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WATER CONSUMPTION TRENDS WITHIN THE CENTRAL AND SOUTHERN FLORIDA FLOOD CONTROL DISTRICT

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Technical Publication: No. 74-3

Water Consumption Trends Within The Central and Southern Florida Flood Control District

by

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ABSTRACT

The use (consumption) of potable water in southeastern Florida is of primary interest to planners, engineers, and the regulatory agency responsible for effective and efficient management of available water resources. This study recognizes the unique climatologic position southeastern Florida occupies, and examines and quantifies the changes and range of per capita use of potable water supplies due in part to this uniqueness. Comparative per capita use of potable water is shown for Florida, the South Atlantic Gulf Region, and the national averages; and is compared with the per capita use in southeastern Florida. These studies indicate that per capita potable water within the Central and Southern Florida Flood Control District has a rather broad range, and centers about a significantly higher per capita use than is found in other parts of the state and the nation.

PURPOSE AND SCOPE

Among the more basic criteria used by engineers in planning for, or designing, a water supply system, is the individual or per capita water consumption. It is always a problem to arrive at a satisfactory value because of the many variables involved. It is especially difficult to establish these per capita values in southeastern Florida because of the unique circumstances that exist. Southeastern Florida is one of the most rapidly growing regions, in terms of population, in this country. The area has a highly seasonal population both in quantity and type. The climate is tropical Savannah, as compared with most of the rest of the United States, which is temperate or arid. These conditions are reflected in water consumption values.

There are a number of factors that ultimately affect the per capita and, therefore, the total "consumptive use" of potable water in southeastern Florida. We consider cost to the consumer, the age of the population, the type of dwelling unit, lawn sprinkling, swimming pool demands, and the transient population as being important in this regard. This study is limited in scope in that it does not attempt to break out all of these parameters, but rather recognizes that the life style (or quality of life) that has evolved dictates the ultimate demands placed on the resource. As against these demands, the water manager must equate use with the long-term sustained viability of the resource sufficiently into the future to flag those times or areas where this viability is, or will be, placed under stress. The basic parameters in this planning and management function are, therefore, the per capita use of water as compared with projected population growth and equated against the sustained yield of the resource. This report will document the per capita use of water within the Central and Southern Florida Flood Control District, and display the range of values statistically. The validity and confidence limits will be outlined.

BACKGROUND

Daily average water consumption values are highly variable throughout the United States and around the world. Daily water consumption can range from three to five gallons per capita for villages in developing countries to around 400 for some western United States cities (1). Rounding out the comparison, it might be interesting to note that design criteria for atomic bomb fallout shelters call for storage in the amount of 0.5 gpcd in equipping such facilities with potable water and necessary life support systems (2). The national average for the United States was 157 gpcd in 1965 (3), whereas for the year 1970, it had increased to 166 gpcd. The U.S. Geological Survey estimate was 187 gallons/day as the per capita consumption for the South Atlantic Gulf Region, and 163 gpcd for the entire State of Florida, for the year 1970 (4). Geographic distribution of per capita water use is not consistent. Use ranges from 350 gpcd for Fresno, California; to 140 gpcd for Sacramento, California, which are under almost identical climatic conditions. Chicago uses 230 gpcd, while neighboring Gary, Indiana uses only 100 gpcd (1).

The graphical results of a compilation of the per capita consumption for the 100 largest cities in the United States is shown in Figure 1. It can be seen from this figure that the data shows a strong central tendency, but a high individual variability. These trends will be compared with similar data for southeastern Florida.

The scope of this study is limited. It is meant to display the gross per capita values and the nature of the distribution within southeastern Florida. To the water management and regulatory agency, the gross per capita consumption is of primary interest as related to its responsibilities in determining present use and future needs as measured against the long-term sustained yields of the

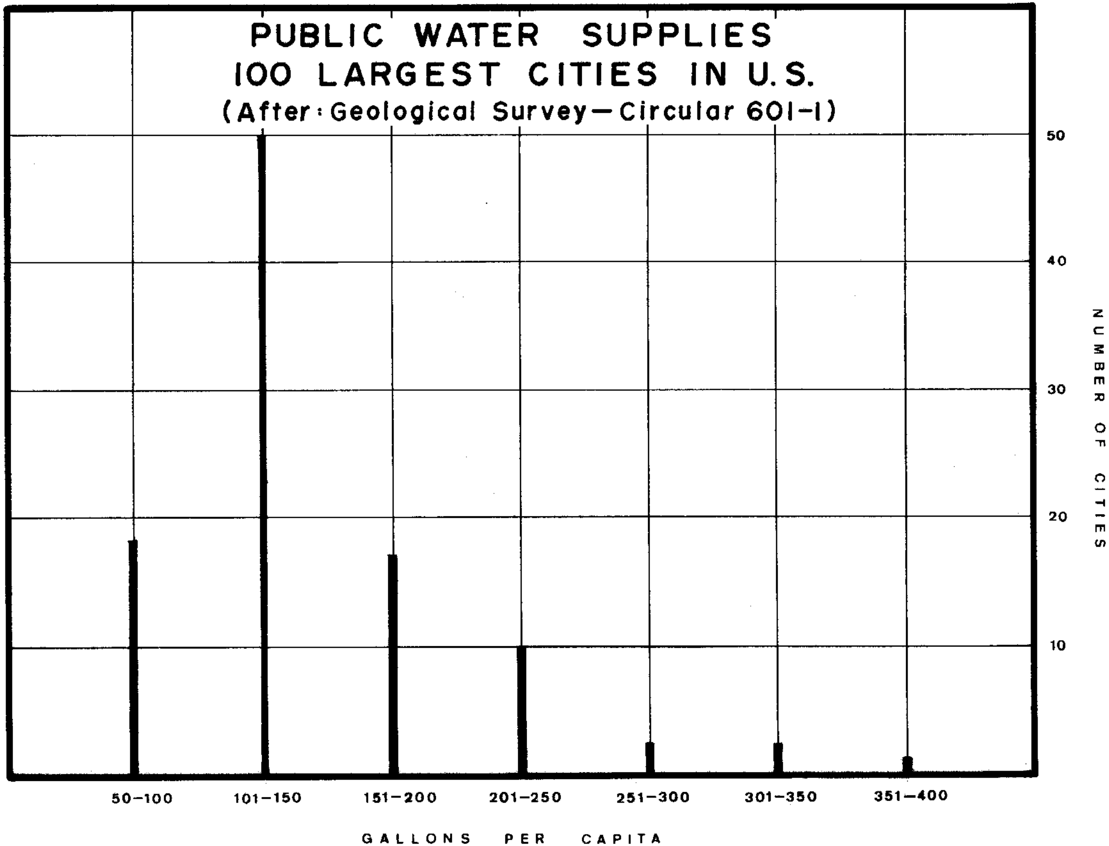

PUBLIC WATER SUPPLIES
100 LARGEST CITIES IN U.S.
(After: Geological Survey—Circular 601-I)
50
40
30
20
10
NUMBER OF CITIES
50–100
101–150
151–200
201–250
251–300
301–350
351–400
GALLONS PER CAPITA

FIGURE 1

resource. It is recognized that there are many factors that enter into the makeup of per capita values. Typical of these is the price structure of the water to the consumer, the average age of the consumer, the type of dwelling unit, and the user's income level. In addition, it is recognized that there are many parameters that reside within the gross per capita values. Examples of these are lawn sprinkling demands and cooling requirements. This class of parameters, although important in the water management function, are considered to be of lesser importance to the water management agency in its initial considerations of balancing use with availability.

