ESTIMATE OF LIVESTOCK WATER USE IN NEBRASKA DURING 1980

By Eugene K. Steele, Jr.

U.S. GEOLOGICAL SURVEY

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FACTORS FOR CONVERTING ENGLISH UNITS TO INTERNATIONAL SYSTEM (SI) UNITS

Multiply	By	To obtain
	Rate	
gallons per day	0.0037	cubic meters per day
million gallons per day	3,700	cubic meters per day
	Volume	
acre-feet	1,233	cubic meters

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ABSTRACT

The estimated volume of 148,120 acre-feet of water used by livestock in Nebraska during 1980 is the second largest volume used for livestock production in the fifty States. Although water used by livestock is a small percentage of the total water used in Nebraska, this use has a major impact on the farm economy of the State, as livestock sales accounted for 59 percent of the total farm-market cash receipts in 1980. About 16 percent, or 23,590 acre-feet, of this use is estimated to be from surface-water sources, with the remaining 124,530 acre-feet pumped from the State's ground-water supply.

The estimated livestock water use in Nebraska's 93 counties during 1980 ranged from 340 acre-feet in Hooker County to 6,770 acre-feet in Cherry County. Livestock water use by Hydrologic Units ranged from 20 acre-feet in the Hat Creek basin (Unit 10120106) to 10,370 acre-feet in the Elkhorn River basin (Unit 10220003), and the Natural Resources Districts' use ranged from 1,880 acre-feet in the South Platte NRD to 17,830 acre-feet in the Lower Elkhorn NRD.

INTRODUCTION

Water-use data are collected cooperatively by the University of Nebraska, Conservation and Survey Division, and the U.S. Geological Survey to estimate total water use in Nebraska. Aggregated water-use data are stored in the U.S. Geological Survey computer files in Reston, VA, as part of a National Water Use Data System (NWUDS).

The volume of water used for livestock production in Nebraska during 1980, estimated as 148,120 acre-ft, is the second largest volume used for livestock in the fifty States. Only Texas had a greater livestock water use in 1980 (303,290 acre-ft, computed from Solley and others, 1983).

Agriculture is the backbone of Nebraska's economy, and although water used for livestock production is only about 1 percent of the total agricultural water use in the State, the impact of this use is a major factor controlling the farm economy of the State. Cash receipts for livestock of 3,570.3 million accounted for about 59 percent of the total farm-market cash receipts during 1980 (Nebraska Department of Economic Development, 1983).

Purpose and Scope

The purpose of this report is to provide better estimates of water used by livestock classes in Nebraska in 1980 for planners and water managers, to prepare these estimates for inclusion in the U.S. Geological Survey National Water-Use Data System (NWUDS), and to document the method of estimation. Estimates are provided by county, hydrologic unit and subregion, and Natural Resources District.

DEFINITION OF TERMS

The following definitions of terms are provided for the convenience of users of this report:

Acre-foot (Acre-ft) is the volume of water required to cover 1 acre of land to a depth of 1 foot and is equal to 43,560 cubic feet or about 326,000 gallons.

County number (County No.) is an identification number adopted from Federal Information Processing Standards Publication 6-2 (U.S. Water Resources Council, 1976) and used by the U.S. Geological Survey for the storage and retrieval of county data. This identification number must be used when storing or retrieving county data from the National Water Use Data System.

Hydrologic unit - A geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as delineated by the U.S. Geological Survey on the State Hydrologic Unit Maps; each hydrologic unit is identified by an eight-digit number, the first four of which denote the region and subregion containing the unit.

Livestock water use - Water used by or for cows, hogs, sheep, poultry and other animals normally found on farms and ranches.

Million gallons per day (Mgal/d) - A standard term used to denote an average daily use rate.

Natural Resources District (NRD) - A political entity established by the Nebraska State Legislature with the authority to levy taxes for the development, conservation, regulation, and management of the natural resources within the boundaries of the district.

National Water Use Data System (NWUDS) - A national system established by the U.S. Geological Survey for the storage and retrieval of aggregated estimates of water used by the States.

Subregion - A geographic area representing a drainage basin or distinct hydrologic feature as delineated by the U.S. Geological Survey on the State Hydrologic Unit Maps, comprising one or more hydrologic units and identified by a four-digit number, the first two of which identify the region containing the subregion.

ESTIMATION OF LIVESTOCK WATER USE

To estimate the livestock water use in Nebraska during 1980 it was necessary to determine the number of animals in each class. Water use was estimated by multiplying these numbers by the gallons per day (gal/d) per head, utilized by each type of animal.

Estimation of 1980 Livestock Populations

Estimates of livestock populations in Nebraska during 1980 were made from information published in Nebraska Agricultural Statistics Annual Reports, (Nebraska Crop and Livestock Reporting Service, 1982, 1983). These reports list the number of animals by county for the livestock classes of beef cows and other cattle, milk cows, and sheep as of January 1 and hogs as of December 1 of each year. The reports also give the number of calves born and the number of pigs raised in each county during the year. The number of lambs raised during the year is given only as a State total.

The numbers of beef cows and other cattle, milk cows, and sheep, per county, during 1980, that were used in this report, were determined as the average of the January 1, 1980, and January 1, 1981, inventories. The hog population for 1980 was computed as the average of the December 1, 1979, and the December 1, 1980, inventories. The number of calves raised was computed by determining a survival rate from the number of calves born and the number of calves that died (Nebraska Crop and Livestock Reporting Service, 1982). This survival rate of 92.5 percent was applied to the number of calves born in each county to determine populations for this class of livestock water-use. The number of pigs raised per county was taken from Nebraska Crop and Livestock Reporting Service (1982) and used without adjustment. The number of lambs raised per county was assigned on the basis of the number of sheep in the county. A ratio of

the number of sheep in each county to the total number of sheep in the State was determined. These ratios were multiplied by the total number of lambs raised to estimate the number raised in each county.

Average number of livestock in Nebraska during 1980 for the seven major water-use categories -- beef cows and other cattle, calves raised, milk cows, hogs, pigs raised, sheep, and lambs raised -- are listed by county in table 1. These data are used to estimate livestock water use during 1980. County populations for other classes of livestock such as horses, goats, chickens, and turkeys generally are not available, and water used by these classes is minimal. County locations and identification numbers are shown in figure 1.

Water-Use Rates for Livestock Classes

The quantity of water used by livestock in Nebraska counties, Hydrologic Units, Subregions, and Natural Resources Districts during 1980 was computed from estimates of gallons per day per head given in table 2. These estimates were adjusted from Anderson (1966) and Sykes (1955).

County Water-Use Estimates

Estimates of water used by livestock in each county in Nebraska during 1980 were made by multiplying the average number of head of the various livestock classes listed in table 1 by the gallons per day per head shown in table 2. Only State totals were available for turkeys and chickens, and no head-count was available for horses and goats. Therefore, no county head figures were estimated for these four livestock classes, but the combined use of these classes is estimated to be less than 0.4 percent of total livestock water use in the State.

An estimated water use was computed for turkeys and assigned to the four counties where known turkey-raising operations existed. (Counties are not identified in this report to avoid disclosing use by individual operations.) An estimated water use of 0.005 Mgal/d per county for horses, goats, and chickens was included in the aggregate total livestock use per county to indicate an awareness of some water use by these classes. In most counties this volume is indiscernable in the county water-use totals, as a result of rounding procedures.

Bentall and Shaffer (1979) estimated that 20 percent of the water used by livestock in Nebraska is supplied from surface water. This is considered a reasonable estimate to use for the classes of beef cows and

Table 1.--Average number of livestock on Nebraska farms and ranches during 1980

(Nebraska Crop and Livestock Reporting Service, 1982, 1983)

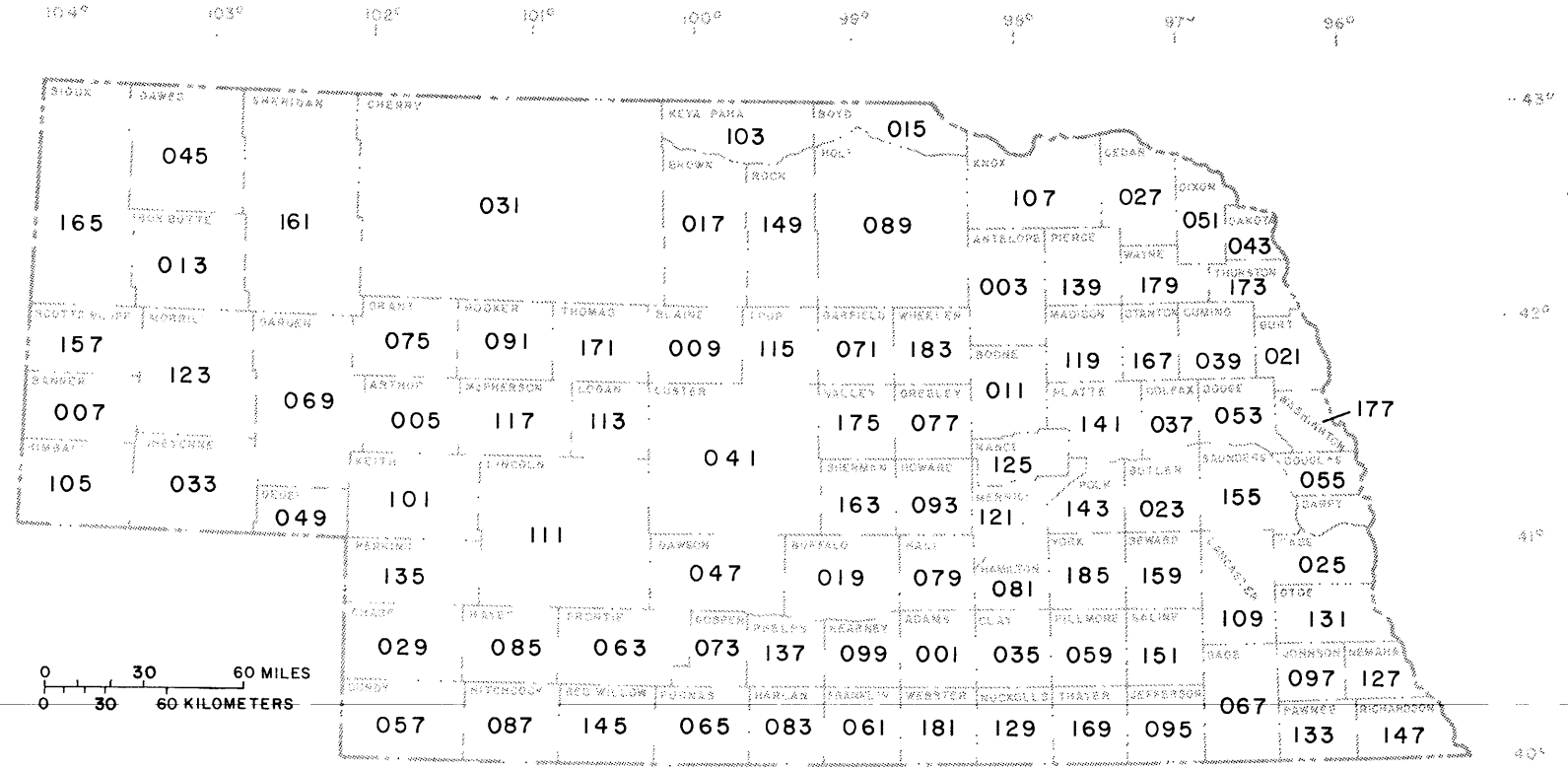
County No.	County Name	Beef cows and other cattle	Calves raised	Milk cows	Hogs	Pigs raised	Sheep	Lambs raised
001	Adams	76,550	11,920	450	37,050	56,300	2,150	1,050
003	Antelope	86,275	22,640	4,225	90,300	150,200	2,500	1,220
005	Arthur	38,450	16,360	50	650	1,100	150	75
007	Banner	23,450	9,790	50	3,300	5,900	775	375
009	Blaine	40,300	16,080	200	6,950	16,300	75	35
011	Boone	87,200	24,020	2,300	85,350	158,400	1,700	830
013	Box Butte	63,800	16,630	200	4,800	8,600	1,800	880
015	Boyd	46,400	18,570	1,100	29,350	54,000	725	355
017	Brown	95,275	25,690	775	10,150	18,500	1,700	830
019	Buffalo	117,200	31,600	1,300	56,350	91,000	7,000	3,410
021	Burt	59,100	10,810	900	82,000	148,800	3,200	1,560
023	Butler	46,125	13,580	875	48,550	83,600	4,050	1,970
025	Cass	40,400	10,530	1,600	34,550	55,500	1,450	705
027	Cedar	96,675	25,690	7,825	148,250	176,100	3,000	1,460
029	Chase	57,875	14,320	125	25,300	39,300	900	435
031	Cherry	359,200	143,960	800	5,550	10,600	650	315
033	Cheyenne	49,700	11,460	300	17,350	29,700	5,200	2,530
035	Clay	57,625	14,410	375	121,150	197,300	9,700	4,720
037	Colfax	67,250	8,690	1,250	81,200	136,100	1,300	635
039	Cuming	204,100	15,520	3,400	204,700	304,200	4,400	2,140
041	Custer	233,000	80,670	2,500	54,600	82,900	5,400	2,630
043	Dakota	22,425	6,470	575	29,150	40,700	900	435
045	Dawes	57,700	24,390	300	5,250	9,900	10,650	5,190
047	Dawson	216,725	45,280	775	92,850	141,300	3,750	1,830
049	Deuel	19,450	3,420	50	5,750	6,600	900	230
051	Dixon	70,075	13,950	1,425	84,750	108,000	2,950	1,440
053	Dodge	66,850	9,610	1,650	93,400	140,600	3,850	1,870
055	Douglas	31,850	3,880	1,150	10,650	16,000	475	230
057	Dundy	51,850	16,080	150	13,800	19,300	600	290
059	Fillmore	55,500	9,790	500	69,950	104,400	1,700	830
061	Franklin	52,000	19,590	500	30,250	53,300	1,100	535
063	Frontier	64,100	26,520	400	26,650	35,900	700	340
065	Furnas	55,300	19,400	1,200	20,200	34,000	1,575	765
067	Gage	55,850	18,480	6,150	118,700	196,500	2,700	1,310
069	Garden	98,275	33,730	225	3,500	5,900	925	450

