

ESTIMATE OF SELF-SUPPLIED DOMESTIC WATER USE IN NEBRASKA
DURING 1980

By Eugene K. Steele, Jr.

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CONTENTS

	Page
Abstract-----	1
Introduction-----	1
Purpose and scope-----	1
Definition of terms-----	2
Effects of hydrology on water use-----	3
Estimation of self-supplied domestic water use-----	3
Self-supplied domestic population estimates-----	3
Determination of county per capita water-use rates-----	3
County water-use estimates-----	10
Hydrologic unit and subregion water-use estimates-----	10
Natural Resources Districts' water-use estimates-----	16
Summary-----	16
References cited-----	28

ILLUSTRATIONS

	Page
Figures 1-6. Maps showing:	
1. Average annual precipitation for Nebraska, 1951-80-----	4
2. Average precipitation for Nebraska, 1980-----	5
3. Availability of ground water in Nebraska-----	6
4. Estimates of self-supplied domestic water use in Nebraska counties, 1980-----	11
5. Hydrologic units and subregions of Nebraska-----	15
6. Natural Resources Districts in Nebraska-----	20

TABLES

	Page
Table 1. Nebraska 1980 population data and estimated self-supplied domestic population-----	7
2. Estimate of Nebraska self-supplied domestic water use by county, 1980-----	12
3. Estimate of Nebraska self-supplied domestic water use by Hydrologic Unit, 1980-----	17
4. Estimate of Nebraska self-supplied domestic water use by Natural Resources Districts, 1980-----	21

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

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

ESTIMATE OF SELF-SUPPLIED, DOMESTIC WATER USE IN NEBRASKA
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ABSTRACT

No data base of actual measurements exists for self-supplied, domestic water use in Nebraska, because Nebraska laws do not require drilling permits, well registration, or reporting of volumes withdrawn from domestic wells. Self-supplied, domestic water use of 31,820 acre-feet in Nebraska during 1980 was computed from estimates of gallons per day per capita use for each county. This represents an average of 95 gallons per day per capita.

During 1980, county use volumes ranged from 30 acre-feet in Hooker and Pawnee Counties to 1,380 acre-feet in Douglas County, and Hydrologic Unit use volumes ranged from less than 5 acre-feet to 2,270 acre-feet. Natural Resources Districts' (NRD) use volumes ranged from 360 acre-feet in Middle Niobrara NRD to 3,530 acre-feet in the Lower Elkhorn NRD for the same period.

INTRODUCTION

Self-supplied, domestic water use is a small part of the total water used in Nebraska; but it is an important category for water-management plans, as the availability of water for domestic use will affect the distribution of the population in a given area. No actual measurements of domestic water use per person are available, because Nebraska laws do not require drilling permits, well registrations, or reporting of volumes withdrawn from domestic wells.

Purpose and Scope

The purpose of this report is to provide better estimates of self-supplied, domestic water use for planners and water managers, to include these estimates in the U.S. Geological Survey National Water-Use Data System (NWUDS), and to document the method of estimation. To estimate the self-supplied, domestic water use, it was necessary to determine the self-supplied, domestic population of each county and estimate a water-use rate, in gallons per day per capita. The estimate of this use was made for the year 1980, because the census for that year provided the best available population data.

DEFINITION OF TERMS

The following definitions of terms are provided for 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.

Domestic water use - Water used for normal household purposes, such as drinking, bathing, laundering, flushing stools, food preparation, washing dishes and utensils, household cleaning, washing cars, and watering lawns and gardens. It does not include livestock use. The water may be obtained from a public supply or may be self supplied.

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.

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.

Public-supplied water - Water withdrawn for all uses by public and private water suppliers and delivered to users that do not supply their own water.

Self-supplied, domestic population - The population residing outside the corporate boundaries of a city or town who supply their own water.

Self-supplied water - Water withdrawn from a surface- or ground-water source by a user and not obtained from a public supply.

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.

EFFECTS OF HYDROLOGY ON WATER USE

Volumes or rates used for various water-use categories are dependent to some extent on the available supply of water, the ease by which it can be obtained, and the cost of pumping and transporting. Other conditions that affect the rate of water used are precipitation and temperature. For example, water used for lawns and gardens would be greater during a year of less-than-normal precipitation and greater-than-normal temperatures.

The average annual precipitation for Nebraska for 1951 through 1980 is shown in figure 1. The distribution of precipitation for 1980 is shown in figure 2. Precipitation was less than normal and temperatures were greater than normal for June through September 1980; therefore, domestic water-use estimates provided in this report may be slightly greater than those for a year of average precipitation and temperature.

Self-supplied, domestic water use in Nebraska is met by ground-water withdrawals. Abundant ground water is available at moderate pumping depths in most areas of the State; however, in some parts the supply is limited or unobtainable. Areas of limited supply are principally in the southeastern part of the State and along the northern border. The availability of ground water in Nebraska is shown in figure 3 (Shaffer, 1972, p. 8).

ESTIMATION OF SELF-SUPPLIED, DOMESTIC WATER USE

Self-supplied, domestic water use in Nebraska in 1980 was estimated by determining the county population served by self-supplied systems and by multiplying these population figures by the gallons per day per capita use estimated for each county. County estimates were aggregated to determine total estimated use for the State. Estimates of self-supplied, domestic use also were made for the Hydrologic Units and Subregions and for the Natural Resources Districts in Nebraska.

Self-Supplied, Domestic Population Estimates

The self-supplied, domestic population for each county was computed as the difference between the 1980 county population published in Nebraska Statistical Handbook, 1984-85 (Nebraska Department of Economic Development, 1985) and the county population served by public supply as listed by Lawton and others (1983, p. 18-21). County populations are listed under these categories in table 1.

