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

By Jerry D. Stoner

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SELECTED FACTORS FOR CONVERTING INCH-POUND UNITS TO METRIC UNITS

Inch-pound units used in this report may be converted to metric units by the following conversion factors:

Inch-pound	Multiply by	Metric
inch	25.40	millimeter
mile	1.609	kilometer
gallon	.0037	cubic meter
gallon	3.785	liter
acre-foot	1,233	cubic meter

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ABSTRACT

Reported or measured water-use data for the domestic self-supplied user were not available for Oklahoma; therefore estimates of water use within this classification were derived. The total self-supplied population in Oklahoma during 1980 was estimated to be 343,615, which was 11.4 percent of the total 1980 State population. The rate of water use by this group was estimated to be 56 gallons per capita per day. The estimated annual domestic self-supplied water use by county ranged from 10 to 1,180 acre-feet, with a total statewide use of 21,610 acre-feet.

INTRODUCTION

Withdrawal of water for domestic use is the one consumptive water-use classification in Oklahoma that does not require a permit. Oklahoma statutes recognize domestic use as water used by an individual, family, or household for household purposes, for farm and domestic animals up to the normal grazing capacity of the land, and for the irrigation of land not exceeding 3 acres for gardens, orchards, and lawns. Withdrawal for domestic use should not be confused with withdrawal of water public supply, which requires a permit. Because water-use permits are not required for self-supplied domestic use, no water-use reporting mechanism is available for this classification. Identification and measurement of the volume of water used from each of the domestic sources in Oklahoma would be impractical.

The purpose of this study was to develop a means of estimating the self-supplied domestic use by county. Only currently available data were used and no attempt was made to contact water users throughout the State. To estimate the self-supplied domestic use, it was necessary to determine the self-supplied population of each county and to determine the rate, gallons per capita per day, of water use by this group. The year 1980 was selected because the census for that year provided the best available population data.

DEFINITIONS

The following definitions of terms used in this report are provided to alleviate confusion.

Domestic water use: Water used for normal household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens. The water may be obtained from a public supply or may be self supplied. It does not include stock watering or other farm uses, that are included in the Oklahoma State Statute definition.

Public supply: Water withdrawn for all uses by public and private water suppliers and delivered to users that do not supply their own water. Water suppliers provide water for variety of uses such as domestic, commercial, industrial, and public water use.

Rural population: The population residing outside of the corporate boundaries of Oklahoma's incorporated cities and towns.

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

Urban population: The population residing within the corporate boundaries of of Oklahoma's incorporated cities and towns.

POPULATION ESTIMATES

The self-supplied domestic user population for each county was estimated from three sources. The total county population and the population of the incorporated cities and towns within the county were obtained from the 1980 census data (Oklahoma Employment Security Commission, 1981). Information about the public supplied rural population was obtained from the report "Rural Water Systems in Oklahoma" (Oklahoma Water Resources Board, 1980), and from the 1981 unpublished public supply water-use records on file at the Oklahoma Water Resources Board.

The urban and rural population by county as determined from the 1980 census data is listed in table 1. The average persons per household as given by the Statistical Abstract of Oklahoma for 1982 (University of Oklahoma, 1982) also is listed in table 1. A simplified division into rural and urban populations was used in this study. Much of the population in the rural group is certainly suburban. Many of the towns included in the urban group are quite small and their residents would not consider themselves urban dwellers. However, the simplified division was adequate for this study.

Table 1.--Oklahoma population data by county, 1980

County	Population			Average persons per household
	Total	Urban	Rural	
Adair	18,575	3,734	14,841	2.99
Alfalfa	7,077	4,660	2,417	2.38
Atoka	12,748	4,961	7,787	2.73
Beaver	6,806	2,740	4,066	2.67
Beckham	19,243	14,604	4,639	2.53
Blaine	13,443	9,160	4,283	2.59
Bryan	30,535	17,606	12,929	2.54
Caddo	30,905	17,071	13,834	2.72
Canadian	56,452	52,321	4,131	2.95
Carter	43,610	34,896	8,714	2.62
Cherokee	30,684	10,341	20,343	2.73
Choctaw	17,203	9,128	8,075	2.67
Cimarron	3,648	2,318	1,330	2.62
Cleveland	133,173	128,432	4,741	2.73
Coal	6,041	3,199	2,842	2.66
Commanche	112,456	102,361	10,095	2.87
Cotton	7,338	4,764	2,574	2.56
Craig	15,014	8,262	6,752	2.59
Creek	59,210	30,625	28,585	2.80
Custer	25,995	21,782	4,213	2.55
Delaware	23,946	7,839	16,107	2.69
Dewey	5,922	3,371	2,551	2.53
Ellis	5,596	3,549	2,047	2.50
Garfield	62,820	57,570	5,250	2.55
Garvin	27,856	15,743	12,113	2.55
Grady	39,490	25,085	14,405	2.71
Grant	6,518	4,205	2,313	2.41
Greer	6,877	5,461	1,416	2.29
Harmon	4,519	3,276	1,243	2.47
Harper	4,715	3,099	1,616	2.44
Haskell	11,010	4,528	6,482	2.61
Hughes	14,338	8,734	5,604	2.53
Jackson	30,356	26,659	3,697	2.77
Jefferson	8,183	6,084	2,099	2.53
Johnston	10,356	5,689	4,667	2.61
Kay	49,852	41,423	8,429	2.51
Kingfisher	14,187	8,469	5,718	2.72
Kiowa	12,711	9,826	2,885	2.48
Latimer	9,840	3,672	6,168	2.71
Le Flore	40,698	24,100	16,598	2.75
Lincoln	26,601	13,585	13,016	2.73
Logan	26,881	13,776	13,105	2.70

