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Estimated Use of Water in South Dakota,1995

By Franklin D. Amundson

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ABSTRACT

During 1995, the total amount of water withdrawn from ground- and surface-water sources in South Dakota was about 460 Mgal/d (million gallons per day). Of this amount, about 187 Mgal/d, or 41 percent of the total, was withdrawn from ground water. Surface-water withdrawals were about 273 Mgal/d, or 59 percent of the total.

Total withdrawals for eight categories of offstream use in South Dakota during 1995 were compiled. The withdrawals include: 88.4 Mgal/d for public supply; 9.4 Mgal/d for domestic; 10.1 Mgal/d for commercial; 268.5 Mgal/d for irrigation; 45.9 Mgal/d for livestock; 5.1 Mgal/d for industrial; 27.3 Mgal/d for mining; and 5.3 Mgal/d for thermoelectric power.

Water use for hydroelectric power, the only instream use compiled in this report, was about 62,400 Mgal/d to generate about 6,420 gigawatt-hours of electricity during 1995. Reservoir evaporation, the only consumptive use reported in this report, was about 1,561,000 acre-feet from about 560,000 reservoir surface acres during 1995.

INTRODUCTION

Our Nation's social and economic development has depended on and will continue to depend on the availability of usable water. In 1950, the U.S. Geological Survey (USGS) began publishing water-use data on a national level every 5 years to assist in the wise management of our Nation's water resources. The USGS currently collects water-use data for the following categories: public supply, domestic, commercial, irrigation, livestock, animal specialties, industrial, mining, thermoelectric power, hydroelectric power, reservoir evaporation, and wastewater returns.

In 1977, Congress authorized the National Water-Use Information Program. The program encourages the USGS and a State-level agency in each of the 50 states to cooperate in the collection and dissemination of water-use data. In South Dakota, the USGS and the South Dakota Department of Environment and Natural Resources (SDDENR), Water Rights Program, are cooperators in this effort. Data contained in this report were collected and compiled through the cooperative program.

Purpose

This report presents 10 categories of freshwater withdrawal estimates for South Dakota by source and category during 1995. Withdrawal source is either ground water or surface water. The withdrawal data are aggregated by county except for reservoir evaporation, which is aggregated by hydrologic unit code (HUC). In this report, a hydrologic unit is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as delineated by the USGS Office of Water Data Coordination on the State Hydrologic Unit Maps. Each hydrologic unit is identified by a unique numeric hydrologic unit code consisting of an 8-digit number.

Terminology

In this report, the term "offstream use" represents all water diverted or withdrawn from a surface- or ground-water source and conveyed to a place of use.

"Instream use" refers to all uses taking place within the river channel itself. "Consumptive use" refers to water that is evaporated.

DATA-COLLECTION TECHNIQUES

The permitted irrigators in South Dakota are required to annually report to the SDDENR the amount of water applied and acres irrigated. The reported data are compiled by the SDDENR and provided to the USGS on a computer disc. The USGS then reformats these data and downloads the data to a Site-Specific Water-Use Data System (SWUDS).

In 1995, SDDENR mailed out a one-page water-use questionnaire to each permitted water user for other water-use categories, requesting total withdrawals and the source(s) of withdrawals. The completed questionnaires were sent directly to the USGS where they were compiled and entered into SWUDS. Telephone requests were made to the rural water systems and to the 20 largest municipalities requesting annual withdrawals; sources; and deliveries to commercial, industrial, and residential users. All of the SWUDS data were then aggregated by water-use category and by county or HUC and stored in the U.S. Geological Survey's Aggregated Water-Use Data System (AWUDS).

TOTAL WITHDRAWALS

During 1995, total withdrawals from ground- and surface-water sources in South Dakota were about 460 Mgal/d (million gallons per day) (table 1). Total withdrawals by county are shown in figure 1, and total withdrawals by category of use are shown in figure 2. Of this total, about 187 Mgal/d, or 41 percent of the total, was withdrawn from ground water (table 1). Ground-water withdrawals by category of use are shown in figure 3. Surface-water withdrawals were about 273 Mgal/d, or 59 percent of the total withdrawals (table 1). Surface-water withdrawals by category of use are shown in figure 4. Butte County had the largest withdrawals, with about 88.6 Mgal/d, followed by Fall River County with about 37.6 Mgal/d (table 1).

OFFSTREAM USE

Water-use information was compiled for eight categories of offstream use during 1995. The eight categories are public supply, domestic, commercial, irrigation, livestock, industrial, mining, and thermoelectric power.

Public Supply

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

Public-supply facilities in South Dakota withdrew an estimated 88.4 Mgal/d during 1995 (table 2). About 60 percent of these withdrawals, or about 53.4 Mgal/d, was from ground water. Surface-water withdrawals were about 34.9 Mgal/d (table 2). Total public-supply withdrawals averaged about 147 gallons per day for each person served.

The population served by public-supply systems increased from 550,000 during 1990 (Solley and others, 1993, p. 25) to about 602,000 during 1995. It is estimated that about 382,000 people were served by public-supply systems withdrawing from ground-water sources, while about 220,000 people were served by public-supply systems withdrawing from surface-water sources. The increase in population served by public-supply systems from 1990 to 1995 can be attributed to the continued increase in the number of rural customers and towns served by rural water systems.

There are 27 regional rural water systems operating in South Dakota and several other regional systems either under construction or being planned. Many of these regional rural water systems make withdrawals from one location and deliver the water over a large geographic area that my include several counties and/or HUC's. The largest withdrawal by a rural water system was 3.72 Mgal/d by the WEB Water Development Association, Inc., which delivers water to rural customers and towns within 14 counties in northeastern South Dakota.

Deliveries by public suppliers for domestic, commercial, and industrial use were about 81 Mgal/d. About 52 Mgal/d, or 64 percent of the deliveries, was for domestic use (table 3).

Table 1. Total population and water withdrawals by county in South Dakota, 1995

County	Population, in thousands	Water withdrawals, in million gallons per day		
		Source		Total
		Ground water	Surface water	
Aurora	3.09	0.35	0.43	0.78
Beadle	18.14	5.25	4.07	9.32
Bennett	3.31	6.76	0.31	7.07
Bon Homme	7.01	1.98	2.41	4.39
Brookings	26.45	6.10	0.55	6.65
Brown	35.73	4.44	4.00	8.44
Brule	5.63	1.50	2.49	3.99
Buffalo	1.83	0.87	2.34	3.21
Butte	8.90	2.95	85.68	88.63
Campbell	1.88	1.38	1.34	2.72
Charles Mix	9.48	2.69	7.95	10.64
Clark	4.38	2.32	0.54	2.86
Clay	13.61	4.03	0.48	4.51
Codington	24.83	6.97	4.13	11.10
Corson	4.26	0.70	1.30	2.00
Custer	6.68	1.14	3.06	4.20
Davison	17.82	1.21	2.79	4.00
Day	6.71	0.84	0.39	1.23
Deuel	4.45	0.77	0.36	1.13
Dewey	5.78	0.55	1.24	1.79
Douglas	3.62	1.27	0.38	1.65
Edmunds	4.34	1.23	0.47	1.70
Fall River	7.09	1.48	36.08	37.56
Faulk	2.59	0.30	0.42	0.72
Grant	8.24	3.02	2.59	5.61
Gregory	5.11	0.80	1.31	2.11
Haakon	2.55	1.09	1.03	2.12
Hamlin	5.37	2.45	0.25	2.70
Hand	4.20	1.03	0.68	1.71
Hanson	2.94	0.24	0.64	0.88
Harding	1.54	0.46	0.72	1.18
Hughes	15.54	5.17	16.50	21.67
Hutchinson	8.02	1.82	0.84	2.66
Hyde	1.68	0.69	0.69	1.38
Jackson	2.87	0.52	1.46	1.98
Jerauld	2.34	0.74	0.46	1.20
Jones	1.32	0.21	0.78	0.99
Kingsbury	5.74	2.82	0.42	3.24
Lake	10.80	1.36	2.03	3.39
Lawrence	22.45	4.41	10.42	14.83
Lincoln	17.67	2.27	0.52	2.79
Lyman	3.78	0.62	4.42	5.04
McCook	5.82	1.03	0.47	1.50
McPherson	3.04	0.72	1.17	1.89
Marshall	4.71	1.05	0.55	1.60
Meade	23.08	2.84	2.36	5.20
Mellette	2.00	0.39	0.70	1.09
Miner	3.06	0.36	0.35	0.71
Minnehaha	135.64	14.96	9.90	24.86
Moody	6.62	1.54	0.62	2.16
Pennington	87.30	16.91	13.24	30.15
Perkins	3.70	0.68	0.82	1.50
Potter	2.99	1.26	2.54	3.80
Roberts	9.95	1.20	0.42	1.62
Sanborn	2.80	0.43	0.36	0.79
Shannon	11.68	0.95	0.20	1.15
Spink	7.84	7.66	0.80	8.46
Stanley	2.82	0.62	1.88	2.50
Sully	1.57	2.55	10.33	12.88
Todd	9.10	7.78	0.56	8.34
Tripp	6.90	2.82	2.30	5.12
Turner	8.60	14.30	0.81	15.11
Union	11.22	15.20	0.83	16.03
Walworth	5.83	0.61	5.85	6.46
Yankton	20.75	4.30	6.22	10.52
Ziebach	2.22	0.35	0.46	0.81
Total	729.01	187.31	272.71	460.02