Table 1.--Average number of livestock on Nebraska farms and ranches during 1980--Continued

County No.	County Name	Beef cows and other cattle	Calves raised	Milk cows	Hogs	Pigs raised	Sheep	Lambs raised
071	Garfield	39,500	15,150	500	9,800	17,700	550	270
073	Gosper	29,875	11,460	125	16,200	31,100	425	205
075	Grant	57,400	23,100	100	350	700	0	0
077	Greeley	58,350	21,710	1,150	33,400	48,100	650	315
079	Hall	77,400	14,690	1,600	39,050	53,300	4,650	2,260
081	Hamilton	50,650	8,960	850	48,200	67,600	2,850	1,390
083	Harlan	56,600	14,600	400	17,050	31,800	1,300	635
085	Hayes	35,400	15,710	100	14,350	23,500	650	315
087	Hitchcock	42,325	13,490	175	20,750	41,400	650	315
089	Holt	206,400	80,390	6,100	91,150	139,900	4,000	1,950
091	Hooker	16,950	6,280	50	2,850	2,500	0	0
093	Howard	66,625	17,370	3,375	49,350	69,600	1,850	900
095	Jefferson	44,150	13,490	2,850	58,450	100,100	2,475	1,210
097	Johnson	27,625	10,900	1,375	43,350	64,800	2,850	1,390
099	Kearney	72,725	10,630	275	28,300	36,300	1,225	595
101	Keith	65,675	18,760	325	1,800	4,100	400	195
103	Keya Paha	48,450	21,250	1,550	10,800	19,200	2,700	1,310
105	Kimball	23,325	7,850	175	3,650	3,300	4,750	2,310
107	Knox	138,650	41,580	5,350	158,400	261,200	3,900	1,900
109	Lancaster	39,500	13,950	2,250	48,000	95,000	4,550	2,250
111	Lincoln	173,150	66,810	1,350	34,450	44,900	3,750	1,830
113	Logan	39,350	13,580	150	5,650	8,500	450	220
115	Loup	37,825	11,730	176	4,400	6,400	300	145
117	McPherson	37,450	15,710	50	4,700	6,400	550	270
119	Madison	65,450	17,000	2,550	91,600	165,800	2,600	1,270
121	Merrick	71,750	14,510	1,250	46,600	75,200	2,350	1,140
123	Morrill	81,400	31,790	100	8,000	9,200	6,750	3,290
125	Nance	43,675	14,510	1,325	33,450	58,500	525	255
127	Nemaha	27,975	8,870	525	55,450	76,300	1,300	635
129	Nuckolls	48,400	13,680	1,100	63,600	82,100	1,850	900
131	Otoe	41,700	14,040	1,800	73,900	76,300	1,400	680
133	Pawnee	29,300	12,290	1,200	41,300	63,400	2,500	1,220
135	Perkins	25,575	10,350	425	9,000	12,400	2,700	1,320
137	Phelps	81,400	13,950	100	37,000	57,700	600	290
139	Pierce	67,150	17,830	3,350	83,200	155,400	850	415

Table 1.--Average number of livestock on Nebraska farms and ranches during 1980--Continued

County No.	County Name	Beef cows and other cattle	Calves raised	Milk cows	Hogs	Pigs raised	Sheep	Lambs raised
141	Platte	72,250	17,650	3,750	131,500	294,100	2,300	1,120
143	Polk	95,600	10,630	400	56,050	70,700	700	340
145	Red Willow	70,300	17,560	700	24,400	35,900	950	465
147	Richardson	43,125	14,230	1,375	43,100	50,400	1,350	655
149	Rock	83,175	26,430	1,325	3,750	8,500	800	390
151	Saline	47,675	9,240	825	45,450	73,400	2,450	1,190
153	Sarpy	52,850	3,880	650	14,800	15,200	3,000	1,460
155	Saunders	86,525	12,380	1,475	56,500	97,300	2,500	1,220
157	Scotts Bluff	138,150	13,300	850	18,900	22,500	27,650	13,470
159	Seward	61,975	11,270	1,525	63,600	117,000	2,800	1,360
161	Sheridan	149,200	59,780	800	13,050	13,200	4,500	2,190
163	Sherman	50,750	19,030	2,250	31,050	44,400	1,100	535
165	Sioux	77,250	22,550	250	2,950	7,300	4,400	2,145
167	Stanton	78,250	12,290	1,500	78,600	99,900	1,725	840
169	Thayer	56,775	13,030	1,225	38,600	46,100	1,225	595
171	Thomas	30,950	11,270	50	1,800	1,400	100	50
173	Thurston	44,975	9,420	1,025	57,650	66,600	1,250	610
175	Valley	69,950	19,130	2,050	48,350	71,000	1,950	950
177	Washington	44,750	9,240	2,750	70,300	122,400	3,100	1,510
179	Wayne	77,075	12,840	2,925	80,550	126,500	2,675	1,300
181	Webster	41,550	16,720	950	21,450	28,100	1,175	575
183	Wheeler	48,375	16,450	1,125	8,100	9,200	200	90
185	York	49,550	10,440	950	74,600	122,400	2,600	1,270
	TOTALS	6,504,500	1,820,270	120,500	4,025,000	6,290,000	230,000	42,540



EXPLANATION

101 COUNTY IDENTIFICATION NUMBER

Figure 1.--Locations and identification numbers of Nebraska counties.

Table 2.--Water-use rates for various livestock classes (adjusted from Anderson, 1966, and Sykes, 1955)

[Gal/d, gallons per day]

Livestock class	Daily use rate (gal/d/head)	Annual use rate (gal/d/head)
Beef cows and other cattle[1/]	15	15
Calves raised[2/]	6	4
Milk cows[3/]	30	30
Hogs[4/]	4	4
Pigs raised[5/]	2	1
Sheep	2	2
Lambs raised[6/]	1	0.6
Turkeys	0.12	0.12

1/ Class includes breeding stock, herd replacement stock, cattle in feedlots, and all other cattle, excluding milk cows.

2/ Based on zero water use at birth to 12 gal/d/head at 8 months of age, for an average use of 6 gal/d/head for two-thirds of a year. For computational purposes in succeeding sections, this is equal to an annual use rate of 4 gal/d/head.

3/ Most dairy herds in Nebraska are maintained for the marketing of Grade A or Grade B whole milk. Certain sanitary procedures are required for certification to sell to these markets, and the 30 gal/d/head includes an estimated 5 gal/d/head for sanitation.

4/ Includes water for cooling during summer months and for sanitation of feeding floors and lots.

5/ Based on zero water use at birth to 4 gal/d/head at market age of 6 months, for an average of 2 gal/d/head for one-half year. For computational purposes in succeeding sections, this is equal to an annual use rate of 1 gal/d/head.

6/ Based on zero water use at birth to 2 gal/d/head at market age of 7 months, for an average use rate of 1 gal/d/head during this period. For computational purposes in succeeding sections, this is equal to an annual use rate of 0.6 gal/d/head.

other cattle and calves raised, and was used to estimate the 23,590 acre-ft of surface water used by livestock during 1980. Milk cows, hogs, pigs, sheep, and lambs generally are kept in more confined lots and pastures, and surface water used by these classes of livestock is minimal. In this report, all water used by these livestock classes is considered to be provided by ground-water supplies. The total volume of ground water used by all livestock in Nebraska during 1980 is estimated to be 124,530 acre-ft.

The water use of the various livestock classes during 1980, expressed as percentages of total water use, are shown in figure 2. The cattle-raising industry in the State uses over four times as much water as all other livestock industries combined, with the two classes of "beef cows and other cattle" and "calves raised" accounting for 79.6 percent of the total livestock water use during 1980. The hog-raising industry is the second largest livestock user, with the classes of "hogs" and "pigs raised" accounting for 17.0 percent of the total. Water used for milk production is only 2.7 percent of the total. Water use for all other livestock classes (sheep, lambs raised, horses, goats, turkeys, and chickens) was only 0.7 percent of the total.

Estimates of water used by all livestock during 1980 in each county are listed in table 3 as a rate in million gallons per day and total volume in acre-feet per year. Estimates range from 340 acre-ft/yr in Hooker County to 6,770 acre-ft/yr in Cherry County, the largest of the 93 Nebraska counties.

Estimates of water used by the five major classes of livestock in Nebraska in 1980 are listed, by county, in million gallons per day in table 4 and in total acre-feet per year in table 5. Note that the categories for sheep and lambs raised accounted for less than 0.7 percent of the total livestock use (fig. 2), so water use in these categories was not computed for each accounting unit.