Table 1.--Oklahoma population data by county, 1980--Continued

County	Population			Average persons per household
	Total	Urban	Rural	
Love	7,469	3,045	4,424	2.64
McClain	20,291	12,261	8,030	2.84
McCurtain	36,151	14,772	21,379	2.89
McIntosh	15,495	6,967	8,528	2.56
Major	8,772	4,758	4,014	2.65
Marshall	10,550	5,014	5,536	2.49
Mayes	32,261	14,978	17,283	2.72
Murray	12,147	8,603	3,544	2.57
Muskogee	66,939	48,943	17,996	2.64
Noble	11,573	7,815	3,758	2.60
Nowata	11,486	6,322	5,164	2.61
Okfuskee	11,125	5,577	5,548	2.62
Oklahoma	568,933	559,830	9,103	2.54
Okmulgee	39,169	27,240	11,929	2.61
Osage	39,327	22,191	17,136	2.68
Ottawa	32,870	23,362	9,508	2.57
Pawnee	15,130	6,549	8,761	2.65
Payne	62,435	50,355	12,080	2.40
Pittsburg	40,524	26,850	13,674	2.57
Pontotoc	32,598	19,415	13,183	2.54
Pottawatomie	55,239	41,866	13,373	2.67
Pushmataha	11,773	4,319	7,454	2.67
Roger Mills	4,799	2,319	2,480	2.69
Rogers	46,436	18,370	28,066	2.94
Seminole	27,473	17,601	9,872	2.65
Sequoyah	30,749	13,442	17,307	2.90
Stephens	43,419	31,121	12,298	2.59
Texas	17,727	13,555	4,172	2.74
Tillman	12,398	10,016	2,382	2.58
Tulsa	470,593	437,035	33,558	2.54
Wagoner	41,801	14,359	27,442	3.02
Washington	48,113	40,302	7,811	2.53
Washita	13,798	9,475	4,323	2.64
Woods	10,923	8,463	2,460	2.33
Woodward	21,172	15,922	5,250	2.73
STATEWIDE	3,025,266	2,331,720	693,546	2.62

For this study it was assumed that the urban population (table 1) was all publicly supplied. However, the assumption that the rural population (table 1) was self supplied could not be made. Most of the 77 counties in Oklahoma have one or more rural water systems. The Oklahoma water Resources Board recently published a report containing most of the data required to estimate the rural public-supplied population (Oklahoma Water Resources Board, 1980). Data for the population served by each of the rural water systems and the number and types of meters were obtained from this report. The report was published in September 1980 and the data probably represent 1978 and 1979 population numbers. The error introduced by population data that were 1 or 2 years earlier than the 1980 census was considered to be minimal.

A comparison of the ratio of population served to the number of residential meters indicated that many of the rural water systems estimated their population served by assuming an average of 3.0 persons per household. The data from the 1980 census (table 1) indicates that an estimate of 3.0 persons per household is biased on the high side. In many instances, it appeared that the number of reported residential meters was an estimate or a rounded number. Because of this uncertainty, it was decided not to adjust the population-served values by the 1980 census information.

Another source of population data was the 1981 water-use data on file at the Oklahohoma Water Resources Board. The year 1981 was selected because it was the first year that population information was supplied. Again, the error introduced by a year's deviation from the 1980 census was considered to be minimal.

The water-use reports on file at the Oklahoma Water Resources Board are only for suppliers who withdraw water and are not for suppliers who purchase water from another entity. Several public suppliers had not reported their 1981 withdrawals. Therefore, there was not a one-to-one correspondence between the 1981 reported data and the data in the rural water-suppliers report (Oklahoma Water Resources Board, 1980). Population data from these two sources were compared wherever it was possible. Whenever there was a major difference between the two values, the value selected was that closest to the value computed by multiplying the population per house-hold (table 1) times the number of residential meters. After the available information was collated, a population-served value was available for each of the rural water suppliers.

In order to supply water-use data to the National Water-Use Data System, it was necessary to estimate the self-supplied population by county. Many of the rural water systems supply residential customers in more than one county. For each of these systems, the county populations served were apportioned by the ratio of the area covered by the distribution system in each county to the area covered by the total distribution system. Maps showing the distribution systems in each county were provided in the rural water-suppliers report (Oklahoma Water Resources Board, 1980). After the apportionments were made, the self-supplied domestic population for each county was determined and these values are listed in table 2.

Table 2.--Oklahoma public and self-supplied population by County, 1980

County	Population		
		Supply	
	Total	Public	Self
Adair	18,575	11,659	6,916
Alfalfa	7,077	5,894	1,183
Atoka	12,748	7,309	5,439
Beaver	6,806	3,612	3,194
Beckham	19,243	15,262	3,981
Blaine	13,443	9,596	3,847
Bryan	30,535	24,060	6,475
Caddo	30,905	20,756	10,149
Canadian	56,452	54,528	1,924
Carter	43,610	38,115	5,495
Cherokee	30,684	18,982	11,702
Choctaw	17,303	10,157	7,046
Cimarron	3,648	2,411	1,237
Cleveland	133,173	130,120	3,053
Coal	6,041	4,041	2,000
Comanche	112,456	110,151	2,305
Cotton	7,338	6,538	755
Craig	15,014	11,566	3,448
Creek	59,210	47,143	12,067
Custer	25,995	23,174	2,821
Delaware	23,946	13,728	10,218
Dewey	5,922	4,535	1,387
Ellis	5,596	3,549	2,047
Garfield	62,820	58,794	4,026
Garvin	27,856	24,059	3,797
Grady	39,490	30,321	9,169
Grant	6,518	6,077	441
Greer	6,877	6,351	526
Harmon	4,519	4,008	511
Harper	4,715	3,793	922
Haskell	11,010	8,410	2,600
Hughes	14,338	10,984	3,354
Jackson	30,356	28,926	1,430
Jefferson	8,183	6,787	1,396
Johnston	10,356	8,798	1,558
Kay	49,852	48,860	992
Kingfisher	14,187	10,464	3,723
Kiowa	12,711	12,292	416
Latimer	9,840	8,456	1,384
Le Flore	40,698	39,689	1,009
Lincoln	26,601	15,648	10,953
Logan	26,881	18,418	8,463

Table 2.--Oklahoma public and self-supplied population by County, 1980--Continued

