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WATER TYPE AND SUITABILITY OF OKLAHOMA SURFACE WATERS FOR PUBLIC SUPPLY AND IRRIGATION

PART 3: CANADIAN, NORTH CANADIAN, AND DEEP FORK RIVER BASINS THROUGH 1979

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PART 3: CANADIAN, NORTH CANADIAN, AND DEEP FORK RIVER BASINS THROUGH 1979

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By Jerry D. Stoner

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CONVERSION FACTORS

Inch-pound units used in this report may be converted to International System of Units (SI), an updated metric system, by the following conversion factors:

| <u>Multiply inch-pound unit</u> | <u>By</u> | <u>To obtain SI unit</u> |
|-----------------------------------|-----------------------|--------------------------|
| Foot (ft) | 0.3048 | Meter |
| Mile (mi) | 1.609 | Kilometer |
| Square mile (mi^2) | 2.590 | Square kilometer |
| Degree Fahrenheit ($^{\circ}F$) | $(^{\circ}F - 32)5/9$ | Degree Celsius |

WATER TYPE AND SUITABILITY OF OKLAHOMA SURFACE
WATERS FOR PUBLIC SUPPLY AND IRRIGATION

PART 3: CANADIAN, NORTH CANADIAN, AND DEEP FORK RIVER BASINS THROUGH 1979

By Jerry D. Stoner

ABSTRACT

Water-quality data through 1979 in the Canadian, North Canadian, and Deep Fork River basins within Oklahoma were examined for water type and suitability for public water supply and irrigation use. Of 105 stations with available data, 47 stations or 45 percent were considered to have sufficient data for analysis. The classification of water type was based on the relation of the major ions: calcium, magnesium, sodium, carbonate, bicarbonate, sulfate, and chloride to each other within the range of measured specific conductance. The suitability for use as a public supply was based on the concentration distribution of selected constituents. The constituents selected were those with maximum contaminant levels established by regulation, or constituents for which recommended maximum limits have been established and for which historic data are available. The irrigation classification method of Wilcox was used to relate sodium, calcium, and magnesium concentrations and the salinity distribution to the use of the water for irrigation. Where data were available, the chance of phytotoxic effects by boron was discussed.

INTRODUCTION

Surface-water-quality data for Oklahoma have been collected and published on a regular basis since 1946. These data through 1975 represent 2,733 station-years of record from 527 stations (Stoner, 1977). These data consist of tabulations of water-quality analyses of varying suites of constituents but the data are not readily usable to water planners and managers. The purpose of this report is to summarize the data at selected stations to provide information on water type, water-quality trends, and suitability for use as public and irrigation supplies. A water-quality report on selected Oklahoma surface waters that is of a more general statistical nature has recently been published (Kurklin, 1979). A statistical summary of streamflow records is provided in a report by Mize (1975); therefore, streamflow data were not included in this report.

ACKNOWLEDGMENTS

Water-quality data in Oklahoma have been collected and published on a cooperative basis with many Federal, State, county, district, and city agencies since 1946. Two of the principal cooperators are the Oklahoma Water Resources Board and the U.S. Army Corps of Engineers. The author thanks all of the agencies, past and present, for their part in the collection of surface-water-quality data in Oklahoma.

STATION SELECTION

The stations included in this report were selected using two criteria. First, stations listed in the report by Stoner (1977) were eliminated if less than 10 samples had been collected and if the stations had not been operated during 1976-79. Statistical analysis of data from less than 10 samples generally is inadequate to determine frequencies and variations during the annual hydrologic cycle. Second, only data in the U.S. Geological Survey's WATSTORE (National Water Data Storage and Retrieval System) were used. WATSTORE was accessed for each station to determine data availability. A deletion of stations was made from WATSTORE information using the same criterion of less than 10 samples. Very few of the elected stations had 10 analyses for each of the selected water-quality constituents. Most of the stations lacked data on the toxic metals -- arsenic, cadmium, chromium, lead, and mercury.

STATION ORDER

In order to reduce the physical size of the report and to make it more usable on a regional and hydrologic basis to water planners and managers, the report has been divided into five parts. The river basins included within each part are as follows:

- Part 1: Arkansas River Mainstem and Verdigris, Neosho, and Illinois River basins (Stoner, 1981).
- Part 2: Salt Fork Arkansas and Cimarron River basins (Stoner, 1982).
- Part 3: Canadian, North Canadian, and Deep Fork River basins.
- Part 4: Red River Mainstem and North Fork Red River basin.
- Part 5: Washita River basin.

Within each part the stations are grouped by river basin. All rivers and streams within Oklahoma are tributary to either the Arkansas River or the Red River. Mainstem stations are those stations on the Arkansas or Red River or are on streams whose basins are directly tributary to the Arkansas or Red River and are too small to be listed as a separate basin. The stations are arranged in alphabetical order within each basin or mainstem designation. Where more than one station on a stream is reported, those stations are arranged in downstream order.

The location of each station is shown in figure 1, and the stations are identified by their station numbers. All of the assigned station numbers in Oklahoma begin with the digits 07. These two digits are omitted from the station numbers shown in figure 1. For example, station number 07228500 is shown in figure 1 as 228500. A listing of the stations by number that provides cross-indexing of stations shown in figure 1 with their station summaries is provided in table 3, which follows the station summaries.

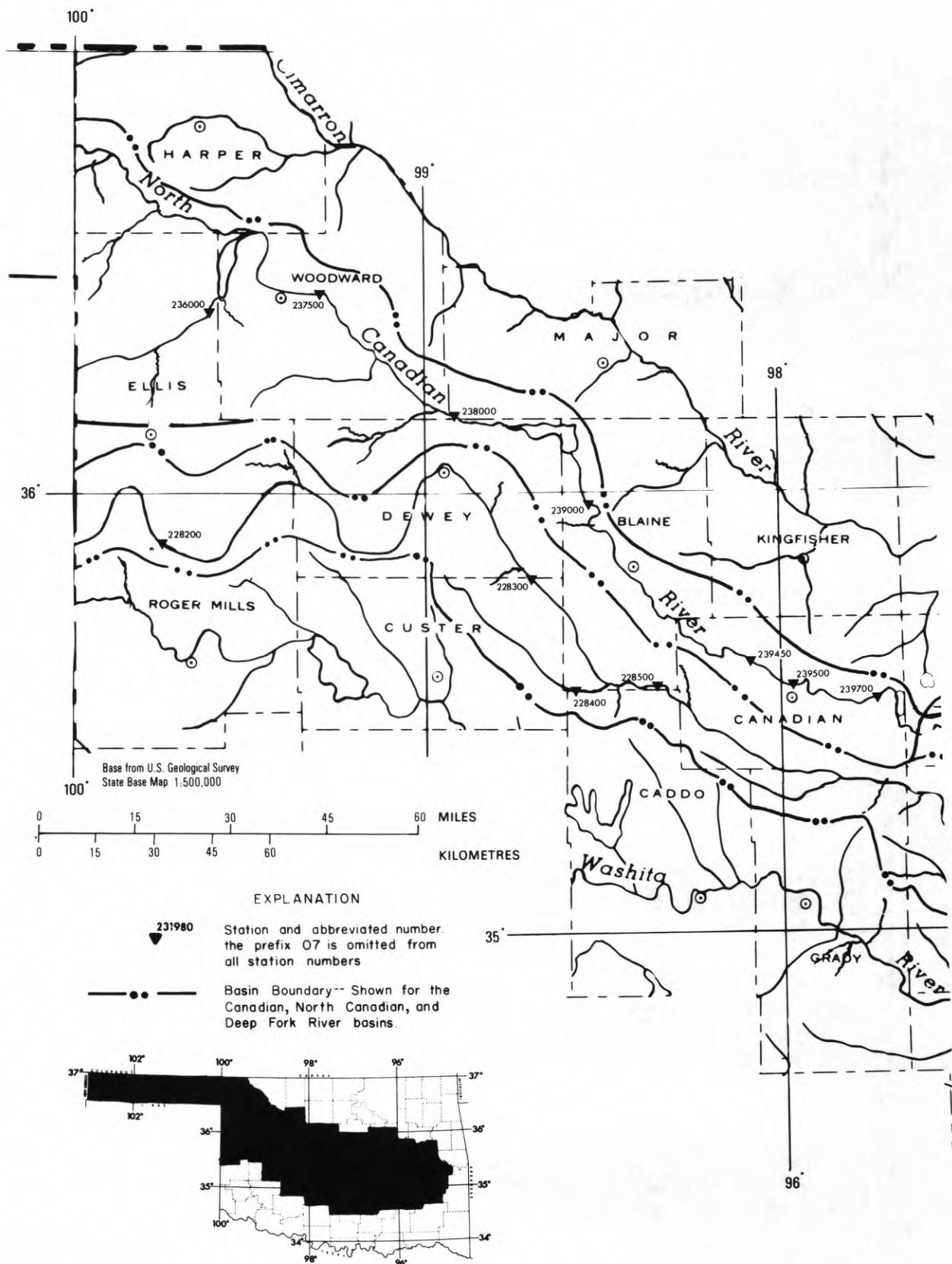
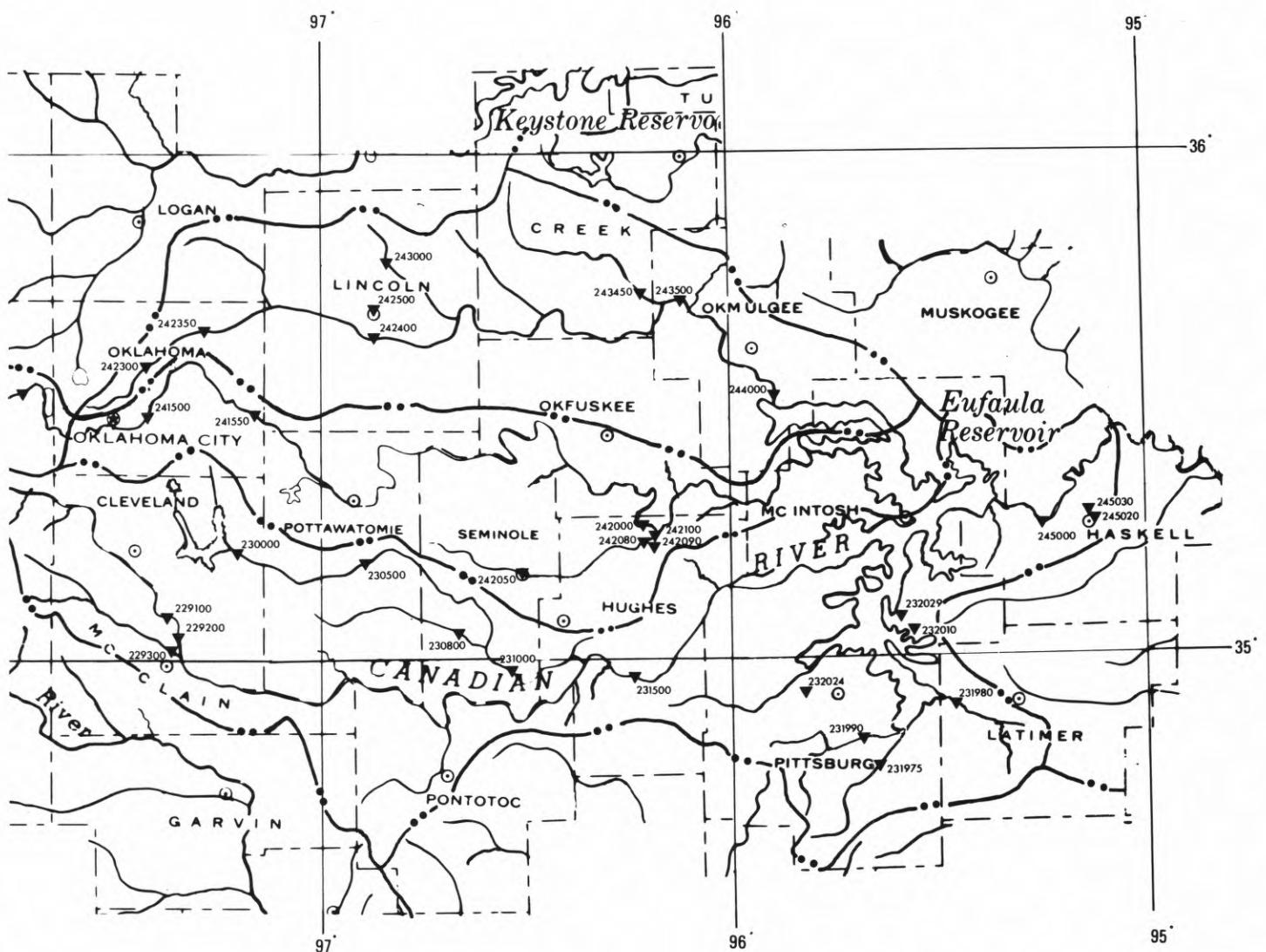
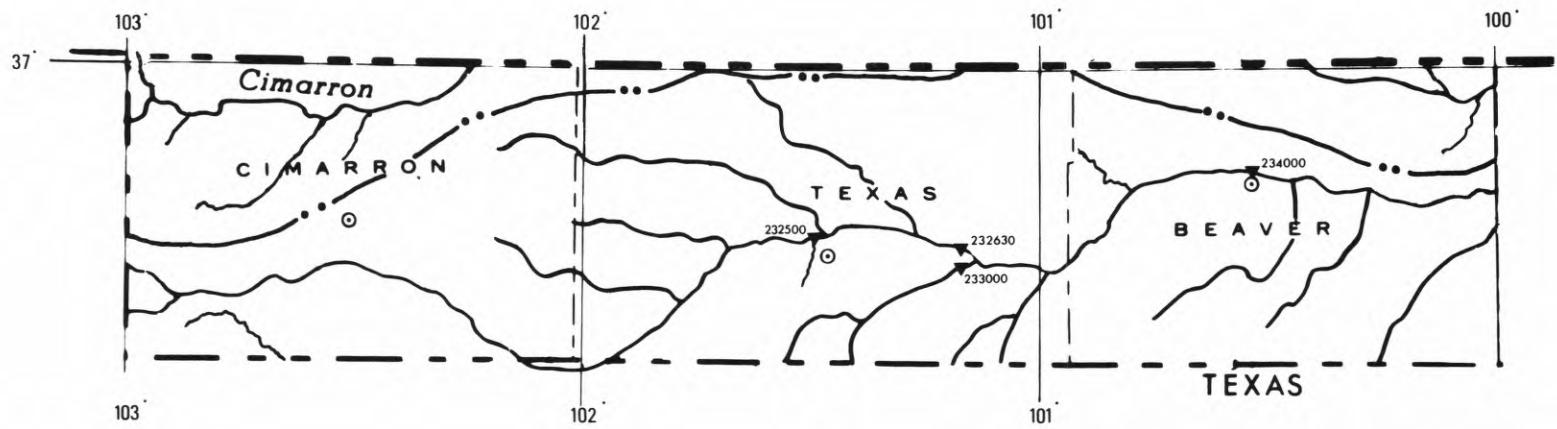


Figure 1. – Station location map



DATA PRESENTATION

Each station summary is in the following format:

1. Station location.
2. Drainage area.
3. Period of water-quality record.
4. Pertinent remarks if any.
5. A discussion of water types.
6. Trend analysis where sufficient current data are available.
7. A discussion of water quality related to use as a public water supply.
8. A discussion of water quality related to use for irrigation.
9. Two tables; one providing the univariate statistics for the selected constituents, and one showing the frequency distribution for the constituents.
10. Plots of the specific conductance versus the major cation ratios and the major anion ratios.
11. An irrigation diagram.

The selection of water-quality constituents was based on their significance to water use for public supply and irrigation. Dissolved solids as determined by the residue on evaporation at 180° Celsius method was included because it is a measure of the total amount of dissolved material present in the water.

The data are discussed in the summaries on a per value basis rather than a percentage of time basis. For some stations the percentage of values can be thought of as the percentage of time. However, when the period of record is less than 3 years or the number of values is less than 40, care needs to be taken in assuming this relationship. The data were analyzed using the Statistical Analysis System 1976 version (SAS-76), developed by Barr and others (1976), and the Supplemental Library (Helwig, 1977).

EXPLANATION OF STATION SUMMARY

Location

The location for each station is given in at least three ways: (1) by latitude (lat) and longitude (long); (2) by the township, range, and section; and (3) by distance and direction from local geographic features such as bridges, tributary streams, and towns. The location also is described, where information is available, by river mile, the distance the station is upstream from the mouth of the stream.

Drainage Area

The drainage area of a stream at a specific location is that area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the river upstream from the specified point. Drainage-area values given include all closed basins, or noncontributing areas, within the area unless otherwise noted.

Period of Record

The period of record in this report is the period of water-quality record by water year--that is, the 12-month period ending September 30. The water year is designated by the calendar year in which it ends and includes 9 of the 12 months. The period of record for the water-quality data used in this report includes all available WATSTORE data through the 1979 water year. A water year was included in the period of record when at least one sample was available for that water year.

Water Type

Water can be typed according to the percentage of each of the major ions in solution. For example, if the calcium and sulfate ions are predominant, the water would be described as calcium sulfate type. In this report a cation or anion was considered to be a predominant ion if it constituted at least 50 percent of its respective cation or anion group. The major cations, calcium, magnesium, sodium, and potassium, which are electropositive, and the major anions, carbonate, bicarbonate, chloride, and sulfate, which are electronegative, generally constitute more than 95 percent of the total ions in solution.

Ordinarily the concentration of the potassium ion is very small in relation to the sodium ion concentration. Potassium is grouped with the sodium because of its small concentration and because it is chemically similar to sodium; and the ions are referred to as sodium rather than sodium plus potassium.

The relationship between the carbonate and bicarbonate ions is pH dependent. Both carbonate and bicarbonate ions are considered to be present in solution when the pH is greater than 8.3, and when the pH is equal to or less than 8.3 only the bicarbonate ion is considered present. Because the relation between pH and specific conductance at each station was not determined, the carbonate and bicarbonate ions are referred to as carbonate/bicarbonate.

The concentration and relationship of the major ions in solution will, to a large extent, be determined by the geology of the terrane through which the water flowed and how the constituents in the water reacted to mixing with other waters.

Cation and Anion Ratio Plots

The cation ratio plot presents the ratio of each major cation, expressed in meq/L (milliequivalents per liter), to the sum of the major cations, in meq/L, plotted versus the specific conductance. The anion ratio plot was prepared in the same manner using the major anions. Each ion ratio plot requires complete data for all major cations or all major anions. In many instances, an analysis with complete anion data will not have complete cation data. Some confusion in the comparison of the ion ratio plots can result from the different data requirements for the cation and anion plots. However, to provide as complete a water-quality summary as possible, all data that met the various plotting requirements were included. These plots were constructed to determine whether the ionic distributions changed with changes in the total concentration of dissolved materials. Example plots of the cation and anion ratios are shown in figures 2 and 3.

Trend

Trend analyses were made to determine whether the concentration of a constituent was increasing (positive trend) or decreasing (negative trend) with time. Only data collected after October 1, 1960, were used in the trend analyses. This was done because of the format in which SAS stores the dates and because it was believed that 18 years was a sufficient time span to adequately determine the presence of trend. Trend analysis was made only for those stations that had current data (data from 1977, 1978, or 1979 water years) because trend analyses based on historical data could be misleading. Trend analysis is significant because it indicates what is occurring in the present, and what possible effects may occur in the future.

Plots, not included in this report, of dissolved solids, hardness, sulfate, and chloride concentrations versus time were generated where current data were available. The plots were examined to determine if there were data for a minimum time span, 5 years, to make a statistical test for trend and to see

CATION RATIO PLOT
 N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=ARKANSAS RIVER AT TULSA, OK

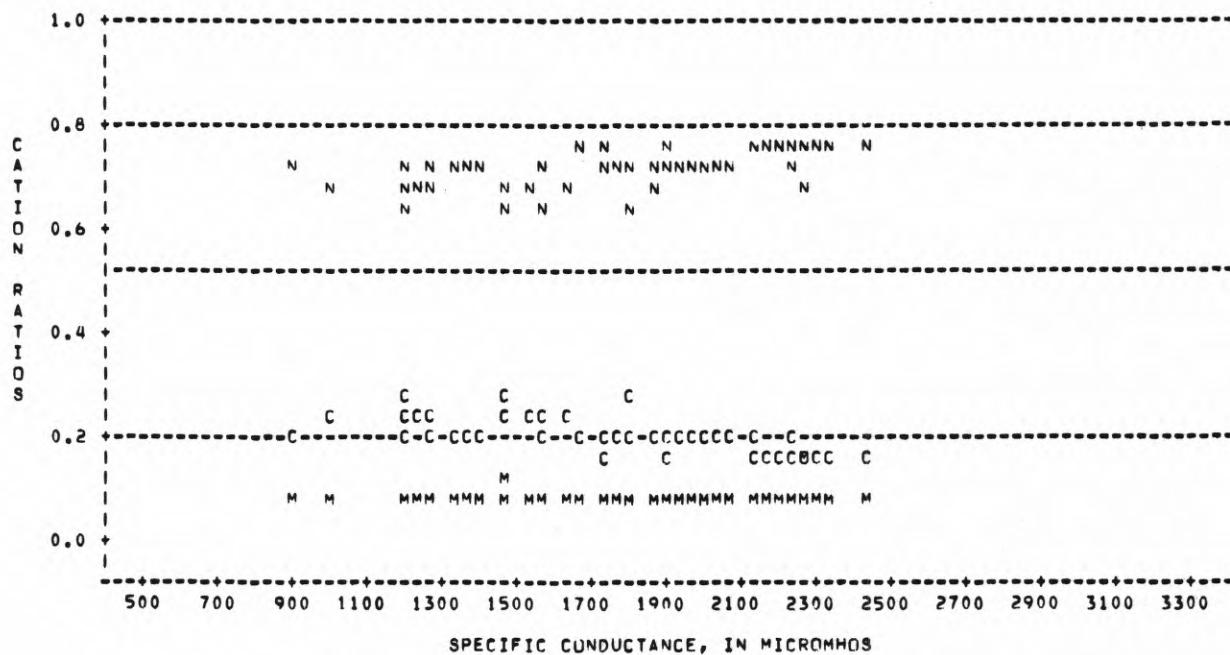


Figure 2.- Cation ratio plot for Arkansas River at Tulsa, Oklahoma.

ANION RATIO PLOT
 H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=ARKANSAS RIVER AT TULSA, OK

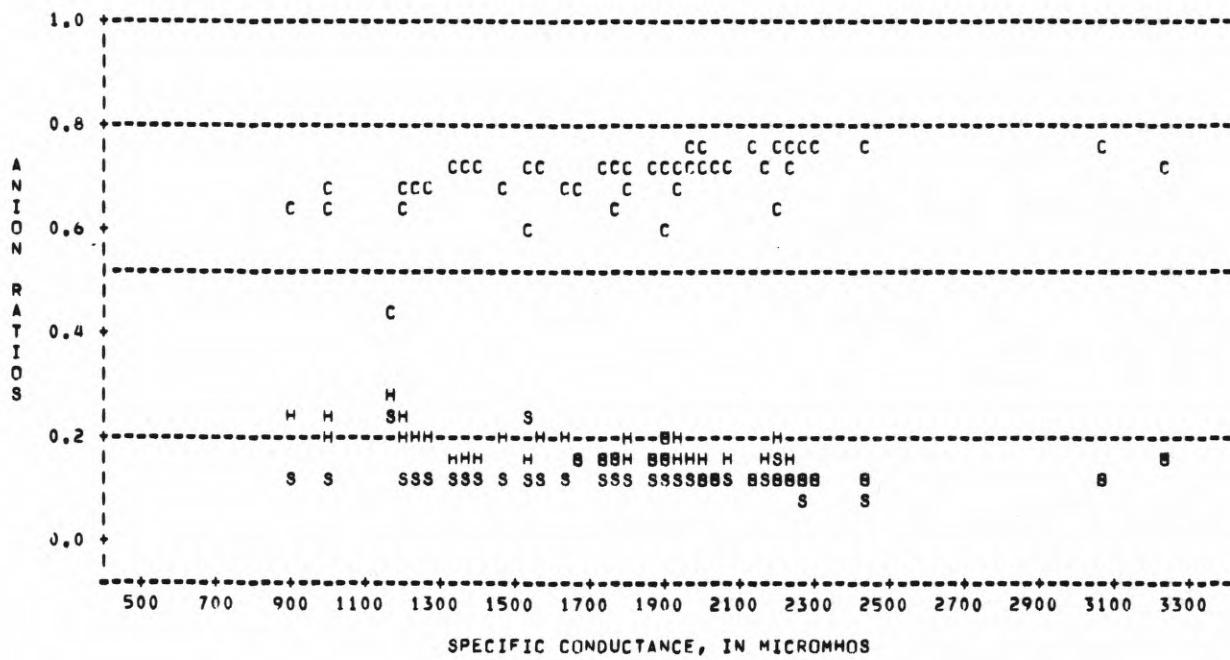


Figure 3.- Anion ratio plot for Arkansas River at Tulsa, Oklahoma.

if there were any indication of trend. The test chosen for trend analysis was a Spearman's rho technique and is fully described by Conover (1971). The test is two sided and indicates whether a trend, if any, is positive or negative. The test was made for the four constituents at the 95-percent probability level. The technique does not indicate the cause of a trend, only that a trend is or is not occurring. A trend may be the result of an extended period of drought or a period of much precipitation.

Public Water Supply

This section includes a discussion of water hardness, constituents for which maximum concentrations have been recommended, and constituents for which maximum contaminant levels have been established by regulation. Where adequate data were available, an evaluation was made as to the suitability for use as a public supply. Suitability for use as a public supply is based on available water-quality criteria and is an evaluation of the fitness of the water for its intended use. Water evaluated as unsuitable because a water-quality constituent(s) exceeds established criteria may or may not be acceptable for use by the population to be supplied. The acceptability of water for public supply depends a great deal on the availability, or more importantly, the non-availability of a more suitable supply source. In many parts of the United States, particularly in the arid West, the public water supply is accepted by the majority of the population served even though the concentrations of such constituents as sulfate and chloride commonly exceed the recommended limits, simply because a more suitable source is not available. Because the acceptability of a water supply depends on many factors other than the water quality, no evaluation of acceptability was made. All evaluations of the suitability for use were based on the water as a raw untreated source and do not reflect any evaluation of suitability after treatment. However, these evaluations need to be used with caution because, for many stations, the data were more than 10 years old and need to be updated to determine the existing water quality. Furthermore, important data were missing for many stations, particularly the toxic metals. The suitability evaluations were provided to show whether the existing data indicated a constituent concentration which might preclude the use of the water for public supply.

Hardness

Hardness was included because, in relation to public water supply, it is one of the most noticeable water-quality characteristics. No maximum hardness concentration has been recommended because hardness is not generally considered a human health hazard. As hardness increases the efficiency of soaps and detergents decreases. When the concentration of hardness is large, deposition or scaling occurs, thereby reducing the efficiency of hot water tanks and

restricting the flow of water in plumbing systems. Additional information on hardness is given by Durfor and Becker (1964), and Hem (1970). The concentration of hardness is expressed as mg/L (milligrams per liter) as CaCO_3 (calcium carbonate). The hardness classification used in this report and given in the following table is that used by Durfor and Becker (1964, p. 27).

| Hardness range (mg/L as CaCO_3) | Description |
|--|-----------------|
| 0 to 60 | Soft |
| 61 to 120 | Moderately hard |
| 121 to 180 | Hard |
| Greater than 180 | Very hard |

Constituents with recommended maximum concentrations

Maximum concentrations for several water-quality constituents that have not had maximum contaminant levels set by regulation have been recommended by the National Academy of Sciences and National Academy of Engineering (1973). These constituents generally are not toxic to humans at their recommended limits. Particular constituents affect such qualities as color, taste, and odor; some may cause staining of clothes and plumbing fixtures; and others produce laxative effects in humans. The selected water-quality constituents in this group are chloride, sulfate, pH, and iron. Other components such as color, odor, oil and grease, silver, and zinc, were excluded because of the lack of analytical data. Following is a brief summary of reasons for selecting each constituent:

Chloride.--Affects taste. Normal water-treatment processes do not remove chloride.

Sulfate.--Affects taste and produces laxative effects. Normal water-treatment processes do not remove sulfate.

pH.--Contributes to the corrosion of plumbing and water distribution systems. The cost of treatment for waters with pH in excess of the recommended limits may be uneconomical.

Iron.--Causes staining of plumbing fixtures and clothing, accumulation of deposits in water distribution systems, and objectional taste.

Data in the following table were taken from the National Academy of Sciences and National Academy of Engineering (1973) report.

| Constituent | Recommended concentration limit(s) |
|-------------|------------------------------------|
| Chloride | 250 mg/L |
| Sulfate | 250 mg/L |
| pH | 5.0 and 9.0 units |
| Iron | 300 ug/L |

Constituents with maximum contaminant levels

The U.S. Environmental Protection Agency through the Safe Drinking Water Act (Public Law 93-523) announced regulations for maximum contaminant levels in public water supplies for certain constituents (U.S. Environmental Protection Agency, 1976). The constituents, fluoride, arsenic, cadmium, chromium, lead, and mercury are included in this report; however, barium, selenium, and silver were not selected because of the almost total lack of historic data. Nitrate-nitrogen was not selected because changes in analytical methods and onsite field preservation techniques have produced data that probably are not comparable.

The maximum contaminant level for fluoride is based on the annual average maximum daily air temperature at the water source and is tabulated below. The maximum contaminant levels for fluoride given in the following table are from the U.S. Environmental Protection Agency (1976).

| Temperature (°F) | Maximum fluoride contaminant level (mg/L) |
|---------------------|---|
| 53.7 and below | 2.4 |
| 53.8 to 58.3 | 2.2 |
| 58.4 to 63.8 | 2.0 |
| 63.9 to 70.6 | 1.8 |
| 70.7 to 79.2 | 1.6 |
| 79.3 to 90.5 | 1.4 |

Although the amount of data available at most stations was limited, the toxic metals were included because of their significance to human health. The following table lists the maximum contaminant levels established by regulation for the toxic metals, U.S. Environmental Protection Agency (1976).

| Constituent | Maximum contaminant level (ug/L) |
|-------------|-------------------------------------|
| Arsenic | 50 |
| Cadmium | 10 |
| Chromium | 50 |
| Lead | 50 |
| Mercury | 2.0 |

Irrigation

The irrigation section of each station summary is based primarily on the irrigation waters classification system developed by Wilcox (1955). This system describes the utility of waters for irrigation based on their respective salinity and sodium hazards. Where boron data were available an evaluation was made on the possible phytotoxic effects of this trace element, based in the information contained in the National Academy of Sciences and National Academy of Engineering report (1973).

Salinity and sodium hazard classification

The Wilcox classification system depicts a salinity hazard based on the specific conductance, and a sodium hazard based on the SAR (sodium adsorption ratio). The SAR is based on the ratio of sodium to calcium and magnesium and expresses the relative activity of sodium ion in exchange reactions with soil. Complete discussions of the SAR and the method for its computation are provided in Hem (1970) and Wilcox (1955).

The following descriptions of the effects of the different salinity and sodium hazard classes are taken directly from Wilcox (1955).

"Low-salinity water (C1) can be used for irrigation with most crops on most soils, with little likelihood that a salinity problem will develop. Some leaching is required, but this occurs under normal irrigation practices except in soils of extremely low permeability.

Medium-salinity water (C2) can be used if a moderate amount of leaching occurs. Plants with moderate salt tolerance can be grown in most instances with special practices for salinity control.

High-salinity water (C3) cannot be used on soils with restricted drainage. Even with adequate drainage, special management for salinity control may be required and plants with good salt tolerance should be selected.

Very high salinity water (C4) is not suitable for irrigation under ordinary conditions but may be used occasionally under very special circumstances. The soils must be permeable, drainage must be adequate, irrigation water must be applied in excess to provide considerable leaching, and very salt-tolerant crops should be selected."

"Low sodium water (S1) can be used for irrigation on almost all soils with little danger of the development of harmful levels of exchangeable sodium. However, sodium-sensitive crops, such as stone-fruit trees and avocados, may accumulate injurious concentrations of sodium.

Medium-sodium water (S2) will present an appreciable sodium hazard in fine textured soils of high cation-exchange capacity, especially under low-leaching conditions, unless gypsum is present in the soil. This water may be used on coarse textured or organic soils that have good permeability.

High-sodium water (S3) may produce harmful levels of exchangeable sodium in most soils and will require special soil management--good drainage, high leaching, and additions of organic matter. Gypsiferous soils may not develop harmful levels of exchangeable sodium from such waters.

Very high sodium water (S4) is generally unsatisfactory for irrigation purposes except at low and perhaps medium salinity where the solution of calcium from the soil or the use of gypsum or other amendments may make the use of this water feasible."

Additional information on the effect of salinity and sodium on water use for irrigation is given by Wilcox (1955) and the National Academy of Sciences and National Academy of Engineering (1973).

Irrigation diagram

An irrigation diagram is included for each station where sufficient data were available. On the diagram the SAR of a sample is plotted against its specific conductance and the appropriate salinity and sodium hazards are determined (example, fig. 4). In the irrigation diagram the salinity hazard is along the horizontal axis and ranges from C1 to C4. All specific conductance values given in this report are in micromhos per centimeter at 25 degrees Celsius and are hereafter abbreviated as umho. The specific-conductance ranges for the salinity hazard classes are: less than 250 umho, low salinity hazard; 250 to 750 umho, medium salinity hazard; 751 to 2,250 umho, high salinity hazard; and greater than 2,250 umho, very high salinity hazard. The sodium hazard is along the vertical axis and the class breakpoints S1 through S4 vary with the specific conductance and are delineated by the sloping lines.

IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=BIRD CREEK NR BARNSDALL, OK

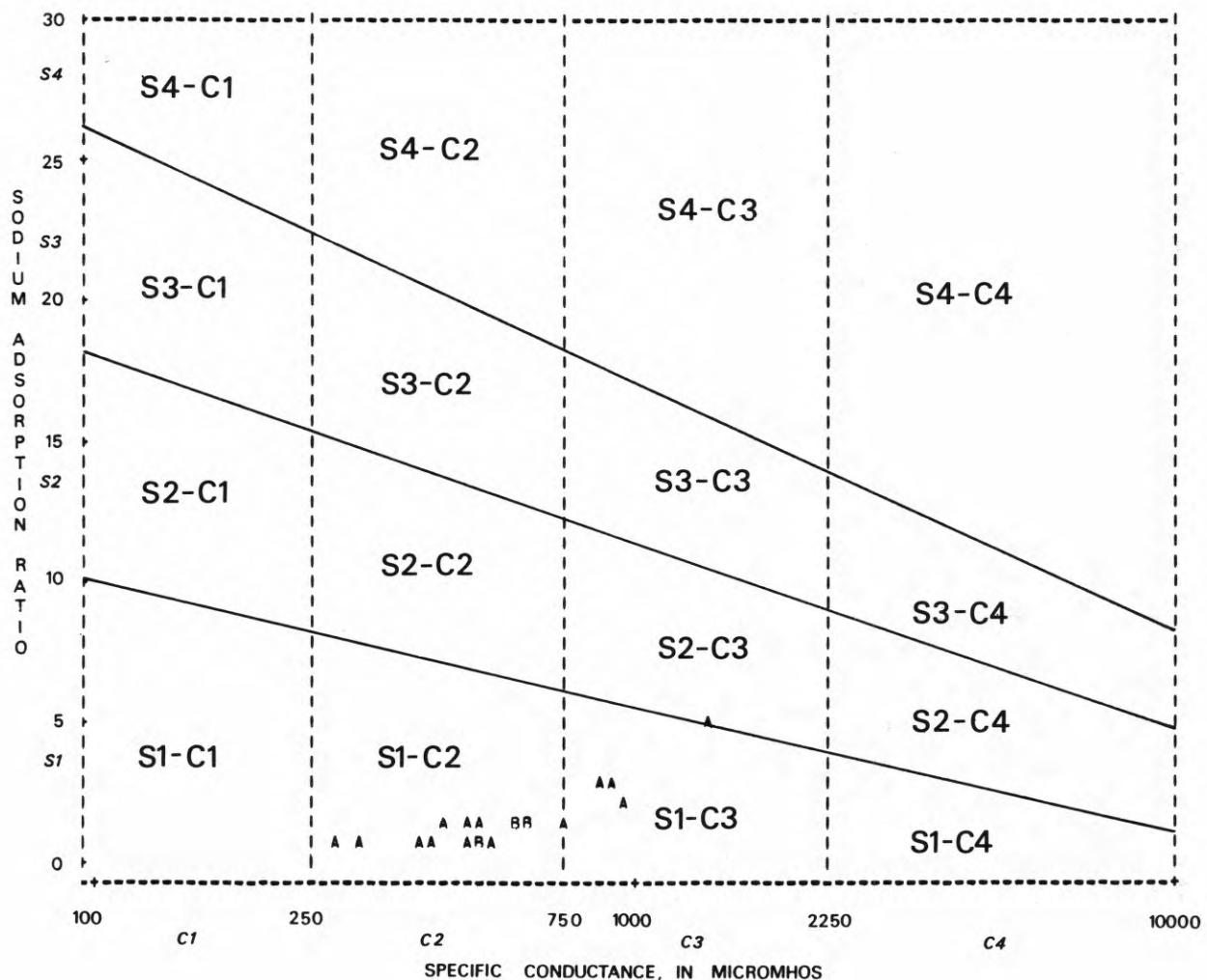


Figure 4.- Irrigation diagram for Bird Creek near Barnsdall, Oklahoma.

Boron

Boron has long been recognized as a phytotoxic trace element. The recommended maximum boron concentrations for use on all soils from the National Academy of Sciences and National Academy of Engineering (1973) report are: boron sensitive plants, 750 ug/L (micrograms per liter); boron semitolerant plants, 1,000 ug/L; and boron tolerant plants, 2,000 ug/L. The relative boron tolerances of certain plants are shown in table 1. This table was taken directly from the Wilcox (1955) report and lists many plants that are not native to or commercially grown in Oklahoma; however, it is possible that most or all of these plants may be grown in Oklahoma on a non-commercial basis.

Table 1.--Relative boron tolerance of certain plants

[From Wilcox (1955). In each group, the plants first named are considered as more tolerant; the last named, more sensitive]

| Tolerant | Semitolerant | Sensitive |
|-------------------------------------|-------------------------|--|
| Athel (<u>Tamerix aphylla</u>) | Sunflower (native) | Pecan |
| Asparagus | Potato | Walnut (Black; and Persian or English) |
| Palm (<u>Phoenix canariensis</u>) | Cotton (Acala and Pima) | Jerusalem artichoke |
| Date Palm (<u>P. dactylifera</u>) | Tomato | Navy bean |
| Sugar beet | Sweet pea | American Elm |
| Mangel | Radish | Plum |
| Garden beet | Field pea | Pear |
| Alfalfa | Ragged robin rose | Apple |
| Gladiolus | Olive | Grape (Sultania and Malaga) |
| Broad bean | Barley | Kadota fig |
| Onion | Wheat | Persimmon |
| Turnip | Corn | Cherry |
| Cabbage | Milo | Peach |
| Lettuce | Oat | Apricot |
| Carrot | Zinnia | Thornless blackberry |
| | Pumpkin | Orange |
| | Bell pepper | Avocado |
| | Sweet potato | Grapefruit |
| | Lima bean | Lemon |

Univariate Statistics

The station summaries show the univariate statistics for each constituent. The units of concentration in the summary are those units that have already been described for the constituents. The standard deviation, skewness, and kurtosis were not computed for constituents with less than 10 values. When only one value was available for a constituent, that value is listed in the mean column. In many instances the number of values for one constituent are two to three or more times greater than the number of values for another constituent. Therefore, comparison of statistics, particularly minimums and maximums, between constituents needs to be done with care.

The following are brief descriptions of the headings in the univariate statistics summary for each station.

N.--The number of values available for the period of record for that constituent.

MEAN.--The arithmetic average, except for pH which is the median or middle value.

MIN.--The minimum value recorded.

MAX.--The maximum value recorded.

STD.--The standard deviation of the constituent distribution.

SKEW.--The skewness of the constituent distribution. Skewness is a measure of the asymmetry of the distribution of the data when compared to the symmetrical normal distribution. Detailed information on the theory, use, and computational methods for the skewness and kurtosis (described in the next section) are given by Fisher (1973) and Snedecor (1956). A positive value for the skewness statistic indicates there are more values smaller than the mean than values greater than the mean, and for negative skewness values the converse is true (fig. 5). Although the statistic computed for the skewness cannot be used to determine the shape of the distribution, the skewness statistic can indicate whether the distribution curve is significantly different from a normal distribution. If the sample distribution is significantly different, tests that are based on normality are not applicable. The 95-percent probability range, plus and minus, for skewness for various sample sizes is shown in table 2. As an example: For a sample size of 100, if the skewness statistic greatly exceeded plus or minus 0.47, the distribution is not considered normal at the 95-percent probability level.

KURT.--The kurtosis of the sample distribution. Kurtosis is a measure of the deviation of the sample distribution from the normal distribution. In general, kurtosis measures the relative peakness or flatness of the sample distribution curve with respect to the normal distribution. A positive kurtosis indicates peakness and a negative kurtosis indicates flatness (fig. 6). Values for the 95-percent probability limits for kurtosis for selected sample sizes are given in table 2.

