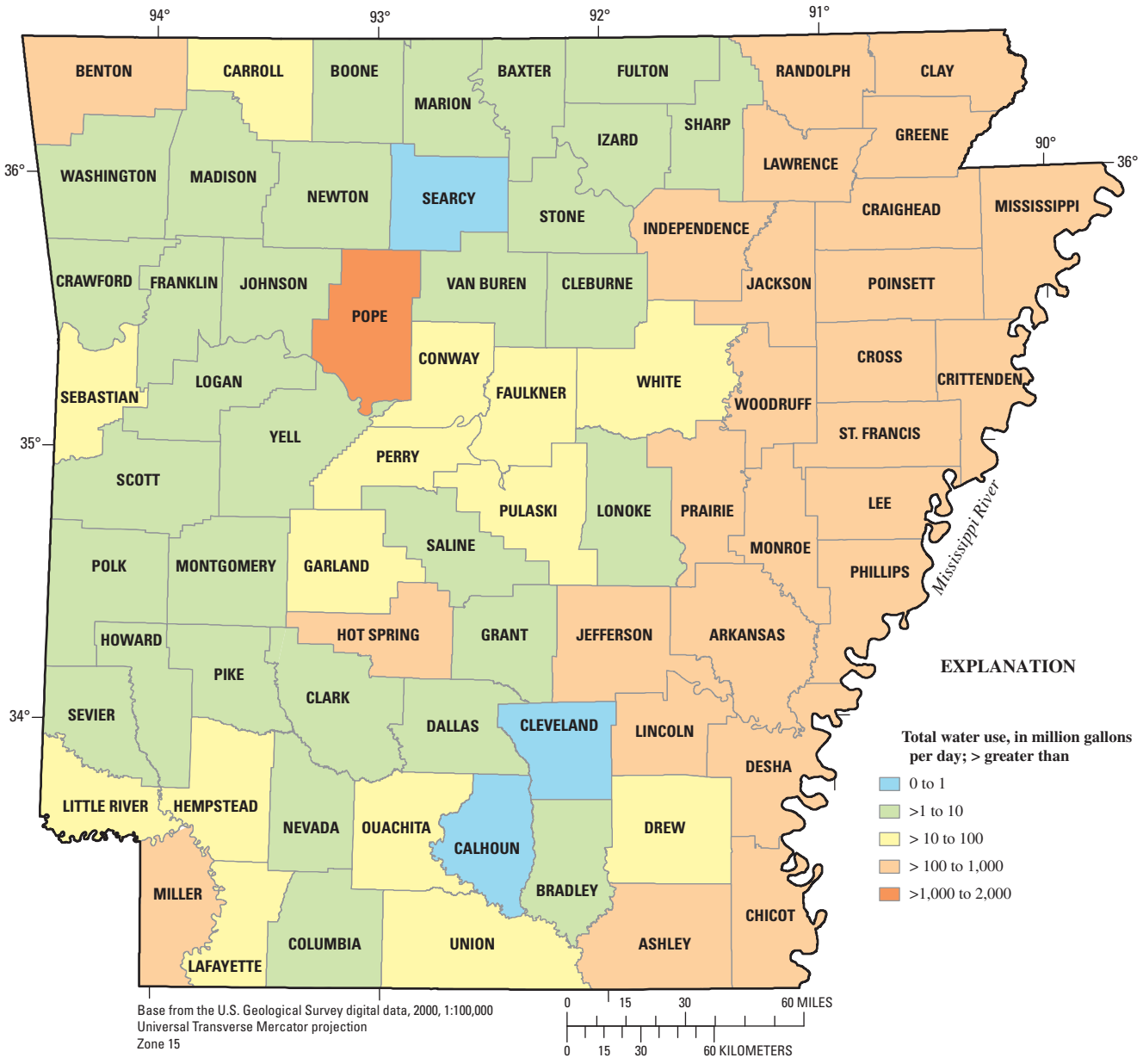

Figure 3. Total water use by county for Arkansas, 2005.

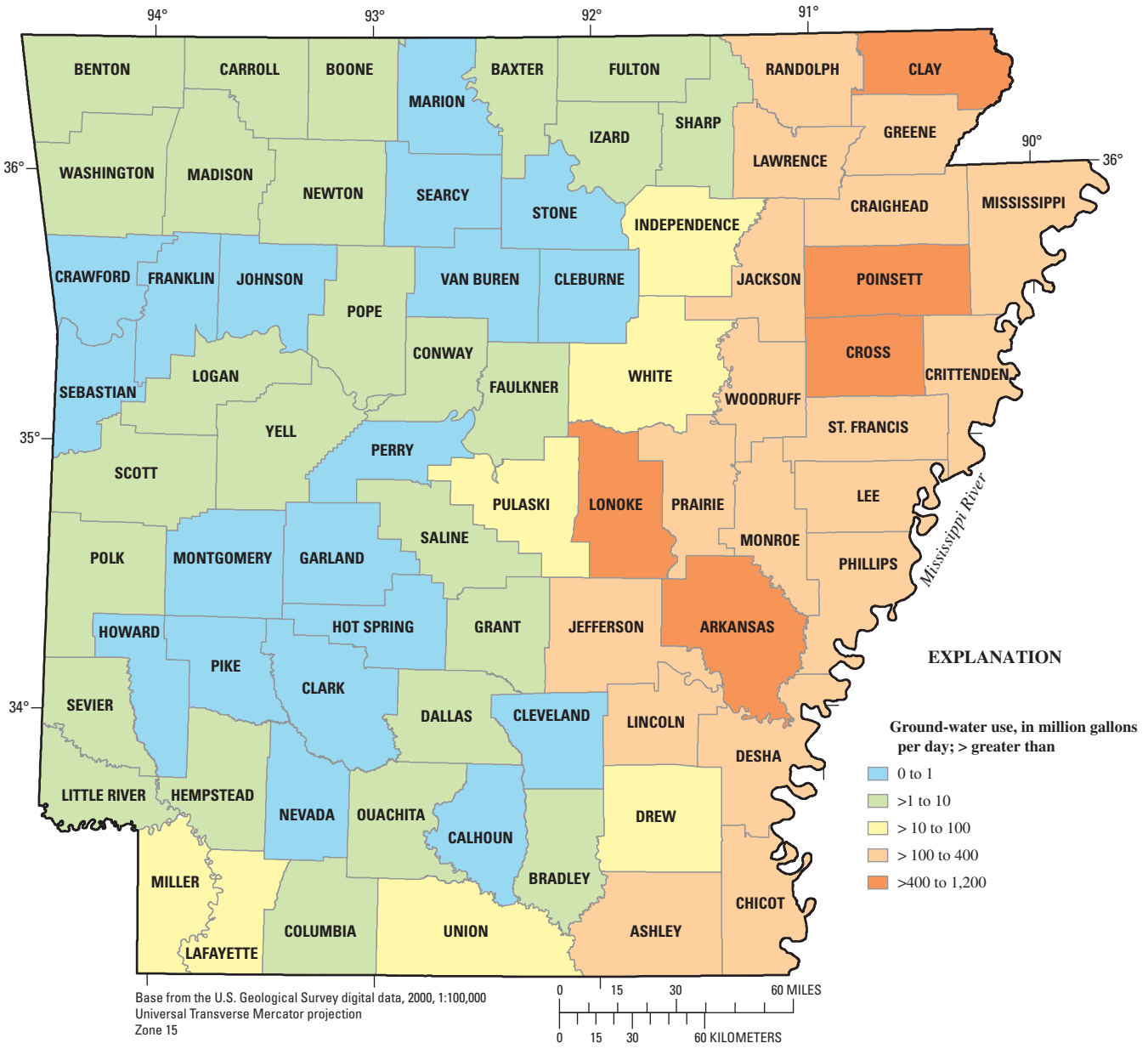

Figure 4. Ground-water use by county for Arkansas, 2005.

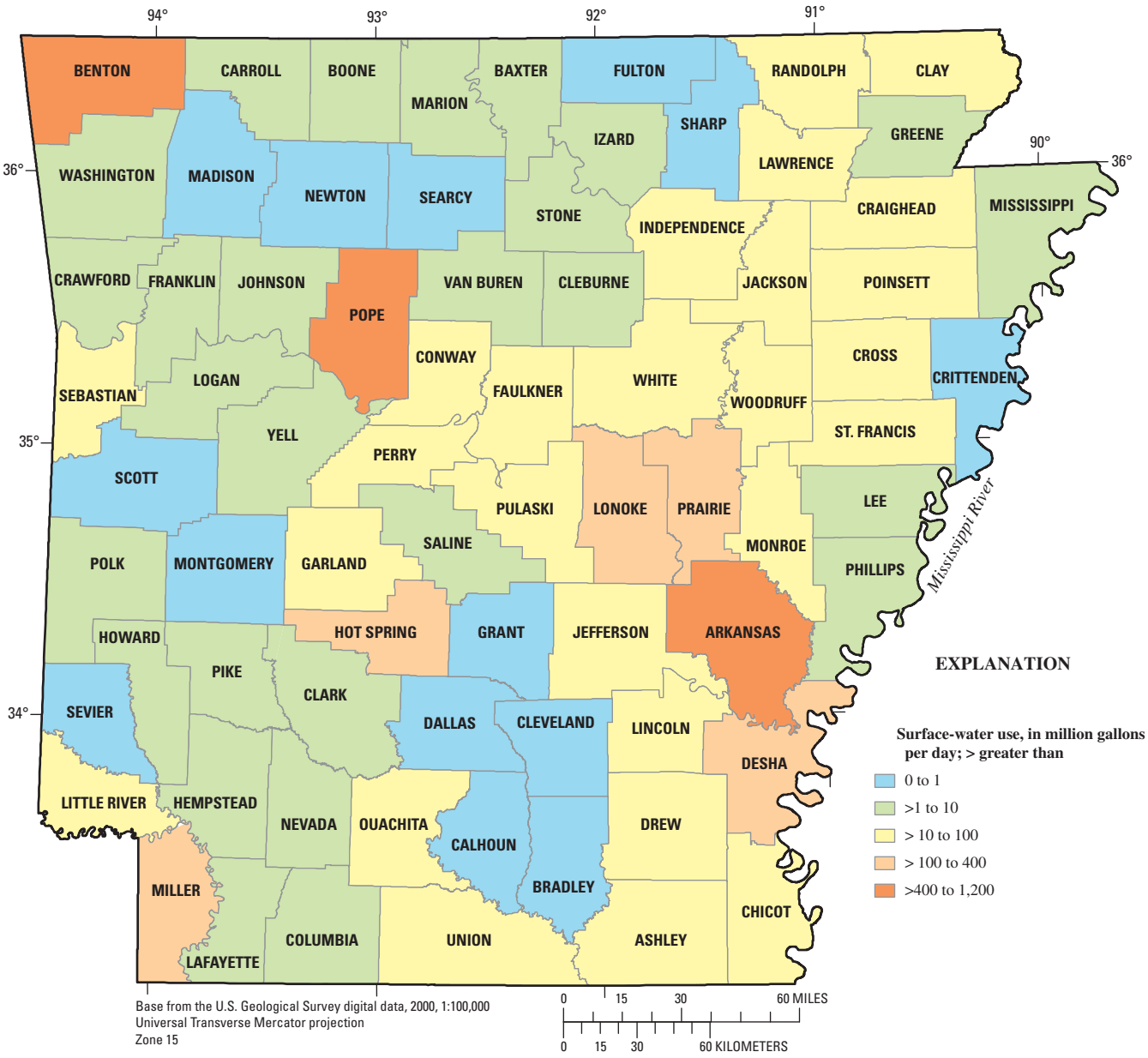

Figure 5. Surface-water use by county for Arkansas, 2005.