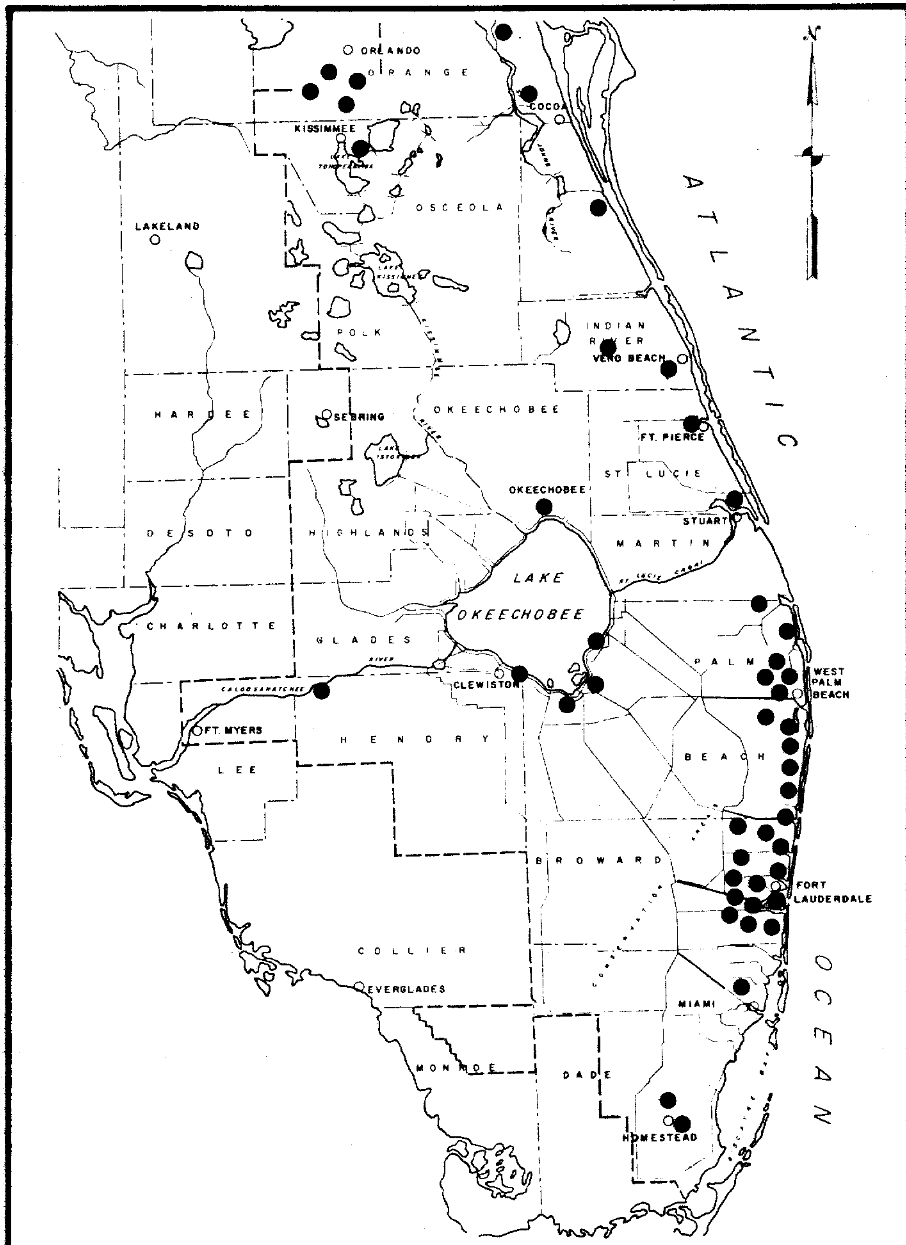
It is considered to be beyond the scope of this study to break these figures out of the gross use values. This report will focus its attention on gross per capita consumption with the rationale that it is these quantities that the supplier must be prepared to deliver on instantaneous demand; and that the regulatory agency's role is to establish that these demands do not endanger the resource either through over draught of the supply source, or degradation due to quality considerations.

HYDROLOGIC AND CLIMATOLOGIC SETTING

The Central and Southern Florida Flood Control District comprises all, or parts of eighteen counties covering some 15,000-square miles of southeastern Florida (Figure 2). Climatologically, the District is considered to be tropical Savannah. It is characterized by a hot, humid rainy season, and a cooler dry season.

Average annual temperatures in the District range from approximately 71 degrees in northern counties to 75 degrees in the southeastern counties (5). Average annual precipitation in the District is seasonally oriented and ranges from approximately 54 inches to 60 inches for the same locations (6). Evapotranspiration is another major parameter that varies within the District. This item of the hydrologic budget consumes from approximately 45 inches in the northern counties to 47 inches in the southeastern counties (7).

Several other unique geologic and hydrologic conditions found within the District are pertinent. A complex system of primary and secondary canals constructed to provide flood and land drainage relief exist that have the effect of creating numerous sub basins. Large volumes of fresh water are discharged seasonally to tidewater through this system. Associated with these conveyances



LOCATION OF 46 SAMPLE SITES

is an inflow - outflow relationship between the canals and the water table aquifers with which they are in hydraulic communication. Topographic relief is extremely low. Approximately 60% of the land mass is less than 40 feet above MSL. Hydraulic gradients of surface and subsurface waters are on the order of one to two feet per mile, and potentiometric surfaces throughout most of the District are less than 20 feet above MSL. In areas of heaviest draft; that is, along the coast, these values are generally less than 10 feet MSL. One of the most prolific water table aquifers in the world underlies all or parts of Dade, Broward, and Palm Beach Counties, where transmissivities exceeding 10 MGD/ft^2 have been measured. All of the above make a complex set of factors requiring careful study.

PRESENTATION OF DATA

The water consumption data was compiled from forty-six (46) municipal and private water suppliers within the Central and Southern Florida Flood Control District. The area covered by the District is shown in Figure 2. These data were gathered in connection with an inventory of municipal and private water suppliers in late 1973. The reflected water consumption in south Florida communities ranges in size from the metropolitan Miami - Dade system of 830,000 serviced population to the Castle Villa Mobile Home Park of 130. The service areas range from entirely resort or vacation places to small farming communities to urban areas. The complete basic data is given in Table 1. These data consist of the water supplier's name, county, population served, daily pumpage, and per capita usage.

Similar data is available for the entire State of Florida. This set of data was compiled by the U.S. Geological Survey (8), and is given for purposes of comparison in Table 2. All data presented reflects use during the calendar year 1972.

METHODOLOGY

The data was analyzed by making a basic statistical analysis. The first step was construction of histograms to graphically observe the nature of the consumption data distributions. Next, the basic statistical parameters of mean and standard deviation were computed. The cumulative distribution curves were computed and plotted on rectangular and probability coordinates. The cumulative gausian distribution was fitted for the computed parameters, and the confidence limits of 90 percent were computed for the gausian distribution (9).

Single and multiple linear regression computations were also made. A definition of regression is given by Yevdjevich (9) as follows:

> Single and multiple regression problems consider the "frequency distribution of one variable when another is held fixed at each of several levels. A correlation problem considers the joint variation of two measurements, neither of which is restricted by the experimenter or observer".

The dependent variable in this analysis was taken as the per capita consumption of water. The independent variables for a water consumption relationship were taken as the total community population, the location within the District, the location of the community relative to the seacoast, and the type of water supply. By type of water supply is meant whether the community's water supply comes from deep wells, shallow wells, lakes, rivers, or canals.

Computations of multiple regression and correlation coefficients were made; the results of these computations were not significant when judged on the basis of correlation coefficients. That is, the correlation coefficients were quite low ($\ll 0.5$) for the above mentioned variables.

This low correlation should not discourage further analytical work to develop per capita water consumption relationships based on sociological, physiological, climatological, and economic factors. This aspect of consumption is reviewed in some greater detail herein in a subsequent section. The ultimate goal of a study such as this is to provide some predictive capability for water consumption in a given area for planning purposes. Studies in other areas have been successful in establishing such quantitative relationships by statistical methods (10, 11).

These latter individual data substantiate the results stated above in the discussion of the regression analysis. That is, in simple terms, the relation between community per capita water consumption and total community population is not a straight line, and is obscured or overpowered by other variables not yet defined. Thus, it is concluded that the few data that show some correlation are purely random and accidental.

DISCUSSION

The histograms for the water consumption within the District are shown in Figures 3 and 4 which respectively show the number of suppliers versus consumption and the percentage distribution versus consumption. It can be seen that these data show a strong central tendency of about 200 gpcd with a skew to the left, or lower values, and a long tail to the right, or higher values. The individual values ranged from 75 gpcd for the Taft Water Association to 406 gpcd for Hillsboro Beach. The Taft Water Association is in the Orlando metropolitan area (population served, 680) and Hillsboro Beach is in northern Broward County (population served, 1,700).

The computed distribution curve is shown as Figure 5. The statistical parameters were computed. The mean and standard deviation were respectively 197 and 87 gpcd on a sample of 46 water suppliers.