County	Population		
	Total	Supply	
		Public	Self
Love	7,469	6,689	780
McClain	20,291	13,422	6,869
McCurtain	36,151	24,786	11,365
McIntosh	15,495	12,699	2,796
Major	8,772	6,169	2,603
Marshall	10,550	9,016	1,534
Mayes	32,261	23,535	8,726
Murray	12,147	11,948	199
Muskogee	66,939	58,546	8,393
Noble	11,573	9,669	1,904
Nowata	11,486	8,654	2,832
Okfuskee	11,125	9,567	1,558
Oklahoma	568,933	560,621	8,312
Okmulgee	39,169	36,267	2,902
Osage	39,327	29,229	10,098
Ottawa	32,870	26,869	6,001
Pawnee	15,310	12,328	2,982
Payne	62,435	54,711	7,724
Pittsburg	40,524	38,652	1,872
Pontotoc	32,598	27,210	5,388
Pottawatomie	55,239	43,448	11,791
Pushmataha	11,773	10,325	1,448
Roger Mills	4,799	3,435	1,364
Rogers	46,436	39,544	6,892
Seminole	27,473	21,873	5,600
Sequoyah	30,749	24,688	6,061
Stephens	43,419	33,787	9,632
Texas	17,727	13,812	3,915
Tillman	12,398	11,636	762
Tulsa	470,593	451,866	18,727
Wagoner	41,801	34,417	7,348
Washington	48,113	46,586	1,527
Washita	13,798	10,775	3,023
Woods	10,923	9,628	1,294
Woodward	21,172	17,174	3,998
STATEWIDE	3,025,266	2,681,651	343,615

The rural and self-supplied domestic population percentages for each county were computed and are shown in figure 1. The urban counties, those with a rural population of 15 percent or less, had a median self-supplied population of 2 percent and had a self-supplied population range of 1 to 6 percent. Nineteen of the seventy-seven Oklahoma counties were considered to be rural, 50 percent or more of their population live outside of incorporated towns and cities. Of the 19 rural counties, 17 were in the eastern and southeastern part of the State. Eleven counties that were neither urban nor rural had self-supplied populations of 10 percent or less. Those 11 counties have well-developed rural water systems. Of the 11 counties, 4 were in the southwestern part of the State, and 7 were in the eastern one-half of the State.

Because of the method by which many of the rural water suppliers estimated their population served, the self-supplied county populations listed in table 2 probably represent minimum values. The maps used to apportion the population served by rural water suppliers serving more than one county did not show any population distribution information. Because the apportionment was determined only by the area of the distribution systems, some error has been introduced in the county self-supplied populations. Any improvement in the accuracy of the population estimates would require an examination of the records from each supplier.

ESTIMATE OF WATER-USE RATE

The available information relating to water-use rates, gallons per capita per day (GPCD), has been developed from public water-supply data. An average GPCD of 120 for public supplies has been estimated (Steel, 1947, p.13). This value includes not only domestic use but also includes industrial, commercial, municipal use such as fire fighting and recreation, and system losses. Several factors affect the per-capita water-use rate. One of the major factors is the size of the population served, with the relation generally being that as the served population increases the GPCD increases. An attempt to quantify this relationship in a mathematical expression was made for almost complete to completely metered systems (Babbitt and Doland, 1955). The equation developed was:

$$GPCD = 54\ p^{0.125} \qquad (1)$$

where P is the the population served. Although the equation was not developed for extemely small populations, when the 1980 average of 2.62 persons per household is used in the equation, the rate computed is 61 GPCD.

Some efforts have been made to determine domestic use from the available data by subtracting leakage estimates and all other uses. Domestic use rates in the range of 10 to 60 GPCD have been determined, but the rates generally range from 30 to 60 GPCD (Babbitt and Doland, 1955). Therefore, the rate of 61 GPCD as computed from the equation is not an unreasonable estimate.

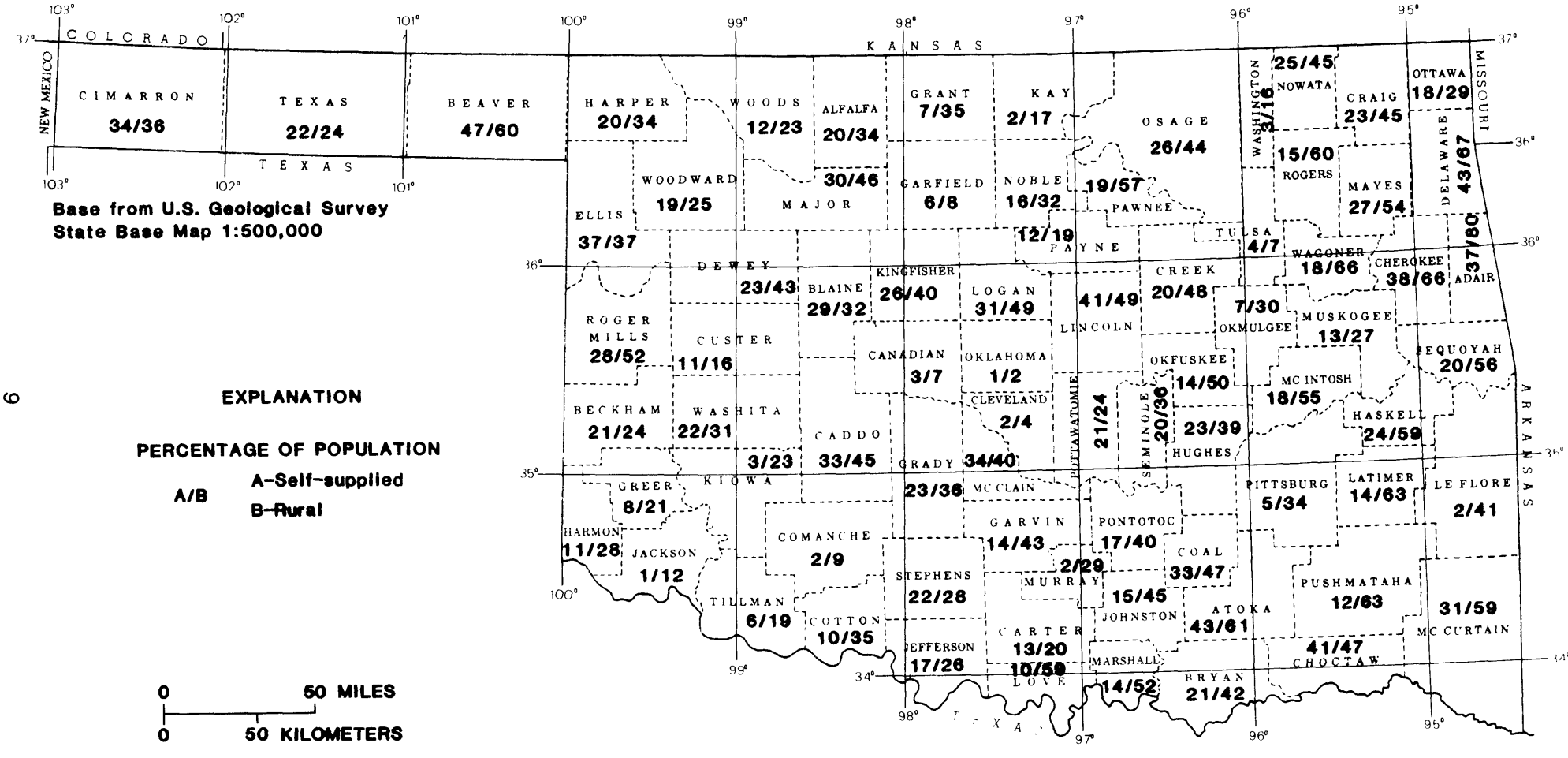

Figure 1.--Rural and self-supplied population percentages by county.

