[redacted]

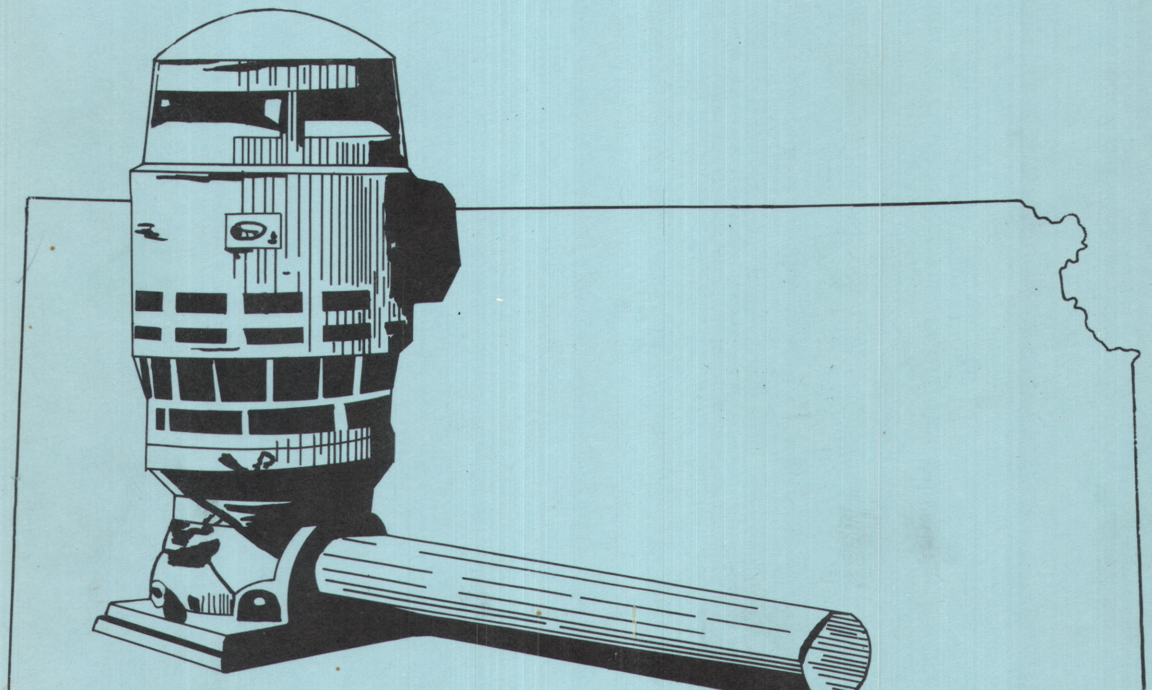
c.1

PB80-175631

EVALUATION OF METHODS FOR ESTIMATING GROUND-WATER WITHDRAWALS IN WESTERN KANSAS

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations 79-92



QE
75
.U58w
no.79-92
1979

Report prepared in cooperation with the Kansas Water Resources Board

50272-101

REPORT DOCUMENTATION PAGE

1. Report No. USGS/WRD/WRI-80/017

2.

3. Recipient's Accession No.

4. Title and Subtitle
EVALUATION OF METHODS FOR ESTIMATING GROUND-WATER WITHDRAWALS IN WESTERN KANSAS

5. Report Date
September 1979

6.

7. Author(s)
Claud H. Baker, Jr.

8. Performing Organization Rept. No.
WRI 79-92

9. Performing Organization Name and Address
U.S. Geological Survey, Water Resources Division
1950 Avenue "A" - Campus West
Lawrence, Kansas 66045

10. Project/Task/Work Unit No.

11. Contract(C) or Grant(G) No.
(C)
(G)

12. Sponsoring Organization Name and Address
U.S. Geological Survey, Water Resources Division
1950 Avenue "A" - Campus West
Lawrence, Kansas 66045

13. Type of Report & Period Covered
Final

14.

LIBRARY
DEC 01 1980
Water & Power Resources Service
Denver, Colorado
RECLAMATION LIBRARY
NOT RETURN
SURPLUS

15. Supplementary Notes
Report prepared in cooperation with the Kansas Water Resources Board

16. Abstract (Limit: 200 words)

Quantities of annual ground-water withdrawals currently are reported by the individual user to the Kansas State Board of Agriculture. It is estimated that these values are 10 to 15 percent higher than actual values because most users do not possess the means for accurately determining discharge rates.

Methods of estimating ground-water use in western Kansas that appear to offer the desired accuracy include (1) extrapolation from a sample of metered withdrawals, (2) calculation from precipitation and irrigated acreages of various crop types, and (3) calculation from a sample of power-coefficients. All three methods are being tested and compared with actual measured values.

Newly developed electronic running-time and discharge-totaling meters are being tested that may give accurate values of total pumping time and discharge at small cost.

17. Document Analysis a. Descriptors
Withdrawal, ground water, water use, irrigation

b. Identifiers/Open-Ended Terms
Western Kansas

c. COSATI Field/Group

18. Availability Statement
Release unlimited

19. Security Class (This Report)
Unclassified

20. Security Class (This Page)
Unclassified

21. No. of Pages
70

22. Price

(See ANSI-Z39.18)

See *Instructions on Reverse*

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

QE 75 .U58w 79-92 1979

BUREAU OF RECLAMATION DENVER LIBRARY
92059089

C.1

EVALUATION OF METHODS FOR ESTIMATING GROUND-WATER WITHDRAWALS IN WESTERN KANSAS

By Claud H. Baker, Jr.

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations 79-92

Report prepared in cooperation with
the Kansas Water Resources Board

Lawrence, Kansas
1979

UNITED STATES DEPARTMENT OF THE INTERIOR

CECIL D. ANDRUS, SECRETARY

GEOLOGICAL SURVEY

H. WILLIAM MENARD, DIRECTOR

For additional information write to:

U.S. Geological Survey, WRD
1950 Ave. A - Campus West
University of Kansas
Lawrence, Kansas 66045

CONTENTS

ILLUSTRATIONS

TABLES

CONVERSION TABLE

For those readers who may prefer to use metric units rather than inch-pound units, the conversion factors for International System (SI) of units and abbreviations for terms used in this report are given as follows:

Multiply inch-pound units	by	To obtain SI units
Foot (ft)	0.3048	Meter (m)
Cubic foot (ft^3)	.02832	Cubic meter (m^3)
Square mile (mi^2)	2.509	Square kilometer (km^2)
Acre-foot (acre-ft)	1,233	Cubic meter (m^3)
Gallons per minute (gal/min)	.06309	Liter per second (L/s)

SUMMARY

During 1978, methods of estimating ground-water withdrawals in western Kansas were examined and evaluated, using both existing data from the files of the U.S. Geological Survey and newly collected data.

Values for annual ground-water withdrawals reported to the Division of Water Resources, Kansas State Board of Agriculture, by water users probably contain substantial errors because most individual users do not possess the means to measure or accurately estimate the discharge rates of their wells. Such reported values are estimated to average 10 to 15 percent higher than the actual discharge rate. Values obtained from discharge-totaling meters are reasonably accurate, but few wells are equipped with these meters, and the cost of equipping all wells with meters may be prohibitive. Measured rates of power consumption can give good estimates of total withdrawal from wells where the power consumption is measured. However, power-consumption values cannot be extrapolated reliably from one well to another.

Three techniques are regarded as promising for estimating areal ground-water withdrawals from readily collected data:

1. Examination of a small sample of withdrawal values from metered wells indicates that the statistical approach used by Luckey (1972) may be applied to western Kansas to estimate total withdrawal with acceptable accuracy in a large area from a statistical sample of measured values.
2. Measured values of irrigation application at a small number of selected wells might be used to compute total withdrawal for irrigation by crop type and precipitation zone. Evaluation of reported values of irrigation-water application for selected crops in zones of generally similar precipitation showed that, although the reported values are judged to be erroneously high, the reported values were consistent with each other and with average precipitation.
3. Power-consumption coefficients may be used to calculate an average coefficient for an area. The method described by Luckey (1972) was used to calculate the number of power-consumption coefficients that would have to be determined to estimate the mean power consumption of wells pumped by electric or natural-gas engines. The results indicate that as few as 100 values would produce results accurate to within 10 percent of the true average at the 95-percent confidence level. Thus, power coefficients for a particular type of irrigation system in any given area can be used even though values of power coefficients have little transfer value from well to well.

Efforts by the Instrument Development Laboratory of the U.S. Geological Survey to design improved instruments for measuring ground-water withdrawals have produced two promising results:

1. An electronic running-time meter (Running-time Sentry) that was tested during 1978 in western Kansas and Florida appears to give accurate values of total pumping time. Large-scale testing of this prototype running-time meter is planned for 1979.
2. A low-cost discharge-totaling meter (REELTOT), based on the concept of sensing the velocity head in a pipe with differential-pressure transducers permanently installed in the pipe, is nearly complete. Early prototypes of this instrument may be tested in western Kansas during 1979.

For the remainder of this study, the three techniques for estimating areal ground-water withdrawals described above will be tested on a larger scale in Groundwater Management District No. 1, an area of about 1,800 square miles in west-central Kansas. About 150 randomly selected wells will be equipped with Running-time Sentry units and monitored for total withdrawal, instantaneous discharge, and power consumption. A few wells will be equipped with prototype discharge-totaling meters. The performance of the Sentry units and discharge-totaling meters will be evaluated. Areal estimates of withdrawal from measured withdrawal values, from average power-consumption coefficients, and from irrigation application by crop will be calculated and compared with each other and with reported values of withdrawal.

INTRODUCTION

Purpose and Scope of Study

A major unknown factor in quantitative ground-water investigations in Kansas is the amount of ground water withdrawn annually from the aquifers. More than 95 percent of the ground water pumped in western Kansas is used for irrigation, and only a few of the irrigation wells are metered. The purpose of this study, therefore, is to evaluate various methods of estimating areal ground-water withdrawals from irrigation wells and to test such methods by application to a large irrigated area.

The study on which this report is based was designed as a two-phase effort: (1) a one-year evaluation of techniques for determining ground-water withdrawals over large areas, and (2) a follow-up intensive application of the most promising method or methods to a specific area in western Kansas, such as one of the Groundwater Management Districts. The purpose of this report is to document the first phase of the study and to outline, in some detail, plans for the second phase of the study. A further extension of the scope of the study, not foreseen when the study was planned, is the testing and evaluation of improved devices for monitoring ground-water withdrawals. Two such improved devices that are being developed by the Instrument Development Laboratory of the U.S. Geological Survey will be discussed in this report.

Previous Studies

Although many investigators have made estimates of ground-water withdrawals, few have published analyses of the techniques used to arrive at the estimates. Methods in common use include application of (1) an average power-consumption coefficient to the total power or fuel used by pumps in the area, (2) an average withdrawal from measured wells to all wells in the area, and (3) average values of withdrawal to types of use in the area. Such techniques served the purpose of semiquantitative areal studies, but the resulting estimate may contain large, unanalyzed errors.

Young and Harenberg (1971) found that the variation of power-consumption coefficients was small for 173 wells pumped by electric motors in the Snake River plain of Idaho. They used the average power consumption of these wells to estimate pumpage from all electric-powered irrigation wells in the area.

Luckey (1972) found that values of the annual discharge per well from about 800 wells in the Arkansas River valley of southeastern Colorado followed a log-normal distribution and that total pumpage from the area could be estimated from a sample of measurements. He demonstrated a method of calculating the number of random samples required to estimate total pumpage for any desired combination of accuracy and probability.

Kastner (1974) evaluated the relationship between power-consumption coefficients and various physical properties of wells and aquifers in northwestern Kansas, using regression-analysis techniques. He also used regression analysis to relate the amount of water pumped for irrigation to weather factors (precipitation and evaporation) for the same area. Both relationships proved to be poorly defined, and water withdrawals computed from either set of relationships contained large errors.

Romm (1977) related water requirements to land-use patterns in the Santa Clara Valley of California. The relationships presented were empirically derived from metered water-use data and, although suitable for the intended purpose, probably have little transfer value to other areas.

WITHDRAWALS FROM INDIVIDUAL WELLS

Metered

Certainly the most valid measurements of ground-water withdrawals in any area can be obtained by installing an accurate and reliable discharge-totaling device on each well. At present (1978), two factors detract from the feasibility of this approach:

1. Discharge-totaling meters are expensive. Meters of acceptable accuracy cost from $300 to $500 per unit; moreover, the conditions for accurate operation of such meters are rigorous and entail substantial added costs for installation. State agencies concerned with ground-water withdrawals probably do not want to bear the costs of installing meters on all of the several thousand large-discharge wells in western Kansas, and most well owners also are unwilling to do so.
2. Discharge-totaling meters require maintenance. All devices that are presently used have propellers or vanes inside the discharge pipe; the shafts and bearings that hold the propellers and vanes are subject to wear from sediment contained in the water. Most of the wear on totaling meters tends to cause the meters to record less than actual volume, but the rate of change in accuracy depends on the individual meter and installation and cannot be predicted readily. Periodic overhauls and calibration are required if the meter is to maintain acceptable accuracy.

Should the development of an improved electronic discharge-totaling meter (described in a later section of this report) prove successful, however, metering of most or all large-discharge wells may become a feasible and preferred method of determining ground-water withdrawals.

Reported

Water users in Kansas are required to report water withdrawal annually to the Division of Water Resources, Kansas State Board of Agriculture. Although the provision for reporting has not always been rigorously observed, 80 to 90 percent of water-right holders prepare annual reports. The reported values for wells that are equipped with discharge-totaling meters are reasonably accurate, but only a small percentage of wells in western Kansas have meters. In the absence of meters, withdrawal is reported in terms of hours of pumping and average discharge rate.

Anyone can, and many water users do, keep accurate records of pumping time. Discharge rate, however, is another matter; very few water users possess the means of accurately determining the discharge rate of their wells. Reported discharge rates come from a variety of sources--measurements (or estimates) by the driller or pump installer, measurements by Division of Water Resources field personnel when the well is tested, or perhaps measurements by U.S. Geological Survey personnel during project work. The common weakness of using these values is the change with time; typically a discharge measurement will be used for 5 or more years after it was made as the average discharge of the well. Well-discharge rates tend to decrease with time because of wear on pump and power-plant components. Rates also vary seasonally with changes in water level and changes in operating characteristics of the pumping plant. Although no data are available for making a valid estimate, reported discharge rates probably average 10 to 15 percent too high.

Accurate values of reported withdrawal could be obtained if the discharge rate of all wells were measured periodically by trained personnel using proper equipment. Such a program, however, would be very costly and cannot be recommended. For example, one man with a pickup equipped to measure discharge rates in wells by several different methods can measure only 6 to 10 discharges in a day, even if all wells are ready to be measured. Actual progress is slower because well owners have to be contacted and appointments set up prior to each measurement. Where wells are widely scattered, additional time is consumed in travel between installations.

Power-Consumption Coefficients

The amount of water lifted by a pump is directly related to the amount of energy consumed by the pumping plant. This relation, commonly called the power-consumption coefficient (PCC), is expressed as the volume of fuel or kilowatt hours of electricity required to lift a unit volume of water under existing operating conditions. If the power-consumption coefficient is known and if the amount of power used is known, then the product of the power-consumption coefficient and the power consumed is the quantity of water pumped. Power-consumption coefficients are readily calculated from parameters measured when the well is being pumped, using the following relations:

1. For wells pumped by natural-gas engines,

$$PCC = \frac{(1.955 \times 10^7)(V)(P)}{(Q)(t)},$$

where

PCC = power-consumption coefficient, in cubic feet of natural gas required to lift 1 acre-foot of water;
V = volume of natural gas consumed in t seconds, in cubic feet;
P = a pressure-correction factor (a function of atmospheric pressure and gas-line pressure, furnished by the gas company);
Q = discharge of the well, in gallons per minute;
t = time, in seconds, to consume V cubic feet of natural gas; and
(1.955×10^7) = a units-conversion constant.

2. For wells pumped by electric motors,

$$PCC = \frac{(1.955 \times 10^4)\ (n)\ (K)\ (M)}{(Q)\ (t)},$$

where

PCC = power-consumption coefficient, ~~in~~ kilowatt hours of electricity ~~required to lift~~ 1 acre-foot of water;
n = the number of revolutions of the electric meter disc, in t seconds;
K = a meter constant (generally stamped "Kh" on the nameplate of the meter);
M = the product of the current and voltage transformer ratios (M = 1, if there are no transformers);
Q = discharge of the well, in gallons per minute;
t = time, in seconds, for n revolutions of the meter disc; and
(1.955×10^4) = a units-conversion constant.

Power-consumption coefficients vary during the pumping season as a function of water-level changes. For example, a total head change from 20 feet to 40 feet during a pumping season would cause the power-consumption coefficient to double, all other factors being equal.

Calculation of power-consumption coefficients at a well site also is a time-consuming process because both the power-consumption and the discharge rate must be measured at each site.