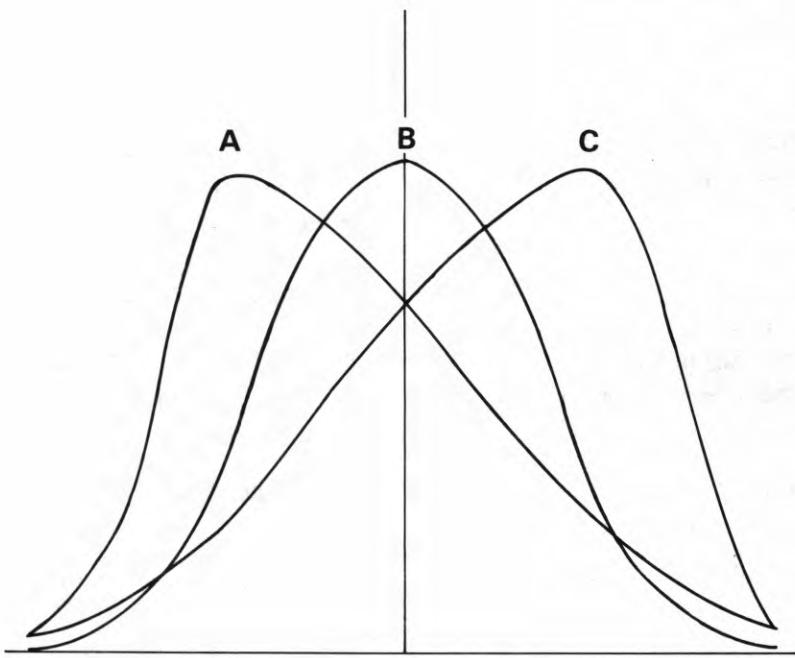


Figure 5 - Skewness and the normal distribution. Curve A is positive skewness, curve B is normal distribution, and curve C is negative skewness.

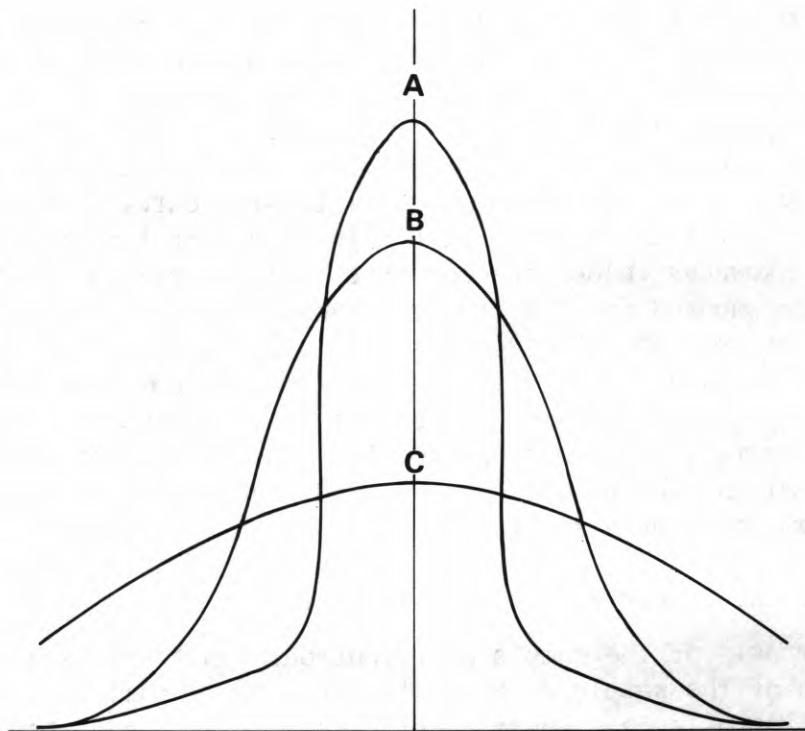


Figure 6 - Kurtosis and the normal distribution. Curve A is positive kurtosis, curve B is normal distribution, and curve C is negative kurtosis.

Table 2.--Ninety-five percent probability limits for skewness and kurtosis for selected sample sizes

| Sample size | 95 percent of probability limits (plus or minus) | |
|-------------|--|----------|
| | Skewness | Kurtosis |
| 10 | 1.35 | 2.61 |
| 25 | .91 | 1.77 |
| 50 | .66 | 1.30 |
| 75 | .54 | 1.07 |
| 100 | .47 | .94 |
| 150 | .39 | .77 |
| 200 | .34 | .67 |
| 300 | .28 | .55 |
| 400 | .24 | .48 |
| 500 | .21 | .43 |
| 600 | .20 | .39 |
| 700 | .18 | .36 |

Frequency Distribution

The frequency distribution table shows selected percentile concentrations from the cumulative frequency distributions of constituents for which 10 or more values were available. The concentration units in the table are the same as previously described for the constituents. The percentile concentrations in the table are explained in the following example: The concentration shown in the 25th percentile column is that concentration for which 25 percent of the samples had concentrations less than or equal to the column value.

STATION NUMBERING SYSTEM

Stations numbers are assigned in a downstream sequence so that as one progresses downstream the numbers become larger. Station numbers on a tributary are assigned on a rank-order basis. Station numbers on a first-rank tributary are assigned so that the numbers are larger than any number assigned to an upstream station on the mainstem and are smaller than any station number assigned to a station downstream on the mainstem. The station numbers on the tributary are assigned in the same downstream method as on the mainstem. A first-rank tributary is one that flows directly into the mainstem, a second-rank tributary is one which flows into a first-rank tributary, and so on for the greater ranked tributaries. The numbering system is followed from the mainstem up through the greater ranked tributaries, first rank, second rank, third rank, and so on.

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STATION SUMMARIES

All constituent values except for pH and specific conductance are for the dissolved phase. Specific conductance and pH are measured on unfiltered samples. The values for the standard deviation, skewness, and kurtosis for pH represent the distribution of the pH values and not the distribution of the hydrogen ion concentrations and were computed from the arithmetic mean of the pH values.

The units of concentration for selected constituents in the following station summaries are as follows:

Milligrams per liter (mg/L) - dissolved solids, total hardness, chloride, sulfate, and fluoride.

Micrograms per liter (ug/L) - Iron, arsenic, cadmium, chromium, lead, mercury, and boron.

Micromhos per centimeter at 25 degrees Celsius (umho) - Specific conductance.

Standard units - pH.

Unitless - SAR.

CANADIAN RIVER BASIN

07232010 - Blue Creek near Blocker, Okla.

LOCATION.--Lat $34^{\circ}02'26''$, long $95^{\circ}34'21''$, in SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 36, T.7 N., R.16 E., Pittsburg County, at bridge on State Highway 31, 1.5 mi south of Blocker, and at mile 3.9.

DRAINAGE AREA.--12.1 mi².

PERIOD OF RECORD.--1976 to 1979.

WATER TYPE.--No ion was predominant over the range of measured specific conductance. The sodium and sulfate ion ratios were significantly higher than the other ion ratios for specific conductance greater than 60 umho, which was measured in 90 percent of the samples.

TREND.--The period of record is insufficient, less than 5 years, to perform trend analysis.

PUBLIC WATER SUPPLY.--All of the hardness values were less than 60 mg/L and the average hardness concentration was 28 mg/L. The hardness class for this water is soft. The recommended maximum concentration for iron of 300 ug/L was exceeded by 10 percent of the iron values. The maximum contaminant level for cadmium of 10 ug/L was exceeded by 4 percent of the cadmium values, the maximum level for lead of 50 ug/L was exceeded by 9 percent of the lead values, and the maximum contaminant level for mercury of 2 ug/L was exceeded by 9 percent of the mercury values. Because the maximum contaminant levels for cadmium, lead, and mercury were exceeded, this water may not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard and the sodium hazard were low for all samples. The data indicate that no phytotoxic effects from boron should occur.

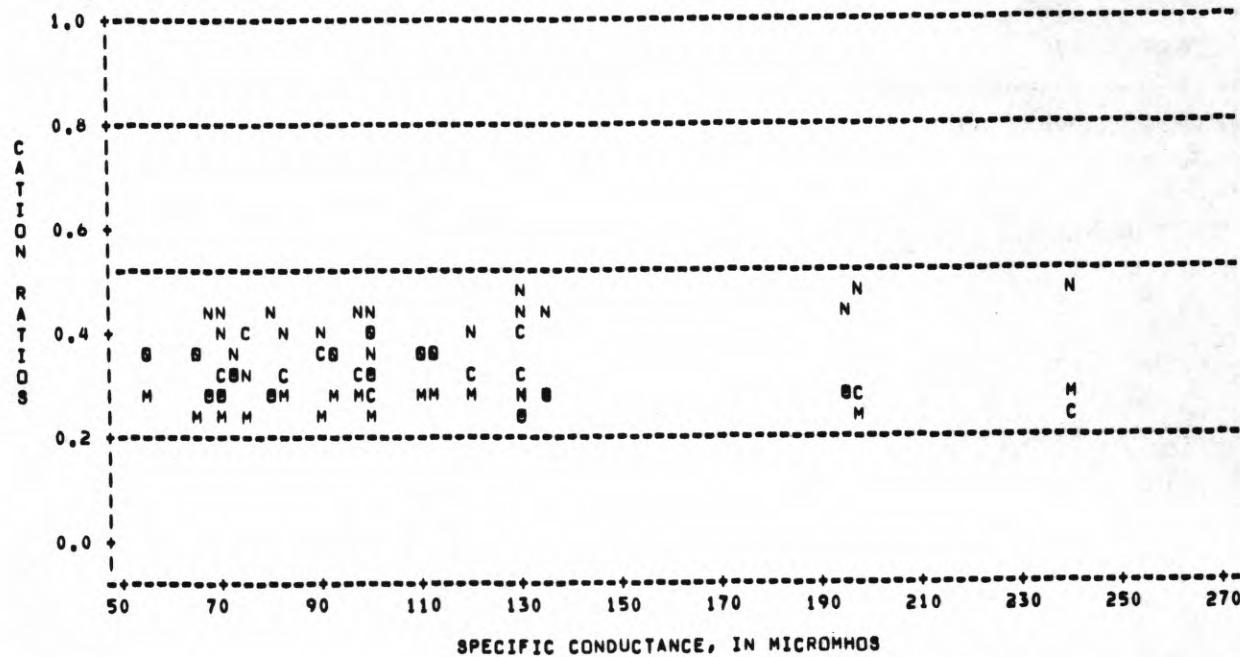
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|-----|-----|------|-------|
| Specific conductance | 37 | 100 | 54 | 240 | 41 | 1.76 | 3.51 |
| Dissolved solids | 27 | 72 | 45 | 150 | 26 | 1.56 | 2.39 |
| pH | 36 | 7.1 | 6.5 | 8.3 | .4 | .91 | .64 |
| Total hardness | 27 | 28 | 15 | 59 | 11 | 1.32 | 1.97 |
| Chloride | 27 | 7.6 | 3.2 | 23 | 5.0 | 1.99 | 3.14 |
| Sulfate | 27 | 20 | 9.4 | 56 | 11 | 1.69 | 3.36 |
| Iron | 28 | 165 | 0 | 650 | 154 | 1.89 | 3.45 |
| Fluoride | 27 | .1 | 0.0 | .2 | .1 | -.40 | .19 |
| Arsenic | 31 | 0 | 0 | 2 | .6 | 1.55 | 1.50 |
| Cadmium | 24 | 2 | 0 | 17 | 4.0 | 2.68 | 8.08 |
| Chromium | 29 | 2 | 0 | 10 | 3.9 | 1.57 | .59 |
| Lead | 23 | 19 | 0 | 190 | 50 | 3.11 | 8.73 |
| Mercury | 31 | .8 | 0 | 11 | 2.4 | 3.50 | 12.01 |
| SAR | 27 | .6 | .2 | 1.4 | .3 | 1.32 | 2.05 |
| Boron | 28 | 30 | 0 | 70 | 15 | .67 | .61 |

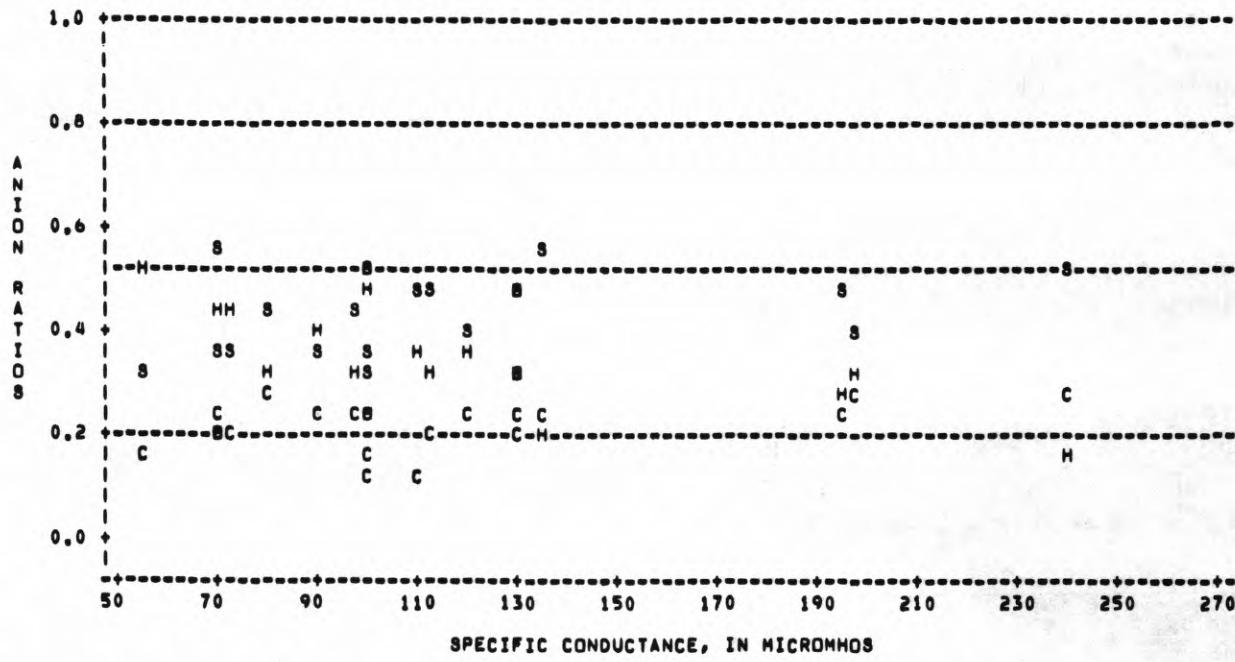
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 60 | 70 | 90 | 112 | 132 |
| Dissolved solids | 49 | 54 | 64 | 80 | 100 |
| pH | 6.7 | 6.8 | 7.0 | 7.4 | 7.6 |
| Total hardness | 17 | 20 | 25 | 34 | 37 |
| Chloride | 3.7 | 4.4 | 5.4 | 8.3 | 14 |
| Sulfate | 10 | 12 | 14 | 24 | 33 |
| Iron | 36 | 70 | 110 | 230 | 284 |
| Fluoride | 0.0 | 0.0 | .1 | .1 | .1 |
| Arsenic | 0 | 0 | 0 | 1 | 1 |
| Cadmium | 0 | 0 | 0 | 1 | 7 |
| Chromium | 0 | 0 | 0 | 1 | 10 |
| Lead | 0 | 0 | 4 | 6 | 20 |
| Mercury | 0.0 | 0.0 | 0.0 | .2 | 1.0 |
| SAR | .4 | .5 | .6 | .7 | 1.0 |
| Boron | 10 | 20 | 30 | 30 | 50 |

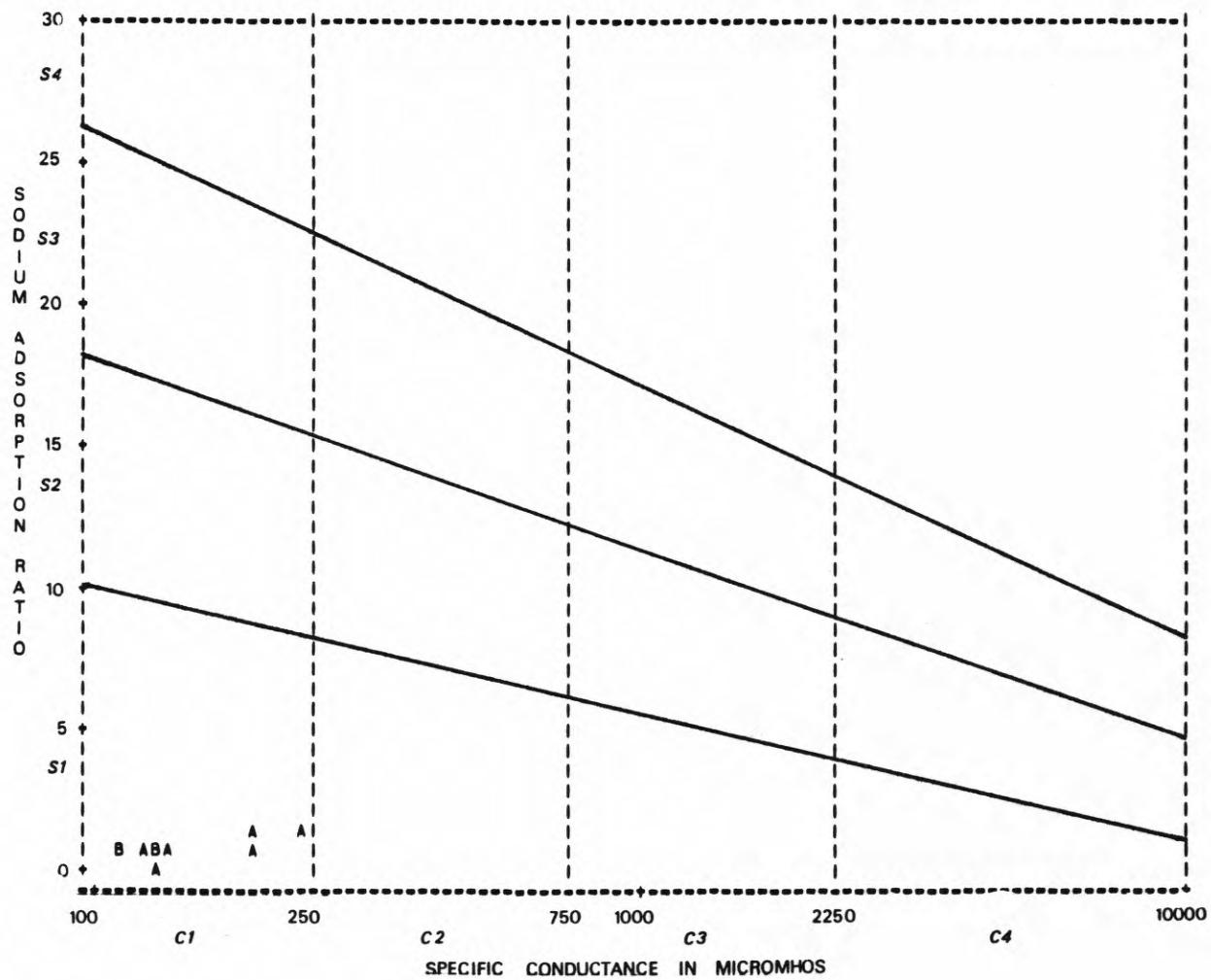
CATION RATIO PLOT
N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=BLUE CREEK NR BLOCKER, OK



ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=BLUE CREEK NR BLOCKER, OK



IRRIGATION DIAGRAM
 C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
 C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
 A = 1 OBS, B = 2 OBS, C = 3 OBS
 STATION NAME OR LOCAL IDENTIFIER=BLUE CREEK NR BLOCKER, OK



CANADIAN RIVER BASIN

07231975 - Brushy Creek near Haileyville, Okla.

LOCATION.--Lat $34^{\circ}48'05''$, long $95^{\circ}39'16''$, in NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 19, T.4 N., R.16 E., Pittsburg County, at county road bridge, 0.9 mi south of junction of State Highway 63 and county road, 1.2 mi northeast of Arch, 6.3 mi southwest of Haileyville, and at mile 14.3.

DRAINAGE AREA.--139 mi².

PERIOD OF RECORD.--1978 to 1979.

WATER TYPE.--This water was calcium bicarbonate type. The calcium ion ratio was slightly less than 50 percent in some of the samples; however, calcium was the dominant cation throughout the range of measured specific conductance.

TREND.--The period of record is insufficient, less than 5 years, to perform trend analyses.

PUBLIC WATER SUPPLY.--Seventy-five percent of the hardness values were less than 180 mg/L and the average concentration was 48 mg/L. Generally, the hardness class for this water is soft. The maximum contaminant level for cadmium of 10 ug/L was exceeded by 10 percent of the cadmium values. Because the maximum cadmium contaminant level was exceeded, this water may not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard was low, specific conductance less than 250 umhos, for 95 percent of the samples. All SAR values were equivalent to a low sodium hazard. The data indicate that phytotoxic effects from boron should not occur.

07231975 - Brushy Creek near Haileyville, Okla.--Continued

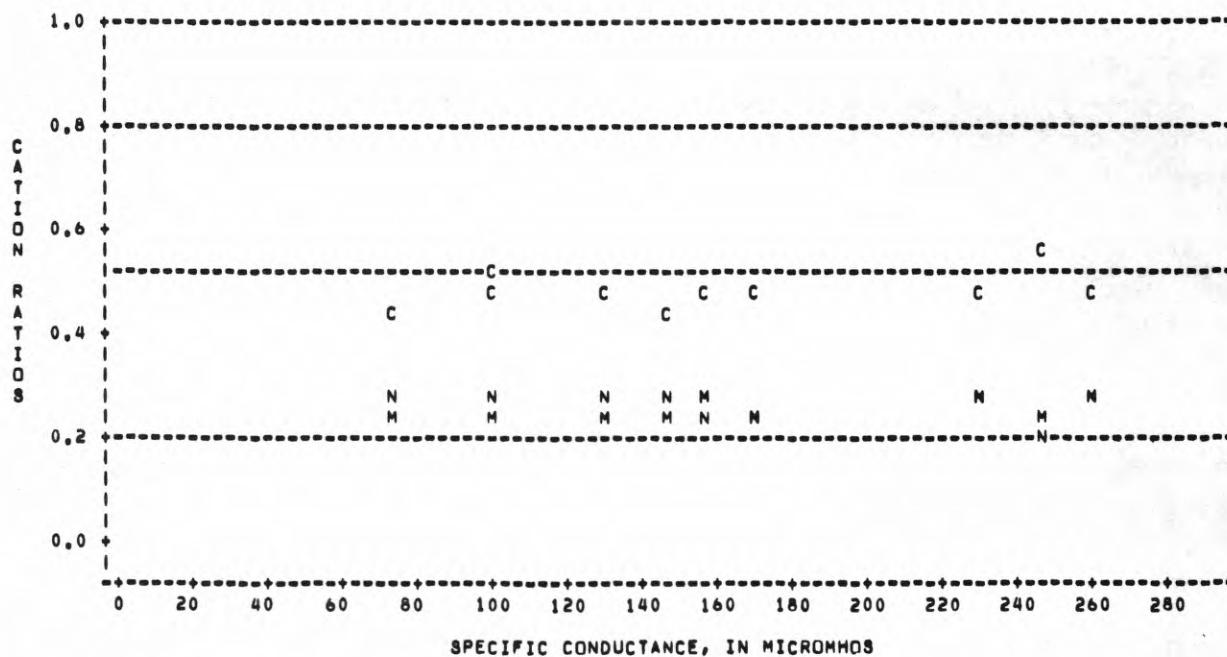
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|-----|-----|------|-------|
| Specific conductance | 18 | 138 | 72 | 280 | 60 | 1.20 | 0.85 |
| Dissolved solids | 11 | 89 | 47 | 133 | 29 | .01 | -1.05 |
| pH | 19 | 7.2 | 6.9 | 7.4 | .2 | -.16 | -.82 |
| Total hardness | 11 | 48 | 0 | 93 | 27 | .01 | -.26 |
| Chloride | 11 | 5.4 | 2.8 | 7.9 | 1.7 | -.12 | -1.22 |
| Sulfate | 11 | 18 | 11 | 24 | 5.0 | -.52 | -1.23 |
| Iron | 10 | 117 | 20 | 300 | 81 | 1.14 | 2.15 |
| Fluoride | 11 | .1 | .1 | .2 | 0.0 | 1.92 | 2.04 |
| Arsenic | 15 | 1 | 0 | 2 | .6 | .09 | -.17 |
| Cadmium | 10 | 3 | 0 | 16 | 4.8 | 2.30 | 5.89 |
| Chromium | 15 | 4 | 0 | 20 | 7.4 | 1.63 | 1.32 |
| Lead | 15 | 11 | 0 | 47 | 18 | 1.38 | .12 |
| Mercury | 15 | 0.0 | 0.0 | .2 | .1 | 2.40 | 4.35 |
| SAR | 10 | .4 | .3 | .6 | .1 | .39 | .37 |
| Boron | 11 | 48 | 30 | 60 | 9.8 | -.35 | -.59 |

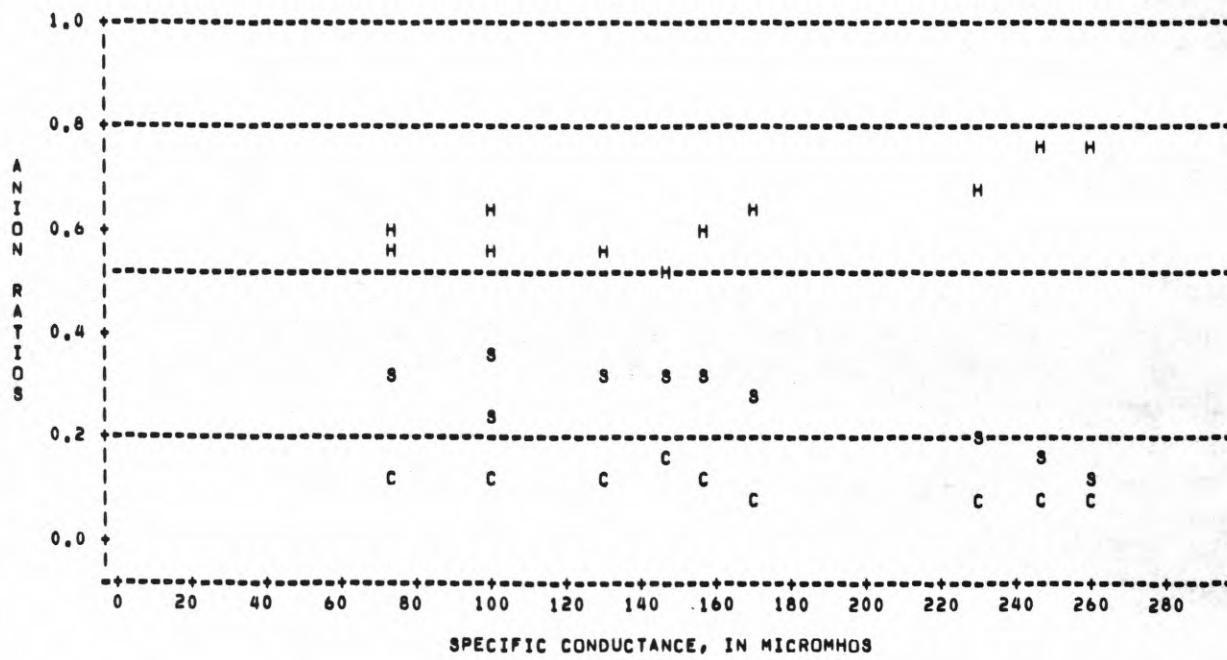
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 73 | 96 | 123 | 148 | 234 |
| Dissolved solids | 47 | 62 | 81 | 107 | 124 |
| pH | 6.9 | 7.0 | 7.2 | 7.3 | 7.4 |
| Total hardness | 2 | 24 | 45 | 60 | 82 |
| Chloride | 2.8 | 3.7 | 5.5 | 6.3 | 7.5 |
| Sulfate | 11 | 11 | 18 | 22 | 23 |
| Iron | 20 | 40 | 110 | 135 | 170 |
| Fluoride | .1 | .1 | .1 | .1 | .2 |
| Arsenic | 0 | 0 | 1 | 1 | 1 |
| Cadmium | 0 | 0 | 1 | 4 | 5 |
| Chromium | 0 | 0 | 0 | 2 | 15 |
| Lead | 0 | 0 | 0 | 8 | 43 |
| Mercury | 0.0 | 0.0 | 0.0 | 0.0 | .1 |
| SAR | .3 | .4 | .4 | .5 | .5 |
| Boron | 31 | 40 | 50 | 52 | 60 |

CATION RATIO PLOT
N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=BRUSHY CREEK NR HAILEYVILLE OK



ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=BRUSHY CREEK NR HAILEYVILLE OK



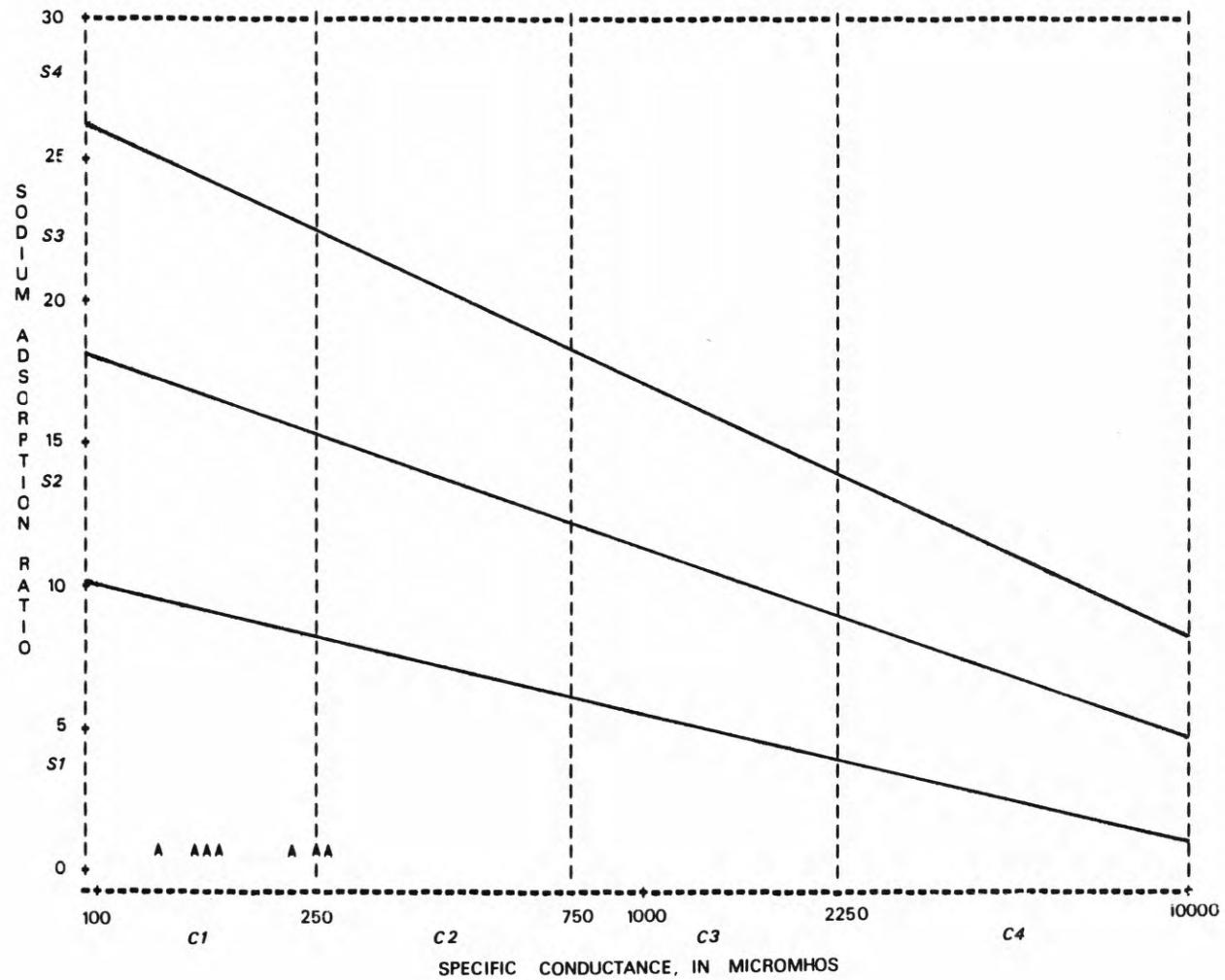
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=BRUSHY CREEK NR HAILEYVILLE OK



CANADIAN RIVER BASIN

07228200 - Canadian River near Roll, Okla.

LOCATION.--Lat $34^{\circ}52'12''$, long $99^{\circ}43'40''$, in SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 10, T.16 N., R.24 W.,
Roger Mills County, at bridge on U.S. Highway 283, 6.0 mi northwest of
Roll, and at mile 383.6.

DRAINAGE AREA.--23,615 mi², of which 63.4 mi² is probably noncontributing.

PERIOD OF RECORD.--1950 to 1953, 1962 to 1963, 1976 to 1977.

WATER TYPE.--For specific conductance less than 1,200 umho, 26 percent of the samples, the water was carbonate/bicarbonate type. The water was mixed type with respect to the anions for specific conductance between 1,200 and 1,600 umho, 14 percent of the samples. The water was chloride type for specific conductance between 1,600 and 2,400 umho, 30 percent of the samples. Data indicate that the water shifts to sulfate type for specific conductance greater than 2,400 umho. There were not sufficient data to make any determination of the cation distribution.

TREND.--The current period of record is insufficient, less than 5 years, to perform trend analyses.

PUBLIC WATER SUPPLY.--Ninety-five percent of the hardness values were greater than 180 mg/L and the average concentration was 445 mg/L. Generally, the hardness class for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 61 percent of the chloride values and the recommended maximum sulfate concentration of 250 mg/L was exceeded by 48 percent of the sulfate values. No toxic metal data were available. Because of the frequency and magnitude by which the recommended maximum concentrations of chloride and sulfate were exceeded, this water may not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard was high or very high, specific conductance greater than 750 umho, in 92 percent of the samples. The sodium hazard ranged from low to high with 42 percent of the SAR values equivalent to a low sodium hazard. No boron data were available.

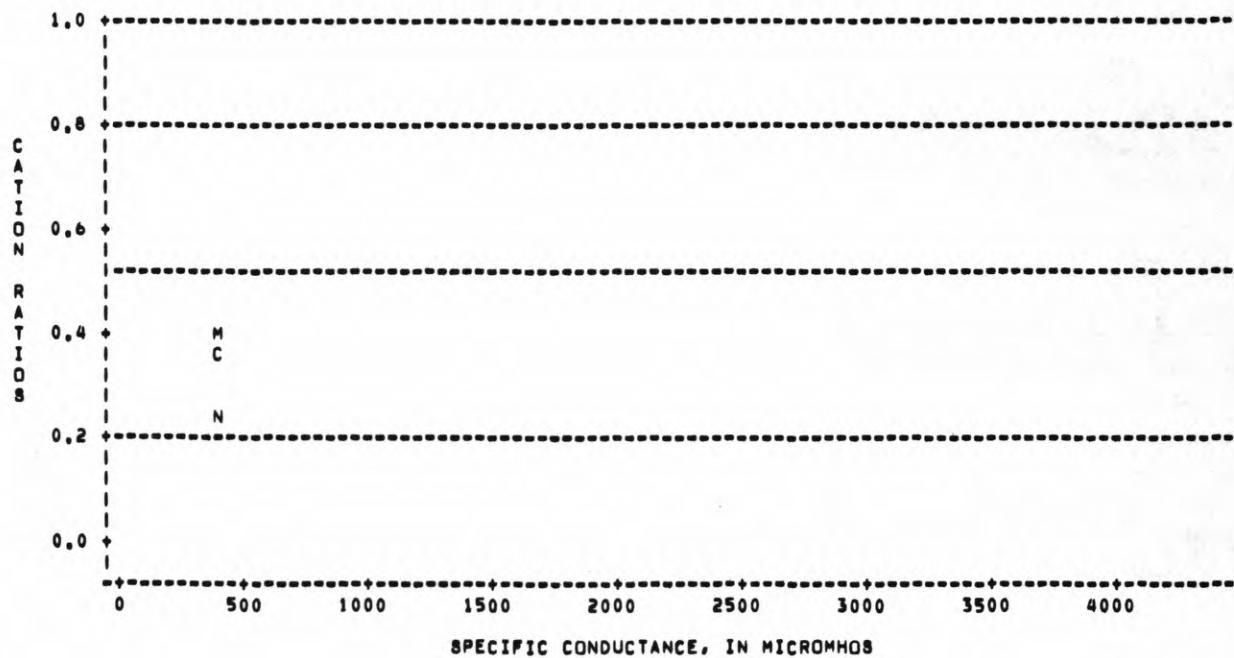
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|------|-----|------|-------|
| Specific conductance | 32 | 1980 | 412 | 4000 | 887 | 0.38 | -0.47 |
| Dissolved solids | 21 | 1064 | 249 | 2550 | 492 | 1.28 | 3.08 |
| pH | 30 | 8.1 | 7.5 | 8.6 | .3 | -.41 | -.17 |
| Total hardness | 32 | 445 | 180 | 1303 | 205 | 2.47 | 9.45 |
| Chloride | 32 | 343 | 30 | 685 | 194 | -.04 | -1.14 |
| Sulfate | 30 | 296 | 12 | 1064 | 221 | 2.58 | 7.26 |
| Iron | 0 | | | | | | |
| Fluoride | 0 | | | | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 19 | 4.4 | 0.7 | 7.6 | 2.1 | -.34 | -1.26 |
| Boron | 0 | | | | | | |

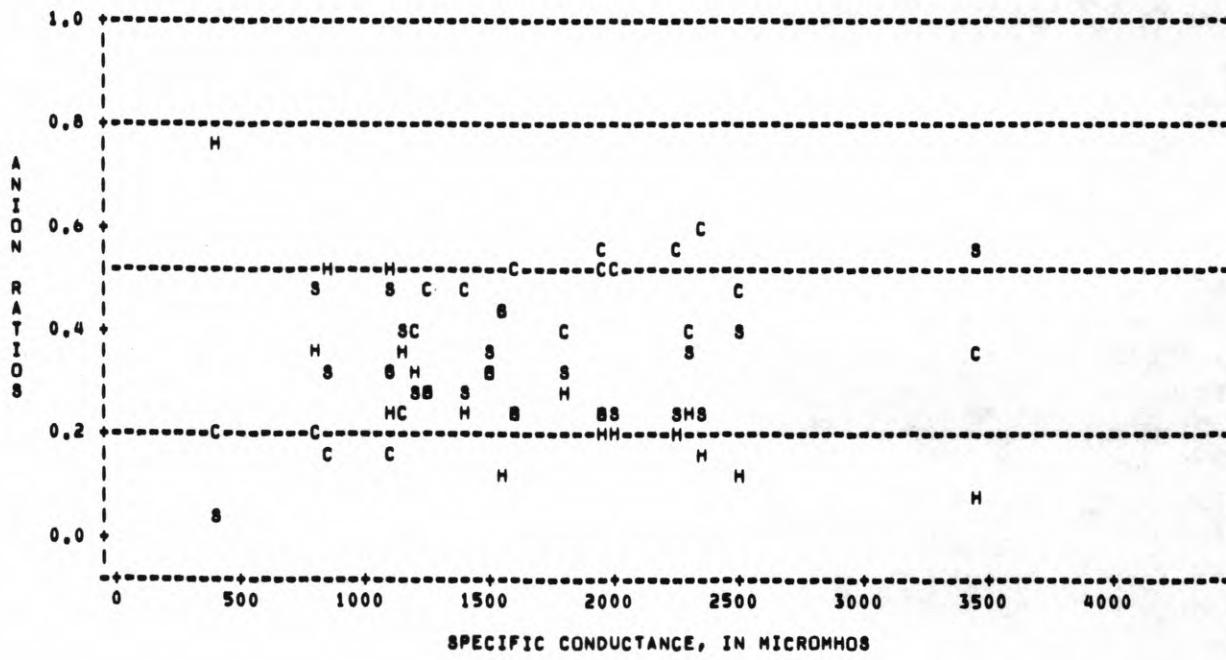
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 840 | 1180 | 1930 | 2500 | 3240 |
| Dissolved solids | 549 | 742 | 928 | 1215 | 1558 |
| pH | 7.8 | 7.9 | 8.1 | 8.3 | 8.4 |
| Total hardness | 214 | 317 | 425 | 509 | 556 |
| Chloride | 58 | 175 | 360 | 495 | 591 |
| Sulfate | 144 | 186 | 248 | 293 | 440 |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 1.2 | 2.0 | 4.8 | 6.0 | 6.6 |
| Boron | | | | | |

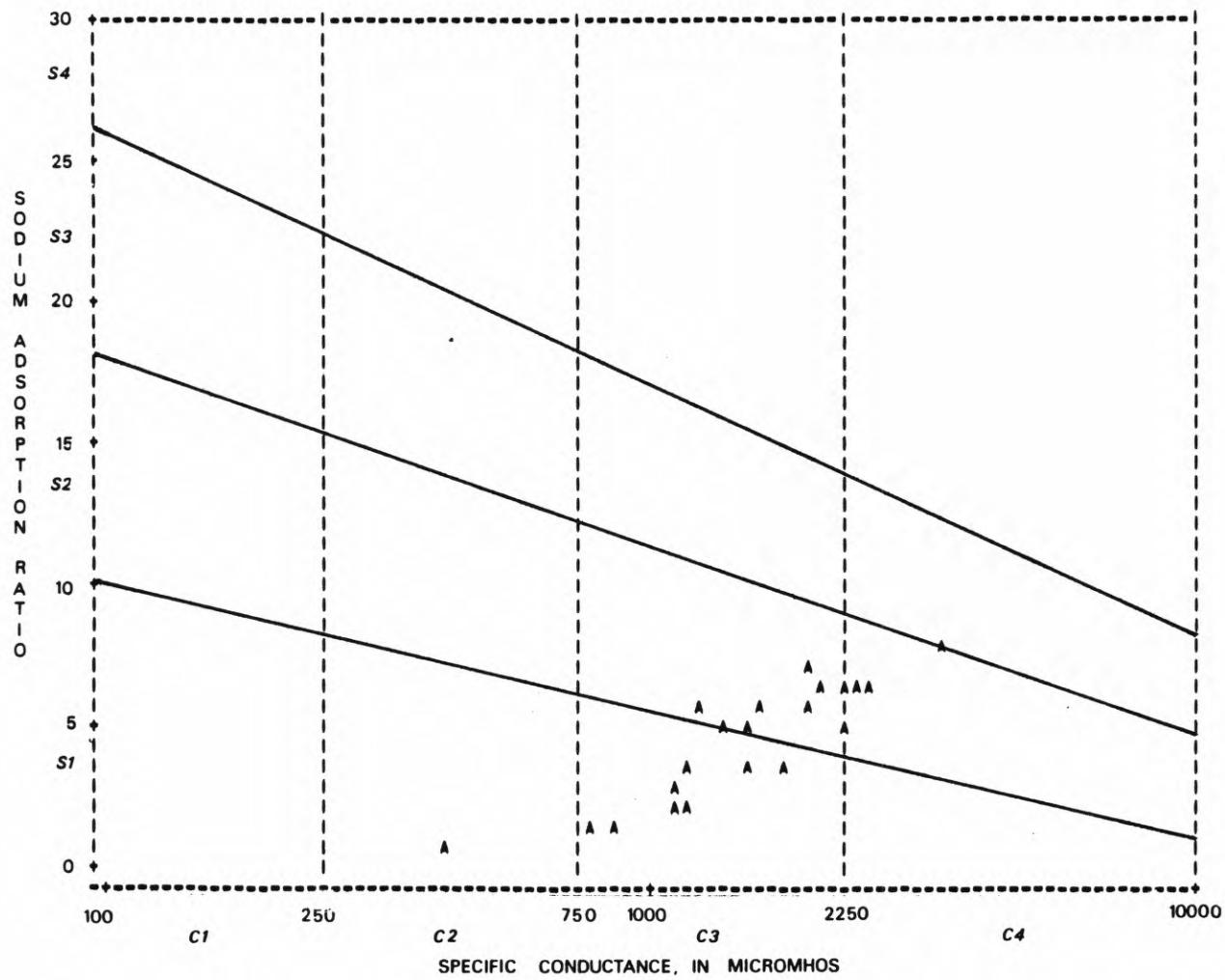
CATION RATIO PLOT
N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER NR ROLL, OK



ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER NR ROLL, OK



IRRIGATION DIAGRAM
 C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
 C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
 A = 1 OBS, B = 2 OBS, C = 3 OBS
 STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER NR ROLL, OK



CANADIAN RIVER BASIN

07228300 - Canadian River near Thomas, Okla.