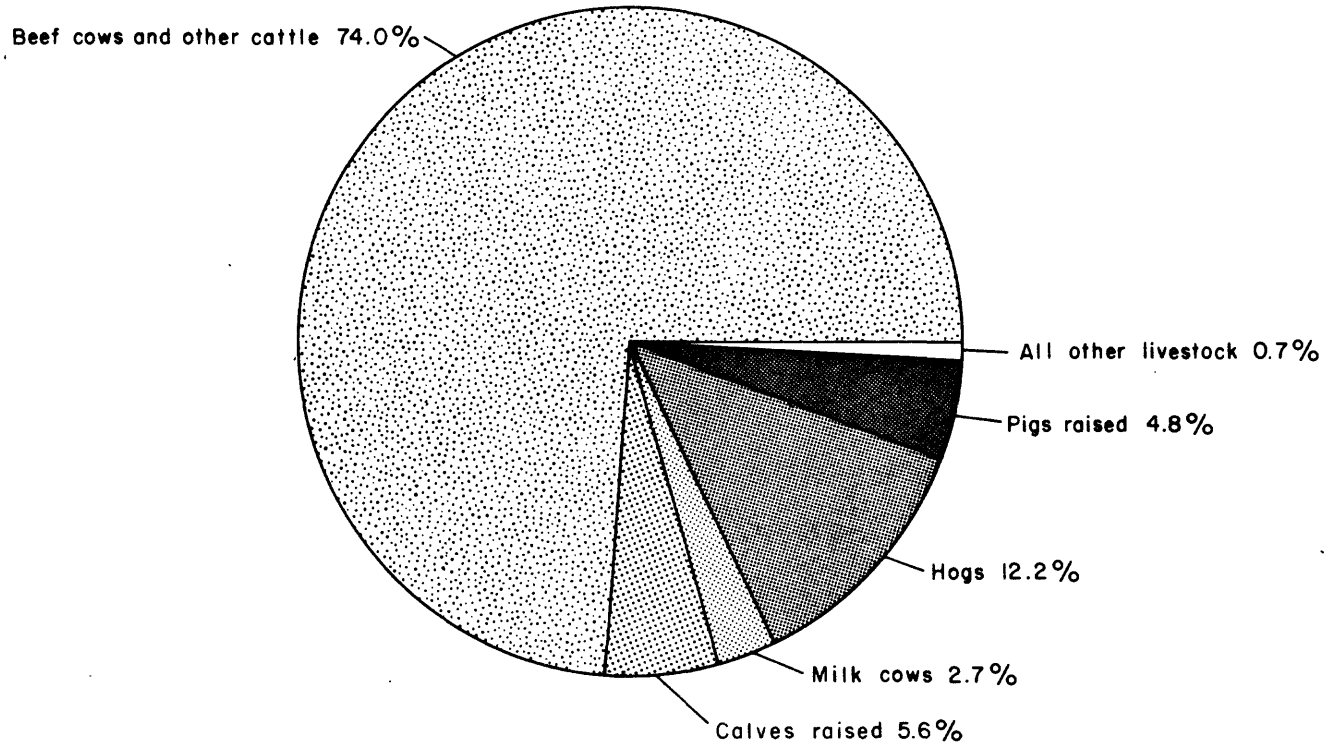


Figure 2.--1980 water use by major livestock classes.

Table 3.--Ground water and surface water use by livestock during 1980, by county

County No.	County Name	Water use, in million gallons per day: Ground water	Surface water	Total	Water use, in acre-feet per year[1/]: Ground water	Surface water	Total
001	Adams	1.18	0.24	1.42	1,330	270	1,600
002	Antelope	1.75	.28	2.03	1,970	310	2,280
005	Arthur	.52	.13	.65	580	150	730
007	Banner	.34	.08	.42	380	90	470
009	Blaine	.60	.14	.74	670	160	830
011	Boone	1.70	.28	1.98	1,910	310	2,220
013	Box Butte	.86	.21	1.07	970	230	1,200
015	Boyd	.83	.15	.98	930	170	1,100
017	Brown	1.32	.31	1.63	1,480	350	1,830
019	Buffalo	1.88	.38	2.26	2,110	430	2,540
021	Burt	1.26	.19	1.45	1,420	210	1,630
023	Butler	.91	.15	1.06	1,020	170	1,190
025	Cass	.77	.13	.90	860	150	1,010
027	Cedar	2.26	.31	2.57	2,540	350	2,890
029	Chase	.89	.19	1.08	1,000	210	1,210
031	Cherry	4.84	1.19	6.03	5,430	1,340	6,770
033	Cheyenne	.76	.16	.92	850	180	1,030
035	Clay	1.46	.18	1.64	1,640	200	1,840
037	Colfax	1.34	.21	1.55	1,500	240	1,740
039	Cuming	3.74	.62	4.36	4,200	700	4,900
041	Custer	3.46	.76	4.22	3,890	850	4,740
043	Dakota	.47	.07	.54	530	80	610
045	Dawes	.84	.19	1.03	950	210	1,160
047	Dawson	3.29	.69	3.98	3,700	770	4,470
049	Deuel	.28	.06	.34	310	70	380
051	Dixon	1.39	.22	1.61	1,560	250	1,810
053	Dodge	1.41	.21	1.62	1,580	240	1,820
055	Douglas	.49	.10	.59	550	110	660
057	Dundy	.76	.17	.93	850	190	1,040
059	Fillmore	1.11	.17	1.28	1,250	190	1,440
061	Franklin	.89	.17	1.06	1,000	190	1,190
063	Frontier	1.02	.21	1.23	1,140	240	1,380
065	Furnas	.90	.18	1.08	1,010	200	1,210
067	Gage	1.60	.18	1.78	1,800	200	2,000
069	Garden	1.32	.32	1.64	1,480	360	1,840

Table 3.--Ground water and surface water use by livestock during 1980, by county--Continued

County No.	County Name	Water use, in million gallons per day: Ground water	Surface water	Total	Water use, in acre-feet per year[1/]: Ground water	Surface water	Total
071	Garfield	0.60	0.13	0.73	670	150	820
073	Gosper	.50	.10	.60	560	110	670
075	Grant	.77	.19	.96	870	210	1,080
077	Greeley	.99	.19	1.18	1,120	210	1,330
079	Hall	1.25	.24	1.49	1,400	270	1,670
081	Hamilton	.93	.16	1.09	1,040	180	1,220
083	Harlan	.85	.18	1.03	960	200	1,160
085	Hayes	.56	.12	.68	630	130	760
087	Hitchcock	.69	.14	.83	770	160	930
089	Holt	3.44	.68	4.12	3,870	760	4,630
091	Hooker	.24	.06	.30	270	70	340
093	Howard	1.23	.22	1.45	1,380	250	1,630
095	Jefferson	1.00	.15	1.15	1,120	170	1,290
097	Johnson	.66	.09	.75	740	100	840
099	Kearney	1.07	.23	1.30	1,200	260	1,460
101	Keith	.88	.21	1.09	980	240	1,220
103	Keya Paha	.77	.16	.93	860	180	1,040
105	Kimball	.34	.08	.42	380	90	470
107	Knox	2.87	.45	3.32	3,220	510	3,730
109	Lancaster	.90	.13	1.03	1,010	150	1,160
111	Lincoln	2.53	.57	3.10	2,840	640	3,480
113	Logan	.56	.13	.69	630	150	780
115	Loup	.53	.12	.65	600	130	730
117	McPherson	.53	.13	.66	590	150	740
119	Madison	1.46	.21	1.67	1,640	240	1,880
121	Merrick	1.21	.23	1.44	1,360	260	1,620
123	Morrill	1.14	.27	1.41	1,280	300	1,580
125	Nance	.81	.14	.95	910	160	1,070
127	Nemaha	.69	.09	.78	780	100	880
129	Nuckolls	1.00	.16	1.16	1,120	180	1,300
131	Otoe	.98	.14	1.12	1,100	160	1,260
133	Pawnee	.66	.10	.76	740	110	850
135	Perkins	.41	.09	.50	460	100	560
137	Phelps	1.24	.25	1.49	1,390	280	1,670
139	Pierce	1.46	.21	1.67	1,640	240	1,880

Table 3.--Ground water and surface water use by livestock during 1980, by county--Continued

County No.	County Name	Water use, in million gallons per day: Ground water	Surface water	Total	Water use, in acre-feet per year[1]: Ground water	Surface water	Total
141	Platte	1.87	0.23	2.10	2,100	260	2,360
143	Polk	1.49	.30	1.79	1,670	340	2,010
145	Red Willow	1.06	.23	1.29	1,190	260	1,450
147	Richardson	.84	.14	.98	940	160	1,100
149	Rock	1.15	.27	1.42	1,290	300	1,590
151	Saline	.89	.15	1.04	1,000	170	1,170
153	Sarpy	.75	.16	.91	840	180	1,020
155	Saunders	1.46	.27	1.73	1,640	300	1,940
157	Scotts Bluff	1.89	.43	2.32	2,130	480	2,610
159	Seward	1.21	.19	1.40	1,360	210	1,570
161	Sheridan	2.09	.49	2.58	2,350	550	2,900
163	Sherman	.91	.71	1.08	1,020	190	1,210
165	Sioux	1.04	.25	1.29	1,170	280	1,450
167	Stanton	1.45	.24	1.69	1,630	270	1,900
169	Thayer	.97	.18	1.15	1,090	200	1,290
171	Thomas	.42	.10	.52	470	110	580
173	Thurston	.91	.14	1.05	1,020	160	1,180
175	Valley	1.24	.22	1.46	1,390	250	1,640
177	Washington	1.07	.14	1.21	1,200	160	1,360
179	Wayne	1.52	.24	1.76	1,710	270	1,980
181	Webster	.70	.14	.84	780	160	940
183	Wheeler	.71	.16	.87	800	180	980
185	York	1.09	.16	1.25	1,220	180	1,400
	TOTALS	110.92	20.98	131.90	124,530	23,590	148,120

1/ Rounded to nearest 10.

Table 4.--Average daily water use, by county, of the five major livestock classes during 1980

County No.	County Name	Water use, in million gallons per day: Beef cows and other cattle	Calves raised	Milk cows	Hogs	Pigs raised
001	Adams	1.15	0.05	0.01	0.15	0.06
003	Antelope	1.29	.09	.13	.36	.15
005	Arthur	.58	.07	.00	.00	.00
007	Banner	.35	.04	.00	.01	.01
009	Blaine	.60	.06	.01	.03	.02
011	Boone	1.31	.10	.07	.34	.16
013	Box Butte	.96	.07	.01	.02	.01
015	Boyd	.70	.07	.03	.12	.05
017	Brown	1.44	.10	.02	.04	.02
019	Buffalo	1.76	.13	.04	.23	.09
021	Burt	.86	.04	.03	.33	.15
023	Butler	.69	.05	.03	.19	.08
025	Cass	.61	.04	.05	.14	.06
027	Cedar	1.45	.10	.23	.59	.18
029	Chase	.87	.06	.00	.10	.04
031	Cherry	5.39	.58	.02	.02	.01
033	Cheyenne	.75	.05	.01	.07	.03
035	Clay	.86	.06	.01	.48	.20
037	Colfax	1.01	.03	.04	.32	.14
039	Cuming	3.06	.06	.10	.82	.30
041	Custer	3.50	.32	.08	.22	.08
043	Dakota	.33	.03	.02	.12	.04
045	Dawes	.87	.10	.01	.02	.01
047	Dawson	3.25	.18	.02	.37	.14
049	Deuel	.29	.01	.00	.02	.01
051	Dixon	1.05	.06	.04	.34	.11
053	Dodge	1.00	.04	.05	.37	.14
055	Douglas	.48	.02	.03	.04	.02
057	Dundy	.78	.06	.00	.06	.02
059	Fillmore	.83	.04	.02	.28	.10
061	Franklin	.78	.08	.02	.12	.05
063	Frontier	.96	.11	.01	.11	.04
065	Furnas	.83	.08	.04	.08	.03
067	Gage	.84	.07	.18	.47	.20
069	Garden	1.47	.14	.01	.01	.01

Table 4.--Average daily water use, by county, of the five major livestock classes during 1980--Continued