Determination of County Per Capita Water-Use Rates

Self-supplied, domestic water use probably approaches that part of public-supplied water delivered for domestic use. Bentall and Shaffer (1979, p. 73) estimated that 47 percent of the water supplied by public-supply systems was for domestic use (drinking, cooking, laundering, bathing, stool flushing, and lawn watering). The average daily per capita public-supply use for Nebraska during 1980 is 239 gallons (Lawton and others, 1983, p. 14). The estimate by Bentall and Shaffer (1979) would indicate that 112 gallons per day (GPD) per capita was for public-supplied domestic use ($239 \times 0.47 = 112$).



EXPLANATION

— 12 — LINE OF EQUAL AVERAGE PRECIPITATION, IN INCHES

Figure 2.--Average precipitation for Nebraska, 1980.

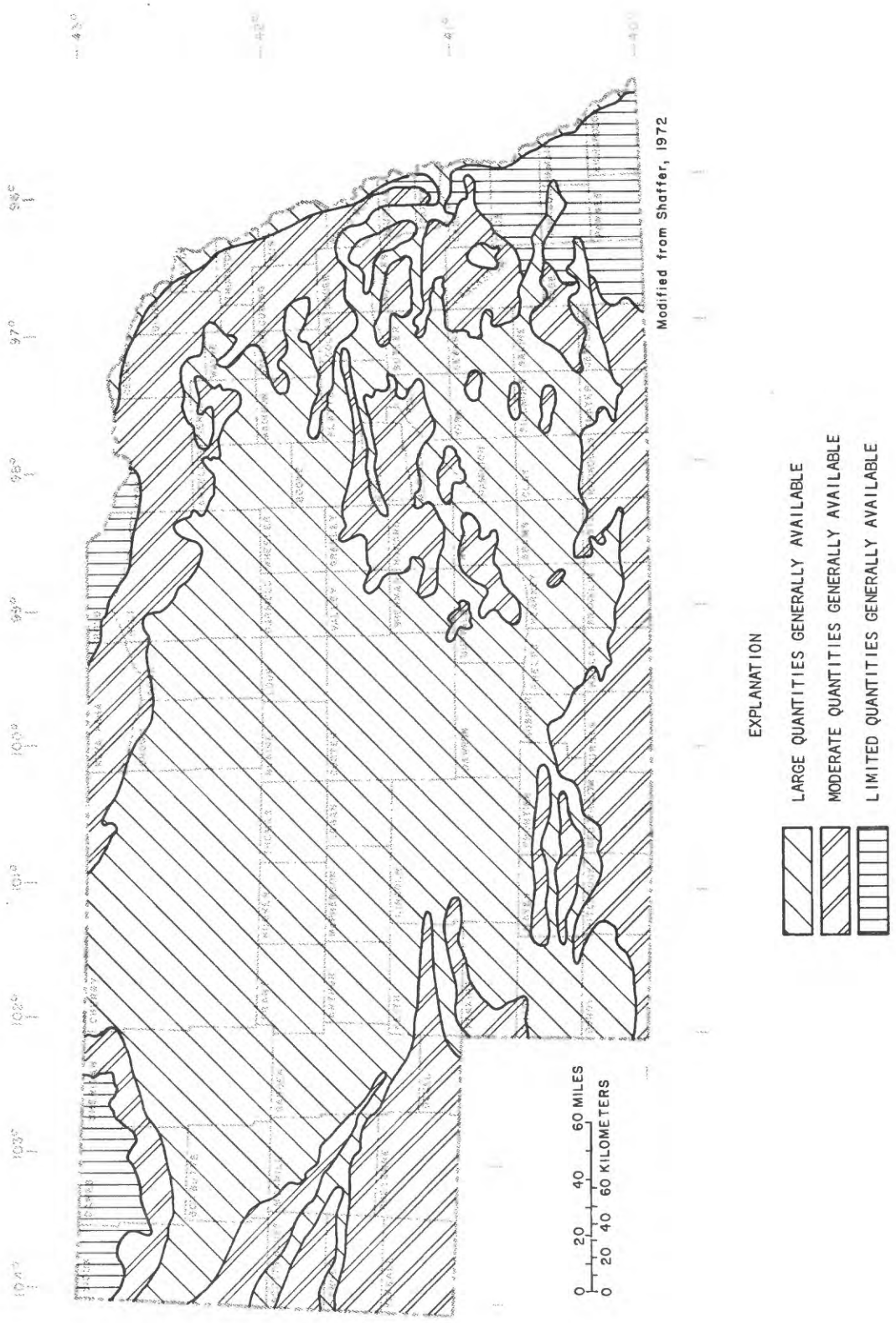


Figure 3.--Availability of ground water in Nebraska.

Table 1.--Nebraska 1980 population data and estimated self-supplied domestic population

County No.	County name	Population		
		Total	Public supplied domestic	Self-supplied domestic
001	Adams	30,656	27,494	3,162
003	Antelope	8,675	4,705	3,970
005	Arthur	513	0	513
007	Banner	918	0	918
009	Blaine	867	182	685
011	Boone	7,391	3,940	3,451
013	Box Butte	13,696	10,963	2,733
015	Boyd	3,331	2,273	1,058
017	Brown	4,377	2,753	1,624
019	Buffalo	34,797	27,823	6,974
021	Burt	8,813	5,458	3,355
023	Butler	9,330	4,441	4,889
025	Cass	20,297	18,036	2,261
027	Cedar	11,375	5,347	6,028
029	Chase	4,758	2,699	2,059
031	Cherry	6,758	3,539	3,219
033	Cheyenne	10,057	7,909	2,148
035	Clay	8,106	5,593	2,513
037	Colfax	9,890	6,654	3,236
039	Cuming	11,664	8,307	3,357
041	Custer	13,877	7,973	5,904
043	Dakota	16,573	13,264	3,309
045	Dawes	9,609	8,046	1,563
047	Dawson	22,304	16,241	6,063
049	Deuel	2,462	1,626	836
051	Dixon	7,137	3,894	3,243
053	Dodge	35,847	30,946	4,901
055	Douglas	397,038	382,524	14,514
057	Dundy	2,861	1,468	1,393
059	Fillmore	7,920	5,161	2,759