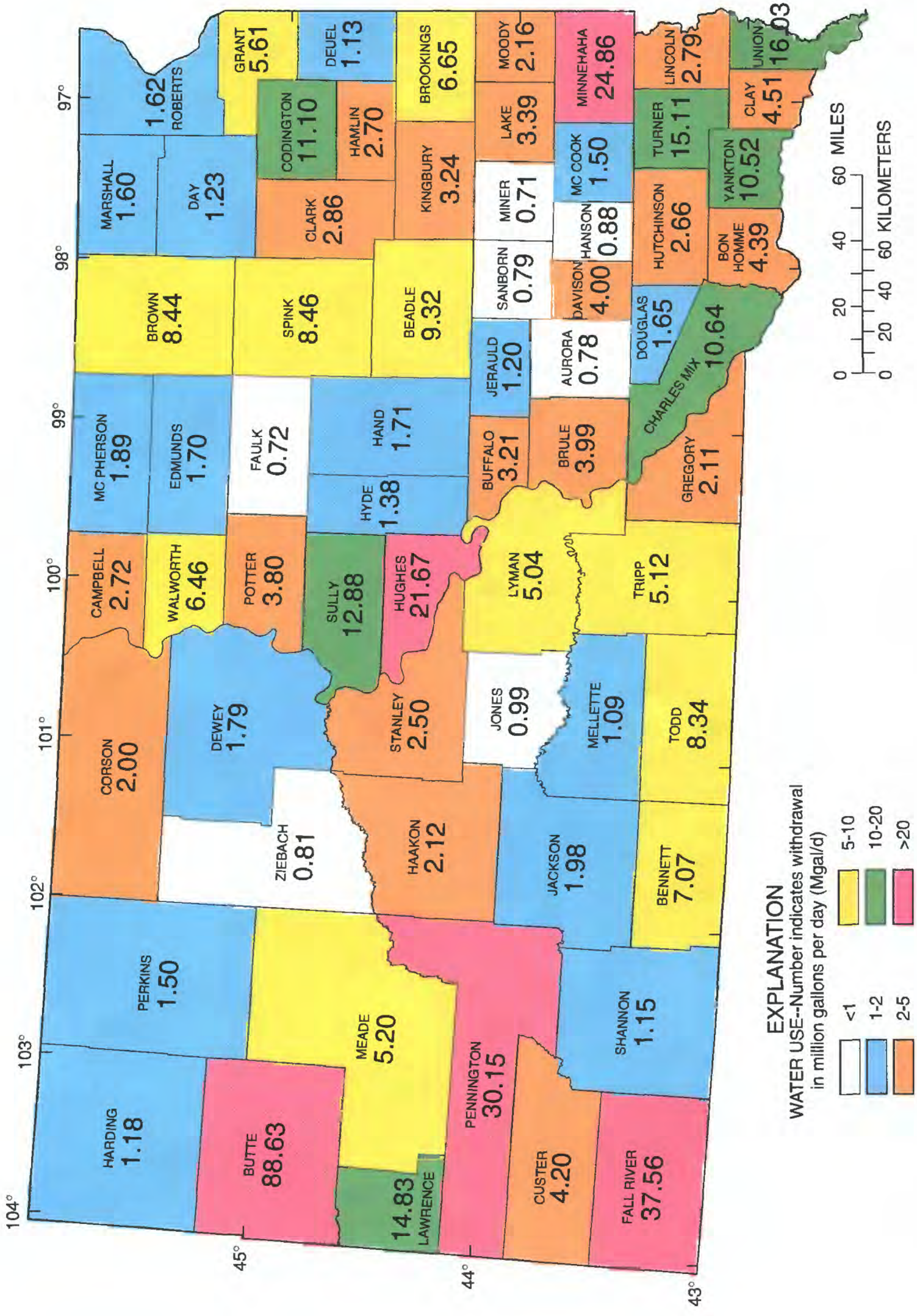

Figure 1. Total water withdrawals by county during 1995.

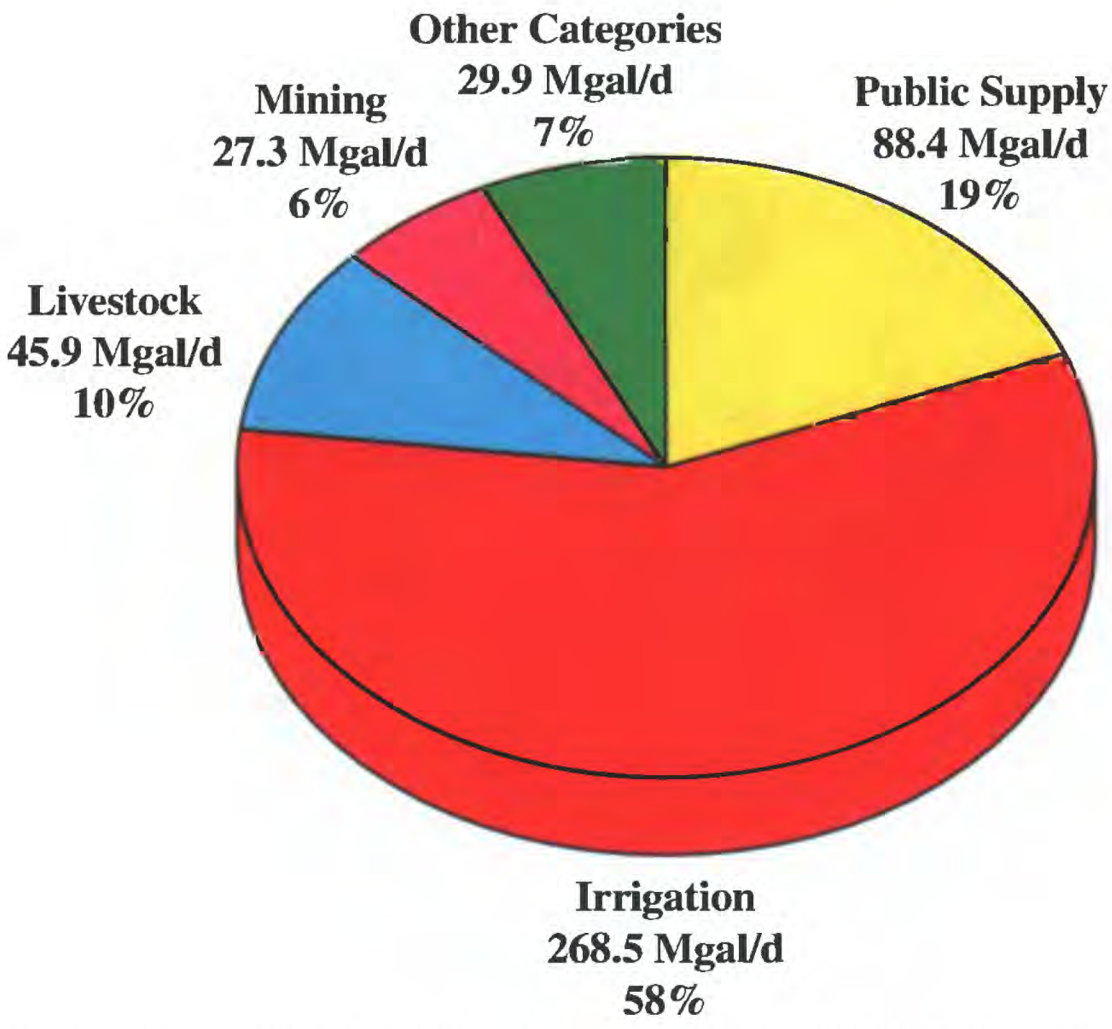

Figure 2. Total water withdrawals in South Dakota by category during 1995, in million gallons per day and percent.