County No.	County Name	Water use, in million gallons per day: Beef cows and other cattle	Calves raised	Milk cows	Hogs	Pigs raised
071	Garfield	0.59	0.06	0.02	0.04	0.02
073	Gosper	.45	.05	.00	.06	.03
075	Grant	.86	.09	.00	.00	.00
077	Greeley	.88	.09	.03	.13	.05
079	Hall	1.16	.06	.05	.16	.05
081	Hamilton	.76	.04	.03	.19	.07
083	Harlan	.85	.06	.01	.07	.03
085	Hayes	.53	.06	.00	.06	.02
087	Hitchcock	.64	.05	.01	.08	.04
089	Holt	3.10	.32	.18	.36	.14
091	Hooker	.25	.03	.00	.01	.00
093	Howard	1.00	.07	.10	.20	.07
095	Jefferson	.66	.05	.09	.23	.10
097	Johnson	.41	.04	.04	.17	.06
099	Kearney	1.09	.04	.01	.11	.04
101	Keith	.99	.08	.01	.01	.00
103	Keya Paha	.73	.08	.05	.04	.02
105	Kimball	.35	.03	.01	.01	.00
107	Knox	2.08	.17	.16	.63	.26
109	Lancaster	.59	.06	.07	.19	.10
111	Lincoln	2.60	.27	.04	.14	.05
113	Logan	.59	.05	.00	.02	.01
115	Loup	.56	.05	.01	.02	.01
117	McPherson	.56	.06	.00	.02	.01
119	Madison	.98	.07	.08	.37	.17
121	Merrick	1.08	.06	.04	.19	.07
123	Morrill	1.22	.13	.00	.03	.01
125	Nance	.66	.06	.04	.13	.06
127	Nemaha	.42	.04	.02	.22	.08
129	Nuckolls	.73	.05	.03	.25	.08
131	Otoe	.63	.06	.05	.30	.08
133	Pawnee	.44	.05	.04	.17	.06
135	Perkins	.38	.04	.01	.04	.01
137	Phelps	1.22	.06	.00	.15	.06
139	Pierce	1.01	.07	.10	.33	.16

Table 4.--Average daily water use, by county, of the five major livestock classes during 1980--Continued

County No.	County Name	Water use, in million gallons per day: Beef cows and other cattle	Calves raised	Milk cows	Hogs	Pigs raised
141	Platte	1.08	0.07	0.11	0.53	0.29
143	Polk	1.43	.04	.01	.22	.07
145	Red Willow	1.05	.07	.02	.10	.04
147	Richardson	.65	.06	.04	.17	.05
149	Rock	1.25	.11	.04	.01	.01
151	Saline	.72	.04	.02	.18	.07
153	Sarpy	.79	.02	.02	.06	.02
155	Saunders	1.30	.05	.04	.23	.10
157	Scotts Bluff	2.07	.05	.03	.08	.02
159	Seward	.93	.05	.05	.25	.12
161	Sheridan	2.24	.24	.02	.05	.01
163	Sherman	.76	.08	.07	.12	.04
165	Sioux	1.16	.09	.01	.01	.01
167	Stanton	1.18	.05	.04	.31	.10
169	Thayer	.85	.05	.04	.15	.05
171	Thomas	.46	.05	.00	.01	.00
173	Thurston	.67	.04	.03	.23	.07
175	Valley	1.05	.08	.06	.19	.07
177	Washington	.67	.04	.08	.28	.12
179	Wayne	1.16	.05	.09	.32	.13
181	Webster	.62	.07	.03	.09	.03
183	Wheeler	.73	.07	.03	.03	.01
185	York	.74	.04	.03	.30	.12
	TOTALS	97.59	7.35	3.61	16.04	6.33

Table 5.--Volume of water used, by county, by the five major livestock classes during 1980

County No.	County Name	Water use, in acre-feet per year[1] Beef cows and other cattle	Calves raised	Milk cows	Hogs	Pigs raised
001	Adams	1,290	60	10	170	70
003	Antelope	1,450	100	150	400	170
005	Arthur	650	80	0	0	0
007	Banner	390	40	0	10	10
009	Blaine	670	70	10	30	20
011	Boone	1,470	110	80	380	180
013	Box Butte	1,080	80	10	20	10
015	Boyd	790	80	30	130	60
017	Brown	1,620	110	20	40	20
019	Buffalo	1,980	150	40	260	100
021	Burt	1,000	40	30	370	170
023	Butler	780	60	30	210	90
025	Cass	680	40	60	160	70
027	Cedar	1,630	110	260	660	200
029	Chase	980	70	0	110	40
031	Cherry	6,050	650	20	20	10
033	Cheyenne	840	60	10	80	30
035	Clay	970	70	10	540	220
037	Colfax	1,130	30	40	360	160
039	Cuming	3,440	70	110	920	340
041	Custer	3,930	360	90	250	90
043	Dakota	370	30	20	130	40
045	Dawes	980	110	10	20	10
047	Dawson	3,650	200	20	420	160
049	Deuel	330	10	0	20	10
051	Dixon	1,180	70	40	380	120
053	Dodge	1,120	40	60	420	160
055	Douglas	540	20	30	40	20
057	Dundy	880	70	0	70	20
059	Filmore	930	40	20	310	110
061	Franklin	880	70	20	130	60
063	Frontier	1,080	120	10	120	40
065	Furnas	930	90	40	90	30
067	Gage	940	80	200	530	220
069	Garden	1,650	160	10	10	10

Table 5.--Volume of water used, by county, by the five major livestock classes during 1980--Continued

County No.	County Name	Water use, in acre-feet per year[1] Beef cows and other cattle	Calves raised	Milk cows	Hogs	Pigs raised
071	Garfield	660	70	20	40	20
073	Gosper	510	60	0	70	30
075	Grant	970	100	0	0	0
077	Greeley	990	100	30	150	60
079	Hall	1,300	70	60	180	60
081	Hamilton	850	40	30	210	80
083	Harlan	950	70	10	80	30
085	Hayes	600	70	0	70	20
087	Hitchcock	720	60	10	90	40
089	Holt	3,480	360	200	400	160
091	Hooker	280	30	0	10	0
093	Howard	1,120	80	110	220	80
095	Jefferson	740	60	100	260	110
097	Johnson	460	40	40	190	70
099	Kearney	1,220	40	20	120	40
101	Keith	1,110	90	10	10	0
103	Keya Paha	820	90	60	40	20
105	Kimball	400	30	10	10	0
107	Knox	2,340	190	180	710	290
109	Lancaster	660	70	80	210	110
111	Lincoln	2,920	300	40	160	60
113	Logan	660	60	0	20	10
115	Loup	630	60	10	20	10
117	McPherson	630	70	0	20	10
119	Madison	1,100	80	90	420	190
121	Merrick	1,210	70	40	210	80
123	Morrill	1,370	150	0	30	10
125	Nance	740	70	40	150	70
127	Nemaha	470	40	20	250	90
129	Nuckolls	820	60	30	280	90
131	Otoe	710	70	60	330	90
133	Pawnee	490	60	40	190	70
135	Perkins	430	40	10	40	10
137	Phelps	1,370	70	0	160	70
139	Pierce	1,130	80	110	370	180

Table 5.--Volume of water used, by county, by the five major livestock classes during 1980--Continued

County No.	County Name	Water use, in acre-feet per year[1] Beef cows and other cattle	Calves raised	Milk cows	Hogs	Pigs raised
141	Platte	1,210	80	120	600	330
143	Polk	1,610	40	10	250	80
145	Red Willow	1,180	80	20	110	40
147	Richardson	730	70	40	190	60
149	Rock	1,400	120	40	10	10
151	Saline	810	40	20	200	80
153	Sarpy	890	20	20	70	20
155	Saunders	1,460	60	40	260	110
157	Scotts Bluff	2,330	60	30	90	20
159	Seward	1,040	60	60	280	130
161	Sheridan	2,520	270	20	60	20
163	Sherman	850	90	80	130	40
165	Sioux	1,300	100	10	10	10
167	Stanton	1,330	60	40	350	110
169	Thayer	950	60	40	170	60
171	Thomas	510	60	0	10	0
173	Thurston	750	40	30	260	80
175	Valley	1,180	90	70	210	80
177	Washington	750	40	90	320	130
179	Wayne	1,300	60	100	360	150
181	Webster	700	80	30	100	30
183	Wheeler	820	80	30	30	10
185	York	830	40	30	340	130
	TOTALS	109,590	8,270	3,920	17,940	7,060

[1]Rounded to nearest 10.

Hydrologic Unit and Subregion Water-Use Estimates

Estimates of water use for the hydrologic units and subregions, all or part of which lie within the borders of the State (fig. 3), are needed for the U.S. Geological Survey's National Water Use Data System (NWUDS) (U.S. Water Resources Council, 1976). Water use by hydrologic unit was computed by determining the percentage of a county area lying within the hydrologic-unit boundary and assuming a homogeneous distribution of livestock population within each county. The percentage of each county within a hydrologic unit was multiplied by the county water use, and aggregated to determine the use in the hydrologic unit. For hydrologic units that extend over Nebraska boundaries, the water-use estimates apply only to that part of the unit within the State. Estimated livestock water use by hydrologic units and subregions for 1980 are given in table 6. The volume of water used by livestock during 1980 ranged from 20 acre-ft in the Hat Creek basin (Hydrologic Unit 10120106) to 10,370 acre-ft in the Elkhorn River basin (Hydrologic Unit 10220003).

Estimates of water use in the hydrologic units within a subregion were aggregated to determine estimated use in the subregion. Subregions and drainage basin names are shown in figure 4.

Water use by the major classes of livestock in the subregions of Nebraska is shown in figures 5 through 11. The water used by beef cows and other cattle and calves raised is the predominant livestock use of all the subregions and ranges from 63.9 percent in the Weeping Water Creek, Nemaha River basin (subregion 1024) to 96.5 percent in the Hat Creek basin (subregion 1012). Water use for hogs and pigs raised ranged from 1.6 percent in the Hat Creek basin (subregion 1012) to 30.4 percent in the Weeping Water Creek, Nemaha River basin (subregion 1024). Water use for milk cows ranged from 0.6 percent in the Hat Creek basin (subregion 1012) to 5.8 percent in the Upper Missouri River tributaries basin (subregion 1017). Water used by all other classes of livestock (sheep, lambs raised, horses, goats, turkeys and chickens) ranged from 0.5 percent in the Niobrara River, Ponca Creek basin (subregion 1015), the Upper Missouri River tributaries basin (subregion 1017), and the Elkhorn River basin (subregion 1022) to 1.8 percent in the White River basin (subregion 1014).