LOCATION.--Lat $35^{\circ}46'25''$, long $98^{\circ}40'15''$. in NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 4, T.15 N., R.14 W., Custer County, at St. Louis and San Francisco Railroad Co. bridge, 4 mi northeast of Thomas.

DRAINAGE AREA.--24,640 mi².

PERIOD OF RECORD.--1952 to 1953, 1961 to 1963.

WATER TYPE.--For specific conductance less than 2,000 umho, 61 percent of the samples, the water was generally calcium sulfate type. For specific conductance greater than 2,000 umho and less than 3,000 umho, 35 percent of the samples, the water was generally sodium sulfate type. For specific conductance greater than 3,000 umho, the water was mixed type.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--All of the hardness values were greater than 180 mg/L and the average concentration was 636 mg/L. The hardness class for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 38 percent of the chloride values and the recommended maximum sulfate concentration of 250 mg/L was exceeded by 93 percent of the sulfate values. No toxic metal data were available. Because of the frequency and magnitude by which the recommended maximum chloride and sulfate concentrations were exceeded, this water may not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard was high or very high, specific conductance greater than 750 umho, in 99 percent of the samples. The sodium hazard ranged from low to high with 80 percent of the SAR values equivalent to a low sodium hazard. The data indicate that phytotoxic effects could occur in boron sensitive plants. One percent of the boron values exceeded the 750 ug/L limit for sensitive plants.

UNIVARIATE STATISTICS

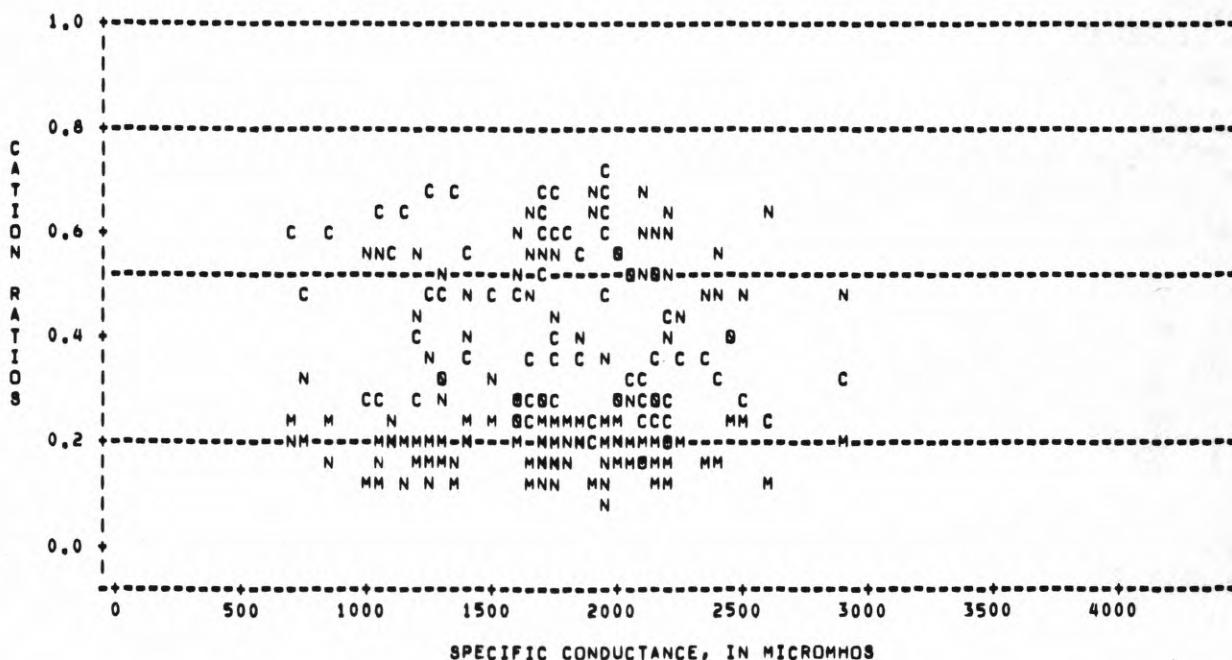
| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|-----|------|-----|------|-----|-------|------|
| Specific conductance | 201 | 1841 | 697 | 4340 | 554 | 0.77 | 2.74 |
| Dissolved solids | 201 | 1366 | 480 | 3260 | 415 | .56 | 2.28 |
| pH | 200 | 8.2 | 7.0 | 8.6 | .2 | -1.27 | 3.75 |
| Total hardness | 201 | 636 | 202 | 1250 | 239 | .39 | -.76 |
| Chloride | 202 | 212 | 27 | 760 | 148 | .97 | 1.00 |
| Sulfate | 201 | 562 | 135 | 1220 | 243 | .53 | -.59 |
| Iron | 0 | | | | | | |
| Fluoride | 148 | 0.8 | 0.1 | 1.6 | 0.3 | .17 | -.61 |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 199 | 3.2 | 0.1 | 10 | 2.1 | .84 | .15 |
| Boron | 100 | 329 | 40 | 810 | 154 | .76 | .58 |

FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 1101 | 1440 | 1840 | 2160 | 2399 |
| Dissolved solids | 810 | 1103 | 1385 | 1618 | 1818 |
| pH | 7.9 | 8.0 | 8.2 | 8.3 | 8.4 |
| Total hardness | 350 | 433 | 598 | 828 | 960 |
| Chloride | 55 | 82 | 180 | 318 | 385 |
| Sulfate | 288 | 377 | 512 | 767 | 900 |
| Iron | | | | | |
| Fluoride | 0.3 | 0.5 | 0.8 | 1.0 | 1.2 |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 0.9 | 1.4 | 2.7 | 4.7 | 6.1 |
| Boron | 150 | 220 | 300 | 430 | 540 |

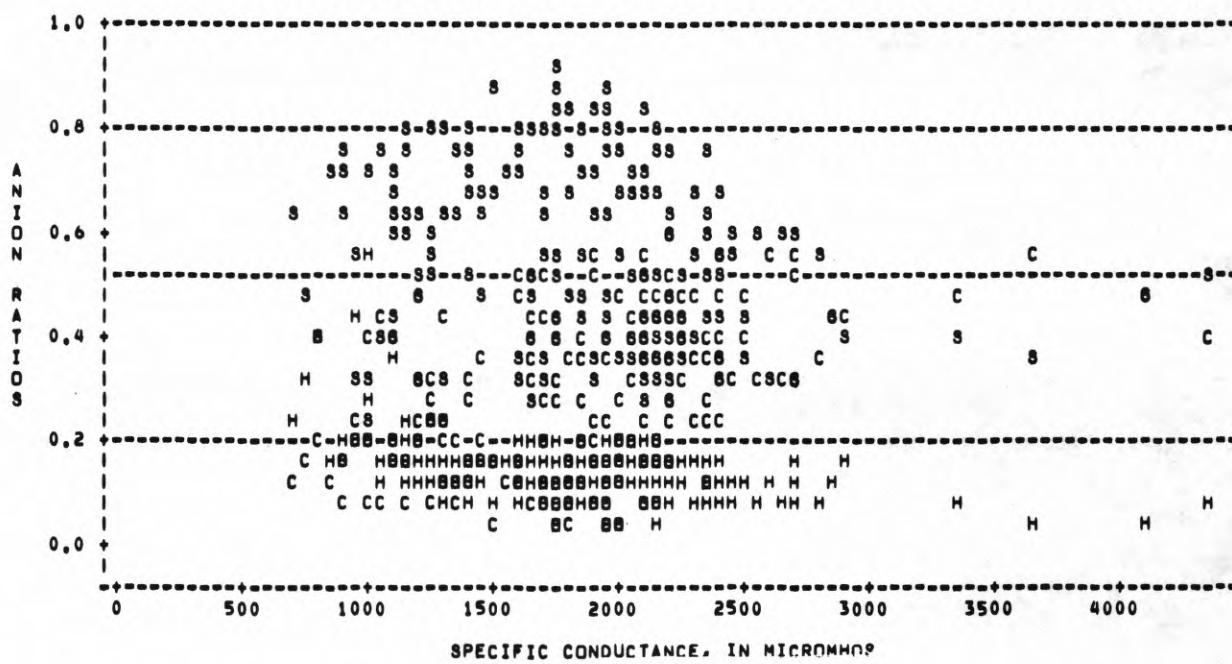
CATION RATIO PLOT

N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER NR THOMAS, OK

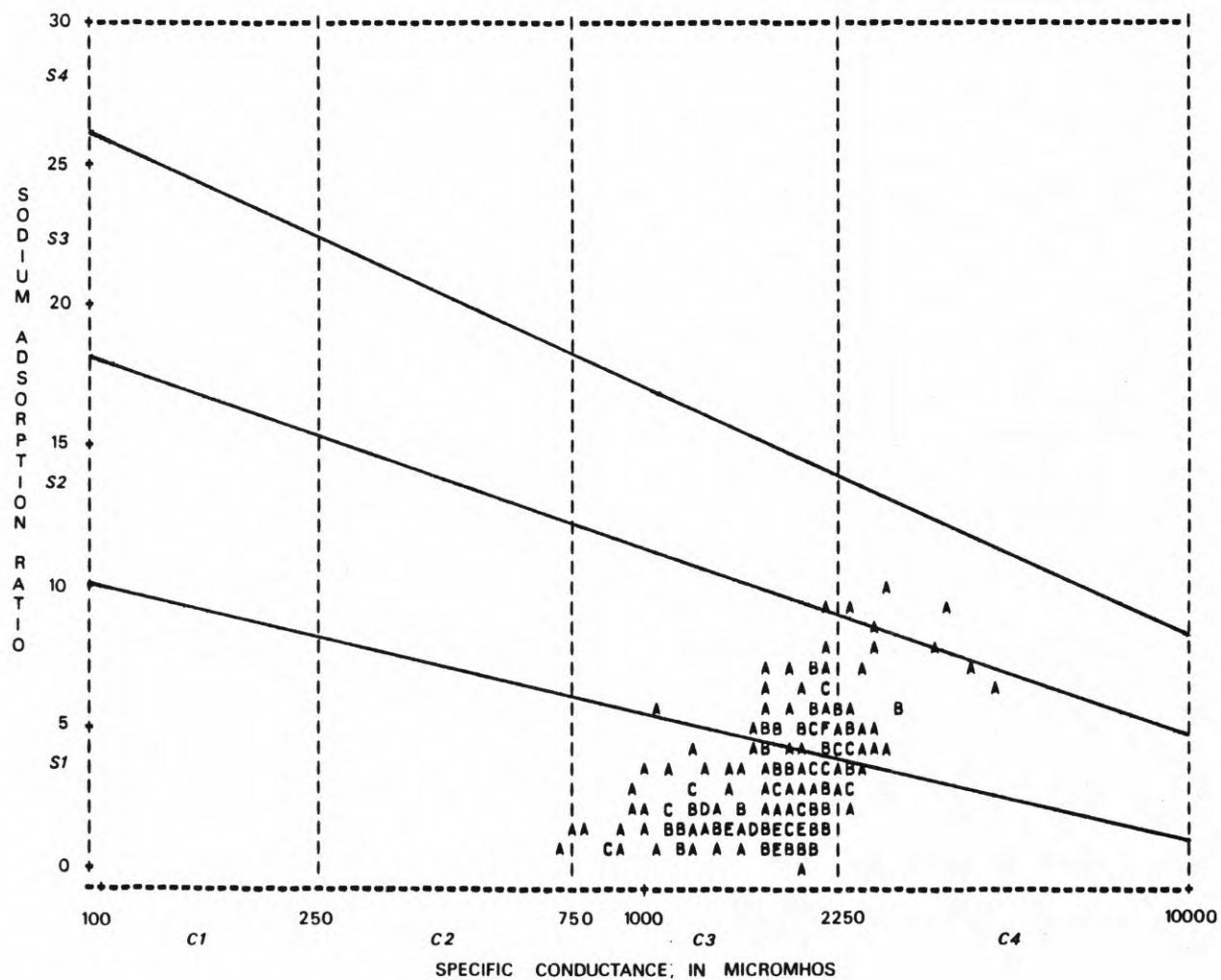


ANION RATIO PLOT

H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER NR THOMAS, OK



IRRIGATION DIAGRAM
 C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
 C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
 A = 1 OBS, B = 2 OBS, C = 3 OBS
 STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER NR THOMAS, UK



CANADIAN RIVER BASIN

07228500 - Canadian River at Bridgeport, Okla.

LOCATION.--Lat $35^{\circ}34'00''$, long $98^{\circ}22'45''$, in SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 28, T.13 N., R.11 W., Blaine County, at Chicago, Rock Island, and Pacific Railroad Co. bridge, 1.0 mi morth of Bridgeport, 2.8 mi upstream from Lumpmouth Creek, and at mile 267.3.

DRAINAGE AREA.--25,229 mi², of which 4,801 mi² is probably noncontributing.

PERIOD OF RECORD.--1949 to 1961, 1970 to 1979.

WATER TYPE.--For specific conductance less than 500 umho, 4 percent of the samples, the water was calcium carbonate/bicarbonate type. For specific conductance between 500 and 1,600 umho, 74 percent of the samples, the water was calcium sulfate type and between 1,600 and 2,000 umho, 14 percent of the samples, the water was sodium sulfate type. The water was sodium chloride type for specific conductance greater than 2,000 umho.

TREND.--Plots of the dissolved solids, hardness, chloride, and sulfate concentrations versus time indicate trends of increasing concentration. The Spearman's rhos for the constituents at the 95-percent probability level also indicate positive trends.

PUBLIC WATER SUPPLY.--Ninety-six percent of the hardness values were greater than 180 mg/L and the average concentration was 415 mg/L. In general, the hardness class for this water is very hard. The recommended maximum pH limit of 9.0 was exceeded by 3 percent of the pH values, the recommended maximum chloride concentration of 250 mg/L was exceeded by 15 percent of the chloride values, and the recommended maximum sulfate concentration of 250 mg/L was exceeded by 62 percent of the sulfate values. The maximum contaminant level for fluoride of 1.6 mg/L for the maximum daily air temperature of 73° F at this location was exceeded by 1 percent of the fluoride values. The toxic metals did not exceed maximum contaminant levels. Because of the frequency and magnitude by which the recommended maximum sulfate and chloride concentrations were exceeded, this water may not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard was high or very high, specific conductance greater than 750 umho, in 86 percent of the samples. Eighty-nine percent of the SAR values were equivalent to a low sodium hazard. The data indicate that phytotoxic effects from boron should not occur.

UNIVARIATE STATISTICS

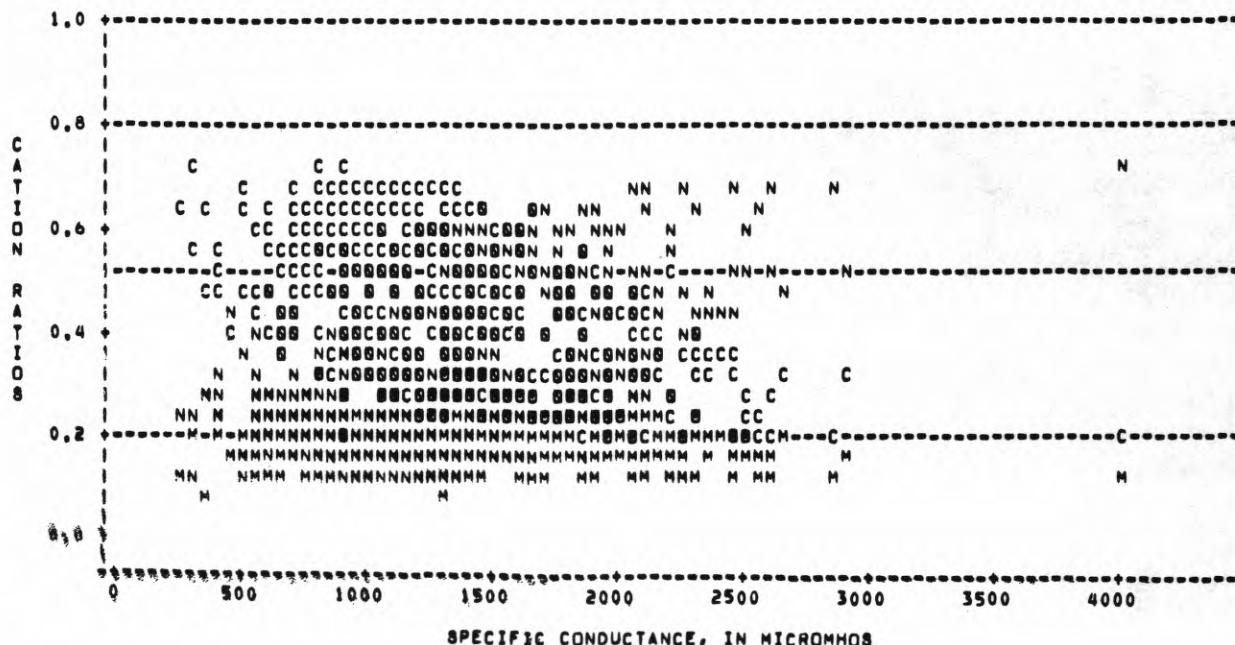
| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|------|------|-----|------|-----|------|------|
| Specific conductance | 1364 | 1233 | 223 | 4000 | 491 | 0.79 | 0.68 |
| Dissolved solids | 1294 | 821 | 170 | 2450 | 317 | .67 | .40 |
| pH | 1202 | 8.1 | 6.8 | 9.7 | .3 | -.42 | 1.60 |
| Total hardness | 1292 | 415 | 10 | 920 | 142 | .49 | .29 |
| Chloride | 1293 | 126 | 3.5 | 825 | 119 | 1.32 | 1.77 |
| Sulfate | 1284 | 291 | 23 | 790 | 123 | .75 | .97 |
| Iron | 19 | 29 | 10 | 90 | 24 | 1.61 | 1.88 |
| Fluoride | 89 | .5 | 0.0 | 2.6 | .4 | 1.81 | 7.25 |
| Arsenic | 1 | 2 | | | | | |
| Cadmium | 18 | 0 | 0 | 2 | 0.6 | .84 | -.10 |
| Chromium | 16 | 3 | 0 | 20 | 6 | 1.89 | 3.03 |
| Lead | 18 | 3 | 0 | 20 | 5 | 2.94 | 9.55 |
| Mercury | 1 | .1 | | | | | |
| SAR | 1041 | 2.3 | 0.2 | 11 | 1.8 | 1.17 | .98 |
| Boron | 60 | 209 | 0 | 640 | 153 | .79 | .56 |

FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 696 | 897 | 1100 | 1540 | 1946 |
| Dissolved solids | 460 | 604 | 760 | 1020 | 1270 |
| pH | 7.7 | 7.9 | 8.1 | 8.3 | 8.4 |
| Total hardness | 240 | 310 | 415 | 493 | 600 |
| Chloride | 16 | 26 | 83 | 190 | 300 |
| Sulfate | 148 | 206 | 281 | 350 | 450 |
| Iron | 10 | 10 | 20 | 32 | 62 |
| Fluoride | .1 | .2 | .5 | .7 | 1.0 |
| Arsenic | | | | | |
| Cadmium | 0 | 0 | 0 | 1 | 1 |
| Chromium | 0 | 0 | 0 | 0 | 10 |
| Lead | 0 | 1 | 2 | 3 | 5 |
| Mercury | | | | | |
| SAR | 0.7 | 0.9 | 1.7 | 3.4 | 4.9 |
| Boron | 0 | 90 | 190 | 270 | 380 |

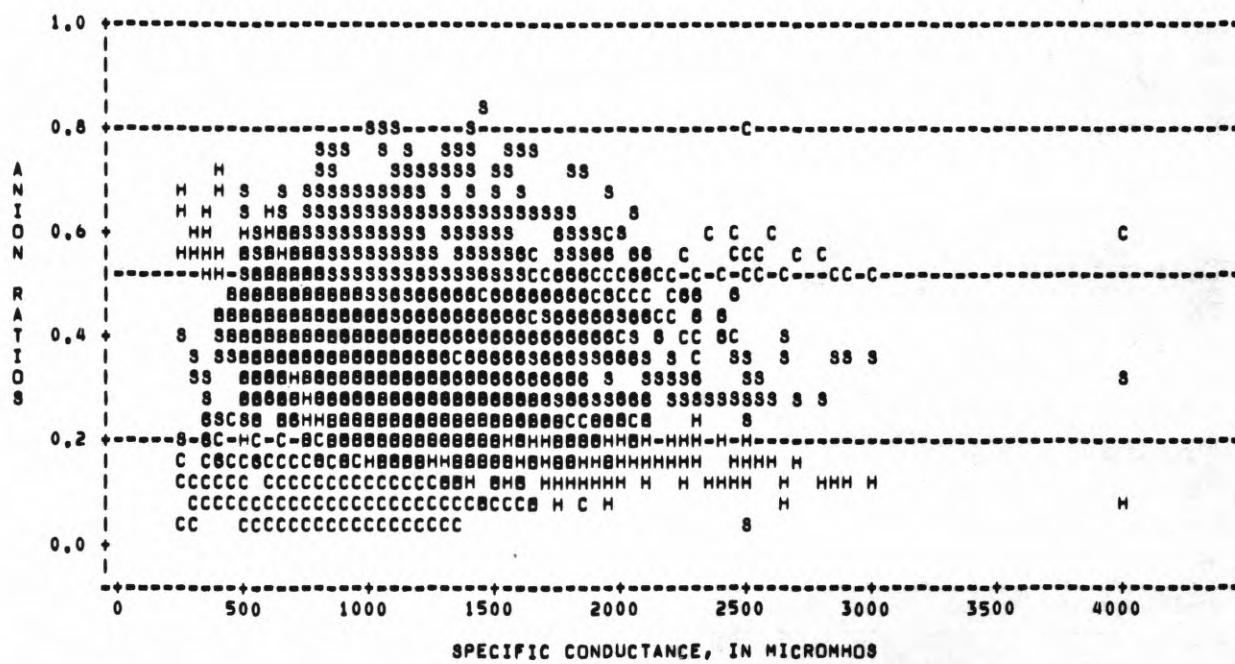
CATION RATIO PLOT

N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER AT BRIDGEPORT, OK



ANION RATIO PLOT

H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER AT BRIDGEPORT, OK



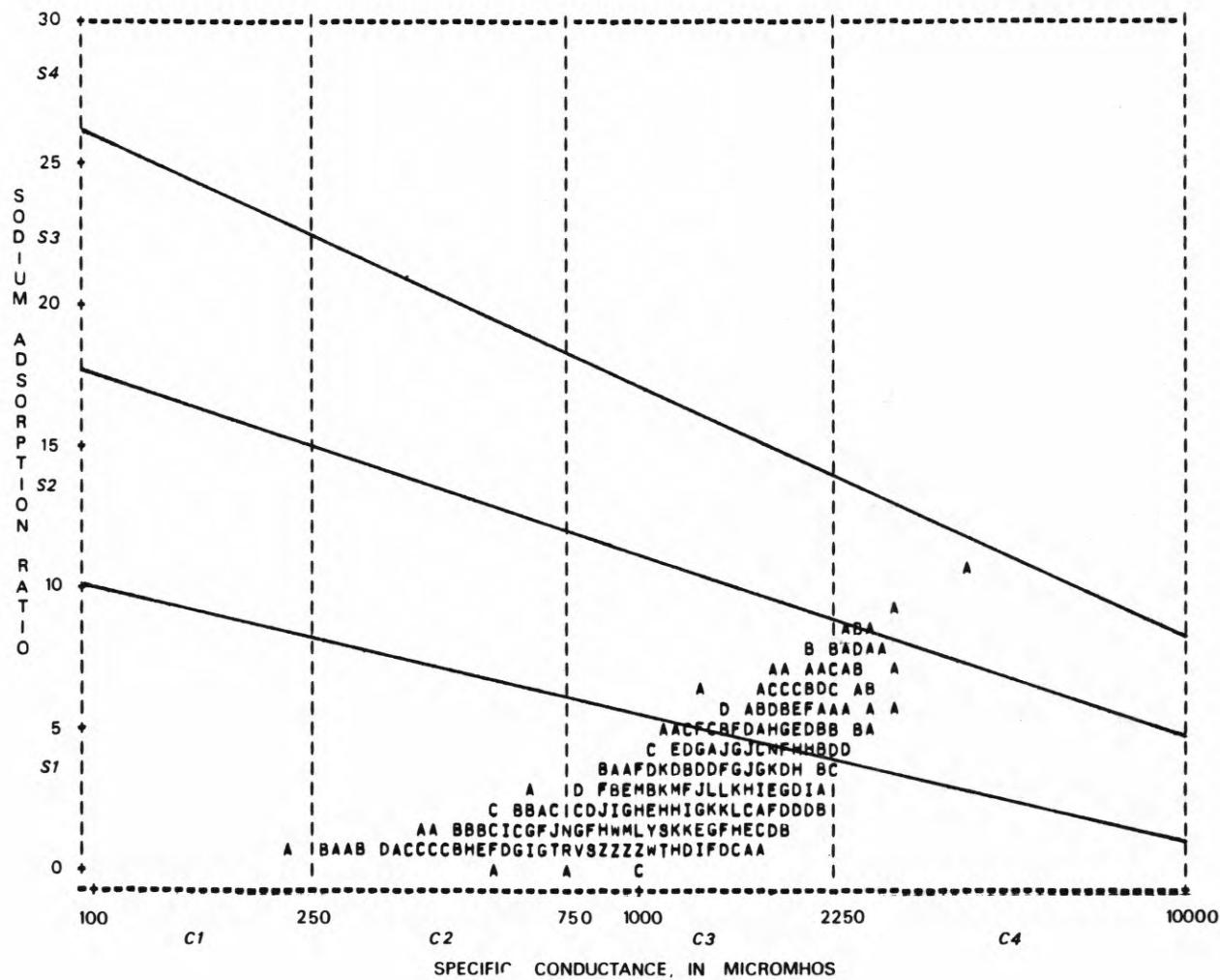
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER AT BRIDGEPORT, OK



CANADIAN RIVER BASIN

07229100 - Canadian River near Noble, Okla.

LOCATION.--Lat 35°04'55", long 97°22'52", in N¹ sec. 14, T.7 N., R.2 W., McClain County, at Atchison, Topeka, and Santa Fe Railway Co. bridge, 3.6 mi upstream from Choteau Creek, 3.8 mi south of Noble, and at mile 190.8.

DRAINAGE AREA.--25,911 mi², of which 4,801 mi² is probably noncontributing.

PERIOD OF RECORD.--1965 to 1971, 1973 to 1975.

WATER TYPE.--For specific conductance less than 1,200 umho, 61 percent of the samples, the water was carbonate/bicarbonate type. For specific conductance greater than 1,200 umho and less than 1,700 umho, 28 percent of the samples, the water was sulfate type. The sodium ion was predominant for specific conductance between 600 and 900 umho, 26 percent of the samples; therefore, the water was sodium carbonate/bicarbonate type between 600 and 900 umho. The water was mixed type for specific conductance greater than 1,700 umho.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--Seventy-nine percent of the hardness values were greater than 180 mg/L and the average concentration was 320 mg/L. In general, the hardness class for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 6 percent of the chloride values and the recommended maximum sulfate concentration of 250 mg/L was exceeded by 39 percent of the sulfate values. The data for the toxic metals cadmium, chromium, lead, and mercury indicate that maximum contaminant levels would not be exceeded. No arsenic data are available. Based on the data, this water would be marginally suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from low to high with 80 percent of the samples having a high salinity hazard. The sodium hazard ranged from low to medium with 91 percent of the SAR values equivalent to a low sodium hazard. Boron phytotoxic effects could occur even in tolerant plants. Twenty-seven percent of the boron values were greater than 750 ug/L, the limit for sensitive plants, 23 percent of the boron values were greater than 1,000 ug/L, the limit for semitolerant plants, and 4 percent of the boron values were greater than 2,000 ug/L, the limit for tolerant plants.

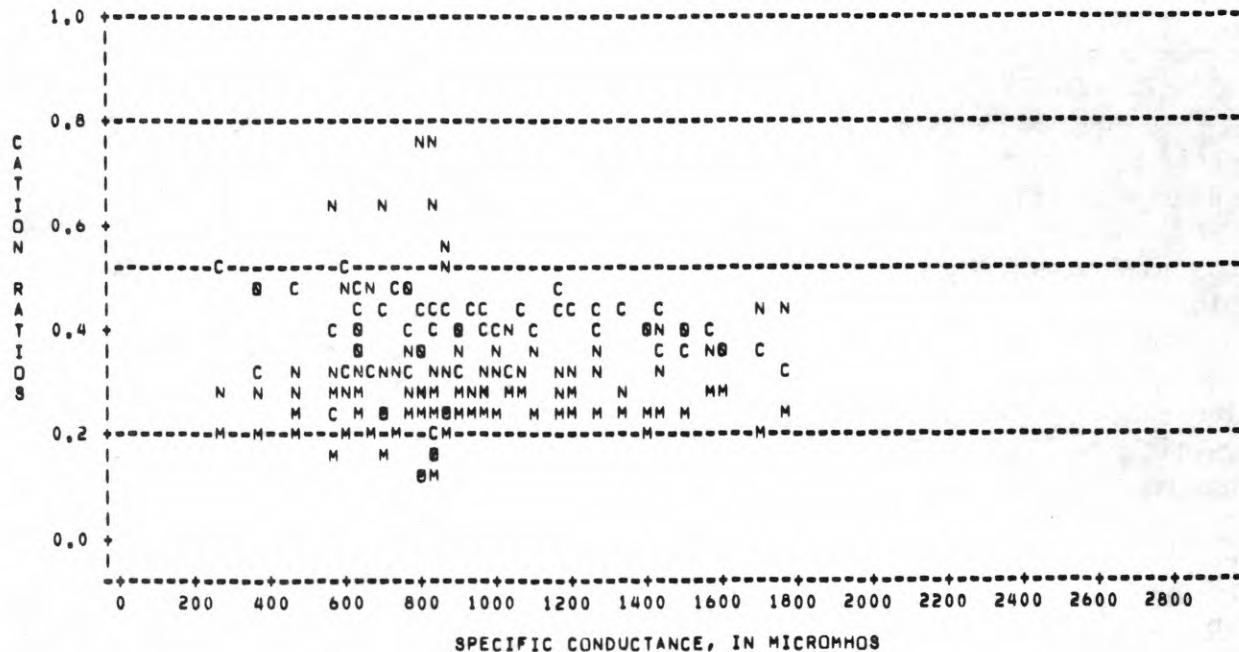
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|-----|------|-----|------|-----|------|-------|
| Specific conductance | 369 | 1119 | 198 | 2260 | 428 | 0.30 | -0.65 |
| Dissolved solids | 181 | 694 | 110 | 1500 | 283 | .50 | -.20 |
| pH | 215 | 7.8 | 6.6 | 9.0 | .4 | -.13 | .25 |
| Total hardness | 195 | 320 | 56 | 630 | 146 | .08 | -.99 |
| Chloride | 293 | 108 | 7.9 | 380 | 76 | 1.16 | .68 |
| Sulfate | 264 | 217 | 29 | 530 | 128 | .41 | -.89 |
| Iron | 8 | 61 | 10 | 80 | | | |
| Fluoride | 1 | .6 | | | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 9 | 0 | 0 | 1 | | | |
| Chromium | 8 | 8 | 0 | 20 | | | |
| Lead | 8 | 2 | 0 | 4 | | | |
| Mercury | 1 | 0.0 | | | | | |
| SAR | 191 | 2.9 | 0.6 | 11 | 1.8 | 2.22 | 6.65 |
| Boron | 28 | 611 | 50 | 2300 | 601 | 1.47 | 1.19 |

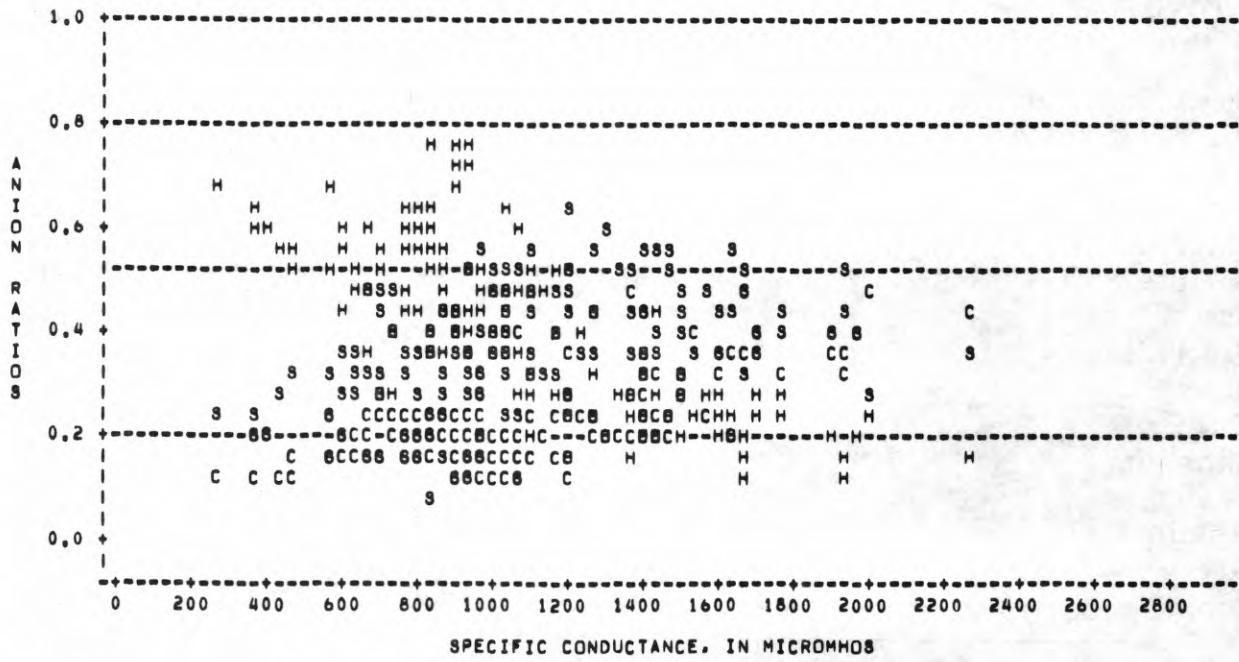
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 618 | 801 | 1030 | 1450 | 1710 |
| Dissolved solids | 378 | 489 | 634 | 903 | 1089 |
| pH | 7.3 | 7.6 | 7.8 | 8.1 | 8.3 |
| Total hardness | 120 | 210 | 318 | 441 | 520 |
| Chloride | 39 | 51 | 75 | 149 | 220 |
| Sulfate | 59 | 100 | 200 | 310 | 408 |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 1.4 | 1.8 | 2.4 | 3.5 | 5.2 |
| Boron | 148 | 220 | 300 | 970 | 1460 |

CATION RATIO PLOT
 N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER NR NOBLE, OK



ANION RATIO PLOT
 H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER NR NOBLE, OK



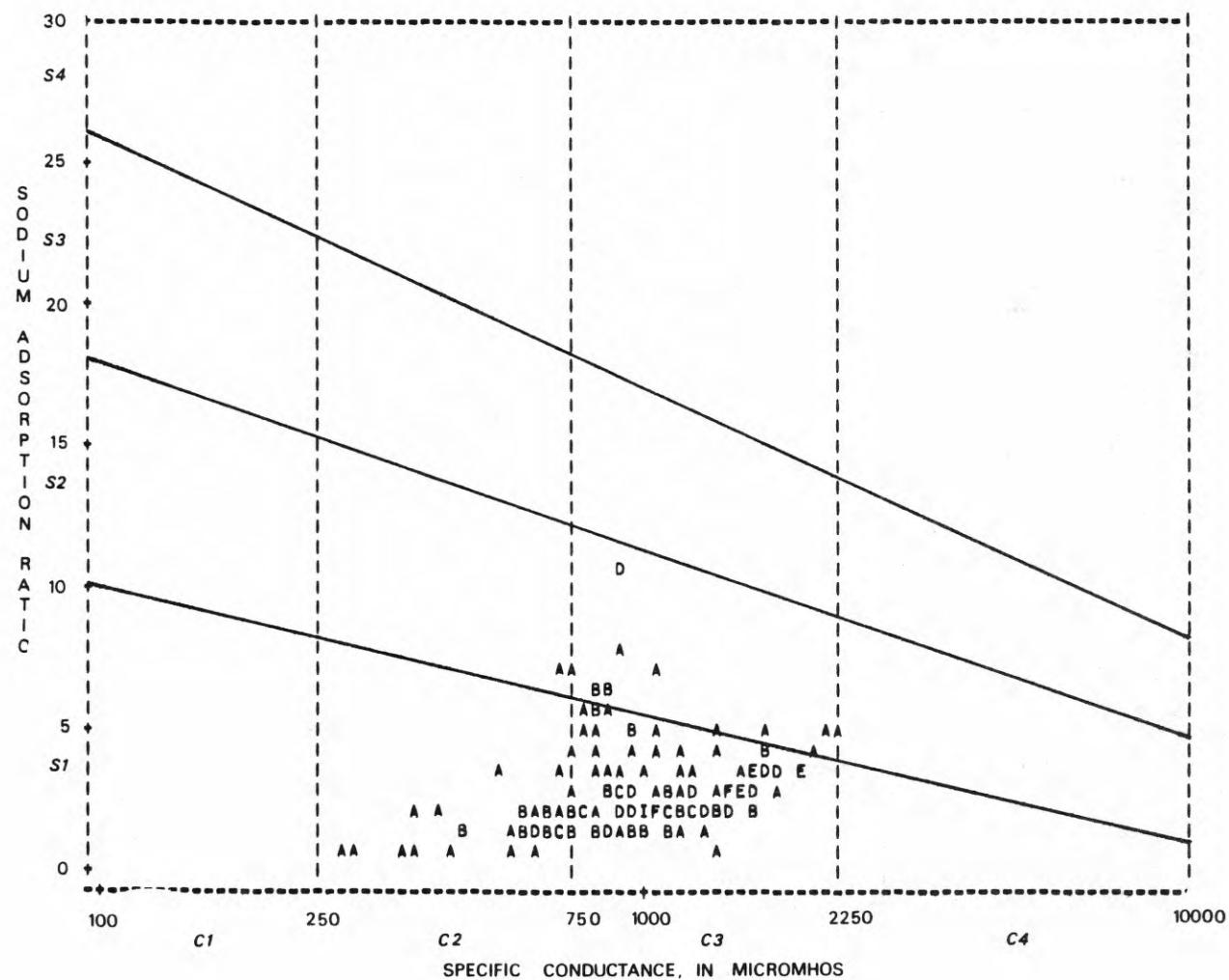
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER NR NOBLE, OK



CANADIAN RIVER BASIN

07229200 - Canadian River at Purcell, Okla.

LOCATION.--Lat $35^{\circ}00'50''$, long $97^{\circ}20'50''$, in NW 1_4 sec. 7, T.6 N., R.1 W.,
McClain County, at bridge on U.S. Highway 77, 0.5 mi east of Purcell, 1 mi
upstream from Walnut Creek, and at mile 184.9.

DRAINAGE AREA.--25,939 mi², of which 4,801 mi² is probably noncontributing.

PERIOD OF RECORD.--1952, 1957 to 1958, 1960 to 1963, 1974 to 1979.

WATER TYPE.--For specific conductance between 1,000 and 1,500 umho, 35 percent
of the samples, the water was sulfate type. No anion was predominant for
specific conductance less than 1,000 umho and greater than 1,500 umho. The
cations were mixed throughout the range of measured specific conductance.
The water was therefore mixed type for specific conductance less than
1,000 umho and greater than 1,500 umho.