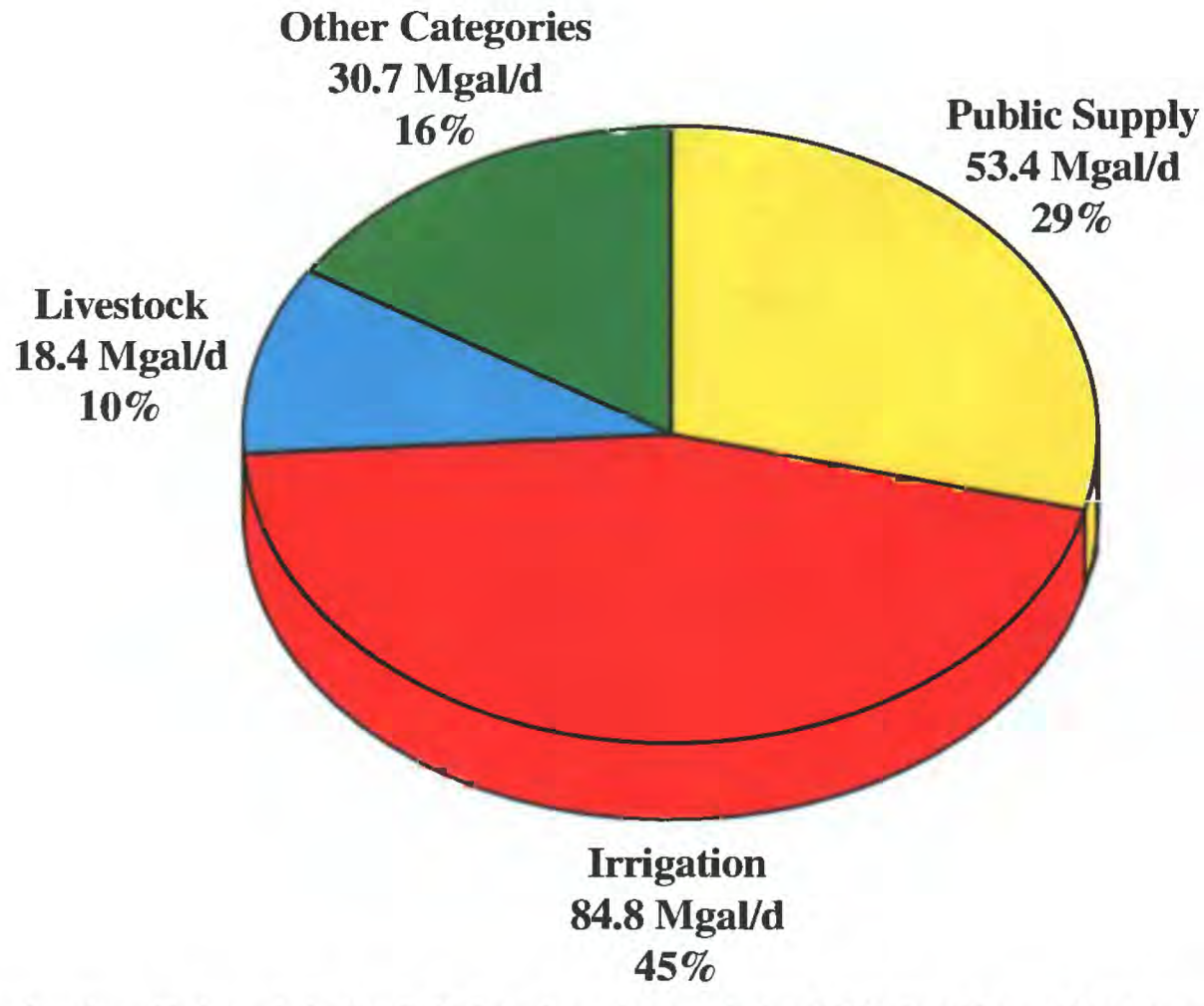

Figure 3. Ground-water withdrawals in South Dakota by category during 1995, in million gallons per day and percent.

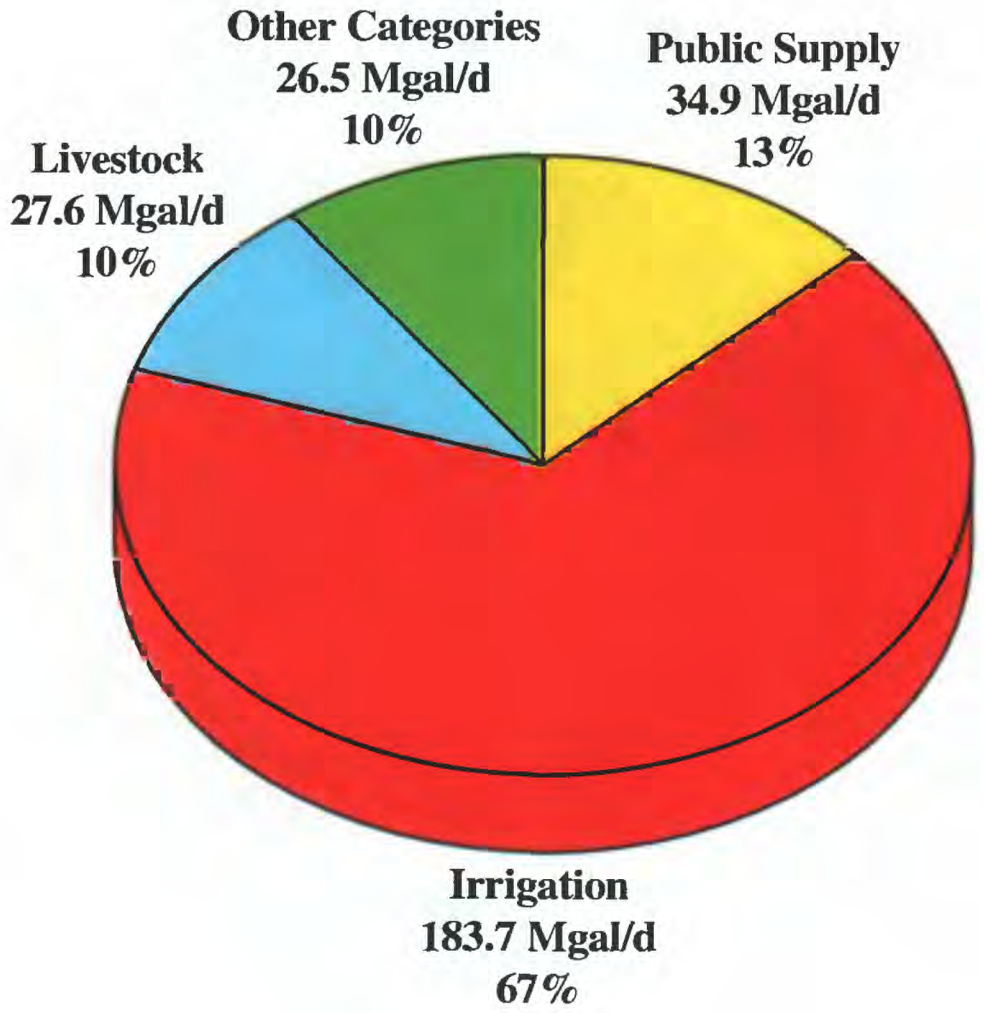

Figure 4. Surface-water withdrawals in South Dakota by category during 1995, in million gallons per day and percent.