A power-consumption coefficient is only valid at a specific pumping rate and pumping head. Because the pumping head initially changes rapidly after a well starts pumping, the power-consumption coefficient also changes rapidly. Therefore, it is practical to pump wells for a time until water levels "stabilize"; then the power-consumption coefficient determinations are made. Typically, determinations are made after about 1 hour of pumping. Determining power-consumption coefficients at a rate of four per day assumes that appointments with the well owners or operators have been made previously and that all equipment, including the pumping well, are ready for measurement.

The total amount of water withdrawn from a well can be calculated with considerable accuracy from the power-consumption coefficient and records of the amount of fuel or electrical power used. Unfortunately, the power-consumption coefficient determined at one well cannot be applied with acceptable accuracy to another well, even an apparently identical nearby well.

Kastner (1974) used regression analysis to relate power-consumption coefficients to readily measurable physical characteristics of the well--such as, well depth, depth to water, aquifer thickness, well diameter, and others. He reported (1974, p. 5) that all the regression analyses provided equations with poor accuracy for estimating power-consumption coefficients. The most practical equation developed by Kastner related the power-consumption coefficient to depth to water; the standard error of the estimate was about 25 percent of the mean.

Kastner's findings reflect the variability of the four components used to develop the power-consumption coefficient. The coefficient is a measure of the efficiency of the total well installation and the components included are (1) the ability of the aquifer to yield water, (2) the effectiveness of the well in extracting available water from the aquifer, (3) the head against which the system is operating, and (4) the efficiency of the pumping plant in converting input energy into work. Kastner°s analyses considered aquifer characteristics (component 1), well construction (component 2), and head (component 3), but not pumping-plant efficiency (component 4). Pumping-plant efficiency, however, is so highly variable that the effects of the other components are masked.

Miles and Longenbaugh (1968) described the wide variations in efficiencies of pumping plants on the high plains of eastern Colorado and discussed in detail the common causes of inefficiencies in pumping plants. These causes included poor matching of the pump to the well performance, poor matching of the pump to the irrigation method, poor matching of the power plant to the pump characteristics, and wear on both pump and power plant. Because all of these factors may differ greatly between adjacent wells, the pumping-plant efficiency and, therefore, the power-consumption coefficient will vary widely. Consideration of pumping-plant efficiency in a statistical analysis of power-consumption coefficients would be pointless, however, because the measurements necessary to compute plant efficiency are also adequate to compute power-consumption coefficients directly; hence, no effort or expense would be saved.

AREAL WITHDRAWALS

From the foregoing discussion, it can be seen that determination of ground-water withdrawals in western Kansas on a well-by-well basis would be a costly undertaking in both money and manpower. For many purposes, however, it is sufficient to know the total withdrawal in an area that may contain many hundreds or thousands of wells. Areal estimates of ground-water withdrawal probably can be made with acceptable accuracy from several kinds of data. Some direct measurements of appropriate parameters are required at a properly selected random sample of wells for accurate estimates of total withdrawals.

Estimates From Metered Values

An accurate estimate based on metered data from a sample of wells probably can be made. Luckey (1972) found that the measured values of ground-water withdrawals from wells in the Arkansas River valley of southeastern Colorado followed a log-normal distribution. Based on this fact, he demonstrated equations for calculating the number of wells that must be measured in order to estimate the total withdrawal with any desired degree of accuracy at any specified probability level.

Only a small number of wells in western Kansas are metered. Values of total ground-water withdrawal for 78 wells in western Kansas, equipped with meters in 1977, were examined and the values also appeared to follow a log-normal distribution. The standard deviation of the natural logarithms of withdrawals (1.22) was very close to the value calculated by Luckey for the Arkansas River valley in Colorado (1.25); hence, the numbers derived by Luckey (1972, fig. 2) for sample size probably are applicable to western Kansas as well.

Estimates From Irrigated Acreage

Kastner (1974, p. 7-8) reported only a poor correlation between the amount of water pumped for irrigation in northwestern Kansas and selected weather parameters. Because different crops require different amounts of water, he postulated that the poor correlation might be due, in part, to consideration of all of the irrigated crops together. Only reported values of irrigation withdrawal by each crop were available for this study; so no attempt was made to repeat Kastner's regression analysis. However, the approach to estimating ground-water withdrawal from irrigated acreage was examined.

Reported water-use data for 1977 included reports of acreage and crops irrigated during the year. From these data, the 1,507 reports indicating that water had been applied to only a single crop were selected for analysis. Water application, in feet, was calculated from the reports and examined; 104 values outside the range 0.1 to 6.0 were rejected as improbable. The State was divided into five precipitation zones as shown by the map in figure 1. The zones follow, as nearly as possible on county boundaries, the lines of equal average annual precipitation, 1941-70. The reported water-application values were divided into 13 groups on the basis of precipitation zone and crop type. The selected crops were alfalfa, corn (grown for grain), and milo (grown for grain). Histograms of each group were prepared, and within each group the values appeared to be normally distributed. Basic statistical parameters for each group were calculated, and the results are given in table 1.

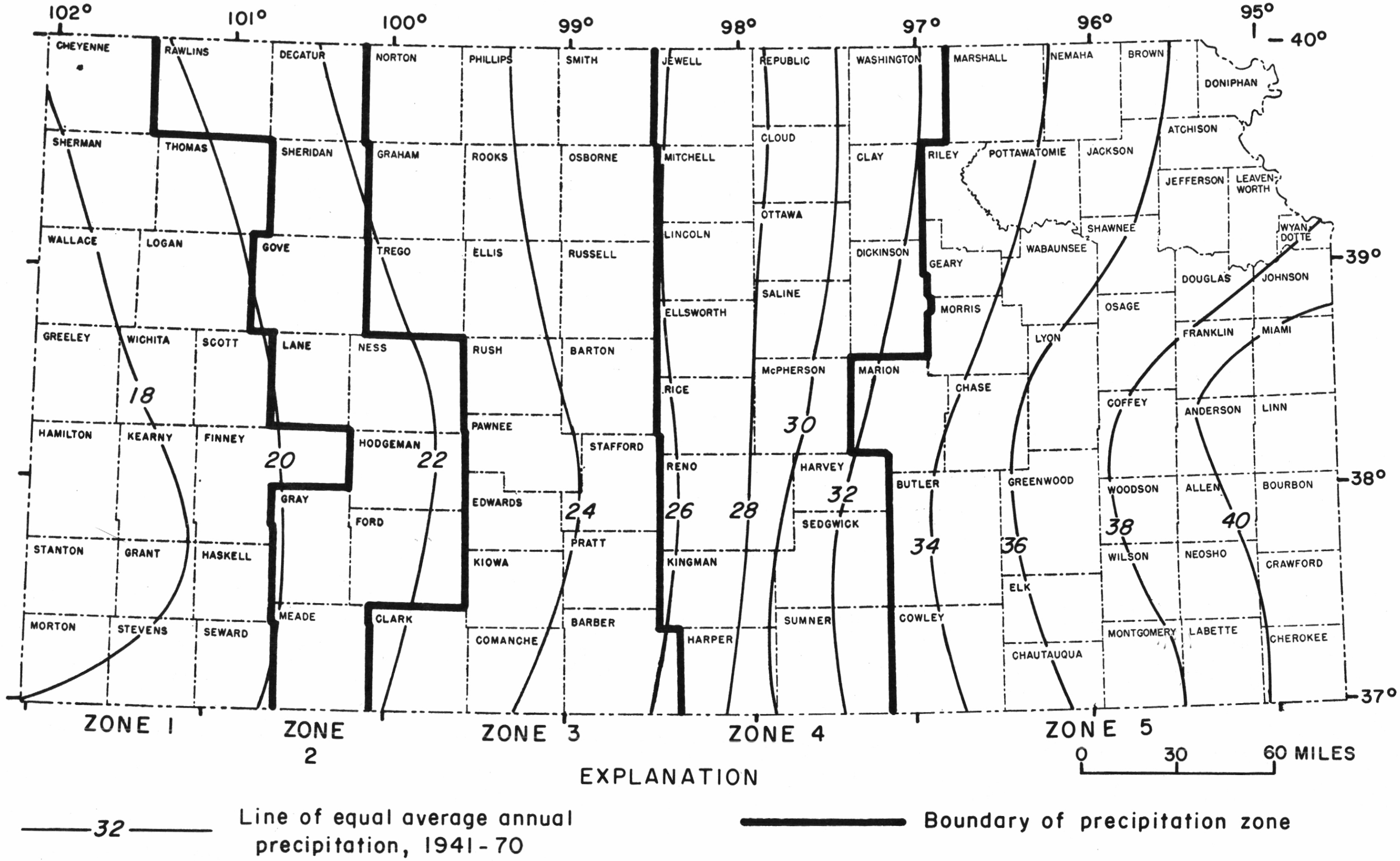


Figure 1.--Map of Kansas showing precipitation zones used for evaluating reported values of irrigation-water application.

Table 1.--Statistical parameters for water application based on precipitation zone and crop type.

Precipitation zone and crop type	No. of wells	Average amount of water applied, in feet ($\bar{X}$)	Standard deviation (S)	Coefficient of variation (CV)
Zone 1				
corn	460	2.51	1.21	0.48
milo	70	2.16	1.14	.53
alfalfa	45	2.42	1.21	.50
Zone 2				
corn	322	2.24	0.92	.41
milo	53	1.72	1.02	.59
alfalfa	43	1.62	1.12	.69
Zone 3				
corn	69	1.63	0.77	.47
milo	42	1.14	0.74	.65
alfalfa	31	1.19	0.81	.68
Zone 4				
corn	150	1.11	0.69	.62
milo	57	0.68	0.54	.79
alfalfa	18	0.84	0.56	.67
Zone 5				
corn	43	0.89	0.86	.97

Pooled variance (Sp) = 0.77.

Variance from total sample = 1.23.

The average amount of water applied is an arithmetic mean, $\bar{X}$, given by

$$X = \frac{\sum_{i=1}^{n} x_i}{n} ,$$

where

x_i = individual values, and
n = number of values.

The standard deviation, S, is a measure of dispersion and is given by

$$S = \sqrt{\frac{\sum_{i=1}^{n} (\bar{X}-x_i)^2}{n-1}} .$$

The coefficient of variation, CV, a dimensionless measure of dispersion, is given by

$$CV = \frac{S}{X} .$$

The pooled variance, Sp, is calculated by

$$Sp = \frac{\sum_{i=1}^{m} N_i S_i^2}{n} ,$$

where

m = number of groups, and
N_i = number of wells in individual groups.

The comparison of the pooled variance with the variance of the total sample is a measure of the effectiveness of the grouping.

These results are calculated from reported values of withdrawal and, accordingly, are subject to substantial error, as discussed earlier. Nevertheless, the data indicate a regional variation in irrigation-water application that corresponds to regional variations in average annual precipitation and a smaller, but persistent, variation in average application by crop. Thus, if the acreage devoted to each irrigated crop in an area were determined and a statistical sample of water application to each crop were measured annually, accurate estimates of annual water use for irrigation should be possible. Regression analysis using more accurate values of water application and irrigated acreage by crop might show a much closer correlation than that determined earlier by Kastner (1974).

Estimates From Average Power-Consumption Coefficients

Areal estimates of withdrawal based on power-consumption coefficients require that the quantity of power consumed be measured. The power consumed is often obtained by courtesy from electric or natural-gas suppliers. This requires identification of electric or gas meters that monitor each well. Commonly, power records for individual wells are obtained from the supplier, and an average power-consumption coefficient is used for all the wells using that particular type of power in an area.

Power-consumption coefficients for wells which utilize gasoline, liquid petroleum gas, or diesel fuel are difficult to obtain. However, the percentage of wells utilizing these fuels is small in western Kansas.

Although values for power-consumption coefficients cannot be validly extrapolated from one well to another, average values may be applicable for estimating areal withdrawals. Values of power-consumption coefficients obtained from a variety of sources were examined and subjected to various statistical analyses. Kastner's (1974) findings were sustained; no reasonable correlation could be found between values of power-consumption coefficients and values of depth to water, discharge rate, well diameter, aquifer thickness, or aquifer penetration. Moreover, no appreciable difference in statistical parameters was discovered when values were grouped by area or by date of measurement.

Statistical parameters for both raw values (PCC) and natural logarithms of the values (LPCC), separated by type of power, were calculated and are presented in the following tabulation:

Variable	Number of values	Mean	Standard deviation	Standard error of the mean	Standard error of the mean, in percent
			Electric motors		
PCC	104	345.3	188.6	18.5	5.4
LPCC	104	5.67	0.62	0.06	6.1
			Natural-gas engines		
PCC	384	86.9	43.2	2.2	2.5
LPCC	384	4.37	0.42	0.02	2.1

Sample variance = 1,868.
Pooled variance (by county) = 1,563.
Pooled variance (by year) = 1,657.

The standard error of the mean is a measure of the closeness of the sample mean to the true population mean; the population mean can be expected, at the 95-percent confidence level, within two standard errors of the sample mean. Derivation of the standard error of the mean is given by Ostle (1966, p. 90-91).

The separation of values for electric motors and natural-gas engines is necessary because of the differences in the equations used to calculate the values. A further separation into values for high-pressure sprinkler systems and for low-pressure open-flow systems would probably reduce the sample variance, but that distinction is not generally available for the historic values.

The method presented by Luckey (1972, p. 206-207) can be used to calculate the sample size needed for estimating average power-consumption coefficients with desired degrees of accuracy. When the untransformed values are used, the equation becomes

$$n = \frac{b^2(S/\overline{X})^2}{d^2} ,$$

where

n = the number of values to be measured;
b = a constant for estimating the confidence limits;
S = the standard deviation of the population;
$\overline{X}$ = the mean of the population; and
d = the fractional error in estimating the mean.

In practice, S and $\overline{X}$ are estimated by s and $\overline{x}$, the standard deviation and the mean of the sample.

A graph showing sample size for various values of fractional error in estimating the mean at the 90- and 95-percent confidence levels is given in figure 2 for natural-gas-powered pumps; a similar graph for electric-powered pumps is given in figure 3. From these graphs, it can be seen that the mean power-consumption coefficient for natural-gas engines can be estimated within 10 percent at the 95-percent confidence level from about 100 measured values. Similar results for electric motors can be obtained from about 115 measured values. Additional measurements would be needed for wells pumped with other power sources and for other withdawals, such as domestic wells, but the number of measurements could be adjusted so that the resulting estimate would be within about 15 percent of the true total withdrawal at the 95-percent confidence level.

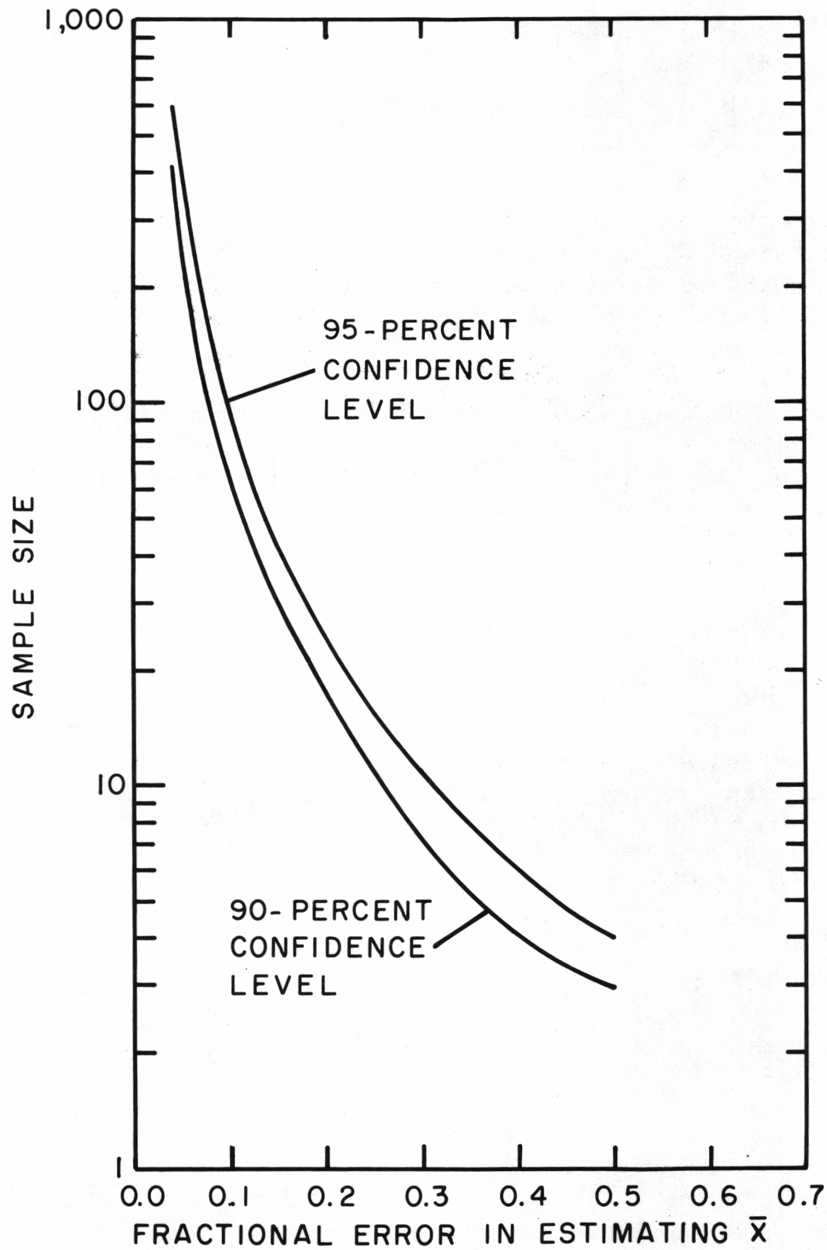


Figure 2.--Relation of sample size to fractional error of the estimate of mean power-consumption coefficient for natural-gas-powered pumps.