TREND.--Plots of the dissolved solids, hardness, chloride, and sulfate concen-
trations versus time do not indicate any trend. The Spearman's rhos at
the 95-percent probability level for these constituents also do not indi-
cate any trends.

PUBLIC WATER SUPPLY.--Ninety percent of the hardness values were greater than
180 mg/L and the average concentration was 416 mg/L. In general, the
hardness class for this water is very hard. The recommended maximum pH
of 9.0 was exceeded by 9 percent of the pH values, the recommended maximum
chloride concentration of 250 mg/L was exceeded by 10 percent of the chlor-
ide values, and the recommended maximum sulfate concentration of 250 mg/L
was exceeded by 63 percent of the sulfate values. Data for the toxic
metals cadmium, chromium, and lead indicate that the maximum contaminant
levels would not be exceeded. No data are available for arsenic and mer-
cury. Based on the data, this water would be marginally suitable for use
as a public supply.

IRRIGATION.--The salinity hazard ranged from medium to very high with 82 percent
of the samples having a high salinity hazard. The sodium hazard ranged
from low to medium with 96 percent of the SAR values equivalent to a low
sodium hazard. None of the boron values exceeded the recommended limit,
750 ug/L, for boron sensitive plants.

UNIVARIATE STATISTICS

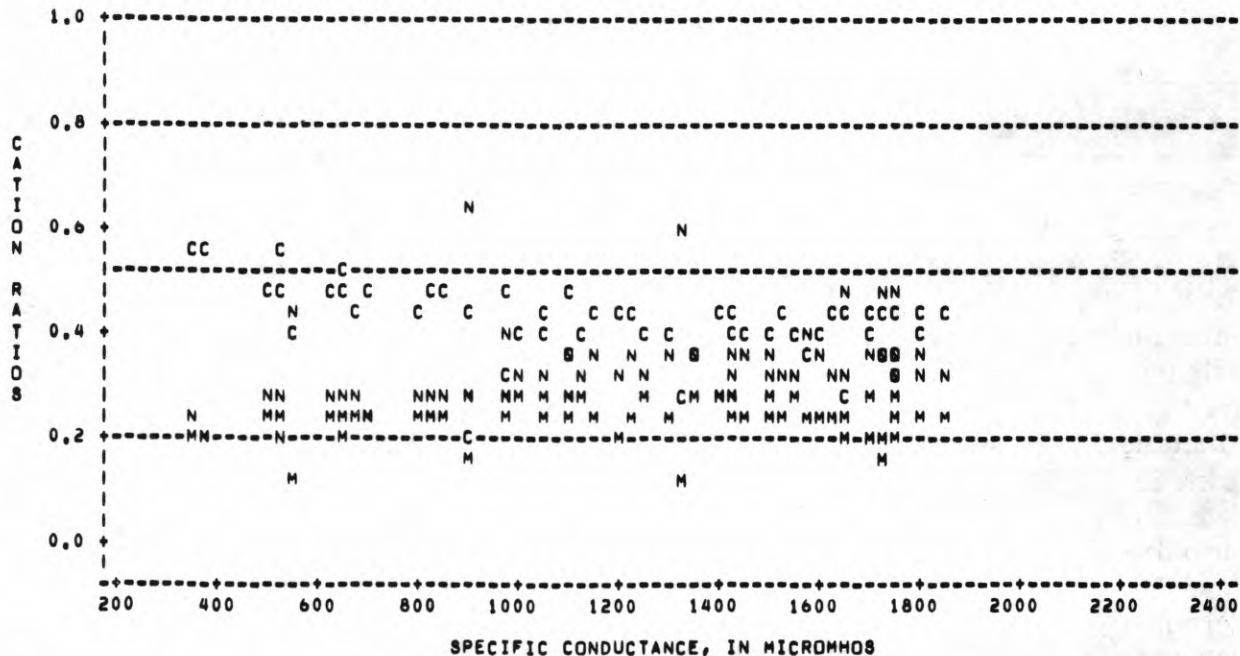
| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|-----|------|-----|------|-----|------|-------|
| Specific conductance | 142 | 1228 | 346 | 2370 | 447 | 0.11 | -0.64 |
| Dissolved solids | 85 | 817 | 209 | 1780 | 345 | -.00 | -.74 |
| pH | 139 | 8.2 | 6.4 | 10.4 | .6 | .92 | 1.71 |
| Total hardness | 112 | 416 | 30 | 890 | 171 | -.10 | -.63 |
| Chloride | 128 | 121 | 14 | 398 | 79 | .89 | .30 |
| Sulfate | 107 | 286 | 9.2 | 579 | 137 | -.10 | -.83 |
| Iron | 14 | 34 | 0 | 70 | 23 | -.26 | -1.20 |
| Fluoride | 8 | .7 | .5 | .9 | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 11 | 1 | 0 | 2 | 0.6 | .29 | -.21 |
| Chromium | 13 | 2 | 0 | 10 | 3.8 | 2.18 | 3.22 |
| Lead | 13 | 3 | 0 | 7 | 1.9 | .17 | -.06 |
| Mercury | 0 | | | | | | |
| SAR | 74 | 2.3 | 0.6 | 8.4 | 1.2 | 2.06 | 7.43 |
| Boron | 7 | 356 | 210 | 690 | | | |

FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 632 | 900 | 1200 | 1605 | 1748 |
| Dissolved solids | 324 | 490 | 858 | 1060 | 1235 |
| pH | 7.6 | 7.8 | 8.1 | 8.5 | 8.9 |
| Total hardness | 180 | 270 | 435 | 556 | 630 |
| Chloride | 35 | 56 | 105 | 170 | 255 |
| Sulfate | 85 | 181 | 296 | 392 | 462 |
| Iron | 0 | 10 | 40 | 50 | 56 |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | 0 | 0 | 1 | 1 | 1 |
| Chromium | 0 | 0 | 0 | 0 | 7 |
| Lead | 0 | 2 | 3 | 4 | 6 |
| Mercury | | | | | |
| SAR | 1.1 | 1.4 | 2.2 | 2.6 | 3.8 |
| Boron | | | | | |

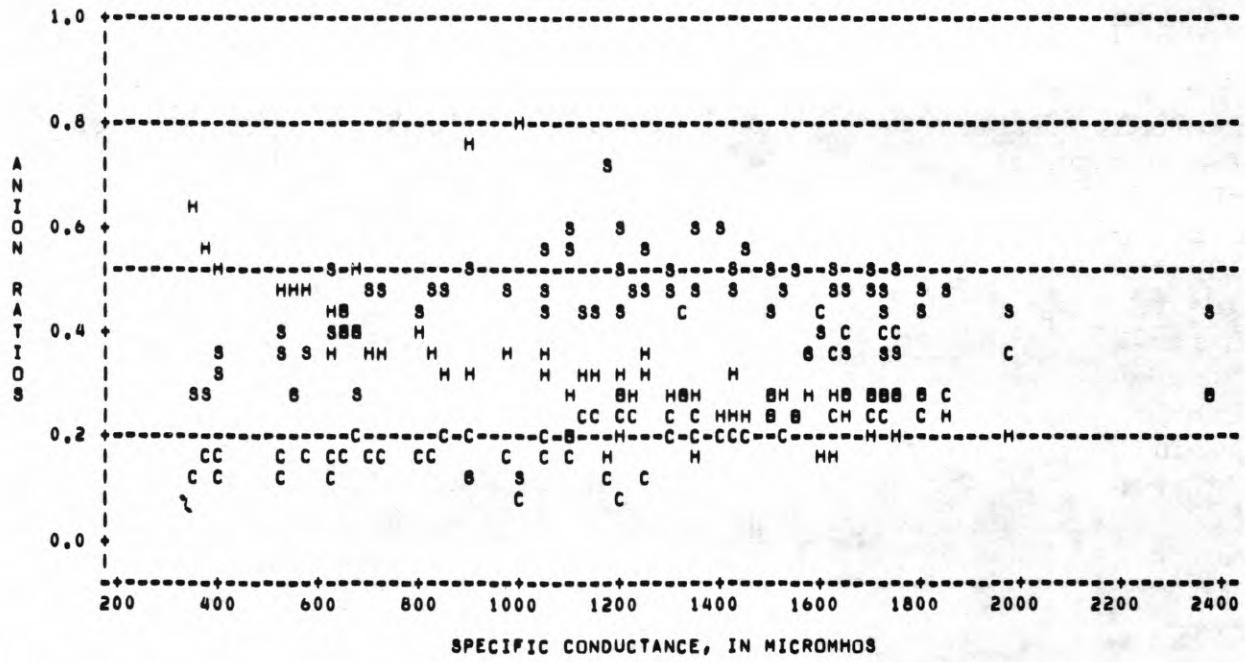
CATION RATIO PLOT

N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER AT PURCELL, OK



ANION RATIO PLOT

H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER AT PURCELL, OK



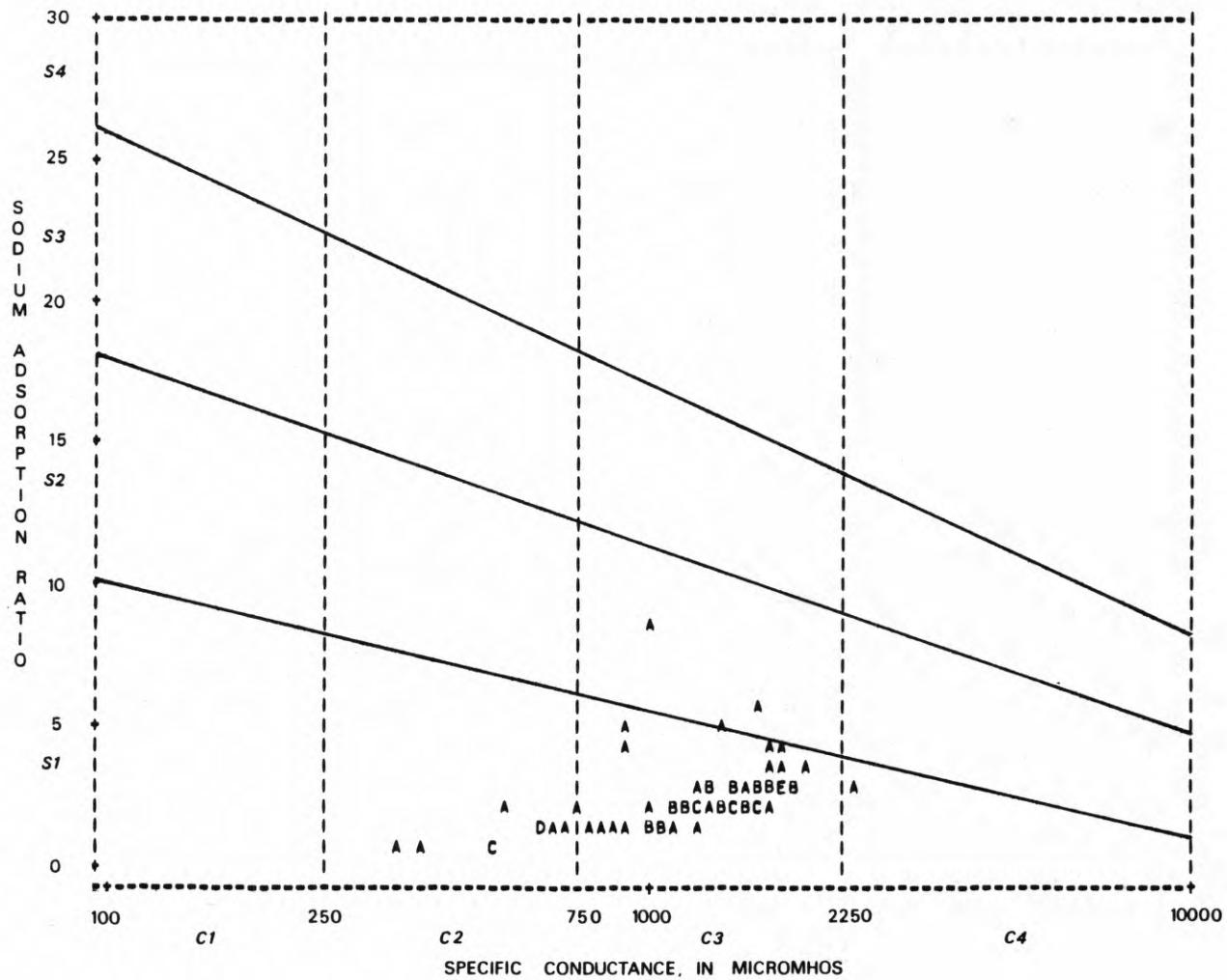
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER AT PURCELL, OK



CANADIAN RIVER BASIN

07231500 - Canadian River at Calvin, Okla.

LOCATION.--Lat $34^{\circ}58'32''$, long $96^{\circ}14'24''$, in NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 22, T.6 N., R.10 E., Hughes County, at bridge on old U.S. Highway 75, 0.5 mi northeast of Calvin, 2.4 mi upstream from Shawnee Creek, 8.5 mi downstream from Little River, and at mile 93.9.

DRAINAGE AREA.--27,952 mi², of which 4,801 mi² is probably noncontributing.

PERIOD OF RECORD.--1950 to 1953, 1960 to 1961, 1965 to 1979.

WATER TYPE.--For specific conductance less than 5,000 umho, more than 99 percent of the samples, the water was sodium chloride type. Cation data are not available for specific conductance greater than 5,000 umho. Based on the anion data for these high specific conductances, it is assumed that the water was also sodium chloride type for specific conductance greater than 5,000 umho.

TREND.--Plots of the dissolved solids, hardness, chloride, and sulfate concentrations versus time indicate the possibility of a trend of decreasing concentration for sulfate. The Spearman's rhos at the 95-percent probability level indicate negative trends, decreasing concentrations, for dissolved solids, chloride, and sulfate. The Spearman's rho for hardness did not indicate a trend.

PUBLIC WATER SUPPLY.--Eighty-two percent of the hardness values were greater than 180 mg/L and the average concentration was 324 mg/L. In general, the hardness class for this water is very hard. The recommended maximum pH of 9.0 was exceeded by 4 percent of the pH values, the recommended maximum chloride concentration of 250 mg/L was exceeded by 45 percent of the chloride values, and the recommended maximum sulfate concentration was exceeded by 5 percent of the sulfate values. The toxic metals arsenic, cadmium, lead, and mercury should not exceed maximum contaminant levels. Because of the frequency and magnitude by which the recommended maximum chloride concentration was exceeded, this water would not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from medium to very high with 80 percent of the samples having a high or very high salinity hazard. The sodium hazard ranged from low to high with about 80 percent of the SAR values equivalent to a low sodium hazard. The data indicate that phytotoxic effects from boron should not occur.

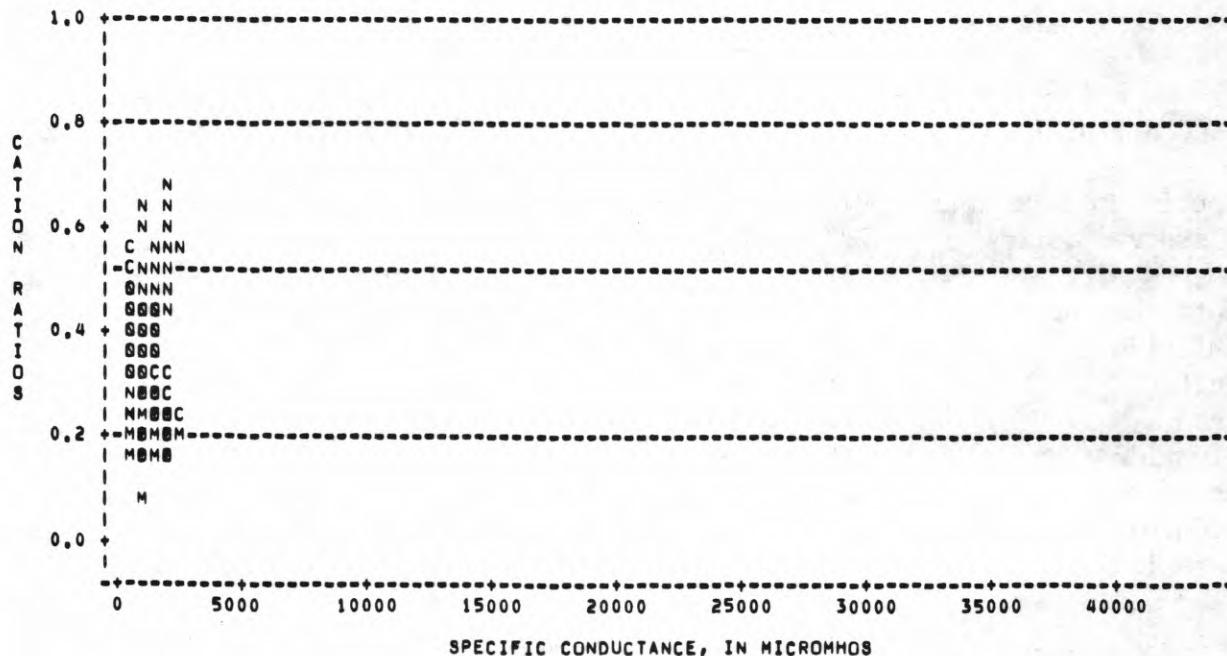
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKW | KURT |
|----------------------|-----|------|-----|-------|------|-------|--------|
| Specific conductance | 818 | 1427 | 190 | 40200 | 2223 | 13.84 | 221.98 |
| Dissolved solids | 727 | 882 | 85 | 27500 | 1600 | 13.85 | 216.59 |
| pH | 738 | 8.2 | 6.5 | 9.6 | 0.4 | -.60 | 2.24 |
| Total hardness | 601 | 324 | 82 | 5210 | 333 | 10.78 | 141.73 |
| Chloride | 702 | 338 | 12 | 15600 | 920 | 13.96 | 216.49 |
| Sulfate | 668 | 90 | 7.0 | 382 | 72 | 1.62 | 2.54 |
| Iron | 20 | 62 | 10 | 270 | 66 | 2.01 | 4.43 |
| Fluoride | 140 | 0.5 | 0.2 | 1.2 | 0.2 | 1.32 | 3.53 |
| Arsenic | 19 | 3 | 1 | 7 | 1.7 | .83 | .44 |
| Cadmium | 20 | 1 | 0 | 6 | 1.5 | 2.02 | 4.98 |
| Chromium | 72 | 2 | 0 | 20 | 4.8 | 2.01 | 3.47 |
| Lead | 20 | 5 | 0 | 49 | 11 | 4.13 | 17.80 |
| Mercury | 21 | 0.0 | 0.0 | 0.4 | 0.1 | 3.07 | 9.96 |
| SAR | 587 | 3.8 | 0.5 | 18 | 1.9 | 1.99 | 9.93 |
| Boron | 96 | 173 | 0 | 410 | 79 | .51 | .85 |

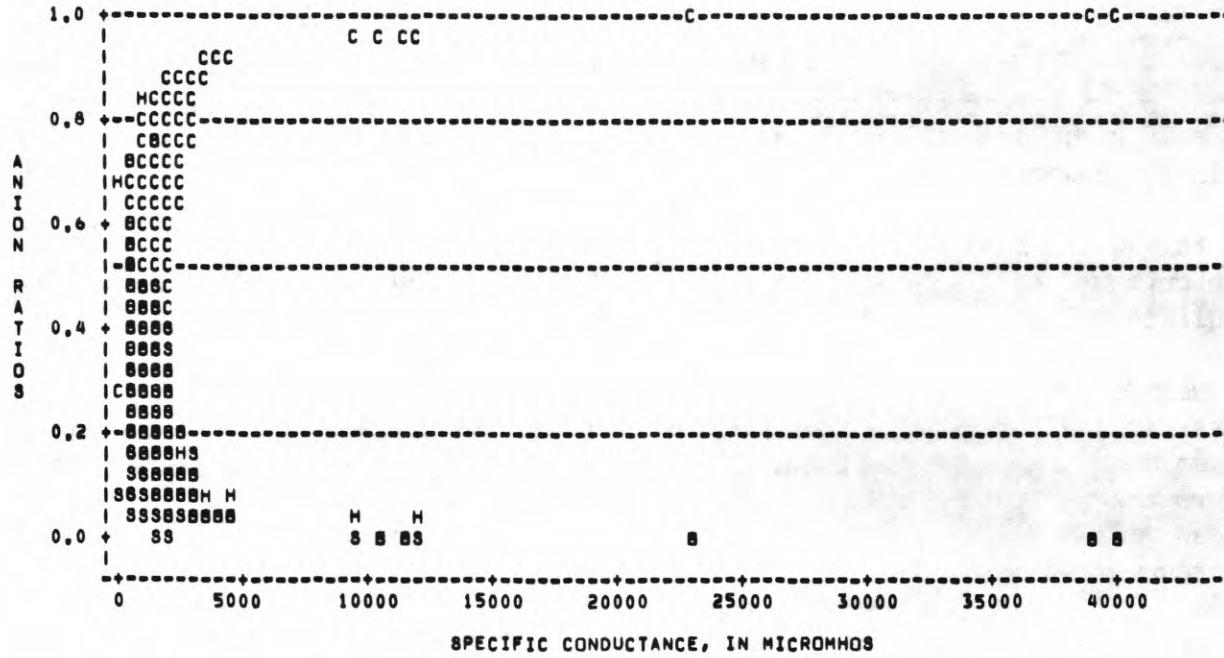
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 569 | 842 | 1200 | 1610 | 1940 |
| Dissolved solids | 335 | 491 | 720 | 978 | 1190 |
| pH | 7.7 | 8.0 | 8.2 | 8.4 | 8.6 |
| Total hardness | 144 | 204 | 295 | 380 | 450 |
| Chloride | 86 | 140 | 230 | 340 | 480 |
| Sulfate | 25 | 39 | 66 | 112 | 190 |
| Iron | 10 | 20 | 30 | 70 | 140 |
| Fluoride | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 |
| Arsenic | 1 | 1 | 2 | 4 | 5 |
| Cadmium | 0 | 0 | 1 | 1 | 3 |
| Chromium | 0 | 0 | 0 | 0 | 10 |
| Lead | 0 | 1 | 3 | 4 | 8 |
| Mercury | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| SAR | 1.8 | 2.5 | 3.6 | 4.7 | 6.1 |
| Boron | 70 | 120 | 180 | 220 | 254 |

CATION RATIO PLOT
N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER AT CALVIN, OK



ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER AT CALVIN, OK



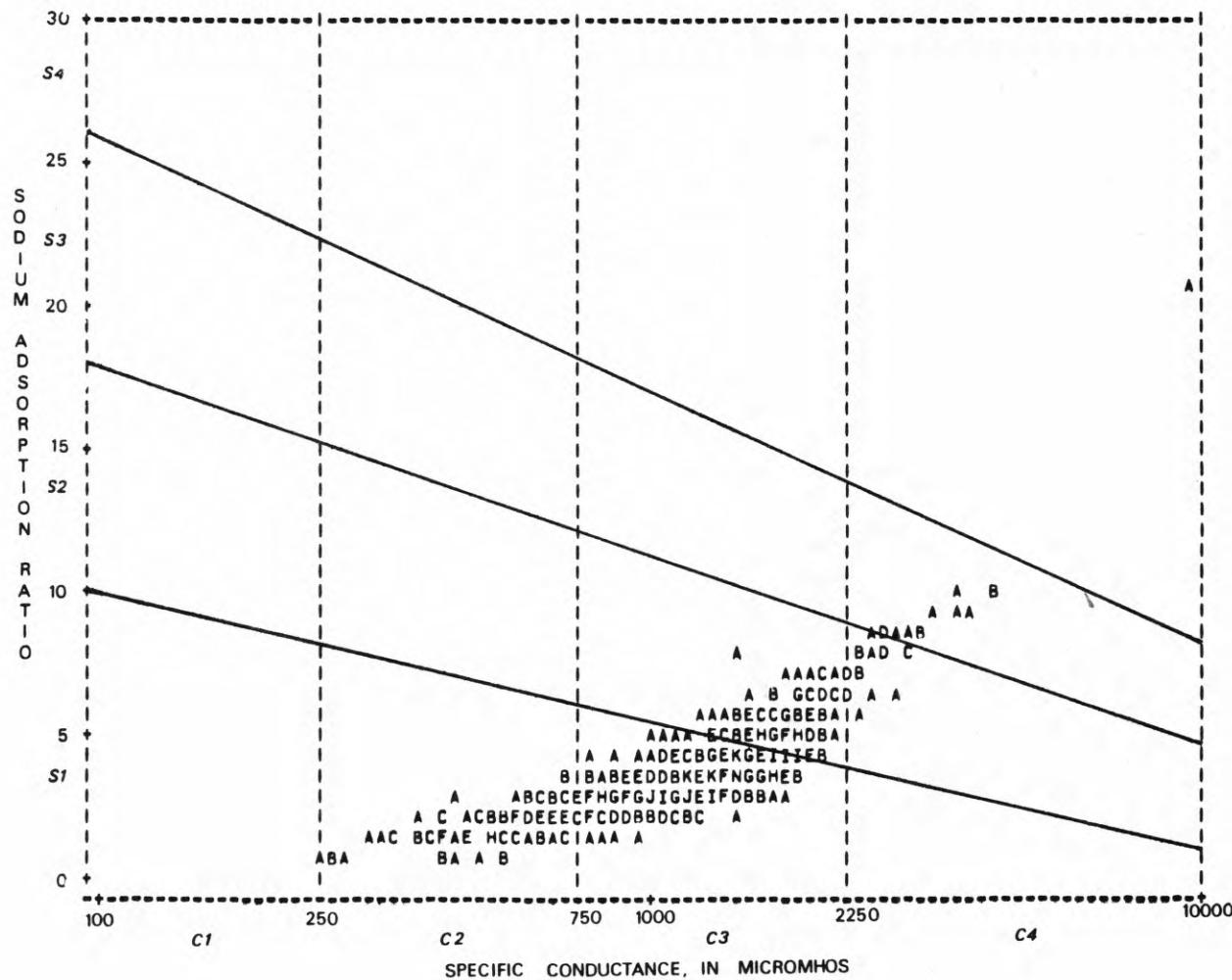
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

$$A = 1.088, \quad B = 2.088, \quad C = 3.089$$

STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER AT CALVIN, OK



CANADIAN RIVER BASIN

07245000 - Canadian River near Whitefield, Okla.

LOCATION.--Lat $35^{\circ}15'45''$, long $95^{\circ}14'19''$, in SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 12, T.9 N., R.19 E., Haskell County, at bridge on State Highway 2, 0.8 mi north of Whitefield, 5.5 mi upstream from Taleka (Snake) Creek, 8.2 mi downstream from Eufaula Dam, and at mile 18.8.

DRAINAGE AREA.--47,576 mi², of which 9,700 mi² is probably noncontributing.

PERIOD OF RECORD.--1947 to 1964, 1967 to 1979.

REMARKS.--There has been a significant change in the water quality at this location since the completion of Lake Eufaula in 1964. The 1967 to 1979 period of record was used for this report because it better represents current river conditions.

WATER TYPE.--For specific conductance less than about 150 umho, 2 percent of the samples, the water was calcium carbonate/bicarbonate type. For specific conductance greater than 150 umho, the water was generally mixed type with the carbonate/bicarbonate ion occasionally predominant in the 150-540 umho range.

TREND.--Plots of the dissolved solids, hardness, sulfate, and chloride concentrations versus time for the 1967 to 1979 period do not indicate any trend. The Spearman's rhos at the 95-percent probability level for the same time period also do not indicate any trend.

PUBLIC WATER SUPPLY.--Fifty-five percent of the hardness values were greater than 120 mg/L and the average concentration was 123 mg/L. In general, the hardness class for this water is hard. The recommended maximum pH of 9.0 was exceeded by 2 percent of the pH values and the recommended maximum iron concentration of 300 ug/L was exceeded by 9 percent of the iron values. The maximum cadmium contaminant level of 10 ug/L was exceeded by 1 of 17 cadmium values. Arsenic, chromium, lead, and mercury concentrations did not exceed their maximum contaminant levels. Based on the data, this water is probably suitable for use as a public water supply; however, cadmium concentrations should be closely monitored.

IRRIGATION.--The salinity hazard ranged from low to medium with 95 percent of the samples in the medium salinity hazard class. All of the SAR values were equivalent to a low sodium hazard. The data indicate that phytotoxic effects from boron should not occur.

UNIVARIATE STATISTICS

[Statistics computed from the 1967 to 1979 period of record]

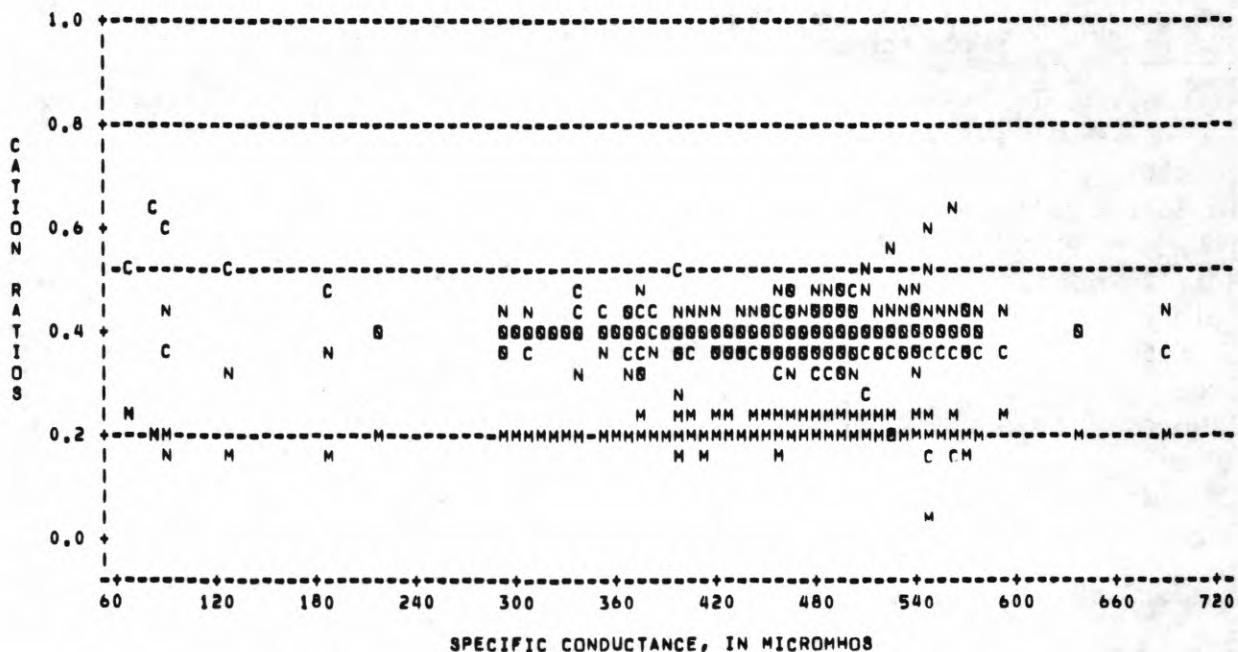
| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKW | KURT |
|----------------------|-----|------|-----|-----|-----|-------|-------|
| Specific conductance | 678 | 450 | 65 | 694 | 100 | -1.05 | 2.34 |
| Dissolved solids | 597 | 260 | 57 | 420 | 56 | -.83 | 2.11 |
| pH | 572 | 8.0 | 6.4 | 9.3 | 0.5 | -.54 | .87 |
| Total hardness | 540 | 123 | 29 | 177 | 42 | -.68 | 1.75 |
| Chloride | 620 | 67 | 2.0 | 125 | 20 | -.47 | 1.60 |
| Sulfate | 599 | 32 | 4.6 | 60 | 11 | .12 | -.72 |
| Iron | 18 | 66 | 0 | 720 | 166 | 3.99 | 16.45 |
| Fluoride | 101 | 0.3 | 0.1 | 0.9 | 0.1 | 2.47 | 8.65 |
| Arsenic | 18 | 1 | 0 | 4 | 1.1 | .98 | 1.14 |
| Cadmium | 17 | 2 | 0 | 11 | 2.6 | 2.73 | 9.08 |
| Chromium | 17 | 1 | 0 | 20 | 4.8 | 4.12 | 17.00 |
| Lead | 20 | 6 | 0 | 35 | 10 | 1.90 | 2.73 |
| Mercury | 17 | 0.1 | 0.0 | 0.4 | 0.1 | 2.12 | 4.09 |
| SAR | 529 | 1.6 | 0.3 | 2.8 | 0.4 | -.48 | 1.38 |
| Boron | 42 | 115 | 10 | 220 | 49 | -.05 | -.35 |

FREQUENCY DISTRIBUTION

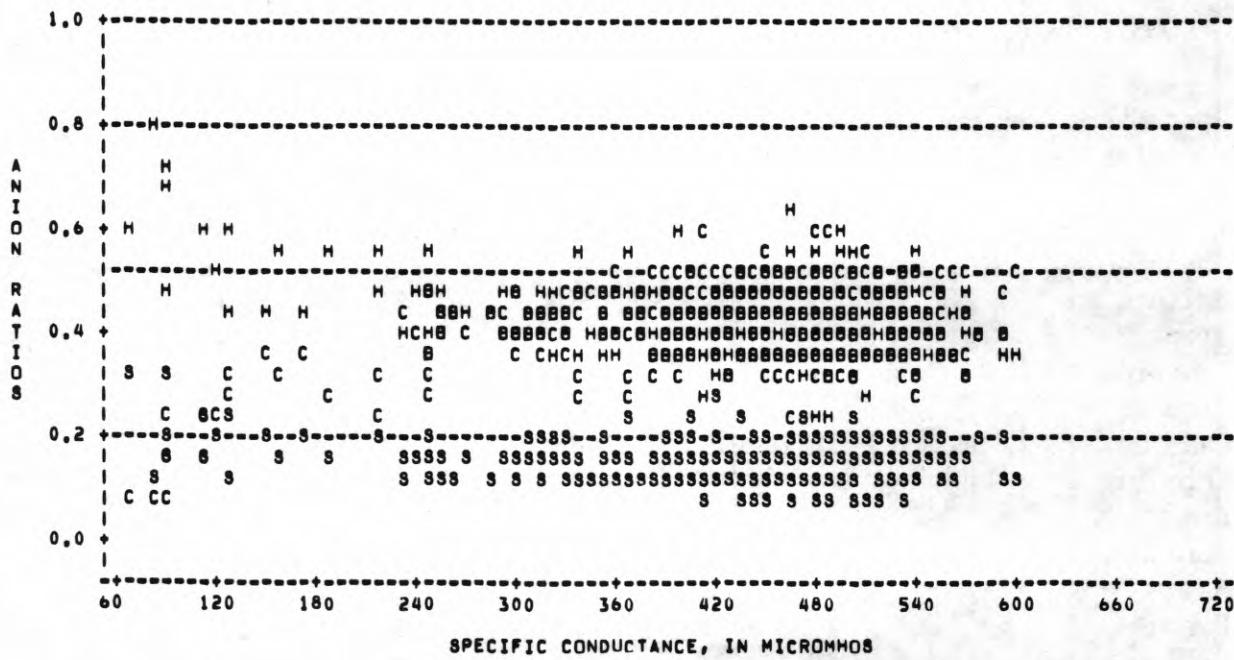
[Statistics computed from the 1967 to 1979 period of record]

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 330 | 408 | 467 | 504 | 550 |
| Dissolved solids | 196 | 239 | 266 | 292 | 312 |
| pH | 7.5 | 7.8 | 8.0 | 8.2 | 8.4 |
| Total hardness | 86 | 106 | 120 | 140 | 156 |
| Chloride | 43 | 58 | 68 | 78 | 88 |
| Sulfate | 19 | 23 | 31 | 40 | 46 |
| Iron | 0 | 1 | 20 | 45 | 180 |
| Fluoride | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 |
| Arsenic | 0 | 1 | 1 | 2 | 3 |
| Cadmium | 0 | 0 | 1 | 3 | 5 |
| Chromium | 0 | 0 | 0 | 0 | 4 |
| Lead | 0 | 0 | 2 | 8 | 29 |
| Mercury | 0.0 | 0.0 | 0.0 | 0.1 | 0.3 |
| SAR | 1.2 | 1.4 | 1.7 | 1.8 | 2.1 |
| Boron | 50 | 78 | 120 | 160 | 170 |

CATION RATIO PLOT
 N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER NR WHITEFIELD, OK



ANION RATIO PLOT
 H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER NR WHITEFIELD, OK



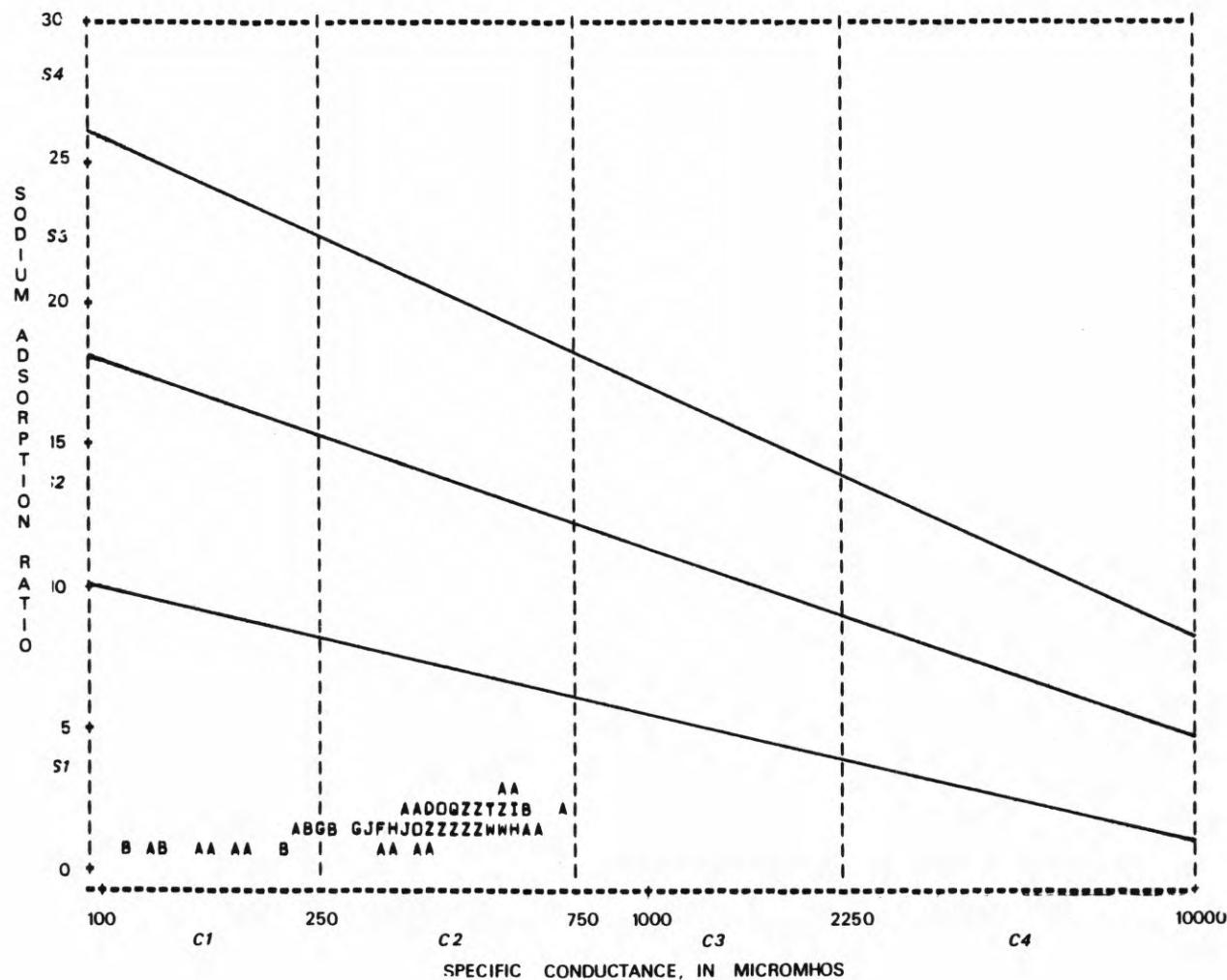
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=CANADIAN RIVER NR WHITEFIELD, OK



CANADIAN RIVER BASIN

07228400 - Deer Creek at Hydro, Okla.

LOCATION.--Lat $35^{\circ}32'28''$, long $98^{\circ}34'40''$, in NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 4, T.12 N., R.13 W., Caddo County, at bridge on State Highway 58 at south edge of Hydro, 3.2 mi downstream from Little Deep Creek, 7 mi east of Weatherford, and at mile 7.4.

DRAINAGE AREA.--274 mi².

PERIOD OF RECORD.--1951 to 1958, 1960 to 1963, 1977 to 1979.

WATER TYPE.--The water is calcium sulfate type throughout the range of measured specific conductance.

TREND.--The current period of record is insufficient, less than 5 years, to perform trend analyses.

PUBLIC WATER SUPPLY.--Ninety-five percent of the hardness values were greater than 180 mg/L and the average concentration was 605 mg/L. The hardness class for this water is very hard. The recommended maximum sulfate concentration of 250 mg/L was exceeded by 85 percent of the sulfate values. The maximum cadmium contaminant level of 10 ug/L was exceeded by 1 of 3 cadmium values and the maximum lead contaminant level of 50 ug/L was exceeded by 1 of 4 lead values. Arsenic, chromium, and mercury did not exceed their maximum contaminant levels. Because of the frequency and magnitude by which the recommended maximum sulfate concentration was exceeded and because the maximum cadmium and lead contaminant levels were exceeded, this water would probably not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from medium to very high with 77 percent of the samples having a high salinity hazard. All SAR values were equivalent to a low sodium hazard. None of the boron values exceeded the recommended limit, 750 ug/L, for boron sensitive plants.