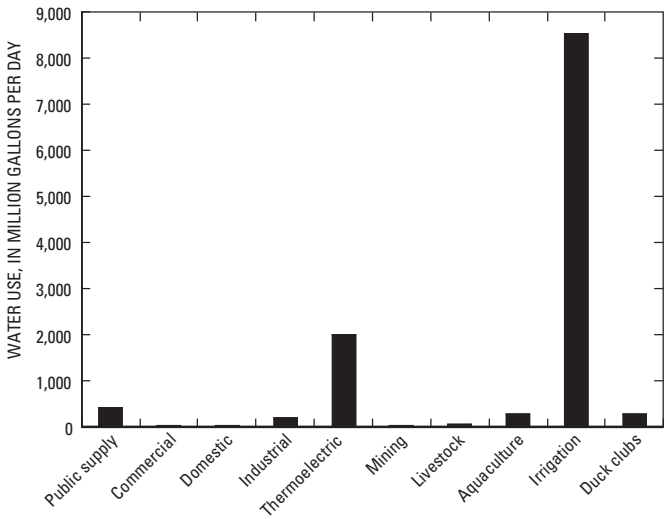

Figure 6. Total water use in Arkansas by category, 2005.

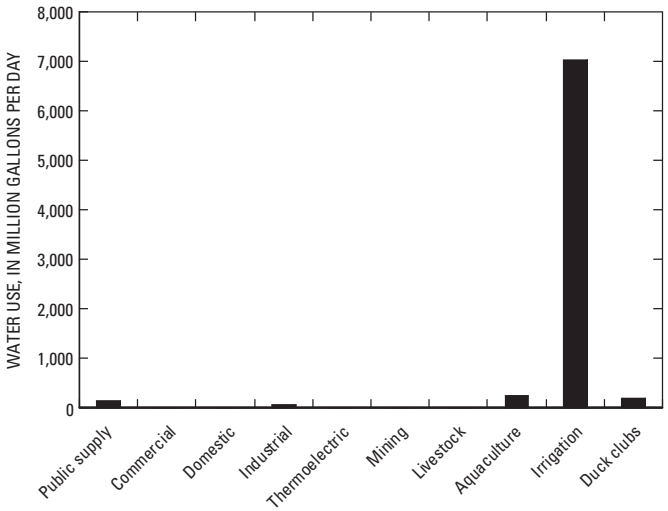

Figure 7. Ground-water use in Arkansas by category, 2005.

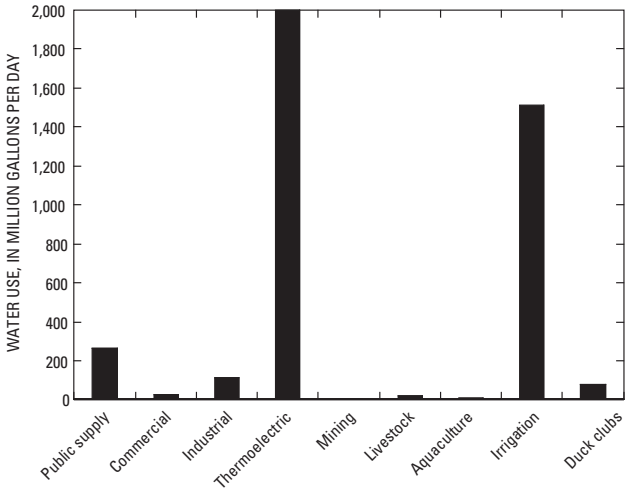

Figure 8. Surface-water use in Arkansas by category, 2005.

Public Supply

Public supply refers to water withdrawn by public and private water suppliers and delivered to multiple users for domestic, commercial, industrial, and thermoelectric power generation uses. Public supply includes public and private systems that furnish water to at least 25 people or have a minimum of 15 service connections.

Data on public-supply withdrawals are obtained from ANRC water-use registration reports. ANRC requires all public and private suppliers in Arkansas to report their annual and monthly withdrawals and deliveries. Site-specific data for about 800 public-water suppliers are stored in the WUDBS maintained by USGS. Data reporting deficiencies are supplemented with information from monthly operation reports reported to the Arkansas Department of Health (ADH). Population served, source of water, water sold to facilities, and water purchased from other public supply facilities are available on the ADH web site (Arkansas Department of Health, 2007).

Public-supply systems served about 2.6 million people or about 93 percent of Arkansas' population in 2005. Public-supply withdrawals in 2005 in Arkansas were 404 Mgal/d (table 2; fig. 6); about 66 percent were from surface-water sources. Public-supply withdrawals account for about 4 percent of the total withdrawals of water in the State for all purposes. Ground-water withdrawals for public supply were about 2 percent of the State's total ground-water withdrawals for 2005. Public-supply surface-water withdrawals were about 7 percent of the State's total surface-water withdrawals.

Benton County had the largest total withdrawals for public supply at 59 Mgal/d during 2005. Jefferson County had the

Table 2. Public supply and per capita water use in Arkansas, 2005.

[Mgal/d, million gallons per day; gal/d, gallons per day]

County	Total population served (thousands)	Water withdrawals (Mgal/d)			Per capita water use (gal/d)
		Ground water	Surface water	Total	
Arkansas	18.07	6.02	0.00	6.02	333
Ashley	21.12	2.12	0.00	2.12	100
Baxter	32.90	0.53	3.67	4.20	128
Benton	181.20	1.10	57.99	59.09	326
Boone	30.34	0.88	0.33	1.21	40
Bradley	11.64	1.22	0.00	1.22	105
Calhoun	4.50	0.40	0.00	0.40	89
Carroll	23.59	0.90	7.71	8.61	365
Chicot	11.03	1.82	0.00	1.82	165
Clark	22.13	0.07	2.82	2.89	131
Clay	16.58	1.42	0.00	1.42	86
Cleburne	24.39	0.08	7.82	7.90	324
Cleveland	8.10	0.54	0.00	0.54	67
Columbia	24.00	1.38	1.96	3.34	139
Conway	18.74	0.00	4.00	4.00	213
Craighead	81.61	13.52	0.00	13.52	166
Crawford	50.36	0.00	5.82	5.82	116
Crittenden	49.88	8.47	0.00	8.47	170
Cross	19.24	2.44	0.00	2.44	127
Dallas	7.26	1.34	0.00	1.34	185
Desha	14.36	2.18	0.00	2.18	152
Drew	17.94	2.78	0.00	2.78	155
Faulkner	91.85	0.52	8.03	8.55	93
Franklin	18.22	0.00	2.89	2.89	159
Fulton	10.95	1.28	0.00	1.28	117
Garland	92.77	0.13	16.55	16.68	180
Grant	15.96	2.03	0.00	2.03	127
Greene	38.87	4.23	0.00	4.23	109
Hempstead	14.65	2.65	0.43	3.08	210
Hot Spring	29.50	0.00	3.64	3.64	123
Howard	14.01	0.01	3.31	3.32	237
Independence	32.83	0.87	5.52	6.39	195
Izard	11.85	1.01	0.00	1.01	85
Jackson	16.01	1.52	0.00	1.52	95
Jefferson	80.38	14.25	0.00	14.25	177
Johnson	24.04	0.00	4.58	4.58	191
Lafayette	5.85	0.92	0.00	0.92	157
Lawrence	17.15	1.61	0.00	1.61	94
Lee	11.42	0.99	0.00	0.99	87

Table 2. Public supply and per capita water use in Arkansas, 2005.—Continued

[Mgal/d, million gallons per day; gal/d, gallons per day]

County	Total population served (thousands)	Water withdrawals (Mgal/d)			Per capita water use (gal/d)
		Ground water	Surface water	Total	
Lincoln	14.26	1.04	0.00	1.04	73
Little River	12.11	0.61	0.95	1.56	129
Logan	13.24	0.00	3.36	3.36	254
Lonoke	54.51	6.49	0.00	6.49	119
Madison	8.27	0.00	0.00	0.00	0
Marion	9.84	0.03	0.91	0.94	96
Miller	35.02	0.25	0.00	0.25	7
Mississippi	47.91	4.05	0.00	4.05	85
Monroe	9.30	1.49	0.00	1.49	160
Montgomery	3.95	0.03	0.48	0.51	129
Nevada	6.79	0.15	0.77	0.92	135
Newton	7.82	0.97	0.00	0.97	124
Ouachita	26.48	0.97	2.81	3.78	143
Perry	6.90	0.01	0.76	0.77	112
Phillips	24.11	3.70	0.00	3.70	153
Pike	8.42	0.05	0.85	0.90	107
Poinsett	23.54	5.12	0.00	5.12	218
Polk	10.87	0.00	1.74	1.74	160
Pope	53.58	0.00	9.58	9.58	179
Prairie	7.11	0.79	0.00	0.79	111
Pulaski	366.46	4.56	44.67	49.23	134
Randolph	13.01	0.33	1.15	1.48	114
Saline	84.77	1.63	5.93	7.56	89
Scott	7.14	1.69	0.00	1.69	237
Searcy	7.14	0.00	0.38	0.38	53
Sebastian	113.04	0.20	38.04	38.24	338
Sevier	13.46	1.15	0.00	1.15	85
Sharp	14.40	3.80	0.00	3.80	264
St. Francis	25.90	5.18	0.00	5.18	200
Stone	11.72	0.02	1.47	1.49	127
Union	36.77	8.44	0.00	8.44	230
Van Buren	16.03	0.00	2.36	2.36	147
Washington	178.36	0.00	0.58	0.58	3
White	63.13	0.75	8.27	9.02	143
Woodruff	7.16	0.96	0.00	0.96	134
Yell	21.39	2.00	4.28	6.28	294
Total	2,579.20	137.69	266.41	404.10	[1]157

[1]Average per capita use for the State (in gallons per day).

largest ground-water withdrawals for public supply with 14 Mgal/d, Benton County had the largest surface-water withdrawals for public supply (from Beaver Lake) with 58 Mgal/d during 2005. The statewide average for per capita residential use from public supply systems was about 157 gallons per day (gal/d). Carroll County had the highest per capita use at 365 gal/d (table 2).

Domestic (self-supplied)

Domestic water use includes water for household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens. Most water used for domestic purposes in Arkansas is provided by public supply. However, about 199,000 people in Arkansas (or about 1 percent of the State's population) (U.S. Department of Commerce, U.S. Census Bureau, 2005) furnish their own water supplies from individual wells; these users are considered self supplied. All self-supplied withdrawals were assumed to be obtained from ground-water sources.