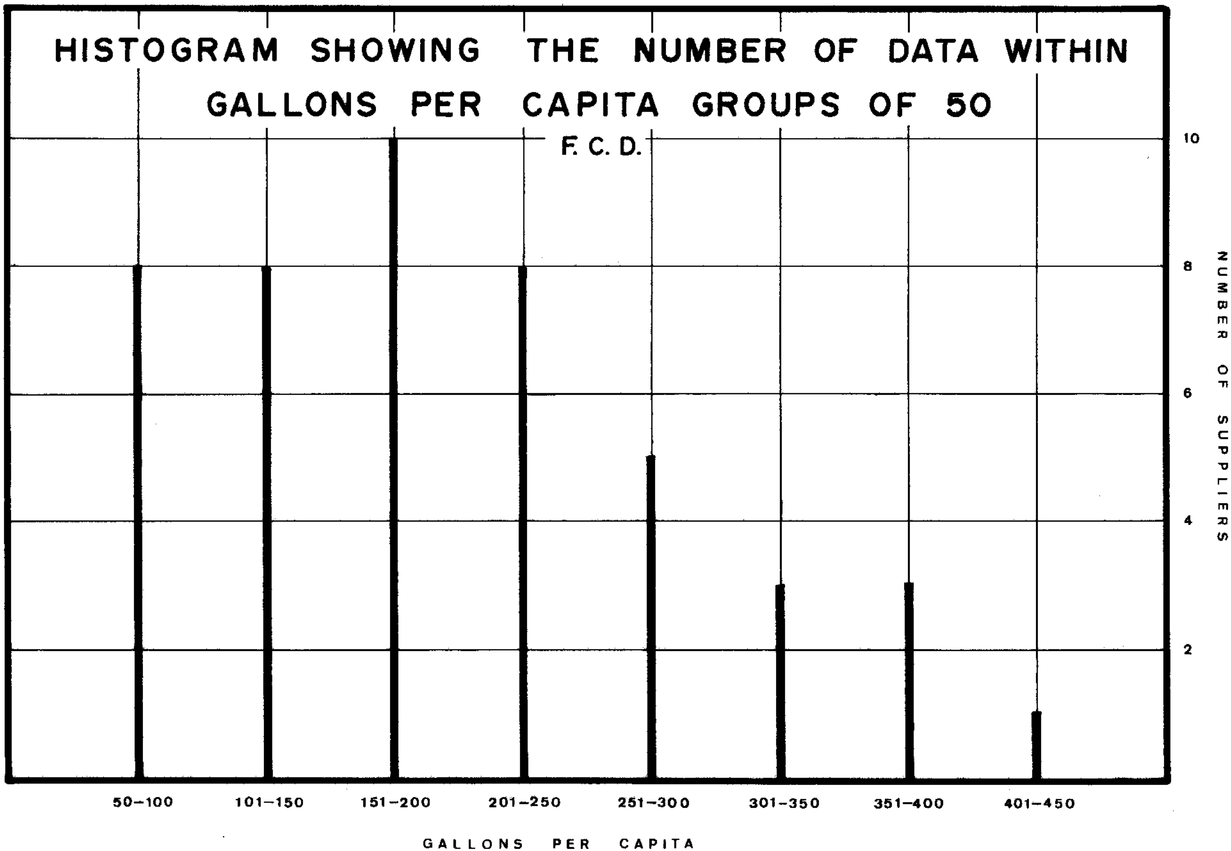
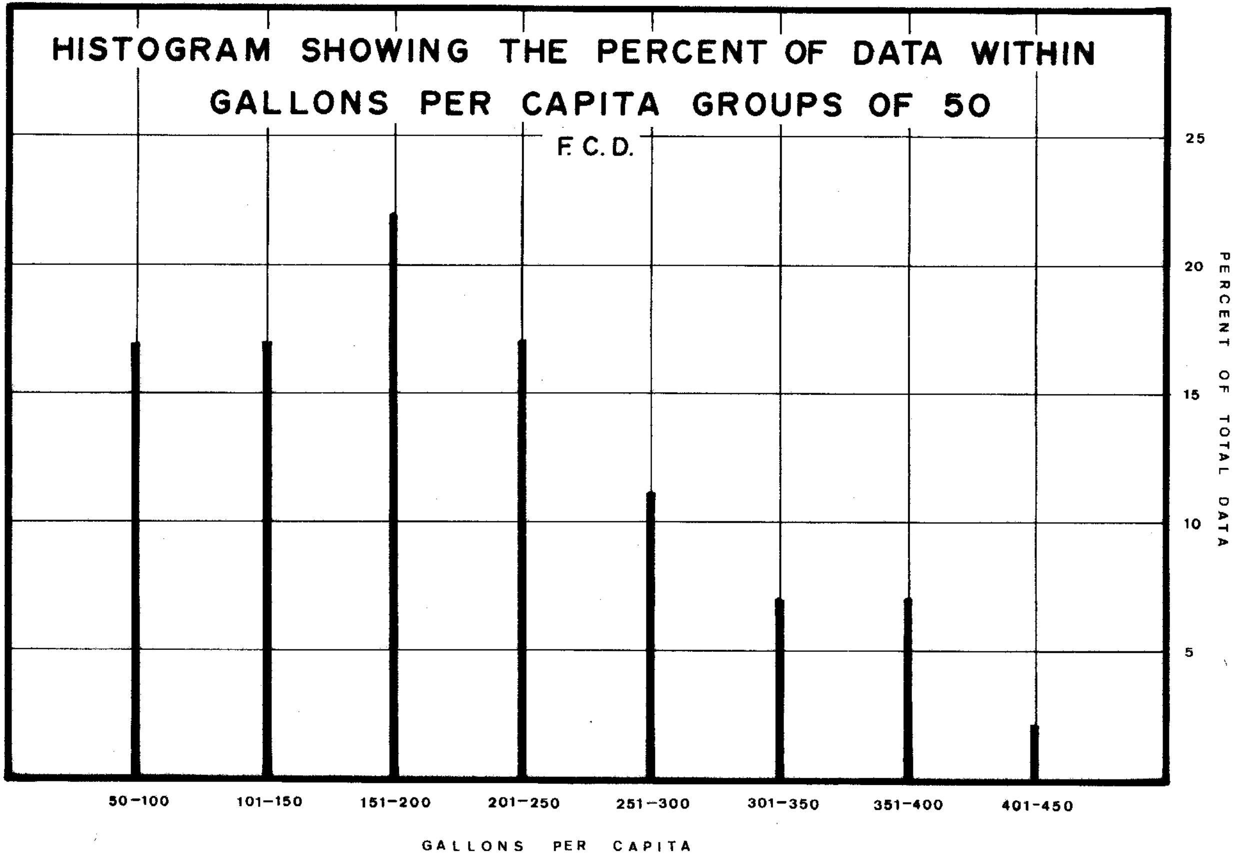
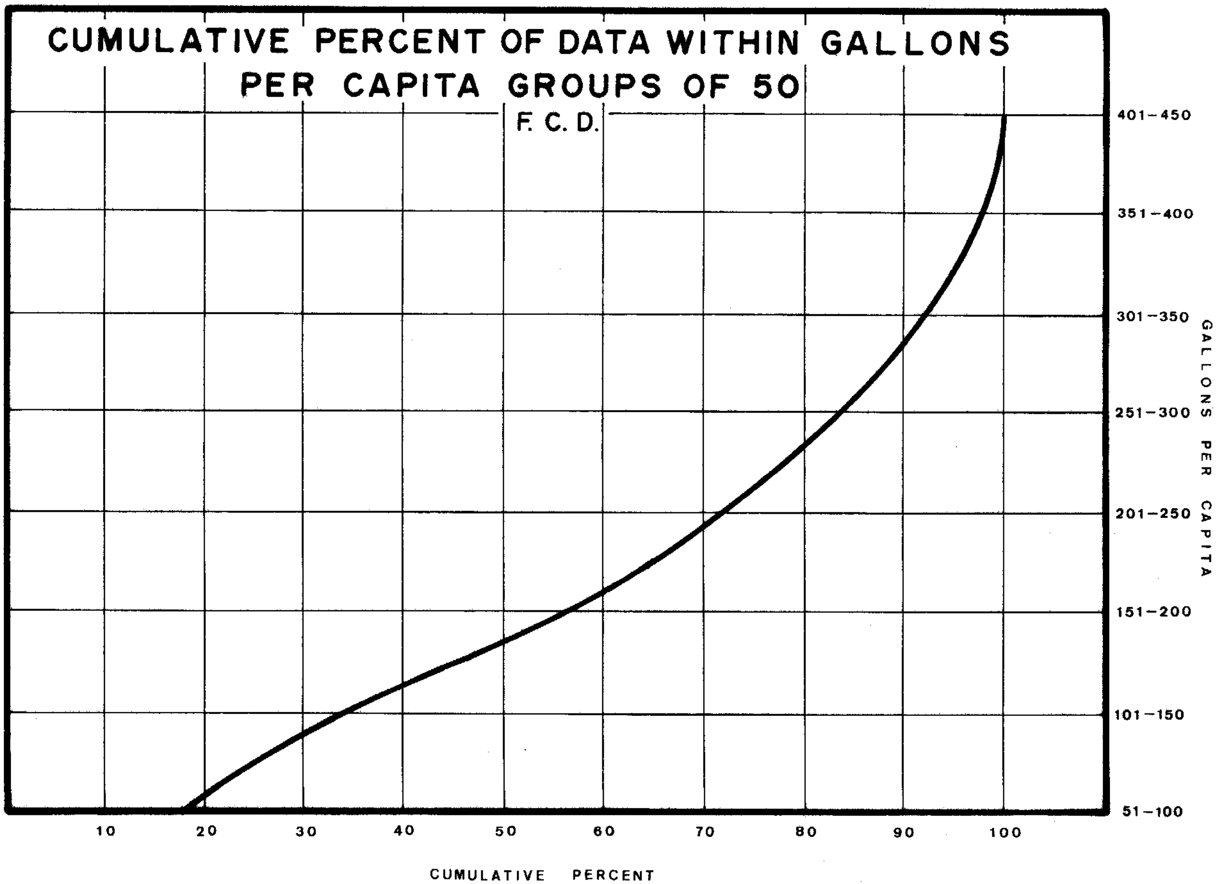