Table 1.--Nebraska 1980 population data and estimated self-supplied domestic population--Continued

County No.	County name	Population		
		Total	Public supplied domestic	Self-supplied domestic
061	Franklin	4,377	2,698	1,679
063	Frontier	3,647	1,896	1,751
065	Furnas	6,486	4,579	1,907
067	Gage	24,456	17,183	7,273
069	Garden	2,802	1,060	1,742
071	Garfield	2,363	1,382	981
073	Gosper	2,140	941	1,199
075	Grant	877	334	543
077	Greeley	3,462	1,897	1,565
079	Hall	47,690	38,633	9,057
081	Hamilton	9,301	5,316	3,985
083	Harlan	4,292	2,843	1,449
085	Hayes	1,356	260	1,096
087	Hitchcock	4,079	2,464	1,615
089	Holt	13,552	7,517	6,035
091	Hooker	990	712	278
093	Howard	6,773	3,171	3,602
095	Jefferson	9,817	7,039	2,778
097	Johnson	5,285	4,334	951
099	Kearney	7,053	4,347	2,706
101	Keith	9,364	6,911	2,453
103	Keya Paha	1,301	319	982
105	Kimball	4,882	3,718	1,164
107	Knox	11,457	6,357	5,100
109	Lancaster	192,884	181,592	11,292
111	Lincoln	36,455	27,400	9,055
113	Logan	983	340	643
115	Loup	859	0	859
117	McPherson	593	0	593
119	Madison	31,382	25,575	5,807

Table 1.--Nebraska 1980 population data and estimated self-supplied domestic population--Continued

County No.	County name	Population		
		Total	Public supplied domestic	Self-supplied domestic
121	Merrick	8,945	4,531	4,414
123	Morrill	6,085	3,294	2,791
125	Nance	4,740	2,793	1,947
127	Nemaha	8,367	6,213	2,154
129	Nuckolls	6,726	4,744	1,982
131	Otoe	15,183	14,508	675
133	Pawnee	3,937	3,549	388
135	Perkins	3,637	1,960	1,677
137	Phelps	9,769	7,135	2,634
139	Pierce	8,481	4,185	4,296
141	Platte	28,852	21,249	7,603
143	Polk	6,320	3,456	2,864
145	Red Willow	12,615	9,861	2,754
147	Richardson	11,315	9,464	1,851
149	Rock	2,383	1,190	1,193
151	Saline	13,131	9,411	3,720
153	Sarpy	86,015	82,847	3,168
155	Saunders	18,716	10,812	7,904
157	Scotts Bluff	38,344	28,888	9,456
159	Seward	15,789	10,702	5,087
161	Sheridan	7,544	4,381	3,163
163	Sherman	4,226	2,391	1,835
165	Sioux	1,845	368	1,477
167	Stanton	6,549	2,122	4,427
169	Thayer	7,582	5,161	2,421
171	Thomas	973	313	660
173	Thurston	7,186	4,320	2,866
175	Valley	5,633	3,478	2,155
177	Washington	15,508	9,711	5,797
179	Wayne	9,858	6,114	3,744
181	Webster	4,858	2,620	2,238
183	Wheeler	1,060	275	785
185	York	14,798	10,344	4,454
	Totals	1,569,825	1,272,467	297,358

Self-supplied, domestic water users generally are in rural areas and have their own waste-water systems, which have limited capacities. Therefore, the volume of water used by the self-supplied, domestic population for laundering, bathing, dishwashing, and garbage disposal generally would be less than that used by public-supplied consumers having access to sewer systems with treatment and disposal plants.