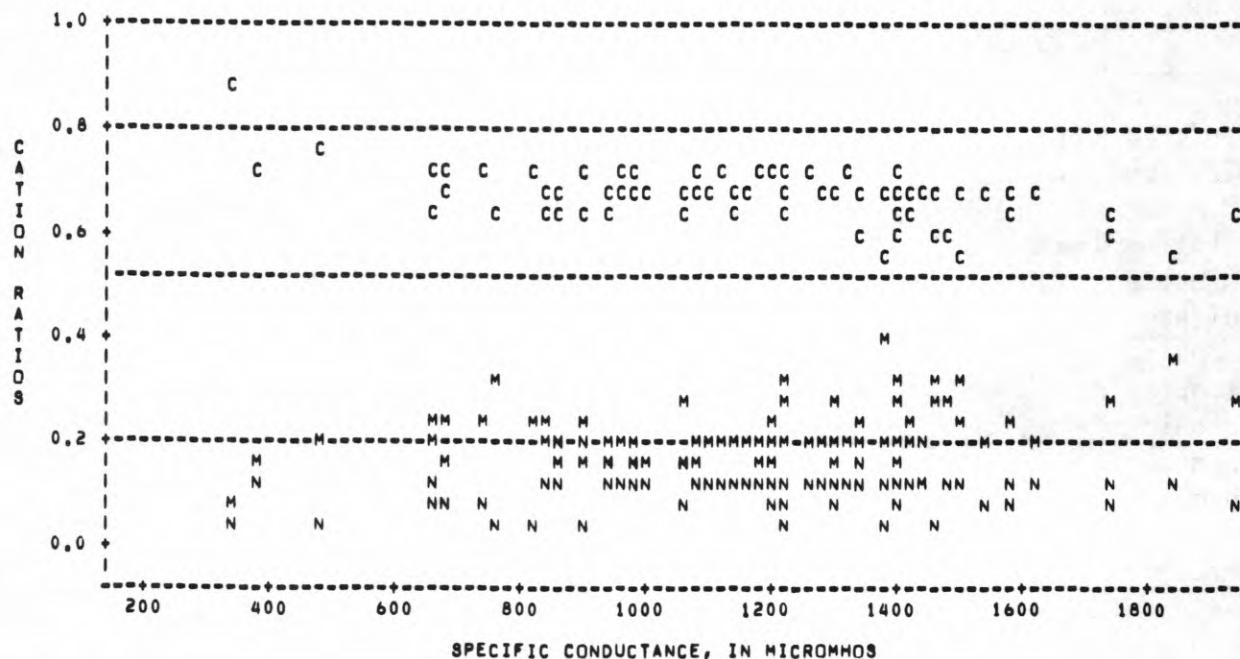
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|-----|------|-----|------|-----|------|-------|
| Specific conductance | 124 | 1234 | 290 | 8750 | 767 | 7.70 | 75.90 |
| Dissolved solids | 103 | 912 | 203 | 1720 | 336 | .02 | -.46 |
| pH | 102 | 8.0 | 7.0 | 8.8 | 0.3 | -.46 | .68 |
| Total hardness | 103 | 605 | 140 | 1200 | 227 | .08 | -.37 |
| Chloride | 104 | 19 | 0.3 | 38 | 8.5 | .22 | .05 |
| Sulfate | 121 | 482 | 58 | 1060 | 212 | .18 | -.30 |
| Iron | 4 | 60 | 0 | 180 | | | |
| Fluoride | 11 | 0.3 | 0.3 | 0.4 | 0.1 | 1.19 | -.76 |
| Arsenic | 5 | 4 | 2 | 5 | | | |
| Cadmium | 5 | 5 | 0 | 14 | | | |
| Chromium | 5 | 2 | 0 | 10 | | | |
| Lead | 4 | 55 | 0 | 130 | | | |
| Mercury | 5 | 0.1 | 0.0 | 0.3 | | | |
| SAR | 103 | 0.6 | 0.0 | 3.4 | 0.3 | 5.28 | 42.94 |
| Boron | 8 | 131 | 10 | 200 | | | |

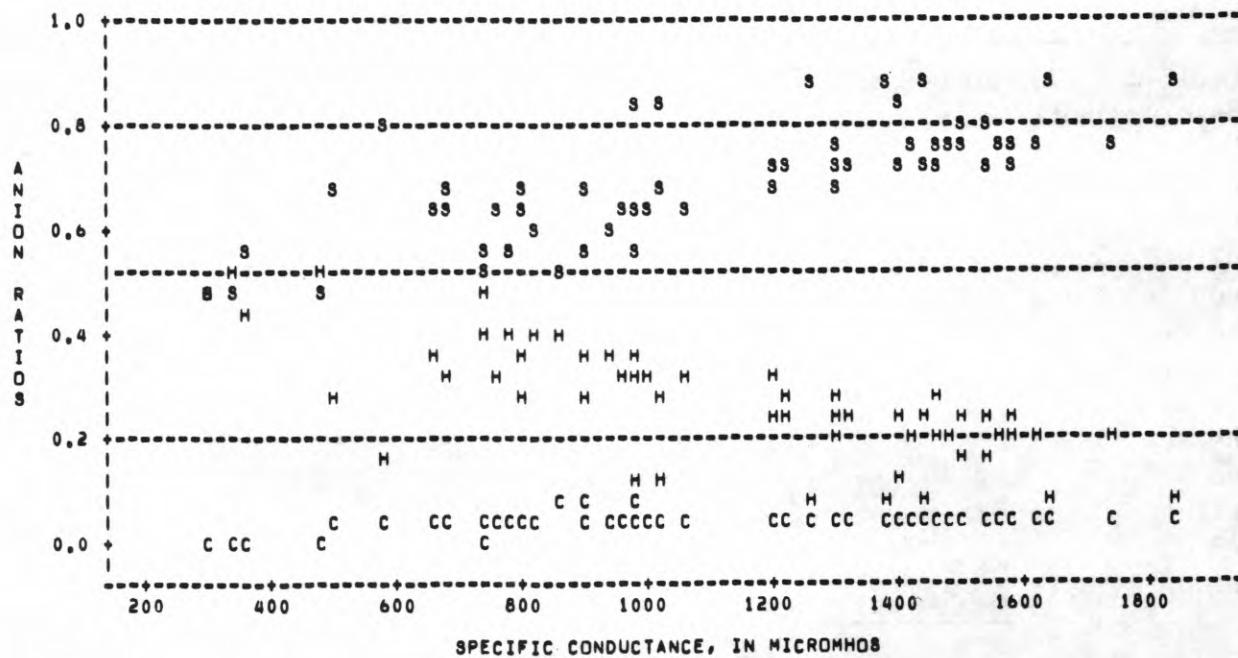
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 700 | 950 | 1220 | 1430 | 1580 |
| Dissolved solids | 480 | 665 | 918 | 1170 | 1320 |
| pH | 7.5 | 7.8 | 8.0 | 8.2 | 8.3 |
| Total hardness | 326 | 428 | 600 | 755 | 900 |
| Chloride | 6.9 | 13 | 19 | 23 | 30 |
| Sulfate | 230 | 320 | 460 | 649 | 730 |
| Iron | | | | | |
| Fluoride | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 0.2 | 0.4 | 0.6 | 0.7 | 0.7 |
| Boron | | | | | |

CATION RATIO PLOT
 N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=DEER CREEK AT HYDRO, OK

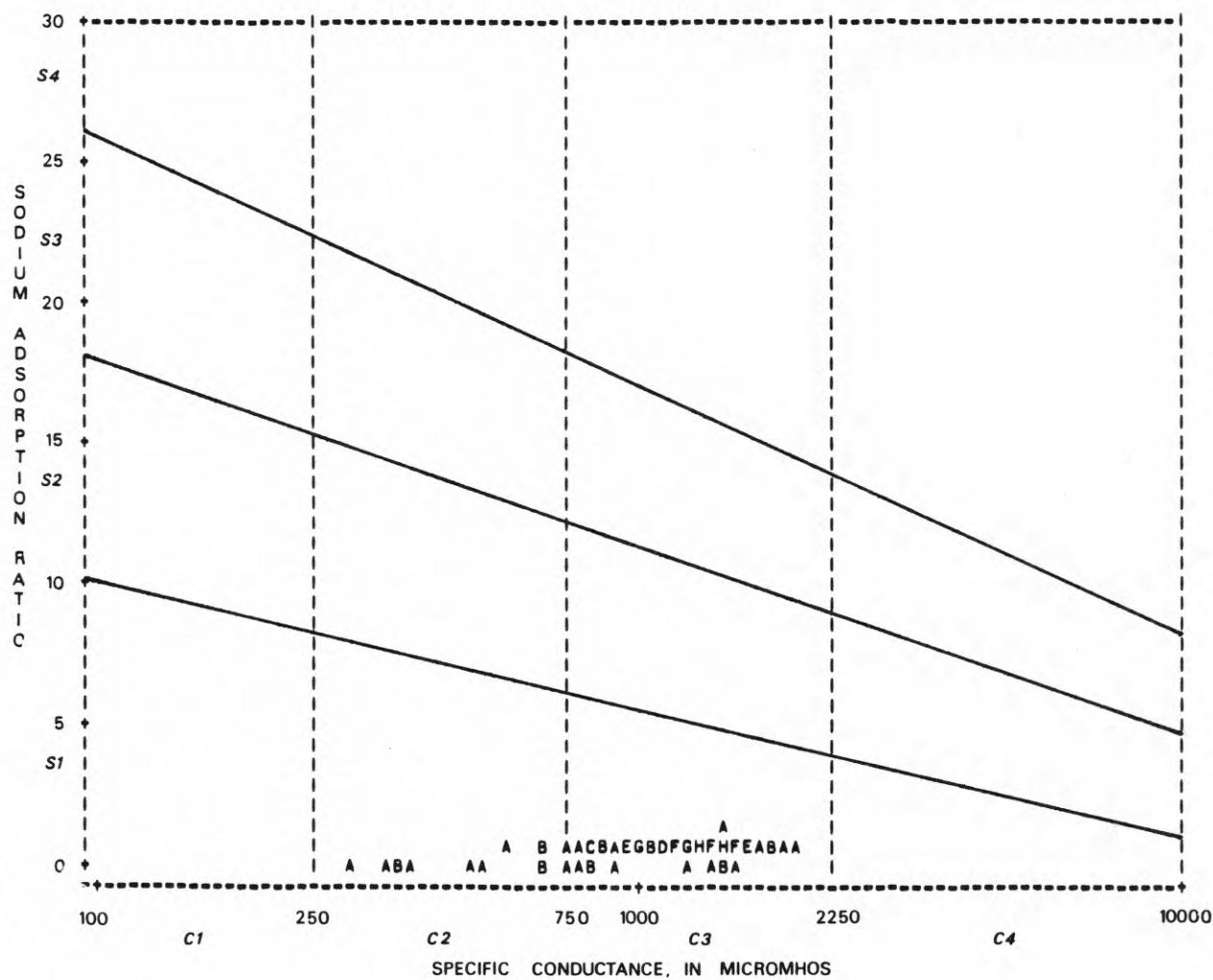


ANION RATIO PLOT
 H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=DEER CREEK AT HYDRO, OK



IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
 C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
 A = 1 OBS, B = 2 OBS, C = 3 OBS
 STATION NAME OR LOCAL IDENTIFIER=DEER CREEK AT HYDRO, OK



CANADIAN RIVER BASIN

07232024 - Deer Creek near McAlester, Okla.

LOCATION.--Lat 34°56'58", long 95°51'00", near center of sec. 32, T.6 N., R.14 E., Pittsburg County, at bridge on U.S. Highway 270, 0.4 mi west of junction with Indian Nation Turnpike, 4.1 mi west of McAlester, and at mile 2.4.

DRAINAGE AREA.--38.3 mi².

PERIOD OF RECORD.--1978 to 1979.

WATER TYPE.--For specific conductance greater than 600 umho, 31 percent of the samples, the water was sodium chloride type. For specific conductance greater than 200 umho and less than 600 umho, 53 percent of the samples, the water was sodium bicarbonate type. The water was mixed type for specific conductance less than 200 umho.

TREND.--The period of record is insufficient, less than 5 years, to perform trend analysis.

PUBLIC WATER SUPPLY.--Seventy percent of the hardness values were less than 120 mg/L and the average concentration was 111 mg/L. For most of the samples the hardness class was moderately hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 8 percent of the chloride values. The maximum cadmium contaminant level of 10 ug/L was exceeded by 5 percent of the cadmium values and the maximum lead contaminant level of 50 ug/L was exceeded by 14 percent of the lead values. Arsenic, chromium, and mercury did not exceed their maximum contaminant levels. Because the maximum cadmium and lead contaminant levels were exceeded, this water may not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from low to high with 80 percent of the samples having a low or medium salinity hazard. The sodium hazard ranged from low to medium with 93 percent of the SAR values equivalent to a low sodium hazard. The data indicate that phytotoxic effects from boron should not occur.

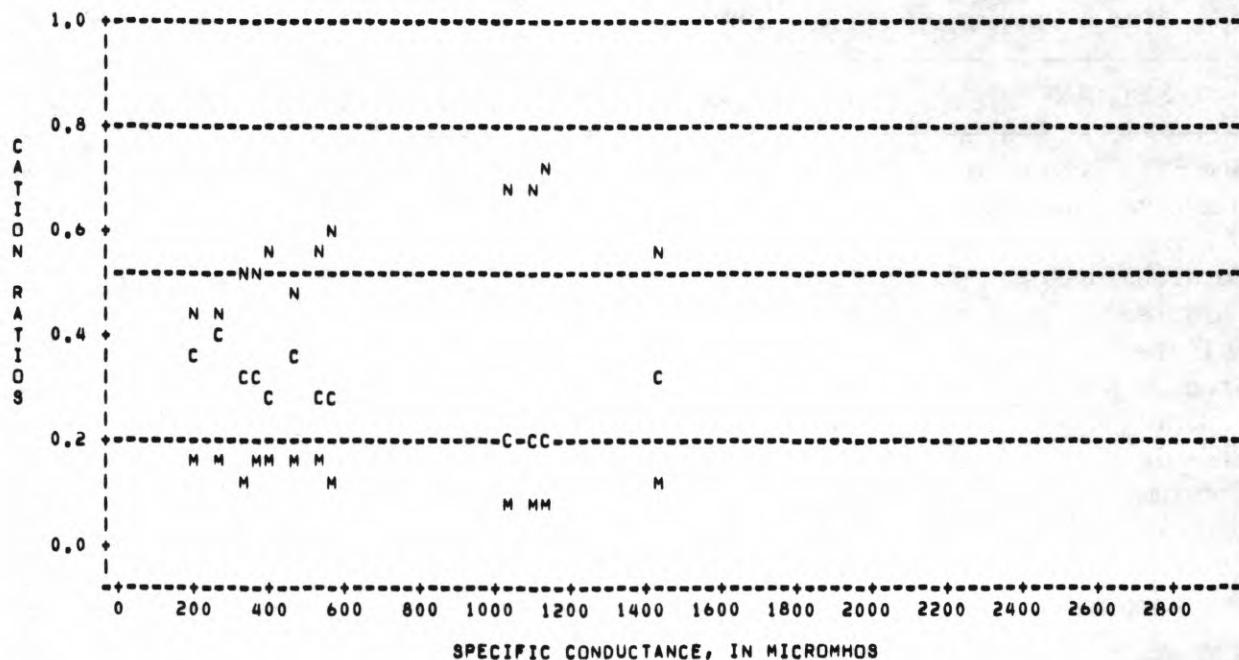
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|------|-----|-------|-------|
| Specific conductance | 21 | 555 | 79 | 1430 | 360 | 1.01 | 0.37 |
| Dissolved solids | 14 | 369 | 136 | 646 | 184 | .43 | -1.58 |
| pH | 22 | 7.3 | 6.4 | 7.8 | 0.2 | -1.30 | 5.47 |
| Total hardness | 15 | 111 | 54 | 210 | 47 | .84 | -.20 |
| Chloride | 14 | 108 | 14 | 260 | 95 | .66 | -1.44 |
| Sulfate | 14 | 51 | 24 | 100 | 20 | .96 | 1.57 |
| Iron | 15 | 82 | 10 | 240 | 77 | 1.21 | .29 |
| Fluoride | 14 | 0.4 | 0.2 | 1.3 | 0.3 | 2.45 | 7.22 |
| Arsenic | 20 | 3 | 0 | 7 | 2.1 | .62 | -.72 |
| Cadmium | 16 | 4 | 0 | 18 | 4.5 | 2.43 | 6.92 |
| Chromium | 20 | 6 | 0 | 20 | 7.6 | 1.02 | -.37 |
| Lead | 20 | 21 | 0 | 100 | 33 | 1.62 | 1.34 |
| Mercury | 21 | 0.1 | 0.0 | 0.4 | 0.1 | 1.95 | 2.45 |
| SAR | 15 | 2.6 | 0.9 | 5.6 | 1.4 | .88 | -.16 |
| Boron | 15 | 212 | 100 | 380 | 96 | .43 | -1.14 |

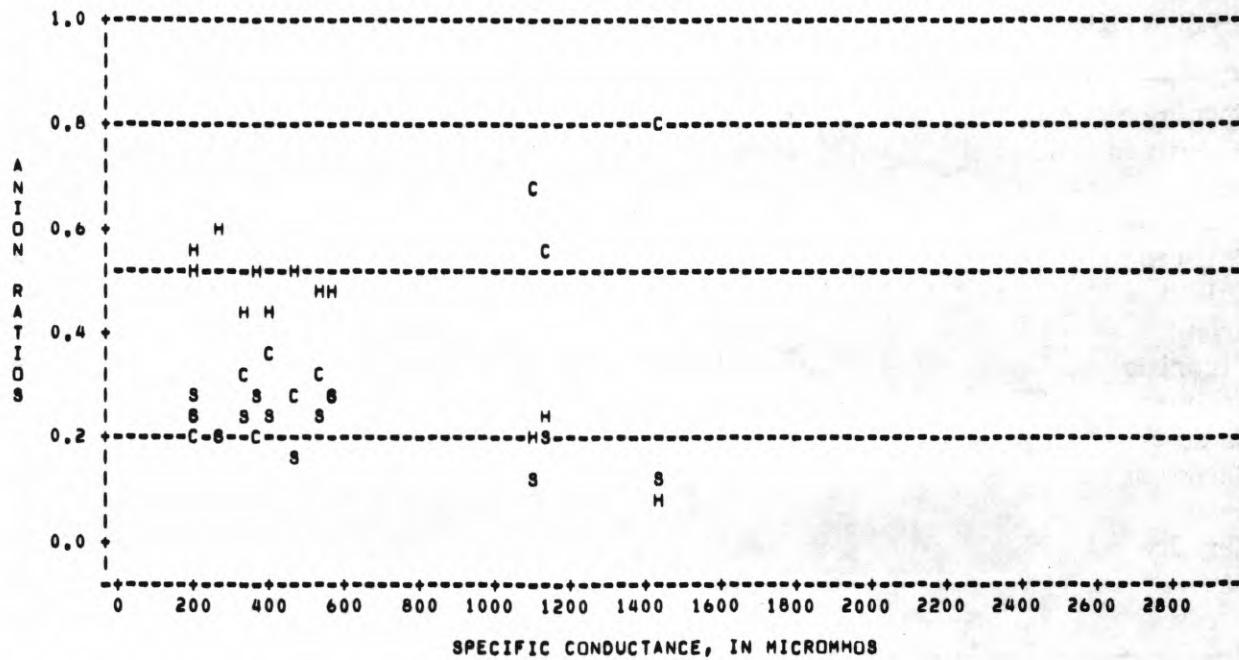
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 187 | 285 | 445 | 693 | 1103 |
| Dissolved solids | 151 | 217 | 287 | 550 | 611 |
| pH | 7.1 | 7.1 | 7.3 | 7.4 | 7.5 |
| Total hardness | 55 | 76 | 97 | 143 | 170 |
| Chloride | 16 | 30 | 50 | 195 | 244 |
| Sulfate | 26 | 33 | 50 | 60 | 67 |
| Iron | 10 | 20 | 50 | 98 | 205 |
| Fluoride | 0.2 | 0.3 | 0.3 | 0.5 | 0.6 |
| Arsenic | 1 | 1 | 2 | 4 | 6 |
| Cadmium | 0 | 1 | 2 | 4 | 7 |
| Chromium | 0 | 0 | 0 | 10 | 20 |
| Lead | 0 | 0 | 3 | 23 | 86 |
| Mercury | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 |
| SAR | 1.0 | 1.6 | 2.2 | 3.2 | 4.8 |
| Boron | 100 | 110 | 195 | 285 | 340 |

CATION RATIO PLOT
N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=DEER CREEK NR MCALISTER OK

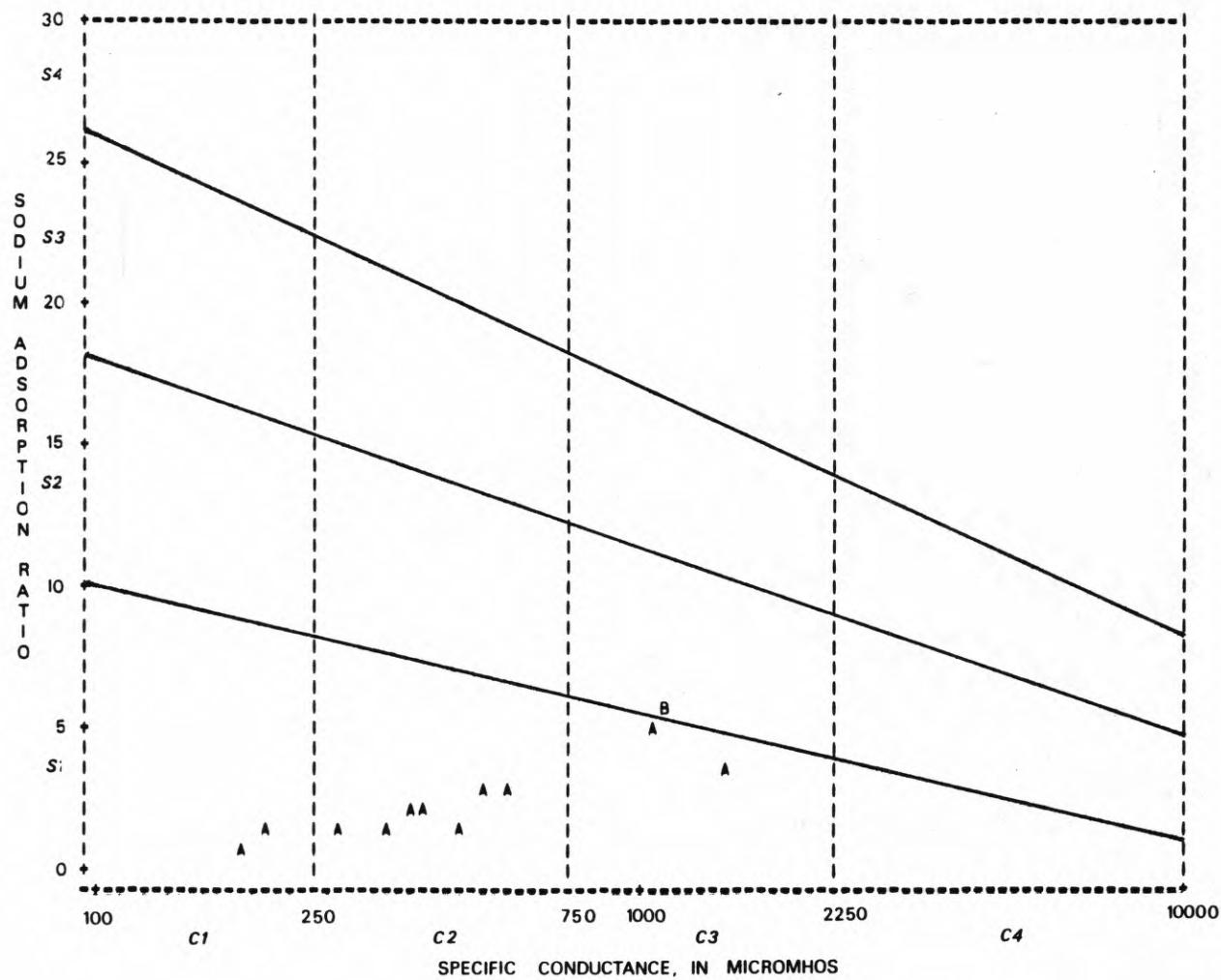


ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=DEER CREEK NR MCALISTER OK



IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
A = 1 OBS, B = 2 OBS, C = 3 OBS
STATION NAME OR LOCAL IDENTIFIER=DEER CREEK NR MCALISTER OK



CANADIAN RIVER BASIN

07231980 - Gaines Creek near Higgins, Okla.

LOCATION.--Lat $34^{\circ}48'57''$, long $95^{\circ}28'46''$, in NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 14, T.4 N., R.17 E., Latimer County, at State Highway 1 bridge, 4.5 mi southeast of Hartshorne.

DRAINAGE AREA.--Not determined.

PERIOD OF RECORD.--1978 to 1979.

WATER TYPE.--The cations were mixed type throughout the range of measured specific conductance. No anion distribution data were available.

TREND.--The period of record is insufficient, less than 5 years, to perform trend analyses.

PUBLIC WATER SUPPLY.--Eighty-four percent of the hardness values were less than 60 mg/L and the average concentration was 32 mg/L. The hardness classification for this water is soft. The recommended maximum iron concentration of 300 ug/L was exceeded by 27 percent of the iron values. Arsenic, cadmium, chromium, lead, and mercury did not exceed their maximum contaminant levels. Based on the data, this water is probably suitable for use as a public supply; however, staining of clothes and plumbing fixtures from iron may occur.

IRRIGATION.--The salinity hazard ranged from low to medium with 94 percent of the samples having a low salinity hazard. All SAR values were equivalent to a low sodium hazard. No boron data are available.

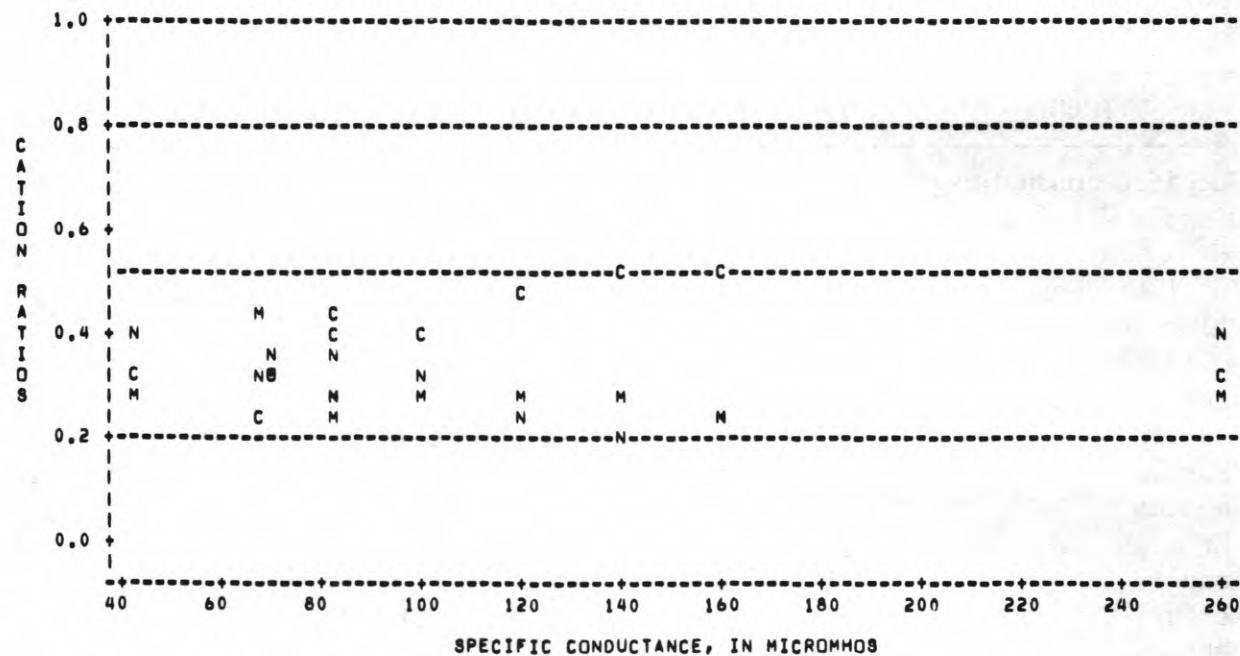
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|-----|-----|------|-------|
| Specific conductance | 17 | 98 | 42 | 260 | 51 | 2.34 | 6.40 |
| Dissolved solids | 9 | 57 | 35 | 97 | | | |
| pH | 10 | 6.7 | 5.7 | 7.6 | 0.6 | -.04 | .06 |
| Total hardness | 10 | 32 | 14 | 64 | 18 | 1.06 | -.04 |
| Chloride | 9 | 4.1 | 2.8 | 5.5 | | | |
| Sulfate | 9 | 6.8 | 3.1 | 10 | | | |
| Iron | 10 | 218 | 80 | 670 | 196 | 1.71 | 2.34 |
| Fluoride | 9 | 0.1 | 0.1 | 0.1 | | | |
| Arsenic | 10 | 1 | 0 | 3 | 1.1 | .66 | -.71 |
| Cadmium | 9 | 2 | 0 | 10 | | | |
| Chromium | 10 | 6 | 0 | 30 | 11 | 1.69 | 1.86 |
| Lead | 7 | 0 | 0 | 0 | | | |
| Mercury | 10 | 0.0 | 0.0 | 0.1 | 0.1 | 1.04 | -1.22 |
| SAR | 10 | 0.4 | 0.3 | 0.5 | 0.1 | -.09 | 1.50 |
| Boron | 0 | | | | | | |

FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 62 | 70 | 80 | 110 | 180 |
| Dissolved solids | | | | | |
| pH | 5.8 | 6.4 | 6.7 | 7.3 | 7.6 |
| Total hardness | 14 | 19 | 26 | 45 | 64 |
| Chloride | | | | | |
| Sulfate | | | | | |
| Iron | 80 | 80 | 130 | 335 | 647 |
| Fluoride | | | | | |
| Arsenic | 0 | 0 | 1 | 2 | 3 |
| Cadmium | | | | | |
| Chromium | 0 | 0 | 0 | 13 | 29 |
| Lead | | | | | |
| Mercury | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| SAR | 0.3 | 0.4 | 0.4 | 0.4 | 0.5 |
| Boron | | | | | |

CATION RATIO PLOT
N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=GAINES CREEK NEAR HIGGINS, OK



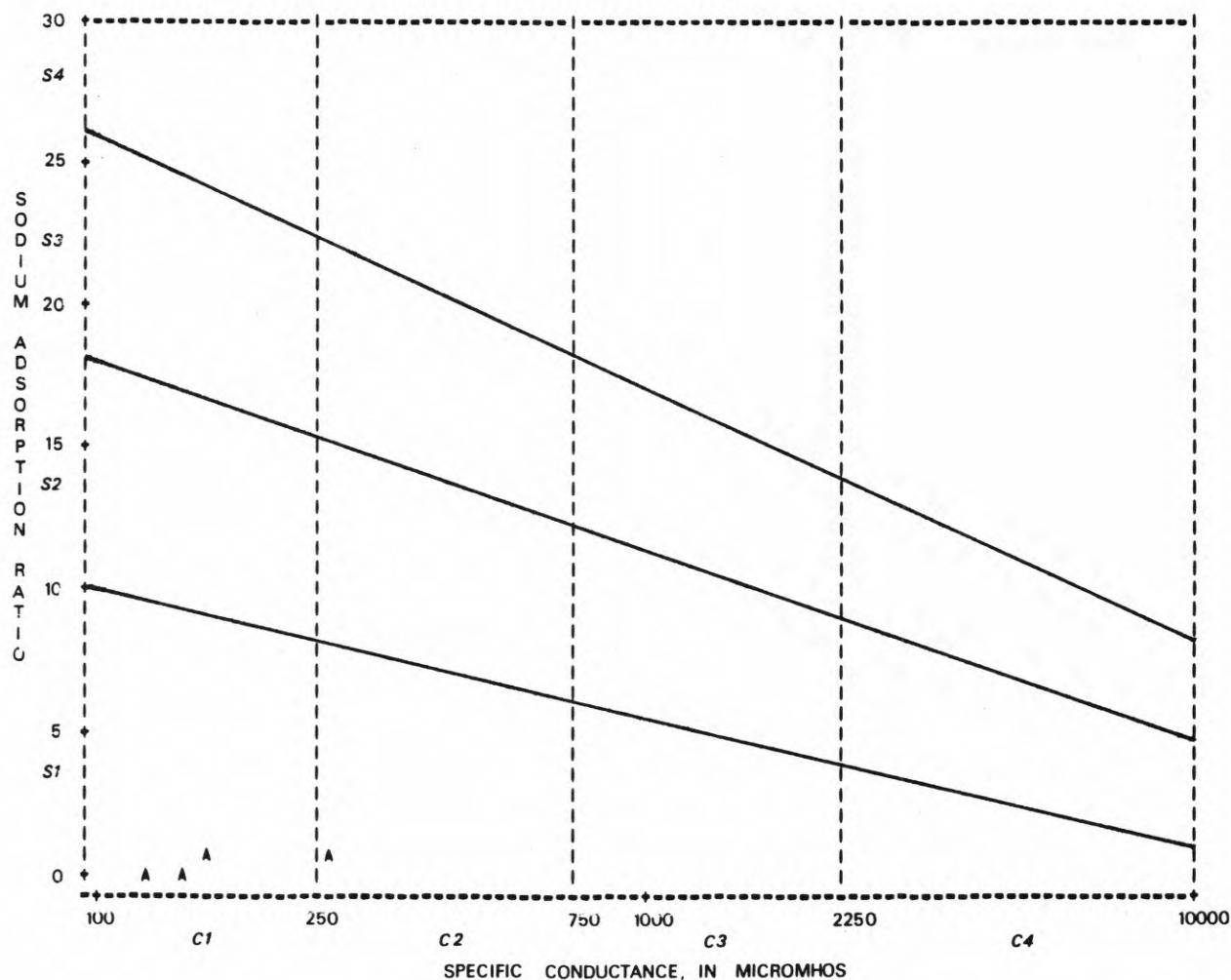
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER: GAINES CREEK NEAR HIGGINS, OK



CANADIAN RIVER BASIN

07230000 - Little River below Lake Thunderbird, near Norman, Okla.

LOCATION.--Lat $35^{\circ}13'14''$, long $97^{\circ}13'00''$, in NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 29, T.9 N., R.1 E., Cleveland County, at outlet channel, 170 ft upstream from State Highway 9, 1,200 ft downstream from Lake Thunderbird, 1.0 mi upstream from Prairie Creek, 13.0 mi east of Norman, and at mile 96.2.

DRAINAGE AREA.--257 mi².

PERIOD OF RECORD.--1953 to 1965, 1975 to 1979.

WATER TYPE.--For specific conductance less than 500 umho, 25 percent of the samples, the water was calcium carbonate/bicarbonate type. For specific conductance greater than 500 umho and less than 1,000 umho, 66 percent of the samples, the water was magnesium carbonate/bicarbonate type. The water was sodium chloride type for specific conductance greater than 1,000 umho.

TREND.--Plots of the hardness, sulfate, and chloride concentrations versus time indicate a trend of decreasing concentration for hardness. The Spearman's rhos at the 95-percent probability level indicate a negative trend for hardness and positive trends, increasing concentration, for chloride and sulfate. Current data are not available for the dissolved solids.

PUBLIC WATER SUPPLY.--Seventy-seven percent of the hardness values were greater than 180 mg/L and the average concentration was 239 mg/L. In general, the hardness classification for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 5 percent of the chloride values and the recommended maximum sulfate concentration of 250 mg/L was exceeded by 2 percent of the sulfate values. No toxic metal data are available. Based on the data, this water probably is suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from low to very high with 67 percent of the samples having a low or medium salinity hazard. The sodium hazard ranged from low to very high with 95 percent of the SAR values equivalent to a low sodium hazard. Phytotoxic effects from boron could occur in sensitive plants. The upper limit for boron sensitive plants of 750 ug/L was exceeded by 6 percent of the boron values.

UNIVARIATE STATISTICS

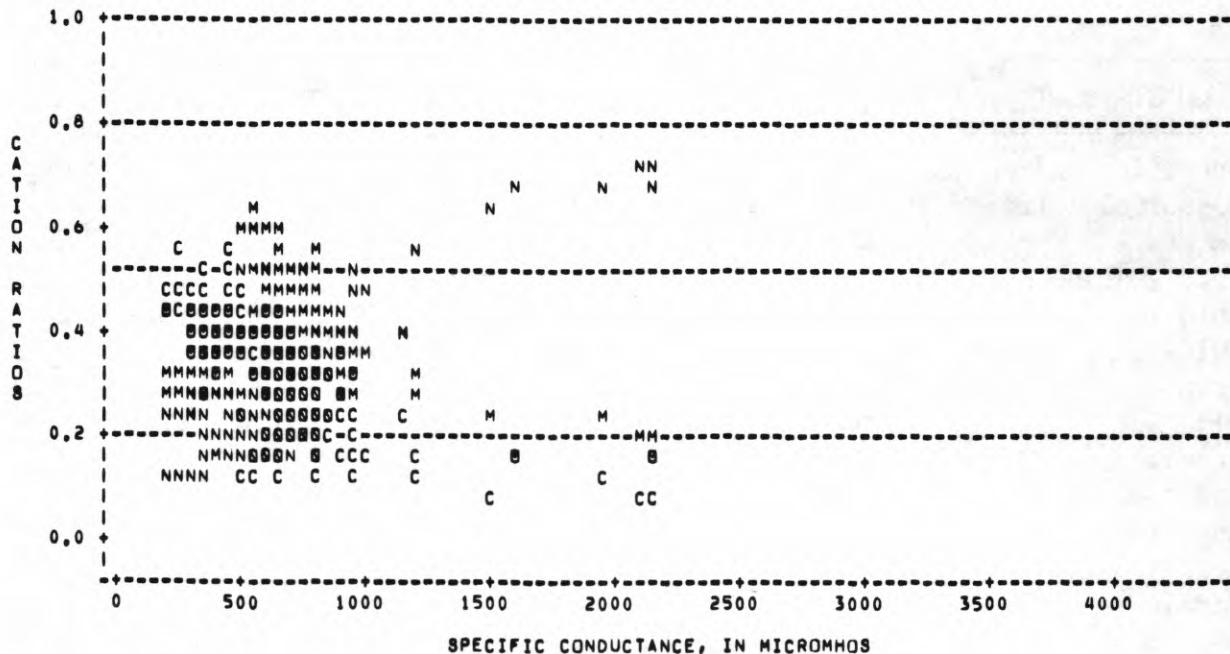
| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|-----|------|-----|------|-----|------|-------|
| Specific conductance | 536 | 691 | 100 | 3640 | 335 | 2.84 | 16.44 |
| Dissolved solids | 489 | 396 | 80 | 2140 | 194 | 2.88 | 17.21 |
| pH | 530 | 8.2 | 7.0 | 8.8 | 0.3 | -.87 | .52 |
| Total hardness | 520 | 239 | 52 | 430 | 72 | -.31 | -.58 |
| Chloride | 534 | 72 | 3.8 | 880 | 76 | 4.51 | 31.28 |
| Sulfate | 516 | 32 | 0.0 | 372 | 33 | 4.47 | 30.32 |
| Iron | 0 | | | | | | |
| Fluoride | 63 | 0.3 | 0.0 | 0.6 | 0.1 | .17 | -.49 |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 487 | 1.7 | 0.1 | 21 | 1.8 | 4.40 | 30.79 |
| Boron | 54 | 309 | 0 | 860 | 194 | .80 | 1.26 |

FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 342 | 500 | 681 | 794 | 949 |
| Dissolved solids | 199 | 280 | 389 | 458 | 557 |
| pH | 7.8 | 8.0 | 8.2 | 8.5 | 8.6 |
| Total hardness | 134 | 192 | 248 | 292 | 325 |
| Chloride | 20 | 34 | 54 | 81 | 124 |
| Sulfate | 9.4 | 16 | 23 | 35 | 54 |
| Iron | | | | | |
| Fluoride | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 0.6 | 0.8 | 1.1 | 1.8 | 3.2 |
| Boron | 10 | 220 | 285 | 415 | 535 |

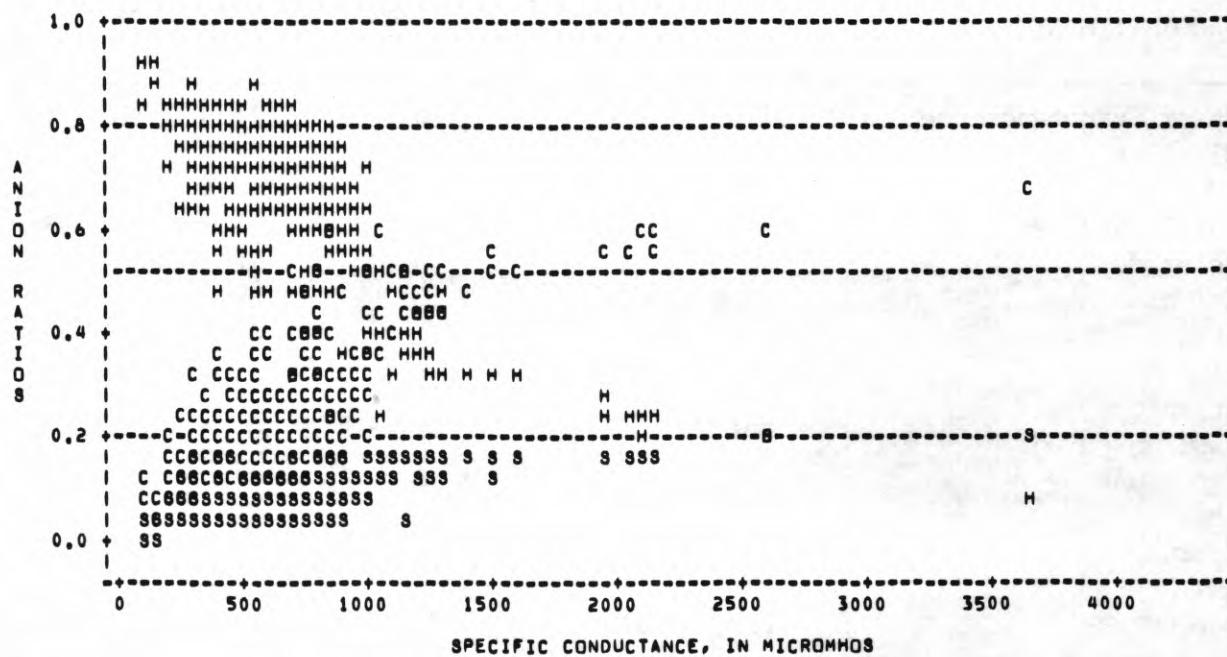
CATION RATIO PLOT

N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=LITTLE RIVER BLW LK THUNDERBIRD NR NORMAN, OK



ANION RATIO PLOT

ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=LITTLE RIVER BLW LK THUNDERBIRD NR NORMAN, OK



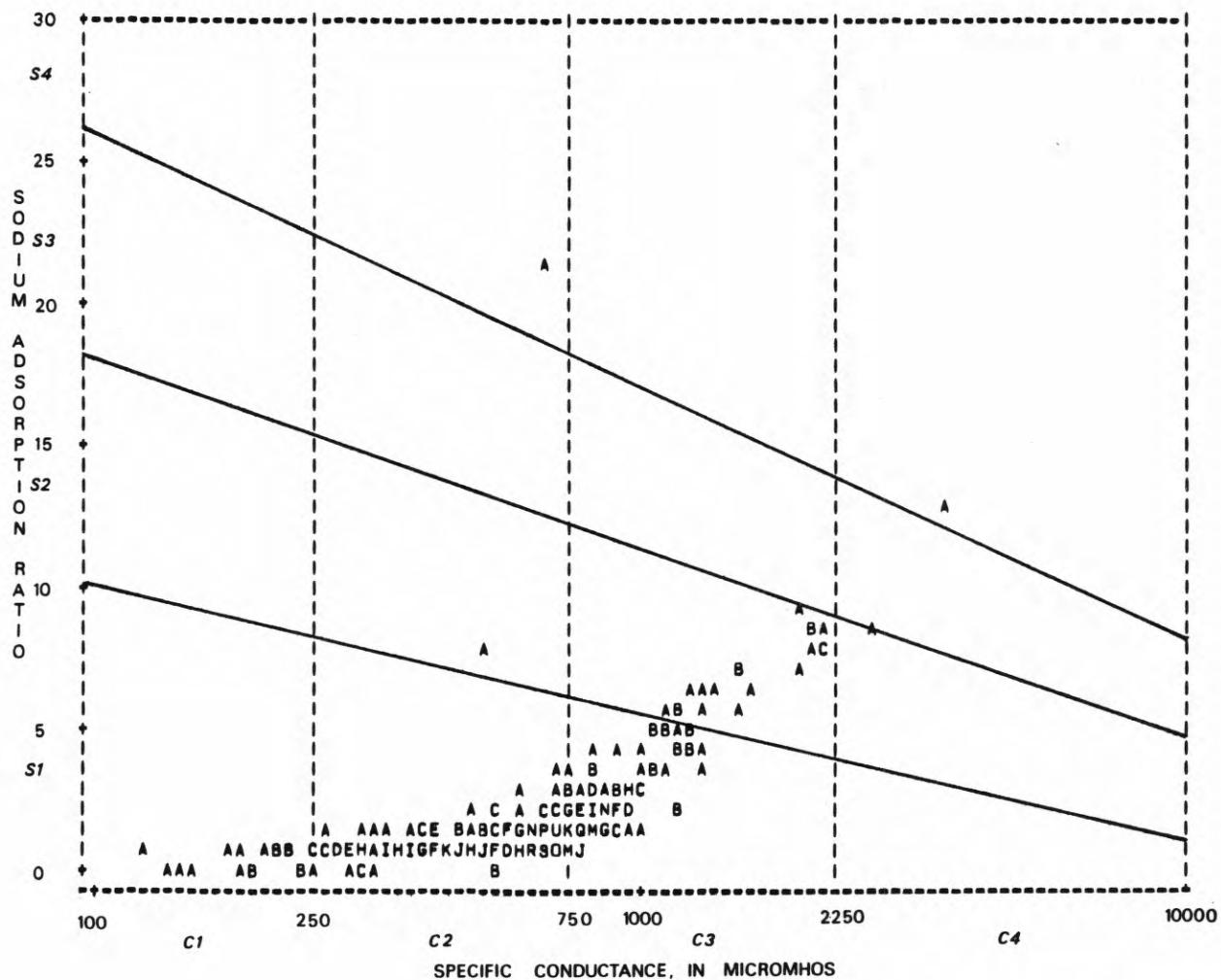
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=LITTLE RIVER BLW LK THUNDERBIRD NR NORMAN, OK



CANADIAN RIVER BASIN

07230500 - Little River near Tecumseh, Okla.