HISTOGRAM SHOWING THE NUMBER OF DATA WITHIN
GALLONS PER CAPITA GROUPS OF 50
F. C. D.
10
8
6
4
2
NUMBER OF SUPPLIERS
50–100
101–150
151–200
201–250
251–300
301–350
351–400
401–450
GALLONS PER CAPITA

FIGURE 3



HISTOGRAM SHOWING THE PERCENT OF DATA WITHIN GALLONS PER CAPITA GROUPS OF 50

FIGURE 4



CUMULATIVE PERCENT OF DATA WITHIN GALLONS
PER CAPITA GROUPS OF 50
F. C. D.
401–450
351–400
301–350
251–300
201–250
151–200
101–150
51–100
GALLONS PER CAPITA
10
20
30
40
50
60
70
80
90
100
CUMULATIVE PERCENT

FIGURE 5

The computed distribution points were then replotted on probability paper, and the gausian curve was fitted to them for the parameters in the standard manner (9). This fitted distribution was computed by the method of moments, and is shown in Figure 6. The fitted distribution line closely approximates the data points with the exception of the highest point. It should be noted that this last point represents only one piece of data in addition to the others.

The accuracy of the fitted distribution line was established by placing confidence curves of the confidence region on Figure 6. The 90 percent confidence curves were computed by a standard technique (9). The simplest interpretation of the confidence curves is that for a given accumulated percentage of the distribution, the probability is 0.90 that the gpcd consumption lies within the confidence curves.

The data compiled by the U.S. Geological Survey (8) was analyzed in a similar manner. The histograms for water consumption within the State of Florida are shown in Figures 7 and 8. The data shows the mode of the distribution around 150 gpcd with a skew upward, and to the right. The individual values range from 38 gpcd for Crawfordsville in the far western panhandle, to 400 gpcd for Cutler Ridge in suburban Miami. The histograms for both the District and the U.S. Geological Survey data are shown superimposed on Figure 9 for comparison purposes. By inspection, it is seen that the primary difference lies in the per capita consumption. The U.S. Geological Survey distribution is centered at the 100-150 gpcd range, whereas the District distribution centers about the 150-200 gpcd range. It should also be noted that the distribution of the two samples shows the same degree of skewness. A third observation is worthy of note. In the area of the upper per capita limits, several of the per capita groups are not represented in the U.S. Geological Survey sample. The reason for this lack of representation is not obvious.

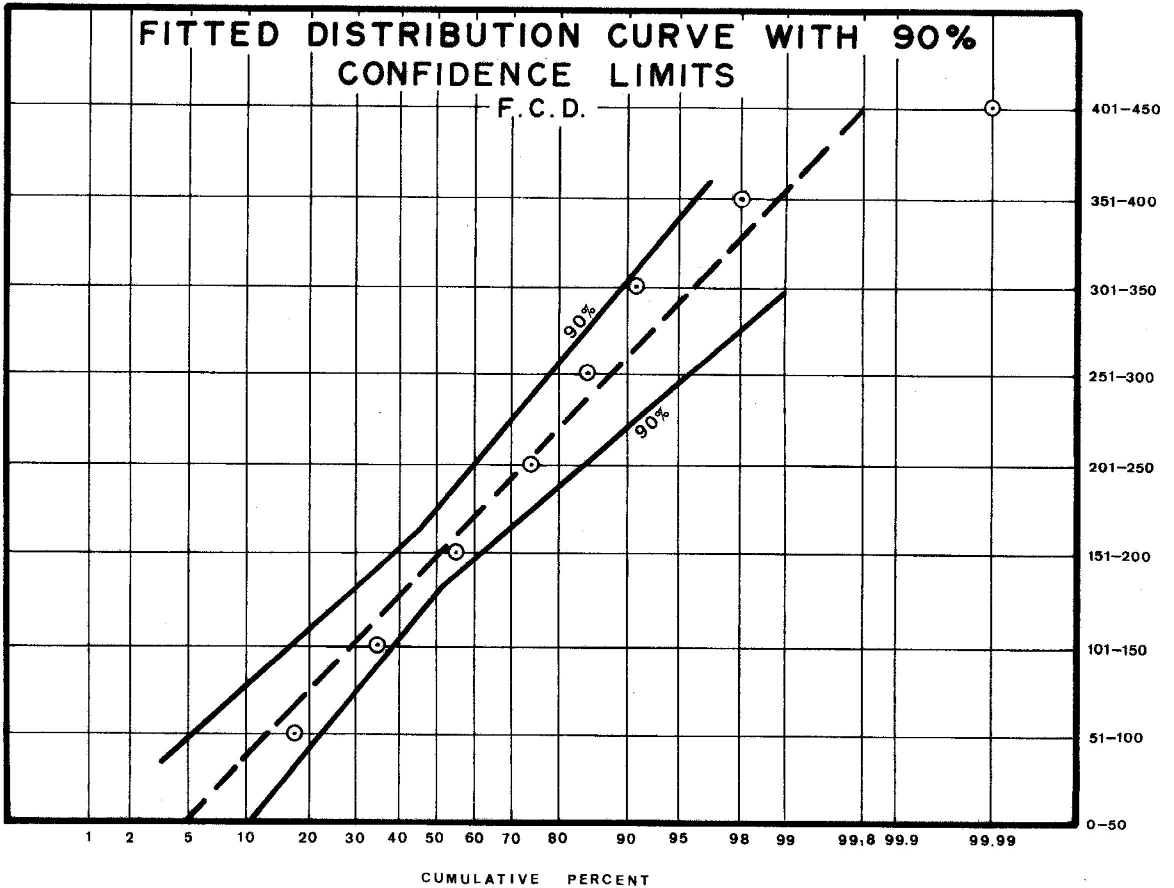

FITTED DISTRIBUTION CURVE WITH 90%
CONFIDENCE LIMITS
F.C.D.
90%
90%
401–450
351–400
301–350
251–300
201–250
151–200
101–150
51–100
0–50
GALLONS PER CAPITA
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
CUMULATIVE PERCENT