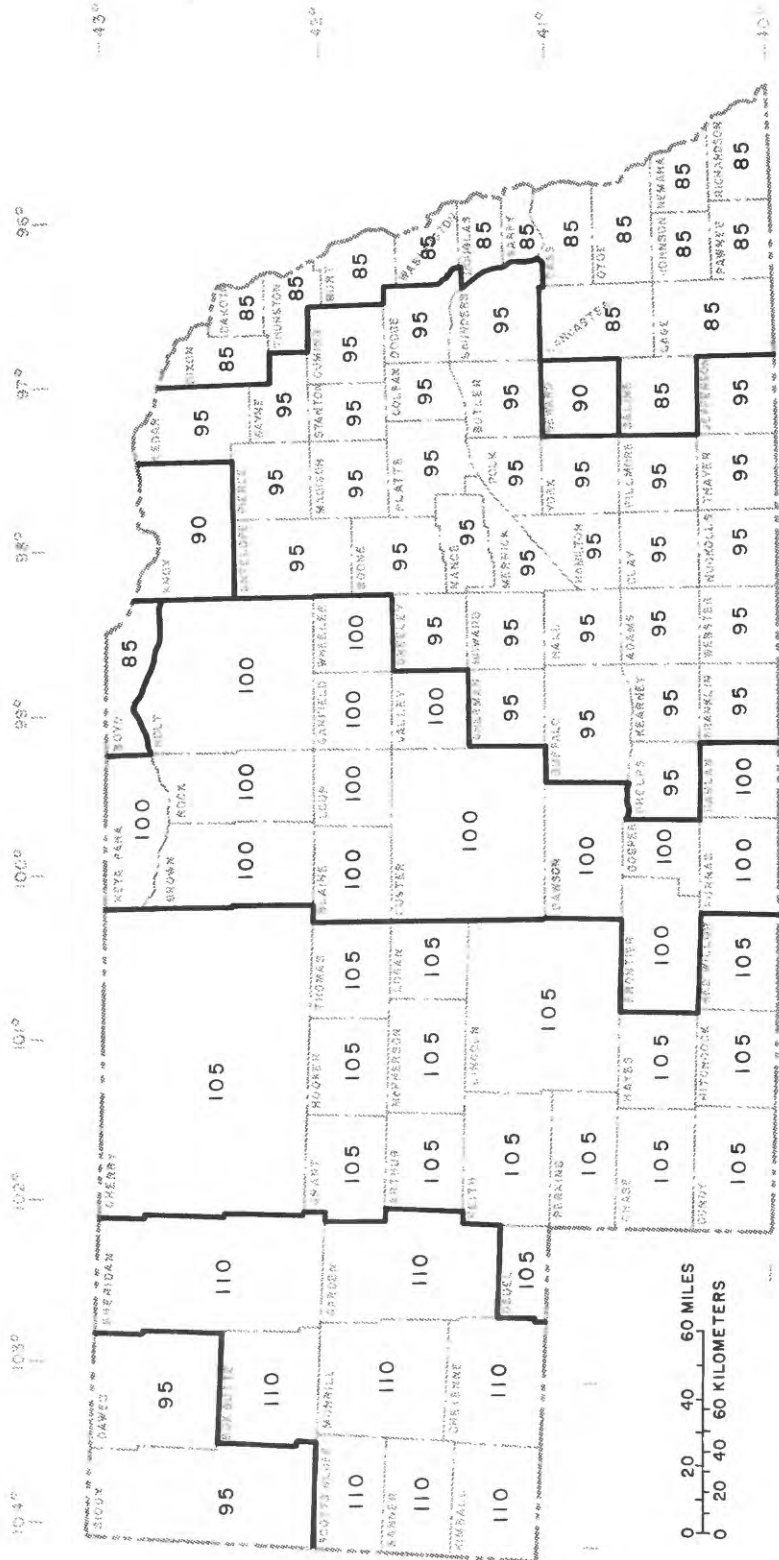
Estimates of gallons per day per capita for the self-supplied, domestic population were made for each county in the State based on 1980 precipitation (fig. 2) and availability of ground water (fig. 3). Considering the 112 GPD per capita for public-supplied domestic use computed from Bentall and Shaffer (1979) and considering that self-supplied domestic per capita use generally is less than public-supplied domestic use because of the limited capacity of private waste-water systems, an estimated base usage rate of 80 percent of the gallons per day per capita public-supplied domestic use was selected. This is equal to 90 GPD per capita and was adjusted downward for counties where known ground-water supplies were limited (Lawton and others, 1983). The rate was increased for counties from east to west across the State as annual precipitation decreased, based on estimates of gallons per day per capita of public-supply use computed from annual quantities published by Lawton and others (1983). The estimates of self-supplied domestic water use, in gallons per day per capita are shown in figure 4 for Nebraska counties and range from 85 GPD per capita in counties along the eastern border to 110 GPD per capita in most of the western counties. The average use of the self-supplied domestic population during 1980 was computed as 95 GPD per capita from these county estimates. This average compares closely with the farm-domestic daily requirement of 100 GPD per capita listed by Anderson (1966, p. 38).

County Water-Use Estimates

Estimates of self-supplied domestic water use by county were computed by multiplying the self-supplied domestic population of the county listed in table 1 by the estimated water-use rate assigned to the county as shown in figure 4. These estimates for 1980 are given in table 2 as an average daily-use rate in million gallons per day (Mgal/d) and as an annual volume in acre-feet (acre-ft). Volumes of water use during 1980 ranged from 30 acre-ft in Hooker and Pawnee Counties to 1,380 acre-ft in Douglas County, with a total State use of 31,820 acre-ft.

Hydrologic Unit and Subregion Water-Use Estimates

Estimates of self-supplied domestic water use for the hydrologic units and subregions, all or part of which lie within the boundaries of the State (fig. 5), are needed for the National Water Use Data System (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 population within the county. This percentage was applied to the county use, and these county increments were aggregated to determine the use in the hydrologic unit. For hydrologic units that



EXPLANATION

105 GALLONS PER DAY, PER CAPITA

— GALLONS PER DAY, PER CAPITA BOUNDARY

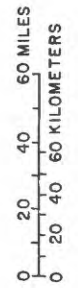


Figure 4.--Estimates of self-supplied domestic water use in Nebraska counties, 1980.

Table 2.--Estimate of Nebraska self-supplied domestic water use
by county, 1980

[GPD, gallons per day; Mgal/d, million gallons per day; acre-ft, acre-foot]

County No.	County name	Rural population	Self-supplied domestic water use		
			GPD per capita	Average daily use rate (Mgal/d) ^{1/}	Annual volume (acre-ft) ^{2/}
001	Adams	3,162	95	0.30	340
003	Antelope	3,970	95	.38	430
005	Arthur	513	105	.05	60
007	Banner	918	110	.10	110
009	Blaine	685	100	.07	80
011	Boone	3,451	95	.33	370
013	Box Butte	2,733	110	.30	340
015	Boyd	1,058	85	.09	100
017	Brown	1,624	100	.16	180
019	Buffalo	6,974	95	.66	740
021	Burt	3,355	85	.29	330
023	Butler	4,889	95	.46	520
025	Cass	2,261	85	.19	210
027	Cedar	6,028	95	.57	640
029	Chase	2,059	105	.22	250
031	Cherry	3,219	105	.34	380
033	Cheyenne	2,148	110	.24	270
035	Clay	2,513	95	.24	270
037	Colfax	3,236	95	.31	350
039	Cuming	3,357	95	.32	360
041	Custer	5,904	100	.59	660
043	Dakota	3,309	85	.28	310
045	Dawes	1,563	95	.15	170
047	Dawson	6,063	100	.61	690
049	Deuel	836	105	.09	100
051	Dixon	3,243	85	.28	310
053	Dodge	4,901	95	.47	530
055	Douglas	14,514	85	1.23	1,380
057	Dundy	1,393	105	.15	170
059	Fillmore	2,759	95	.26	290

Table 2.--Estimate of Nebraska self-supplied domestic water use
by county, 1980--Continued