Other factors affect the rate of domestic water use even after the effects of population size, leakage, and other uses have been considered. Of these factors, three seem to have the most effect--economic status, rate structure, and metering. As the economic status of the residential consumer increases the water-use rate tends to increase because of the increased ability to afford larger homes, swimming pools, sprinkler systems, and other water-using devices. At the same time, a number of the rate structures, including increasing block rates, peak-load rates, and seasonal rates tend to encourage conservation and decrease the water-use rate. Finally, as the percentage of water that is metered increases versus flat-rate delivery the water-use rate decreases. Although not all of these factors relate directly to the water-use rate of the self-supplied domestic user, they provide a basis with which to examine the available use-rate data.

The rural water-supply report (Oklahoma Water Resources Board, 1980) listed water-use rate data for many of the rural water suppliers. The data represented total water use and did not distinguish between commercial, industrial, and other uses. The 1981 water-use data on file at the Oklahoma Water Resources Board provided an additional group of water-use rates for examination. Values greater than 200 GPCD were not used because it is considered improbable that any single person would use more than 200 gallons per day. After deleting the improbable values, 436 water-use rates remained. The frequency distribution of the 436 values (fig. 2) shows the mode to be 60 GPCD and the median to be 75 GPCD.

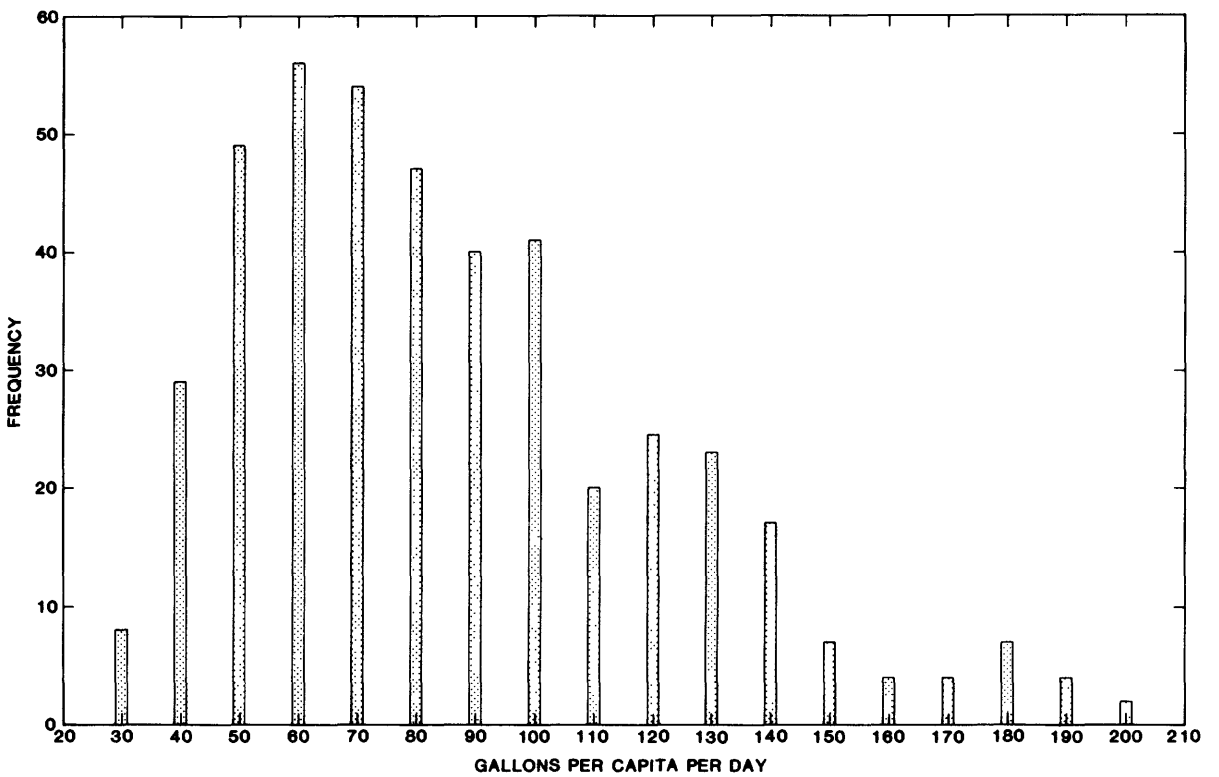

Figure 2.--Distribution of gallons per capita per day of 200 or less.

Three factors--precipitation, cost of water delivery, and the ratio of residential meters to total meters--were examined to determine if any of them had a significant effect on the water-use rate. Precipitation was selected because of the significant range of annual precipitation in Oklahoma. The average annual precipitation ranges from about 16 inches in the extreme western Panhandle to about 56 inches in the southeast (Oklahoma Water Resources Board, 1971, p. 40). Because of the range of precipitation across Oklahoma, (fig. 3) it was believed that there could be a relation between the water-use rate and precipitation. However, when the data were plotted (fig. 4) no relation between the water-use rates and precipitation was apparent.

In general, as the cost of acquiring water for domestic use increases, this use decreases. Information on minimum delivery cost was available from the rural water-supply report (Oklahoma Water Resources Board, 1980). For each supplier for which cost information and water-use rate data were available, the minimum cost to deliver 5,000 gallons was determined. These data were plotted (fig. 5) to determine if any relationship was discernable. The data in figure 5 show that no relationship between delivery and water-use rate was indicated. This probably is due in part to other water uses--commercial, industrial, and other purposes--that are included in the water-use rates. Business use of water has a built-in resistance to decrease in use with increase in cost because of the ability to pass this cost on to the consumer. A review of the data showed that water-delivery cost also was not areally associated; that is, for any county the cost of delivery of water within that county generally included large, median, and small delivery costs. Therefore, no relation of delivery cost to domestic-water use could be developed.