FIGURE 6

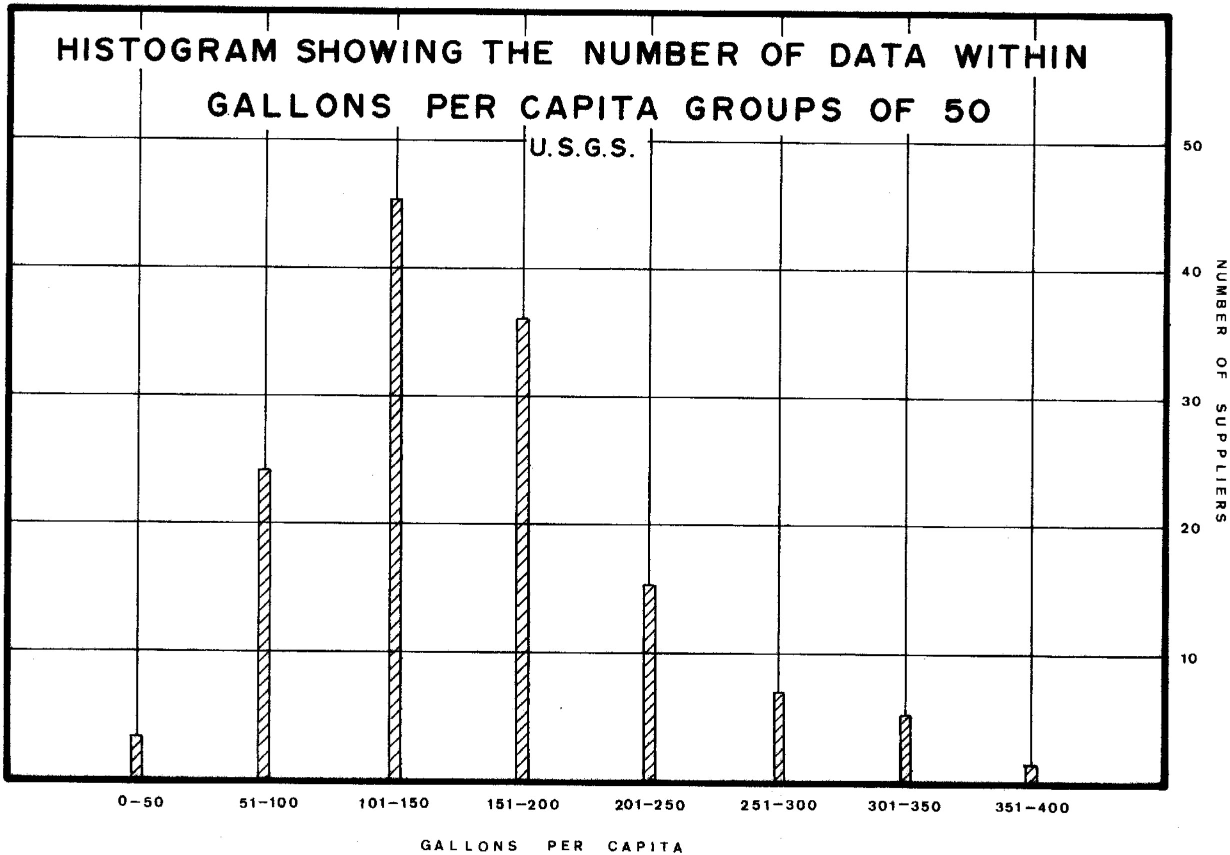

HISTOGRAM SHOWING THE NUMBER OF DATA WITHIN
GALLONS PER CAPITA GROUPS OF 50
U.S.G.S.
50
40
30
20
10
NUMBER OF SUPPLIERS
0–50
51–100
101–150
151–200
201–250
251–300
301–350
351–400
GALLONS PER CAPITA

FIGURE 7

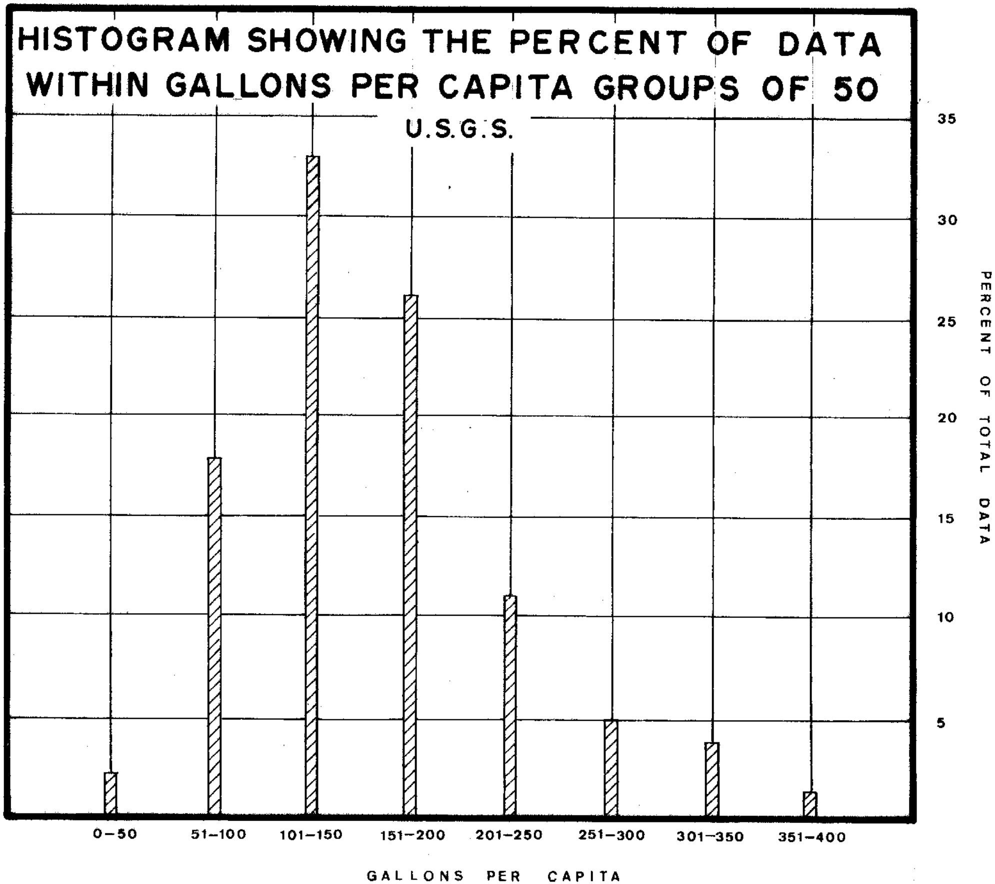

HISTOGRAM SHOWING THE PERCENT OF DATA
WITHIN GALLONS PER CAPITA GROUPS OF 50
U.S.G.S.
35
30
25
20
15
10
5
PERCENT OF TOTAL DATA
0–50
51–100
101–150
151–200
201–250
251–300
301–350
351–400
GALLONS PER CAPITA

FIGURE 8

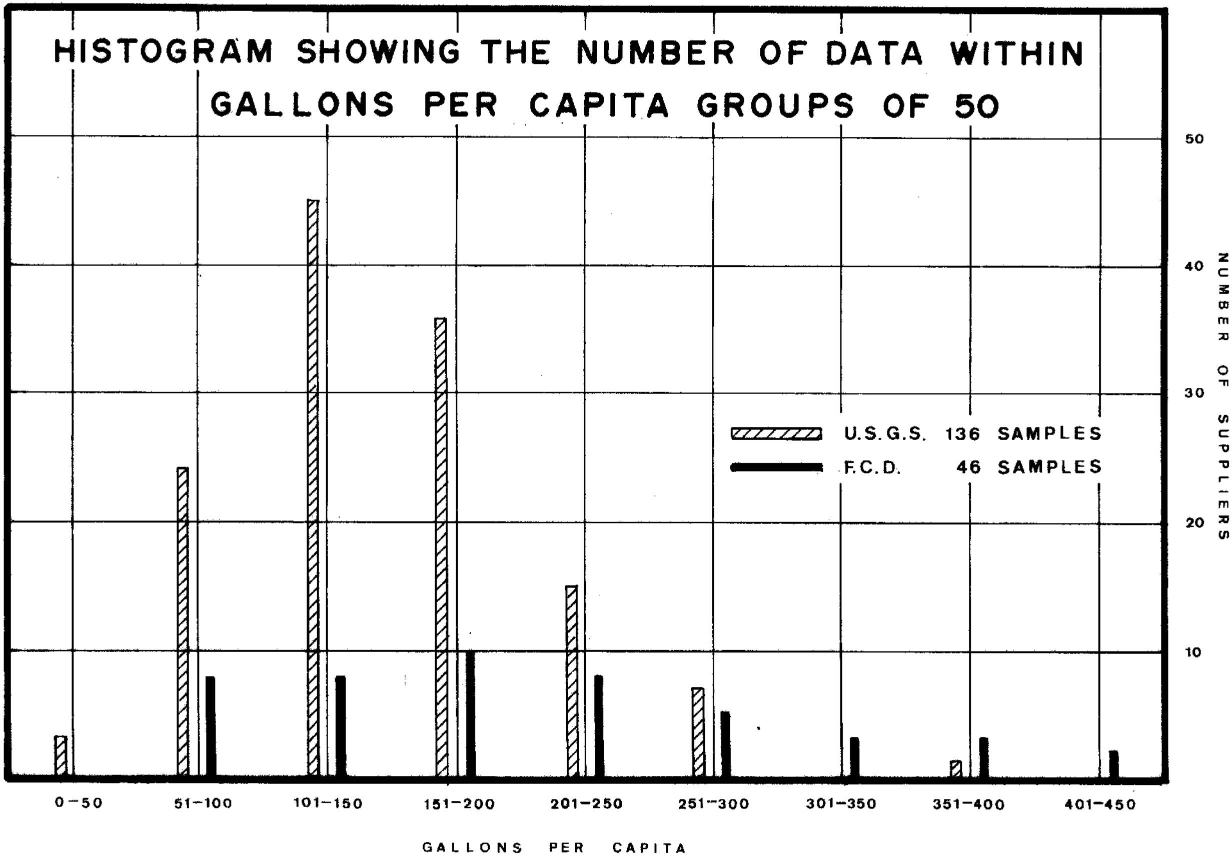

HISTOGRAM SHOWING THE NUMBER OF DATA WITHIN
GALLONS PER CAPITA GROUPS OF 50
U.S.G.S. 136 SAMPLES
F.C.D. 46 SAMPLES
50
40
30
20
10
NUMBER OF SUPPLIERS
0-50
51-100
101-150
151-200
201-250
251-300
301-350
351-400
401-450
GALLONS PER CAPITA