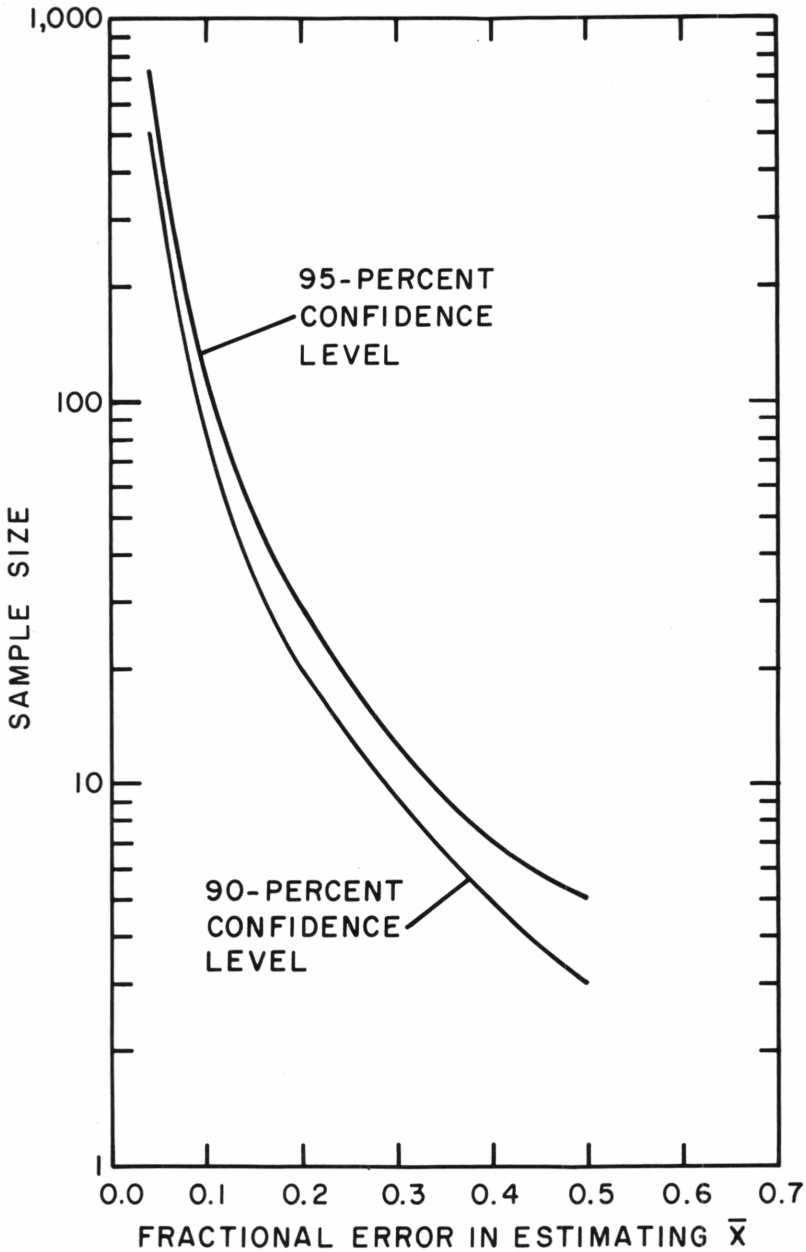


Figure 3.--Relation of sample size to fractional error of the estimate of mean power-consumption coefficient for electric-powered pumps.

INSTRUMENTATION DEVELOPMENTS

Early in the present study, a request was made to the Instrument Development Laboratory of the U.S. Geological Survey for assistance in designing and testing improved instruments for measuring pump-operating time and total well discharge. The response to this request has resulted in the development of the Running-time Sentry, which was tested in Kansas and Florida during 1978, and the REELTOT (REcording ELectronic TOTaling) meter, which may be ready for prototype testing in Kansas during 1979.

Running-Time Sentry Unit

Most machinery associated with the pumping of water has considerable vibration generated by gears, surging water, line-shaft whipping, and other causes. The Running-time Sentry uses the presence of this vibration to accumulate total hours of pumping over a period of weeks or months.

The distinctive component of the Sentry unit is an integrating storage cell (E-cell). This device deposits silver ions in a reservoir at a rate that is proportional to the amount of electrical current passed through the cell. The E-cell is in a circuit that is activated by a machinery-vibration detector; so the amount of silver deposited in the reservoir is proportional to total operating time. The vibration detector consists of a piezo-electric crystal coupled to a mass that has been selected to impart maximum acceleration to the crystal at vibration frequencies most common to pumps and similar equipment. The crystal releases a small amount of electrical energy that activates a constant-current driving circuit to operate the E-cell.

In operation, the Sentry unit is attached to the surface of a pump or discharge pipe where some vibration can be detected manually. The units tested during 1978 were attached to the machinery using a small piece of pressure-sensitive plastic (polymer), but the models developed for use in 1979 will include a mounting bracket. The attachment will include provisions for turning the accumulator circuit off when the Sentry is removed; hence, the Sentry units can be transported without concern that they will accumulate additional time from vibration of the vehicle during transportation.

Sentry units are read out by reversing the polarity on the E-cell and passing a small fixed current through the cell until all the silver is removed from the accumulation reservoir. When all the silver has been removed from the reservoir, the resistance of the circuit becomes very high and causes the readout device to stop. The readout process is destructive; that is, after the unit has been read out, it is "empty" and can be returned to service. The readout device used during 1978 produced a digital display of the total count in hours and hundredths of hours. An improved readout device for 1979 is being prepared by the Instrument Development Laboratory; this device will be automated to hold perhaps 100 Sentry units and to print the readout from each unit on a paper tape.

Prototype Sentry units tested in 1978 gave generally good results when compared with other time-recording devices. Testers in Florida reported accuracy within 6 percent but did not report the basis for this comparison. In western Kansas, 6 of 10 units agreed within less than 10 percent with electrically driven engine-hour meters. Two of the remaining four engine-hour meters failed during the test period. The discrepancy between the two engine-hour meters that continued to function and the corresponding sentry units remains unexplained.

The Running-time Sentry is a relatively inexpensive device. The prototype instruments tested in 1978 were manufactured at a cost of $10 to $12 each; the more sophisticated version to be used in 1979 may cost about $20. The cost of the automated readout device is estimated to be about $3,500.

REELTOT Meter

The REELTOT meter is an entirely new approach to the design of a reliable, accurate discharge-totaling meter. As now conceived, the REELTOT meter will use differential-pressure transducers on bolts permanently installed in discharge pipes to detect the velocity head in the pipe. Electrical output from the transducer will be used to activate a circuit that includes an E-cell; the amount of silver deposited in the E-cell accumulation reservoir will be proportional to the total volume of water discharged. The proposed design will allow the E-cell to be read out on the same device used for the improved Sentry unit. In addition, a portable readout unit will permit reading instantaneous discharge from the REELTOT meter whenever the well is visited.

The first prototypes of the REELTOT meter have not yet been completed, and a period of thorough testing will be required. It is planned to have a few prototypes available for testing on irrigation wells in western Kansas during the 1979 irrigation season.

Prototype REELTOT units are estimated to cost $100 to $150 each, but the unit cost for production versions may be less. Installation costs may be as high as $75 per site; however, this is a fraction of the $200 to $500 costs for properly installing a propeller meter. Field maintenance will not be attempted. Malfunctioning units will be replaced by new units. The design calls for no moving parts and solid-state electronics; therefore, reliability should be good.

PLANS FOR FURTHER STUDY

From the preceding discussion, it appears likely that good estimates of areal ground-water withdrawal can be made in western Kansas by using any of the extrapolation techniques from (1) a selected sample of measured values, (2) a sample of power-consumption coefficients, or (3) measured application rates for specific crops. During the 1979 irrigation season, these three techniques will be tested concurrently and compared with each other in Groundwater Management District No. 1, an area of about 1,800 square miles in west-central Kansas.

A randomly selected sample of about 150 wells will be fitted with Running-time Sentrys to monitor pumping time, and the discharge rates and power-consumption coefficients will be measured several times during the season. The withdrawal from wells that are used to irrigate a single crop will be used to establish the relation between irrigation withdrawal and precipitation. Data on irrigated acreage by crop will be obtained at the end of the season from the Agricultural Reporting Service, and data on power consumption will be obtained from power-supply companies in the area. Reported pumpage data will also be obtained from the Division of Water Resources for comparison with measured and calculated values.

As many prototype REELTOT meters as can be obtained in 1979 will be installed on selected wells and compared with propeller-type totaling meters and with withdrawal values calculated from repetitive measurements of discharge rates and pumping hours.

Analysis of the results obtained during the 1979 irrigation season will be used to determine which techniques, if any, should be dropped from testing in 1980 and 1981. A final report on results of the study will be prepared in 1981.

SELECTED REFERENCES

Kastner, W. M., 1974, Application of statistical techniques to the estimation of ground-water withdrawals in northwestern Kansas: U.S. Geological Survey Water-Resources Investigations 41-74, 11 p.

Luckey, R. R., 1972, Analysis of selected statistical methods for estimating groundwater withdrawal: Water Resources Research, v. 8, no. 1, p. 205-210.

Miles, D. L., and Longenbaugh, R. L., 1968, Evaluation of irrigation pumping plant efficiencies and costs in the high plains of eastern Colorado: Colorado State University Experiment Station General Series 876, 19 p.

Ostle, Bernard, 1966, Statistics in research: The Iowa State University Press, 585 p.

Romm, J. K., 1977, Water supply, land use, and urban growth: American Society of Civil Engineers Proceedings, Journal of Water Resources Planning and Management Division, v. 103, no. WR2, p. 271-284.

Young, H. W., and Harenberg, W. A., 1971, Ground-water pumpage from the Snake Plain Aquifer, southeastern Idaho: Idaho Department of Reclamation Water Information Bulletin, no. 23, 28 p.

SUPPLEMENTARY DATA

Statistical Analysis System--University of North Carolina

Analysis of irrigation, crop, and zone

["Applied" irrigation, in acre-feet per acre;
zone 1-5, shown in figure 1; crop A = alfalfa, C = corn, M = milo]

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE
		- CROP=A	ZONE=1 -	
APPLIED	45	2.42464106	1.21045898	0.39294033
		- CROP=A	ZONE=2 -	
APPLIED	43	1.61826034	1.11857535	0.13449732
		- CROP=A	ZONE=3 -	
APPLIED	31	1.18810851	0.81130674	0.21482211
		- CROP=A	ZONE=4 -	
APPLIED	18	0.83582831	0.56274203	0.11047994
		- CROP=C	ZONE=1 -	
APPLIED	460	2.50479532	1.02650504	0.28328191
		- CROP=C	ZONE=2 -	
APPLIED	322	2.23967824	0.91507597	0.12275549
		- CROP=C	ZONE=3 -	
APPLIED	69	1.63222770	0.76877772	0.11726921
		- CROP=C	ZONE=4 -	
APPLIED	150	1.11065665	0.68865134	0.11311042
		- CROP=C	ZONE=5 -	
APPLIED	43	0.89068532	0.86313019	0.14730659
		- CROP=M	ZONE=1 -	
APPLIED	70	2.16451542	1.14262652	0.18954892
		- CROP=M	ZONE=2 -	
APPLIED	53	1.72193009	1.01909917	0.19640879
		- CROP=M	ZONE=3 -	
APPLIED	42	1.13541671	0.74237959	0.11646427
		- CROP=M	ZONE=4 -	
APPLIED	57	0.68228825	0.54099635	0.10906353

MAXIMUM VALUE	STD ERROR OF MEAN	SUM	VARIANCE	C.V
	- CROP=A	ZONE=1 -		
4.60333097	0.18044457	109.10884748	1.46521094	49.92
	- CROP=A	ZONE=2 -		
4.94906535	0.17058114	69.58519470	1.25121082	69.12
	- CROP=A	ZONE=3 -		
3.79774805	0.14571499	36.83136387	0.65821862	68.28
	- CROP=A	ZONE=4 -		
2.24880143	0.13263957	15.04490952	0.31667859	67.32
	- CROP=C	ZONE=1 -		
4.97159745	0.04786104	1152.2058468	1.05371259	40.98
	- CROP=C	ZONE=2 -		
4.95318412	0.05099519	721.17639311	0.83736403	40.85
	- CROP=C	ZONE=3 -		
3.68072653	0.09254996	112.62371119	0.59101918	47.10
	- CROP=C	ZONE=4 -		
4.14299787	0.05622815	166.59849675	0.47424067	62.00
	- CROP=C	ZONE=5 -		
4.35866078	0.13162612	38.29946879	0.74499372	96.90
	- CROP=M	ZONE=1 -		
4.89511133	0.13656999	151.51607970	1.30559535	52.78
	- CROP=M	ZONE=2 -		
4.53428101	0.13998404	91.26229482	1.03856312	59.18
	- CROP=M	ZONE=3 -		
3.29431104	0.11455166	47.68750184	0.55112745	65.38
	- CROP=M	ZONE=4 -		
3.01308936	0.07165672	38.89043029	0.29267705	79.29

CROP=A ZONE=1

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
0.3929403	1	1	2.222	2.222
0.4419198	1	2	2.222	4.444
0.5155731	1	3	2.222	6.667
0.5585375	1	4	2.222	8.889
0.7346916	1	5	2.222	11.111
0.7733596	1	6	2.222	13.333
0.8101863	1	7	2.222	15.556
1.077179	1	8	2.222	17.778
1.251531	1	9	2.222	20.000
1.281567	1	10	2.222	22.222
1.346474	1	11	2.222	24.444
1.364657	1	12	2.222	26.667
1.590641	1	13	2.222	28.889
1.690343	1	14	2.222	31.111
1.830068	1	15	2.222	33.333
1.87306	1	16	2.222	35.556
2.030069	1	17	2.222	37.778
2.146389	1	18	2.222	40.000
2.301665	1	19	2.222	42.222
2.359172	1	20	2.222	44.444
2.40699	1	21	2.222	46.667
2.407896	1	22	2.222	48.889
2.429142	1	23	2.222	51.111
2.451603	1	24	2.222	53.333
2.492881	1	25	2.222	55.556
2.528291	1	26	2.222	57.778
2.536967	1	27	2.222	60.000
2.832819	1	28	2.222	62.222
2.946132	1	29	2.222	64.444
2.956489	1	30	2.222	66.667
3.059445	1	31	2.222	68.889
3.148678	1	32	2.222	71.111
3.263408	1	33	2.222	73.333
3.282833	2	35	4.444	77.778
3.531676	1	36	2.222	80.000
3.559909	1	37	2.222	82.222
3.887107	1	38	2.222	84.444
3.977278	1	39	2.222	86.667
4.08162	1	40	2.222	88.889
4.088841	1	41	2.222	91.111
4.129188	1	42	2.222	93.333
4.250138	1	43	2.222	95.556
4.603331	2	45	4.444	100.000

CROP=A ZONE=2

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
0.1344973	1	1	2.326	2.326
0.1578285	1	2	2.326	4.651
0.179714	1	3	2.326	6.977
0.2549537	1	4	2.326	9.302
0.3265532	1	5	2.326	11.628
0.4511264	1	6	2.326	13.953
0.6444663	1	7	2.326	16.279
0.7491448	1	8	2.326	18.605
0.8123525	1	9	2.326	20.930
0.8385428	1	10	2.326	23.256
0.8592884	1	11	2.326	25.581
0.9016391	1	12	2.326	27.907
0.9039268	2	14	4.651	32.558
0.9666995	1	15	2.326	34.884
0.9793587	1	16	2.326	37.209
1.039811	1	17	2.326	39.535
1.046212	1	18	2.326	41.860
1.111032	1	19	2.326	44.186
1.207914	1	20	2.326	46.512
1.259471	1	21	2.326	48.837
1.288933	1	22	2.326	51.163
1.344973	1	23	2.326	53.488
1.531716	1	24	2.326	55.814
1.603494	1	25	2.326	58.140
1.682978	1	26	2.326	60.465
1.704101	1	27	2.326	62.791
1.720486	1	28	2.326	65.116
1.799245	1	29	2.326	67.442
2.120601	1	30	2.326	69.767
2.141611	1	31	2.326	72.093
2.252924	1	32	2.326	74.419
2.301665	1	33	2.326	76.744
2.4073	1	34	2.326	79.070
2.610726	2	36	4.651	83.721
2.634522	1	37	2.326	86.047
2.777134	1	38	2.326	88.372
2.887209	1	39	2.326	90.698
3.544565	1	40	2.326	93.023
3.833521	1	41	2.326	95.349
4.10924	1	42	2.326	97.674
4.949065	1	43	2.326	100.000