The cost-of-delivery data indicated that water for commercial, industrial, and other purposes biased the available water-use rates. To determine if this bias could be removed or decreased the ratio of residential meters to the total number of meters, R(residential), was plotted against the water-use rate. This plot (fig. 6) indicated, in a general way, that the water-use rate increased as the ratio decreased. The ratio, R(residential) ranged from 0.35 to 1.00 and as this ratio approaches 1.00 the water-use rate should approximate that of domestic use. The median water-use rate where R(residential) was equal to or greater than 0.90 was 67 GPCD. Because of the uncertainty of the data--number of residential meters, number of total meters, population served, and water-use rate--it was decided to use the median water-use rates from the cumulative distributions for R(residential) of 0.90 through 1.00 by 0.01 increments. The median water-use rates were determined and are plotted in figure 7. The results of linear-regression analysis for these points were: equation, Median GPCD=100.3-37.3 R(residential); correlation coefficient (r^2), -0.81; and 95-percent confidence limits, $\pm$ 1.2 GPCD. The estimate of the domestic use from this information was $63.\overline{0} \pm 1.2$ gallons per capita per day.

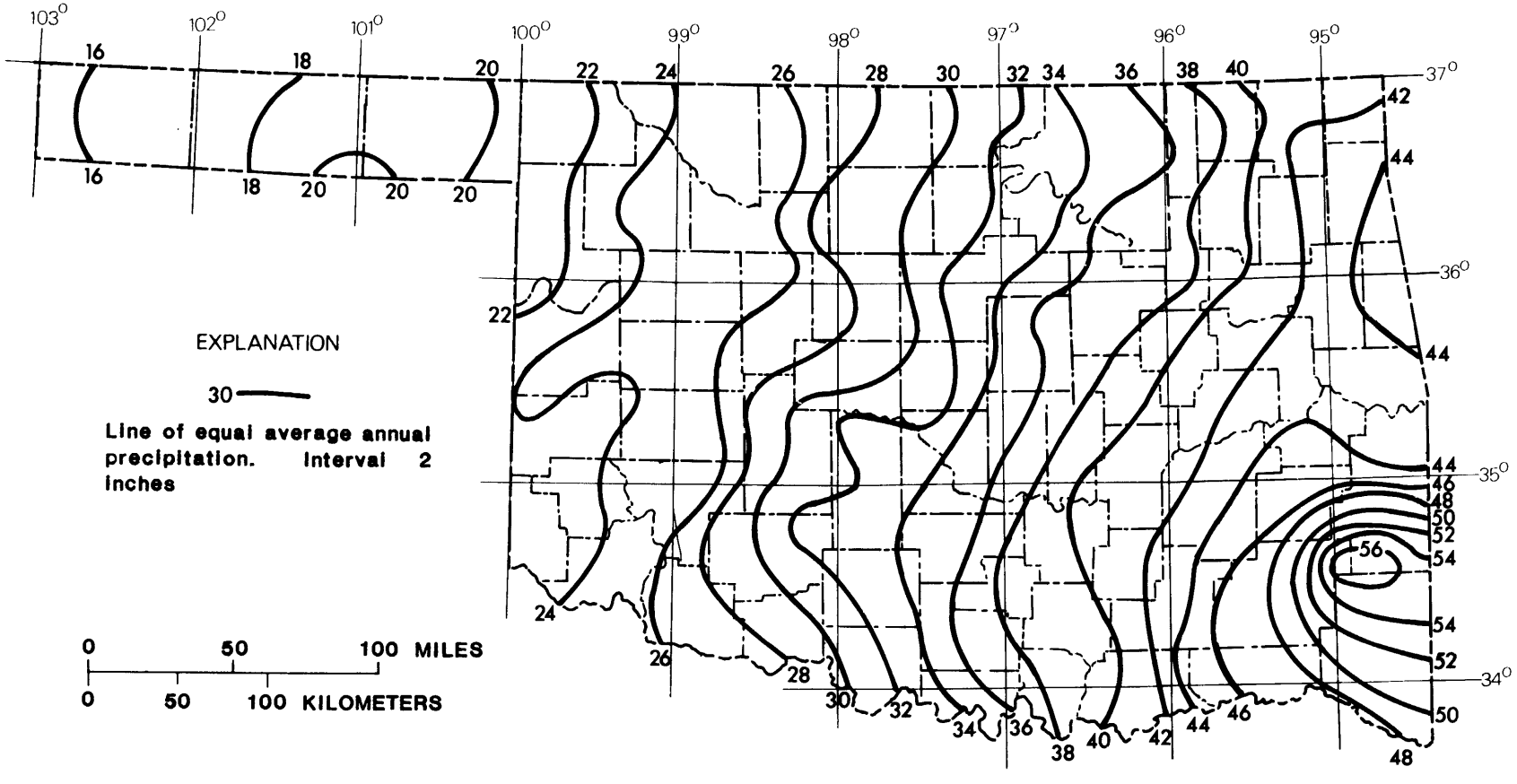

Figure 3.---Average annual precipitation in Oklahoma, for 1931 to 1960 (from Oklahoma Water Resources Board, 1971).