FIGURE 9

The computed distribution curve from the U.S. Geological Survey data is shown in Figure 10. The mean was computed as 157 gpcd and the standard deviation as 67 gpcd for a sample size of 136. The fitted gausian curve with the confidence curves for 90 percent is shown on Figure 11. The confidence curves are closer together on the U.S. Geological Survey data because of the larger sample size.

VALIDATION

During the course of this study, a careful attempt was made to present the most statistically accurate sample possible. The results of this analysis are shown in Figure 12. It is based essentially on an inventory of all public water suppliers in the District made in late 1973. The data is presented in columnar and summary form. Percentile and numerical comparisons of the complete public water supply inventory conducted by the District is shown, and then compared with similar data taken from the 46 samples used in this study. These figures are further broken down by counties for closer inspection.

Population in the service area was made available by the suppliers. In several cases they were calculated by multiplying number of services by the average number of persons per service in each municipality. These latter figures were also provided by the suppliers. All of the above were broken down by counties and calculated as a percentile comparison against the sample used in the study, and then summed as a "bottom line total". It can be seen that close correlations on a county-by-county basis exist between the sample used and the total inventory. Additional confidence is derived by comparing the summed percentile values of total population served with the total population of the District.

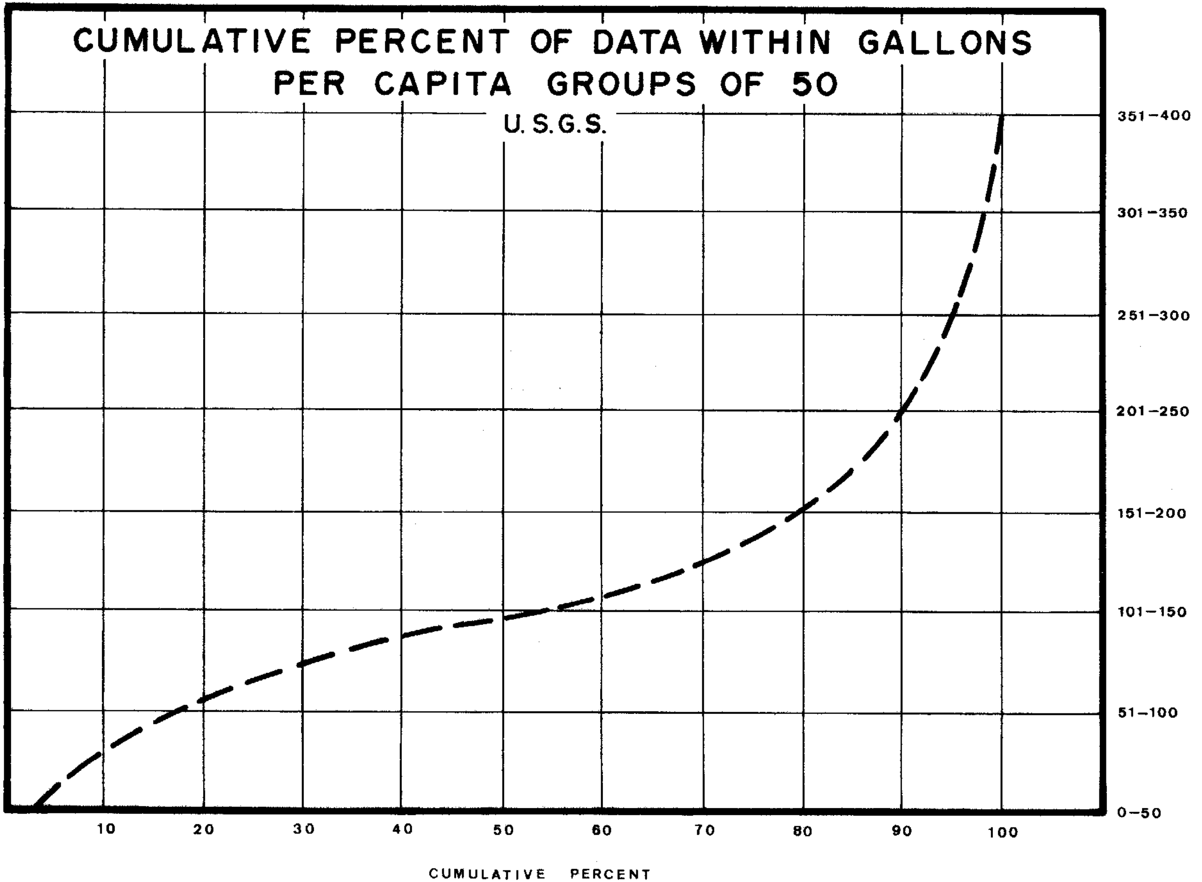

CUMULATIVE PERCENT OF DATA WITHIN GALLONS
PER CAPITA GROUPS OF 50
U.S.G.S.
351–400
301–350
251–300
201–250
151–200
101–150
51–100
0–50
GALLONS PER CAPITA
10
20
30
40
50
60
70
80
90
100
CUMULATIVE PERCENT

FIGURE 10

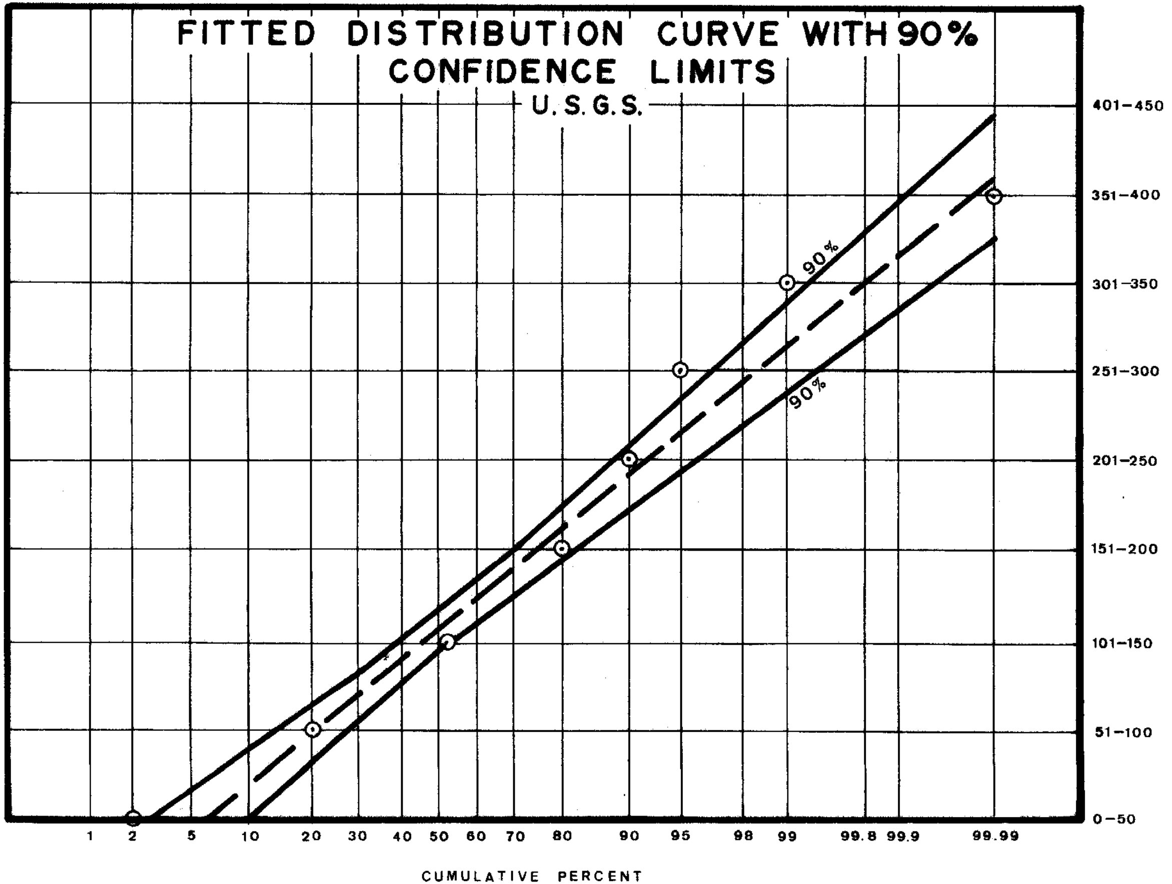

FITTED DISTRIBUTION CURVE WITH 90%
CONFIDENCE LIMITS
U.S.G.S.
90%
90%
401–450
351–400
301–350
251–300
201–250
151–200
101–150
51–100
0–50
GALLONS PER CAPITA
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
CUMULATIVE PERCENT