Table 2. Estimated population and public-supply withdrawals by county in South Dakota, 1995

County	Population served, in thousends			Water withdrewals[1], in million gallons per day		
	Source		Total	Source		Total
	Ground water	Surface weter		Ground weter	Surfece water	
Aurora	0.60	2.49	3.09	0.06	0.00	0.06
Beadle	3.06	10.74	13.80	0.45	2.36	2.81
Bennett	1.18	0.00	1.18	0.05	0.00	0.05
Bon Homme	1.15	5.86	7.01	0.36	0.20	0.56
Brookings	26.36	0.00	26.36	3.86	0.00	3.86
Brown	0.66	34.31	34.97	0.37	3.03	3.40
Brule	0.00	5.63	5.63	0.00	1.00	1.00
Buffalo	0.00	0.12	0.12	0.00	0.00	0.00
Butte	3.06	4.72	7.78	0.67	0.00	0.67
Campbell	0.11	1.77	1.88	0.06	0.00	0.06
Charles Mix	0.10	9.38	9.48	0.16	2.07	2.23
Clark	4.38	0.00	4.38	0.88	0.00	0.88
Clay	12.84	0.21	13.05	1.65	0.00	1.65
Codington	23.70	0.00	23.70	3.14	0.00	3.14
Corson	1.26	0.00	1.26	0.18	0.00	0.18
Custer	2.58	0.00	2.58	0.44	0.00	0.44
Davison	3.54	13.93	17.47	0.04	2.53	2.57
Day	1.60	2.67	4.27	0.01	0.00	0.01
Deuel	4.45	0.00	4.45	0.18	0.00	0.18
Dewey	0.83	2.01	2.84	0.09	0.75	0.84
Douglas	0.21	3.41	3.62	0.02	0.00	0.02

Table 2. Estimated population and public-supply withdrawals by county in South Dakota, 1995—Continued

County	Population served, in thousands			Water withdrawals[1], in million gallons per day		
	Source		Total	Source		Total
	Ground water	Surface water		Ground water	Surface water	
Edmunds	0.00	4.22	4.22	0.07	0.00	0.07
Fall River	5.14	0.00	5.14	0.67	0.00	0.67
Faulk	0.09	2.50	2.59	0.03	0.00	0.03
Grant	3.74	3.79	7.53	0.04	0.49	0.53
Gregory	5.11	0.00	5.11	0.40	0.00	0.40
Haakon	0.80	1.03	1.83	0.02	0.22	0.24
Hamlin	5.37	0.00	5.37	0.18	0.00	0.18
Hand	2.16	0.00	2.16	0.25	0.00	0.25
Hanson	2.85	0.00	2.85	0.00	0.00	0.00
Harding	0.58	0.00	0.58	0.03	0.00	0.03
Hughes	14.11	0.00	14.11	2.74	0.00	2.74
Hutchinson	2.09	2.34	4.43	0.29	0.00	0.29
Hyde	0.80	0.00	0.80	0.06	0.00	0.06
Jackson	1.17	0.00	1.17	0.11	0.00	0.11
Jerauld	0.33	1.07	1.40	0.02	0.14	0.16
Jones	0.12	0.67	0.79	0.01	0.11	0.12
Kingsbury	5.74	0.00	5.74	1.78	0.00	1.78
Lake	10.80	0.00	10.80	0.79	0.00	0.79
Lawrence	0.16	14.35	14.51	0.00	4.09	4.09
Lincoln	17.31	0.36	17.67	1.52	0.00	1.52
Lyman	0.79	1.32	2.11	0.06	0.19	0.25
McCook	5.82	0.00	5.82	0.75	0.00	0.75
McPherson	0.27	2.34	2.61	0.08	0.00	0.08
Marshall	3.30	0.38	3.67	0.51	0.05	0.56
Meade	5.52	1.16	6.68	0.61	0.00	0.61
Mellette	1.29	0.00	1.29	0.04	0.00	0.04
Miner	3.06	0.00	3.06	0.12	0.00	0.12
Minnehaha	73.82	52.40	126.22	11.30	8.83	20.13
Moody	6.62	0.00	6.62	1.01	0.00	1.01
Pennington	68.37	2.88	71.25	11.82	0.00	11.82
Perkins	1.98	0.00	1.98	0.19	0.00	0.19
Potter	1.14	1.46	2.59	0.35	0.00	0.35
Roberts	9.80	0.00	9.80	0.59	0.00	0.59
Sanborn	1.23	0.00	1.23	0.06	0.00	0.06
Shannon	0.14	0.00	0.14	0.01	0.00	0.01
Spink	0.22	7.00	7.22	0.11	0.00	0.11
Stanley	2.03	0.00	2.03	0.33	0.00	0.33
Sully	0.83	0.00	0.83	0.06	0.00	0.06
Todd	1.70	0.00	1.70	0.11	0.00	0.11
Tripp	6.90	0.00	6.90	1.49	0.00	1.49
Turner	7.96	0.00	7.96	1.08	0.00	1.08
Union	9.25	0.00	9.25	1.00	0.00	1.00
Walworth	0.20	5.63	5.83	0.03	4.24	4.27
Yankton	0.00	15.87	15.87	0.04	4.64	4.68
Ziebach	0.00	1.84	1.84	0.00	0.00	0.00
Total	382.38	219.86	602.22	53.43	34.94	88.37

[1]May include withdrawals by rural water systems that make deliveries to other counties.

Table 3. Estimated public-supply deliveries by use and by county in South Dakota, 1995

County	Water deliveries, by type of use, in million gallons per day			Total deliveries
	Domestic	Commercial	Industrial	
Aurora	0.24	0.00	0.00	0.24
Beadle	1.04	0.54	0.95	2.53
Bennett	0.08	0.37	0.00	0.45
Bon Homme	0.76	0.14	0.00	0.90
Brookings	1.39	1.12	0.15	2.66
Brown	2.49	1.80	0.82	5.11
Brule	0.56	0.27	0.00	0.83
Buffalo	0.01	0.00	0.00	0.01
Butte	0.82	0.16	0.08	1.06
Campbell	0.24	0.00	0.00	0.24
Charles Mix	1.09	0.19	0.00	1.28
Clark	0.58	0.19	0.00	0.77
Clay	0.79	0.46	0.06	1.31
Codington	2.05	0.67	0.27	2.99
Corson	0.11	0.09	0.00	0.20
Custer	0.29	0.00	0.00	0.29
Davison	1.89	0.63	0.25	2.77
Day	0.32	0.00	0.00	0.32
Deuel	0.53	0.00	0.00	0.53
Dewey	0.37	0.00	0.00	0.37
Douglas	0.37	0.02	0.00	0.39
Edmunds	0.38	0.04	0.00	0.42
Fall River	0.60	0.07	0.00	0.67
Faulk	0.25	0.00	0.00	0.25
Grant	0.54	0.12	0.05	0.71
Gregory	0.46	0.16	0.00	0.62
Haakon	0.09	0.09	0.05	0.23
Hamlin	0.43	0.02	0.00	0.45
Hand	0.15	0.12	0.00	0.27
Hanson	0.35	0.00	0.00	0.35
Harding	0.03	0.00	0.00	0.03
Hughes	1.62	0.72	0.40	2.74
Hutchinson	0.43	0.05	0.00	0.48
Hyde	0.06	0.00	0.00	0.06
Jackson	0.06	0.05	0.00	0.11
Jerauld	0.10	0.00	0.00	0.10
Jones	0.12	0.00	0.00	0.12
Kingsbury	0.81	0.00	0.00	0.81
Lake	1.06	0.04	0.27	1.37
Lawrence	1.47	0.77	0.93	3.17
Lincoln	1.33	0.00	0.00	1.33
Lyman	0.19	0.00	0.00	0.19
McCook	0.49	0.12	0.00	0.61
McPherson	0.18	0.00	0.00	0.18
Marshall	0.29	0.07	0.00	0.36
Meade	0.63	0.08	0.00	0.71
Mellette	0.12	0.00	0.00	0.12
Miner	0.22	0.03	0.00	0.25
Minnehaha	9.75	5.52	2.50	17.77
Moody	0.68	0.15	0.00	0.83
Pennington	6.23	3.82	0.81	10.86
Perkins	0.15	0.04	0.00	0.19
Potter	0.23	0.12	0.00	0.35
Roberts	1.55	0.23	0.00	1.78
Sanborn	0.04	0.00	0.00	0.04
Shannon	0.01	0.00	0.00	0.01
Spink	0.55	0.10	0.00	0.65
Stanley	0.14	0.19	0.00	0.33
Sully	0.06	0.00	0.00	0.06
Todd	0.14	0.00	0.00	0.14
Tripp	0.61	0.01	0.01	0.63
Turner	0.61	0.16	0.00	0.77
Union	0.65	0.48	0.00	1.13
Walworth	0.46	0.26	0.10	0.82
Yankton	1.88	0.79	0.20	2.87
Ziebach	0.13	0.00	0.00	0.13
Total	52.35	21.07	7.90	81.32

Domestic and Commercial

Domestic water use includes water for household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, car washing, and watering lawns and gardens. Commercial water use includes water used by commercial facilities such as hotels, motels, restaurants, office buildings, government and military facilities, educational institutions, and retail sales stores. Domestic and commercial water users obtain water from both public-supply and self-supplied facilities.