County No.	County name	Rural population	Self-supplied domestic water use		
			GPD per capita	Average daily use rate (Mgal/d) ^{1/}	Annual volume (acre-ft) ^{2/}
061	Franklin	1,679	95	0.16	180
063	Frontier	1,751	100	.18	200
065	Furnas	1,907	100	.19	210
067	Gage	7,273	85	.62	700
069	Garden	1,742	110	.19	210
071	Garfield	981	100	.01	110
073	Gosper	1,199	100	.12	130
075	Grant	543	105	.06	70
077	Greeley	1,565	95	.15	170
079	Hall	9,057	95	.86	970
081	Hamilton	3,985	95	.38	430
083	Harlan	1,449	100	.14	160
085	Hayes	1,096	105	.12	130
087	Hitchcock	1,615	105	.17	190
089	Holt	6,035	100	.60	670
091	Hooker	278	105	.03	30
093	Howard	3,602	95	.34	380
095	Jefferson	2,778	95	.26	290
097	Johnson	951	85	.08	90
099	Kearney	2,706	95	.26	290
101	Keith	2,453	105	.26	290
103	Keya Paha	982	100	.10	110
105	Kimball	1,164	110	.13	150
107	Knox	5,100	90	.46	520
109	Lancaster	11,292	85	.96	1,080
111	Lincoln	9,055	105	.95	1,070
113	Logan	643	105	.07	80
115	Loup	859	100	.09	100
117	McPherson	593	105	.06	70
119	Madison	5,807	95	.55	620

Table 2.--Estimate of Nebraska self-supplied domestic water use
by county, 1980--Continued

County No.	County name	Rural population	Self-supplied domestic water use		
			GPD per capita	Average daily use rate (Mgal/d) ^{1/}	Annual volume (acre-ft) ^{2/}
121	Merrick	4,414	95	0.42	470
123	Morrill	2,791	110	.31	350
125	Nance	1,947	95	.18	200
127	Nemaha	2,154	85	.18	200
129	Nuckolls	1,982	95	.19	210
131	Otoe	675	85	.06	70
133	Pawnee	388	85	.03	30
135	Perkins	1,677	105	.18	200
137	Phelps	2,634	95	.25	280
139	Pierce	4,296	95	.41	460
141	Platte	7,603	95	.72	810
143	Polk	2,864	95	.27	300
145	Red Willow	2,754	105	.29	330
147	Richardson	1,851	85	.16	180
149	Rock	1,193	100	.12	130
151	Saline	3,720	85	.32	360
153	Sarpy	3,168	85	.27	300
155	Saunders	7,904	95	.75	840
157	Scotts Bluff	9,456	110	1.04	1,170
159	Seward	5,087	90	.46	520
161	Sheridan	3,163	110	.35	390
163	Sherman	1,835	95	.17	190
165	Sioux	1,477	95	.14	160
167	Stanton	4,427	95	.42	470
169	Thayer	2,421	95	.23	260
171	Thomas	660	105	.07	80
173	Thurston	2,866	85	.24	270
175	Valley	2,155	100	.22	250
177	Washington	5,797	85	.49	550
179	Wayne	3,744	95	.36	400
181	Webster	2,238	95	.21	240
183	Wheeler	785	100	.08	90
185	York	4,454	95	.42	470
State total				28.38	31,870

^{1/} Rural population x GPD per capita divided by 10⁶.

^{2/} Rounded to nearest 10.

extend over Nebraska boundaries, the water-use estimates apply only to that part of the unit within the State. Estimated self-supplied domestic water use by hydrologic units and subregions for 1980 are given in table 3. The volume of water used by self-supplied domestic population during 1980 ranged from less than 5 acre-ft in hydrologic units 10120106, 1140230, 10250001, and 10250003 to 2,270 acre-ft in hydrologic unit 10220003.

Natural Resources Districts' Water-Use Estimates

Estimates were made of the self-supplied, domestic water use for the Natural Resources Districts (NRD) (fig. 6), 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 multiplied by county-use values, and county increments within the NRD were aggregated for estimated total use within the District. The computations of estimated water use for the NRD's are given in table 4. The volume of water used during 1980 ranged from 360 acre-ft in the Middle Niobrara NRD to 3,530 acre-ft in the Lower Elkhorn NRD.

SUMMARY

Self-supplied, domestic water-use estimates for Nebraska were computed, as no data base of actual measurements exists for this water-use category. The self-supplied, domestic water use in Nebraska is small compared to other uses; but it is an important category for water-management plans, since it affects to some extent the distribution of population in rural areas. Because precipitation volumes were less than normal and temperatures were greater than normal for June through September 1980, the estimated average water use of 95 gallons per day per capita may be greater than would be used in a normal year.

The volume of water used by the self-supplied, domestic population during 1980 ranged from 30 acre-ft in Hooker and Pawnee Counties to 1,380 acre-ft in Douglas County. Hydrologic unit volumes of water use in 1980 ranged from less than 5 acre-ft in four of the units to 2,270 acre-ft in one unit. Natural Resources Districts' self-supplied, domestic water use ranged from 360 acre-ft in Middle Niobrara NRD to 3,530 acre-ft in the Lower Elkhorn NRD. The total volume of water used by the self-supplied, domestic population during 1980 was 31,820 acre-ft.

Table 3.--Estimate of Nebraska self-supplied, domestic water use by Hydrologic Unit, 1980

[Mgal/d, million gallons per day; acre-ft, acre-foot;
< , indicates the actual value is less than the value shown]

Hydrologic unit number	Self-supplied domestic water use	
	Average daily use rate in Mgal/d	Annual volume in acre-ft ^{1/}
(Hat Creek Basin)		
10120106	<0.005	0
10120108	<u>.03</u>	<u>30</u>
Subregion 1012 - total	0.03	30
(White River Basin)		
10140201	0.18	200
10140203	<u><.005</u>	<u>0</u>
Subregion 1014 - total	0.18	200
(Niobrara River-Ponca Creek Basin)		
10150001	0.07	80
10150002	.08	90
10150003	.62	700
10150004	.30	340
10150005	.06	70
10150006	.08	90
10150007	<u>.45</u>	<u>510</u>
Subregion 1015 - total	1.66	1,880
(Upper Missouri River Tributaries)		
10170101	<u>1.02</u>	<u>1,150</u>
Subregion 1017 - total	1.02	1,150
(North Platte River Basin)		
10180009	1.30	1,460
10180012	.15	170
10180013	.23	260
10180014	<u>.38</u>	<u>430</u>
Subregion 1018 - total	2.06	2,320