CROP=A ZONE=3

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
0.2148221	1	1	3.226	3.226
0.302619	1	2	3.226	6.452
0.3444561	1	3	3.226	9.677
0.3568502	1	4	3.226	12.903
0.4511264	1	5	3.226	16.129
0.5523997	1	6	3.226	19.355
0.5761529	1	7	3.226	22.581
0.5874727	1	8	3.226	25.806
0.7206692	1	9	3.226	29.032
0.7411363	1	10	3.226	32.258
0.7488517	1	11	3.226	35.484
0.7971553	1	12	3.226	38.710
0.8396476	2	14	6.452	45.161
0.9662746	1	15	3.226	48.387
0.9943195	1	16	3.226	51.613
1.010102	1	17	3.226	54.839
1.019815	1	18	3.226	58.065
1.104799	1	19	3.226	61.290
1.255454	1	20	3.226	64.516
1.470233	1	21	3.226	67.742
1.484574	1	22	3.226	70.968
1.502527	1	23	3.226	74.194
1.611166	1	24	3.226	77.419
1.712439	1	25	3.226	80.645
1.799799	1	26	3.226	83.871
1.830501	1	27	3.226	87.097
1.867111	1	28	3.226	90.323
2.109163	1	29	3.226	93.548
3.222332	1	30	3.226	96.774
3.797748	1	31	3.226	100.000

CROP=A   ZONE=4

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
0.1104799	1	1	5.556	5.556
0.2209599	1	2	5.556	11.111
0.3823834	1	3	5.556	16.667
0.4009025	1	4	5.556	22.222
0.4603331	1	5	5.556	27.778
0.4660873	1	6	5.556	33.333
0.5370553	1	7	5.556	38.889
0.5892264	1	8	5.556	44.444
0.6744415	1	9	5.556	50.000
0.7037572	1	10	5.556	55.556
0.8691089	1	11	5.556	61.111
0.9820439	1	12	5.556	66.667
1.019815	1	13	5.556	72.222
1.023781	1	14	5.556	77.778
1.072024	1	15	5.556	83.333
1.35031	1	16	5.556	88.889
1.933399	1	17	5.556	94.444
2.248801	1	18	5.556	100.000

CROP=C ZONE=1

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
0.2832819	1	1	0.217	0.217
0.2992165	1	2	0.217	0.435
0.6118889	1	3	0.217	0.652
0.632958	1	4	0.217	0.870
0.6407837	1	5	0.217	1.087
0.6518317	1	6	0.217	1.304
0.6695754	1	7	0.217	1.522
0.6798766	1	8	0.217	1.739
0.6991309	1	9	0.217	1.957
0.7030542	1	10	0.217	2.174
0.7818581	1	11	0.217	2.391
0.7931893	1	12	0.217	2.609
0.798855	1	13	0.217	2.826
0.8138689	1	14	0.217	3.043
0.8233518	1	15	0.217	3.261
0.8639033	1	16	0.217	3.478
0.8976495	1	17	0.217	3.696
0.9009294	1	18	0.217	3.913
0.9059355	1	19	0.217	4.130
0.9178334	2	21	0.435	4.565
0.9206662	1	22	0.217	4.783
0.9543059	2	24	0.435	5.217
0.9730126	1	25	0.217	5.435
1.021398	1	26	0.217	5.652
1.038391	1	27	0.217	5.870
1.039202	1	28	0.217	6.087
1.081491	1	29	0.217	6.304
1.104799	1	30	0.217	6.522
1.127816	1	31	0.217	6.739
1.131315	2	33	0.435	7.174
1.151399	1	34	0.217	7.391
1.182985	1	35	0.217	7.609
1.189784	1	36	0.217	7.826
1.214846	1	37	0.217	8.043
1.218529	1	38	0.217	8.261
1.223778	1	39	0.217	8.478
1.227332	2	41	0.435	8.913
1.22907	1	42	0.217	9.130
1.231702	1	43	0.217	9.348
1.242899	1	44	0.217	9.565
1.245155	1	45	0.217	9.783
1.24644	1	46	0.217	10.000
1.248654	1	47	0.217	10.217
1.262628	1	48	0.217	10.435
1.273564	1	49	0.217	10.652
1.287206	1	50	0.217	10.870
1.295543	1	51	0.217	11.087
1.317261	1	52	0.217	11.304
1.317453	1	53	0.217	11.522
1.33301	1	54	0.217	11.739
1.334966	1	55	0.217	11.957
1.352766	1	56	0.217	12.174
1.380122	1	57	0.217	12.391

CROP=C ZONE=1

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
1.380999	1	58	0.217	12.609
1.397847	1	59	0.217	12.826
1.420456	1	60	0.217	13.043
1.422687	1	61	0.217	13.261
1.437712	1	62	0.217	13.478
1.438541	1	63	0.217	13.696
1.447038	1	64	0.217	13.913
1.453391	1	65	0.217	14.130
1.458335	1	66	0.217	14.348
1.46079	1	67	0.217	14.565
1.473066	1	68	0.217	14.783
1.474907	1	69	0.217	15.000
1.478732	1	70	0.217	15.217
1.490233	1	71	0.217	15.435
1.501227	2	73	0.435	15.870
1.512059	1	74	0.217	16.087
1.527223	1	75	0.217	16.304
1.529722	2	77	0.435	16.739
1.532272	1	78	0.217	16.957
1.535701	1	79	0.217	17.174
1.543212	1	80	0.217	17.391
1.546719	1	81	0.217	17.609
1.553124	1	82	0.217	17.826
1.55805	2	84	0.435	18.261
1.559478	1	85	0.217	18.478
1.56992	1	86	0.217	18.696
1.570154	1	87	0.217	18.913
1.572215	1	88	0.217	19.130
1.574339	1	89	0.217	19.348
1.593461	3	92	0.652	20.000
1.595821	1	93	0.217	20.217
1.596214	1	94	0.217	20.435
1.599633	2	96	0.435	20.870
1.605276	1	97	0.217	21.087
1.620373	1	98	0.217	21.304
1.627738	1	99	0.217	21.522
1.639108	1	100	0.217	21.739
1.649015	1	101	0.217	21.957
1.653603	1	102	0.217	22.174
1.657199	1	103	0.217	22.391
1.667156	1	104	0.217	22.609
1.675612	1	105	0.217	22.826
1.682695	1	106	0.217	23.043
1.689901	1	107	0.217	23.261
1.697992	1	108	0.217	23.478
1.707836	1	109	0.217	23.696
1.712439	1	110	0.217	23.913
1.721646	1	111	0.217	24.130
1.731106	1	112	0.217	24.348
1.740635	1	113	0.217	24.565
1.743128	1	114	0.217	24.783
1.74487	1	115	0.217	25.000
1.751462	1	116	0.217	25.217
1.754032	1	117	0.217	25.435

CROP=C ZONE=1

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
1.757157	1	118	0.217	25.652
1.757635	1	119	0.217	25.870
1.760774	1	120	0.217	26.087
1.767679	2	122	0.435	26.522
1.788394	1	123	0.217	26.739
1.789775	2	125	0.435	27.174
1.795653	1	126	0.217	27.391
1.797601	1	127	0.217	27.609
1.802214	1	128	0.217	27.826
1.811871	1	129	0.217	28.043
1.812117	1	130	0.217	28.261
1.813004	1	131	0.217	28.478
1.826602	1	132	0.217	28.696
1.832564	1	133	0.217	28.913
1.836422	1	134	0.217	29.130
1.839491	1	135	0.217	29.348
1.840978	1	136	0.217	29.565
1.841332	1	137	0.217	29.783
1.852164	1	138	0.217	30.000
1.856063	1	139	0.217	30.217
1.858595	1	140	0.217	30.435
1.864349	1	141	0.217	30.652
1.865883	1	142	0.217	30.870
1.875326	1	143	0.217	31.087
1.875904	1	144	0.217	31.304
1.887366	2	146	0.435	31.739
1.888782	1	147	0.217	31.957
1.89374	1	148	0.217	32.174
1.903654	1	149	0.217	32.391
1.914065	1	150	0.217	32.609
1.917152	1	151	0.217	32.826
1.920651	1	152	0.217	33.043
1.924806	1	153	0.217	33.261
1.926976	1	154	0.217	33.478
1.94813	1	155	0.217	33.696
1.954645	1	156	0.217	33.913
1.964088	1	157	0.217	34.130
1.968016	1	158	0.217	34.348
1.974829	1	159	0.217	34.565
1.982973	1	160	0.217	34.783
1.985751	1	161	0.217	35.000
1.988639	4	165	0.870	35.870
2.019639	1	166	0.217	36.087
2.032548	1	167	0.217	36.304
2.032831	2	169	0.435	36.739
2.034672	1	170	0.217	36.957
2.03963	2	172	0.435	37.391
2.041248	1	173	0.217	37.609
2.055848	1	174	0.217	37.826
2.062292	2	176	0.435	38.261
2.063901	1	177	0.217	38.478
2.071499	1	178	0.217	38.696
2.088071	2	180	0.435	39.130
2.09402	1	181	0.217	39.348

CROP=C ZONE=1

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
2.094516	1	182	0.217	39.565
2.101623	1	183	0.217	39.783
2.106975	1	184	0.217	40.000
2.114902	1	185	0.217	40.217
2.117287	1	186	0.217	40.435
2.119541	1	187	0.217	40.652
2.120179	1	188	0.217	40.870
2.120322	2	190	0.435	41.304
2.124308	1	191	0.217	41.522
2.132425	1	192	0.217	41.739
2.140115	1	193	0.217	41.957
2.154359	2	195	0.435	42.391
2.166438	1	196	0.217	42.609
2.169424	1	197	0.217	42.826
2.177781	1	198	0.217	43.043
2.1829	1	199	0.217	43.261
2.183604	1	200	0.217	43.478
2.2028	1	201	0.217	43.696
2.209599	2	203	0.435	44.130
2.23906	1	204	0.217	44.348
2.240502	1	205	0.217	44.565
2.253791	1	206	0.217	44.783
2.254712	1	207	0.217	45.000
2.254773	1	208	0.217	45.217
2.257374	1	209	0.217	45.435
2.25897	1	210	0.217	45.652
2.26366	1	211	0.217	45.870
2.266255	1	212	0.217	46.087
2.272204	1	213	0.217	46.304
2.27273	1	214	0.217	46.522
2.275098	1	215	0.217	46.739
2.276556	1	216	0.217	46.957
2.279864	1	217	0.217	47.174
2.281836	1	218	0.217	47.391
2.287501	1	219	0.217	47.609
2.290397	1	220	0.217	47.826
2.291436	1	221	0.217	48.043
2.29304	1	222	0.217	48.261
2.313174	1	223	0.217	48.478
2.343514	1	224	0.217	48.696
2.345668	2	226	0.435	49.130
2.349891	1	227	0.217	49.348
2.35639	1	228	0.217	49.565
2.361509	1	229	0.217	49.783
2.375319	1	230	0.217	50.000
2.379568	1	231	0.217	50.217
2.384813	2	233	0.435	50.652
2.393732	1	234	0.217	50.870
2.403202	1	235	0.217	51.087
2.414978	1	236	0.217	51.304
2.417491	1	237	0.217	51.522
2.42206	1	238	0.217	51.739
2.430559	2	240	0.435	52.174
2.435469	1	241	0.217	52.391

CROP=C ZONE=1

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
2.438178	1	242	0.217	52.609
2.4587	1	243	0.217	52.826
2.463629	1	244	0.217	53.043
2.466465	2	246	0.435	53.478
2.473618	1	247	0.217	53.696
2.475959	1	248	0.217	53.913
2.485799	3	251	0.652	54.565
2.488868	2	253	0.435	55.000
2.501855	2	255	0.435	55.435
2.506478	1	256	0.217	55.652
2.525256	1	257	0.217	55.870
2.526603	1	258	0.217	56.087
2.528291	1	259	0.217	56.304
2.531773	1	260	0.217	56.522
2.536947	1	261	0.217	56.739
2.547397	1	262	0.217	56.957
2.549537	3	265	0.652	57.609
2.552087	1	266	0.217	57.826
2.563135	1	267	0.217	58.043
2.566817	1	268	0.217	58.261
2.568659	1	269	0.217	58.478
2.589197	1	270	0.217	58.696
2.589374	1	271	0.217	58.913
2.591257	1	272	0.217	59.130
2.604381	1	273	0.217	59.348
2.606194	1	274	0.217	59.565
2.619602	1	275	0.217	59.783
2.651519	2	277	0.435	60.217
2.655662	1	278	0.217	60.435
2.656459	1	279	0.217	60.652
2.668195	1	280	0.217	60.870
2.68154	1	281	0.217	61.087
2.700621	1	282	0.217	61.304
2.701955	1	283	0.217	61.522
2.709521	1	284	0.217	61.739
2.713443	1	285	0.217	61.957
2.71426	1	286	0.217	62.174
2.719506	1	287	0.217	62.391
2.725172	1	288	0.217	62.609
2.728855	1	289	0.217	62.826
2.730251	1	290	0.217	63.043
2.734379	1	291	0.217	63.261
2.734793	1	292	0.217	63.478
2.73645	1	293	0.217	63.696
2.777548	1	294	0.217	63.913
2.783409	1	295	0.217	64.130
2.787108	1	296	0.217	64.348
2.791072	1	297	0.217	64.565
2.810434	1	298	0.217	64.783
2.825248	1	299	0.217	65.000
2.832304	1	300	0.217	65.217
2.836768	1	301	0.217	65.435
2.846334	1	302	0.217	65.652
2.855482	2	304	0.435	66.087

CROP=C ZONE=1

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
2.866955	1	305	0.217	66.304
2.873834	1	306	0.217	66.522
2.882085	2	308	0.435	66.957
2.887209	1	309	0.217	67.174
2.9284	1	310	0.217	67.391
2.940552	1	311	0.217	67.609
2.946132	1	312	0.217	67.826
2.949814	2	314	0.435	68.261
2.956489	1	315	0.217	68.478
2.96048	1	316	0.217	68.696
2.986641	1	317	0.217	68.913
2.992165	1	318	0.217	69.130
2.994352	1	319	0.217	69.348
2.997581	1	320	0.217	69.565
2.998799	1	321	0.217	69.783
2.999346	1	322	0.217	70.000
3.00069	1	323	0.217	70.217
3.005054	2	325	0.435	70.652
3.032783	1	326	0.217	70.870
3.036417	1	327	0.217	71.087
3.052735	1	328	0.217	71.304
3.055308	1	329	0.217	71.522
3.059445	1	330	0.217	71.739
3.068887	3	333	0.652	72.391
3.093438	1	334	0.217	72.609
3.107248	1	335	0.217	72.826
3.126744	1	336	0.217	73.043
3.126791	1	337	0.217	73.261
3.130265	1	338	0.217	73.478
3.131738	1	339	0.217	73.696
3.168175	1	340	0.217	73.913
3.175024	1	341	0.217	74.130
3.208061	1	342	0.217	74.348
3.211468	1	343	0.217	74.565
3.226335	1	344	0.217	74.783
3.240515	1	345	0.217	75.000
3.254555	1	346	0.217	75.217
3.260575	1	347	0.217	75.435
3.283905	1	348	0.217	75.652
3.295016	1	349	0.217	75.870
3.314398	1	350	0.217	76.087
3.327057	1	351	0.217	76.304
3.342018	1	352	0.217	76.522
3.355828	1	353	0.217	76.739
3.375487	1	354	0.217	76.957
3.383448	1	355	0.217	77.174
3.386579	2	357	0.435	77.609
3.388052	1	358	0.217	77.826
3.393313	1	359	0.217	78.043
3.394496	1	360	0.217	78.261
3.396395	1	361	0.217	78.478
3.399272	1	362	0.217	78.696
3.401833	1	363	0.217	78.913
3.406465	1	364	0.217	79.130

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
3.414835	1	365	0.217	79.348
3.417973	1	366	0.217	79.565
3.421069	1	367	0.217	79.783
3.421541	1	368	0.217	80.000
3.428688	2	370	0.435	80.435
3.448355	1	371	0.217	80.652
3.464237	1	372	0.217	80.870
3.487023	1	373	0.217	81.087
3.498532	1	374	0.217	81.304
3.508163	1	375	0.217	81.522
3.508601	1	376	0.217	81.739
3.512696	1	377	0.217	81.957
3.52431	1	378	0.217	82.174
3.52922	1	379	0.217	82.391
3.531062	2	381	0.435	82.826
3.532451	1	382	0.217	83.043
3.57955	1	383	0.217	83.261
3.58295	1	384	0.217	83.478
3.595713	1	385	0.217	83.696
3.630395	1	386	0.217	83.913
3.63433	1	387	0.217	84.130
3.63992	1	388	0.217	84.348
3.640051	1	389	0.217	84.565
3.640633	1	390	0.217	84.783
3.655882	1	391	0.217	85.000
3.657782	1	392	0.217	85.217
3.658906	1	393	0.217	85.435
3.662541	1	394	0.217	85.652
3.682665	1	395	0.217	85.870
3.700669	1	396	0.217	86.087
3.70338	1	397	0.217	86.304
3.714888	1	398	0.217	86.522
3.717003	1	399	0.217	86.739
3.734222	1	400	0.217	86.957
3.780869	1	401	0.217	87.174
3.785473	3	404	0.652	87.826
3.803272	1	405	0.217	88.043
3.824306	1	406	0.217	88.261
3.830662	1	407	0.217	88.478
3.844702	1	408	0.217	88.696
3.850167	1	409	0.217	88.913
3.914982	1	410	0.217	89.130
3.935848	1	411	0.217	89.348
3.949658	1	412	0.217	89.565
3.965002	1	413	0.217	89.783
3.986574	1	414	0.217	90.000
3.987635	1	415	0.217	90.217
3.988786	1	416	0.217	90.435
4.0396	1	417	0.217	90.652
4.049592	2	419	0.435	91.087
4.058297	1	420	0.217	91.304
4.066276	1	421	0.217	91.522
4.072042	1	422	0.217	91.739
4.085456	1	423	0.217	91.957