FIGURE 11

FIGURE 12. REPRESENTATION OF THE 46 SAMPLES TO THE C.S.F.F.C.D., 1972

COUNTIES IN (2) FCD	POPULATION (1)	% OF POPULATION	POPULATION 46 SAMPLES	% TOTAL SAMPLE BY COUNTY	POP. IN SAMPLE VS. CTY.	# OF SUPPLIERS EACH CTY. OF SAMPLES	% OF SAMPLE	# WATER SUPPLIERS FCD INVENT.	% OF INVENTORY
Brevard	240,481	7	191,781	9	6	3	7	77	4
Broward	722,659	22	476,986	24	15	13	28	704	33
Dade	1,342,475	41	853,020	42	26	3	7	113	5
Glades	3,850	.1	0	0	0	0	0	13	.6
Hendry	13,538	.5	9,150	.5	.3	2	4	22	1
Highlands(3)	21,264	1	0	0	0	0	0	27	1
Indian River	39,108	1	14,549	.7	.4	2	4	53	2
Lee (3)	30,851	1	0	0	0	0	0	3	.1
Martin	32,375	1	10,500	.5	.3	1	2	61	3
Okeechobee	13,106	.4	3,896	.2	.1	1	2	12	.1
Orange (3)	343,063	10	189,919	9	6	4	9	228	11
Osceola	31,399	1	5,652	.3	.2	1	2	97	5
Palm Beach	390,364	12	245,942	12	8	15	33	691	32
St. Lucie	54,488	2	31,565	2	1	1	2	48	2
Totals	3,279,021	100%	2,032,960	100%	63%	46	100%	2,149	100%

(1) Taken from "Florida Estimates of Population-July 1, 1972" University of Florida - 1970 Census and Pop. Change
(2) Monroe, Polk, Seminole and Volusia Counties are partially within the F.C.D., and have statistically insignificant populations residing therein and, therefore, were omitted.
(3) Highlands, Lee, and Orange Counties are partially within the F.C.D., but have statistically significant populations residing therein, and consequently, the populations were retained.

PROPOSED ADDITIONAL STUDIES

Several previous studies have derived empirical methods to account for the variability in per capita consumption. These studies have produced a set of demand prediction equations that provide greater insight into factors affecting residential water demands. Some of the parameters are climate, economic level, price of water, and cost of housing.

A study conducted by C.W. Howe and F.P. Linaweaver at John Hopkins University (10) derived a demand prediction equation based on price of water per 1000 gallons and the cost of housing as follows:

Q_a, d = 206 + 3.47 V - 1.30P_w

where Qa, d = average annual demand per dwelling unit per day, and

P_w = price of water per 1000 gallons, and

V = market value of houses in the area.

The study was carried out from 1961 to June 1966, and was based on actual residential use in 10 study areas in the West, and 11 study areas in the East.

Burke (11), in his study, developed a log linear type model which attempts to accommodate the several impacts on water requirements generated by demographic, social, economic, and environmental factors that characterize a particular community. The model was derived from data published by the U.S. Department of Commerce - Census Bureau, and the U.S. Public Health Service (13). Eighteen cities in Florida with populations exceeding 25,000 were used in the development of the water demand model.

Both studies briefly described above confirm the impact of the several parameters on per capita consumption. The authors confirm the probability of the existence of such correlations. It must, however, be recognized that the John Hopkins study was conducted in the Eastern and Western United States where life style, age group distribution, and climate are significantly different than southeastern Florida. Use of this demand prediction equation for the Flood Control District area without some modification might not be justified.

Burke's model is based on use data from eighteen large cities in Florida. Although it is more congruous climatologically than the John Hopkins study, the model bases its viability on large city populations. Since a significant number of "water communities" in the District area do not fit that criteria, the transfer value of that model requires verification.

This brief evaluation suggests that the several parameters previously described could probably be used in developing a water demand model to yield per capita consumption values that would be valid and unique to the southeastern Florida area.

CONCLUSIONS

1. Single and multiple regression statistical techniques show no correlation between per capita consumption and community population location within the Central and Southern Florida Flood Control District, proximity to the sea-coast, and the source of the water supply.
2. An "a priori" recognition of the varied life style of family units residing within the District area, the varied types of dwellings, and the extreme range in age groups is scknowledged, and appear to be among the principal reasons for the broad range in per capita values.
3. This report suggests that additional study be made to confirm published data wherein empirical methods were derived to display per capita consumption as related to cost of water to the consumer, family income, and cost of housing, and other related factors that would be unique to southeastern Florida.
4. A median value of 196 gpcd was established. This is significantly higher than the daily average water value of 120 gpcd that has been suggested as the standard design criteria of water treatment and distribution systems (14). This conclusion is based on an analysis of the data gathered by the Central and Southern Florida Flood Control District for this study, and additional data gathered by the U.S. Geological Survey. The distribution of gpcd consumption for southeast Florida is different than for the United States as a whole. This can be seen by comparing Figures 1 and 3. The distribution is also significantly different than the one for the State of Florida as a whole, and can be seen on Figure 9.

5. The cause of the differences in per capita water consumption in the southeast Florida area are varied. Among the more significant causes is undoubtedly the climate, which is tropical Savannah. This type of climate is characterized by a humid, wet, or rainy season, and a cooler, dry season. The water demand is high for cooling and sanitation purposes during the rainy season, and high for lawn sprinkling during the dry season. The overall makeup of the communities in southeast Florida is reflected in the water consumption data. The majority of the communities are on the seacoast, and have a great influx of tourists from the North during the winter season. This causes the gpcd value to rise for the community. These same communities have a high average per capita water consumption value. Thus, although not definitively proven, the study seems to suggest that climatological amenities could account for the increased consumption observed.

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TABLE 1. PER CAPITA CONSUMPTION VALUES - FCD STUDY

WATER SUPPLIERS	COUNTY	POPULATION OF AREA SERVED	DAILY PUMPAGE (GALLONS)	PER CAPITA USE (GALLONS)
Cocoa	Brevard	81,547	14,895,890	183
Melbourne	Brevard	78,026	7,498,458	96
Titusville	Brevard	32,208	3,380,000	105
Coral Springs	Broward	6,715	557,737	83
Dania	Broward	10,200	1,699,000	167
Deerfield Beach	Broward	18,608	4,664,000	251
Ft. Lauderdale	Broward	149,368	37,000,000	248
Hallandale	Broward	30,851	4,198,901	136
Hillsboro Beach	Broward	1,699	689,214	406
Hollywood	Broward	116,374	16,000,000	137
Lauderhill	Broward	13,502	2,500,000	185
Margate	Broward	13,233	2,301,833	174
Miramar	Broward	26,900	2,246,592	84
Plantation	Broward	28,411	3,343,000	118
Pompano Beach	Broward	47,669	13,280,000	279
Sunrise	Broward	13,456	1,400,000	104
Florida City	Dade	5,524	773,000	140
Homestead	Dade	17,496	3,744,000	214
Miami Water & Sewer	Dade	830,000	171,602,192	207
Clewiston	Hendry	6,934	2,000,000	288
LaBelle	Hendry	2,216	208,333	94
*Fellsmere	Indian River	893	133,950	150
Vero Beach	Indian River	13,656	3,097,973	227
Stuart	Martin	10,500	1,937,907	185
Okeechobee	Okeechobee	3,896	657,534	169
Apoka	Orange	4,109	385,114	94
Castle Villa S/D	Orange	130	46,000	354
Orlando Util. Comm.	Orange	185,000	36,971,595	200
Taft Water Assoc.	Orange	680	51,000	75
St. Cloud	Osceola	5,652	1,266,667	224
Atlantis	Palm Beach	11,600	436,650	273
Belle Glade	Palm Beach	17,105	3,000,000	175
Boca Raton	Palm Beach	37,593	11,600,000	309
Boynton Beach	Palm Beach	24,091	5,000,000	208
Delray Beach	Palm Beach	29,000	9,250,000	319
Highland Beach	Palm Beach	1,358	500,000	368
Juno Beach	Palm Beach	800	250,000	313
Lake Worth	Palm Beach	25,179	4,500,000	179
Mangonia Park	Palm Beach	862	75,000	87
Pahokee	Palm Beach	10,000	800,000	80
Palm Springs	Palm Beach	5,500	1,270,605	231
Riviera Beach	Palm Beach	28,000	4,400,000	157
Royal Palm Beach	Palm Beach	2,500	600,000	240

*Private wells - gpc and daily pumpage estimated.