Table 3.--Estimate of Nebraska self-supplied, domestic water use by Hydrologic Unit, 1980--Continued

Hydrologic unit number	Self-supplied domestic water use	
	Average daily use rate in Mgal/d	Annual volume in acre-ft ^{1/}
(South Platte River Basin)		
10190012	0.02	20
10190015	.01	10
10190016	.19	210
10190017	.09	100
10190018	<u>.34</u>	<u>380</u>
Subregion 1019 - total	0.65	730
(Platte River Basin)		
10200101	1.55	1,740
10200102	.54	610
10200103	1.07	1,200
10200201	.77	860
10200202	.45	510
10200203	<u>1.66</u>	<u>1,850</u>
Subregion 1020 - total	6.04	6,760
(Loup River Basin)		
10210001	0.14	160
10210002	.16	180
10210003	.47	530
10210004	.53	600
10210005	.26	290
10210006	.17	190
10210007	.34	380
10210008	.14	160
10210009	.70	790
10210010	<u>.32</u>	<u>360</u>
Subregion 1021 - total	3.23	3,640
(Elkhorn River Basin)		
10220001	0.96	1,080
10220002	.57	640
10220003	2.03	2,270
10220004	<u>.74</u>	<u>830</u>
Subregion 1022 - total	4.30	4,820

Table 3.--Estimate of Nebraska self-supplied, domestic water use by Hydrologic Unit, 1980--Continued

Hydrologic unit number	Self-supplied domestic water use	
	Average daily use rate in Mgal/d	Annual volume in acre-ft ^{1/}
(Lower Missouri River Tributaries)		
10230001	0.62	700
10230006	<u>1.24</u>	<u>1,390</u>
Subregion 1023 - total	1.86	2,090
(Weeping Water Creek-Nemaha River Basin)		
10240001	0.11	120
10240005	.06	70
10240006	.23	260
10240007	.05	60
10240008	<u>.33</u>	<u>370</u>
Subregion 1024 - total	0.78	880
(Republican River Basin)		
10250001	<0.005	0
10250002	.08	90
10250003	<.005	0
10250004	.49	550
10250005	.17	190
10250006	.24	270
10250007	.20	220
10250008	.26	290
10250009	.35	390
10250011	.06	70
10250014	.14	160
10250015	.01	10
10250016	<u>.50</u>	<u>560</u>
Subregion 1025 - total	2.50	2,800
(Blue River Basin)		
10270201	0.76	850
10270202	.84	940
10270203	.90	1,010
10270204	.37	420
10270205	.06	70
10270206	.94	1,060
10270207	<u>.20</u>	<u>220</u>
Subregion 1027 - total	4.07	4,570
State total	28.38	31,870

^{1/} Rounded to nearest 10.