CROP=C ZONE=1

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
4.101568	1	424	0.217	92.174
4.106921	1	425	0.217	92.391
4.134088	1	426	0.217	92.609
4.14184	1	427	0.217	92.826
4.164244	1	428	0.217	93.043
4.178151	1	429	0.217	93.261
4.197485	1	430	0.217	93.478
4.198238	1	431	0.217	93.696
4.324015	1	432	0.217	93.913
4.330814	1	433	0.217	94.130
4.419198	1	434	0.217	94.348
4.446818	1	435	0.217	94.565
4.454551	1	436	0.217	94.783
4.474438	1	437	0.217	95.000
4.589167	3	440	0.652	95.652
4.598728	1	441	0.217	95.870
4.603331	1	442	0.217	96.087
4.626348	1	443	0.217	96.304
4.640158	1	444	0.217	96.522
4.653415	1	445	0.217	96.739
4.656789	1	446	0.217	96.957
4.660873	1	447	0.217	97.174
4.674529	1	448	0.217	97.391
4.687028	1	449	0.217	97.609
4.695398	1	450	0.217	97.826
4.713811	1	451	0.217	98.043
4.743272	1	452	0.217	98.261
4.828383	1	453	0.217	98.478
4.833498	1	454	0.217	98.696
4.861118	1	455	0.217	98.913
4.928272	1	456	0.217	99.130
4.93672	1	457	0.217	99.348
4.956253	1	458	0.217	99.565
4.971597	2	460	0.435	100.000

CROP=C ZONE=2

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
0.1227555	1	1	0.311	0.311
0.1841332	2	3	0.621	0.932
0.2496722	1	4	0.311	1.242
0.4373164	1	5	0.311	1.553
0.5523997	1	6	0.311	1.863
0.5800197	1	7	0.311	2.174
0.626053	1	8	0.311	2.484
0.6940407	1	9	0.311	2.795
0.6977681	1	10	0.311	3.106
0.702008	1	11	0.311	3.416
0.713065	1	12	0.311	3.727
0.7432784	1	13	0.311	4.037
0.812588	1	14	0.311	4.348
0.8421027	1	15	0.311	4.658
0.8498457	1	16	0.311	4.969
0.8661628	1	17	0.311	5.280
0.904708	1	18	0.311	5.590
0.9055733	1	19	0.311	5.901
0.9369549	1	20	0.311	6.211
0.9583802	1	21	0.311	6.522
0.9728999	1	22	0.311	6.832
0.9928753	1	23	0.311	7.143
1.012733	1	24	0.311	7.453
1.02772	1	25	0.311	7.764
1.070846	1	26	0.311	8.075
1.077179	1	27	0.311	8.385
1.100797	1	28	0.311	8.696
1.133128	1	29	0.311	9.006
1.158355	1	30	0.311	9.317
1.160039	1	31	0.311	9.627
1.185358	1	32	0.311	9.938
1.186035	1	33	0.311	10.248
1.198707	1	34	0.311	10.559
1.202316	1	35	0.311	10.870
1.206441	1	36	0.311	11.180
1.208374	1	37	0.311	11.491
1.240226	1	38	0.311	11.801
1.242899	1	39	0.311	12.112
1.253329	1	40	0.311	12.422
1.260576	1	41	0.311	12.733
1.262021	1	42	0.311	13.043
1.299674	1	43	0.311	13.354
1.306118	1	44	0.311	13.665
1.325759	1	45	0.311	13.975
1.349194	1	46	0.311	14.286
1.36337	1	47	0.311	14.596
1.364752	2	49	0.621	15.217
1.369951	1	50	0.311	15.528
1.380999	3	53	0.932	16.460
1.385157	1	54	0.311	16.770
1.39658	1	55	0.311	17.081
1.428874	1	56	0.311	17.391
1.439587	2	58	0.621	18.012

CROP=C ZONE=2

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
1.46588	1	59	0.311	18.323
1.473066	1	60	0.311	18.634
1.477021	1	61	0.311	18.944
1.484397	1	62	0.311	19.255
1.489901	1	63	0.311	19.565
1.516391	1	64	0.311	19.876
1.534444	1	65	0.311	20.186
1.537878	1	66	0.311	20.497
1.539408	1	67	0.311	20.807
1.565133	1	68	0.311	21.118
1.566053	1	69	0.311	21.429
1.566806	1	70	0.311	21.739
1.593461	1	71	0.311	22.050
1.595231	1	72	0.311	22.360
1.59871	1	73	0.311	22.671
1.611166	2	75	0.621	23.292
1.620848	1	76	0.311	23.602
1.623772	1	77	0.311	23.913
1.623908	1	78	0.311	24.224
1.62533	1	79	0.311	24.534
1.627068	2	81	0.621	25.155
1.628007	1	82	0.311	25.466
1.630894	1	83	0.311	25.776
1.631284	1	84	0.311	26.087
1.631704	1	85	0.311	26.398
1.637703	1	86	0.311	26.708
1.638151	1	87	0.311	27.019
1.656083	1	88	0.311	27.329
1.657199	3	91	0.932	28.261
1.668007	1	92	0.311	28.571
1.683504	1	93	0.311	28.882
1.683703	2	95	0.621	29.503
1.699691	1	96	0.311	29.814
1.712047	1	97	0.311	30.124
1.717618	1	98	0.311	30.435
1.724218	1	99	0.311	30.745
1.726249	1	100	0.311	31.056
1.737257	1	101	0.311	31.366
1.738343	1	102	0.311	31.677
1.748038	1	103	0.311	31.988
1.796422	1	104	0.311	32.298
1.79736	1	105	0.311	32.609
1.827793	1	106	0.311	32.919
1.830284	1	107	0.311	33.230
1.839916	1	108	0.311	33.540
1.841332	1	109	0.311	33.851
1.842416	2	111	0.621	34.472
1.84373	1	112	0.311	34.783
1.858663	2	114	0.621	35.404
1.863428	1	115	0.311	35.714
1.90762	1	116	0.311	36.025
1.915483	1	117	0.311	36.335
1.929947	1	118	0.311	36.646
1.931097	1	119	0.311	36.957

CROP=C ZONE=2

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
1.934753	1	120	0.311	37.267
1.949646	1	121	0.311	37.578
1.951812	1	122	0.311	37.888
1.956416	1	123	0.311	38.199
1.957073	1	124	0.311	38.509
1.964088	1	125	0.311	38.820
1.969098	1	126	0.311	39.130
1.969203	1	127	0.311	39.441
1.972856	1	128	0.311	39.752
1.97598	1	129	0.311	40.062
1.97734	1	130	0.311	40.373
1.977727	1	131	0.311	40.683
1.98214	2	133	0.621	41.304
1.982973	1	134	0.311	41.615
1.988639	2	136	0.621	42.236
1.992888	1	137	0.311	42.547
1.997846	1	138	0.311	42.857
2.00448	1	139	0.311	43.168
2.006592	2	141	0.621	43.789
2.025466	1	142	0.311	44.099
2.032831	1	143	0.311	44.410
2.05796	1	144	0.311	44.720
2.062292	2	146	0.621	45.342
2.071499	1	147	0.311	45.652
2.073624	1	148	0.311	45.963
2.074568	1	149	0.311	46.273
2.075642	1	150	0.311	46.584
2.083336	1	151	0.311	46.894
2.099931	1	152	0.311	47.205
2.101285	1	153	0.311	47.516
2.106484	2	155	0.621	48.137
2.109811	1	156	0.311	48.447
2.111394	1	157	0.311	48.758
2.121215	1	158	0.311	49.068
2.129317	1	159	0.311	49.379
2.13495	1	160	0.311	49.689
2.141903	1	161	0.311	50.000
2.144611	1	162	0.311	50.311
2.148835	1	163	0.311	50.621
2.152942	1	164	0.311	50.932
2.154359	1	165	0.311	51.242
2.155209	1	166	0.311	51.553
2.155442	1	167	0.311	51.863
2.156989	1	168	0.311	52.174
2.163462	1	169	0.311	52.484
2.173016	1	170	0.311	52.795
2.17612	1	171	0.311	53.106
2.180525	1	172	0.311	53.416
2.18252	1	173	0.311	53.727
2.193352	2	175	0.621	54.348
2.204407	1	176	0.311	54.658
2.209599	2	178	0.621	55.280
2.212922	1	179	0.311	55.590
2.223763	1	180	0.311	55.901

CROP=C ZONE=2

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
2.24705	1	181	0.311	56.211
2.250517	1	182	0.311	56.522
2.253791	1	183	0.311	56.832
2.261266	1	184	0.311	57.143
2.263756	1	185	0.311	57.453
2.266255	1	186	0.311	57.764
2.278649	1	187	0.311	58.075
2.280003	1	188	0.311	58.385
2.289948	1	189	0.311	58.696
2.301665	2	191	0.621	59.317
2.314818	1	192	0.311	59.627
2.328744	1	193	0.311	59.938
2.379001	1	194	0.311	60.248
2.379568	1	195	0.311	60.559
2.382224	1	196	0.311	60.870
2.38301	1	197	0.311	61.180
2.410611	1	198	0.311	61.491
2.412882	1	199	0.311	61.801
2.450052	1	200	0.311	62.112
2.459905	1	201	0.311	62.422
2.474751	1	202	0.311	62.733
2.478717	1	203	0.311	63.043
2.485799	1	204	0.311	63.354
2.496422	1	205	0.311	63.665
2.496637	1	206	0.311	63.975
2.498546	1	207	0.311	64.286
2.513419	1	208	0.311	64.596
2.52205	1	209	0.311	64.907
2.528236	1	210	0.311	65.217
2.537423	1	211	0.311	65.528
2.549537	1	212	0.311	65.839
2.554849	1	213	0.311	66.149
2.557406	1	214	0.311	66.460
2.558817	1	215	0.311	66.770
2.574391	1	216	0.311	67.081
2.577865	1	217	0.311	67.391
2.589374	1	218	0.311	67.702
2.589702	1	219	0.311	68.012
2.59812	2	221	0.621	68.634
2.613067	1	222	0.311	68.944
2.613091	1	223	0.311	69.255
2.614201	1	224	0.311	69.565
2.617494	1	225	0.311	69.876
2.623236	1	226	0.311	70.186
2.651519	3	229	0.932	71.118
2.665548	1	230	0.311	71.429
2.678034	1	231	0.311	71.739
2.688345	2	233	0.621	72.360
2.691178	1	234	0.311	72.671
2.692949	1	235	0.311	72.981
2.699631	1	236	0.311	73.292
2.700621	1	237	0.311	73.602
2.709521	1	238	0.311	73.913
2.725172	1	239	0.311	74.224

CROP=C ZONE=2

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
2.761999	4	243	1.242	75.466
2.766909	1	244	0.311	75.776
2.785015	1	245	0.311	76.087
2.795143	1	246	0.311	76.398
2.799132	1	247	0.311	76.708
2.799848	1	248	0.311	77.019
2.806927	1	249	0.311	77.329
2.808646	1	250	0.311	77.640
2.808982	1	251	0.311	77.950
2.813147	1	252	0.311	78.261
2.81417	1	253	0.311	78.571
2.851095	1	254	0.311	78.882
2.870433	1	255	0.311	79.193
2.872479	2	257	0.621	79.814
2.875931	1	258	0.311	80.124
2.884754	1	259	0.311	80.435
2.890621	1	260	0.311	80.745
2.914385	1	261	0.311	81.056
2.924469	1	262	0.311	81.366
2.928455	1	263	0.311	81.677
2.942355	1	264	0.311	81.988
3.000144	1	265	0.311	82.298
3.005054	1	266	0.311	82.609
3.013647	1	267	0.311	82.919
3.017553	1	268	0.311	83.230
3.034516	1	269	0.311	83.540
3.056045	1	270	0.311	83.851
3.061215	1	271	0.311	84.161
3.093438	2	273	0.621	84.783
3.139472	1	274	0.311	85.093
3.149648	1	275	0.311	85.404
3.179175	1	276	0.311	85.714
3.188825	1	277	0.311	86.025
3.200109	1	278	0.311	86.335
3.226014	1	279	0.311	86.646
3.240745	1	280	0.311	86.957
3.245655	1	281	0.311	87.267
3.263408	1	282	0.311	87.578
3.268365	1	283	0.311	87.888
3.293445	1	284	0.311	88.199
3.314398	2	286	0.621	88.820
3.35859	1	287	0.311	89.130
3.378942	1	288	0.311	89.441
3.384905	1	289	0.311	89.752
3.409095	1	290	0.311	90.062
3.431783	1	291	0.311	90.373
3.44578	1	292	0.311	90.683
3.45075	1	293	0.311	90.994
3.505227	2	295	0.621	91.615
3.544034	1	296	0.311	91.925
3.602946	1	297	0.311	92.236
3.610907	1	298	0.311	92.547
3.649784	2	300	0.621	93.168
3.712126	1	301	0.311	93.478

CROP=C   ZONE=2

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
3.726092	1	302	0.311	93.789
3.770633	1	303	0.311	94.099
3.781978	1	304	0.311	94.410
3.816293	1	305	0.311	94.720
4.006279	1	306	0.311	95.031
4.106103	1	307	0.311	95.342
4.142998	1	308	0.311	95.652
4.275983	1	309	0.311	95.963
4.375006	1	310	0.311	96.273
4.400784	1	311	0.311	96.584
4.419198	2	313	0.621	97.205
4.433928	1	314	0.311	97.516
4.441294	1	315	0.311	97.826
4.594215	1	316	0.311	98.137
4.687506	1	317	0.311	98.447
4.713811	1	318	0.311	98.758
4.807923	1	319	0.311	99.068
4.828383	1	320	0.311	99.379
4.91022	1	321	0.311	99.689
4.953184	1	322	0.311	100.000

CROP=C ZONE=3

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
0.1172692	1	1	1.449	1.449
0.1395536	1	2	1.449	2.899
0.1556634	1	3	1.449	4.348
0.2946132	1	4	1.449	5.797
0.3119434	1	5	1.449	7.246
0.7138704	1	6	1.449	8.696
0.7181196	1	7	1.449	10.145
0.837523	1	8	1.449	11.594
0.8838395	1	9	1.449	13.043
0.8953654	1	10	1.449	14.493
0.9008787	1	11	1.449	15.942
0.9609453	1	12	1.449	17.391
1.028557	1	13	1.449	18.841
1.033793	1	14	1.449	20.290
1.079463	1	15	1.449	21.739
1.098001	1	16	1.449	23.188
1.113245	1	17	1.449	24.638
1.156539	1	18	1.449	26.087
1.191909	1	19	1.449	27.536
1.223778	1	20	1.449	28.986
1.231303	1	21	1.449	30.435
1.24644	1	22	1.449	31.884
1.272729	1	23	1.449	33.333
1.300264	1	24	1.449	34.783
1.3097	1	25	1.449	36.232
1.325759	2	27	2.899	39.130
1.364073	1	28	1.449	40.580
1.469085	1	29	1.449	42.029
1.473066	1	30	1.449	43.478
1.504935	1	31	1.449	44.928
1.516975	2	33	2.899	47.826
1.554301	1	34	1.449	49.275
1.641162	1	35	1.449	50.725
1.654776	1	36	1.449	52.174
1.656161	1	37	1.449	53.623
1.68733	1	38	1.449	55.072
1.699691	1	39	1.449	56.522
1.716613	1	40	1.449	57.971
1.741082	1	41	1.449	59.420
1.767679	1	42	1.449	60.870
1.784676	2	44	2.899	63.768
1.855282	2	46	2.899	66.667
1.875397	2	48	2.899	69.565
1.913259	1	49	1.449	71.014
1.991987	1	50	1.449	72.464
2.0181	1	51	1.449	73.913
2.034355	1	52	1.449	75.362
2.045925	1	53	1.449	76.812
2.159094	1	54	1.449	78.261
2.209599	1	55	1.449	79.710
2.21469	1	56	1.449	81.159
2.237219	1	57	1.449	82.609
2.239298	1	58	1.449	84.058