The domestic (self-supplied) water use in each county was computed by multiplying the population (not served by a public-supply system) by a per-capita-use factor (ranging from 80-97 gal/d per person (Halberg, 1977)) (U.S. Department of Commerce, U.S. Census Bureau, 2005). Domestic use in Arkansas for 2005 (table 3) was 18 Mgal/d. Logan County, at 0.86 Mgal/d, had the highest domestic water use in Arkansas in 2005.

Table 3. Domestic (self-supplied) water use in Arkansas, 2005.

County	Population (in thousands)	Per capita use (gal/d)	Domestic use (Mgal/d)
Arkansas	2.00	90	0.18
Ashley	2.06	88	0.18
Baxter	7.43	89	0.66
Benton	5.74	89	0.51
Boone	5.46	90	0.49
Bradley	0.56	90	0.05
Calhoun	1.09	92	0.10
Carroll	3.41	88	0.30
Chicot	2.00	90	0.18
Clark	0.78	89	0.07
Clay	0.00	0	0.00
Cleburne	1.00	90	0.09
Cleveland	0.80	87	0.07
Columbia	0.70	86	0.06
Conway	2.00	90	0.18
Craighead	5.12	90	0.46
Crawford	7.27	89	0.65
Crittenden	2.00	90	0.18
Cross	0.00	0	0.00
Dallas	1.27	87	0.11
Desha	0.00	0	0.00
Drew	0.75	93	0.07
Faulkner	5.29	89	0.47
Franklin	0.00	0	0.00
Fulton	0.98	92	0.09
Garland	0.78	90	0.07
Grant	1.38	87	0.12
Greene	0.53	94	0.05
Hempstead	8.73	89	0.78
Hot Spring	1.77	91	0.16
Howard	0.54	92	0.05
Independence	1.91	89	0.17
Izard	1.58	88	0.14
Jackson	1.59	88	0.14
Jefferson	1.32	91	0.12
Johnson	0.00	0	0.00
Lafayette	2.17	87	0.19
Lawrence	0.00	0	0.00
Lee	0.12	82	0.01
Lincoln	0.00	0	0.00
Little River	1.12	90	0.10
Logan	9.70	89	0.86
Lonoke	6.15	89	0.55
Madison	6.69	90	0.60
Marion	6.89	89	0.61
Miller	8.14	88	0.72
Mississippi	0.00	0	0.00
Monroe	0.00	0	0.00
Montgomery	5.32	88	0.47
Nevada	2.76	91	0.25
Newton	0.63	95	0.06

Table 3. Domestic (self-supplied) water use in Arkansas, 2005.—Continued

[Mgal/d, million gallons per day]

County	Population (in thousands)	Per capita use (gal/d)	Domestic use (Mgal/d)
Ouachita	0.62	97	0.06
Perry	3.57	90	0.32
Phillips	0.00	0	0.00
Pike	2.62	88	0.23
Poinsett	1.81	88	0.16
Polk	9.31	89	0.83
Pope	3.00	90	0.27
Prairie	2.00	90	0.18
Pulaski	0.00	0	0.00
Randolph	5.46	90	0.49
Saline	6.41	89	0.57
Scott	4.01	90	0.36
Searcy	0.83	85	0.07
Sebastian	5.71	89	0.51
Sevier	3.00	90	0.27
Sharp	3.00	90	0.27
St. Francis	2.00	90	0.18
Stone	0.00	0	0.00
Union	7.41	89	0.66
Van Buren	0.50	80	0.04
Washington	2.00	90	0.18
White	8.20	89	0.73
Woodruff	0.94	85	0.08
Yell	0.00	0	0.00
Total	199.93	[1]89	17.83

[1]Average per capita use for the State (in gallons per day).

Commercial (self-supplied)

Commercial water use includes water for motels, hotels, restaurants, office buildings, schools, and civilian and military institutions. Total commercial (self-supplied) water use in Arkansas for 2005 was 27 Mgal/d, of which about 88 percent (24 Mgal/d) was from surface-water and about 12 percent (3.16 Mgal/d) was from ground-water sources (table 4). The largest self-supplied commercial use of water occurred in Lawrence County at 7.94 Mgal/d of which 97 percent was from surface-water sources. The largest commercial use of ground water (Mississippi River Valley alluvial aquifer) was in Clay County (1.97 Mgal/d).

Table 4. Commercial (self-supplied) water use in Arkansas, 2005.

[Mgal/d, million gallons per day]

County	Ground water (Mgal/d)	Surfac water (Mgal/d)	Total (Mgal/d)
Arkansas	0.18	0.54	0.72
Ashley	0.00	0.00	0.00
Baxter	0.00	0.00	0.00
Benton	0.00	0.15	0.15
Boone	0.00	0.00	0.00
Bradley	0.00	0.00	0.00
Calhoun	0.00	0.00	0.00
Carroll	0.10	0.00	0.10
Chicot	0.00	0.00	0.00
Clark	0.00	0.00	0.00
Clay	1.97	0.58	2.55
Cleburne	0.00	0.17	0.17
Cleveland	0.00	0.00	0.00
Columbia	0.00	0.00	0.00
Conway	0.00	0.00	0.00
Craighead	0.00	0.00	0.00
Crawford	0.00	0.00	0.00
Crittenden	0.00	0.00	0.00
Cross	0.00	0.00	0.00
Dallas	0.00	0.00	0.00
Desha	0.00	0.00	0.00
Drew	0.00	1.25	1.25
Faulkner	0.00	0.00	0.00
Franklin	0.00	0.00	0.00
Fulton	0.00	0.00	0.00
Garland	0.00	0.01	0.01
Grant	0.00	0.00	0.00
Greene	0.14	0.00	0.14
Hempstead	0.01	4.82	4.83
Hot Spring	0.00	0.00	0.00
Howard	0.00	0.00	0.00
Independence	0.00	0.00	0.00
Izard	0.00	0.00	0.00
Jackson	0.00	0.00	0.00
Jefferson	0.00	0.67	0.67
Johnson	0.00	0.02	0.02
Lafayette	0.00	0.00	0.00
Lawrence	0.24	7.70	7.94

Table 4. Commercial (self-supplied) water use in Arkansas, 2005.—Continued

[Mgal/d, million gallons per day]

County	Ground water (Mgal/d)	Surfac water (Mgal/d)	Total (Mgal/d)
Lee	0.00	0.00	0.00
Lincoln	0.00	0.00	0.00
Little River	0.06	0.00	0.06
Logan	0.00	0.00	0.00
Lonoke	0.00	0.00	0.00
Madison	0.00	0.00	0.00
Marion	0.00	0.00	0.00
Miller	0.00	0.80	0.80
Mississippi	0.00	0.44	0.44
Monroe	0.00	0.00	0.00
Montgomery	0.00	0.04	0.04
Nevada	0.00	0.00	0.00
Newton	0.00	0.00	0.00
Ouachita	0.00	0.00	0.00
Perry	0.00	0.21	0.21
Phillips	0.00	0.00	0.00
Pike	0.00	0.03	0.03
Poinsett	0.19	0.00	0.19
Polk	0.01	0.00	0.01
Pope	0.10	0.05	0.15
Prairie	0.00	0.00	0.00
Pulaski	0.12	0.16	0.28
Randolph	0.00	0.00	0.00
Saline	0.00	0.00	0.00
Scott	0.00	0.00	0.00
Searcy	0.00	0.00	0.00
Sebastian	0.00	0.00	0.00
Sevier	0.00	0.00	0.00
Sharp	0.00	0.00	0.00
St. Francis	0.00	0.90	0.90
Stone	0.01	0.00	0.01
Union	0.00	5.46	5.46
Van Buren	0.00	0.00	0.00
Washington	0.03	0.02	0.05
White	0.00	0.00	0.00
Woodruff	0.00	0.00	0.00
Yell	0.00	0.00	0.00
Total	3.16	24.02	27.18

Industrial (self-supplied)

Industrial water use includes water for such purposes as fabrication, processing, washing, and cooling in facilities that manufacture products. The paper products and chemical industries are the largest water users in Arkansas. Total industrial (self-supplied) water use in Arkansas for 2005 was 178 Mgal/d, of which about 37 percent (66 Mgal/d) was from ground-water and about 63 percent (113 Mgal/d) was from surface-water sources (table 5). The largest total water use occurred in Ashley County at 59 Mgal/d. The largest ground water use (Sparta-Memphis aquifer) occurred in Jefferson County (43 Mgal/d) and the largest surface water use occurred in Ashley County (53 Mgal/d).

Table 5. Industrial (self-supplied) water use in Arkansas, 2005.

[Mgal/d, million gallons per day]

County	Ground water (Mgal/d)	Surface water (Mgal/d)	Total (Mgal/d)
Arkansas	0.00	0.00	0.00
Ashley	6.20	52.81	59.01
Baxter	0.61	0.00	0.61
Benton	0.00	0.16	0.16
Boone	0.00	0.00	0.00
Bradley	0.46	0.00	0.46
Calhoun	0.00	0.00	0.00
Carroll	0.00	0.00	0.00
Chicot	0.00	0.00	0.00
Clark	0.27	0.00	0.27
Clay	0.00	0.00	0.00
Cleburne	0.00	0.00	0.00
Cleveland	0.00	0.00	0.00
Columbia	2.08	0.09	2.17
Conway	0.00	7.62	7.62
Craighead	0.00	0.00	0.00
Crawford	0.00	0.45	0.45
Crittenden	0.30	0.00	0.30
Cross	0.40	0.00	0.40
Dallas	0.00	0.00	0.00
Desha	3.19	9.92	13.11
Drew	0.00	0.00	0.00
Faulkner	0.00	0.00	0.00
Franklin	0.00	0.00	0.00
Fulton	0.00	0.00	0.00
Garland	0.06	2.35	2.41

Table 5. Industrial (self-supplied) water use in Arkansas, 2005.—Continued

[Mgal/d, million gallons per day]

County	Ground water (Mgal/d)	Surface water (Mgal/d)	Total (Mgal/d)
Grant	0.15	0.00	0.15
Greene	0.00	0.00	0.00
Hempstead	0.00	0.00	0.00
Hot Spring	0.00	0.04	0.04
Howard	0.00	1.18	1.18
Independence	0.00	32.61	32.61
Izard	0.00	2.85	2.85
Jackson	0.00	0.00	0.00
Jefferson	42.54	0.00	42.54
Johnson	0.00	0.00	0.00
Lafayette	0.00	0.00	0.00
Lawrence	0.00	0.00	0.00
Lee	0.00	0.00	0.00
Lincoln	0.00	0.00	0.00
Little River	0.24	1.31	1.55
Logan	0.00	0.00	0.00
Lonoke	0.59	0.00	0.59
Madison	0.00	0.00	0.00
Marion	0.00	0.00	0.00
Miller	0.00	0.00	0.00
Mississippi	2.16	0.00	2.16
Monroe	0.00	0.00	0.00
Montgomery	0.00	0.00	0.00
Nevada	0.17	0.00	0.17
Newton	0.00	0.00	0.00
Ouachita	0.00	0.00	0.00
Perry	0.00	0.00	0.00
Phillips	0.00	0.00	0.00
Pike	0.00	0.00	0.00
Poinsett	0.00	0.00	0.00
Polk	0.00	0.00	0.00
Pope	0.00	0.00	0.00
Prairie	0.00	0.00	0.00
Pulaski	0.00	0.00	0.00
Randolph	0.00	0.00	0.00
Saline	0.00	0.34	0.34
Scott	0.00	0.00	0.00
Searcy	0.00	0.00	0.00
Sebastian	0.00	0.00	0.00
Sevier	0.00	0.34	0.34
Sharp	0.00	0.50	0.50
St. Francis	0.00	0.00	0.00
Stone	0.00	0.00	0.00
Union	6.33	0.00	6.33
Van Buren	0.00	0.00	0.00
Washington	0.00	0.00	0.00
White	0.00	0.00	0.00
Woodruff	0.00	0.00	0.00
Yell	0.00	0.00	0.00
Total	65.75	112.57	178.32

Mining

Mining water use includes, in part, water used for coal, sand and gravel washing operations, and saline withdrawals from oil and natural gas production wells. Total mining water use in Arkansas for 2005 was 1.29 Mgal/d, of which about 19 percent (0.24 Mgal/d) was from ground-water and about 81 percent (1.05 Mgal/d) was from surface-water sources (table 6). The largest use of mining water (sand and gravel operations) occurred in Lawrence County at 0.68 Mgal/d of which 100 percent was from surface-water sources. The largest mining use of ground water (sand and gravel operations) occurred in Craighead and Poinsett Counties at 0.08 Mgal/d each.