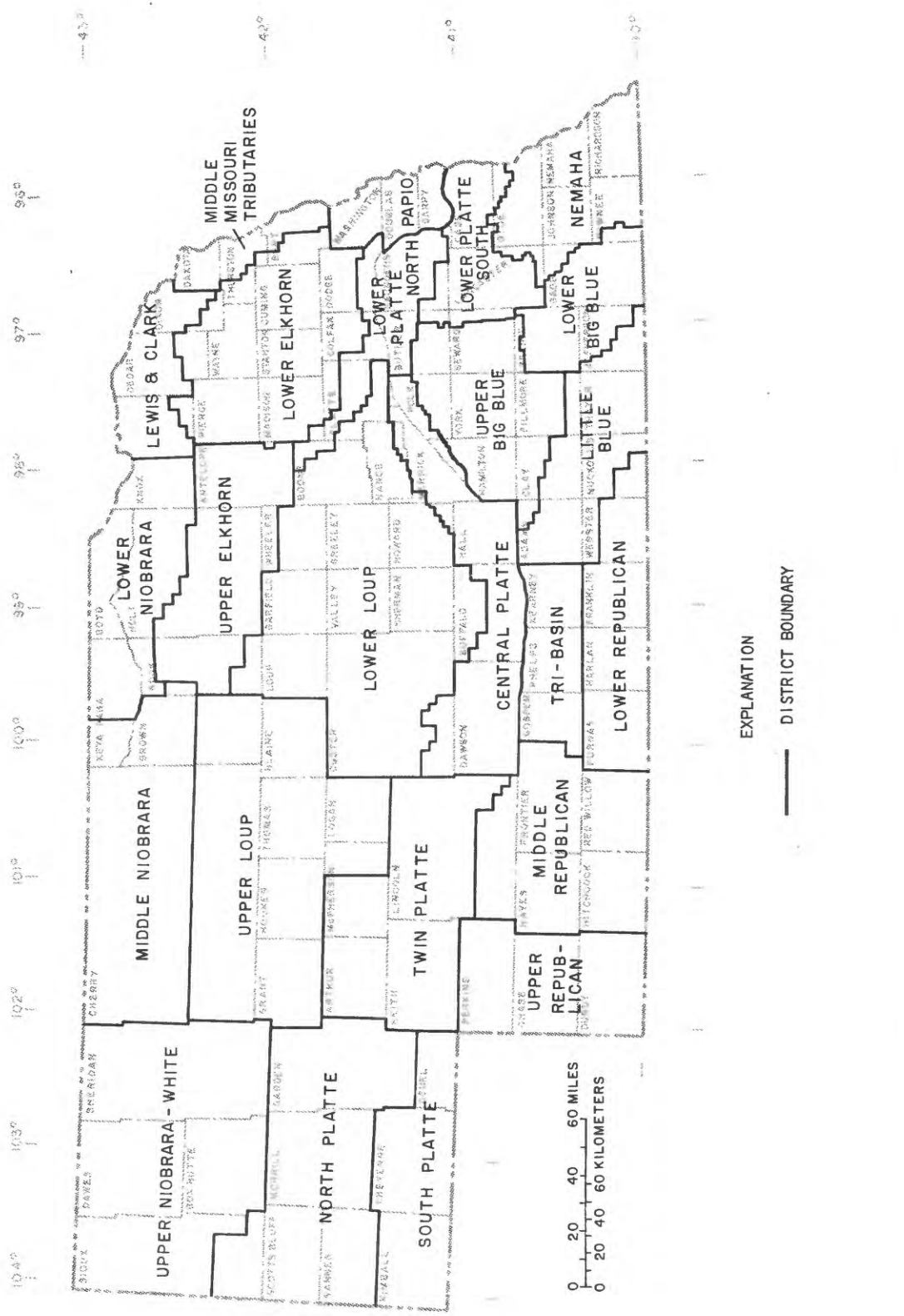


Figure 6.--Natural Resources Districts in Nebraska.

Table 4.--Estimate of Nebraska self-supplied domestic water use by
Natural Resources Districts, 1980

[Mgal/d, million gallons per day; acre-ft, acre-foot; < , indicates the
actual value is less than the value shown]

County No.	County	Percent of county in NRD	Water use in county (Mgal/d)	Water use in NRD, 1980	
				Average daily use rate (Mgal/d)	Annual volume (Acre-ft) ^{1/}
<u>UPPER NIOBRARA - WHITE NRD</u>					
013	Box Butte	100	0.30	0.30	340
045	Dawes	100	.15	.15	170
161	Sheridan	100	.35	.35	390
165	Sioux	76	.14	.11	120
Total use in NRD				0.91	1,020
<u>MIDDLE NIOBRARA NRD</u>					
017	Brown	50	0.16	0.08	90
031	Cherry	61	.34	.21	240
103	Keya Paha	33	.10	.03	30
149	Rock	3	.12	<.005	0
Total use in NRD				0.32	360
<u>LOWER NIOBRARA NRD</u>					
015	Boyd	100	0.09	0.09	100
089	Holt	40	.60	.24	270
103	Keya Paha	67	.10	.07	80
107	Knox	41	.46	.19	210
149	Rock	16	.12	.02	20
Total use in NRD				0.61	680
<u>LEWIS AND CLARK NRD</u>					
027	Cedar	75	0.57	0.43	480
051	Dixon	73	.28	.20	220
107	Knox	51	.46	.23	260
Total use in NRD				0.86	960
<u>UPPER ELKHORN NRD</u>					
003	Antelope	100	0.38	0.38	430
089	Holt	60	.60	.36	400
149	Rock	60	.12	.07	80
183	Wheeler	25	.08	.02	20
Total use in NRD				0.83	930

Table 4.--Estimate of Nebraska self-supplied domestic water use by
Natural Resources Districts, 1980--Continued

County No.	County	Percent of county in NRD	Water use in county (Mgal/d)	Water use in NRD, 1980	
				Average daily use rate (Mgal/d)	Annual volume (acre-ft) ^{1/}
<u>LOWER ELKHORN NRD</u>					
003	Antelope	< 0.5	0.38	<0.005	0
021	Burt	44	.29	.13	150
027	Cedar	25	.57	.14	160
037	Colfax	58	.31	.18	200
039	Cuming	100	.32	.32	360
043	Dakota	< .5	.28	<.005	0
051	Dixon	27	.28	.08	90
053	Dodge	70	.47	.33	370
107	Knox	8	.46	.04	40
119	Madison	94	.55	.52	580
139	Pierce	100	.41	.41	460
141	Platte	18	.72	.13	150
167	Stanton	100	.42	.42	470
173	Thurston	39	.24	.09	100
179	Wayne	100	.36	.36	400
Total use in NRD				3.15	3,530
<u>MIDDLE MISSOURI TRIBUTARIES NRD</u>					
021	Burt	56	0.29	0.16	180
043	Dakota	100	.28	.28	310
173	Thurston	61	.24	.15	170
Total use in NRD				0.59	660
<u>UPPER LOUP NRD</u>					
009	Blaine	100	0.07	0.07	80
017	Brown	50	.16	.08	90
031	Cherry	39	.34	.13	150
075	Grant	100	.06	.06	70
091	Hooker	100	.03	.03	30
113	Logan	100	.07	.07	80
117	McPherson	33	.06	.02	20
171	Thomas	100	.07	.07	80
Total use in NRD				0.53	600

Table 4.--Estimate of Nebraska self-supplied domestic water use by
Natural Resources Districts, 1980--Continued

County No.	County	Percent of county in NRD	Water use in county (Mgal/d)	Water use in NRD, 1980	
				Average daily use rate (Mgal/d)	Annual volume (Acre-ft) ^{1/}
<u>LOWER LOUP NRD</u>					
011	Boone	89	0.33	0.29	330
019	Buffalo	36	.66	.24	270
041	Custer	90	.59	.53	600
071	Garfield	100	.10	.10	110
077	Greeley	100	.15	.15	170
079	Hall	1	.86	.01	10
093	Howard	93	.34	.32	360
115	Loup	100	.09	.09	100
121	Merrick	7	.42	.03	30
125	Nance	91	.18	.16	180
141	Platte	43	.72	.31	350
149	Rock	21	.12	.03	30
163	Sherman	100	.17	.17	190
175	Valley	100	.22	.22	250
183	Wheeler	75	.08	.06	70
Total use in NRD				2.71	3,050
<u>NORTH PLATTE NRD</u>					
007	Banner	100	0.10	0.10	110
069	Garden	100	.19	.19	210
123	Morrill	100	.31	.31	350
157	Scotts Bluff	100	1.04	1.04	1,180
165	Sioux	24	.14	.03	30
Total use in NRD				1.67	1,380
<u>SOUTH PLATTE NRD</u>					
033	Cheyenne	100	0.24	0.24	270
049	Deuel	100	.09	.09	100
105	Kimball	100	.13	.13	150
Total use in NRD				0.46	520