CROP=C   ZONE=3

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
2.297481	1	59	1.449	85.507
2.410471	1	60	1.449	86.957
2.45511	1	61	1.449	88.406
2.475729	1	62	1.449	89.855
2.651519	1	63	1.449	91.304
2.772581	1	64	1.449	92.754
2.789005	1	65	1.449	94.203
3.190108	1	66	1.449	95.652
3.314398	1	67	1.449	97.101
3.661621	1	68	1.449	98.551
3.680727	1	69	1.449	100.000

CROP=C ZONE=4

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
0.1131104	1	1	0.667	0.667
0.1767679	1	2	0.667	1.333
0.2832819	1	3	0.667	2.000
0.3314398	1	4	0.667	2.667
0.3360432	1	5	0.667	3.333
0.3452498	1	6	0.667	4.000
0.3567582	1	7	0.667	4.667
0.3716144	1	8	0.667	5.333
0.3793145	1	9	0.667	6.000
0.3928176	1	10	0.667	6.667
0.3938405	1	11	0.667	7.333
0.3945712	1	12	0.667	8.000
0.3955182	1	13	0.667	8.667
0.3987246	1	14	0.667	9.333
0.4002896	1	15	0.667	10.000
0.4213818	2	17	1.333	11.333
0.4327131	1	18	0.667	12.000
0.4368561	1	19	0.667	12.667
0.4419198	1	20	0.667	13.333
0.4670289	1	21	0.667	14.000
0.4833498	1	22	0.667	14.667
0.4835799	1	23	0.667	15.333
0.4854025	1	24	0.667	16.000
0.5011055	1	25	0.667	16.667
0.5272906	1	26	0.667	17.333
0.5333127	1	27	0.667	18.000
0.5365103	1	28	0.667	18.667
0.5415683	1	29	0.667	19.333
0.5523997	2	31	1.333	20.667
0.5665638	1	32	0.667	21.333
0.5700239	1	33	0.667	22.000
0.5744957	1	34	0.667	22.667
0.5800197	1	35	0.667	23.333
0.5960102	1	36	0.667	24.000
0.6011701	1	37	0.667	24.667
0.6067898	1	38	0.667	25.333
0.6573557	1	39	0.667	26.000
0.6576187	1	40	0.667	26.667
0.6593961	1	41	0.667	27.333
0.6715931	1	42	0.667	28.000
0.6904996	3	45	2.000	30.000
0.6932075	1	46	0.667	30.667
0.6944454	1	47	0.667	31.333
0.6960236	1	48	0.667	32.000
0.6972512	1	49	0.667	32.667
0.7181196	1	50	0.667	33.333
0.7186862	1	51	0.667	34.000
0.736533	1	52	0.667	34.667
0.7488085	1	53	0.667	35.333
0.7575768	1	54	0.667	36.000
0.7595496	1	55	0.667	36.667
0.7617301	2	57	1.333	38.000
0.7673334	1	58	0.667	38.667

CROP=C   ZONE=4

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
0.8034905	1	59	0.667	39.333
0.8055829	1	60	0.667	40.000
0.8135341	1	61	0.667	40.667
0.8285996	2	63	1.333	42.000
0.8369693	1	64	0.667	42.667
0.8451716	1	65	0.667	43.333
0.848486	1	66	0.667	44.000
0.8498457	2	68	1.333	45.333
0.8577776	1	69	0.667	46.000
0.8586213	1	70	0.667	46.667
0.8592884	1	71	0.667	47.333
0.8625934	1	72	0.667	48.000
0.8781739	1	73	0.667	48.667
0.8823051	1	74	0.667	49.333
0.913827	1	75	0.667	50.000
0.9274859	1	76	0.667	50.667
0.9444876	1	77	0.667	51.333
0.9476724	1	78	0.667	52.000
0.9545467	1	79	0.667	52.667
0.9634772	1	80	0.667	53.333
0.9677075	1	81	0.667	54.000
0.9820439	2	83	1.333	55.333
0.9914867	1	84	0.667	56.000
1.00905	1	85	0.667	56.667
1.016057	1	86	0.667	57.333
1.017578	1	87	0.667	58.000
1.025008	1	88	0.667	58.667
1.031146	1	89	0.667	59.333
1.041964	1	90	0.667	60.000
1.050564	1	91	0.667	60.667
1.073589	2	93	1.333	62.000
1.107632	1	94	0.667	62.667
1.160039	1	95	0.667	63.333
1.177664	1	96	0.667	64.000
1.178453	1	97	0.667	64.667
1.182481	1	98	0.667	65.333
1.216467	1	99	0.667	66.000
1.246735	1	100	0.667	66.667
1.259471	1	101	0.667	67.333
1.278411	1	102	0.667	68.000
1.294687	1	103	0.667	68.667
1.300037	1	104	0.667	69.333
1.30893	1	105	0.667	70.000
1.3365	1	106	0.667	70.667
1.358095	1	107	0.667	71.333
1.380999	2	109	1.333	72.667
1.382416	1	110	0.667	73.333
1.390456	1	111	0.667	74.000
1.422429	1	112	0.667	74.667
1.473066	1	113	0.667	75.333
1.481532	1	114	0.667	76.000
1.482886	1	115	0.667	76.667
1.506545	1	116	0.667	77.333
1.509893	1	117	0.667	78.000

CROP=C ZONE=4

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
1.521101	1	118	0.667	78.667
1.534444	1	119	0.667	79.333
1.563905	1	120	0.667	80.000
1.58448	1	121	0.667	80.667
1.592753	1	122	0.667	81.333
1.625633	1	123	0.667	82.000
1.698936	1	124	0.667	82.667
1.714741	1	125	0.667	83.333
1.727784	1	126	0.667	84.000
1.738795	1	127	0.667	84.667
1.833967	1	128	0.667	85.333
1.896572	1	129	0.667	86.000
1.927645	1	130	0.667	86.667
1.933399	1	131	0.667	87.333
1.996925	1	132	0.667	88.000
1.999434	1	133	0.667	88.667
2.001637	2	135	1.333	90.000
2.005559	1	136	0.667	90.667
2.025466	1	137	0.667	91.333
2.169775	1	138	0.667	92.000
2.209599	1	139	0.667	92.667
2.235378	1	140	0.667	93.333
2.320079	1	141	0.667	94.000
2.33347	1	142	0.667	94.667
2.459713	1	143	0.667	95.333
2.577865	1	144	0.667	96.000
2.651519	1	145	0.667	96.667
2.700621	1	146	0.667	97.333
2.737556	1	147	0.667	98.000
3.149648	1	148	0.667	98.667
3.535358	1	149	0.667	99.333
4.142998	1	150	0.667	100.000

CROP=C ZONE=5

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
0.1473066	1	1	2.326	2.326
0.1526632	1	2	2.326	4.651
0.1687888	1	3	2.326	6.977
0.2550698	1	4	2.326	9.302
0.277283	1	5	2.326	11.628
0.2921581	1	6	2.326	13.953
0.3541024	1	7	2.326	16.279
0.3590598	1	8	2.326	18.605
0.3604006	1	9	2.326	20.930
0.465068	1	10	2.326	23.256
0.4833498	2	12	4.651	27.907
0.4888383	1	13	2.326	30.233
0.5099074	1	14	2.326	32.558
0.5291639	1	15	2.326	34.884
0.5310403	1	16	2.326	37.209
0.5324771	1	17	2.326	39.535
0.5337473	1	18	2.326	41.860
0.5358277	1	19	2.326	44.186
0.5523997	1	20	2.326	46.512
0.5671304	1	21	2.326	48.837
0.5892264	1	22	2.326	51.163
0.6363645	1	23	2.326	53.488
0.6677538	1	24	2.326	55.814
0.6684037	1	25	2.326	58.140
0.681293	1	26	2.326	60.465
0.7055986	1	27	2.326	62.791
0.7181196	1	28	2.326	65.116
0.8309431	1	29	2.326	67.442
0.8838395	1	30	2.326	69.767
0.9185947	2	32	4.651	74.419
0.9943195	1	33	2.326	76.744
1.087803	1	34	2.326	79.070
1.242899	1	35	2.326	81.395
1.255983	1	36	2.326	83.721
1.265916	1	37	2.326	86.047
1.34049	1	38	2.326	88.372
1.382878	1	39	2.326	90.698
2.320079	1	40	2.326	93.023
2.545458	1	41	2.326	95.349
3.70712	1	42	2.326	97.674
4.358661	1	43	2.326	100.000

CROP=M ZONE=1

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
0.1895489	1	1	1.429	1.429
0.4567084	1	2	1.429	2.857
0.4770725	1	3	1.429	4.286
0.4798839	1	4	1.429	5.714
0.490464	1	5	1.429	7.143
0.5904091	1	6	1.429	8.571
0.59873	1	7	1.429	10.000
0.6643182	1	8	1.429	11.429
0.6904996	2	10	2.857	14.286
0.7310665	1	11	1.429	15.714
0.7733596	1	12	1.429	17.143
0.8359649	1	13	1.429	18.571
0.9178334	1	14	1.429	20.000
1.039634	1	15	1.429	21.429
1.235994	1	16	1.429	22.857
1.241194	1	17	1.429	24.286
1.266574	1	18	1.429	25.714
1.463434	1	19	1.429	27.143
1.480457	1	20	1.429	28.571
1.493604	2	22	2.857	31.429
1.534093	1	23	1.429	32.857
1.596543	1	24	1.429	34.286
1.62226	1	25	1.429	35.714
1.690343	1	26	1.429	37.143
1.770512	1	27	1.429	38.571
1.775571	1	28	1.429	40.000
1.897207	1	29	1.429	41.429
1.944772	1	30	1.429	42.857
1.951812	1	31	1.429	44.286
1.952549	1	32	1.429	45.714
2.03963	1	33	1.429	47.143
2.106909	1	34	1.429	48.571
2.158679	1	35	1.429	50.000
2.160308	1	36	1.429	51.429
2.198071	1	37	1.429	52.857
2.228012	1	38	1.429	54.286
2.27347	1	39	1.429	55.714
2.313174	1	40	1.429	57.143
2.352154	1	41	1.429	58.571
2.356905	1	42	1.429	60.000
2.386367	1	43	1.429	61.429
2.486857	2	45	2.857	64.286
2.549537	1	46	1.429	65.714
2.575906	1	47	1.429	67.143
2.577865	1	48	1.429	68.571
2.598979	1	49	1.429	70.000
2.723535	1	50	1.429	71.429
2.812217	1	51	1.429	72.857
2.900099	1	52	1.429	74.286
3.013089	1	53	1.429	75.714
3.01408	1	54	1.429	77.143
3.065818	1	55	1.429	78.571
3.105478	1	56	1.429	80.000

CROP=M ZONE=1

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
3.281254	1	57	1.429	81.429
3.343363	1	58	1.429	82.857
3.365577	1	59	1.429	84.286
3.429127	1	60	1.429	85.714
3.509119	1	61	1.429	87.143
3.615707	1	62	1.429	88.571
3.833492	2	64	2.857	91.429
3.934637	1	65	1.429	92.857
3.976127	1	66	1.429	94.286
4.253478	1	67	1.429	95.714
4.305885	1	68	1.429	97.143
4.419198	1	69	1.429	98.571
4.895111	1	70	1.429	100.000

CROP=M ZONE=2

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
0.1964088	1	1	1.887	1.887
0.2300249	1	2	1.887	3.774
0.3963468	1	3	1.887	5.660
0.4170618	1	4	1.887	7.547
0.4704307	1	5	1.887	9.434
0.4733264	1	6	1.887	11.321
0.4813562	1	7	1.887	13.208
0.6997063	1	8	1.887	15.094
0.7011227	1	9	1.887	16.981
0.7083714	1	10	1.887	18.868
0.7506971	1	11	1.887	20.755
0.9091933	1	12	1.887	22.642
0.9121677	1	13	1.887	24.528
0.9411254	1	14	1.887	26.415
0.9427622	1	15	1.887	28.302
1.104799	1	16	1.887	30.189
1.147292	2	18	3.774	33.962
1.251556	1	19	1.887	35.849
1.288933	2	21	3.774	39.623
1.325759	2	23	3.774	43.396
1.432787	1	24	1.887	45.283
1.456794	1	25	1.887	47.170
1.491479	1	26	1.887	49.057
1.505801	1	27	1.887	50.943
1.576123	1	28	1.887	52.830
1.584112	1	29	1.887	54.717
1.722148	1	30	1.887	56.604
1.740059	1	31	1.887	58.491
1.889789	1	32	1.887	60.377
1.956416	1	33	1.887	62.264
2.005211	1	34	1.887	64.151
2.03963	1	35	1.887	66.038
2.043879	1	36	1.887	67.925
2.061159	1	37	1.887	69.811
2.094906	1	38	1.887	71.698
2.181271	1	39	1.887	73.585
2.347699	1	40	1.887	75.472
2.447556	1	41	1.887	77.358
2.460108	1	42	1.887	79.245
2.619602	1	43	1.887	81.132
2.651519	1	44	1.887	83.019
2.900099	1	45	1.887	84.906
2.953267	1	46	1.887	86.792
3.112446	1	47	1.887	88.679
3.143154	1	48	1.887	90.566
3.253021	1	49	1.887	92.453
3.301699	1	50	1.887	94.340
3.610327	1	51	1.887	96.226
4.035531	1	52	1.887	98.113
4.534281	1	53	1.887	100.000

CROP=M ZONE=3

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
0.1164643	1	1	2.381	2.381
0.1716385	2	3	4.762	7.143
0.3288903	1	4	2.381	9.524
0.4029433	1	5	2.381	11.905
0.4050931	1	6	2.381	14.286
0.4065662	1	7	2.381	16.667
0.4747185	1	8	2.381	19.048
0.5257712	1	9	2.381	21.429
0.5303037	1	10	2.381	23.810
0.6015019	1	11	2.381	26.190
0.6016447	1	12	2.381	28.571
0.6757183	1	13	2.381	30.952
0.6904996	1	14	2.381	33.333
0.7535823	1	15	2.381	35.714
0.7627365	1	16	2.381	38.095
0.8670466	1	17	2.381	40.476
0.898095	1	18	2.381	42.857
0.9776059	1	19	2.381	45.238
1.019815	1	20	2.381	47.619
1.031146	1	21	2.381	50.000
1.127816	1	22	2.381	52.381
1.162947	1	23	2.381	54.762
1.17856	1	24	2.381	57.143
1.178927	2	26	4.762	61.905
1.205612	1	27	2.381	64.286
1.24644	1	28	2.381	66.667
1.274769	1	29	2.381	69.048
1.359753	1	30	2.381	71.429
1.436239	1	31	2.381	73.810
1.502527	1	32	2.381	76.190
1.50274	1	33	2.381	78.571
1.504935	1	34	2.381	80.952
1.507591	1	35	2.381	83.333
1.555558	1	36	2.381	85.714
1.687888	1	37	2.381	88.095
2.025466	1	38	2.381	90.476
2.651519	1	39	2.381	92.857
2.745427	1	40	2.381	95.238
2.946132	1	41	2.381	97.619
3.294311	1	42	2.381	100.000

CROP=M ZONE=4

APPLIED	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
0.1090635	1	1	1.754	1.754
0.1104799	1	2	1.754	3.509
0.1150833	1	3	1.754	5.263
0.1325759	1	4	1.754	7.018
0.1473066	1	5	1.754	8.772
0.1657199	1	6	1.754	10.526
0.1712439	1	7	1.754	12.281
0.1726249	1	8	1.754	14.035
0.1787176	1	9	1.754	15.789
0.1841332	1	10	1.754	17.544
0.1982617	1	11	1.754	19.298
0.2148221	1	12	1.754	21.053
0.2192062	1	13	1.754	22.807
0.2410471	1	14	1.754	24.561
0.2551561	1	15	1.754	26.316
0.2649984	1	16	1.754	28.070
0.3038198	1	17	1.754	29.825
0.3314398	1	18	1.754	31.579
0.3437154	1	19	1.754	33.333
0.348884	1	20	1.754	35.088
0.3626008	1	21	1.754	36.842
0.3866798	1	22	1.754	38.596
0.4239156	1	23	1.754	40.351
0.4419198	1	24	1.754	42.105
0.4713811	1	25	1.754	43.860
0.491022	1	26	1.754	45.614
0.5914926	1	27	1.754	47.368
0.6053696	1	28	1.754	49.123
0.6463077	1	29	1.754	50.877
0.6628797	2	31	3.509	54.386
0.6860804	1	32	1.754	56.140
0.6864967	2	34	3.509	59.649
0.6981719	2	36	3.509	63.158
0.7102282	1	37	1.754	64.912
0.8285996	1	38	1.754	66.667
0.8417519	1	39	1.754	68.421
0.8654262	1	40	1.754	70.175
0.8729279	1	41	1.754	71.930
0.8838395	1	42	1.754	73.684
0.9206662	1	43	1.754	75.439
0.9574928	1	44	1.754	77.193
0.9631585	1	45	1.754	78.947
1.000573	1	46	1.754	80.702
1.058766	1	47	1.754	82.456
1.074111	1	48	1.754	84.211
1.099303	1	49	1.754	85.965
1.104799	1	50	1.754	87.719
1.150833	1	51	1.754	89.474
1.396344	1	52	1.754	91.228
1.576181	2	54	3.509	94.737
1.611166	1	55	1.754	96.491
1.974829	1	56	1.754	98.246
3.013089	1	57	1.754	100.000

Analysis of power consumption and fuel type

[Power-consumption coefficient (PCC), natural logarithim of the power-consumption coefficient (LPCC); power by electricity (E) or gas (N)]

Counties are coded according to Federal Information Processing Standards (FIPS). A list of county codes for Kansas is provided on page 60.