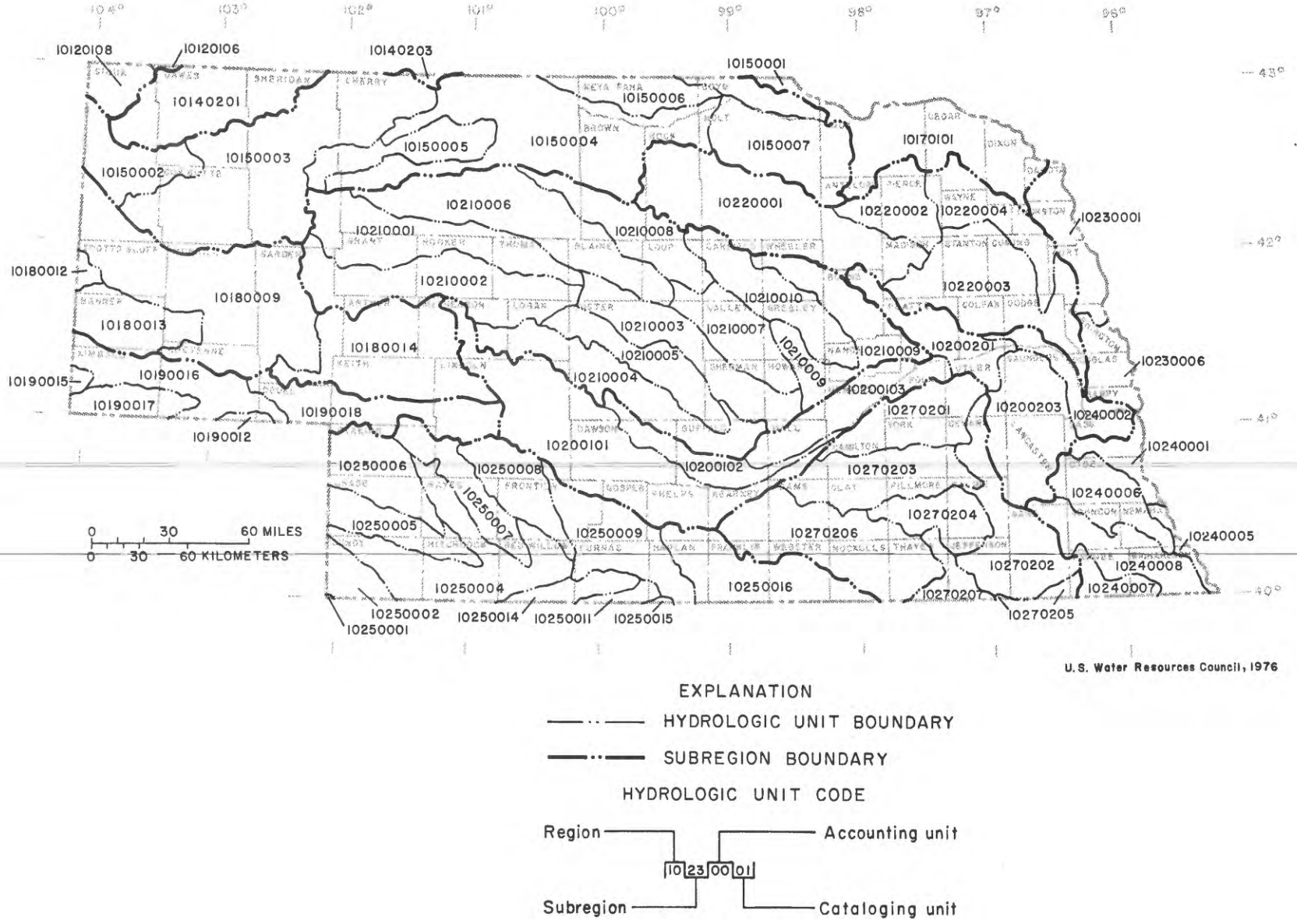


Figure 3.--Hydrologic units and subregions of Nebraska.

Table 6.--Livestock water use by Hydrologic Unit and Subregion, 1980

Hydrologic Unit	Water use, in million gallons per day			Water use, in acre-feet per year		
	Ground water	Surface water	Total	Ground water	Surface water	Total
			(Hat Creek Basin)			
10120106	0.02	0.00	0.02	20	0	20
10120108	.22	.05	.27	250	60	310
Subregion totals	0.24	0.05	0.29	270	60	330
			(White River Basin)			
10140201	1.05	0.24	1.29	1,170	270	1,440
10140203	.03	.01	.04	30	10	40
Subregion totals	1.08	0.25	1.33	1,200	280	1,480
			(Niobrara River, Ponca Creek Basin)			
10150001	0.61	0.11	0.72	690	120	810
10150002	.48	.12	.60	540	130	670
10150003	3.22	.77	3.99	3,610	870	4,480
10150004	3.11	.73	3.84	3,490	820	4,310
10150005	.72	.18	.90	810	200	1,010
10150006	.70	.14	.84	790	160	950
10150007	2.61	.47	3.08	2,930	530	3,460
Subregion totals	11.45	2.52	13.97	12,860	2,830	15,690
			(Upper Missouri River Tributaries)			
10170101	4.67	0.70	5.37	5,250	790	6,040
Subregion totals	4.67	0.70	5.37	5,250	790	6,040
			(North Platte River Basin)			
10180009	3.78	0.88	4.66	4,250	990	5,240
10180012	.27	.62	.33	300	70	370
10180013	.64	.15	.79	720	170	890
10180014	1.75	.42	2.17	1,960	470	2,430
Subregion totals	6.44	1.51	7.95	7,230	1,700	8.930

Table 6.--Livestock water use by Hydrologic Unit and Subregion, 1980--Continued

Hydrologic Unit	Water use, in million gallons per day			Water use, in acre-feet per year		
	Ground water	Surface water	Total	Ground water	Surface water	Total
			(South Platte River Basin)			
10190012	0.06	0.01	0.07	70	10	80
10190015	.03	.01	.04	30	10	40
10190016	.58	.13	.71	650	150	800
10190017	.26	.06	.32	290	70	360
10190018	1.03	.24	1.27	1,160	270	1,430
Subregion totals	1.96	0.45	2.41	2,200	510	2,710
			(Platte River Basin)			
10200101	6.12	1.29	7.41	6,870	1,450	8,320
10200102	1.64	.34	1.98	1,840	380	2,220
10200103	2.80	.53	3.33	3,150	590	3,740
10200201	2.22	.32	2.54	2,490	360	2,850
10200202	1.12	.20	1.32	1,260	230	1,490
10200203	2.49	.42	2.91	2,800	470	3,270
Subregion totals	16.39	3.10	19.49	18,410	3,480	21,890
			(Loup River Basin)			
10210001	1.38	0.34	1.72	1,550	380	1,930
10210002	1.40	.34	1.74	1,580	380	1,960
10210003	2.32	.46	2.78	2,610	520	3,130
10210004	2.37	.51	2.88	2,660	570	3,230
10210005	1.42	.30	1.72	1,590	340	1,930
10210006	1.83	.44	2.27	2,050	500	2,550
10210007	1.77	.33	2.10	1,990	370	2,360
10210008	1.13	.26	1.39	1,270	300	1,570
10210009	3.01	.51	3.52	3,380	570	3,950
10210010	1.93	.37	2.30	2,160	420	2,580
Subregion totals	18.56	3.86	22.42	20,840	4,350	25,190

Table 6.--Livestock water use by Hydrologic Unit and Subregion, 1980--Continued

Hydrologic Unit	Water use, in million gallons per day			Water use, in acre-feet per year		
	Ground water	Surface water	Total	Ground water	Surface water	Total
			(Elkhorn River Basin)			
10220001	4.63	0.86	5.49	5,200	970	6,170
10220002	2.18	.32	2.50	2,450	360	2,810
10220003	7.97	1.26	9.23	8,950	1,420	10,370
10220004	3.54	.55	4.09	3,980	610	4,590
Subregion totals	18.32	2.99	21.31	20,580	3,360	23,940
			(Lower Missouri River Tributaries)			
10230001	1.88	0.28	2.16	2,110	310	2,420
10230006	1.16	.21	1.37	1,300	240	1,540
Subregion totals	3.04	0.49	3.53	3,410	550	3,960
			(Weeping Water Creek, Nemaha River Basin)			
10240001	0.60	0.10	0.70	670	110	780
10240005	.26	.04	.30	290	40	330
10240006	1.41	.20	1.61	1,580	230	1,810
10240007	.54	.08	.62	600	90	690
10240008	1.55	.23	1.78	1,740	260	2,000
Subregion totals	4.36	0.65	5.01	4,880	730	5,610
			(Republican River Basin)			
10250001	0.01	0.00	0.01	10	0	10
10250002	.41	.09	.50	460	100	560
10250003	.01	.00	.01	10	0	10
10250004	2.02	.43	2.45	2,270	480	2,750
10250005	.69	.15	.84	780	170	950
10250006	.75	.16	.91	840	180	1,020
10250007	.70	.15	.85	790	170	960
10250008	.93	.20	1.13	1,040	230	1,270
10250009	1.74	.36	2.10	1,950	400	2,350

Table 6.--Livestock water use by Hydrologic Unit and Subregion, 1980--Continued

Hydrologic Unit	Water use, in million gallons per day			Water use, in acre-feet per year		
	Ground water	Surface water	Total	Ground water	Surface water	Total
	(Republican River Basin--Continued)					
10250011	0.29	0.06	0.35	330	70	400
10250014	.57	.11	.68	640	120	760
10250015	.07	.02	.09	80	20	100
10250016	2.35	.45	2.80	2,640	510	3,150
Subregion totals	10.54	2.18	12.72	11,840	2,450	14,290
	(Blue River Basin)					
10270201	2.29	0.40	2.69	2,570	450	3,020
10270202	2.32	.31	2.63	2,600	340	2,940
10270203	2.73	.42	3.15	3,060	470	3,530
10270204	1.26	.20	1.46	1,410	220	1,630
10270205	.24	.03	.27	270	40	310
10270206	4.24	.75	4.99	4,760	840	5,600
10270207	.79	.12	.91	890	140	1,030
Subregion totals	13.87	2.23	16.10	15,560	2,500	18,060
Nebraska totals	110.92	20.98	131.90	124,530	23,590	148,120

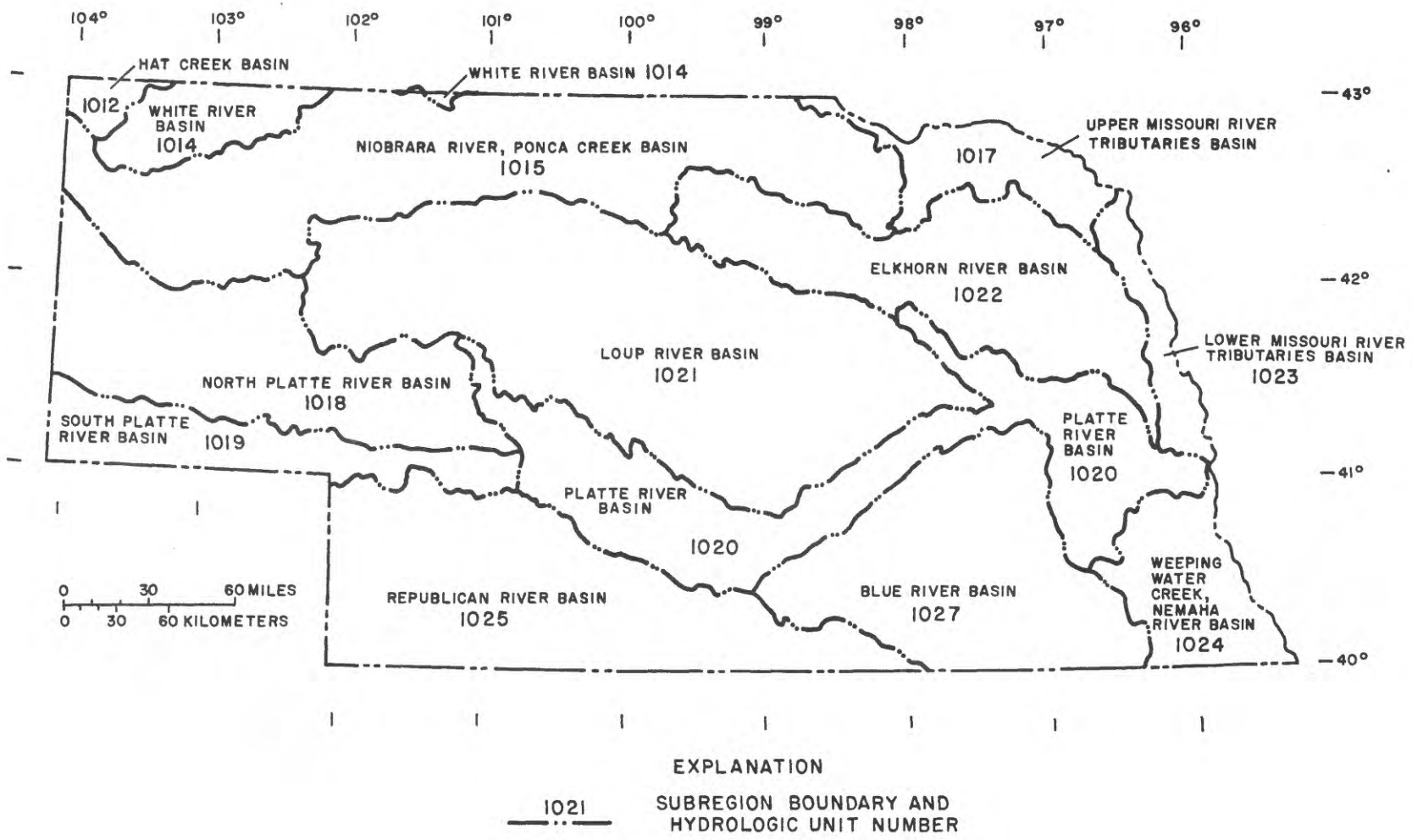


Figure 4.--Subregions and drainage basins of Nebraska.