Domestic water use during 1995 was about 62 Mgal/d. Of this total, about 52.4 Mgal/d was delivered from public-supply systems serving about 602,000 people (table 4). Per capita domestic use was about 87 gal/d (gallons/day) for public-supplied users. Self-supplied withdrawals were 9.36 Mgal/d, of which 9.34 Mgal/d was from ground water (table 5). The population served by self-supplied facilities during 1995 was about 127,000, and per capita use was about 74 gal/d.

Commercial water use during 1995 was about 31 Mgal/d, of which about 21.1 Mgal/d was delivered by public-supply systems and about 10.1 Mgal/d was from self-supplied systems (table 6). Of the self-supplied total, 6.05 Mgal/d was withdrawn from ground water and 4.05 Mgal/d from surface water.

Irrigation

Irrigation water use includes all water artificially applied to farms, orchards, and horticulture crops. Because irrigation is the largest offstream use of water in South Dakota, the quantity of water used by the holder of an irrigation permit must be reported annually to the SDDENR. The irrigation data provided in this report are based on the 1995 SDDENR irrigation questionnaires.

Irrigation withdrawals during 1995 totaled about 268.5 Mgal/d (table 7). This is a decrease from 1990 withdrawals, which totaled 392 Mgal/d (Solley and others, 1993, p. 37). Of the total withdrawals for irrigation, about 184 Mgal/d was from surface-water sources and about 85 Mgal/d was from ground-water sources. The largest withdrawals were about 86.1 Mgal/d in Butte County and about 35.2 Mgal/d in Fall River County, which both have large Bureau of Reclamation projects located in them. An estimated 301,480 acres were irrigated during 1995—224,920 acres by sprinkler application and 76,560 acres by surface (or flood) application. This is a decrease from 1990 irrigated acres, which totaled 396,000 acres, 287,000 by sprinkler application and 109,000 by surface (or flood) application (Solley and others, 1993). This decrease in irrigated acres can be attributed to above-normal precipitation during 1991-95.

Livestock

Livestock water use is that used in the production of meat, poultry, eggs, milk, and wool. It does not include rural-domestic water use, irrigation water use, or other farm needs such as lawn and garden watering. Total livestock water use during 1995 was about 45.9 Mgal/d (table 8). Of this total, about 27.6 Mgal/d was from surface water and about 18.4 Mgal/d was from ground water. The largest withdrawals were 1.32 Mgal/d in Tripp County and 1.30 Mgal/d in Charles Mix County (table 8). Total livestock water use was distributed among 3,777,822 cattle, 1,978,197 hogs, 661,872 sheep, 37,475 horses, and 2,136,682 poultry (South Dakota Agriculture Statistic Service, 1995, p. 121-127).

Industrial and Mining

Industrial water use includes water used to manufacture products. Mining water use includes water withdrawn for the extraction of minerals: solids (such as gold, coal, and ores), liquids (such as crude petroleum), and gases (such as natural gas). It also includes quarrying, gravel pits, dewatering, milling (crushing, screening, washing, floatation, etc.), and other preparations customarily done at mine sites, or as part of a mining activity.

Industrial water use during 1995 was about 13 Mgal/d (table 9). Of this total, about 5.1 Mgal/d was self supplied (4.14 Mgal/d from ground water and 0.97 Mgal/d from surface water); the remainder of 7.90 Mgal/d was provided from public-supply systems. Mining water use during 1995 was all self supplied and was about 27.3 Mgal/d, with about 7.8 Mgal/d withdrawn from ground water and about 19.5 Mgal/d withdrawn from surface water (table 10).

Table 4. Estimated public-supply domestic water deliveries by county in South Dakota, 1995

County	Public-supplied population, in thousands	Public-supply deliveries, in million gallons per day	Per capita use, in gallons per day	County	Public-supplied population, in thousands	Public-supply deliveries, in million gallons per day	Per capita use, in gallons per day
Aurora	3.09	0.24	77.67	Jackson	1.17	0.06	51.41
Beadle	13.80	1.04	75.36	Jerauld	1.40	0.10	71.33
Bennett	1.18	0.08	67.80	Jones	0.79	0.12	151.71
Bon Homme	7.01	0.76	108.42	Kingsbury	5.74	0.81	141.02
Brookings	26.36	1.39	52.73	Lake	10.80	1.06	98.15
Brown	34.97	2.49	71.20	Lawrence	14.51	1.47	101.31
Brule	5.63	0.56	99.41	Lincoln	17.67	1.33	75.27
Buffalo	0.12	0.01	83.33	Lyman	2.11	0.19	90.13
Butte	7.78	0.82	105.40	McCook	5.82	0.49	84.13
Campbell	1.88	0.24	127.66	McPherson	2.61	0.18	68.97
Charles Mix	9.48	1.09	114.98	Marshall	3.67	0.29	78.98
Clark	4.38	0.58	132.42	Meade	6.68	0.63	94.31
Clay	13.05	0.79	60.54	Mellette	1.29	0.12	93.02
Codington	23.70	2.05	86.50	Miner	3.06	0.22	71.90
Corson	1.26	0.11	87.30	Minnehaha	126.22	9.75	77.25
Custer	2.58	0.29	112.40	Moody	6.62	0.68	102.72
Davison	17.47	1.89	108.19	Pennington	71.25	6.23	87.44
Day	4.27	0.32	74.94	Perkins	1.98	0.15	75.76
Deuel	4.45	0.53	119.13	Potter	2.59	0.23	88.73
Dewey	2.84	0.37	130.28	Roberts	9.80	1.55	158.16
Douglas	3.62	0.37	102.21	Sanborn	1.23	0.04	32.52
Edmunds	4.22	0.38	90.05	Shannon	0.14	0.01	71.43
Fall River	5.14	0.60	116.73	Spink	7.22	0.55	76.18
Faulk	2.59	0.25	96.53	Stanley	2.03	0.14	68.97
Grant	7.53	0.54	71.71	Sully	0.83	0.06	72.29
Gregory	5.11	0.46	90.02	Todd	1.70	0.14	82.16
Haakon	1.83	0.09	49.18	Tripp	6.90	0.61	88.41
Hamlin	5.37	0.43	80.07	Turner	7.96	0.61	76.63
Hand	2.16	0.15	69.48	Union	9.25	0.65	70.27
Hanson	2.85	0.35	122.81	Walworth	5.83	0.46	78.90
Harding	0.58	0.03	51.72	Yankton	15.87	1.88	118.46
Hughes	14.11	1.62	114.81	Ziebach	1.84	0.13	70.65
Hutchinson	4.43	0.43	97.07	Total	602.22	52.35	[1]86.93
Hyde	0.80	0.06	74.91				

[1]Average computed by dividing total deliveries by total population.