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE
		- TYPE=E COUNTY=009 -		
PCC	1	313.00000000	.	313.00000000
LPCC	1	5.74620319	.	5.74620319
		- TYPE=E COUNTY=023 -		
PCC	36	296.02777778	174.50443893	75.00000000
LPCC	36	5.51027040	0.62844541	4.31748811
		- TYPE=E COUNTY=039 -		
PCC	1	258.00000000	.	258.00000000
LPCC	1	5.55295958	.	5.55295958
		- TYPE=E COUNTY=041 -		
PCC	1	277.00000000	.	277.00000000
LPCC	1	5.62401751	.	5.62401751
		- TYPE=E COUNTY=047 -		
PCC	1	113.00000000	.	113.00000000
LPCC	1	4.72738782	.	4.72738782
		- TYPE=E COUNTY=051 -		
PCC	7	634.85714286	150.01158685	447.00000000
LPCC	7	6.43013229	0.23177896	6.10255859
		- TYPE=E COUNTY=063 -		
PCC	6	206.33333333	102.74758716	83.00000000
LPCC	6	5.19515032	0.60483855	4.41884061
		- TYPE=E COUNTY=071 -		
PCC	2	375.00000000	76.36753237	321.00000000
LPCC	2	5.91644902	0.20507214	5.77144112
		- TYPE=E COUNTY=089 -		
PCC	4	544.75000000	40.50822962	490.00000000
LPCC	4	6.29819498	0.07592857	6.19440539
		- TYPE=E COUNTY=095 -		
PCC	1	190.00000000	.	190.00000000
LPCC	1	5.24702407	.	5.24702407

MAXIMUM VALUE	STD ERROR OF MEAN	SUM	VARIANCE	C.V
- TYPE=E COUNTY=009 -				
313.00000000	.	313.00000000	.	.
5.74620319	.	5.74620319	.	.
- TYPE=E COUNTY=023 -				
690.00000000	29.08407316	10657.000000	30451.799206	58.94
6.53669160	0.10474090	198.369734	0.394944	11.40
- TYPE=E COUNTY=039 -				
258.00000000	.	258.00000000	.	.
5.55295958	.	5.55295958	.	.
- TYPE=E COUNTY=041 -				
277.00000000	.	277.00000000	.	.
5.62401751	.	5.62401751	.	.
- TYPE=E COUNTY=047 -				
113.00000000	.	113.00000000	.	.
4.72738782	.	4.72738782	.	.
- TYPE=E COUNTY=051 -				
880.00000000	56.69905037	4444.0000000	22503.476190	23.62
6.77992191	0.08760421	45.0109260	0.053721	3.60
- TYPE=E COUNTY=063 -				
312.00000000	41.94652681	1238.0000000	10557.066667	49.79
5.74300319	0.24692430	31.1709019	0.365830	11.64
- TYPE=E COUNTY=071 -				
429.00000000	54.00000000	750.00000000	5832.0000000	20.36
6.06145692	0.14500790	11.83289804	0.0420546	3.46
- TYPE=E COUNTY=089 -				
584.00000000	20.25411481	2179.0000000	1640.9166667	7.43
6.36990098	0.03796428	25.1927799	0.0057651	1.20
- TYPE=E COUNTY=095 -				
190.00000000	.	190.00000000	.	.
5.24702407	.	5.24702407	.	.

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE
		- TYPE=E COUNTY=101 -		
PCC	8	436.12500000	109.62590609	235.00000000
LPCC	8	6.04459903	0.29002322	5.45958551
		- TYPE=E COUNTY=105 -		
PCC	1	260.00000000	.	260.00000000
LPCC	1	5.56068163	.	5.56068163
		- TYPE=E COUNTY=123 -		
PCC	3	366.33333333	284.92864604	163.00000000
LPCC	3	5.71016813	0.74608108	5.09375020
		- TYPE=E COUNTY=141 -		
PCC	2	139.00000000	55.15432893	100.00000000
LPCC	2	4.89347687	0.40772722	4.60517019
		- TYPE=E COUNTY=145 -		
PCC	1	124.00000000	.	124.00000000
LPCC	1	4.82028157	.	4.82028157
		- TYPE=E COUNTY=149 -		
PCC	2	132.00000000	32.52691193	109.00000000
LPCC	2	4.86738650	0.24895620	4.69134788
		- TYPE=E COUNTY=157 -		
PCC	1	152.00000000	.	152.00000000
LPCC	1	5.02388052	.	5.02388052
		- TYPE=E COUNTY=163 -		
PCC	1	131.00000000	.	131.00000000
LPCC	1	4.87519732	.	4.87519732
		- TYPE=E COUNTY=179 -		
PCC	4	254.00000000	127.94009015	134.00000000
LPCC	4	5.44779062	0.48338236	4.89783980
		- TYPE=E COUNTY=181 -		
PCC	4	280.25000000	125.39902977	93.00000000
LPCC	4	5.51025921	0.65271938	4.53259949

MAXIMUM VALUE	STD ERROR OF MEAN	SUM	VARIANCE	C.V
		- TYPE=E COUNTY=101 -		
555.00000000	38.75861079	3489.0000000	12017.839286	25.13
6.31896811	0.10253869	48.3567922	0.084113	4.79
		- TYPE=E COUNTY=105 -		
260.00000000	.	260.00000000	.	.
5.56068163	.	5.56068163	.	.
		- TYPE=E COUNTY=123 -		
692.00000000	164.50363049	1099.0000000	81184.333333	77.77
6.53958596	0.43075011	17.1305044	0.556637	13.06
		- TYPE=E COUNTY=141 -		
178.00000000	39.00000000	278.00000000	3042.0000000	39.67
5.18178355	0.28830668	9.78695374	0.1662415	8.33
		- TYPE=E COUNTY=145 -		
124.00000000	.	124.00000000	.	.
4.82028157	.	4.82028157	.	.
		- TYPE=E COUNTY=149 -		
155.00000000	23.00000000	264.00000000	1058.0000000	24.64
5.04342512	0.17603862	9.73477300	0.0619792	5.11
		- TYPE=E COUNTY=157 -		
152.00000000	.	152.00000000	.	.
5.02388052	.	5.02388052	.	.
		- TYPE=E COUNTY=163 -		
131.00000000	.	131.00000000	.	.
4.87519732	.	4.87519732	.	.
		- TYPE=E COUNTY=179 -		
435.00000000	63.97004507	1016.0000000	16368.666667	50.37
6.07534603	0.24169118	21.7911625	0.233659	8.87
		- TYPE=E COUNTY=181 -		
353.00000000	62.69951488	1121.0000000	15724.916667	44.74
5.86646806	0.32635969	22.0410369	0.426043	11.84

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE
		- TYPE=E COUNTY=193 -		
PCC	3	255.00000000	105.88673194	187.00000000
LPCC	3	5.48888624	0.38565327	5.23110862
		- TYPE=E COUNTY=203 -		
PCC	15	470.46666667	146.67304099	153.00000000
LPCC	15	6.09111474	0.40087338	5.03043792
		- TYPE=E COUNTY=ALL -		
PCC	105	344.52380952	187.85131678	75.00000000
LPCC	105	5.67075691	0.62062663	4.31748811
		- TYPE=N COUNTY=023 -		
PCC	14	91.92857143	25.28442599	40.00000000
LPCC	14	4.48095717	0.30805325	3.68887945
		- TYPE=N COUNTY=039 -		
PCC	4	50.75000000	22.61820800	36.00000000
LPCC	4	3.86347376	0.39380646	3.58351894
		- TYPE=N COUNTY=063 -		
PCC	7	60.71428571	19.97260028	37.00000000
LPCC	7	4.06053403	0.32616211	3.61091791
		- TYPE=N COUNTY=067 -		
PCC	1	63.00000000	.	63.00000000
LPCC	1	4.14313473	.	4.14313473
		- TYPE=N COUNTY=071 -		
PCC	9	69.11111111	19.99027541	41.00000000
LPCC	9	4.19750086	0.29624619	3.71357207
		- TYPE=N COUNTY=101 -		
PCC	10	55.80000000	21.29058216	38.00000000
LPCC	10	3.97258797	0.30977219	3.63758616
		- TYPE=N COUNTY=119 -		
PCC	18	126.22222222	60.46832477	44.00000000
LPCC	18	4.71468041	0.53102156	3.78418963

MAXIMUM VALUE	STD ERROR OF MEAN	SUM	VARIANCE	C.V
- TYPE=E COUNTY=193 -				
377.00000000	61.13373319	765.00000000	11212.000000	41.52
5.93224519	0.22265702	16.46665871	0.148728	7.02
- TYPE=E COUNTY=203 -				
645.00000000	37.87081634	7057.0000000	21512.980952	31.17
6.46925032	0.10350506	91.3667211	0.160699	6.58
- TYPE=E COUNTY=ALL -				
880.00000000	18.33241137	36175.000000	35288.117216	54.52
6.77992191	0.06056696	595.429476	0.385177	10.94
- TYPE=N COUNTY=023 -				
148.00000000	6.75754709	1287.0000000	639.30219780	27.50
4.99721227	0.08233069	62.7334004	0.09489681	6.87
- TYPE=N COUNTY=039 -				
84.00000000	11.30910400	203.00000000	511.58333333	44.56
4.43081680	0.19690323	15.45389505	0.15508353	10.19
- TYPE=N COUNTY=063 -				
94.00000000	7.54893334	425.00000000	398.90476190	32.89
4.54329478	0.12327769	28.42373824	0.10638172	8.03
- TYPE-N COUNTY=067 -				
63.00000000	.	63.00000000	.	.
4.14313473	.	4.14313473	.	.
- TYPE=N COUNTY=071 -				
102.00000000	6.66342514	622.00000000	399.61111111	28.92
4.62497281	0.09874873	37.77750777	0.08776180	7.05
- TYPE=N COUNTY=101				
112.00000000	6.73267323	558.00000000	453.28888889	38.15
4.71849887	0.09795857	39.72587967	0.09595881	7.79
- TYPE=N COUNTY=119 -				
217.00000000	14.25252083	2272.0000000	3656.4183007	47.90
5.37989735	0.12516298	84.8642474	0.2819839	11.26

VARIABLE	N	MEAN	STANDARD DEVIATION	MINIMUM VALUE
		- TYPE=N COUNTY=129 -		
PCC	15	104.46666667	56.59993269	33.00000000
LPCC	15	4.53041230	0.50456277	3.49650756
		- TYPE=N COUNTY=153 -		
PCC	12	76.50000000	31.39339826	35.00000000
LPCC	12	4.25352157	0.43746534	3.55534806
		- TYPE=N COUNTY=171 -		
PCC	8	81.12500000	28.26627218	46.00000000
LPCC	8	4.34437791	0.34214259	3.82864140
		- TYPE=N COUNTY=175 -		
PCC	11	78.18181818	19.14585168	47.00000000
LPCC	11	4.33046485	0.25431916	3.85014760
		- TYPE=N COUNTY=179 -		
PCC	12	63.33333333	15.74416679	44.00000000
LPCC	12	4.12297885	0.23027872	3.78418963
		- TYPE=N COUNTY=181 -		
PCC	62	73.25806452	21.27796943	38.00000000
LPCC	62	4.25800280	0.26447535	3.63758616
		- TYPE=N COUNTY=189 -		
PCC	35	89.91428571	42.60238286	42.00000000
LPCC	35	4.40365732	0.43149579	3.73766962
		- TYPE=N COUNTY=193 -		
PCC	44	67.61363636	22.55867379	38.00000000
LPCC	44	4.17046759	0.28520161	3.63758616
		- TYPE=N COUNTY=199 -		
PCC	30	86.06666667	34.92250863	40.00000000
LPCC	30	4.38233269	0.38323662	3.68887945
		- TYPE=N COUNTY=203 -		
PCC	92	107.95652174	56.00547717	43.00000000
LPCC	92	4.57469529	0.45065929	3.76120012
		- TYPE=N COUNTY=ALL -		
PCC	384	86.88020833	43.21880966	33.00000000
LPCC	384	4.36966883	0.41790577	3.49650756

MAXIMUM VALUE	STD ERROR OF MEAN	SUM	VARIANCE	C.V
- TYPE=N COUNTY=129 -				
275.00000000	14.61403978	1567.0000000	3203.5523810	54.18
5.61677110	0.13027755	67.9561845	0.2545836	11.13
- TYPE=N COUNTY=153 -				
130.00000000	9.06249347	918.00000000	985.54545455	41.03
4.86753445	0.12628537	51.04225879	0.19137592	10.28
- TYPE=N COUNTY=171 -				
130.00000000	9.99363637	649.00000000	798.98214286	34.84
4.86753445	0.12096567	34.75502325	0.11706155	7.87
- TYPE=N COUNTY=175 -				
107.00000000	5.77269148	860.00000000	366.56363636	24.48
4.67282883	0.07668011	47.63511331	0.06467824	5.87
- TYPE=N COUNTY=179 -				
100.00000000	4.54494947	760.00000000	247.87878788	24.85
4.60517019	0.06647574	49.47574624	0.05302829	5.58
- TYPE=N COUNTY=181 -				
168.00000000	2.70230482	4542.0000000	452.75198308	29.04
5.12396398	0.03358840	263.9961735	0.06994721	6.21
- TYPE=N COUNTY=189 -				
216.00000000	7.20111703	3147.0000000	1814.9630252	47.38
5.37527841	0.07293610	154.1280063	0.1861886	9.79
- TYPE=N COUNTY=193 -				
163.00000000	3.40084803	2975.0000000	508.89376321	33.36
5.09375020	0.04299576	183.5005739	0.08133996	6.83
- TYPE=N COUNTY=199 -				
185.00000000	6.37594858	2582.0000000	1219.5816092	40.57
5.22035583	0.06996911	131.4699807	0.1468703	8.74
- TYPE=N COUNTY=203 -				
338.00000000	5.83897463	9932.0000000	3136.6134735	51.87
5.82304590	0.04698448	420.8719667	0.2030938	9.85
- TYPE=N COUNTY=ALL -				
338.00000000	2.20550064	33362.000000	1867.8655081	49.74
5.82304590	0.02132616	1677.952831	0.1746452	9.56

Federal Information Processing Standards
County Codes For Kansas

Code no.	County name	Code no.	County name
001	Allen	107	Linn
003	Anderson	109	Logan
005	Atchison	111	Lyon
007	Barber	113	McPherson
009	Barton	115	Marion
011	Bourbon	117	Marshall
013	Brown	119	Meade
015	Butler	121	Miami
017	Chase	123	Mitchell
019	Chautauqua	125	Montgomery
021	Cherokee	127	Morris
023	Cheyenne	129	Morton
025	Clark	131	Nemaha
027	Clay	133	Neosho
029	Cloud	135	Ness
031	Coffey	137	Norton
033	Comanche	139	Osage
035	Cowley	141	Osborne
037	Crawford	143	Ottawa
039	Decatur	145	Pawnee
041	Dickinson	147	Phillips
043	Doniphan	149	Pottawatomie
045	Douglas	151	Pratt
047	Edwards	153	Rawlins
049	Elk	155	Reno
051	Ellis	157	Republic
053	Ellsworth	159	Rice
055	Finney	161	Riley
057	Ford	163	Rooks
059	Franklin	165	Rush
061	Geary	167	Russell
063	Gove	169	Saline
065	Graham	171	Scott
067	Grant	173	Sedgwick
069	Gray	175	Seward
071	Greeley	177	Shawnee
073	Greenwood	179	Sheridan
075	Hamilton	181	Sherman
077	Harper	183	Smith
079	Harvey	185	Stafford
081	Haskell	187	Stanton
083	Hodgeman	189	Stevens
085	Jackson	191	Sumner
087	Jefferson	193	Thomas
089	Jewell	195	Trego
091	Johnson	197	Wabaunsee
093	Kearny	199	Wallace
095	Kingman	201	Washington
097	Kiowa	203	Wichita
099	Labette	205	Wilson
101	Lane	207	Woodson
103	Leavenworth	209	Wyandotte
105	Lincoln		