Table 6. Mining water use in Arkansas, 2005.

[Mgal/d, million gallons per day]

County	Ground water (Mgal/d)	Surface water (Mgal/d)	Total (Mgal/d)
Arkansas	0.00	0.00	0.00
Ashley	0.00	0.00	0.00
Baxter	0.00	0.00	0.00
Benton	0.00	0.03	0.03
Boone	0.00	0.01	0.01
Bradley	0.00	0.00	0.00
Calhoun	0.00	0.00	0.00
Carroll	0.00	0.00	0.00
Chicot	0.00	0.00	0.00
Clark	0.00	0.01	0.01
Clay	0.00	0.00	0.00
Cleburne	0.00	0.00	0.00
Cleveland	0.00	0.00	0.00
Columbia	0.00	0.00	0.00
Conway	0.00	0.00	0.00
Craighead	0.08	0.00	0.08
Crawford	0.00	0.00	0.00
Crittenden	0.00	0.00	0.00
Cross	0.00	0.00	0.00
Dallas	0.00	0.00	0.00
Desha	0.00	0.00	0.00
Drew	0.00	0.00	0.00
Faulkner	0.00	0.01	0.01
Franklin	0.00	0.00	0.00
Fulton	0.00	0.00	0.00
Garland	0.00	0.00	0.00
Grant	0.00	0.00	0.00
Greene	0.07	0.00	0.07
Hempstead	0.00	0.00	0.00
Hot Spring	0.00	0.12	0.12
Howard	0.00	0.00	0.00
Independence	0.00	0.00	0.00
Izard	0.00	0.00	0.00
Jackson	0.00	0.00	0.00
Jefferson	0.01	0.00	0.01
Johnson	0.00	0.00	0.00
Lafayette	0.00	0.00	0.00
Lawrence	0.00	0.68	0.68
Lee	0.00	0.00	0.00
Lincoln	0.00	0.00	0.00
Little River	0.00	0.00	0.00
Logan	0.00	0.07	0.07
Lonoke	0.00	0.06	0.06
Madison	0.00	0.00	0.00
Marion	0.00	0.00	0.00
Miller	0.00	0.00	0.00
Mississippi	0.00	0.00	0.00
Monroe	0.00	0.00	0.00
Montgomery	0.00	0.00	0.00
Nevada	0.00	0.00	0.00
Newton	0.00	0.00	0.00
Ouachita	0.00	0.00	0.00
Perry	0.00	0.00	0.00
Phillips	0.00	0.00	0.00
Pike	0.00	0.00	0.00
Poinsett	0.08	0.00	0.08
Polk	0.00	0.02	0.02
Pope	0.00	0.00	0.00
Prairie	0.00	0.00	0.00
Pulaski	0.00	0.04	0.04
Randolph	0.00	0.00	0.00
Saline	0.00	0.00	0.00
Scott	0.00	0.00	0.00
Searcy	0.00	0.00	0.00
Sebastian	0.00	0.00	0.00
Sevier	0.00	0.00	0.00
Sharp	0.00	0.00	0.00
St. Francis	0.00	0.00	0.00
Stone	0.00	0.00	0.00
Union	0.00	0.00	0.00
Van Buren	0.00	0.00	0.00
Washington	0.00	0.00	0.00
White	0.00	0.00	0.00
Woodruff	0.00	0.00	0.00
Yell	0.00	0.00	0.00
Total	0.24	1.05	1.29

Livestock

Livestock water use includes water used for stock watering, feed lots, dairy farming, and other farm needs. Many livestock water users fall below the ANRC threshold for reporting either ground water or surface water. Water users that report their usage of water for livestock represent a small portion of the livestock water users in the State. Therefore, the majority of the water use reported for livestock was estimated based on water requirements (Holland, 1987; table 7). The data components required for estimation of water use for livestock include county livestock population and the appropriate water requirement, or water-use coefficient, for each type of livestock produced. Livestock population values for Arkansas for 2005 were published by county by the U.S. Department of Agriculture Crop Reporting Service web site (U.S. Department of Agriculture, 2005). Livestock population was multiplied by the water requirement to obtain the livestock water-use estimate.

Total livestock water use in Arkansas for 2005 was 39 Mgal/d, of which about 40 percent (16 Mgal/d) was from ground-water sources and about 60 percent (23 Mgal/d) was from surface-water sources (table 8). Consumptive use for livestock is considered to be 100 percent of withdrawals. The largest use of livestock water was in Benton County at 2.92 Mgal/d. Washington County was the largest user of ground water at 1.14 Mgal/d. Benton County was the largest surface water user at 1.80 Mgal/d.

Table 7. Livestock water requirements.

Livestock	Water required per animal (gallons per day)
Dairy cattle	30
Other cattle	15
Hogs	2
Poultry	
Broilers	0.04
Hens	0.06
Turkeys	0.08

Table 8. Livestock water use in Arkansas, 2005.

[Mgal/d, million gallons per day]

County	Ground water (Mgal/d)	Surface water (Mgal/d)	Total (Mgal/d)
Arkansas	0.02	0.03	0.05
Ashley	0.03	0.04	0.07
Baxter	0.15	0.21	0.36
Benton	1.12	1.80	2.92
Boone	0.54	0.81	1.35
Bradley	0.05	0.08	0.13
Calhoun	0.02	0.04	0.06
Carroll	0.68	1.01	1.69
Chicot	0.04	0.06	0.10
Clark	0.10	0.16	0.26
Clay	0.06	0.10	0.16
Cleburne	0.24	0.36	0.60
Cleveland	0.12	0.20	0.32
Columbia	0.12	0.18	0.30
Conway	0.39	0.58	0.97
Craighead	0.05	0.07	0.12
Crawford	0.24	0.35	0.59
Crittenden	0.00	0.01	0.01
Cross	0.03	0.04	0.07
Dallas	0.02	0.03	0.05
Desha	0.02	0.03	0.05
Drew	0.07	0.09	0.16
Faulkner	0.30	0.46	0.76
Franklin	0.40	0.60	1.00
Fulton	0.33	0.48	0.81
Garland	0.06	0.08	0.14
Grant	0.07	0.10	0.17
Greene	0.06	0.09	0.15
Hempstead	0.58	0.85	1.43
Hot Spring	0.11	0.17	0.28
Howard	0.44	0.65	1.09
Independence	0.35	0.53	0.88
Izard	0.24	0.37	0.61
Jackson	0.02	0.04	0.06
Jefferson	0.04	0.05	0.09
Johnson	0.29	0.42	0.71
Lafayette	0.26	0.39	0.65
Lawrence	0.17	0.24	0.41
Lee	0.02	0.02	0.04

Table 8. Livestock water use in Arkansas, 2005.—Continued

[Mgal/d, million gallons per day]

County	Ground water (Mgal/d)	Surface water (Mgal/d)	Total (Mgal/d)
Lincoln	0.10	0.16	0.26
Little River	0.23	0.35	0.58
Logan	0.51	0.75	1.26
Lonoke	0.12	0.18	0.30
Madison	0.55	0.83	1.38
Marion	0.19	0.30	0.49
Miller	0.21	0.31	0.52
Mississippi	0.00	0.01	0.01
Monroe	0.01	0.01	0.02
Montgomery	0.20	0.29	0.49
Nevada	0.16	0.24	0.40
Newton	0.14	0.22	0.36
Ouachita	0.05	0.07	0.12
Perry	0.13	0.19	0.32
Phillips	0.01	0.01	0.02
Pike	0.18	0.26	0.44
Poinsett	0.02	0.03	0.05
Polk	0.33	0.48	0.81
Pope	0.38	0.57	0.95
Prairie	0.03	0.05	0.08
Pulaski	0.06	0.10	0.16
Randolph	0.23	0.35	0.58
Saline	0.07	0.11	0.18
Scott	0.30	0.45	0.75
Searcy	0.22	0.32	0.54
Sebastian	0.23	0.34	0.57
Sevier	0.32	0.48	0.80
Sharp	0.24	0.37	0.61
St. Francis	0.02	0.02	0.04
Stone	0.25	0.37	0.62
Union	0.12	0.18	0.30
Van Buren	0.16	0.24	0.40
Washington	1.14	1.71	2.85
White	0.39	0.59	0.98
Woodruff	0.01	0.01	0.02
Yell	0.37	0.55	0.92
Total	15.53	23.32	38.85

Aquaculture

Aquaculture water use includes water used for farming of organisms that live in water, such as fish, shellfish, and algae. Total aquaculture water use in Arkansas for 2005 was 256 Mgal/d, of which about 96 percent (246 Mgal/d) was from ground-water sources and about 4 percent (11 Mgal/d) was from surface-water sources (table 9). The largest use of aquacultural water was in Lonoke County at 60 Mgal/d of which 94 percent was from ground-water sources. The largest aquaculture use of ground water was in Chicot County at 57 Mgal/d and the largest use of surface water was in Lonoke County at 3.36 Mgal/d. Other counties with notable aquaculture water use (greater than 20 Mgal/d) were Prairie and Ashley in order of decreasing use.

Table 9. Aquaculture water use in Arkansas, 2005.