Table 5. Estimated self-supplied domestic water withdrawals by county in South Dakota, 1995

County	Self-supplied population, in thousands	Self-supplied water withdrawals, in million gallons per day			Per capita use, in gallons per day
		Source		Total	
		Ground water	Surface water		
Beadle	4.34	0.30	0.00	0.30	69.12
Bennett	2.13	0.15	0.00	0.15	70.42
Brookings	0.09	0.01	0.00	0.01	111.11
Brown	0.76	0.07	0.00	0.07	92.11
Buffalo	1.71	0.12	0.00	0.12	70.18
Butte	1.12	0.09	0.00	0.09	80.36
Charles Mix	0.00	0.01	0.00	0.01	0.00
Clay	0.56	0.04	0.00	0.04	71.43
Codington	1.13	0.10	0.00	0.10	88.50
Corson	3.00	0.21	0.00	0.21	70.00
Custer	4.10	0.29	0.00	0.29	70.73
Davison	0.35	0.05	0.00	0.05	142.86
Day	2.44	0.17	0.00	0.17	69.67
Dewey	2.94	0.21	0.00	0.21	71.43
Edmunds	0.12	0.01	0.00	0.01	83.33
Fall River	1.95	0.14	0.00	0.14	71.79
Grant	0.71	0.05	0.00	0.05	70.42
Haakon	0.72	0.05	0.00	0.05	69.44
Hand	2.04	0.14	0.00	0.14	68.59
Hanson	0.09	0.01	0.00	0.01	111.11
Harding	0.96	0.08	0.00	0.08	83.33
Hughes	1.43	0.10	0.00	0.10	69.93
Hutchinson	3.59	0.27	0.00	0.27	75.21
Hyde	0.88	0.06	0.00	0.06	68.26
Jackson	1.70	0.12	0.00	0.12	70.46
Jerauld	0.94	0.07	0.00	0.07	74.63
Jones	0.53	0.04	0.00	0.04	75.61
Lawrence	7.94	0.56	0.01	0.57	71.79
Lyman	1.67	0.12	0.00	0.12	71.77
McPherson	0.43	0.03	0.00	0.03	69.77
Marshall	1.04	0.07	0.00	0.07	67.44
Meade	16.40	1.23	0.00	1.23	75.00
Mellette	0.71	0.05	0.00	0.05	70.42
Minnehaha	9.42	0.67	0.00	0.67	71.13
Pennington	16.05	1.28	0.01	1.29	80.37
Perkins	1.72	0.12	0.00	0.12	69.77
Potter	0.40	0.04	0.00	0.04	100.50
Roberts	0.15	0.01	0.00	0.01	66.67
Sanborn	1.57	0.13	0.00	0.13	82.80
Shannon	11.54	0.81	0.00	0.81	70.19
Spink	0.62	0.05	0.00	0.05	80.65
Stanley	0.79	0.05	0.00	0.05	63.29
Sully	0.74	0.05	0.00	0.05	67.57
Todd	7.40	0.52	0.00	0.52	70.31
Turner	0.64	0.05	0.00	0.05	78.13
Union	1.97	0.17	0.00	0.17	86.29
Yankton	4.88	0.34	0.00	0.34	69.67
Ziebach	0.38	0.03	0.00	0.03	78.95
Total	126.79	9.34	0.02	9.36	[1]73.82

[1]Average computed by dividing total withdrawals by total population.

Table 6. Estimated commercial water use by county in South Dakota, 1995

County	Self-supplied water withdrawals, in million gallons per day			Public-supply deliveries, in million gallons per day	Total use	County	Self-supplied water withdrawals, in million gallons per day			Public-supply deliveries, in million gallons per day	Total use
	Source						Source				
	Ground water	Surface water	Total		Withdrawal and deliveries, in million gallons per day		Ground water	Surface water	Total		Withdrawal and deliveries, in million gallons per day
Aurora	0.01	0.00	0.01	0.00	0.01	Jackson	0.01	0.00	0.01	0.05	0.06
Beadle	0.00	0.00	0.00	0.54	0.54	Kingsbury	0.00	0.03	0.03	0.00	0.03
Bennett	0.00	0.00	0.00	0.37	0.37	Lake	0.00	0.00	0.00	0.04	0.04
Bon Homme	0.08	0.00	0.08	0.14	0.22	Lawrence	1.17	1.68	2.85	0.77	3.62
Brookings	0.00	0.00	0.00	1.12	1.12	McCook	0.00	0.00	0.00	0.12	0.12
Brown	0.11	0.00	0.11	1.80	1.91	Marshall	0.00	0.00	0.00	0.07	0.07
Brule	1.07	0.00	1.07	0.27	1.34	Meade	0.36	0.00	0.36	0.08	0.44
Butte	0.97	0.00	0.97	0.16	1.13	Miner	0.00	0.00	0.00	0.03	0.03
Charles Mix	0.00	0.00	0.00	0.19	0.19	Minnehaha	0.44	0.00	0.44	5.52	5.96
Clark	0.04	0.00	0.04	0.19	0.23	Moody	0.04	0.03	0.07	0.15	0.22
Clay	0.00	0.00	0.00	0.46	0.46	Pennington	0.74	0.34	1.08	3.82	4.90
Codington	0.03	0.00	0.03	0.67	0.70	Perkins	0.00	0.00	0.00	0.04	0.04
Corson	0.00	0.00	0.00	0.09	0.09	Potter	0.01	0.00	0.01	0.12	0.13
Custer	0.12	0.00	0.12	0.00	0.12	Roberts	0.00	0.00	0.00	0.23	0.23
Davison	0.06	0.00	0.06	0.63	0.69	Shannon	0.01	0.00	0.01	0.00	0.01
Douglas	0.03	0.00	0.03	0.02	0.05	Spink	0.05	0.00	0.05	0.10	0.15
Edmunds	0.03	0.00	0.03	0.04	0.07	Stanley	0.03	1.62	1.65	0.19	1.84
Fall River	0.08	0.31	0.39	0.07	0.46	Sully	0.00	0.03	0.03	0.00	0.03
Grant	0.00	0.00	0.00	0.12	0.12	Tripp	0.00	0.00	0.00	0.01	0.01
Gregory	0.00	0.00	0.00	0.16	0.16	Turner	0.00	0.00	0.00	0.16	0.16
Haakon	0.22	0.00	0.22	0.09	0.31	Union	0.04	0.00	0.04	0.48	0.52
Hamlin	0.00	0.00	0.00	0.02	0.02	Walworth	0.00	0.00	0.00	0.26	0.26
Hand	0.00	0.00	0.00	0.12	0.12	Yankton	0.08	0.00	0.08	0.79	0.87
Harding	0.02	0.00	0.02	0.00	0.02	Ziebach	0.14	0.00	0.14	0.00	0.14
Hughes	0.06	0.01	0.07	0.72	0.79	Total	6.05	4.05	10.10	21.07	31.17
Hutchinson	0.00	0.00	0.00	0.05	0.05						

Table 7. Estimated irrigation withdrawals and acreage irrigated by county in South Dakota, 1995

County	Water withdrawals, in million gallons per day			Irrigated land, in thousand acres		
	Source		Total	Application method		
	Ground water	Surface water		Sprinkler	Surface (flood)	Total
Aurora	0.00	0.01	0.01	0.01	0.00	0.01
Beadle	4.01	0.15	4.16	9.19	0.35	9.54
Bennett	6.35	0.00	6.35	6.90	1.03	7.93
Bon Homme	1.19	1.68	2.87	6.11	0.38	6.49
Brookings	1.68	0.00	1.68	7.20	0.57	7.77
Brown	1.95	0.20	2.15	3.85	0.13	3.98
Brule	0.10	0.94	1.04	1.75	0.19	1.94
Buffalo	0.59	2.11	2.70	2.43	0.37	2.80
Butte	0.87	85.20	86.07	11.63	48.40	60.03
Campbell	1.14	1.09	2.23	2.06	0.20	2.26
Charles Mix	2.00	5.10	7.10	10.61	0.90	11.51
Clark	0.81	0.02	0.83	1.98	0.05	2.03
Clay	2.17	0.33	2.50	7.60	0.25	7.85
Codington	1.20	0.00	1.20	3.02	0.25	3.27
Corson	0.00	0.83	0.83	0.81	0.05	0.86
Custer	0.08	1.49	1.57	0.98	0.57	1.55
Davison	0.43	0.00	0.43	0.88	0.01	0.89
Day	0.19	0.02	0.21	0.82	0.01	0.83
Deuel	0.35	0.00	0.35	1.15	0.02	1.17
Dewey	0.00	0.11	0.11	0.05	0.01	0.06
Douglas	0.97	0.00	0.97	1.13	0.05	1.18
Edmunds	0.16	0.00	0.16	0.53	0.02	0.55
Fall River	0.14	35.05	35.19	4.84	8.70	13.54
Faulk	0.00	0.01	0.01	0.10	0.00	0.10
Grant	0.98	0.03	1.01	3.01	0.12	3.13
Gregory	0.07	0.81	0.88	1.82	0.14	1.96
Haakon	0.00	0.39	0.39	0.41	0.17	0.58
Hamlin	2.10	0.00	2.10	4.77	0.31	5.08
Hand	0.21	0.03	0.24	0.81	0.03	0.84
Hanson	0.05	0.38	0.43	0.78	0.00	0.78
Harding	0.00	0.25	0.25	0.21	0.10	0.31
Hughes	2.00	16.23	18.23	13.21	1.00	14.21
Hutchinson	0.80	0.14	0.94	2.29	0.04	2.33
Hyde	0.18	0.10	0.28	0.26	0.00	0.26
Jackson	0.00	1.04	1.04	0.35	0.35	0.70
Jerauld	0.43	0.00	0.43	0.97	0.05	1.02