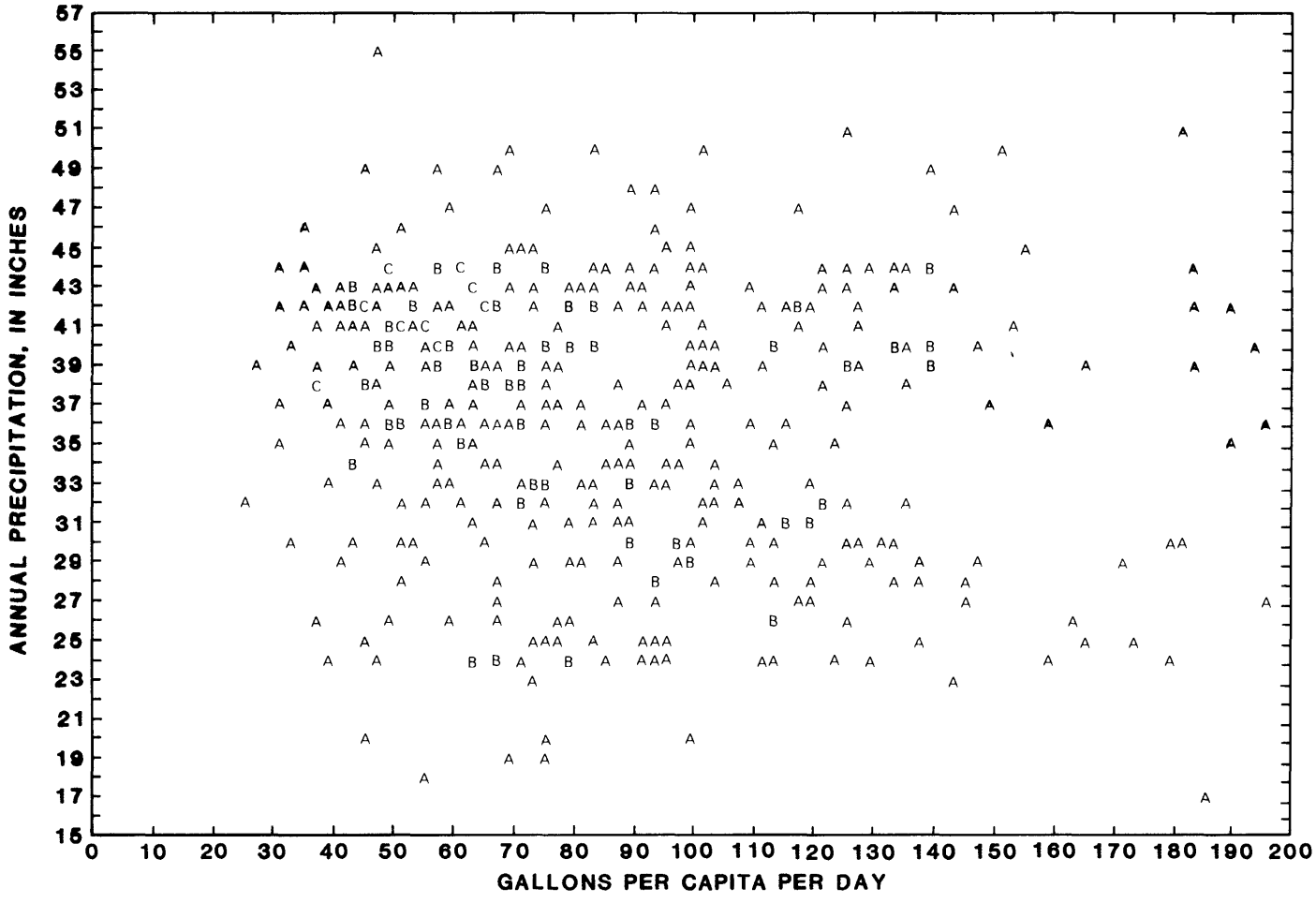

Figure 4.--Plot of average annual precipitation in Oklahoma versus gallons per capita per day. A=1 observation, B=2 observations, C=3 observations.

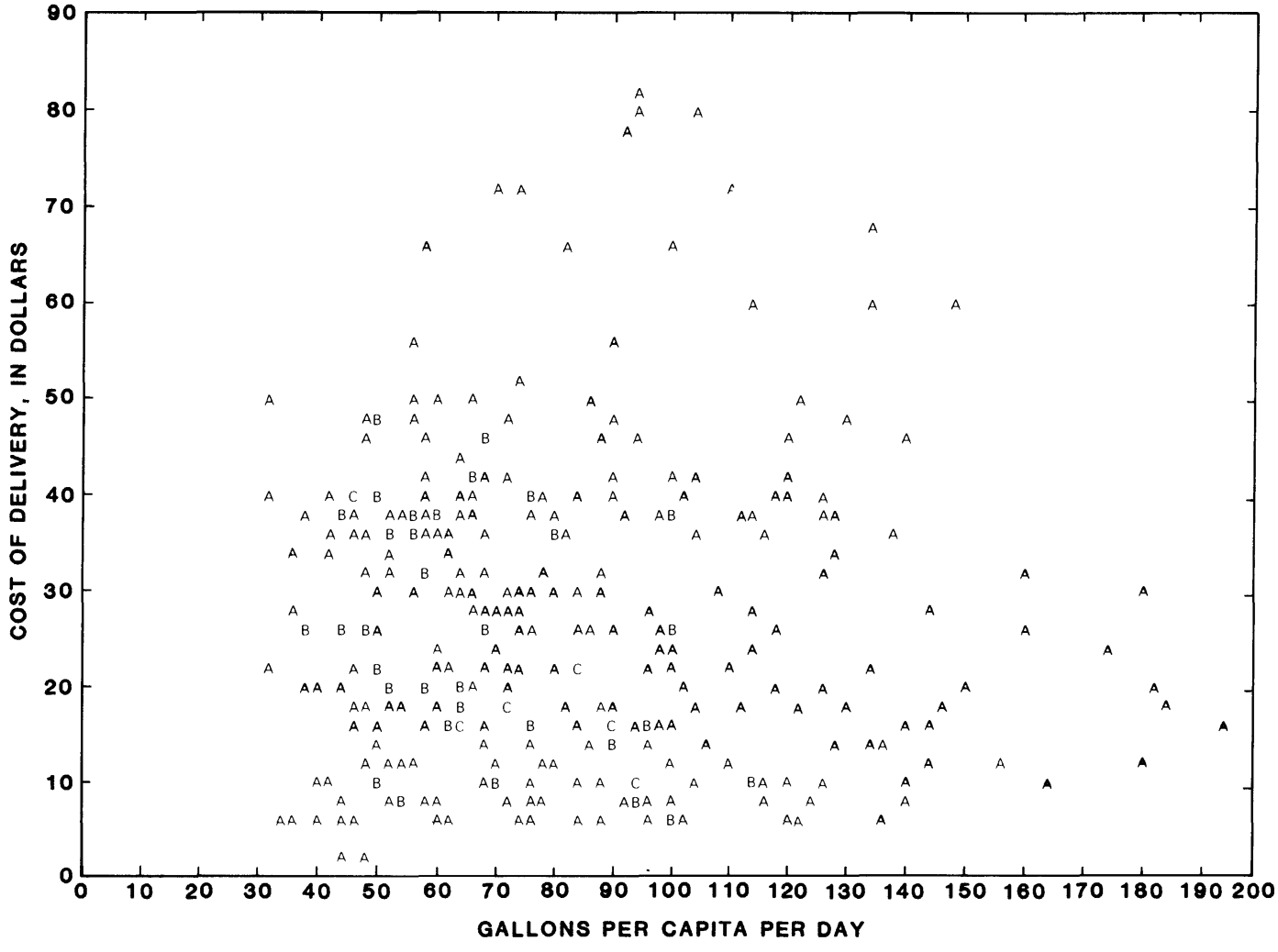

Figure 5.--Plot of cost of delivery versus gallons per capita per day. A=1 observation, B=2 observations, C=3 observations.