[Mgal/d, million gallons per day]

County	Ground water (Mga/d)	Surface water (Mgal/d)	Total (Mgal/d)
Arkansas	8.26	0.00	8.26
Ashley	22.91	0.11	23.02
Baxter	0.00	0.00	0.00
Benton	0.07	0.00	0.07
Boone	0.00	0.00	0.00
Bradley	0.00	0.00	0.00
Calhoun	0.00	0.00	0.00
Carroll	0.00	0.00	0.00
Chicot	56.79	0.90	57.69
Clark	0.00	0.00	0.00
Clay	1.52	0.16	1.68
Cleburne	0.00	0.00	0.00
Cleveland	0.00	0.00	0.00
Columbia	0.00	0.00	0.00
Conway	0.00	0.00	0.00
Craighead	0.16	0.00	0.16
Crawford	0.00	0.00	0.00
Crittenden	1.50	0.00	1.50
Cross	0.02	0.03	0.05
Dallas	0.00	0.00	0.00
Desha	9.67	2.61	12.28
Drew	0.03	0.00	0.03
Faulkner	0.00	0.00	0.00
Franklin	0.00	0.00	0.00
Fulton	0.13	0.00	0.13
Garland	0.00	0.00	0.00

Table 9. Aquaculture water use in Arkansas, 2005.—Continued

[Mgal/d, million gallons per day]

County	Ground water (Mga/d)	Surface water (Mgal/d)	Total (Mgal/d)
Grant	0.00	0.00	0.00
Greene	12.91	0.00	12.91
Hempstead	0.00	0.00	0.00
Hot Spring	0.00	0.00	0.00
Howard	0.00	0.00	0.00
Independence	0.00	0.00	0.00
Izard	0.00	0.00	0.00
Jackson	3.40	0.00	3.40
Jefferson	2.03	3.12	5.15
Johnson	0.00	0.00	0.00
Lafayette	4.49	0.00	4.49
Lawrence	0.26	0.00	0.26
Lee	3.64	0.00	3.64
Lincoln	3.89	0.00	3.89
Little River	0.00	0.00	0.00
Logan	0.00	0.00	0.00
Lonoke	56.60	3.36	59.96
Madison	0.00	0.02	0.02
Marion	0.00	0.00	0.00
Miller	0.35	0.00	0.35
Mississippi	0.98	0.00	0.98
Monroe	13.38	0.02	13.40
Montgomery	0.00	0.00	0.00
Nevada	0.00	0.00	0.00
Newton	0.00	0.00	0.00
Ouachita	0.00	0.00	0.00
Perry	0.00	0.00	0.00
Phillips	0.02	0.00	0.02
Pike	0.01	0.00	0.01
Poinsett	4.72	0.09	4.81
Polk	0.00	0.00	0.00
Pope	0.00	0.00	0.00
Prairie	32.89	0.15	33.04
Pulaski	0.09	0.01	0.10
Randolph	0.00	0.00	0.00
Saline	0.00	0.00	0.00
Scott	0.00	0.00	0.00
Searcy	0.00	0.00	0.00
Sebastian	0.00	0.00	0.00
Sevier	0.00	0.00	0.00
Sharp	0.00	0.00	0.00
St. Francis	2.33	0.03	2.36
Stone	0.00	0.00	0.00
Union	0.00	0.00	0.00
Van Buren	0.00	0.00	0.00
Washington	0.00	0.00	0.00
White	0.27	0.04	0.31
Woodruff	2.50	0.00	2.50
Yell	0.00	0.00	0.00
Total	245.82	10.65	256.47

Irrigation

Irrigation water use includes water applied on lands to assist in the growing of crops and pastures or to maintain vegetative growth in recreational lands, such as parks and golf courses according to the ANRC. The major crops irrigated in Arkansas (in descending order of water use) are rice, soybeans, cotton, corn, and milo. During 2005 there were nearly 4.73 million acres of irrigated land reported to ANRC for Arkansas. Rice totaled 1.73 million acres or about 35 percent of the total land irrigated in the State. The primary types of irrigation were flood, furrow, and to a lesser extent, microirrigation. Irrigation water use accounted for 92 percent (6,942 Mgal/d) of the ground water withdrawn in Arkansas (table 10) and 72 percent (8,265 Mgal/d) of the total withdrawals.

Irrigation water use totaled 8,265 Mgal/d, of which about 84 percent (6,942 Mgal/d) was from ground-water sources and about 16 percent (1,323 Mgal/d) was from surface-water sources (table 10). Water used for the growing of rice totaled 4,583 Mgal/d or about 40 percent of the total water used in Arkansas during 2005. The largest use of water for irrigation was Arkansas County with 836 Mgal/d, of which about 56 percent (470 Mgal/d) was from ground-water sources and about 44 percent (366 Mgal/d) was from surface-water sources. Other counties with notable total irrigation water use (greater than 400 Mgal/d) were Poinsett, Cross, Clay, and Lonoke, in order of decreasing use (table 10).

Table 10. Irrigation water use in Arkansas, 2005.

[Mgal/d, million gallons per day]

	Water withdrawals (Mgal/d)			Irrigated land (thousand acres)			
County	Ground water	Surface water	Total	Micro-irrigation	Sprinkler	Surface	Total
Arkansas	470.15	366.29	836.44	16.99	0.45	391.26	408.70
Ashley	124.86	12.86	137.72	0.01	0.13	105.20	105.34
Baxter	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benton	0.07	0.08	0.15	0.13	0.09	0.10	0.32
Boone	0.00	0.04	0.04	0.06	0.00	0.00	0.06
Bradley	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Calhoun	0.01	0.00	0.01	0.00	0.02	0.00	0.02
Carroll	0.89	0.00	0.89	12.50	0.00	0.00	12.50
Chicot	190.70	69.43	260.13	3.97	26.59	142.43	172.99
Clark	0.00	3.05	3.05	1.33	0.00	1.12	2.45
Clay	466.08	9.36	475.44	0.77	10.00	189.77	200.54
Cleburne	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cleveland	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Columbia	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conway	1.94	4.70	6.64	0.15	1.43	5.58	7.16
Craighead	350.76	44.23	394.99	0.00	7.55	250.44	257.99
Crawford	0.05	0.99	1.04	1.43	1.39	0.70	3.52
Crittenden	148.94	0.96	149.90	0.73	59.06	62.29	122.08
Cross	596.40	44.56	640.96	0.61	8.41	228.69	237.71
Dallas	0	0.00	0	0.00	0.00	0.00	0.00
Desha	284.37	87.75	372.12	0.39	2.49	214.30	217.18
Drew	74.25	12.07	86.32	0.01	0.10	54.79	54.90
Faulkner	1.11	6.31	7.42	0.20	0.05	3.83	4.08
Franklin	0.00	0.03	0.03	0.10	0.00	0.00	0.10
Fulton	0.13	0.00	0.13	0.00	0.00	0.18	0.18
Garland	0.00	0.57	0.57	0.00	0.02	0.10	0.12
Grant	0.23	0.00	0.23	0.00	0.00	0.09	0.09
Greene	206.17	3.81	209.98	0.00	6.11	142.27	148.38
Hempstead	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hot Spring	0.00	6.86	6.86	0.00	0.00	3.01	3.01
Howard	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Independence	40.43	14.97	55.40	0.47	6.45	22.56	29.48
Izard	0.40	0.00	0.40	0.00	0.00	0.20	0.20
Jackson	369.86	17.54	387.40	8.25	19.75	189.57	217.57
Jefferson	215.58	43.01	258.59	0.55	4.13	171.84	176.52
Johnson	0.03	0.00	0.03	0.00	0.01	0.58	0.59
Lafayette	28.42	1.01	29.43	0.16	2.73	18.31	21.20
Lawrence	220.77	24.21	244.98	0.05	1.26	134.94	136.25

Table 10. Irrigation water use in Arkansas, 2005.—Continued

[Mgal/d, million gallons per day]

County	Water withdrawals (Mgal/d)			Irrigated land (thousand acres)			
	Ground water	Surface water	Total	Micro-irrigation	Sprinkler	Surface	Total
Lee	254.71	4.85	259.56	3.33	27.84	132.47	163.64
Lincoln	177.81	23.34	201.15	1.35	0.00	112.37	113.72
Little River	3.19	5.15	8.34	0.20	0.00	5.40	5.60
Logan	0.28	0.07	0.35	0.00	0.00	0.60	0.60
Lonoke	355.84	103.56	459.40	1.94	2.21	264.50	268.65
Madison	0.00	0.13	0.13	0.04	0.08	0.02	0.14
Marion	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Miller	9.75	67.99	77.74	0.24	2.78	30.78	33.80
Mississippi	270.57	2.12	272.69	7.23	126.22	119.11	252.56
Monroe	269.62	22.56	292.18	0.26	1.59	166.31	168.16
Montgomery	0.00	0.01	0.01	0.00	0.01	0.00	0.01
Nevada	0.00	0.35	0.35	0.00	0.14	0.14	0.28
Newton	0.00	0.01	0.01	0.00	0.00	0.00	0.00
Ouachita	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Perry	0.00	13.17	13.17	0.67	1.45	2.46	4.58
Phillips	204.31	1.77	206.08	8.57	75.55	96.18	180.30
Pike	0.01	0.07	0.08	0.01	0.08	0.00	0.09
Poinsett	671.27	83.69	754.96	6.45	33.02	287.03	326.50
Polk	0.00	0.15	0.15	0.00	0.17	0.00	0.17
Pope	1.34	0.61	1.95	0.12	0.24	1.21	1.57
Prairie	218.68	89.64	308.32	3.77	0.85	200.80	205.42
Pulaski	20.76	12.61	33.37	0.09	2.67	22.79	25.55
Randolph	101.46	37.38	138.84	0.77	0.29	59.20	60.26
Saline	0.02	0.60	0.62	0.10	0.29	0.00	0.39
Scott	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Searcy	0.00	0.00		0.00	0.00	0.00	0.00
Sebastian	0.00	0.08	0.08	0.00	0.01	0.06	0.07
Sevier	0.00	0.00	0.00	0.01	0.00	0.00	0.01
Sharp	0.00	0.11	0.11	0.13	0.04	0.07	0.24
St. Francis	285.34	17.34	302.68	0.00	29.97	135.93	165.90
Stone	0.32	0.00	0.32	0.00	0.22	0.06	0.28
Union	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Van Buren	0.21	0.00	0.21	0.00	0.00	0.12	0.12
Washington	0.00	0.19	0.19	0.06	0.12	0.04	0.22
White	41.57	33.84	75.41	0.40	2.93	37.32	40.65
Woodruff	262.50	24.60	287.10	0.25	15.37	152.61	168.23
Yell	0.00	2.59	2.59	0.00	0.00	1.08	1.08
Total	6,942.16	1,323.27	8,265.12	84.85	482.36	4,162.81	4,730.02

Duck (Hunting) Clubs

Duck (hunting) clubs are for the restricted use of their members and their guests. Both ground and surface water are applied to fill open fields or large bayous or ponds with water to attract migratory waterfowl for the purpose of hunting. Until recently (2003), duck (hunting) club water use had been included in the irrigation category. Water-use accounting by duck clubs is important because duck hunting season (usually between October and January) is when the greatest ground-water recharge occurs. Total duck (hunting) club water use in Arkansas for 2005 was 269 Mgal/d, of which about 30 percent (81 Mgal/d) was from ground-water and about 70 percent (188 Mgal/d) was from surface-water sources (table 11). The largest use of water for duck (hunting) clubs was in Arkansas County at 115 Mgal/d of which 79 percent (91 Mgal/d) was from surface-water sources and 21 percent (25 Mgal/d) was from ground-water sources. Other counties with substantial duck (hunting) club water use (greater than 10 Mgal/d) were Miller, Desha, Prairie, Jackson, and Jefferson, in order of decreasing use.