Table 7. Estimated irrigation withdrawals and acreage irrigated by county in South Dakota, 1995—Continued

County	Water withdrawals, in million gallons per day			Irrigated land, in thousand acres		
	Source		Total	Application method		
	Ground water	Surface water		Sprinkler	Surface (flood)	Total
Jones	0.00	0.43	0.43	0.43	0.33	0.76
Kingsbury	0.42	0.00	0.42	1.30	0.03	1.33
Lake	0.32	0.03	0.35	1.27	0.05	1.32
Lawrence	0.72	0.31	1.03	0.72	0.70	1.42
Lincoln	0.50	0.14	0.64	1.16	0.04	1.20
Lyman	0.18	3.91	4.09	2.27	0.20	2.47
McCook	0.00	0.05	0.05	0.03	0.00	0.03
McPherson	0.26	0.19	0.45	0.89	0.03	0.92
Marshall	0.16	0.03	0.19	0.74	0.02	0.76
Meade	0.09	1.64	1.73	0.73	0.61	1.34
Mellette	0.05	0.32	0.37	0.32	0.20	0.52
Miner	0.01	0.00	0.01	0.00	0.00	0.00
Minnehaha	0.67	0.35	1.02	1.87	0.10	1.97
Moody	0.25	0.22	0.47	1.44	0.10	1.54
Pennington	0.12	4.36	4.48	2.27	2.18	4.45
Perkins	0.00	0.32	0.32	0.45	0.11	0.56
Potter	0.65	2.23	2.88	3.35	0.25	3.60
Roberts	0.29	0.00	0.29	1.37	0.04	1.41
Sanborn	0.00	0.01	0.01	0.03	0.00	0.03
Shannon	0.00	0.01	0.01	0.00	0.00	0.00
Spink	6.98	0.09	7.07	14.01	0.32	14.33
Stanley	0.00	0.04	0.04	0.05	0.00	0.05
Sully	1.80	10.08	11.88	14.56	2.99	17.55
Todd	6.93	0.23	7.16	9.06	1.02	10.08
Tripp	0.80	1.51	2.31	2.73	0.44	3.17
Turner	12.79	0.24	13.03	15.07	0.42	15.49
Union	13.75	0.49	14.24	25.05	1.10	26.15
Walworth	0.41	1.36	1.77	2.15	0.19	2.34
Yankton	3.45	1.20	4.65	7.03	0.25	7.28
Ziebach	0.00	0.19	0.19	0.05	0.02	0.07
Total	84.80	183.72	268.52	224.92	76.56	301.48

Table 8. Estimated livestock water use by county in South Dakota, 1995

County	Water withdrawals, in million gallons per day			County	Water withdrawals, in million gallons per day		
	Source		Total		Source		Total
	Ground water	Surface water			Ground water	Surface water	
Aurora	0.28	0.42	0.70	Jackson	0.28	0.42	0.70
Beadle	0.49	0.74	1.23	Jerauld	0.22	0.32	0.54
Bennett	0.21	0.31	0.52	Jones	0.16	0.24	0.40
Bon Homme	0.35	0.53	0.88	Kingsbury	0.26	0.39	0.65
Brookings	0.37	0.55	0.92	Lake	0.25	0.38	0.63
Brown	0.51	0.77	1.28	Lawrence	0.17	0.25	0.42
Brule	0.33	0.55	0.88	Lincoln	0.25	0.38	0.63
Buffalo	0.16	0.23	0.39	Lyman	0.21	0.32	0.53
Butte	0.32	0.48	0.80	McCook	0.28	0.42	0.70
Campbell	0.17	0.25	0.42	McPherson	0.33	0.50	0.83
Charles Mix	0.52	0.78	1.30	Marshall	0.31	0.47	0.78
Clark	0.35	0.52	0.87	Meade	0.48	0.72	1.20
Clay	0.10	0.15	0.25	Mellette	0.25	0.38	0.63
Codington	0.27	0.40	0.67	Miner	0.23	0.35	0.58
Corson	0.31	0.47	0.78	Minnehaha	0.44	0.66	1.10
Custer	0.11	0.17	0.28	Moody	0.24	0.37	0.61
Davison	0.17	0.26	0.43	Pennington	0.27	0.40	0.67
Day	0.25	0.37	0.62	Perkins	0.37	0.50	0.87
Deuel	0.24	0.36	0.60	Potter	0.21	0.31	0.52
Dewey	0.25	0.38	0.63	Roberts	0.28	0.42	0.70
Douglas	0.25	0.38	0.63	Sanborn	0.24	0.35	0.59
Edmunds	0.31	0.47	0.78	Shannon	0.12	0.19	0.31
Fall River	0.24	0.36	0.60	Spink	0.47	0.71	1.18
Faulk	0.27	0.41	0.68	Stanley	0.15	0.22	0.37
Grant	0.22	0.34	0.56	Sully	0.15	0.22	0.37
Gregory	0.33	0.50	0.83	Todd	0.22	0.33	0.55
Haakon	0.28	0.42	0.70	Tripp	0.53	0.79	1.32
Hamlin	0.17	0.25	0.42	Turner	0.38	0.57	0.95
Hand	0.43	0.65	1.08	Union	0.23	0.34	0.57
Hanson	0.18	0.26	0.44	Walworth	0.17	0.25	0.42
Harding	0.31	0.47	0.78	Yankton	0.26	0.38	0.64
Hughes	0.17	0.26	0.43	Ziebach	0.18	0.27	0.45
Hutchinson	0.46	0.70	1.16	Total	18.36	27.57	45.93
Hyde	0.39	0.59	0.98				

Table 9. Estimated industrial water use by county in South Dakota, 1995

County	Self-supplied water withdrawals, in million gallons per day			Public-supply deliveries, in million gallons per day	Total use
	Source		Total		Withdrawal and deliveries, in million gallons per day
	Ground water	Surface water			
Beadle	0.00	0.82	0.82	0.95	1.77
Brookings	0.18	0.00	0.18	0.15	0.33
Brown	0.00	0.00	0.00	0.82	0.82
Butte	0.03	0.00	0.03	0.08	0.11
Clark	0.24	0.00	0.24	0.00	0.24
Clay	0.07	0.00	0.07	0.06	0.13
Codington	0.75	0.00	0.75	0.27	1.02
Custer	0.10	0.00	0.10	0.00	0.10
Davison	0.01	0.00	0.01	0.25	0.26
Edmunds	0.07	0.00	0.07	0.00	0.07
Grant	0.00	0.00	0.00	0.05	0.05
Haakon	0.00	0.00	0.00	0.05	0.05
Harding	0.02	0.00	0.02	0.00	0.02
Hughes	0.00	0.00	0.00	0.40	0.40
Lake	0.00	0.00	0.00	0.27	0.27
Lawrence	0.14	0.00	0.14	0.93	1.07
Meade	0.07	0.00	0.07	0.00	0.07
Minnehaha	1.03	0.00	1.03	2.50	3.53
Pennington	1.26	0.15	1.41	0.81	2.22
Roberts	0.03	0.00	0.03	0.00	0.03
Tripp	0.00	0.00	0.00	0.01	0.01
Union	0.01	0.00	0.01	0.00	0.01
Walworth	0.00	0.00	0.00	0.10	0.10
Yankton	0.13	0.00	0.13	0.20	0.33
Total	4.14	0.97	5.11	7.90	13.01