Table 4.--Estimate of Nebraska self-supplied domestic water use by
Natural Resources Districts, 1980--Continued

County No.	County	Percent of county in NRD	Water use in county (Mgal/d)	Water use in NRD, 1980	
				Average daily use rate (Mgal/d)	Annual volume (Acre-ft) ^{1/}
<u>TWIN PLATTE NRD</u>					
005	Arthur	100	0.05	0.05	60
101	Keith	100	.26	.26	290
111	Lincoln	75	.95	.95	800
117	McPherson	67	.06	.04	40
Total use in NRD				1.06	1,190
<u>TRI-BASIN NRD</u>					
073	Gosper	100	0.12	0.12	140
099	Kearney	100	.26	.26	290
137	Phelps	100	.25	.25	280
Total use in NRD				0.63	710
<u>CENTRAL PLATTE NRD</u>					
019	Buffalo	64	0.66	0.42	470
041	Custer	10	.59	.06	70
047	Dawson	100	.61	.61	690
079	Hall	99	.86	.85	950
093	Howard	7	.34	.02	20
121	Merrick	93	.42	.39	440
125	Nance	9	.18	.02	20
141	Platte	4	.72	.03	30
143	Polk	41	.27	.11	120
081	Hamilton	7	.38	.03	30
Total use in NRD				2.54	2,840
<u>LOWER PLATTE NORTH NRD</u>					
011	Boone	11	0.33	0.04	40
023	Butler	44	.46	.20	220
037	Colfax	42	.31	.13	150
053	Dodge	30	.47	.14	160
119	Madison	6	.55	.03	30
141	Platte	35	.72	.25	280
155	Saunders	82	.75	.61	690
Total use in NRD				1.40	1,570

Table 4.--Estimate of Nebraska self-supplied domestic water use by
Natural Resources Districts, 1980--Continued

County No.	County	Percent of county in NRD	Water use in county (Mgal/d)	Water use in NRD, 1980	
				Average daily use rate (Mgal/d)	Annual volume (Acre-ft) ^{1/}
<u>LOWER PLATTE SOUTH NRD</u>					
023	Butler	11	0.46	0.05	60
025	Cass	96	.19	.18	200
109	Lancaster	87	.96	.84	940
131	Otoe	9	.06	.01	10
155	Saunders	18	.75	.14	160
159	Seward	20	.46	.09	100
Total use in NRD				1.31	1,470
<u>PAPIO NRD</u>					
055	Douglas	100	1.23	1.23	1,390
153	Sarpy	100	.27	.27	300
177	Washington	100	.49	.49	550
Total use in NRD				1.99	2,240
<u>UPPER REPUBLICAN NRD</u>					
029	Chase	100	0.22	0.22	250
057	Dundy	100	.15	.15	170
135	Perkins	100	.18	.18	200
Total use in NRD				0.55	620
<u>MIDDLE REPUBLICAN NRD</u>					
063	Frontier	100	0.18	0.18	200
085	Hayes	100	.12	.12	140
087	Hitchcock	100	.17	.17	190
111	Lincoln	25	.95	.24	270
145	Red Willow	100	.29	.29	330
Total use in NRD				1.00	1,130
<u>LOWER REPUBLICAN NRD</u>					
061	Franklin	100	0.16	0.16	180
065	Furnas	100	.19	.19	210
083	Harlan	100	.14	.14	160
181	Webster	75	.21	.16	180
129	Nuckolls	31	.19	.06	70
Total use in NRD				0.71	800

Table 4.--Estimate of Nebraska self-supplied domestic water use by
Natural Resources Districts, 1980--Continued

County No.	County	Percent of county in NRD	Water use in county (Mgal/d)	Water use in NRD, 1980	
				Average daily use rate (Mgal/d)	Annual volume (Acre-ft) ^{1/}
<u>LITTLE BLUE NRD</u>					
001	Adams	87	0.30	0.26	290
035	Clay	57	.24	.14	160
059	Fillmore	25	.26	.06	70
095	Jefferson	56	.26	.15	170
129	Nuckolls	69	.19	.13	150
169	Thayer	100	.23	.23	260
181	Webster	25	.21	.05	60
Total use in NRD				1.02	1,160
<u>UPPER BIG BLUE NRD</u>					
001	Adams	13	0.30	0.04	40
023	Butler	45	.46	.21	240
035	Clay	43	.24	.10	110
059	Fillmore	75	.26	.20	220
081	Hamilton	93	.38	.35	390
143	Polk	59	.27	.16	180
151	Saline	11	.32	.04	40
159	Seward	80	.46	.37	420
185	York	100	.42	.42	470
Total use in NRD				1.89	2,110
<u>LOWER BIG BLUE NRD</u>					
067	Gage	90	0.52	0.56	630
095	Jefferson	44	.26	.11	120
133	Pawnee	23	.03	.01	10
151	Saline	89	.32	.28	310
Total use in NRD				0.96	1,070

Table 4.--Estimate of Nebraska self-supplied domestic water use by
Natural Resources Districts, 1980--Continued

County No.	County	Percent of county in NRD	Water use in county (Mgal/d)	Water use in NRD, 1980	
				Average daily use rate (Mgal/d)	Annual volume (Acre-ft) ^{1/}
<u>NEMAHA NRD</u>					
025	Cass	4	0.19	0.01	10
067	Gage	10	.62	.06	70
097	Johnson	100	.08	.08	90
109	Lancaster	13	.96	.12	140
127	Nemaha	100	.18	.18	200
131	Otoe	91	.06	.05	60
133	Pawnee	77	.03	.02	20
147	Richardson	100	.16	.16	180
Total use in NRD				0.68	760
State Total				28.33	31,870

^{1/} Rounded to nearest 10.

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