Table 11. Duck (hunting) clubs water use in Arkansas, 2005.

[Mgal/d, million gallons per day]

County	Ground water (Mgal/d)	Surface water (Mgal/d)	Total (Mgal/d)
Arkansas	24.67	90.78	115.45
Ashley	0.00	0.00	0.00
Baxter	0.00	0.00	0.00
Benton	0.00	0.00	0.00
Boone	0.00	0.00	0.00
Bradley	0.00	0.00	0.00
Calhoun	0.00	0.00	0.00
Carroll	0.00	0.00	0.00
Chicot	0.00	0.00	0.00
Clark	0.00	0.03	0.03
Clay	0.00	0.00	0.00
Cleburne	0.00	0.00	0.00
Cleveland	0.00	0.00	0.00
Columbia	0.00	0.00	0.00
Conway	0.00	0.00	0.00
Craighead	0.00	0.38	0.38
Crawford	0.00	0.00	0.00
Crittenden	0.12	0.00	0.12
Cross	0.00	0.38	0.38
Dallas	0.31	0.00	0.31
Desha	4.91	8.96	13.87
Drew	0.20	0.00	0.20
Faulkner	0.00	0.00	0.00
Franklin	0.00	0.00	0.00
Fulton	0.00	0.00	0.00
Garland	0.00	0.00	0.00
Grant	0.00	0.00	0.00
Greene	0.00	0.00	0.00
Hempstead	0.00	2.24	2.24
Hot Spring	0.00	0.43	0.43
Howard	0.00	0.00	0.00
Independence	0.02	0.45	0.47
Izard	0.00	0.00	0.00
Jackson	8.18	5.00	13.18
Jefferson	5.14	7.91	13.05
Johnson	0.00	0.00	0.00
Lafayette	4.62	0.41	5.03
Lawrence	0.22	0.00	0.22
Lee	7.42	0.54	7.96
Lincoln	0.03	0.03	0.06
Little River	0.00	2.28	2.28
Logan	0.00	0.00	0.00
Lonoke	3.65	3.25	6.90
Madison	0.00	0.00	0.00
Marion	0.00	0.00	0.00
Miller	5.00	41.20	46.20
Mississippi	0.00	0.00	0.00
Monroe	5.54	3.82	9.36
Montgomery	0.00	0.00	0.00
Nevada	0.00	0.00	0.00
Newton	0.00	0.00	0.00
Ouachita	0.00	0.00	0.00
Perry	0.00	0.00	0.00
Phillips	0.04	0.00	0.04
Pike	0.00	0.00	0.00
Poinsett	0.75	6.67	7.42
Polk	0.00	0.00	0.00
Pope	0.00	0.00	0.00
Prairie	1.01	12.34	13.35

Table 11. Duck (hunting) clubs water use in Arkansas, 2005.—Continued

[Mgal/d, million gallons per day]

County	Ground water (Mgal/d)	Surface water (Mgal/d)	Total (Mgal/d)
Pulaski	0.80	0.09	0.89
Randolph	0.00	0.00	0.00
Saline	0.00	0.00	0.00
Scott	0.00	0.00	0.00
Searcy	0.00	0.00	0.00
Sebastian	0.00	0.00	0.00
Sevier	0.00	0.00	0.00
Sharp	0.00	0.00	0.00
St Francis	2.68	0.28	2.96
Stone	0.00	0.00	0.00
Union	0.00	0.00	0.00
Van Buren	0.00	0.00	0.00
Washington	0.00	0.00	0.00
White	4.88	0.19	5.07
Woodruff	0.95	0.27	1.22
Yell	0.00	0.00	0.00
Total	81.14	187.93	269.07

Thermoelectric Power Generation

Water is used in the process of the generation of thermoelectric power for boiler makeup, cooling, and domestic purposes. Surface water generally is diverted for “once through” cooling and then returned to a stream. Total thermoelectric power generation water use in Arkansas for 2005 was 1,997 Mgal/d of which more than 99 percent (1,996 Mgal/d) was from surface-water sources and less than 1 percent (0.93 Mgal/d) was from ground-water sources (table 12). Water used for thermoelectric power generation was about 17 percent of the total water used in Arkansas during 2005 and 51 percent of the total surface water used. About 58 percent (1,152 Mgal/d) of the water used in this category was used for cooling at a nuclear power plant in Pope County. About 98 percent (1,957 Mgal/d) of the water used in this category was used in Pope (Lake Dardanelle), Benton, Hot Spring (Lake Catherine and Ouachita River), Woodruff (White River), and Ouachita (Ouachita River) Counties, in order of decreasing use.

Table 12. Thermoelectric-power generation water use in Arkansas, 2005.

County	Ground water (Mgal/d)	Surface water (Mgal/d)	Total (Mgal/d)
Arkansas	0.00	0.00	0.00
Ashley	0.00	10.15	10.15
Baxter	0.00	0.00	0.00
Benton	0.00	377.97	377.97
Boone	0.00	0.00	0.00
Bradley	0.00	0.00	0.00
Calhoun	0.00	0.00	0.00
Carroll	0.00	0.00	0.00
Chicot	0.00	0.00	0.00
Clark	0.00	0.00	0.00
Clay	0.00	0.00	0.00
Cleburne	0.00	0.00	0.00
Cleveland	0.00	0.00	0.00
Columbia	0.00	0.00	0.00
Conway	0.00	0.00	0.00
Craighead	0.00	0.00	0.00
Crawford	0.00	0.00	0.00
Crittenden	0.00	0.00	0.00
Cross	0.00	0.00	0.00
Dallas	0.00	0.00	0.00
Desha	0.00	0.00	0.00
Drew	0.00	0.00	0.00
Faulkner	0.00	0.00	0.00
Franklin	0.00	0.00	0.00
Fulton	0.00	0.00	0.00
Garland	0.00	0.00	0.00
Grant	0.00	0.00	0.00
Greene	0.00	0.00	0.00
Hempstead	0.00	0.00	0.00
Hot Spring	0.00	311.64	311.64
Howard	0.00	0.00	0.00
Independence	0.00	8.66	8.66
Izard	0.00	0.00	0.00
Jackson	0.00	0.00	0.00
Jefferson	0.00	15.51	15.51
Johnson	0.00	0.00	0.00
Lafayette	0.50	0.00	0.50
Lawrence	0.00	0.00	0.00
Lee	0.00	0.00	0.00
Lincoln	0.00	0.00	0.00
Little River	0.00	0.00	0.00
Logan	0.00	0.00	0.00
Lonoke	0.00	0.00	0.00
Madison	0.00	0.00	0.00
Marion	0.00	0.00	0.00
Miller	0.00	0.00	0.00
Mississippi	0.00	0.00	0.00
Monroe	0.00	0.00	0.00
Montgomery	0.00	0.00	0.00
Nevada	0.00	0.00	0.00
Newton	0.00	0.00	0.00
Ouachita	0.00	55.58	55.58
Perry	0.00	0.00	0.00
Phillips	0.43	0.00	0.43
Pike	0.00	0.00	0.00
Poinsett	0.00	0.00	0.00
Polk	0.00	0.00	0.00
Pope	0.00	1,152.00	1,152.00
Prairie	0.00	0.00	0.00
Pulaski	0.00	0.20	0.20
Randolph	0.00	0.00	0.00
Saline	0.00	0.00	0.00
Scott	0.00	0.00	0.00
Searcy	0.00	0.00	0.00
Sebastian	0.00	0.00	0.00
Sevier	0.00	0.00	0.00
Sharp	0.00	0.00	0.00
St. Francis	0.00	0.00	0.00
Stone	0.00	0.00	0.00
Union	0.00	5.01	5.01
Van Buren	0.00	0.00	0.00
Washington	0.00	0.00	0.00
White	0.00	0.00	0.00
Woodruff	0.00	59.59	59.59
Yell	0.00	0.00	0.00
Total	0.93	1,996.31	1,997.24

Changes in Water Use, 1965-2005

Total water use in Arkansas has increased about 435 percent between 1965 and 2005 (table 13). Total ground-water use in Arkansas between 1965 and 2005 has increased from 1,231 to 7,510 Mgal/d, an increase of about 510 percent. Total surface-water use in Arkansas between 1965 and 2005 increased from 911 to 3,945 Mgal/d, an increase of 333 percent. Ground-water irrigation use between 1965 and 2005 increased from 949 to 6,942 Mgal/d, an increase of about 632 percent. Surface-water irrigation use between 1965 and 2005 increased from 211 to 1,323 Mgal/d, an increase of about 527 percent (table 13, fig. 9). Public supply water use between 1965 and 2005 increased from 127 to 404 Mgal/d, an increase of 218 percent (table 13). As the population served by public supply (Arkansas Department of Health, 2007) between 1965 and 2005 increased 36 percent from approximately 1.9 to 2.6 million people (fig. 10), the per capita use of public supply water increased about 35 percent from approximately 116 to 157 gal/d.

Table 13. Changes in water use for selected categories in Arkansas, 1965-2005.

[Mgal/d, million gallons per day]

	Irrigation		Public supply				Total		
Year	Ground water (Mgal/d)	Surface water (Mgal/d)	Population served	Ground water (Mgal/d)	Surface water (Mgal/d)	Per capita use (gallon/day/person)	Ground water (Mgal/d)	Surface water (Mgal/d)	Total (Mgal/d)
1965	949	211	1,900,000	54	73	116	1,231	911	2,142
1970	1,064	229	1,920,000	71	95	135	1,530	1,531	3,061
1975	2,094	346	2,116,000	89	118	180	2,596	2,468	5,064
1980	3,484	597	2,283,733	110	153	155	4,053	2,166	6,219
1985	3,330	541	2,358,000	104	156	153	3,810	2,041	5,851
1990	4,296	949	2,353,000	119	190	173	4,708	3,128	7,836
1995	4,925	1,013	2,484,000	135	246	191	5,456	3,311	8,767
2000	6,506	1,407	2,322,520	138	289	181	6,952	4,011	10,963
2005	6,942	1,323	2,579,200	138	266	157	7,510	3,945	11,455

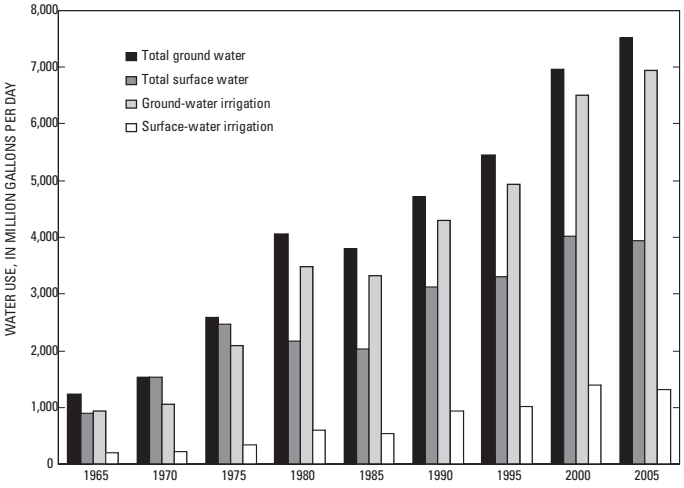

Figure 9. Total ground- and surface-water use compared to irrigation water use in Arkansas, 1965-2005.