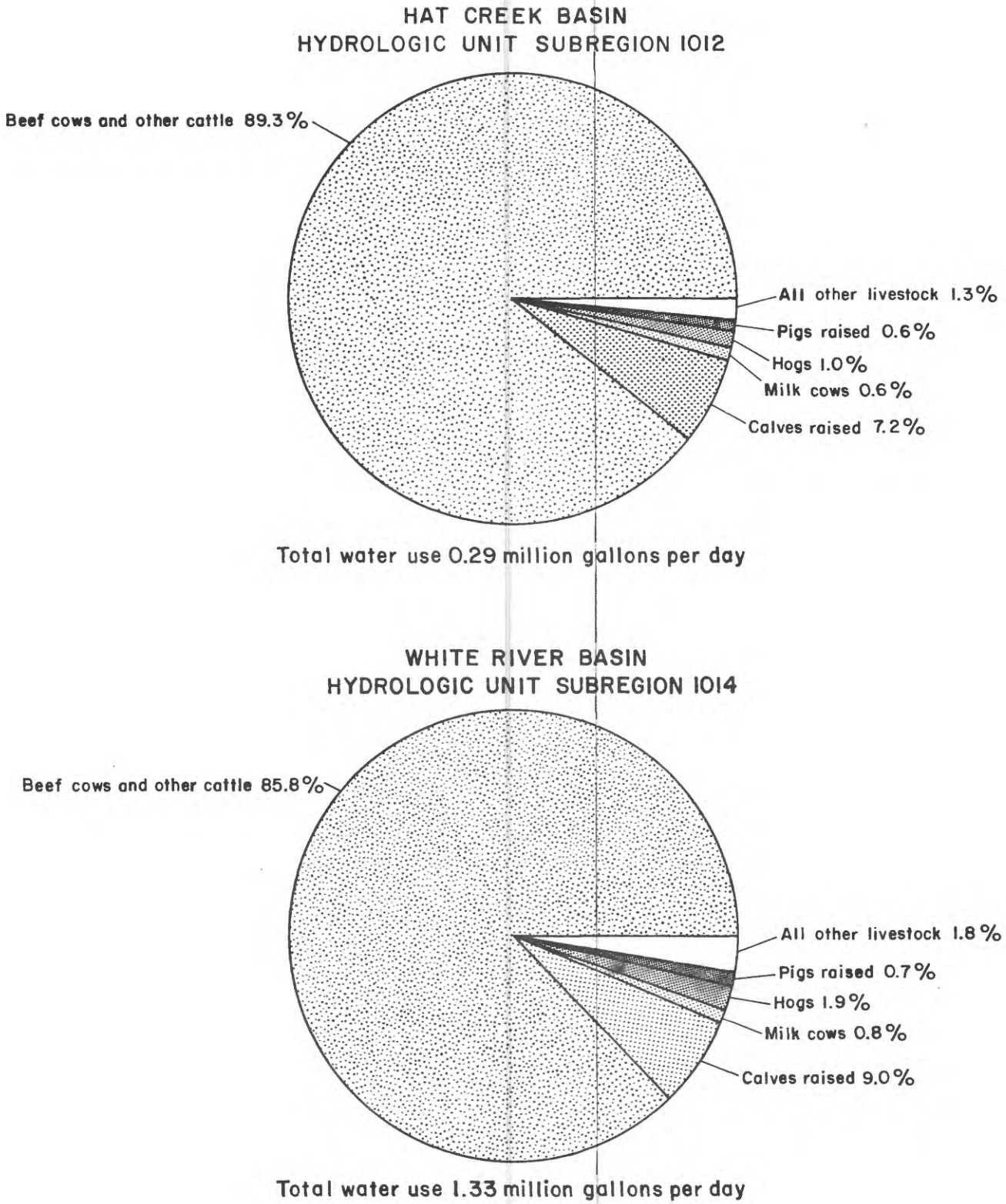


Figure 5.--Estimated water use by livestock classes in subregions 1012 and 1014 during 1980.

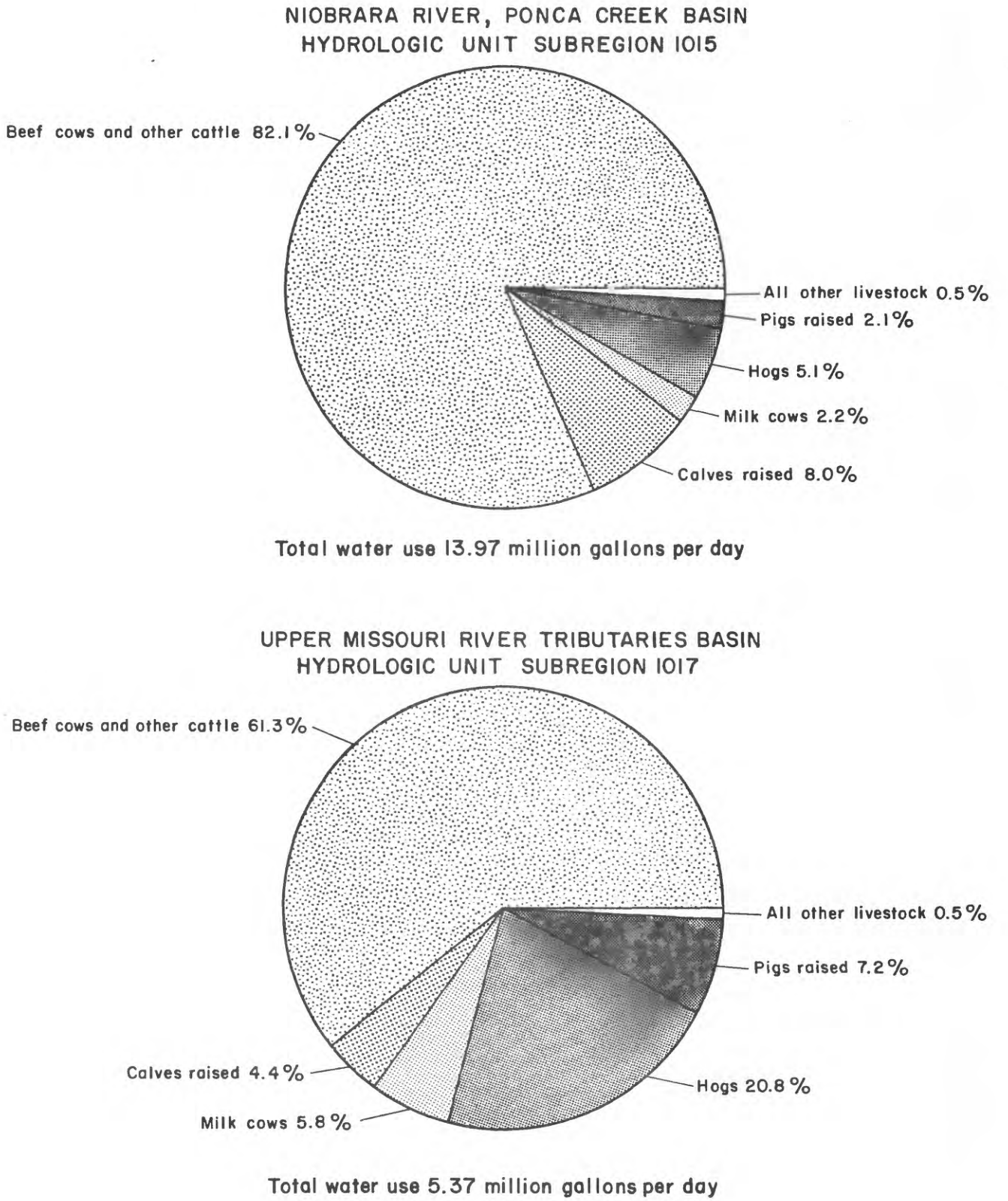


Figure 6.--Estimated water use by livestock classes in subregions 1015 and 1017 during 1980.

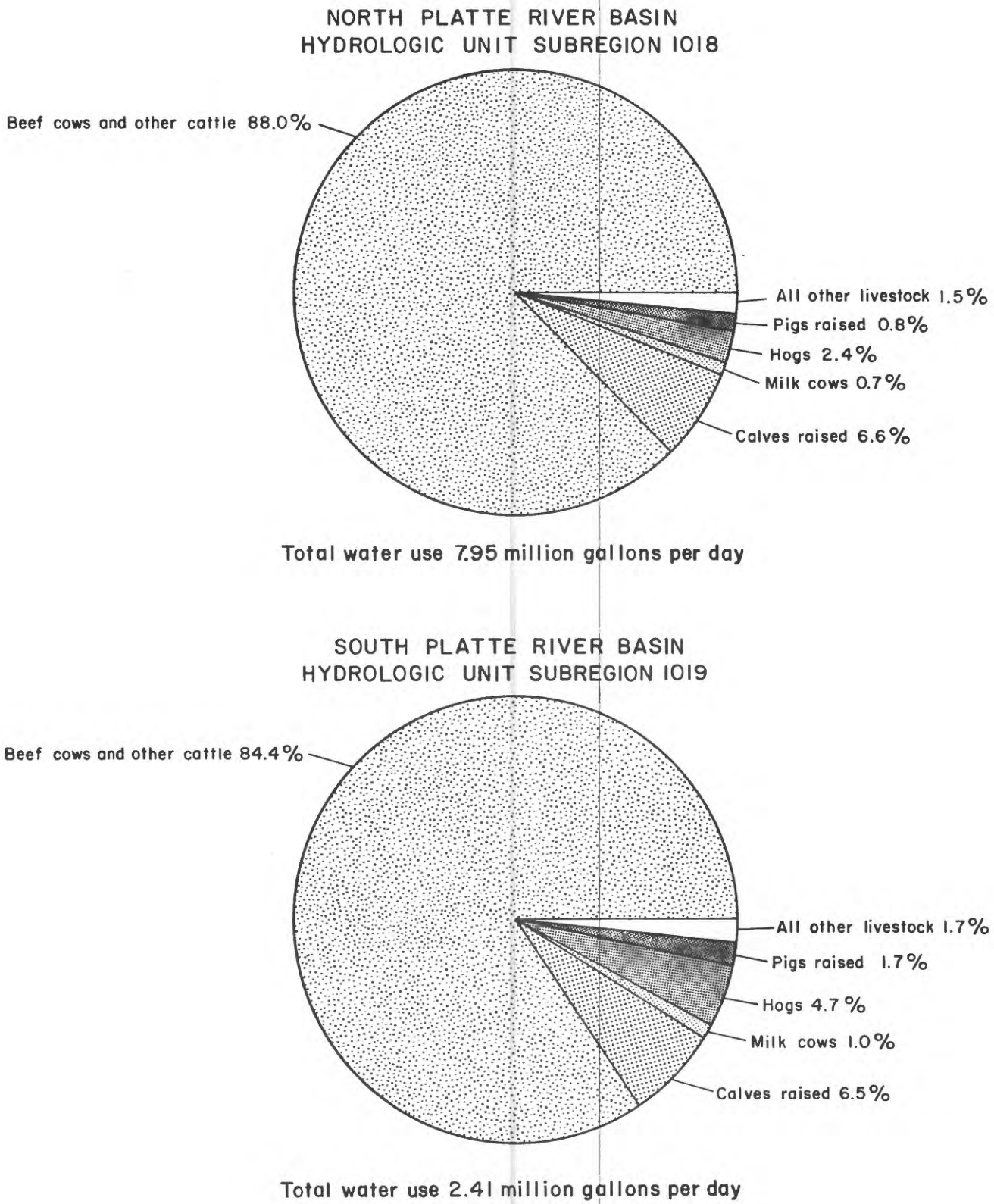


Figure 7.--Estimated water use by livestock classes in subregions 1018 and 1019 during 1980.