LOCATION.--Lat $35^{\circ}10'25''$, long $96^{\circ}55'55''$, in NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 18, T.8 N., R.4 E., Pottawatomie County, at bridge on U.S. Highway 177, 1.5 mi downstream from Dance Creek, 5.0 mi south of Tecumseh, and at mile 77.2.

DRAINAGE AREA.--456 mi².

PERIOD OF RECORD.--1951 to 1963.

WATER TYPE.--For specific conductance less than 1,000 umho, 56 percent of the samples, the water was carbonate/bicarbonate type with no predominant cation. For specific conductance greater than 1,000 umho, the water was sodium chloride type.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--Eighty-five percent of the hardness values were greater than 180 mg/L and the average concentration was 255 mg/L. In general, the hardness classification for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 16 percent of the chloride values. No toxic metal data are available. Based on the data, this water would be marginally suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from medium to very high with 74 percent of the samples having a high salinity hazard. The sodium hazard ranged from low to high with 87 percent of the SAR values equivalent to a low sodium hazard. The data indicate that phytotoxic effects could occur in boron sensitive plants. One of three boron values exceeded the 750 ug/L limit for boron sensitive plants.

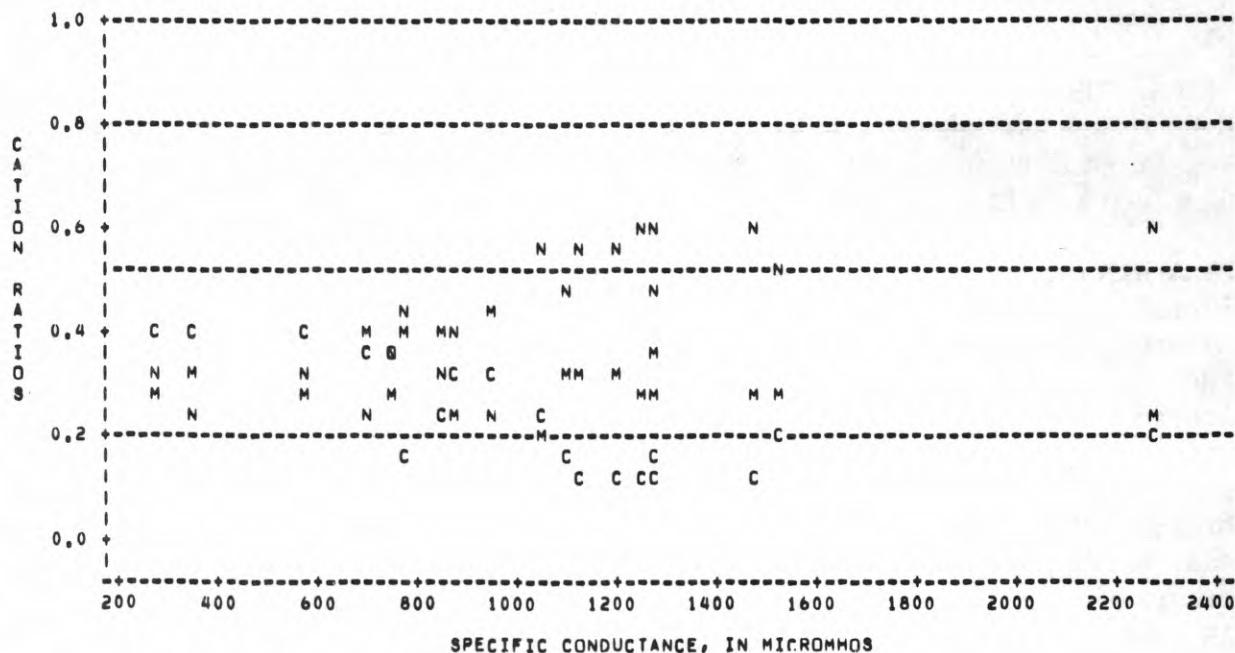
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|------|-----|------|------|
| Specific conductance | 54 | 980 | 266 | 2270 | 429 | 1.02 | 2.13 |
| Dissolved solids | 25 | 474 | 163 | 1170 | 216 | 1.23 | 3.28 |
| pH | 36 | 8.2 | 7.6 | 8.7 | 0.2 | -.28 | -.19 |
| Total hardness | 45 | 255 | 86 | 450 | 74 | .03 | .70 |
| Chloride | 54 | 162 | 13 | 560 | 116 | 1.60 | 3.40 |
| Sulfate | 25 | 36 | 10 | 129 | 25 | 2.30 | 7.22 |
| Iron | 0 | | | | | | |
| Fluoride | 3 | 0.4 | 0.1 | 0.6 | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 45 | 2.8 | 0.5 | 11 | 2.1 | 1.79 | 4.78 |
| Boron | 3 | 553 | 290 | 1000 | | | |

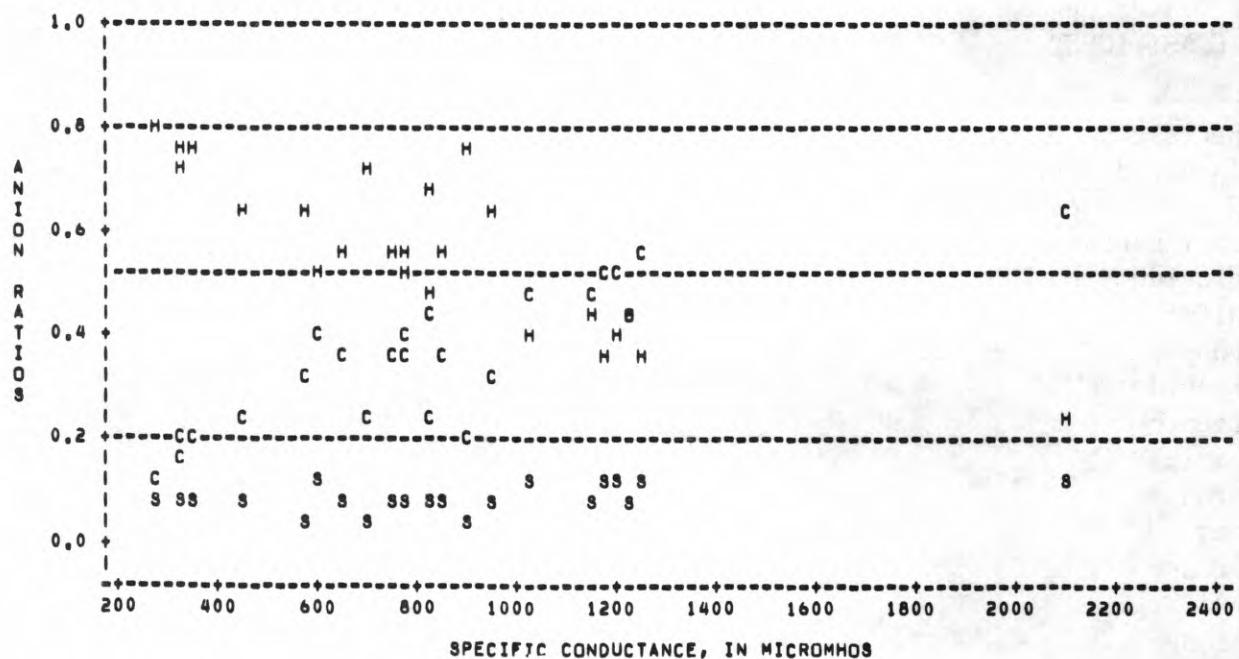
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 394 | 754 | 952 | 1200 | 1410 |
| Dissolved solids | 198 | 350 | 464 | 615 | 682 |
| pH | 7.9 | 8.0 | 8.2 | 8.4 | 8.5 |
| Total hardness | 134 | 221 | 252 | 303 | 356 |
| Chloride | 32 | 84 | 140 | 217 | 290 |
| Sulfate | 12 | 20 | 30 | 59 | 62 |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 0.8 | 1.3 | 2.4 | 3.9 | 4.9 |
| Boron | | | | | |

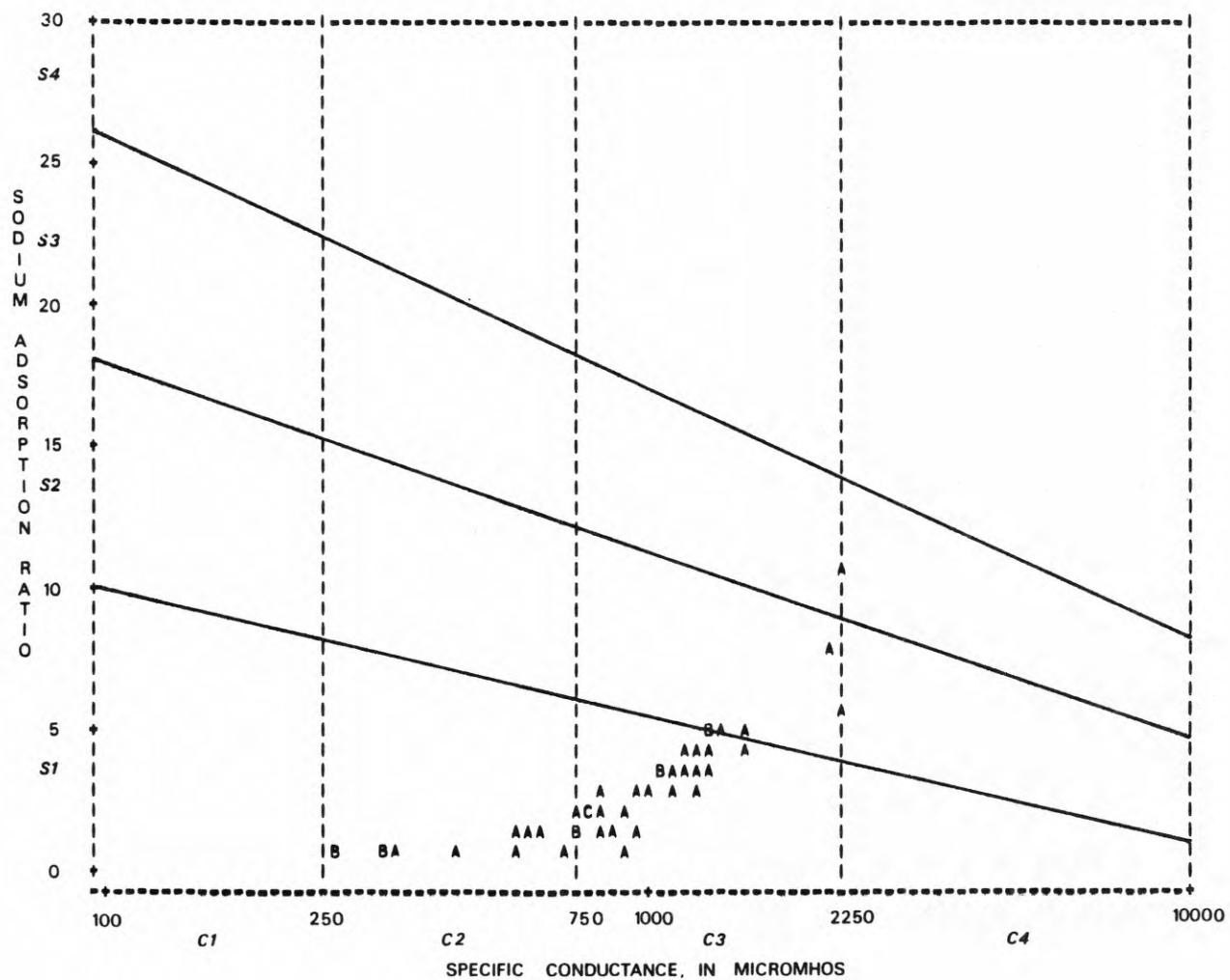
CATION RATIO PLOT
 N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=LITTLE RIVER NR TECUMSEH, OK



ANION RATIO PLOT
 H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=LITTLE RIVER NR TECUMSEH, OK



IRRIGATION DIAGRAM
 C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
 C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
 A = 1 DB8, B = 2 DB8, C = 3 DB8
 STATION NAME OR LOCAL IDENTIFIER=LITTLE RIVER NR TECUMSEH, OK



CANADIAN RIVER BASIN

07231000 - Little River near Sasakwa, Okla.

LOCATION.--Lat $34^{\circ}59'02''$, long $96^{\circ}33'01''$, in NE $\frac{1}{4}$ sec. 22, T.6 N., R.7 E., Seminole County, at county road bridge, 2.8 mi northwest of Sasakwa, 8.7 mi downstream from Salt Creek, and at mile 24.1.

DRAINAGE AREA.--865 mi².

PERIOD OF RECORD.--1951 to 1979.

WATER TYPE.--The water was sodium chloride type throughout the range of measured specific conductance.

TREND.--Plots of the dissolved solids, hardness, and chloride concentrations versus time indicate the possibility of trends of decreasing concentration. The sulfate plot did not indicate any trend. The Spearman's rhos at the 95-percent probability level indicate negative trends for dissolved solids, hardness, and chloride and do not indicate any trend for sulfate.

PUBLIC WATER SUPPLY.--Eighty-eight percent of the hardness values were greater than 180 mg/L and the average concentration was 1,286 mg/L. The hardness classification for this water is very hard. The recommended minimum pH of 5.0 was exceeded by 2 percent of the pH values, the recommended maximum sulfate concentration of 250 mg/L was exceeded by 2 percent of the sulfate values, and the recommended maximum chloride concentration of 250 mg/L was exceeded by 80 percent of the chloride values. No toxic metal data are available. Because of the frequency and magnitude by which the recommended maximum chloride concentration was exceeded, this water would not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from low to very high with 51 percent of the samples having a very high salinity hazard. The sodium hazard ranged from low to very high with about 20 percent of the SAR values equivalent to a very high sodium hazard. Phytotoxic effects from boron could occur even in tolerant plants. The sensitive plant limit of 750 ug/L was exceeded by 25 percent of the boron values, the semitolerant plant limit of 1,000 ug/L was exceeded by 24 percent of the boron values, and the tolerant plant limit of 2,000 ug/L was exceeded by 13 percent of the boron values.

UNIVARIATE STATISTICS

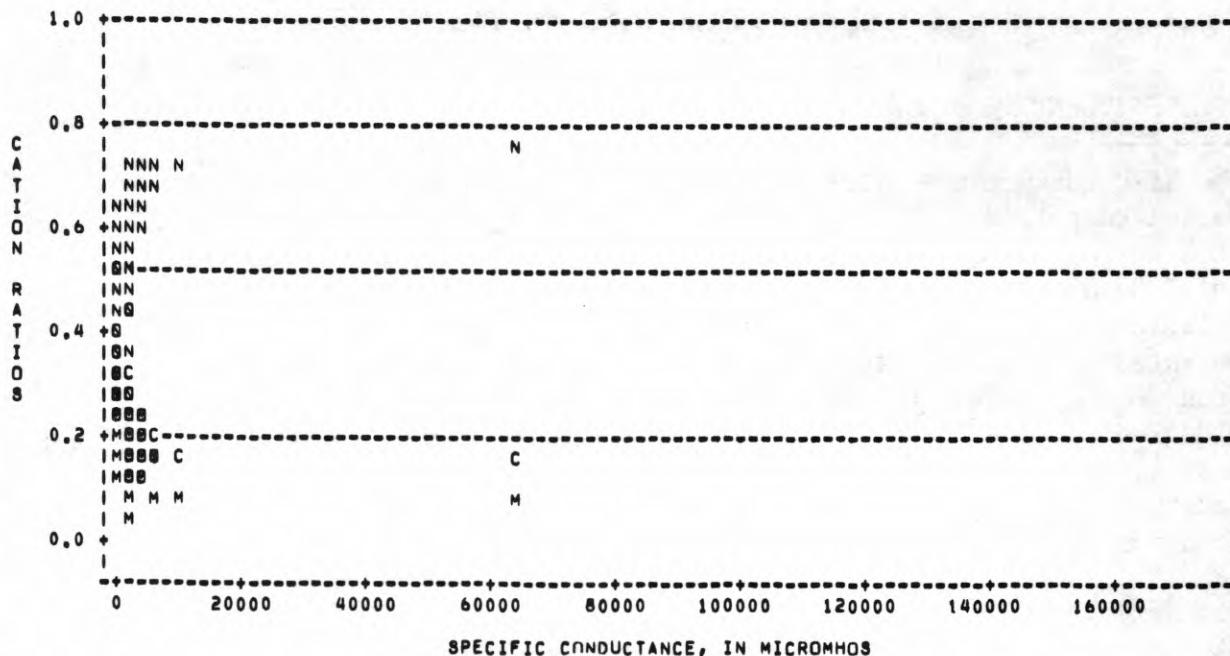
| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|------|------|-----|--------|-------|------|-------|
| Specific conductance | 1298 | 7390 | 142 | 130000 | 17066 | 3.94 | 16.58 |
| Dissolved solids | 1213 | 4780 | 106 | 129000 | 12981 | 4.80 | 26.51 |
| pH | 1239 | 8.1 | 4.0 | 8.8 | 0.3 | -.30 | .50 |
| Total hardness | 1133 | 1286 | 48 | 24400 | 2906 | 4.24 | 20.72 |
| Chloride | 1250 | 2981 | 16 | 73100 | 8189 | 4.52 | 23.53 |
| Sulfate | 1090 | 33 | 0.0 | 410 | 29 | 4.46 | 35.78 |
| Iron | 0 | | | | | | |
| Fluoride | 31 | 0.3 | 0.0 | 0.7 | 0.2 | .54 | -1.05 |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 900 | 12 | 0.6 | 101 | 16 | 2.83 | 7.85 |
| Boron | 24 | 689 | 80 | 2600 | 768 | 1.54 | .92 |

FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|-------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 720 | 1280 | 2300 | 3710 | 15740 |
| Dissolved solids | 411 | 730 | 1310 | 2160 | 6758 |
| pH | 7.5 | 7.8 | 8.1 | 8.3 | 8.4 |
| Total hardness | 166 | 270 | 435 | 640 | 2870 |
| Chloride | 150 | 310 | 625 | 1100 | 5815 |
| Sulfate | 12 | 18 | 27 | 39 | 54 |
| Iron | | | | | |
| Fluoride | 0.0 | 0.1 | 0.2 | 0.4 | 0.7 |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 2.5 | 4.2 | 6.7 | 10 | 30 |
| Boron | 125 | 220 | 365 | 702 | 2155 |

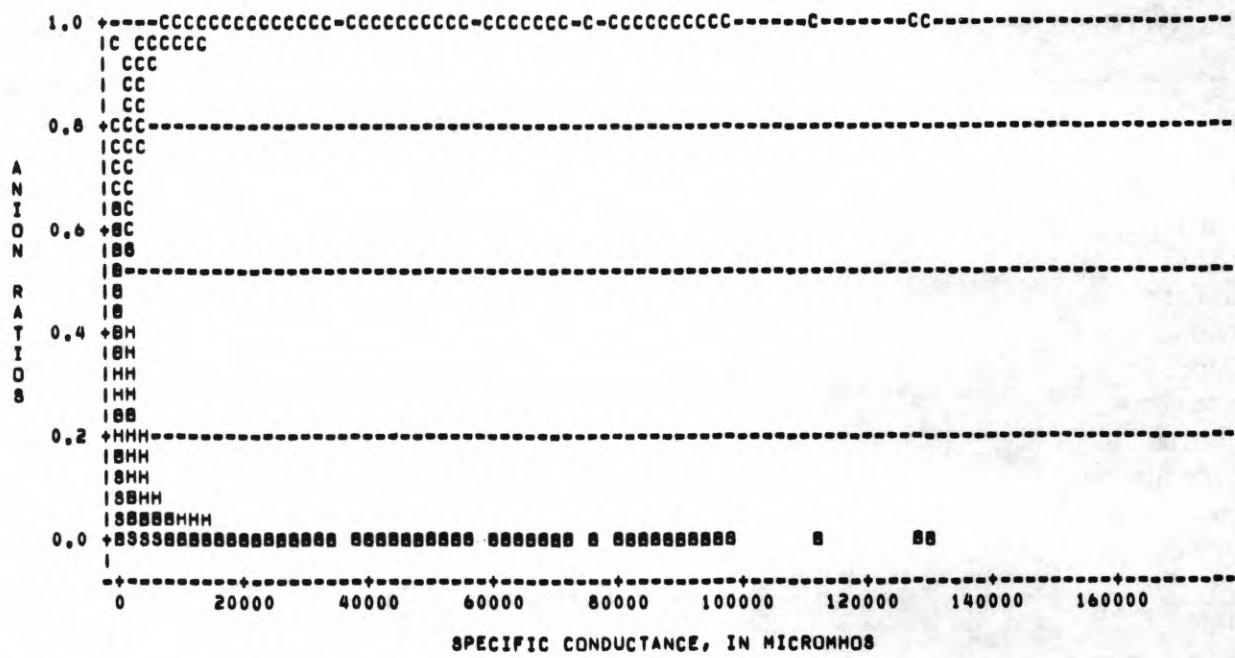
CATION RATIO PLOT

N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=LITTLE RIVER NR SASAKWA, OK



ANION RATIO PLOT

H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=LITTLE RIVER NR SASAKWA, OK



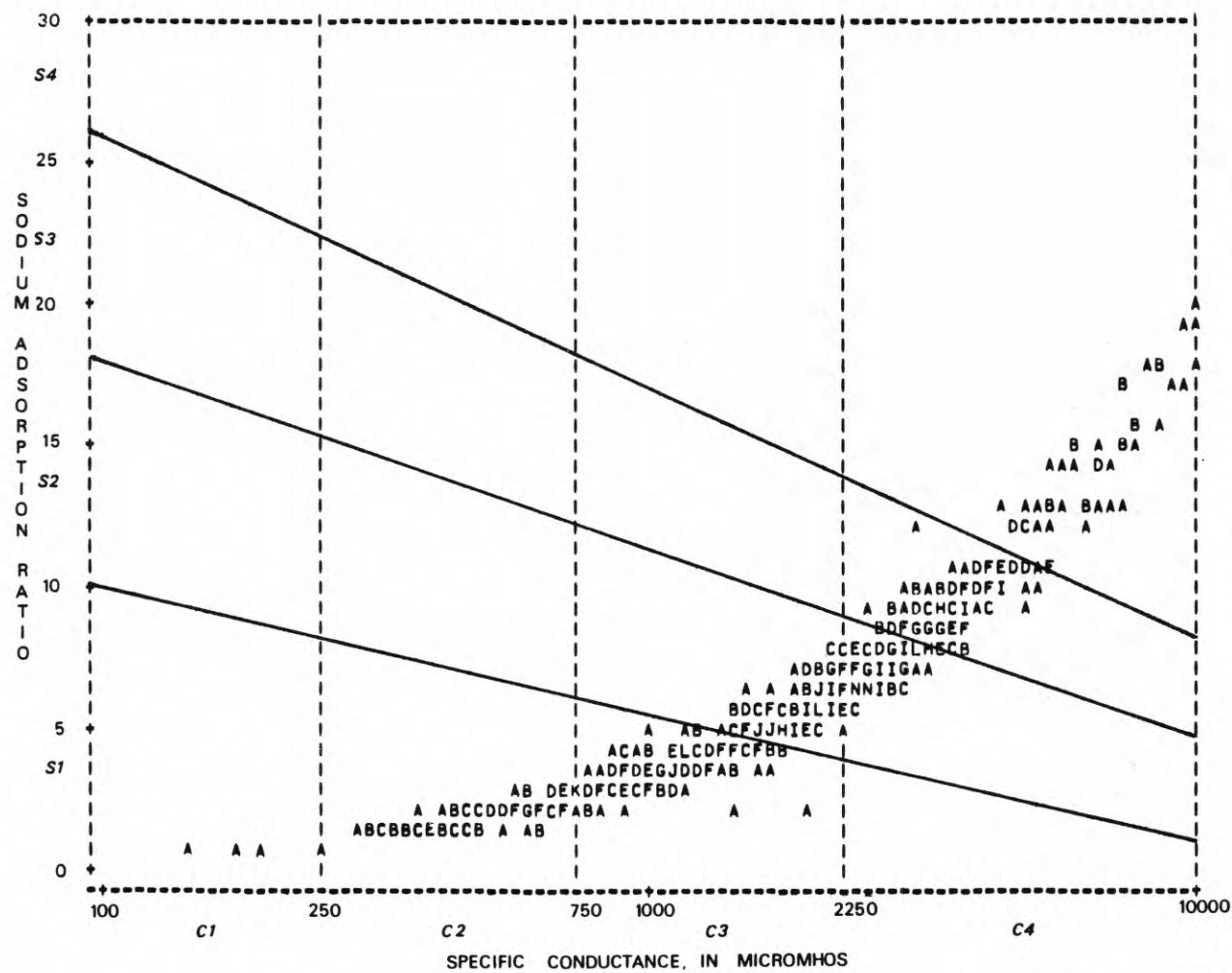
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 088, B = 2 088, C = 3 088

STATION NAME OR LOCAL IDENTIFIER=LITTLE RIVER NR SASAKWA, OK



CANADIAN RIVER BASIN

07232029 - Mathuldy Creek near Crowder, Okla.

LOCATION.--Lat $35^{\circ}04'17''$, long $95^{\circ}36'47''$, in NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 21, T.7 N., R.16 E., Pittsburg County, at county road bridge, 4.3 mi southeast of Crowder, and at mile 6.7.

DRAINAGE AREA.--5.41 mi².

PERIOD OF RECORD.--1976 to 1979.

WATER TYPE.--For the specific conductance range from 150 to 350 umho, 41 percent of the samples, the water was sulfate type. For specific conductance outside this range, the anions were mixed. The cations were mixed throughout the range of measured specific conductance.

TREND.--The period of record is insufficient, less than 5 years, to perform trend analysis.

PUBLIC WATER SUPPLY.--Seventy-four percent of the hardness values were less than 60 mg/L and the average concentration was 51 mg/L. In general, the hardness classification for this water is soft. The recommended maximum iron concentration of 300 ug/L was exceeded by 13 percent of the iron values. The maximum contaminant level for lead of 50 ug/L was exceeded by 9 percent of the lead values and the maximum contaminant level for mercury of 2.0 ug/L was exceeded by 13 percent of the mercury values. Arsenic, cadmium, and chromium did not exceed maximum contaminant levels. Because the maximum lead and mercury contaminant levels were exceeded, this water may not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from low to medium with 83 percent of the samples having a low salinity hazard. All of the SAR values were equivalent to a low sodium hazard. Phytotoxic effects from boron should not occur.

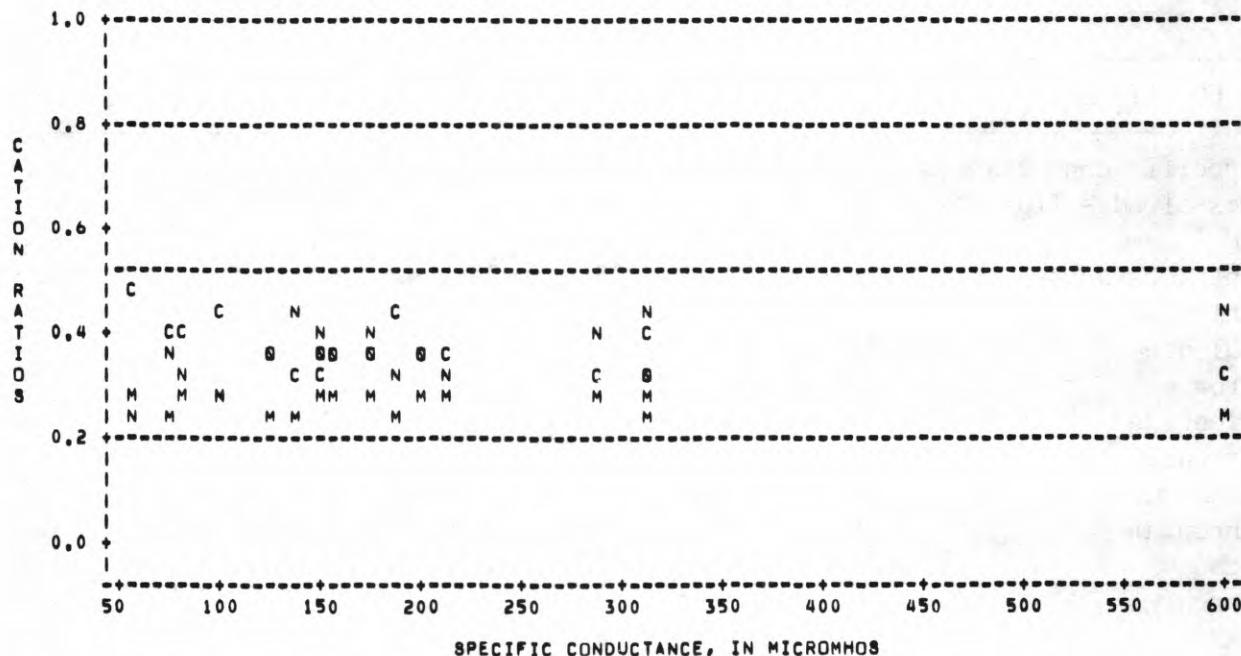
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|-----|-----|------|-------|
| Specific conductance | 29 | 173 | 57 | 600 | 106 | 2.54 | 8.75 |
| Dissolved solids | 21 | 119 | 50 | 359 | 65 | 2.74 | 9.55 |
| pH | 30 | 7.2 | 6.4 | 8.8 | 0.6 | .73 | .47 |
| Total hardness | 21 | 51 | 23 | 140 | 28 | 1.92 | 4.20 |
| Chloride | 21 | 14 | 2.6 | 87 | 18 | 3.76 | 15.48 |
| Sulfate | 21 | 40 | 10 | 110 | 24 | 1.34 | 2.38 |
| Iron | 25 | 157 | 10 | 500 | 125 | 1.31 | 1.66 |
| Fluoride | 21 | 0.1 | 0.1 | 0.2 | 0.1 | .76 | -1.58 |
| Arsenic | 26 | 0 | 0 | 2 | 0.6 | 1.00 | .11 |
| Cadmium | 22 | 1 | 0 | 6 | 1.6 | 2.19 | 4.77 |
| Chromium | 25 | 2 | 0 | 20 | 5.0 | 2.41 | 5.77 |
| Lead | 21 | 10 | 0 | 140 | 30 | 4.38 | 19.65 |
| Mercury | 26 | 1.4 | 0.0 | 25 | 5.2 | 4.23 | 18.58 |
| SAR | 21 | 0.7 | 0.3 | 1.6 | 0.3 | 1.47 | 2.63 |
| Boron | 25 | 40 | 0 | 150 | 27 | 2.92 | 12.27 |

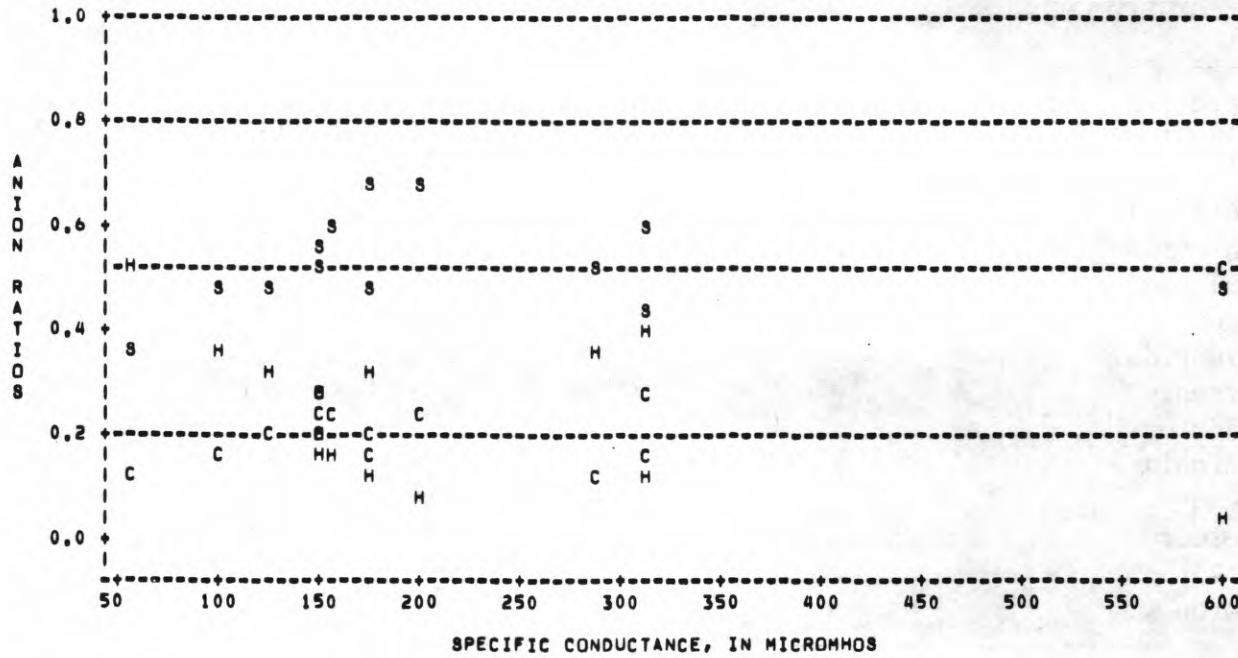
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 74 | 122 | 150 | 192 | 314 |
| Dissolved solids | 64 | 81 | 108 | 132 | 180 |
| pH | 6.5 | 6.8 | 7.2 | 7.8 | 7.9 |
| Total hardness | 24 | 34 | 44 | 62 | 96 |
| Chloride | 3.5 | 5.8 | 9.7 | 12 | 28 |
| Sulfate | 14 | 21 | 37 | 52 | 78 |
| Iron | 20 | 70 | 130 | 215 | 366 |
| Fluoride | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 |
| Arsenic | 0 | 0 | 0 | 1 | 1 |
| Cadmium | 0 | 0 | 0 | 1 | 4 |
| Chromium | 0 | 0 | 0 | 0 | 10 |
| Lead | 0 | 0 | 2 | 5 | 19 |
| Mercury | 0.0 | 0.0 | 0.0 | 0.1 | 4.0 |
| SAR | 0.4 | 0.5 | 0.7 | 0.8 | 1.3 |
| Boron | 16 | 30 | 40 | 45 | 60 |

CATION RATIO PLOT
N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=MATHULDY CREEK NR CROWDER, OK



ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=MATHULDY CREEK NR CROWDER, OK



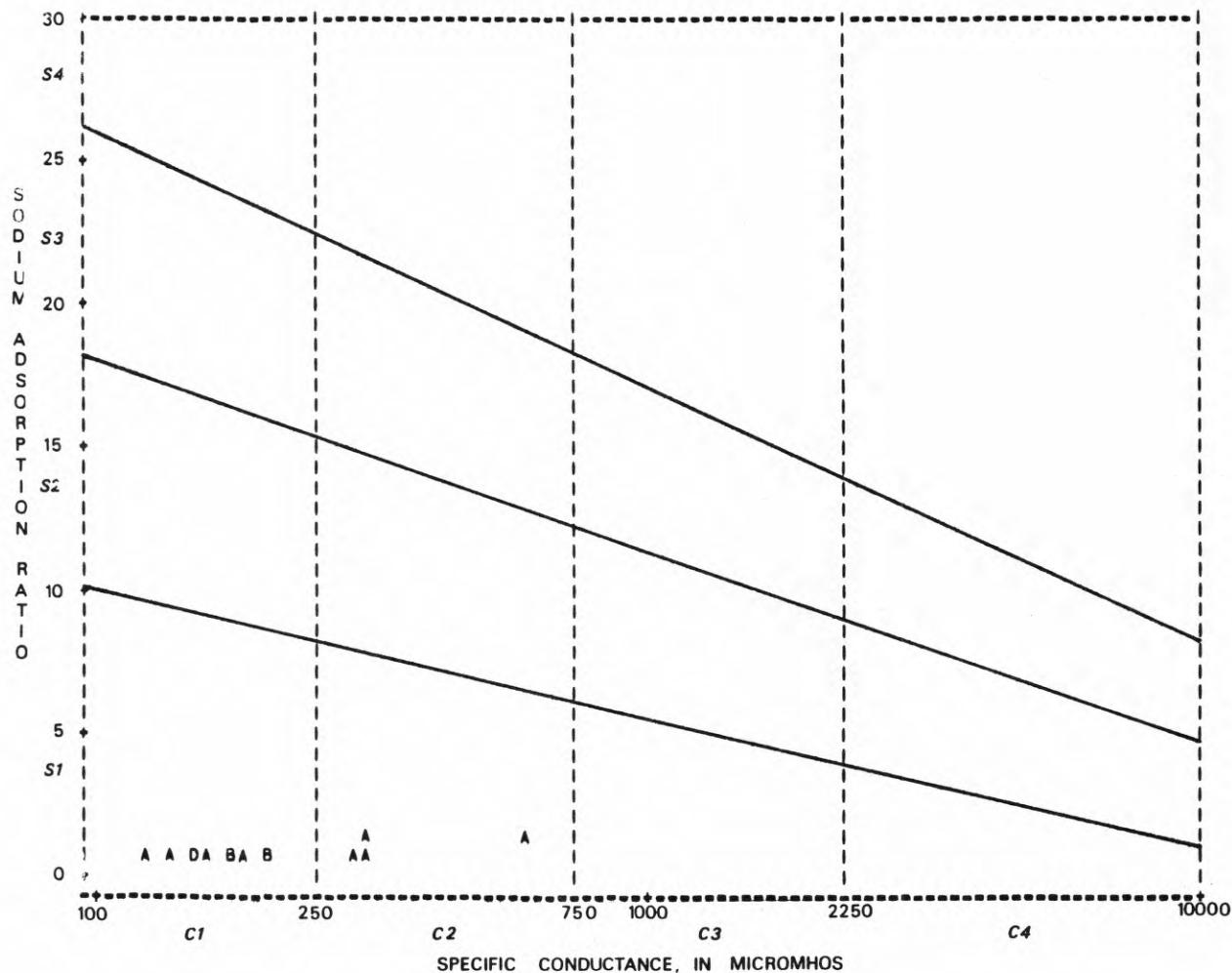
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=MATHULDY CREEK NR CROWDER, OK



CANADIAN RIVER BASIN

07231990 - Peaceable Creek near Haileyville, Okla.