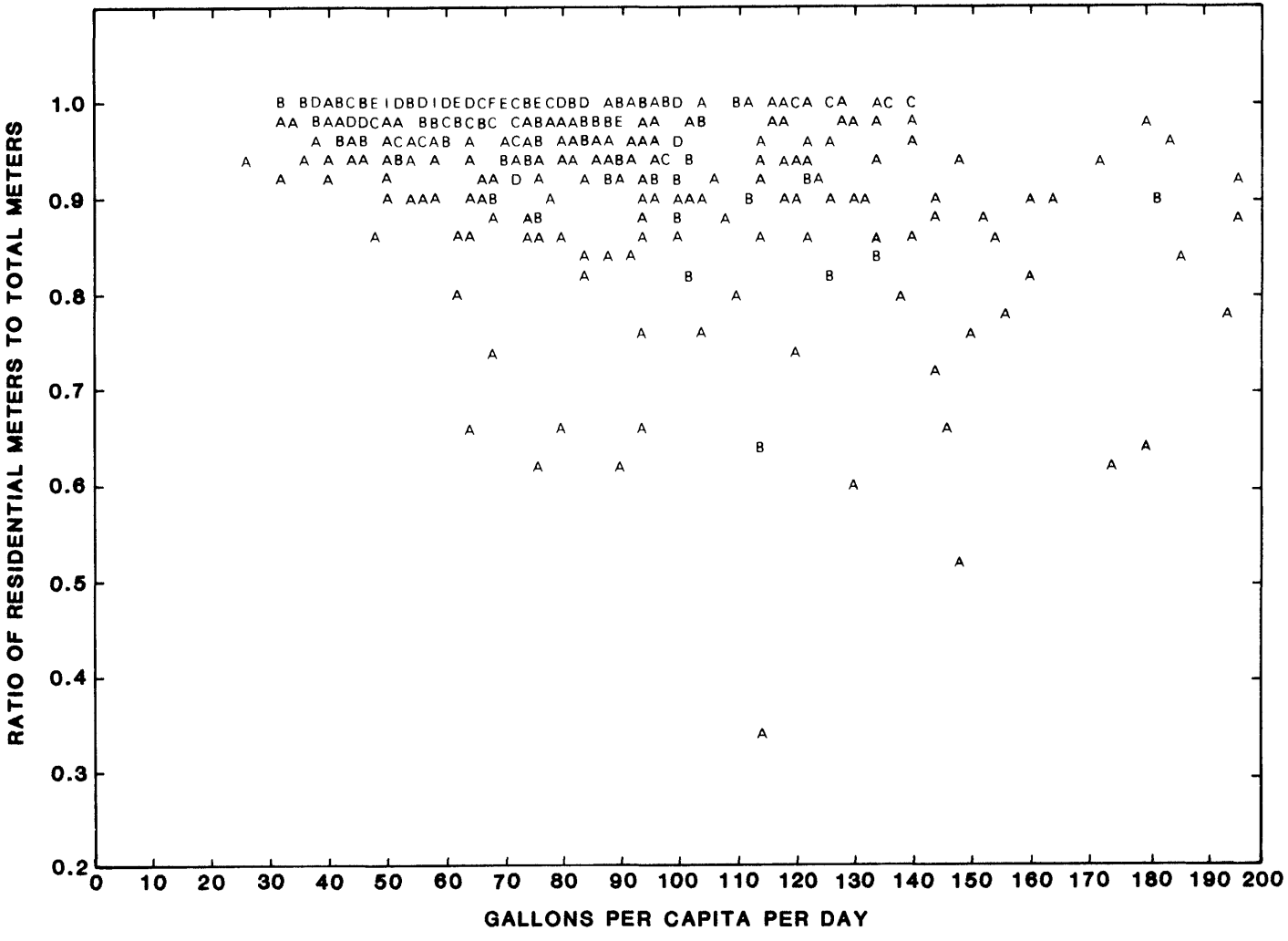

Figure 6.--Plot of ratio of residential meters to total meters versus gallons per capita per day. A=1 observation, B=2 observations, C=3 observations, D=4 observations, E=5 observations, F=6 observations, I=9 observations.