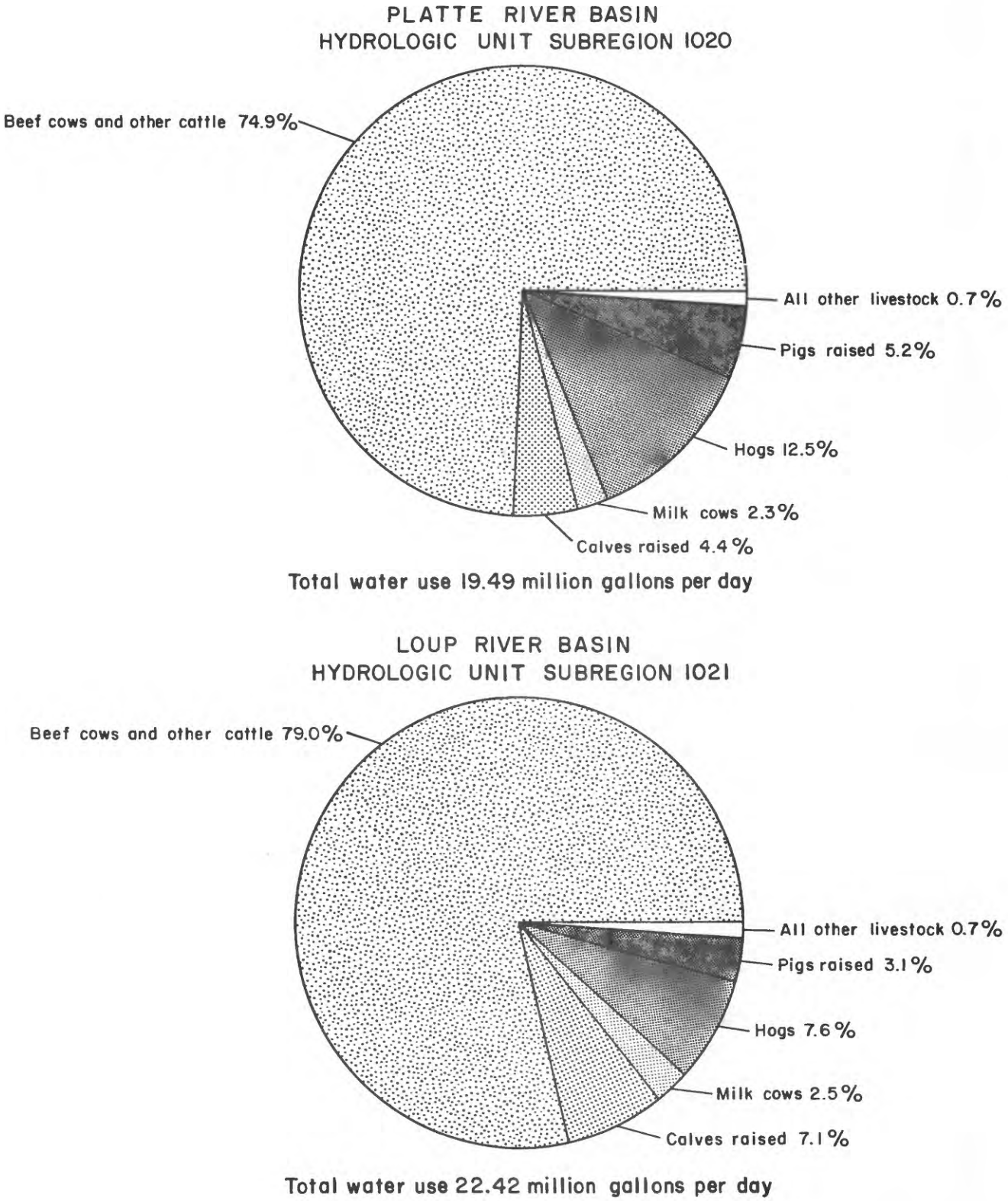


Figure 8.--Estimated water use by livestock classes in subregions 1020 and 1021 during 1980.

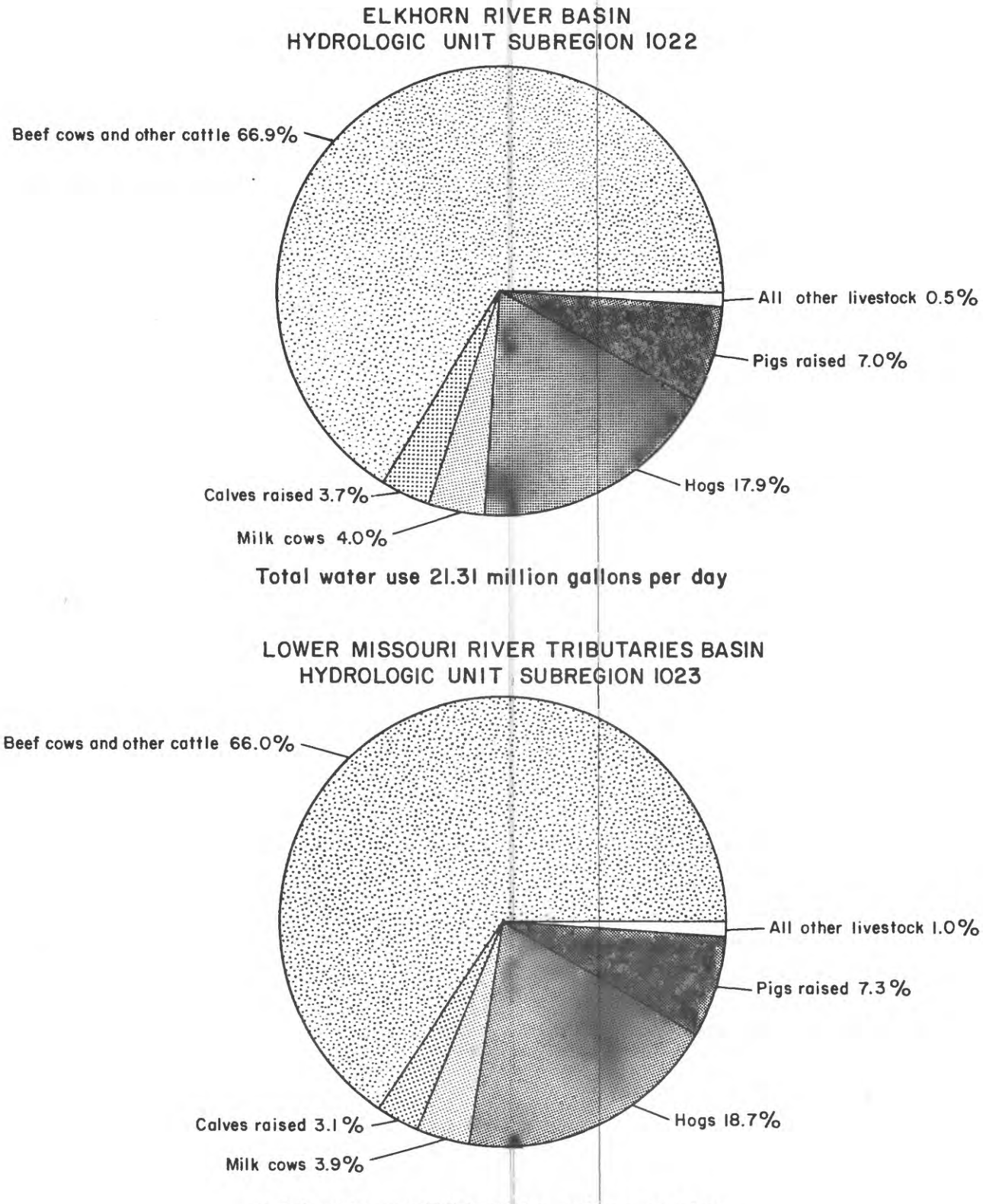


Figure 9.--Estimated water use by livestock classes in subregions 1022 and 1023 during 1980.

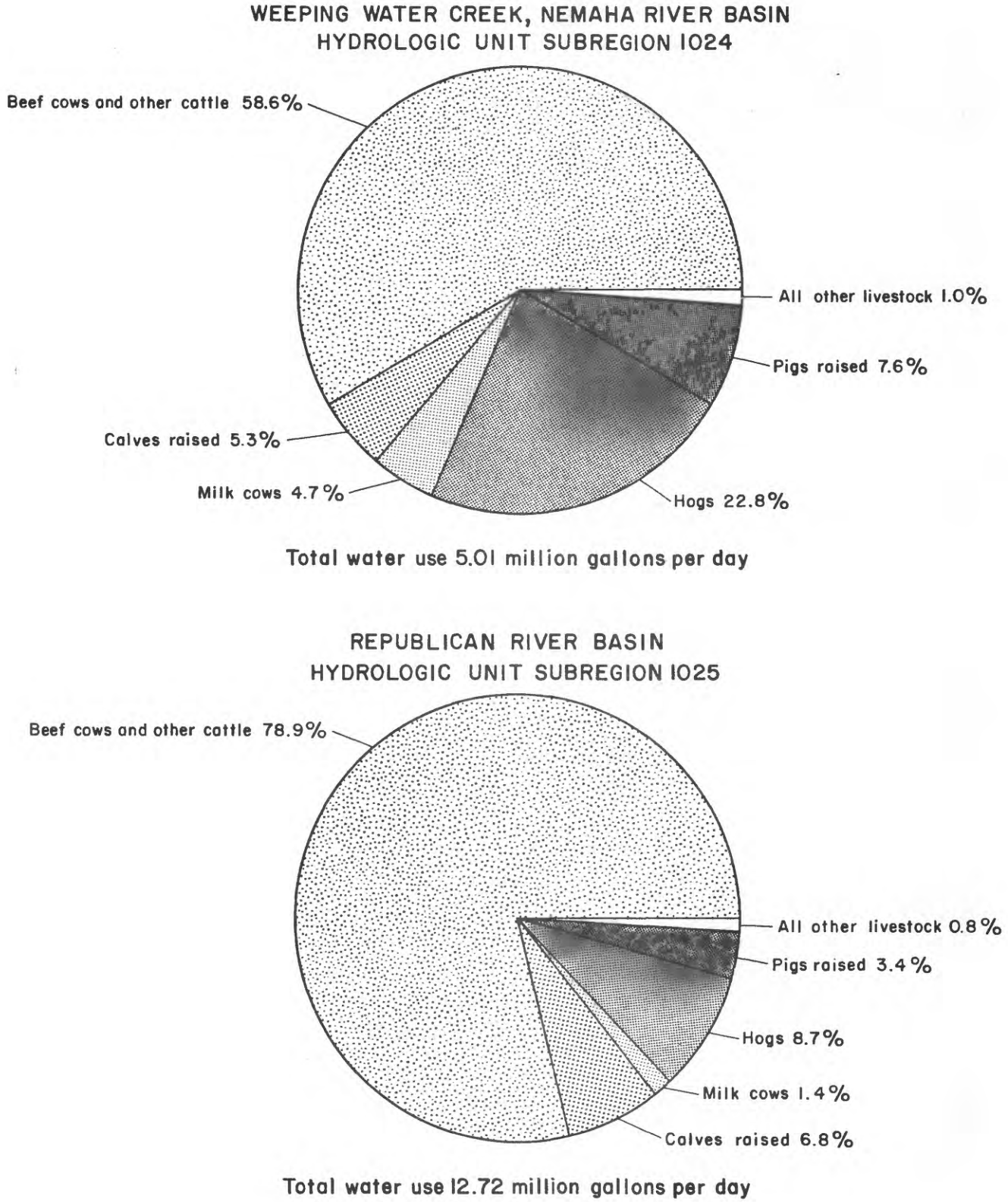


Figure 10.--Estimated water use by livestock classes in subregions 1024 and 1025 during 1980.