Table 10. Estimated mining water use by county in South Dakota, 1995

County	Water withdrawals, in million gallons per day, by source and type		
	Source		Total
	Ground water	Surface water	
Brown	1.43	0.00	1.43
Campbell	0.01	0.00	0.01
Codington	1.48	3.73	5.21
Custer	0.00	1.40	1.40
Davison	0.45	0.00	0.45
Day	0.22	0.00	0.22
Edmunds	0.48	0.00	0.48
Fall River	0.21	0.36	0.57
Kingsbury	0.36	0.00	0.36
Lake	0.00	1.62	1.62
Lawrence	1.21	3.94	5.15
Lyman	0.05	0.00	0.05
McPherson	0.02	0.48	0.50
Minnehaha	0.38	0.00	0.38
Pennington	0.98	7.98	8.96
Sully	0.49	0.00	0.49
Total	7.77	19.51	27.28

Thermoelectric Power

Thermoelectric power water use includes water used in the production of electric power generated with fossil-fuel, geothermal, or nuclear energy. Total water withdrawn by thermoelectric and geothermal uses during 1995 was about 5.3 Mgal/d, with about 3.4 Mgal/d from ground water and about 1.9 Mgal/d from surface water (table 11). Total water withdrawn for thermoelectric power generation by powerplants using fossil fuel was about 4.5 Mgal/d, with about 2.6 Mgal/d from ground water and about 1.9 Mgal/d from surface water (table 12).

Table 11. Estimated total thermoelectric power water use by county in South Dakota, 1995

County	Self-supplied water withdrawals, in million gallons per day		
	Source		Total
	Ground water	Surface water	
Edmunds	0.10	0.00	0.10
Grant	1.73	1.73	3.46
Haakon	0.52	0.00	0.52
Hughes	0.10	0.00	0.10
Lawrence	0.44	0.14	0.58
Minnehaha	0.03	0.06f	0.09
Pennington	0.44	0.00	0.44
Stanley	0.06	0.00	0.06
Total	3.42	1.93	5.35

Table 12. Estimated fossil fuel thermoelectric power water use by county in South Dakota, 1995

County	Self-supplied water withdrawals, in million gallons per day		
	Source		Total
	Ground water	Surface water	
Grant	1.73	1.73	3.46
Lawrence	0.44	0.14	0.58
Minnehaha	0.00	0.06	0.06
Pennington	0.44	0.00	0.44
Total	2.61	1.93	4.54

The withdrawal of geothermal water totaled 0.81 Mgal/d during 1995 (table 13). The majority of this water was from wells completed in the Madison aquifer that are used for heating. South Dakota does not have any operating nuclear powerplants.

Table 13. Estimated geothermal thermoelectric power water use by county in South Dakota, 1995

County	Self-supplied water withdrawals, in million gallons per day		
	Source		Total
	Ground water	Surface water	
Edmunds	0.10	0.00	0.10
Haakon	0.52	0.00	0.52
Hughes	0.10	0.00	0.10
Minnehaha	0.03	0.00	0.03
Stanley	0.06	0.00	0.06
Total	0.81	0.00	0.81

INSTREAM USE

The only instream use reported for South Dakota is for hydroelectric power generation. Instream use occurred in five counties in South Dakota during 1995.

Hydroelectric Power

Water used for hydroelectric power generation refers to the water used in the generation of electricity at plants where turbine generators are driven by falling water. Because of the four hydroelectric powerplants operated by the U.S. Army Corps of Engineers on the Missouri River main stem in South Dakota, water use for hydroelectric power generation is substantial. During 1995, about 62,400 Mgal/d was used by the hydroelectric powerplants to generate about 6,420 gigawatt-hours of electricity (table 14).

Table 14. Estimated hydroelectric power water use by county in South Dakota, 1995

County	Instream water use		Power generated, in gigawatt-hours
	Million gallons per day	Thousand acre-feet per year	
Buffalo	16,776.00	18,805.90	1,083.92
Charles Mix	18,305.00	20,519.90	1,905.55
Hughes	16,587.00	18,594.03	3,043.78
Mellette	47.82	53.61	0.68
Yankton[1]	10,646.00	11,934.17	386.98
Total	62,361.82	69,907.60	6,420.91

[1]Values presented reflect exactly one-half of the water-use and power-generation data for Gavins Point Dam. The other one-half is reported by Nebraska.

CONSUMPTIVE USE

The only consumptive use reported for South Dakota during 1995 is for reservoir evaporation. Reservoir evaporation was compiled by hydrologic unit code only.

Reservoir Evaporation

Reservoir evaporation includes water loss by evaporation from manmade impoundments that have a normal capacity equal to or greater than 5,000 acre-ft (acre-feet). Normal capacity is defined as total volume in a reservoir below normal retention level, including dead storage but excluding flood control and surcharge storage.

During 1995, reservoir evaporation was about 1,561,000 acre-feet from a total reservoir surface area of about 560,000 acres (table 15). A large part of the reservoir evaporation in South Dakota occurs on the four main stem Missouri River reservoirs.

SUMMARY

Total water withdrawals for South Dakota during 1995 were about 460 Mgal/d. Ground-water withdrawals accounted for about 41 percent of the total withdrawals, or about 187 Mgal/d. Surface-water withdrawals accounted for about 59 percent of the total withdrawals, or about 273 Mgal/d.

Total withdrawals for eight categories of offstream use in South Dakota during 1995 were compiled. The withdrawals were as follows: public supply, 88.4 Mgal/d; domestic, 9.4 Mgal/d; commercial, 10.1 Mgal/d; irrigation, 268.5 Mgal/d; livestock, 45.9 Mgal/d; industrial, 5.1 Mgal/d; mining, 27.3 Mgal/d; and thermoelectric power, 5.3 Mgal/d.

Water use for hydroelectric power, the only instream use compiled in this report, was about 62,400 Mgal/d to generate 6,420 gigawatt-hours of electricity during 1995. Reservoir evaporation, the only consumptive use reported in this report, was about 1,561,000 acre-feet from 560,000 reservoir surface acres during 1995.

Table 15. Reservoir evaporation water use by hydrologic unit in South Dakota, 1995

Hydrologic unit code number/name		Surface area, in thousand acres	Reservoir evaporation, in thousand acre-feet
07020001	Upper Minnesota	6.00	19.00
09020101	Bois De Sioux	5.70	18.05
10120106	Angostura Reservoir	3.90	11.39
10120109	Middle Cheyenne-Spring	0.38	1.29
10120110	Rapid	1.21	3.07
10120202	Lower Belle Fourche	6.50	13.98
10130102	Upper Lake Oahe	109.89	317.86
10130105	Lower Lake Oahe	223.11	644.54
10130302	South Fork Grand	4.84	15.39
10140101	Fort Randall Reservoir	142.00	442.00
10140105	Crow	0.34	1.29
10140201	Upper White	0.55	2.21
10160003	Upper James	39.60	11.83
10160004	Elm	1.19	3.96
10160008	Snake	0.85	2.94
10160011	Lower James	0.79	2.90
10170101	Lewis and Clark Lake	13.50	47.50
10170102	Vermillion	0.06	1.95
	Total	560.41	1,561.15

SELECTED REFERENCES

Solley, W.B., Pierce, R.R., and Perlman, H.A., 1993, Estimated use of water in the United States in 1990: U.S. Geological Survey Circular 1081, 76 p.

South Dakota Agricultural Statistic Service, 1995, South Dakota Agriculture, 1989-1995, 128 p.

U.S. Bureau of the Census, 1995, Time series of resident population of places: April 1, 1990, to July 1, 1994, Data for South Dakota (machine-readable data file), prepared by Population distribution and Population Estimates Branches.

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