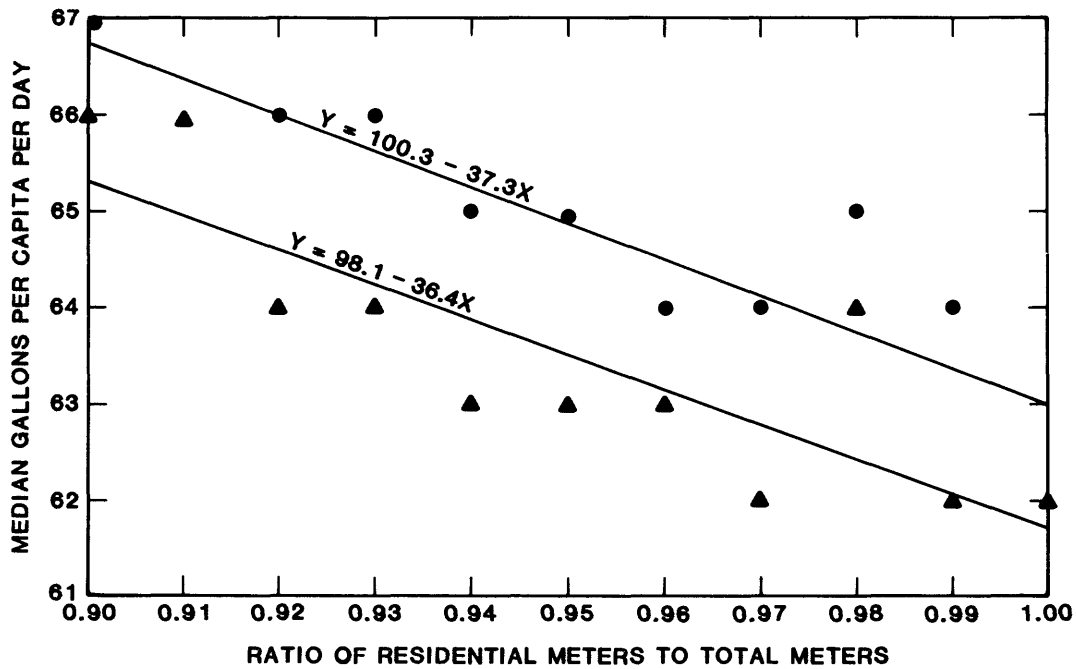

Figure 7.--Plot of median water-use rate versus ratio of residential meters to total meters. Medians are for all GPCD values for which the ratio is equal to or greater than the plotted ratio. Circles are for GPCD values of 200 or less and triangles are for GPCD values of 100 or less.

The available literature indicate that domestic-use greater than 100 GPCD are very unlikely. To account for this, the medians were re-determined after all water-use rates greater than 100 GPCD were deleted and these medians also are plotted in figure 7. The results of regression analysis on these medians were: equation, Median GPCD=98.1-36.4 R(residential) correlation coefficient (r^2), -0.69; and 95-percent confidence limits, $\pm$ 1.6 GPCD. The estimate of the domestic-use rate from this regression was 61.7 $\pm$ 1.6 GPCD.

A U.S. Geological Survey report (Solley, and others, 1983) estimated the rural-domestic water use in Oklahoma during 1980 to be 35 million gallons per day. If this value is divided by the total rural population of 693,546 (table 1) the resulting domestic water use is 50.5 GPCD.

The domestic water-use rates determined in this report are summarized in the following table:

Source	Rate Gallons per capita per day
Babbit and Doland equation (1955)	61
Regression, water-use rates equal to or less than 200 gallons per capita per day	63
Regression, water-use rates equal to or less than 100 gallons per capita per day	62
Water use from Solley and others (1983)	50

The first three rate values in the table are biased on the high side because of the nature of the data used to develop them. Considering the uncertainity of all the data used to determine the rates it is probable that the actual domestic-use rate is within the 50 to 63 GPCD range. The rate selected was the mid-range between the regression developed for water-use rates equal to or less than 100 GPCD, 62 GPCD, and the water-use rate developed from the water use reported by Solley, and others (1983), 50 GPCD, which was 56 GPCD.

SELF-SUPPLIED DOMESTIC USE

The self-supplied domestic population is basically rural. Although a domestic supply may be used for other purposes, the uses considered were food preparation, personal hygiene, lawn watering, clothes washing, cleaning, and irrigation of kitchen gardens. In addition, even though the distribution systems of domestic self-supplied users are relatively small, some leakage probably occurs and must be accounted for. Considering all of the factors, it was believed that the 56 GPCD estimate for the rate of self-supplied domestic water use would be reasonable for all of Oklahoma. Estimates of Oklahoma domestic self-supplied water use by county during 1980 are listed in table 3.

Table 3.--Estimate of Oklahoma domestic self-supplied water use by county, 1980

County	Self-supplied population	Water use (rounded to nearest 10 acre-feet)
Adair	6,916	430
Alfalfa	1,183	70
Atoka	5,439	340
Beaver	3,194	200
Beckham	3,981	250
Blaine	3,847	240
Bryan	6,475	410
Caddo	10,149	640
Canadian	1,924	120
Carter	5,495	350
Cherokee	11,702	740
Choctaw	7,046	440
Cimarron	1,237	80
Cleveland	3,053	190
Coal	2,000	130
Comanche	2,305	140
Cotton	755	50
Craig	3,448	200
Creek	12,067	760
Custer	2,821	180
Delaware	10,218	640
Dewey	1,387	90
Ellis	2,047	130
Garfield	4,026	250
Garvin	3,797	240
Grady	9,169	580
Grant	441	30
Greer	526	30
Harmon	511	30
Harper	922	60
Haskell	2,600	160
Hughes	3,354	210
Jackson	1,430	90
Jefferson	1,396	90
Johnston	1,558	100
Kay	992	60
Kingfisher	3,723	230
Kiowa	416	30
Latimer	1,384	90
Le Flore	1,009	60
Lincoln	10,953	690
Logan	8,463	530

Table 3.--Estimate of Oklahoma domestic self-supplied water use by county, 1980--Continued

County	Self-supplied population	Water use (rounded to nearest 10 acre-feet)
Love	780	50
McClain	6,869	430
McCurtain	11,365	710
McIntosh	2,796	180
Major	2,603	160
Marshall	1,534	100
Mayes	8,726	550
Murray	199	10
Muskogee	8,393	530
Noble	1,904	120
Nowata	2,832	180
Okfuskee	1,558	100
Oklahoma	8,312	520
Okmulgee	2,902	180
Osage	10,098	640
Ottawa	6,001	380
Pawnee	2,982	190
Payne	7,724	480
Pittsburg	1,872	120
Pontotoc	5,388	340
Pottawatomie	11,791	740
Pushmataha	1,448	90
Roger Mills	1,364	80
Rogers	6,892	430
Seminole	5,600	350
Sequoyah	6,061	380
Stephens	9,632	600
Texas	3,915	250
Tillman	762	50
Tulsa	18,727	1,180
Wagoner	7,384	460
Washington	1,527	100
Washita	3,023	190
Woods	1,294	80
Woodward	3,998	250
STATEWIDE	343,615	21,610

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SUMMARY

Water-use information for the self-supplied domestic user generally is not available to water planners and managers. This important category of water-use usually is not included or is only grossly estimated when water-management plans are formulated. Although the individual domestic self-supplied water user does not use much water in comparison to other users, the aggregate self-supplied domestic water use can be significant. In Oklahoma the estimated water use during 1980 for this classification ranged from 10 acre-feet in Murray County to 1,180 acre-feet in Tulsa County. The estimated yearly total for the State was 21,610 acre-feet.

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