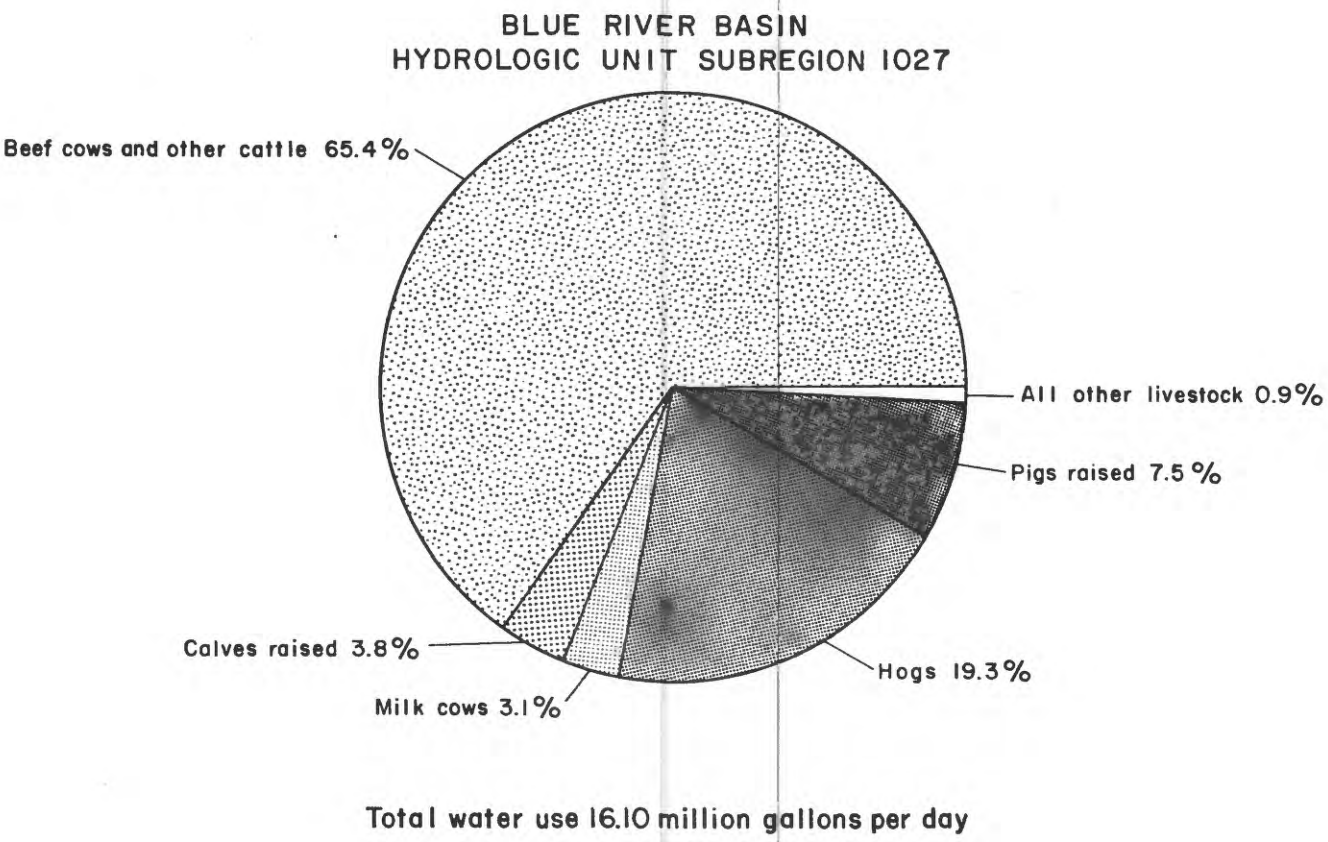


Figure 11.--Estimated water use by livestock classes in subregion 1027 during 1980.

Natural Resources Districts' Water-Use Estimates

Estimates were made of the livestock water use for the Natural Resources Districts (NRD) (fig. 12), as these entities are responsible for the conservation and management of water resources of the State. The NRD's estimated water use was determined by the same procedure as that used to estimate water use in the hydrologic units. The percentage of a county area within the NRD boundary was applied to county-use values and county increments within the NRD were aggregated for estimated total use within the District. The estimated water uses for the NRDs are given in table 7. The volume of water used by livestock during 1980 ranged from 1,880 acre-feet in the South Platte NRD to 17,830 acre-ft in the Lower Elkhorn NRD.

SUMMARY

Total water used by livestock in Nebraska during 1980 was estimated to be 148,120 acre-ft. About 16 percent of this use, or 23,590 acre-ft was estimated to be from surface-water supplies (rivers, streams, lakes, reservoirs, and stock ponds). The remaining 124,530 acre-ft were obtained by pumping from ground-water supplies.

Cherry County, the largest of the 93 Nebraska counties, had the largest livestock water use, with an estimated use of 6,770 acre-ft. Hooker County had the smallest livestock water use, with an estimated 340 acre-ft. The estimated use in the hydrologic units ranged from 20 acre-ft in the Hat Creek Basin (Unit 10120106) to 10,370 acre-ft in the Elkhorn River Basin (Unit 10220003). The estimated livestock water use in the NRDs during 1980 ranged from 1,880 acre-ft in the South Platte NRD to 17,830 acre-ft in the Lower Elkhorn NRD.

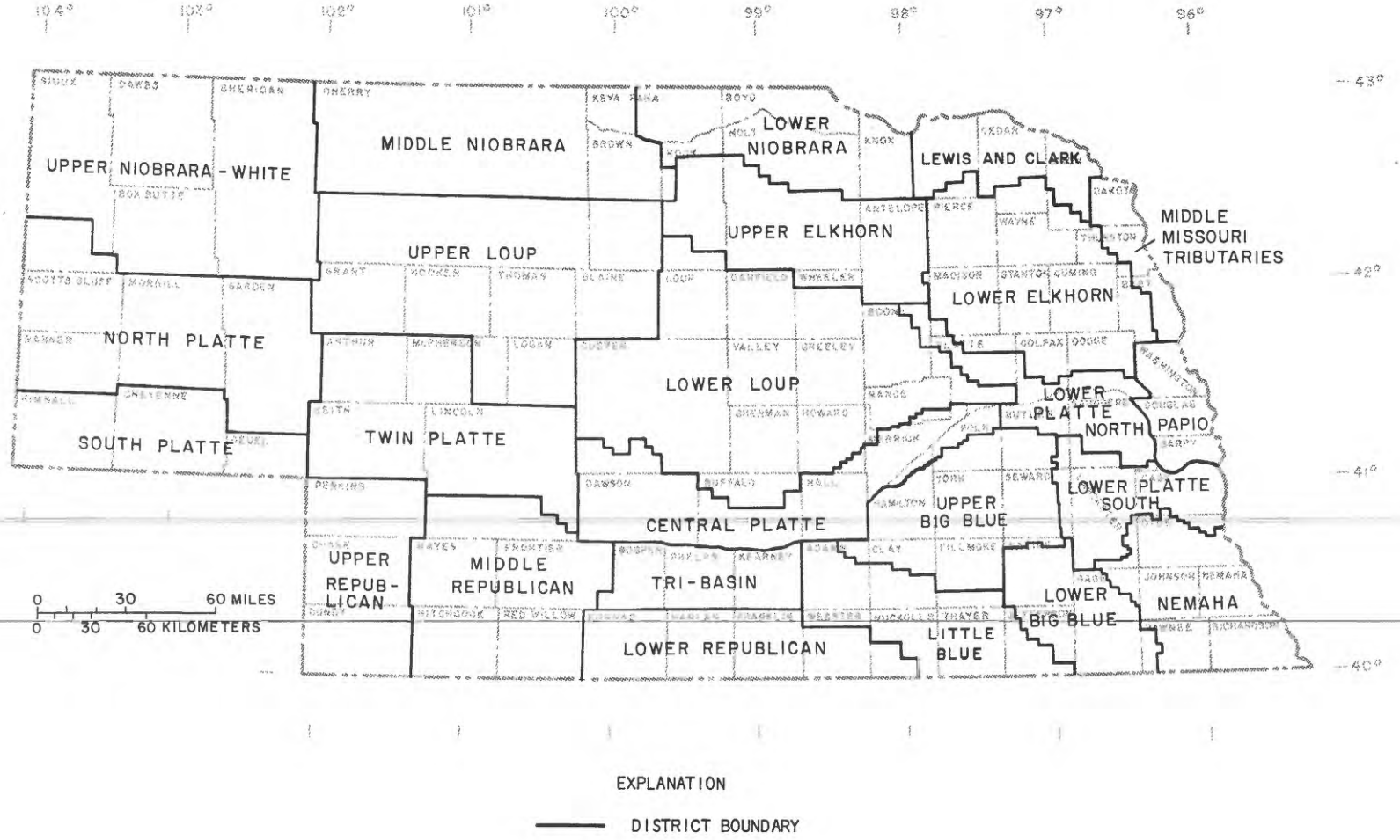


Figure 12.--Natural Resources Districts in Nebraska.

Table 7.--Livestock water use by Natural Resources District, 1980

Natural Resources District	Water use, in million gallons per day			Water use, in acre-feet per year 1/		
	Ground water	Surface water	Total	Ground water	Surface water	Total
Upper Niobrara-White	4.58	1.08	5.66	5,160	1,200	6,360
Middle Niobrara	3.90	.94	4.84	4,370	1,060	5,430
Lower Niobrara	4.09	.75	4.84	4,590	830	5,420
Lewis and Clark	4.17	.62	4.79	4,680	700	5,380
Upper Elkhorn	4.68	.89	5.57	5,270	1,000	6,270
Lower Elkhorn	13.72	2.13	15.85	15,400	2,430	17,830
Middle Missouri Trib.	1.74	.27	2.01	1,960	300	2,260
Upper Loup	5.31	1.28	6.59	5,960	1,450	7,410
Lower Loup	13.11	2.53	15.64	14,740	2,840	17,580
North Platte	4.94	1.16	6.10	5,550	1,300	6,850
South Platte	1.38	.30	1.68	1,540	340	1,880
Twin Platte	3.66	.86	4.52	4,090	970	5,060
Tri-Basin	2.81	.58	3.39	3,150	650	3,800
Central Platte	8.13	1.63	9.76	9,130	1,830	10,960
Lower Platte North	3.51	.55	4.06	3,940	620	4,560
Lower Platte South	2.21	.35	2.56	2,480	390	2,870
Papio	2.31	.40	2.71	2,590	450	3,040
Upper Republican	2.06	.45	2.51	2,310	500	2,810
Middle Republican	3.96	.84	4.80	4,440	950	5,390
Lower Republican	3.48	.69	4.17	3,920	770	4,690
Little Blue	4.53	.75	5.28	5,080	840	5,920
Upper Big Blue	5.92	.97	6.89	6,640	1,090	7,730
Lower Big Blue	2.82	.38	3.20	3,170	430	3,600
Nemaha	3.90	.58	4.48	4,370	650	5,020
Nebraska totals	110.92	20.98	131.90	124,530	23,590	148,120

1/ Rounded to nearest 10.

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