TYPE=E

PCC	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
75	1	1	0.952	0.952
83	1	2	0.952	1.905
86	1	3	0.952	2.857
87	2	5	1.905	4.762
93	1	6	0.952	5.714
100	1	7	0.952	6.667
109	1	8	0.952	7.619
113	1	9	0.952	8.571
115	2	11	1.905	10.476
118	1	12	0.952	11.429
122	1	13	0.952	12.381
124	1	14	0.952	13.333
126	2	16	1.905	15.238
131	1	17	0.952	16.190
134	1	18	0.952	17.143
140	1	19	0.952	18.095
152	1	20	0.952	19.048
153	1	21	0.952	20.000
155	1	22	0.952	20.952
163	1	23	0.952	21.905
177	1	24	0.952	22.857
178	1	25	0.952	23.810
187	1	26	0.952	24.762
190	1	27	0.952	25.714
192	1	28	0.952	26.667
200	1	29	0.952	27.619
201	1	30	0.952	28.571
206	1	31	0.952	29.524
208	2	33	1.905	31.429
217	1	34	0.952	32.381
222	1	35	0.952	33.333
230	1	36	0.952	34.286
235	1	37	0.952	35.238
238	1	38	0.952	36.190
244	1	39	0.952	37.143
246	1	40	0.952	38.095
258	1	41	0.952	39.048
260	1	42	0.952	40.000
262	1	43	0.952	40.952
269	1	44	0.952	41.905
270	1	45	0.952	42.857
276	1	46	0.952	43.810
277	1	47	0.952	44.762
285	1	48	0.952	45.714
287	1	49	0.952	46.667
300	1	50	0.952	47.619
312	2	52	1.905	49.524
313	1	53	0.952	50.476
314	1	54	0.952	51.429
321	1	55	0.952	52.381
326	1	56	0.952	53.333
337	1	57	0.952	54.286

TYPE=E

PCC	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
345	1	58	0.952	55.238
349	1	59	0.952	56.190
353	1	60	0.952	57.143
360	1	61	0.952	58.095
372	1	62	0.952	59.048
377	1	63	0.952	60.000
386	1	64	0.952	60.952
394	1	65	0.952	61.905
399	1	66	0.952	62.857
420	1	67	0.952	63.810
429	2	69	1.905	65.714
435	1	70	0.952	66.667
447	1	71	0.952	67.619
450	1	72	0.952	68.571
458	1	73	0.952	69.524
460	1	74	0.952	70.476
461	1	75	0.952	71.429
465	1	76	0.952	72.381
469	1	77	0.952	73.333
472	1	78	0.952	74.286
490	1	79	0.952	75.238
498	1	80	0.952	76.190
505	1	81	0.952	77.143
518	1	82	0.952	78.095
521	1	83	0.952	79.048
525	1	84	0.952	80.000
528	1	85	0.952	80.952
541	1	86	0.952	81.905
555	1	87	0.952	82.857
564	1	88	0.952	83.810
565	1	89	0.952	84.762
576	1	90	0.952	85.714
577	1	91	0.952	86.667
584	1	92	0.952	87.619
585	1	93	0.952	88.571
587	1	94	0.952	89.524
590	1	95	0.952	90.476
598	1	96	0.952	91.429
613	1	97	0.952	92.381
640	1	98	0.952	93.333
645	2	100	1.905	95.238
686	1	101	0.952	96.190
690	1	102	0.952	97.143
692	1	103	0.952	98.095
782	1	104	0.952	99.048
880	1	105	0.952	100.000

TYPE=E

LPCC	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
4.317488	1	1	0.952	0.952
4.418841	1	2	0.952	1.905
4.454347	1	3	0.952	2.857
4.465908	2	5	1.905	4.762
4.532599	1	6	0.952	5.714
4.60517	1	7	0.952	6.667
4.691348	1	8	0.952	7.619
4.727388	1	9	0.952	8.571
4.744932	2	11	1.905	10.476
4.770685	1	12	0.952	11.429
4.804021	1	13	0.952	12.381
4.820282	1	14	0.952	13.333
4.836282	2	16	1.905	15.238
4.875197	1	17	0.952	16.190
4.89784	1	18	0.952	17.143
4.941642	1	19	0.952	18.095
5.023881	1	20	0.952	19.048
5.030438	1	21	0.952	20.000
5.043425	1	22	0.952	20.952
5.09375	1	23	0.952	21.905
5.17615	1	24	0.952	22.857
5.181784	1	25	0.952	23.810
5.231109	1	26	0.952	24.762
5.247024	1	27	0.952	25.714
5.257495	1	28	0.952	26.667
5.298317	1	29	0.952	27.619
5.303305	1	30	0.952	28.571
5.327876	1	31	0.952	29.524
5.337538	2	33	1.905	31.429
5.379897	1	34	0.952	32.381
5.402677	1	35	0.952	33.333
5.438079	1	36	0.952	34.286
5.459586	1	37	0.952	35.238
5.472271	1	38	0.952	36.190
5.497168	1	39	0.952	37.143
5.505332	1	40	0.952	38.095
5.55296	1	41	0.952	39.048
5.560682	1	42	0.952	40.000
5.568345	1	43	0.952	40.952
5.594711	1	44	0.952	41.905
5.598422	1	45	0.952	42.857
5.620401	1	46	0.952	43.810
5.624018	1	47	0.952	44.762
5.652489	1	48	0.952	45.714
5.659482	1	49	0.952	46.667
5.703782	1	50	0.952	47.619
5.743003	2	52	1.905	49.524
5.746203	1	53	0.952	50.476
5.749393	1	54	0.952	51.429
5.771441	1	55	0.952	52.381
5.786897	1	56	0.952	53.333
5.820083	1	57	0.952	54.286

TYPE=E

LPCC	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
5.843544	1	58	0.952	55.238
5.855072	1	59	0.952	56.190
5.866468	1	60	0.952	57.143
5.886104	1	61	0.952	58.095
5.918894	1	62	0.952	59.048
5.932245	1	63	0.952	60.000
5.955837	1	64	0.952	60.952
5.976351	1	65	0.952	61.905
5.988961	1	66	0.952	62.857
6.040255	1	67	0.952	63.810
6.061457	2	69	1.905	65.714
6.075346	1	70	0.952	66.667
6.102559	1	71	0.952	67.619
6.109248	1	72	0.952	68.571
6.126869	1	73	0.952	69.524
6.131226	1	74	0.952	70.476
6.133398	1	75	0.952	71.429
6.142037	1	76	0.952	72.381
6.150603	1	77	0.952	73.333
6.156979	1	78	0.952	74.286
6.194405	1	79	0.952	75.238
6.2106	1	80	0.952	76.190
6.224558	1	81	0.952	77.143
6.249975	1	82	0.952	78.095
6.25575	1	83	0.952	79.048
6.263398	1	84	0.952	80.000
6.269096	1	85	0.952	80.952
6.293419	1	86	0.952	81.905
6.318968	1	87	0.952	82.857
6.335054	1	88	0.952	83.810
6.336826	1	89	0.952	84.762
6.356108	1	90	0.952	85.714
6.357842	1	91	0.952	86.667
6.369901	1	92	0.952	87.619
6.371612	1	93	0.952	88.571
6.375025	1	94	0.952	89.524
6.380123	1	95	0.952	90.476
6.393591	1	96	0.952	91.429
6.418365	1	97	0.952	92.381
6.461468	1	98	0.952	93.333
6.46925	2	100	1.905	95.238
6.530878	1	101	0.952	96.190
6.536692	1	102	0.952	97.143
6.539586	1	103	0.952	98.095
6.661855	1	104	0.952	99.048
6.779922	1	105	0.952	100.000

TYPE=N

PCC	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
33	1	1	0.260	0.260
35	1	2	0.260	0.521
36	1	3	0.260	0.781
37	2	5	0.521	1.302
38	3	8	0.781	2.083
39	1	9	0.260	2.344
40	2	11	0.521	2.865
41	1	12	0.260	3.125
42	2	14	0.521	3.646
43	10	24	2.604	6.250
44	5	29	1.302	7.552
45	3	32	0.781	8.333
46	5	37	1.302	9.635
47	2	39	0.521	10.156
48	4	43	1.042	11.198
49	4	47	1.042	12.240
50	2	49	0.521	12.760
51	7	56	1.823	14.583
52	3	59	0.781	15.365
53	6	65	1.563	16.927
54	5	70	1.302	18.229
55	3	73	0.781	19.010
56	6	79	1.563	20.573
57	5	84	1.302	21.875
58	3	87	0.781	22.656
59	4	91	1.042	23.698
60	5	96	1.302	25.000
61	16	112	4.167	29.167
62	6	118	1.563	30.729
63	9	127	2.344	33.073
64	2	129	0.521	33.594
65	6	135	1.563	35.156
66	6	141	1.563	36.719
67	5	146	1.302	38.021
68	11	157	2.865	40.885
69	3	160	0.781	41.667
70	6	166	1.563	43.229
71	7	173	1.823	45.052
72	7	180	1.823	46.875
73	13	193	3.385	50.260
74	7	200	1.823	52.083
75	5	205	1.302	53.385
77	3	208	0.781	54.167
78	7	215	1.823	55.990
79	7	222	1.823	57.812
80	2	224	0.521	58.333
81	4	228	1.042	59.375
82	3	231	0.781	60.156
83	2	233	0.521	60.677
84	2	235	0.521	61.198
85	4	239	1.042	62.240
86	1	240	0.260	62.500

TYPE=N

PCC	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
87	2	242	0.521	63.021
88	3	245	0.781	63.802
89	7	252	1.823	65.625
90	2	254	0.521	66.146
91	3	257	0.781	66.927
92	4	261	1.042	67.969
93	2	263	0.521	68.490
94	5	268	1.302	69.792
95	1	269	0.260	70.052
96	4	273	1.042	71.094
97	2	275	0.521	71.615
98	3	278	0.781	72.396
99	3	281	0.781	73.177
100	4	285	1.042	74.219
101	4	289	1.042	75.260
102	1	290	0.260	75.521
103	1	291	0.260	75.781
104	1	292	0.260	76.042
105	3	295	0.781	76.823
106	1	296	0.260	77.083
107	1	297	0.260	77.344
108	3	300	0.781	78.125
109	1	301	0.260	78.385
110	7	308	1.823	80.208
111	3	311	0.781	80.990
112	3	314	0.781	81.771
113	1	315	0.260	82.031
114	1	316	0.260	82.292
115	1	317	0.260	82.552
116	3	320	0.781	83.333
117	3	323	0.781	84.115
119	2	325	0.521	84.635
120	1	326	0.260	84.896
122	1	327	0.260	85.156
123	4	331	1.042	86.198
124	1	332	0.260	86.458
125	1	333	0.260	86.719
126	2	335	0.521	87.240
129	1	336	0.260	87.500
130	2	338	0.521	88.021
132	1	339	0.260	88.281
135	1	340	0.260	88.542
136	1	341	0.260	88.802
138	1	342	0.260	89.062
139	2	344	0.521	89.583
141	2	346	0.521	90.104
144	1	347	0.260	90.365
146	3	350	0.781	91.146
147	2	352	0.521	91.667
148	1	353	0.260	91.927
150	1	354	0.260	92.187
151	2	356	0.521	92.708
156	1	357	0.260	92.969

TYPE=N

PCC	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
157	1	358	0.260	93.229
158	1	359	0.260	93.490
160	1	360	0.260	93.750
162	2	362	0.521	94.271
163	1	363	0.260	94.531
164	1	364	0.260	94.792
168	1	365	0.260	95.052
170	1	366	0.260	95.312
174	1	367	0.260	95.573
175	1	368	0.260	95.833
185	1	369	0.260	96.094
188	1	370	0.260	96.354
189	1	371	0.260	96.615
190	1	372	0.260	96.875
192	1	373	0.260	97.135
206	1	374	0.260	97.396
212	1	375	0.260	97.656
215	1	376	0.260	97.917
216	1	377	0.260	98.177
217	2	379	0.521	98.698
224	1	380	0.260	98.958
275	1	381	0.260	99.219
292	1	382	0.260	99.479
310	1	383	0.260	99.740
338	1	384	0.260	100.000

TYPE=N

LPCC	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
3.496508	1	1	0.260	0.260
3.555348	1	2	0.260	0.521
3.583519	1	3	0.260	0.781
3.610918	2	5	0.521	1.302
3.637586	3	8	0.781	2.083
3.663562	1	9	0.260	2.344
3.688879	2	11	0.521	2.865
3.713572	1	12	0.260	3.125
3.73767	2	14	0.521	3.646
3.7612	10	24	2.604	6.250
3.78419	5	29	1.302	7.552
3.806662	3	32	0.781	8.333
3.828641	5	37	1.302	9.635
3.850148	2	39	0.521	10.156
3.871201	4	43	1.042	11.198
3.89182	4	47	1.042	12.240
3.912023	2	49	0.521	12.760
3.931826	7	56	1.823	14.583
3.951244	3	59	0.781	15.365
3.970292	6	65	1.563	16.927
3.988984	5	70	1.302	18.229
4.007333	3	73	0.781	19.010
4.025352	6	79	1.563	20.573
4.043051	5	84	1.302	21.875
4.060443	3	87	0.781	22.656
4.077537	4	91	1.042	23.698
4.094345	5	96	1.302	25.000
4.110874	16	112	4.167	29.167
4.127134	6	118	1.563	30.729
4.143135	9	127	2.344	33.073
4.158883	2	129	0.521	33.594
4.174387	6	135	1.563	35.156
4.189655	6	141	1.563	36.719
4.204693	5	146	1.302	38.021
4.219508	11	157	2.865	40.885
4.234107	3	160	0.781	41.667
4.248495	6	166	1.563	43.229
4.26268	7	173	1.823	45.052
4.276666	7	180	1.823	46.875
4.290459	13	193	3.385	50.260
4.304065	7	200	1.823	52.083
4.317488	5	205	1.302	53.385
4.343805	3	208	0.781	54.167
4.356709	7	215	1.823	55.990
4.369448	7	222	1.823	57.812
4.382027	2	224	0.521	58.333
4.394449	4	228	1.042	59.375
4.406719	3	231	0.781	60.156
4.418841	2	233	0.521	60.677
4.430817	2	235	0.521	61.198
4.442651	4	239	1.042	62.240
4.454347	1	240	0.260	62.500

TYPE=N

LPCC	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
4.465908	2	242	0.521	63.021
4.477337	3	245	0.781	63.802
4.488636	7	252	1.823	65.625
4.49981	2	254	0.521	66.146
4.51086	3	257	0.781	66.927
4.521789	4	261	1.042	67.969
4.532599	2	263	0.521	68.490
4.543295	5	268	1.302	69.792
4.553877	1	269	0.260	70.052
4.564348	4	273	1.042	71.094
4.574711	2	275	0.521	71.615
4.584967	3	278	0.781	72.396
4.59512	3	281	0.781	73.177
4.60517	4	285	1.042	74.219
4.615121	4	289	1.042	75.260
4.624973	1	290	0.260	75.521
4.634729	1	291	0.260	75.781
4.644391	1	292	0.260	76.042
4.65396	3	295	0.781	76.823
4.663439	1	296	0.260	77.083
4.672829	1	297	0.260	77.344
4.682131	3	300	0.781	78.125
4.691348	1	301	0.260	78.385
4.70048	7	308	1.823	80.208
4.70953	3	311	0.781	80.990
4.718499	3	314	0.781	81.771
4.727388	1	315	0.260	82.031
4.736198	1	316	0.260	82.292
4.744932	1	317	0.260	82.552
4.75359	3	320	0.781	83.333
4.762174	3	323	0.781	84.115
4.779123	2	325	0.521	84.635
4.787492	1	326	0.260	84.896
4.804021	1	327	0.260	85.156
4.812184	4	331	1.042	86.198
4.820282	1	332	0.260	86.458
4.828314	1	333	0.260	86.719
4.836282	2	335	0.521	87.240
4.859812	1	336	0.260	87.500
4.867534	2	338	0.521	88.021
4.882802	1	339	0.260	88.281
4.905275	1	340	0.260	88.542
4.912655	1	341	0.260	88.802
4.927254	1	342	0.260	89.062
4.934474	2	344	0.521	89.583
4.94876	2	346	0.521	90.104
4.969813	1	347	0.260	90.365
4.983607	3	350	0.781	91.146
4.990433	2	352	0.521	91.667
4.997212	1	353	0.260	91.927
5.010635	1	354	0.260	92.187
5.01728	2	356	0.521	92.708
5.049856	1	357	0.260	92.969

TYPE=N

LPCC	FREQUENCY	CUM FREQ	PERCENT	CUM PERCENT
5.056246	1	358	0.260	93.229
5.062595	1	359	0.260	93.490
5.075174	1	360	0.260	93.750
5.087596	2	362	0.521	94.271
5.09375	1	363	0.260	94.531
5.099866	1	364	0.260	94.792
5.123964	1	365	0.260	95.052
5.135798	1	366	0.260	95.312
5.159055	1	367	0.260	95.573
5.164786	1	368	0.260	95.833
5.220356	1	369	0.260	96.094
5.236442	1	370	0.260	96.354
5.241747	1	371	0.260	96.615
5.247024	1	372	0.260	96.875
5.257495	1	373	0.260	97.135
5.327876	1	374	0.260	97.396
5.356586	1	375	0.260	97.656
5.370638	1	376	0.260	97.917
5.375278	1	377	0.260	98.177
5.379897	2	379	0.521	98.698
5.411646	1	380	0.260	98.958
5.616771	1	381	0.260	99.219
5.676754	1	382	0.260	99.479
5.736572	1	383	0.260	99.740
5.823046	1	384	0.260	100.000

☆ U.S. GOVERNMENT PRINTING OFFICE: 1979-667-884/93