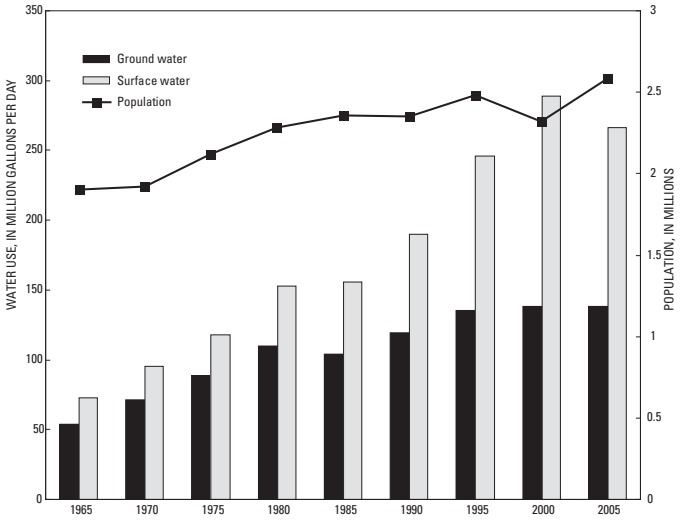

Figure 10. Ground- and surface-water use and population served for public-supply systems in Arkansas, 1965-2005.

Sources of Ground-Water Withdrawals

Ground-water withdrawals comprised about 66 percent (7,510 Mgal/d) of the total amount of water used in Arkansas in 2005 (table 13). About 98 percent (7,349 Mgal/d) of the water was withdrawn from the Mississippi River Valley alluvial aquifer (table 14) and the Sparta-Memphis aquifer (table 14, fig. 11).

The Mississippi River Valley alluvial aquifer supplied about 96 percent (7,180 Mgal/d) of all ground water used in Arkansas in 2005 (table 14). Poinsett, Cross, and Arkansas were the counties with the most use from the Mississippi River Valley alluvial aquifer.

The Sparta-Memphis aquifer supplied about 2 percent of the ground water used in Arkansas, mostly by industry and public-supply systems in eastern and southern Arkansas. The counties with the highest use from the Sparta-Memphis aquifer are Jefferson and Arkansas Counties using about 51 percent of the total water withdrawn from the aquifer.

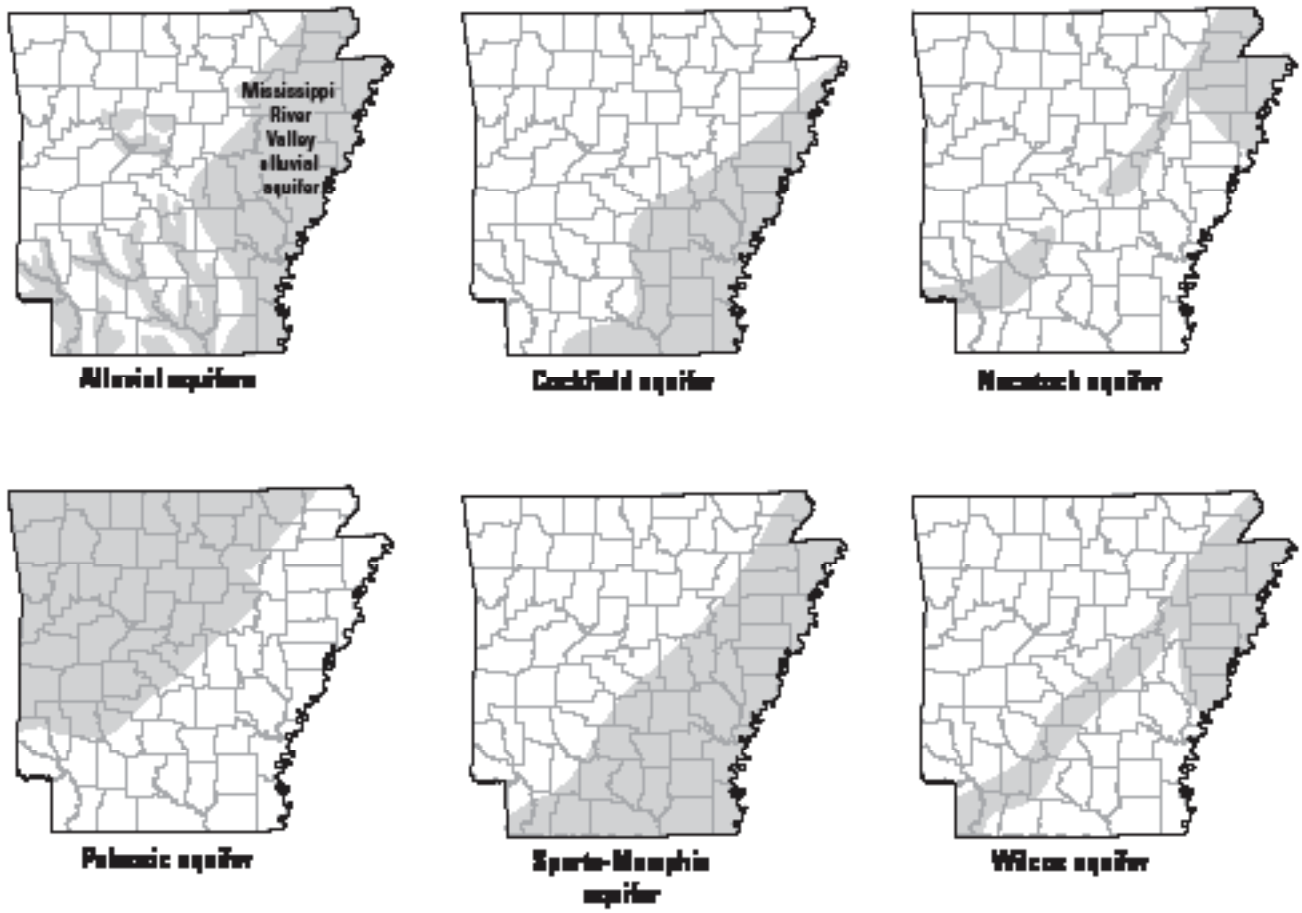

Figure 11. Location of selected major aquifers in Arkansas.

Table 14. Ground-water use by major aquifers in Arkansas, 2005.

[In million gallons per day]

County	Mississippi River Valley alluvial aquifer	Other alluvial deposits	Cockfield aquifer	Cane River aquifer	Sparta-Memphis aquifer	Wilcox aquifer	Claiborne aquifer	Nacatoch aquifer	Tokio aquifer	Trinity aquifer	Paleozoic aquifer	County total	County
Arkansas	472.97	0.00	0.48	0.00	36.03	0.00	0.00	0.00	0.00	0.00	0.00	509.48	Arkansas
Ashley	148.13	0.00	8.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	156.30	Ashley
Baxter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.95	1.95	Baxter
Benton	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.87	2.87	Benton
Boone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.91	1.91	Boone
Bradley	0.00	0.00	0.08	0.00	1.70	0.00	0.00	0.00	0.00	0.00	0.00	1.78	Bradley
Calhoun	0.00	0.00	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.53	Calhoun
Carroll	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.87	2.87	Carroll
Chicot	247.08	0.00	1.93	0.00	0.52	0.00	0.00	0.00	0.00	0.00	0.00	249.53	Chicot
Clark	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.07	0.00	0.01	0.51	Clark
Clay	466.06	0.00	0.00	0.00	0.00	0.33	0.00	0.97	0.00	0.00	3.69	471.05	Clay
Cleburne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.41	Cleburne
Cleveland	0.00	0.00	0.00	0.00	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.73	Cleveland
Columbia	0.00	0.00	0.00	0.00	3.61	0.00	0.00	0.00	0.00	0.03	0.00	3.64	Columbia
Conway	0.00	2.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.51	Conway
Craighead	350.08	0.00	0.00	0.00	14.14	0.81	0.00	0.00	0.00	0.00	0.00	365.03	Craighead
Crawford	0.00	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.94	Crawford
Crittenden	151.42	0.00	0.00	0.00	0.00	8.09	0.00	0.00	0.00	0.00	0.00	159.51	Crittenden
Cross	592.27	0.00	0.00	0.00	7.02	0.00	0.00	0.00	0.00	0.00	0.00	599.29	Cross
Dallas	0.00	0.00	0.00	0.00	1.47	0.00	0.00	0.00	0.00	0.00	0.00	1.47	Dallas
Desha	297.34	0.00	1.58	0.00	5.42	0.00	0.00	0.00	0.00	0.00	0.00	304.34	Desha
Drew	74.58	0.00	0.00	0.00	2.82	0.00	0.00	0.00	0.00	0.00	0.00	77.40	Drew
Faulkner	0.00	2.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	2.40	Faulkner
Franklin	0.00	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.40	Franklin
Fulton	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.96	1.96	Fulton
Garland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.32	Garland
Grant	0.00	0.00	0.00	0.00	2.60	0.00	0.00	0.00	0.00	0.00	0.00	2.60	Grant
Greene	217.60	0.00	0.00	0.00	0.00	5.55	0.00	0.48	0.00	0.00	0.00	223.63	Greene

Table 14. Ground-water use by major aquifers in Arkansas, 2005.—Continued

[In million gallons per day]

County	Mississippi River Valley alluvial aquifer	Other alluvial deposits	Cockfield aquifer	Cane River aquifer	Sparta-Memphis aquifer	Wilcox aquifer	Claiborne aquifer	Nacatoch aquifer	Tokio aquifer	Trinity aquifer	Paleozoic aquifer	County total	County
Hempstead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.92	2.10	0.00	0.00	4.02	Hempstead
Hot Spring	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.27	Hot Spring
Howard	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.50	Howard
Independence	41.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.84	Independence
Izard	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.79	1.79	Izard
Jackson	382.70	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00	383.12	Jackson
Jefferson	227.36	0.00	1.97	0.00	50.38	0.00	0.00	0.00	0.00	0.00	0.00	279.71	Jefferson
Johnson	0.00	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	Johnson
Lafayette	0.00	38.31	0.00	0.67	0.42	0.00	0.00	0.00	0.00	0.00	0.00	39.40	Lafayette
Lawrence	222.20	0.00	0.00	0.00	0.13	0.00	0.00	0.01	0.00	0.00	0.93	223.27	Lawrence
Lee	265.86	0.00	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.00	0.00	266.79	Lee
Lincoln	181.67	0.00	0.00	0.00	1.20	0.00	0.00	0.00	0.00	0.00	0.00	182.87	Lincoln
Little River	0.00	4.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.43	Little River
Logan	0.00	1.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.65	Logan
Lonoke	413.08	0.00	0.90	0.00	9.35	0.51	0.00	0.00	0.00	0.00	0.00	423.84	Lonoke
Madison	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.15	1.15	Madison
Marion	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.83	Marion
Miller	0.00	16.14	0.00	0.00	0.04	0.10	0.00	0.00	0.00	0.00	0.00	16.28	Miller
Mississippi	271.19	0.00	0.00	0.00	0.00	6.57	0.00	0.00	0.00	0.00	0.00	277.76	Mississippi
Monroe	288.33	0.00	0.94	0.00	0.77	0.00	0.00	0.00	0.00	0.00	0.00	290.04	Monroe
Montgomery	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.70	Montgomery
Nevada	0.00	0.00	0.00	0.00	0.19	0.18	0.18	0.18	0.00	0.00	0.00	0.73	Nevada
Newton	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.17	1.17	Newton
Ouachita	0.00	0.00	0.00	0.04	1.03	0.00	0.00	0.01	0.00	0.00	0.00	1.08	Ouachita
Perry	0.00	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	Perry
Phillips	204.37	0.00	0.00	0.00	4.14	0.00	0.00	0.00	0.00	0.00	0.00	208.51	Phillips