LOCATION.--Lat $34^{\circ}51'07''$, long $95^{\circ}39'15''$, on east edge NE $\frac{1}{4}$ sec. 6, T.4 N., R.16 E., Pittsburg County, at county road bridge, 3.3 mi south of Bache, 5 mi west of Haileyville, and at mile 5.7.

DRAINAGE AREA.--134 mi².

PERIOD OF RECORD.--1978 to 1979.

WATER TYPE.--The water was bicarbonate type throughout the range of measured specific conductance. The cations were mixed type for all samples.

TREND.--The period of record is insufficient, less than 5 years, to perform trend analyses.

PUBLIC WATER SUPPLY.--Sixty-six percent of the hardness values were less than 60 mg/L and the average concentration was 52 mg/L. In general, the hardness classification for this water is soft. The recommended maximum iron concentration of 300 ug/L was exceeded by 14 percent of the iron values. The maximum cadmium contaminant level of 10 ug/L was exceeded by 26 percent of the cadmium values and the maximum lead contaminant level of 50 ug/L was exceeded by 24 percent of the lead values. Arsenic, chromium, and mercury did not exceed maximum contaminant levels. Because the maximum cadmium and lead contaminant levels were exceeded, this water probably would not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from low to high with 96 percent of the samples having a low salinity hazard. All of the SAR values were equivalent to a low sodium hazard. Phytotoxic effects from boron should not occur.

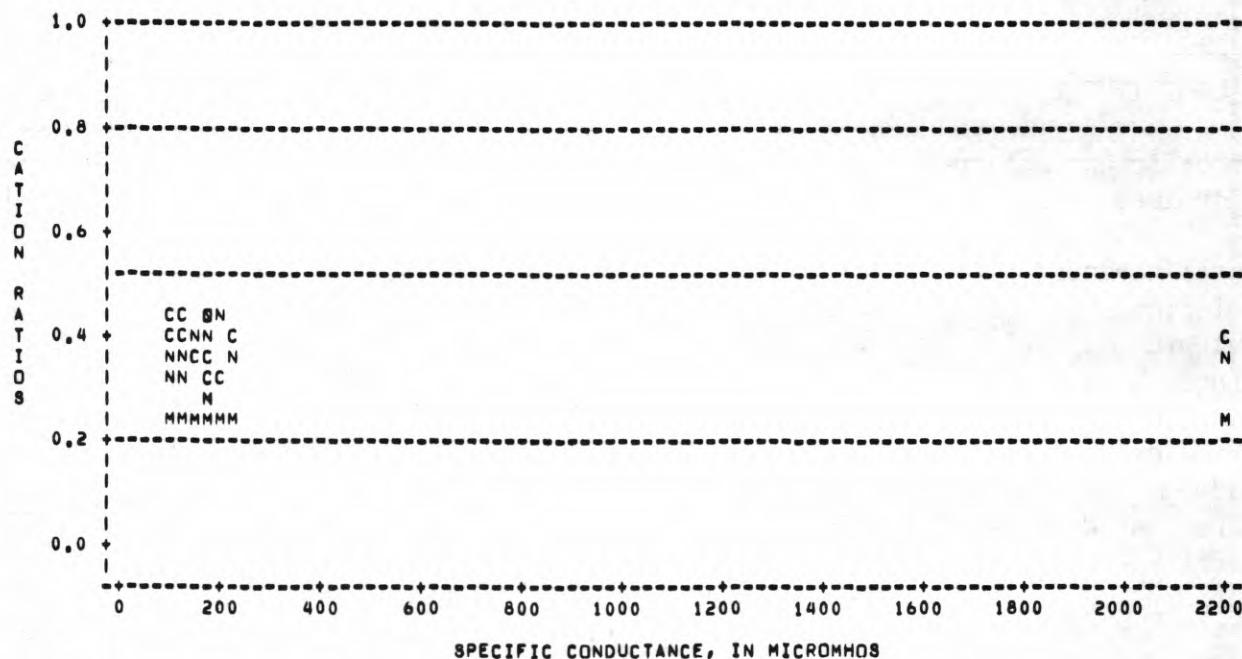
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|------|-----|------|-------|
| Specific conductance | 21 | 261 | 92 | 2200 | 446 | 4.52 | 20.60 |
| Dissolved solids | 12 | 108 | 72 | 138 | 20 | -.67 | -.40 |
| pH | 21 | 7.2 | 7.0 | 7.8 | 0.2 | 1.21 | .75 |
| Total hardness | 13 | 52 | 28 | 68 | 13 | -.29 | -.75 |
| Chloride | 12 | 11 | 5.5 | 20 | 4.2 | .74 | .47 |
| Sulfate | 12 | 18 | 10 | 30 | 6.2 | .72 | -.41 |
| Iron | 12 | 192 | 10 | 430 | 116 | .18 | .70 |
| Fluoride | 12 | 0.2 | 0.1 | 0.3 | 0.1 | .74 | -.19 |
| Arsenic | 18 | 1 | 0 | 2 | 0.5 | .32 | .92 |
| Cadmium | 15 | 7 | 0 | 32 | 8.2 | 2.35 | 6.36 |
| Chromium | 18 | 5 | 0 | 20 | 6.1 | 1.08 | .44 |
| Lead | 18 | 55 | 0 | 350 | 98 | 2.34 | 4.92 |
| Mercury | 19 | 0.0 | 0.0 | 0.3 | 0.1 | 2.16 | 3.82 |
| SAR | 13 | 0.7 | 0.4 | 1.0 | 0.2 | -.23 | -.99 |
| Boron | 13 | 52 | 30 | 70 | 13 | .23 | -.74 |

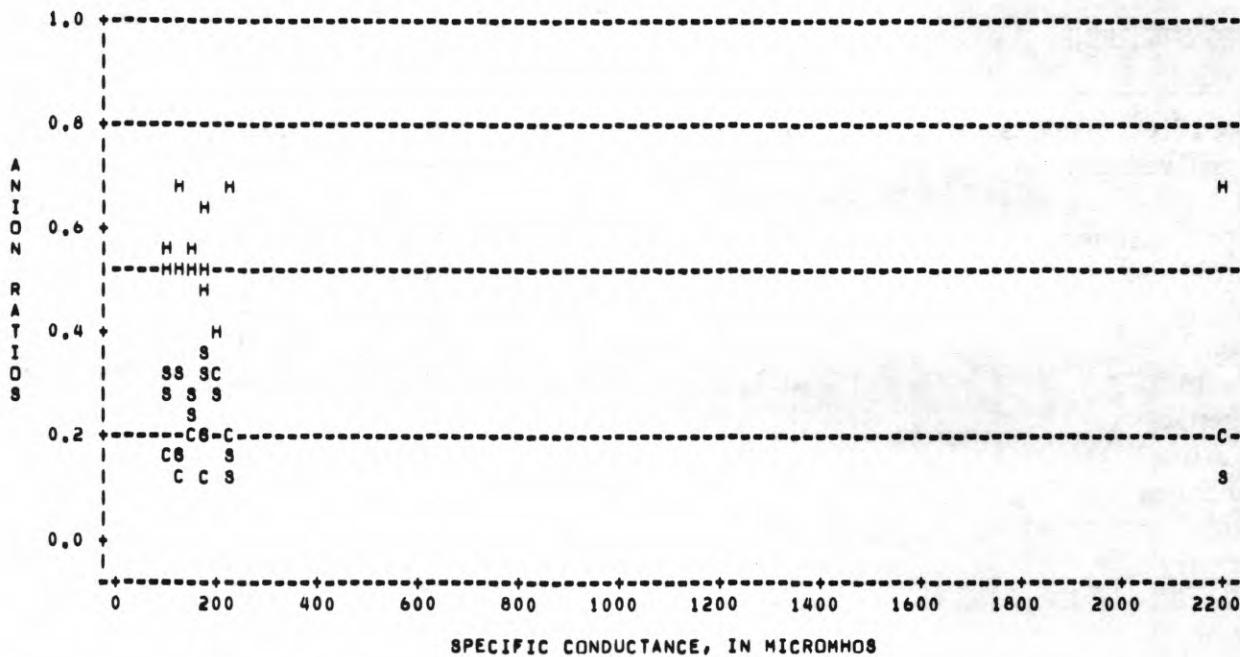
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 99 | 130 | 170 | 210 | 220 |
| Dissolved solids | 74 | 89 | 114 | 120 | 135 |
| pH | 7.0 | 7.1 | 7.2 | 7.4 | 7.7 |
| Total hardness | 32 | 42 | 51 | 65 | 68 |
| Chloride | 5.7 | 7.7 | 10 | 14 | 18 |
| Sulfate | 11 | 13 | 17 | 24 | 28 |
| Iron | 13 | 108 | 210 | 260 | 382 |
| Fluoride | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 |
| Arsenic | 1 | 1 | 1 | 1 | 2 |
| Cadmium | 1 | 2 | 3 | 11 | 21 |
| Chromium | 0 | 0 | 0 | 10 | 11 |
| Lead | 0 | 0 | 18 | 46 | 269 |
| Mercury | 0.0 | 0.0 | 0.0 | 0.1 | 0.3 |
| SAR | 0.4 | 0.5 | 0.7 | 0.8 | 1.0 |
| Boron | 34 | 40 | 50 | 65 | 70 |

CATION RATIO PLOT
N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=PEACEABLE CREEK NR HAILEYVILLE OK



ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=PEACEABLE CREEK NR HAILEYVILLE OK



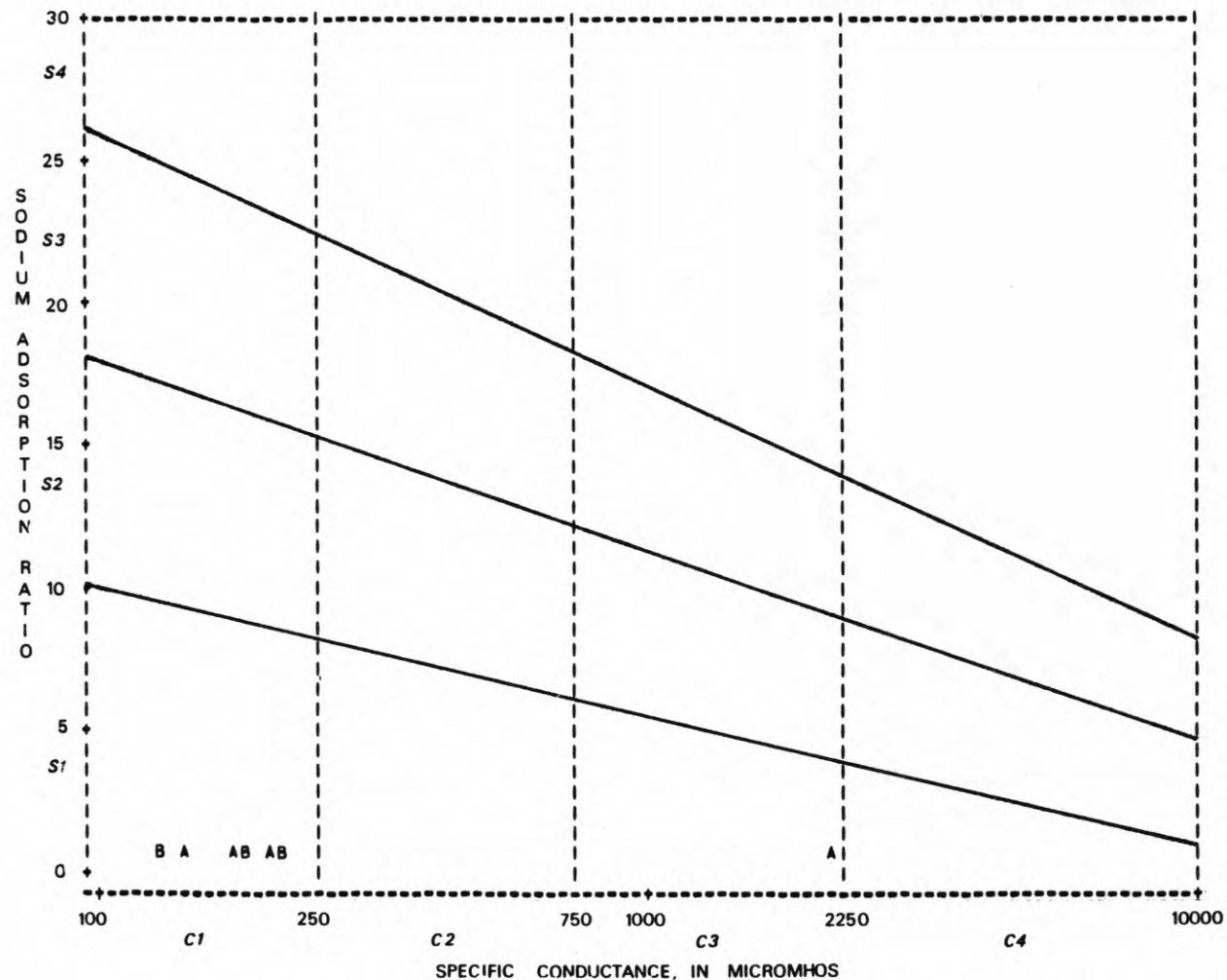
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=PEACEABLE CREEK NR HAILEYVILLE OK



CANADIAN RIVER BASIN

07230800 - Salt Creek near Dewright, Okla.

LOCATION.--Lat $35^{\circ}02'52''$, long $96^{\circ}40'10''$, in NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 27, T.7 N., R.6 E., Seminole County, at bridge on State Highway 99, 2.3 mi south of Dewright, 8 mi northeast of Konawa, and at mile 7.3.

DRAINAGE AREA.--210 mi².

PERIOD OF RECORD.--1952 to 1963.

WATER TYPE.--The water was sodium chloride type throughout the range of measured specific conductance.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--Ninety-eight percent of the hardness values were greater than 180 mg/L and the average concentration was 848 mg/L. The hardness classification for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 93 percent of the chloride values. No toxic metal data are available. Because of the frequency and magnitude by which the recommended maximum chloride concentration was exceeded, this water would not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from medium to very high with 66 percent of the samples having a very high salinity hazard. The sodium hazard ranged from low to very high with about 60 percent of the SAR values equivalent to a very high sodium hazard. The data indicate that phytotoxic effects from boron could occur even in tolerant plants.

07230800 - Salt Creek near Dewright, Okla.--Continued

UNIVARIATE STATISTICS

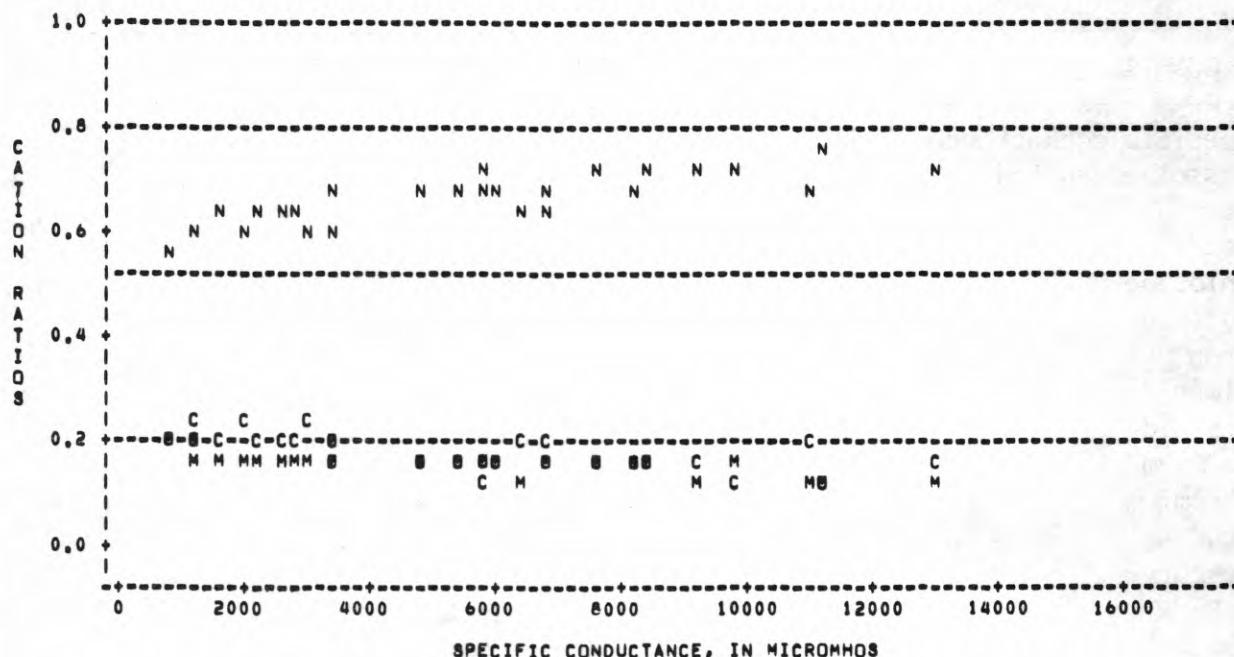
| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|-------|------|------|-------|
| Specific conductance | 76 | 5721 | 749 | 13000 | 3071 | 0.27 | -0.82 |
| Dissolved solids | 75 | 3503 | 441 | 8340 | 1940 | .34 | -.69 |
| pH | 76 | 8.0 | 7.4 | 8.6 | 0.2 | -.36 | -.12 |
| Total hardness | 76 | 848 | 148 | 1790 | 407 | .21 | -.79 |
| Chloride | 76 | 1848 | 171 | 4600 | 1089 | .38 | -.71 |
| Sulfate | 75 | 39 | 9.1 | 72 | 17 | -.07 | -1.04 |
| Iron | 0 | | | | | | |
| Fluoride | 10 | 0.2 | 0.0 | 0.5 | 0.2 | -.09 | -1.39 |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 75 | 12 | 3.3 | 23 | 5.1 | .04 | -.95 |
| Boron | 9 | 533 | 140 | 2200 | | | |

FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|-------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 1604 | 3100 | 5720 | 8060 | 10290 |
| Dissolved solids | 957 | 1840 | 3460 | 5010 | 6290 |
| pH | 7.7 | 7.9 | 8.0 | 8.3 | 8.4 |
| Total hardness | 264 | 531 | 805 | 1190 | 1413 |
| Chloride | 437 | 915 | 1810 | 2638 | 3483 |
| Sulfate | 14 | 25 | 41 | 53 | 61 |
| Iron | | | | | |
| Fluoride | 0.0 | 0.0 | 0.3 | 0.3 | 0.5 |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 5.7 | 7.8 | 13 | 16 | 19 |
| Boron | | | | | |

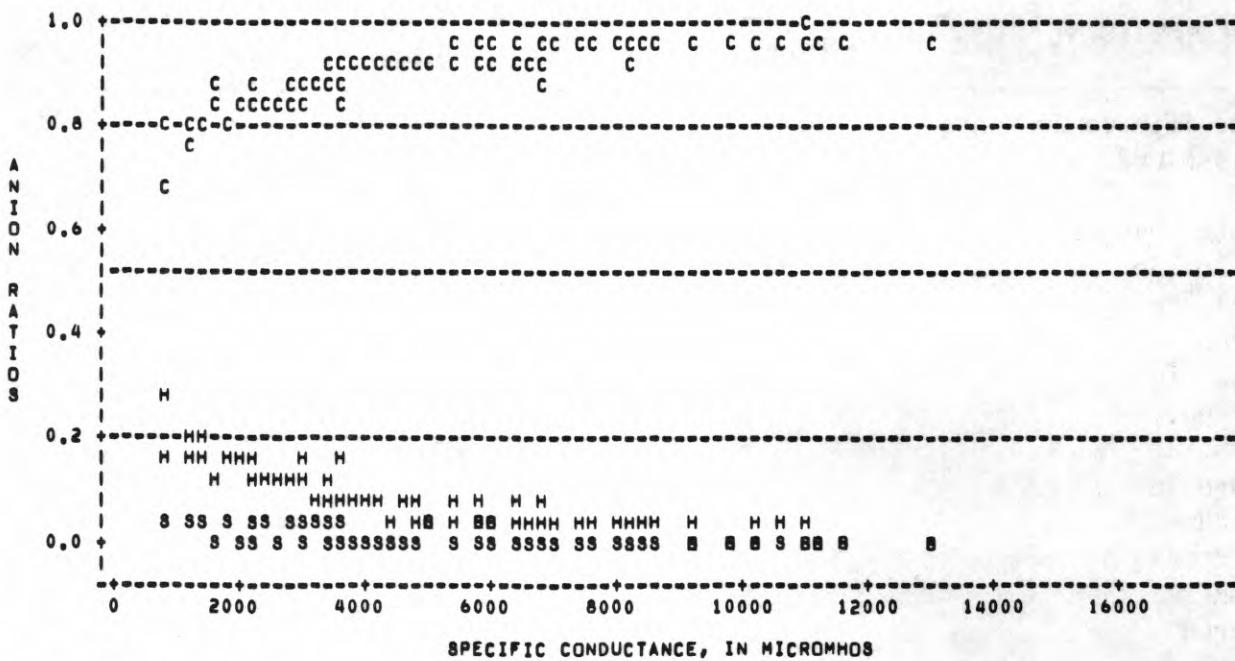
CATION RATIO PLOT

N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=SALT CREEK NR DEWRIGHT, OK



ANION RATIO PLOT

H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=SALT CREEK NR DEWRIGHT, OK



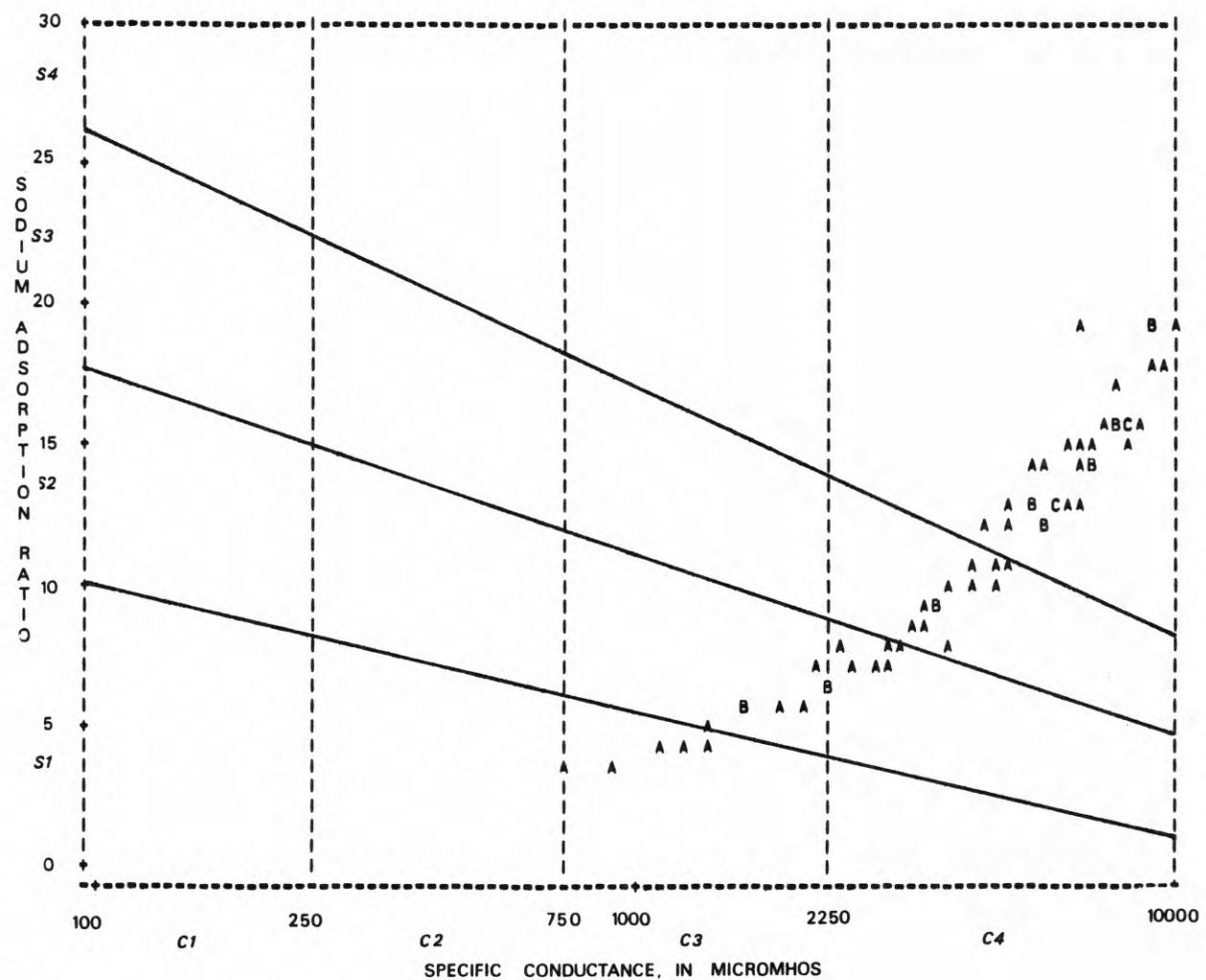
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=SALT CREEK NR DEWRIGHT, OK



CANADIAN RIVER BASIN

07245020 - Taloka Creek at Stigler, Okla.

LOCATION.--Lat $35^{\circ}16'09''$, long $95^{\circ}05'49''$, in SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 9, T.9 N., R.21 E., Haskell County, at county road bridge, 0.6 mi north of State Highway 9, 1.6 mi northeast of Stigler, and at mile 14.0.

DRAINAGE AREA.--3.98 mi².

PERIOD OF RECORD.--1979.

WATER TYPE.--The cations were mixed type throughout the range of measured specific conductance. No anion distribution data were available.

TREND.--The period of record is insufficient, less than 5 years, to perform trend analyses.

PUBLIC WATER SUPPLY.--All of the hardness values were less than 60 mg/L and the average concentration was 26 mg/L. The hardness classification for this water is soft. The recommended maximum iron concentration of 300 ug/L was exceeded by 15 percent of the iron values. The maximum lead contaminant level of 50 ug/L was exceeded by 1 of 7 lead values and the maximum mercury contaminant level of 2.0 ug/L was exceeded by 1 of 13 mercury values. Arsenic, cadmium, and chromium did not exceed maximum contaminant levels. Because the maximum lead and mercury contaminant levels were exceeded, this water may not be suitable for use as a public supply.

IRRIGATION.--The salinity and sodium hazards were low for all available data. Phytotoxic effects from boron should not occur.

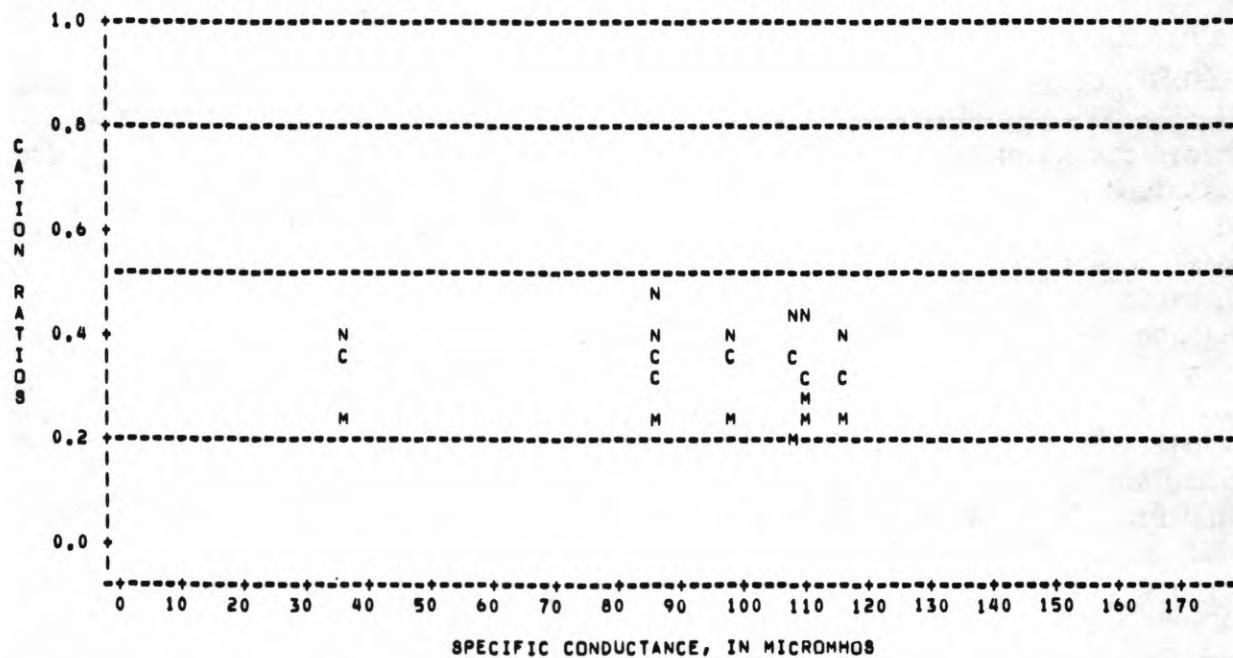
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|-----|-----|------|-------|
| Specific conductance | 14 | 100 | 36 | 166 | 29 | 0.10 | 2.67 |
| Dissolved solids | 8 | 64 | 34 | 77 | | | |
| pH | 14 | 7.2 | 6.4 | 8.2 | 0.4 | .35 | 1.84 |
| Total hardness | 8 | 26 | 11 | 34 | | | |
| Chloride | 8 | 11 | 3.1 | 18 | | | |
| Sulfate | 8 | 11 | 7.6 | 16 | | | |
| Iron | 13 | 160 | 40 | 360 | 105 | 1.11 | .26 |
| Fluoride | 8 | 0.1 | 0.0 | 0.1 | | | |
| Arsenic | 13 | 0 | 0 | 1 | 0.4 | 1.45 | .09 |
| Cadmium | 8 | 1 | 0 | 7 | | | |
| Chromium | 13 | 1 | 0 | 10 | 2.8 | 3.61 | 13.00 |
| Lead | 7 | 14 | 0 | 96 | | | |
| Mercury | 13 | 3.3 | 0.0 | 29 | 8.1 | 3.09 | 9.92 |
| SAR | 8 | 0.6 | 0.3 | 0.8 | | | |
| Boron | 13 | 25 | 10 | 40 | 11 | .11 | -1.28 |

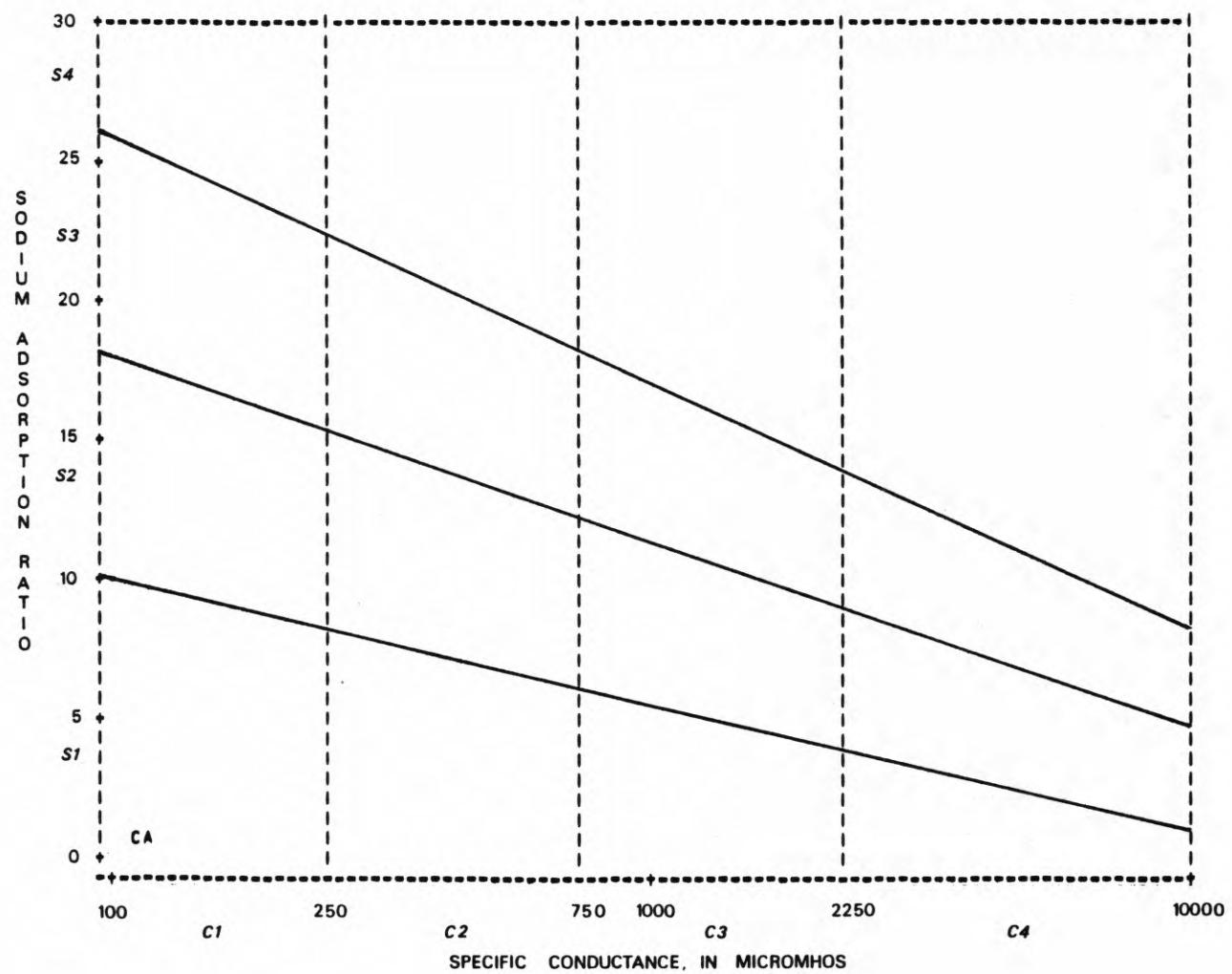
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 58 | 86 | 102 | 111 | 146 |
| Dissolved solids | | | | | |
| pH | 6.5 | 7.0 | 7.2 | 7.4 | 7.9 |
| Total hardness | | | | | |
| Chloride | | | | | |
| Sulfate | | | | | |
| Iron | 52 | 80 | 120 | 215 | 360 |
| Fluoride | | | | | |
| Arsenic | 0 | 0 | 0 | 0 | 1 |
| Cadmium | | | | | |
| Chromium | 0 | 0 | 0 | 0 | 6 |
| Lead | | | | | |
| Mercury | 0.0 | 0.0 | 0.1 | 2.3 | 21 |
| SAR | | | | | |
| Boron | 10 | 15 | 20 | 35 | 40 |

CATION RATIO PLOT
N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=TALOKA CREEK AT STIGLER OK



IRRIGATION DIAGRAM
C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
A = 1 OBS, B = 2 OBS, C = 3 OBS
STATION NAME OR LOCAL IDENTIFIER=TALOKA CREEK AT STIGLER OK



CANADIAN RIVER BASIN

07245030 - Taloka Creek near Stigler, Okla.

LOCATION.--Lat $35^{\circ}17'46''$, long $95^{\circ}07'56''$, in NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 36, T.10 N., R.20 E., Haskell County, at county road bridge, 2.4 mi north on county road at west edge of Stigler, and at mile 9.6.

DRAINAGE AREA.--20.1 mi².

PERIOD OF RECORD.--1979.

WATER TYPE.--The water was sodium type throughout the range of measured specific conductance. No anion distribution data are available.

TREND.--The period of record is insufficient, less than 5 years, to perform trend analysis.

PUBLIC WATER SUPPLY.--Forty-eight percent of the hardness values were greater than 180 mg/L and the average hardness concentration was 208 mg/L. The hardness classification for this water varies between hard and very hard. The recommended maximum sulfate concentration of 250 mg/L was exceeded by 63 percent of the sulfate values and the recommended maximum iron concentration of 300 ug/L was exceeded by 8 percent of the iron values. The maximum lead contaminant level of 50 ug/L was exceeded by 7 percent of the lead values and the maximum mercury contaminant level of 2.0 ug/L was exceeded by 5 percent of the mercury values. Because of the frequency and magnitude by which the recommended maximum sulfate concentration was exceeded and because the maximum lead and mercury contaminant levels were exceeded, this water would not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from low to very high with 55 percent of the samples having a very high salinity hazard. The sodium hazard ranged from low to very high with 38 percent of the SAR values equivalent to a very high sodium hazard. Phytotoxic effects could occur in boron sensitive plants. The limit for boron sensitive plants of 750 ug/L was exceeded by 6 percent of the boron values.