WATER SUPPLIERS	COUNTY	POPULATION OF AREA SERVED	DAILY PUMPAGE (GALLONS)	PER CAPITA USE (GALLONS)
South Bay	Palm Beach	3,050	1,080,000	354
West Palm Beach	Palm Beach	59,304	16,000,000	270
Ft. Pierce	St. Lucie	31,565	3,981,323	126
TOTALS		2,047,360	401,273,468	196 - Avg.

[1]Florida Estimates of Population - July 1, 1972, University of Florida

[2]Public and Private Water Suppliers within the FCD

TABLE 2. PER CAPITA CONSUMPTION VALUES - USGS STUDY*

MUNICIPALITY	CO.	POPULATION SERVED	PUMPAGE (MGD)	PER CAPITA USE
Apalachicola	19	3,000	.49	163
Arcadia	14	6,000	.61	100
Auburndale	53	14,000	1.00	71
Avon Park	28	8,500	1.01	117
Bartow	53	15,000	2.74	103
Belle Glade	50	18,500	3.32	146
Blountstown	07	2,700	.19	70
Boca Raton	50	35,000	11.60	309
Bonifay	30	2,200	.25	113
Boynton Beach	50	19,000	4.49	190
Bradenton	41	22,500	3.10	138
Brandon	29	12,000	1.37	43
Bristol	39	1,600	.16	100
Bronson	38	812	.04	49
Brooksville	27	5,000	.58	116
Bunnell	18	1,554	.22	142
Bushnell	60	700	.12	171
Cape Coral	36	12,500	1.37	80
Carol City	13	15,556	3.31	212
Casselberry	59	9,450	1.49	157
Chattahoochee	20	2,878	.28	97
Chipley	67	4,000	.50	125
Clearwater	52	62,000	4.86	78
Clewiston	26	4,700	.88	187
Cocoa	05	100,000	14.89	148
Crawfordsville	65	288	.01	38
Crestview	46	10,000	1.15	115
Cross City	15	2,000	.35	175
Cutler Ridge	13	12,170	4.88	400
Dade City	51	8,500	1.01	119
Dania	06	8,800	1.49	169
Daytona Beach	64	56,606	10.05	176
Deerfield Beach	06	16,500	4.19	254
De Funiak Springs	66	6,850	.78	113
De Land	64	16,691	2.58	154
Delray Beach	50	20,000	6.37	270
Dunedin	52	17,639	3.06	173
Englewood	58	10,000	.71	71
Eustis	35	9,122	2.21	242
Fernandina Beach	45	6,044	2.25	328
Ft. Lauderdale	06	186,715	40.10	215
Ft. Myers	36	27,000	5.07	187
Ft. Myers Beach	36	8,000	1.21	94
Ft. Myers Subn.	36	26,000	2.92	112
Ft. Pierce	56	29,000	3.97	137

*Taken from: Annual Summary of Public Water Supplies of Selected Municipalities in Florida, 1972 - U.S. Geological Survey

MUNICIPALITY	CO.	POPULATION SERVED	PUMPAGE (MGD)	PER CAPITA USE
Ft. Walton Beach	46	19,949	3.12	156
Gainesville	01	70,000	12.56	179
Gulfport	52	9,730	.00	72
Grn. Cove Springs	10	3,857	.29	75
Haines City	53	13,000	1.70	130
Hallandale	06	27,000	4.18	155
Holly Hill	64	8,191	.77	98
Hollywood	06	100,000	13.55	135
Homestead	13	13,432	4.49	334
Inverness	09	2,500	.35	140
Jacksonville	16	190,000	55.19	290
Jacksonville Beach	16	12,600	1.82	144
Jasper	24	3,034	.48	158
Key West	44	27,500	2.88	105
Key West	44		1.16	
Kissimmee	49	9,935	2.32	166
La Belle	26	1,787	.18	100
Lake Butler	63	1,598	.50	68
Lake City	12	16,600	1.76	106
Lake Placid	28	750	.19	210
Lakeland	53	81,500	16.70	204
Lake Wales	53	14,000	2.17	155
Largo	52	22,031	2.04	93
Lake Worth	50	26,000	4.86	187
Lantana	50	7,000	1.29	184
Leesburg	35	11,869	4.02	338
Lehigh Acres	36	9,500	.54	57
Live Oak	61	7,000	1.00	143
McClenny	02	2,648	.35	132
Madison	40	5,000	.69	138
Maitland	48	7,500	1.63	217
Marianna	32	7,200	.97	134
Mayo	34	900	.10	111
Melbourne	05	63,464	7.93	125
Miami	13	789,644	162.73	204
Milton	57	9,000	.77	86
Miramar	06	26,500	2.24	84
Monticello	33	2,700	.43	159
Moore Haven	22	1,200	.16	133
Naples	11	26,500	6.80	239
New Port Richey	51	12,960	1.27	97
New Smyrna Beach	64	10,580	1.62	148
Niceville	46	7,000	1.40	200
North Miami	13	55,000	10.27	187
North Miami Beach	13	95,000	20.27	213
North Palm Beach	50	16,900	4.26	252
N. Pt. Charlot	58	2,500	.43	172
Oakland Park	06	16,200	2.40	148

MUNICIPALITY	CO.	POPULATION SERVED	PUMPAGE (MGD)	PER CAPITA USE
Ocala	42	25,000	4.48	158
Okeechobee	47	4,500	.66	146
Opa Locka	13	14,000	1.56	110
Orlando	48	175,000	37.75	216
Ormond Beach	64	25,565	2.36	92
Pahokee	50	10,000	.69	69
Palatka	54	12,000	1.62	135
Palm Beach	50	8,488	5.83	175
Palm Beach Garden	50	6,000	2.10	350
Palmetto	41	7,500	.95	
Panama City	03	30,916	4.96	160
Pensacola	17	125,000	21.90	175
Perry	62	9,580	.99	103
Pinellas Pk.	52	22,300	2.80	125
Pine Island	36	5,000	.70	91
Plant City	29	18,000	2.02	112
Pompano Beach	06	50,000	13.84	276
Pt. Charlotte	08	22,000	2.01	91
Port St. Joe	23	4,500	.66	146
Punta Gorda	08	8,500	1.33	156
Quincy	20	10,100	1.38	138
Riviera Beach	50	23,000	4.38	190
St. Augustine	55	12,352	2.38	193
St. Cloud	49	6,500	1.38	210
St. Petersburg	52	250,000	16.05	135
St. Petersburg	52		17.87	
St. Petersburg Beach	52	8,024	.00	
Sanford	59	22,400	3.06	136
Sarasota	58	42,000	7.04	167
Sebring	28	8,300	2.00	240
Starke	04	5,500	.78	140
Stuart	43	8,000	1.95	244
Tallahassee	37	78,000	14.66	188
Tampa	29	307,000	53.42	174
Tarpon Springs	52	7,118	1.49	209
Tavares	35	3,842	.56	145
Titusville	03	30,515	3.38	110
Trenton	21	1,200	.16	125
Valparaiso	46	6,000	.37	62
Venice	58	10,000	1.15	115
Vero Beach	31	16,000	3.16	197
Wauchula	25	4,000	.74	185
Warrington	17	24,750	2.73	110
West Palm Beach	50	66,000	16.70	253
Winter Garden	48	9,000	1.16	128
Winter Haven	53	18,000	5.32	295
Winter Park	48	53,809	11.83	219