Table 14. Ground-water use by major aquifers in Arkansas, 2005.—Continued

[In million gallons per day]

County	Mississippi River Valley alluvial aquifer	Other alluvial deposits	Cockfield aquifer	Cane River aquifer	Sparta-Memphis aquifer	Wilcox aquifer	Claiborne aquifer	Nacatoch aquifer	Tokio aquifer	Trinity aquifer	Paleozoic aquifer	County total	County
Pike	0.00	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.48	Pike
Poinsett	678.17	0.00	0.00	0.00	1.29	2.85	0.00	0.00	0.00	0.00	0.00	682.31	Poinsett
Polk	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.17	1.17	Polk
Pope	0.00	1.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	2.09	Pope
Prairie	247.57	0.00	0.00	0.00	5.79	0.22	0.00	0.00	0.00	0.00	0.00	253.58	Prairie
Pulaski	26.24	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.03	26.39	Pulaski
Randolph	102.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	102.51	Randolph
Saline	0.00	0.98	0.00	0.00	0.38	0.93	0.00	0.00	0.00	0.00	0.00	2.29	Saline
Scott	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.35	2.35	Scott
Searcy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.29	Searcy
Sebastian	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.94	0.94	Sebastian
Sevier	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	1.73	0.00	0.00	1.74	Sevier
Sharp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	4.23	4.31	Sharp
St. Francis	295.34	0.00	0.06	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	295.73	St. Francis
Stone	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.60	Stone
Union	0.00	0.00	0.00	0.00	15.55	0.00	0.00	0.00	0.00	0.00	0.00	15.55	Union
Van Buren	0.00	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	Van Buren
Washington	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.35	1.35	Washington
White	48.05	0.00	0.00	0.00	0.00	0.54	0.00	0.00	0.00	0.00	0.00	48.59	White
Woodruff	265.79	0.00	0.00	0.00	1.21	0.00	0.00	0.00	0.00	0.00	0.00	267.00	Woodruff
Yell	0.00	2.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.37	Yell
Total	7,179.55	72.51	16.11	0.71	169.94	27.01	0.18	4.00	4.48	0.03	34.78	7,509.94	Total

Summary

The water-use program in Arkansas is a cooperative effort between the Arkansas Natural Resources Commission and the U.S. Geological Survey to inventory water use. During 2005, the amount of water withdrawn from ground- and surface-water sources in Arkansas was estimated to be 11,455 Mgal/d. Of this amount, about 7,510 Mgal/d was from ground-water sources and about 3,946 Mgal/d was from surface-water sources.

Public supply systems served about 2.6 million people or about 93 percent of Arkansas' population in 2005. Benton County had the largest surface-water withdrawals (Beaver Lake) at 58 Mgal/d. Jefferson County had the largest ground-water withdrawals (Sparta-Memphis aquifer) at 14 Mgal/d. The statewide average for per capita residential use from public supply systems was about 157 gallons per day (gal/d). Carroll County had the highest per capita use (365 gal/d).

Total (self-supplied) industrial water use in Arkansas for 2005 was 178 Mgal/d, of which about 37 percent (66 Mgal/d) was from ground-water and about 63 percent (113 Mgal/d) was from surface-water sources. The largest industrial use of ground water (Sparta-Memphis aquifer) occurred in Jefferson County (43 Mgal/d) and the largest industrial use of surface water occurred in Ashley County (53 Mgal/d).

Total aquaculture water use in Arkansas for 2005 was 256 Mgal/d, of which about 96 percent (246 Mgal/d) was from ground water and about 4 percent (11 Mgal/d) was from surface-water sources. The largest use of aquacultural water was in Lonoke County at 60 Mgal/d of which 94 percent was from ground-water sources. The largest aquaculture use of surface water was in Lonoke County at 3.36 Mgal/d. Other counties with notable aquaculture water use (greater than 20 Mgal/d) were Prairie and Ashley, in order of decreasing use.

Irrigation water use accounted for 92 percent (6,942 Mgal/d) of the ground water withdrawn in Arkansas and 72 percent (8,265 Mgal/d) of the total withdrawals. Rice totaled 1.73 million acres or about 35 percent of the total land irrigated in the State.

Irrigation water use totaled 8,265 Mgal/d, of which about 84 percent (6,942 Mgal/d) was from ground-water and about 16 percent (1,323 Mgal/d) was from surface-water sources. Water used for the growing of rice totaled 4,583 Mgal/d or about 40 percent of the total water used in Arkansas during 2005. The largest use of water for irrigation was Arkansas County with 836 Mgal/d, of which about 56 percent (470 Mgal/d) was from ground-water and about 44 percent (366 Mgal/d) was from surface-water sources. Other counties with notable total irrigation water use (greater than 400 Mgal/d) were Poinsett, Cross, Clay, and Lonoke, in order of decreasing use.

Duck (hunting) club water use in Arkansas for 2005 was 269 Mgal/d, of which about 30 percent (81 Mgal/d) was from ground water and about 70 percent (188 Mgal/d) was from surface-water sources. The largest use of ground water for duck (hunting) clubs was in Arkansas County at 25 Mgal/d. The largest duck (hunting) club use of surface water was in Arkansas County at 91 Mgal/d. Other counties with substantial duck (hunting) club water use (greater than 10 Mgal/d) were Miller, Desha, Prairie, Jackson, and Jefferson, in order of decreasing use.

Total thermoelectric power water use in Arkansas for 2005 was 1,997 Mgal/d of which over 99 percent (1,996 Mgal/d) was from surface water and less than 1 percent (0.93 Mgal/d) was from ground-water sources. Water used for thermoelectric power generation was about 17 percent of the total water used in Arkansas during 2005 and 51 percent of the total surface water used. About 58 percent (1,152 Mgal/d) of the water used in this category was used for cooling at a nuclear power plant in Pope County. About 98 percent (1,957 Mgal/d) of the water used in this category was used in Pope (Lake Dardanelle), Benton, Hot Spring (Lake Catherine and Ouachita River), Woodruff (White River), and Ouachita (Ouachita River) Counties, in order of decreasing use.

Total water use in Arkansas increased about 435 percent between 1965 and 2005. Total ground-water use increased 510 percent and total surface-water use increased 333 percent between 1965 and 2005.

About 98 percent of the ground water was withdrawn from the Mississippi River Valley alluvial and the Sparta-Memphis aquifers.

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Glossary

Water-use terminology continues to evolve as the field grows and expands. The following is a list of definitions for terms, phrases, and various data-collection components commonly used in the process of water-use data collection and compilation.

Acre-foot of water (acre-ft)—the volume of water required to cover 1 acre of land (43,560 ft2) to a depth of 1 ft.

Acres irrigated—the total number of acres of the crop that was irrigated during the year.

Aquaculture—Farming of organisms that live in water, such as fish, shellfish, and algae.

Aquifer—A geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Commercial water use—Water for motels, hotels, restaurants, office buildings, schools, and other commercial facilities and institutions, both civilian and military. The water may be obtained from a public-supply facility or may be self-supplied. See also public-supply and self-supplied water.

Cooling water—Water used for cooling purposes, such as cooling of condensers and nuclear reactors.

Domestic population served—The total number of people served by the public supplier during the calendar year.

Domestic water use—Water used for household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens, also called residential water use. The water may be obtained from a public-supply facility or may be self-supplied. See also public supply and self-supplied water.

Freshwater—Water that contains less that 1,000 mg/L (milligrams per liter) of dissolved solids and is desirable for drinking and many industrial uses.

Ground water—Generally all subsurface water and springs as distinct from surface water; specifically, that part of the subsurface water in the saturated zone (a zone in which all voids are filled with water) where the water is under pressure greater than atmospheric.

Industrial water use—Water used for industrial purposes, such as fabrication, processing, washing, and cooling, and includes such industries as steel, chemical and allied products, paper and allied products, mining, and petroleum refining. The water may be obtained from a public-supply facility or may be self-supplied. See also public-supply and self-supplied water.

Instream use—Water use taking place within the stream channel for such purposes as hydroelectric power generation, navigation, water-quality improvement, fish propagation, and recreation. Sometimes called nonwithdrawal use or in-channel use.

Irrigation—Refers to the process of supplementing rainfall with water that is needed to produce a crop.

Irrigation water use—Artificial application of water on lands to assist in the growing of crops and pastures or to maintain vegetative growth in recreational lands, such as parks and golf courses.

Livestock water use—Water for stock watering, feed lots, dairy operations, fish farming, and other farm needs. Livestock as used here includes cattle, sheep, goats, hogs, and poultry. Also included are such animal specialties as horses, rabbits, bees, pets, and fur-bearing animals in captivity.

Mining water use—Water use for the extraction of minerals occurring naturally, including solids, such as coal, clay, and ores; liquids, such as crude petroleum; and gases, such as natural gas. Also includes uses associated with sand, gravel, and quarrying for rock aggregates, well operations (dewatering), milling (crushing, screening, washing, floatation, and other), and other preparations customarily done at the mine site or as part of a mining activity.

Per capita use—The average amount of water used per person during a standard time period, generally per day.

Public supply—Water withdrawn by public and private water suppliers and delivered to groups of users. Public suppliers provide water for a variety of uses, such as domestic, commercial, thermoelectric power, industrial, and public water use. See also commercial water use, domestic water use, industrial water use, and public water use.

Public water use—Water supplied from a public water supply and used for such purposes as firefighting, street washing, and municipal parks and swimming pools. See also public supply.

Self-supplied water—Water withdrawn from a ground- or surface-water source by a user rather than being obtained from a public-supply facility.

Sewage—Wastewater carried off by sewers and drains.
Surface water—An open body of water, such as a stream, lake, or river.

Thermoelectric power generation—Electrical power generated using fossil-fuel (coal, oil, or natural gas), geothermal, or nuclear energy.

Thermoelectric power water use—Water used in the process of the generation of thermoelectric power. The water may be obtained from a public-supply facility or may be self-supplied. See also public-supply and self-supplied water.

Water consumed or consumptive use—Refers to that part of water withdrawn that is no longer available because it has evaporated, been incorporated into products and crops, consumed by man or livestock, or otherwise removed from the water environment.

Water use—Describes how and where the water was used and in what amounts.

Withdrawal—The amount of water withdrawn from a source (ground water or surface water). This is equivalent to "intake," "water diversion," or "pumpage," terms commonly used by industry and for irrigation and public supply, respectively.

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