UNIVARIATE STATISTICS

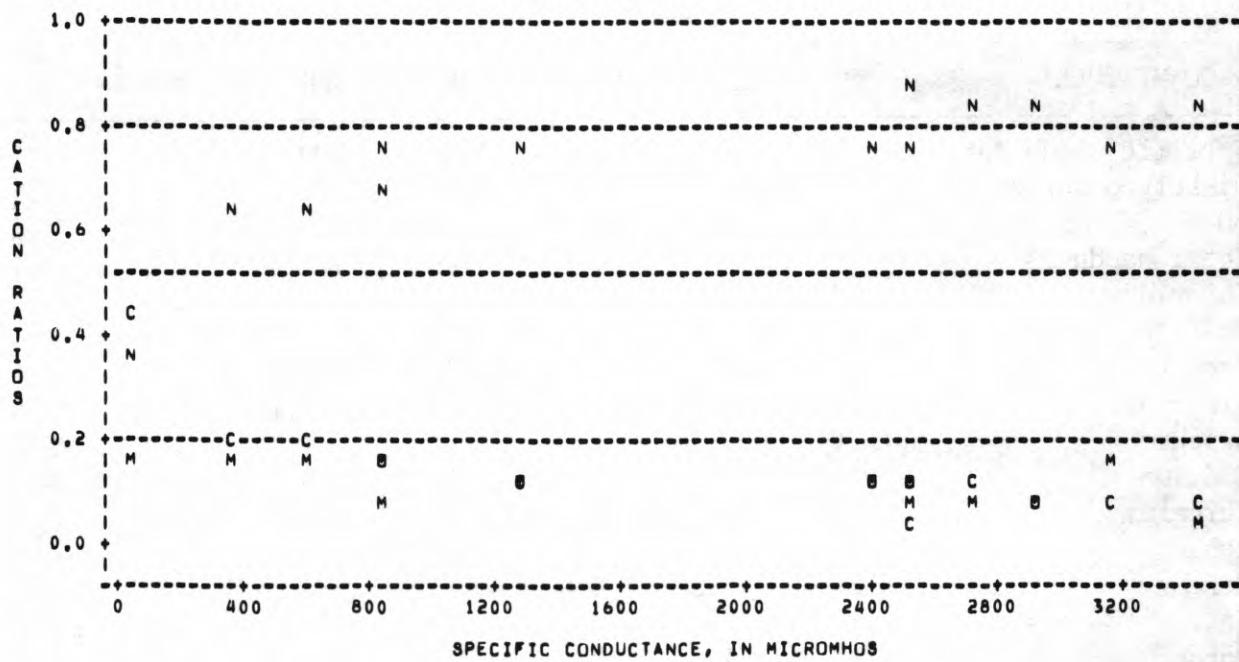
| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|------|------|-------|-------|
| Specific conductance | 22 | 1605 | 58 | 3140 | 1109 | -0.05 | -1.72 |
| Dissolved solids | 13 | 1241 | 57 | 2340 | 831 | -.11 | -1.74 |
| pH | 22 | 8.2 | 6.8 | 8.6 | 0.5 | -1.20 | .56 |
| Total hardness | 13 | 208 | 20 | 440 | 131 | .31 | -1.13 |
| Chloride | 13 | 18 | 3.8 | 29 | 7.1 | -.15 | -.27 |
| Sulfate | 13 | 542 | 11 | 1200 | 406 | .21 | -1.41 |
| Iron | 20 | 104 | 10 | 370 | 105 | 1.31 | .67 |
| Fluoride | 13 | 0.2 | 0.1 | 0.4 | 0.1 | .21 | -.55 |
| Arsenic | 20 | 2 | 0 | 6 | 1.6 | 2.01 | 3.77 |
| Cadmium | 16 | 1 | 0 | 10 | 3.4 | 2.46 | 4.74 |
| Chromium | 20 | 5 | 0 | 20 | 6.9 | 1.08 | .08 |
| Lead | 15 | 40 | 0 | 300 | 91 | 2.31 | 4.66 |
| Mercury | 20 | 3.3 | 0.0 | 53 | 12 | 4.35 | 19.22 |
| SAR | 13 | 10 | 0.4 | 19 | 6.3 | -.02 | -1.47 |
| Boron | 18 | 351 | 40 | 770 | 256 | .17 | -1.73 |

FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 134 | 525 | 1710 | 2550 | 3014 |
| Dissolved solids | 131 | 440 | 1670 | 1910 | 2336 |
| pH | 6.9 | 7.6 | 8.2 | 8.2 | 8.4 |
| Total hardness | 37 | 102 | 150 | 330 | 408 |
| Chloride | 6.3 | 12 | 17 | 23 | 28 |
| Sulfate | 45 | 150 | 570 | 860 | 1160 |
| Iron | 20 | 32 | 50 | 185 | 268 |
| Fluoride | 0.1 | 0.2 | 0.2 | 0.3 | 0.4 |
| Arsenic | 0 | 1 | 1 | 2 | 6 |
| Cadmium | 0 | 0 | 0 | 1 | 10 |
| Chromium | 0 | 0 | 0 | 10 | 19 |
| Lead | 0 | 0 | 0 | 0 | 240 |
| Mercury | 0.0 | 0.0 | 0.1 | 0.6 | 5.9 |
| SAR | 1.4 | 4.2 | 11 | 16 | 19 |
| Boron | 67 | 90 | 325 | 620 | 662 |

CATION RATIO PLOT

N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=TALOKA CREEK NEAR STIGLER OK



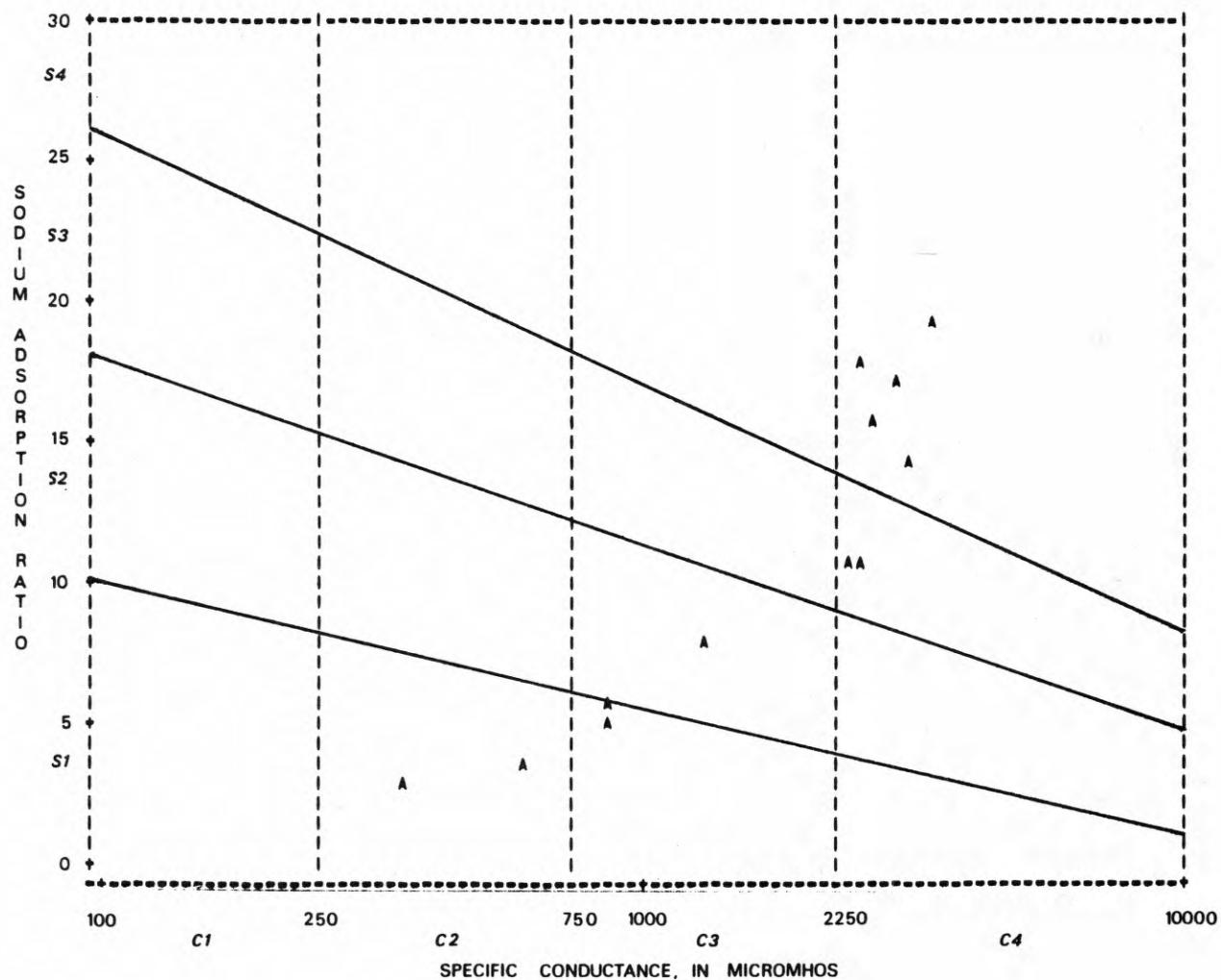
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C1 AND C2 ARE LOW HAZARD, C3 AND C4 ARE MEDIUM HAZARD
C5 AND C6 ARE HIGH HAZARD, C7 AND C8 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=TALOKA CREEK NEAR STIGLER OK



CANADIAN RIVER BASIN

07229300 - Walnut Creek at Purcell, Okla.

LOCATION.--Lat $34^{\circ}59'56''$, long $97^{\circ}22'00''$, in NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 13, T.6 N., R.2 W., McClain County, at bridge on U.S. Highway 77, at south edge of Purcell, and at mile 1.0.

DRAINAGE AREA.--202 mi².

PERIOD OF RECORD.--1960, 1976 to 1977.

WATER TYPE.--For specific conductance greater than 480 umho, 91 percent of the samples, the water was magnesium carbonate/bicarbonate type. For specific conductance less than 480 umho, the water was mixed cation type. No anion distribution data are available for specific conductance less than 480 umho.

TREND.--The period of record is insufficient, less than 5 years, to perform trend analyses.

PUBLIC WATER SUPPLY.--Ninety-four percent of the hardness values were greater than 180 mg/L and the average concentration was 315 mg/L. The hardness classification for this water is very hard. The recommended maximum pH of 9.0 was exceeded by 4 percent of the pH values. No toxic metal data are available. Based on the data, this water probably is suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from medium to high with 65 percent of the samples having a medium salinity hazard. All of the SAR values were equivalent to a low sodium hazard. The boron data are not adequate to determine whether phytotoxic effects could occur.

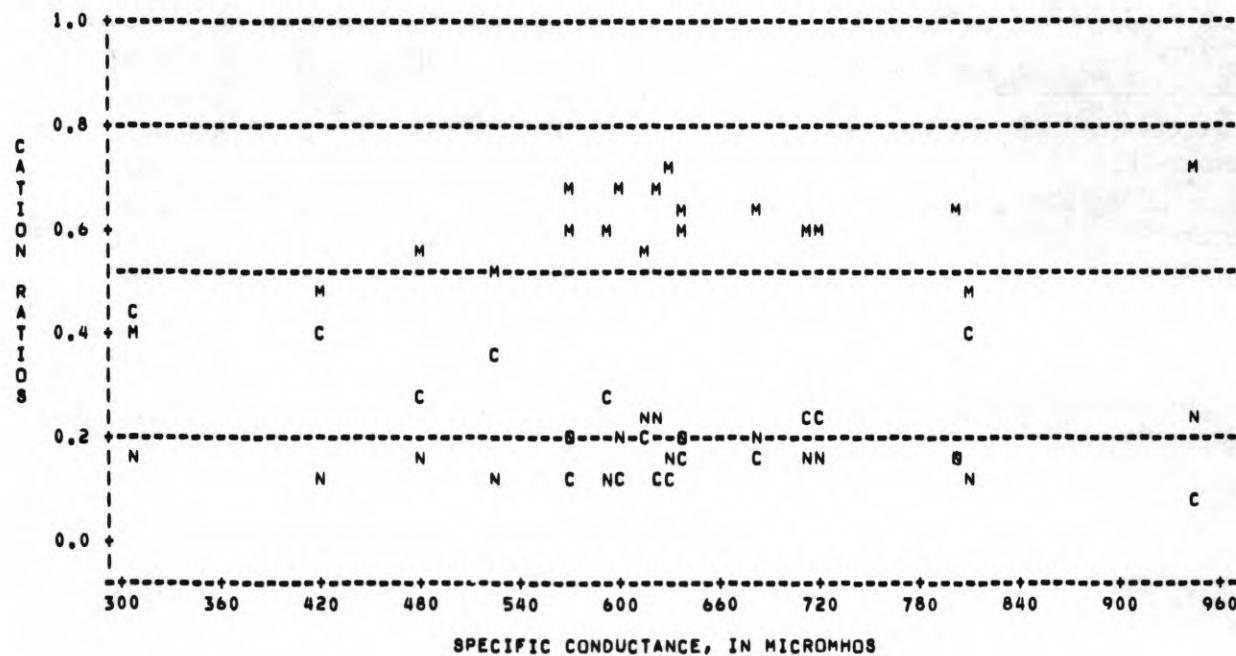
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|-----|-----|-------|------|
| Specific conductance | 53 | 681 | 311 | 947 | 139 | -0.39 | 0.19 |
| Dissolved solids | 20 | 355 | 265 | 422 | 48 | -.28 | -.92 |
| pH | 48 | 8.4 | 7.1 | 9.4 | 0.4 | -.62 | 3.36 |
| Total hardness | 51 | 315 | 136 | 482 | 78 | .02 | -.20 |
| Chloride | 51 | 31 | 9.2 | 86 | 18 | 1.01 | .62 |
| Sulfate | 29 | 37 | 18 | 61 | 9.0 | -.13 | 1.15 |
| Iron | 0 | | | | | | |
| Fluoride | 2 | 0.5 | 0.4 | 0.5 | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 26 | 0.8 | 0.4 | 1.3 | 0.2 | 0.45 | 0.23 |
| Boron | 1 | 170 | | | | | |

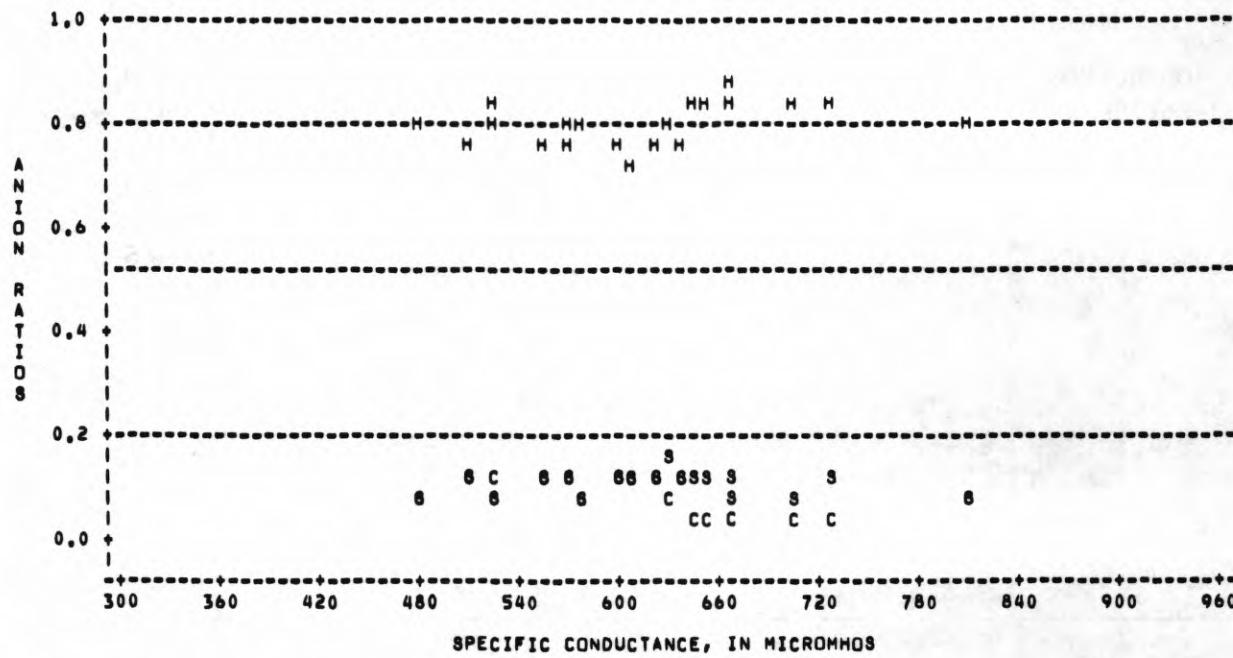
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 514 | 596 | 670 | 800 | 869 |
| Dissolved solids | 287 | 316 | 356 | 402 | 420 |
| pH | 8.0 | 8.2 | 8.4 | 8.7 | 8.8 |
| Total hardness | 215 | 264 | 310 | 361 | 429 |
| Chloride | 12 | 16 | 26 | 42 | 57 |
| Sulfate | 22 | 32 | 39 | 42 | 45 |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 0.5 | 0.6 | 0.8 | 0.9 | 1.0 |
| Boron | | | | | |

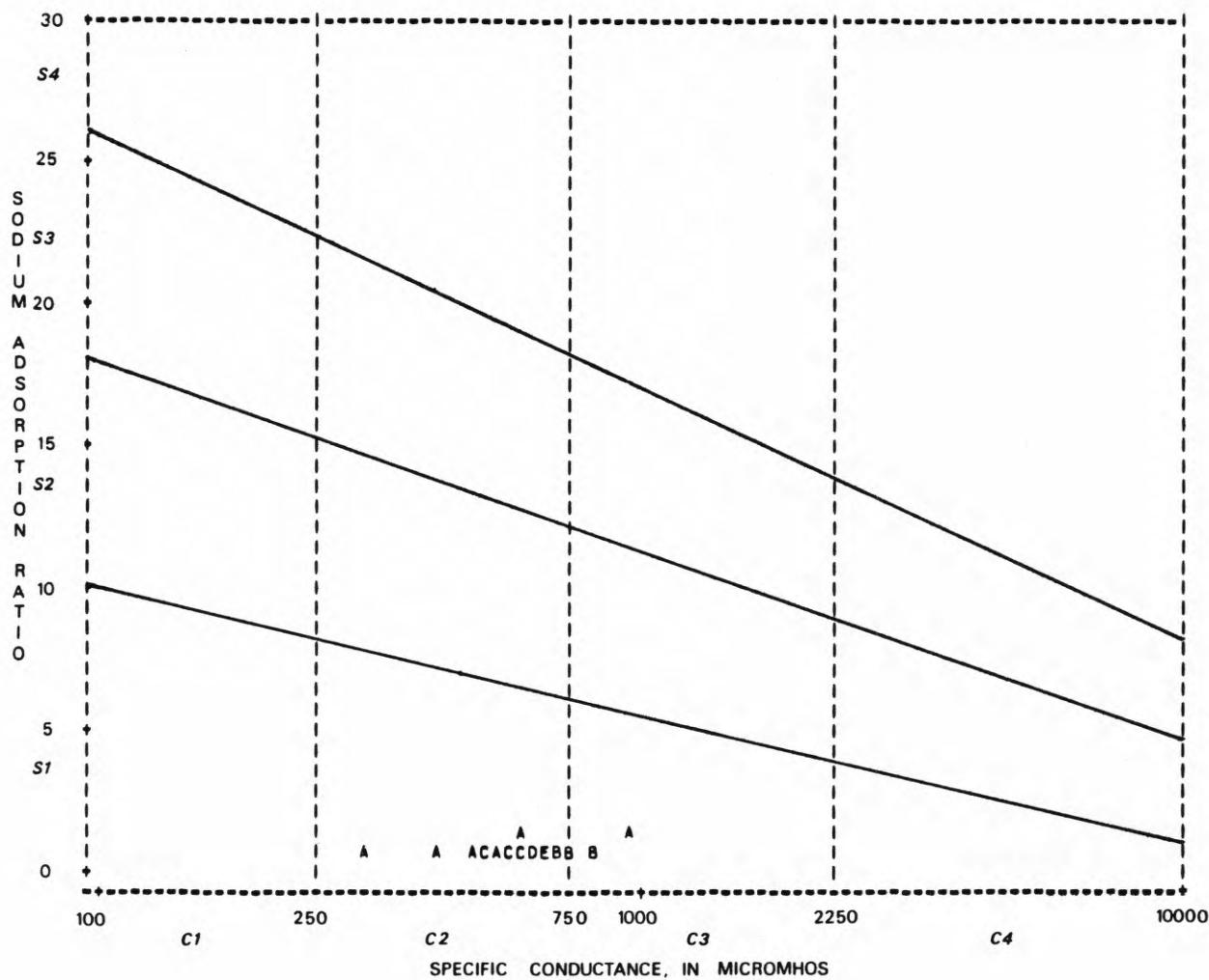
CATION RATIO PLOT
 N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=WALNUT CREEK AT PURCELL, OK



ANION RATIO PLOT
 H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=WALNUT CREEK AT PURCELL, OK



INMIGRATION DIAGRAM
 C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
 C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
 A = 1 OBS, B = 2 OBS, C = 3 OBS
 STATION NAME OR LOCAL IDENTIFIER=WALNUT CREEK AT PURCELL, OK



NORTH CANADIAN RIVER BASIN

07232500 - Beaver River near Guymon, Okla.

LOCATION.--Lat $36^{\circ}43'24''$, long $101^{\circ}29'30''$, in NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 18, T.3 N., R.15 E., Texas County, at bridge on U.S. Highway 64 at Dry Sand Draw, 1.2 mi upstream from Goff Creek, 2.5 mi north of Guymon, and at mile 650.7.

DRAINAGE AREA.--2,139 mi², includes that of Dry Sand Draw, of which 964 mi² is probably noncontributing.

PERIOD OF RECORD.--1952, 1954 to 1963, 1968 to 1979.

WATER TYPE.--For specific conductance less than 500 umho, 30 percent of the samples, the water was calcium carbonate/bicarbonate type. For specific conductance greater than 500 umho, the data are inadequate to determine the relationship of water type to specific conductance. The data indicate, however, that as specific conductance increases the water may become sodium chloride type and with still further increase of specific conductance the water may again become calcium carbonate/bicarbonate type.

TREND.--Plots of the dissolved solids, hardness, chloride, and sulfate concentrations versus time do not indicate any trends. The Spearman's rhos for these constituents at the 95-percent probability level also do not indicate the presence of any trends.

PUBLIC WATER SUPPLY.--Ninety percent of the hardness values were greater than 180 mg/L and the average concentration was 221 mg/L. The hardness classification for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by less than 1 percent of the chloride values. The maximum fluoride contaminant level for the average annual maximum daily air temperature at this location was exceeded by 1 percent of the fluoride values. Arsenic, cadmium, chromium, lead, and mercury did not exceed their maximum contaminant levels. Based on the data, this water probably is suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from low to very high with 93 percent of the samples having a medium salinity hazard. The sodium hazard ranged from low to medium with more than 99 percent of the SAR values equivalent to a low sodium hazard. One of 66 boron values exceeded the limit for boron sensitive and semitolerant plants.

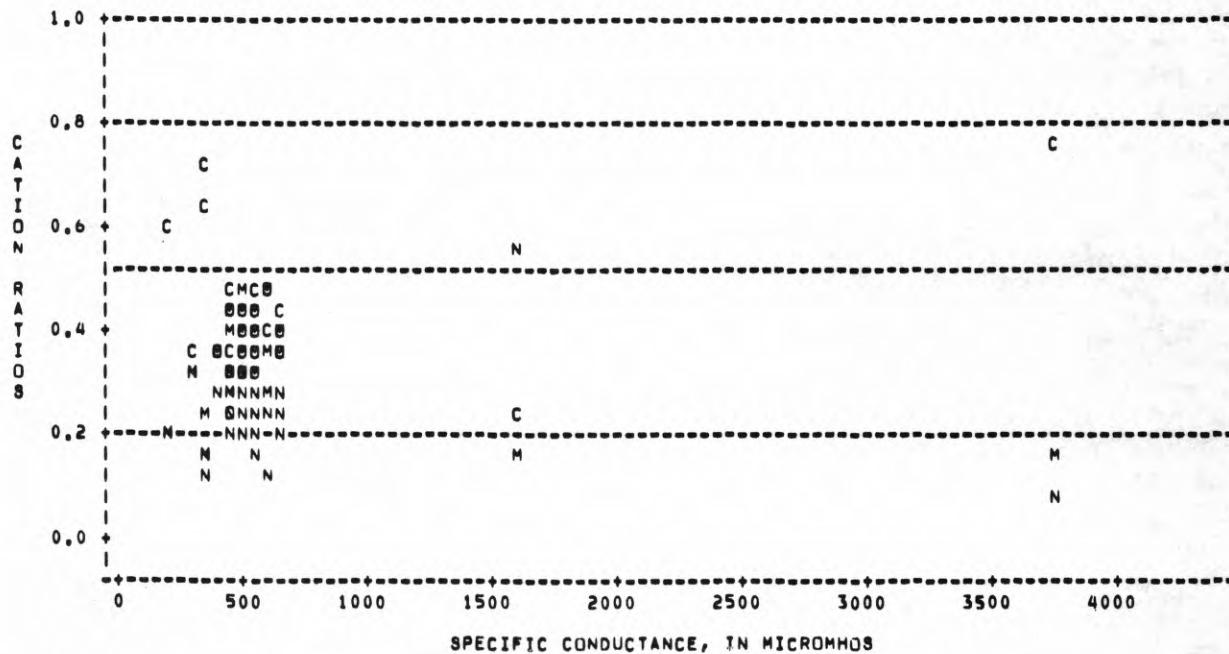
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|-----|------|-----|------|-----|-------|--------|
| Specific conductance | 255 | 553 | 210 | 3800 | 312 | 9.06 | 90.69 |
| Dissolved solids | 214 | 329 | 124 | 937 | 61 | 3.95 | 45.42 |
| pH | 235 | 8.2 | 6.9 | 9.0 | 0.3 | -.93 | 1.92 |
| Total hardness | 218 | 221 | 82 | 330 | 34 | -.76 | 2.54 |
| Chloride | 220 | 16 | 1.5 | 290 | 19 | 13.95 | 202.68 |
| Sulfate | 219 | 52 | 6.5 | 150 | 14 | .48 | 11.14 |
| Iron | 5 | 60 | 10 | 160 | | | |
| Fluoride | 95 | 1.6 | 0.4 | 2.4 | 0.4 | -1.08 | 2.43 |
| Arsenic | 5 | 4 | 2 | 6 | | | |
| Cadmium | 5 | 1 | 0 | 2 | | | |
| Chromium | 5 | 2 | 0 | 10 | | | |
| Lead | 5 | 3 | 2 | 6 | | | |
| Mercury | 5 | 0.0 | 0.0 | 0.1 | | | |
| SAR | 215 | 0.9 | 0.1 | 4.8 | 0.3 | 7.12 | 83.66 |
| Boron | 66 | 295 | 10 | 1900 | 259 | 3.93 | 22.57 |

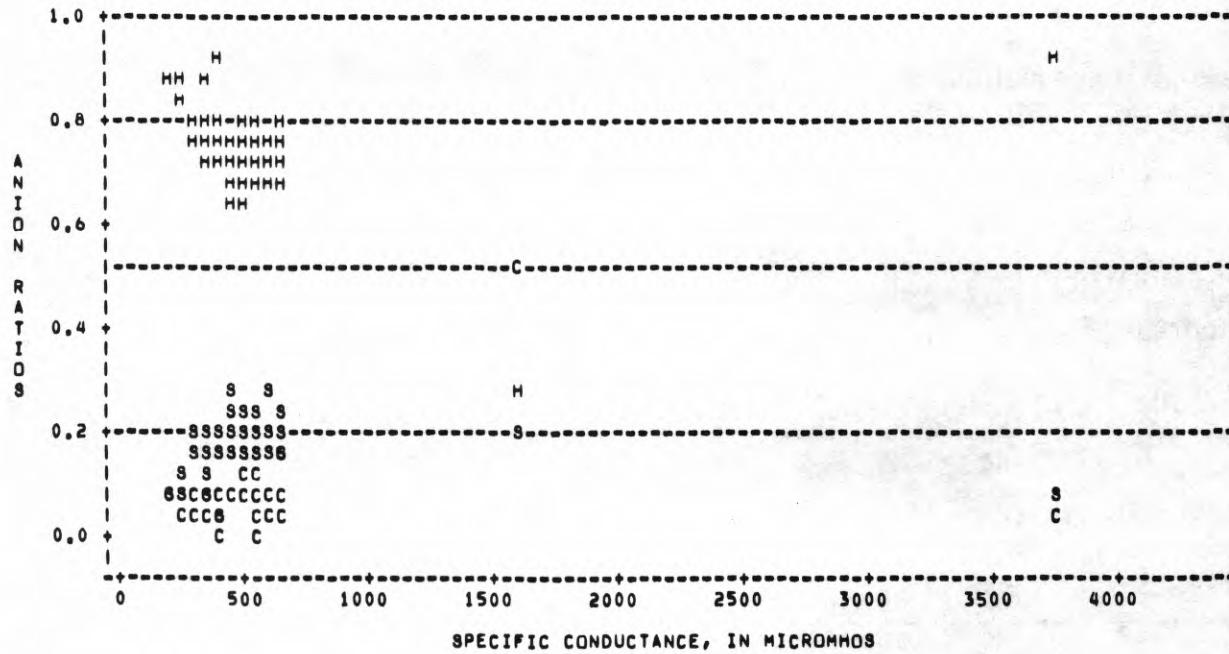
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 433 | 494 | 534 | 558 | 600 |
| Dissolved solids | 279 | 311 | 334 | 348 | 374 |
| pH | 7.8 | 8.0 | 8.2 | 8.4 | 8.5 |
| Total hardness | 180 | 202 | 223 | 240 | 258 |
| Chloride | 9.5 | 13 | 15 | 16 | 18 |
| Sulfate | 40 | 47 | 53 | 59 | 65 |
| Iron | | | | | |
| Fluoride | 1.2 | 1.6 | 1.6 | 1.8 | 2.0 |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 0.7 | 0.8 | 0.9 | 0.9 | 1.1 |
| Boron | 94 | 140 | 250 | 358 | 536 |

CATION RATIO PLOT
N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=BEAVER RIVER NR GUYMON, OK



ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=BEAVER RIVER NR GUYMOR, OK



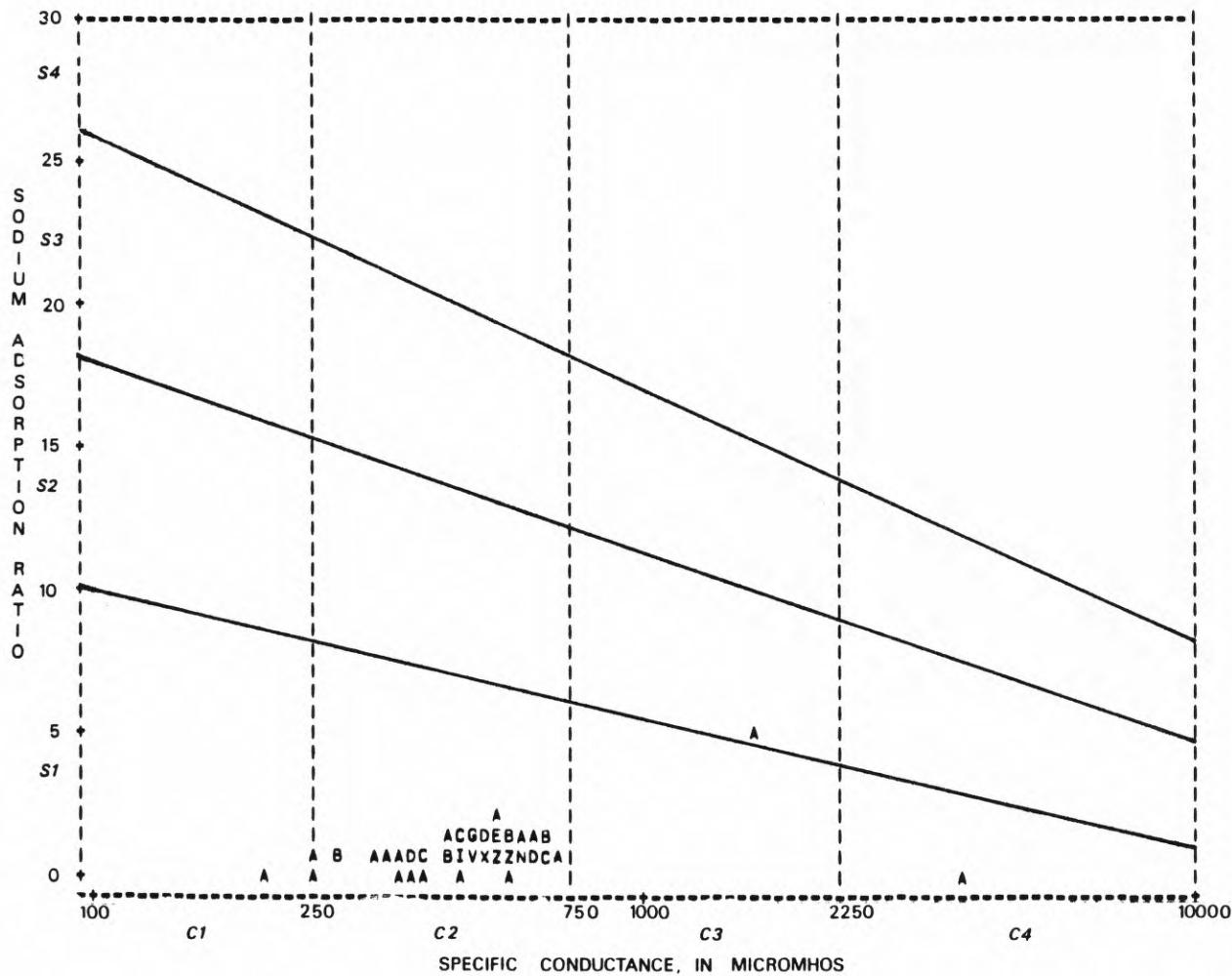
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=BEAVER RIVER NR GUYMON, OK



NORTH CANADIAN RIVER BASIN

07232630 - Beaver River near Hooker, Okla.

LOCATION.--Lat $36^{\circ}41'22''$, long $101^{\circ}12'19''$, in NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 35, T.3 N., R.2 E.,
Texas County, at bridge on State Highway 94, 12 mi south of Hooker, and
at mile 628.6.

DRAINAGE AREA.--3,017 mi², of which 1,488 mi² is probably noncontributing.

PERIOD OF RECORD.--1972 to 1973, 1975 to 1979.

WATER TYPE.--The water was mixed type throughout the range of measured specific conductance. Although no ion was predominant, calcium was the principal cation and carbonate/bicarbonate was the principal anion.

TREND.--The data collected over the period of record are inadequate to perform trend analyses.

PUBLIC WATER SUPPLY.--Eighty-eight percent of the hardness values were greater than 180 mg/L and the average concentration was 277 mg/L. In general, the hardness classification for this water is very hard. None of the measured constituents exceeded their recommended maximum limits. No toxic metal data are available. Based on the data, this water should be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from medium to high with 65 percent of the samples having a high salinity hazard. All of the SAR values were equivalent to a low sodium hazard. No boron data are available.

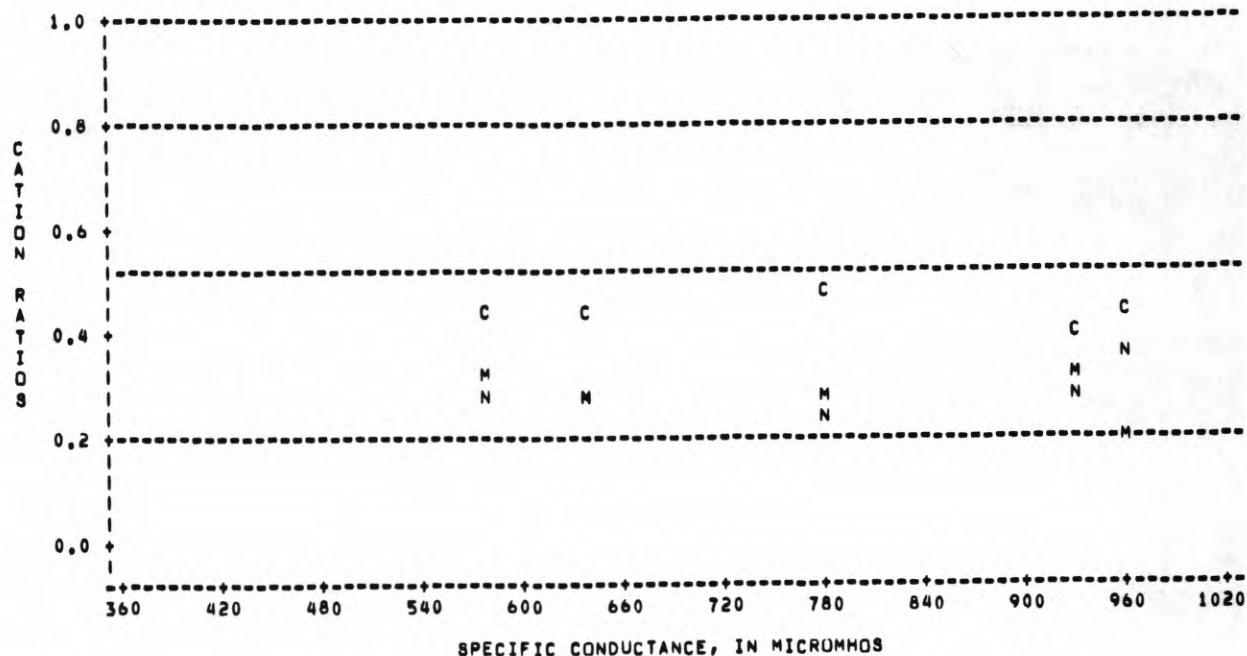
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|-----|-----|-------|------|
| Specific conductance | 14 | 765 | 360 | 989 | 168 | -1.00 | 1.29 |
| Dissolved solids | 10 | 538 | 371 | 713 | 98 | -.01 | .53 |
| pH | 14 | 8.2 | 7.5 | 8.9 | 0.4 | -.13 | -.46 |
| Total hardness | 14 | 277 | 114 | 340 | 62 | -1.67 | 2.68 |
| Chloride | 14 | 38 | 11 | 100 | 25 | 1.49 | 1.85 |
| Sulfate | 14 | 161 | 22 | 230 | 52 | -1.19 | 3.09 |
| Iron | 0 | | | | | | |
| Fluoride | 0 | | | | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 10 | 1.4 | 0.9 | 2.0 | 0.4 | .36 | -.94 |
| Boron | 0 | | | | | | |

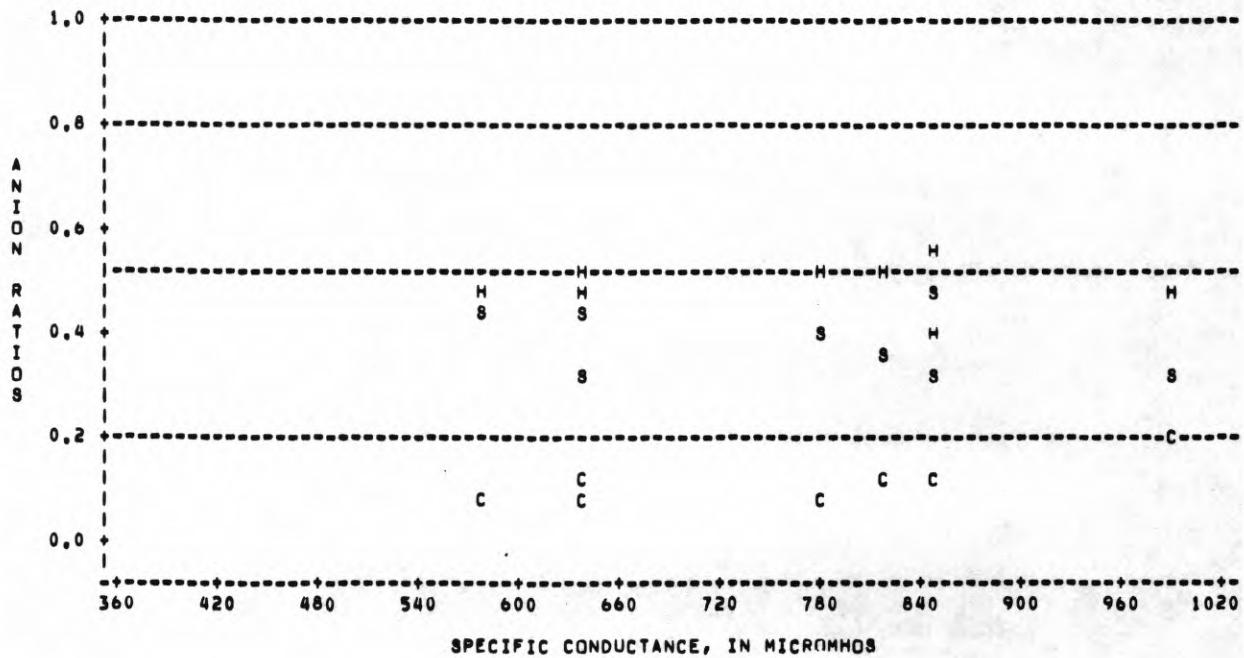
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 467 | 638 | 795 | 868 | 974 |
| Dissolved solids | 376 | 478 | 546 | 583 | 706 |
| pH | 7.6 | 7.8 | 8.2 | 8.4 | 8.7 |
| Total hardness | 158 | 235 | 300 | 320 | 330 |
| Chloride | 14 | 21 | 30 | 46 | 88 |
| Sulfate | 76 | 138 | 160 | 200 | 230 |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 0.9 | 1.2 | 1.4 | 1.8 | 2.0 |
| Boron | | | | | |

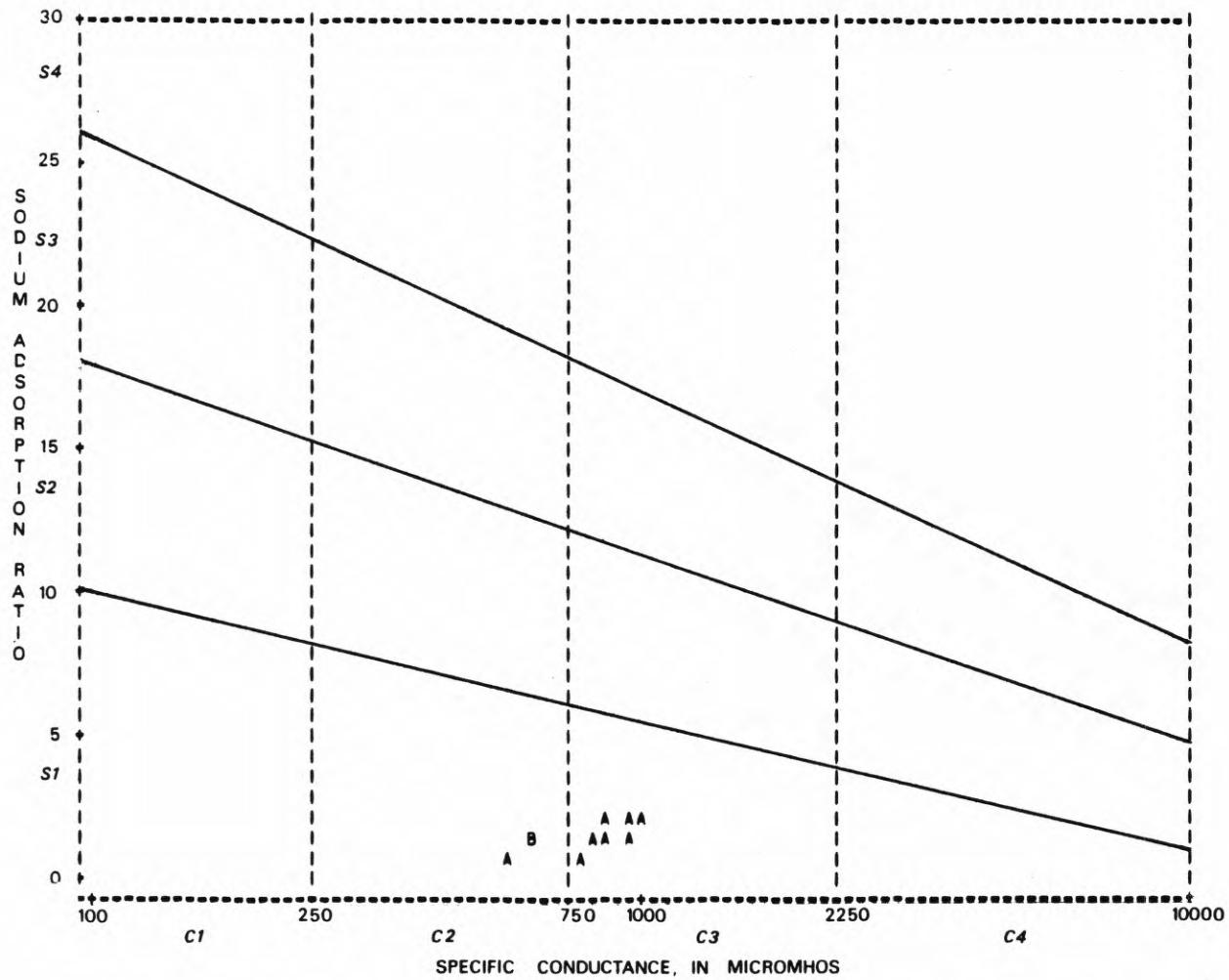
CATION RATIO PLOT
N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=BEAVER RIVER NR HOOKER, OK



ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=BEAVER RIVER NR HOOKER, OK



IRRIGATION DIAGRAM
C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
A = 1 OBS, B = 2 OBS, C = 3 OBS
STATION NAME OR LOCAL IDENTIFIER=BEAVER RIVER NR HOOKER, OK



NORTH CANADIAN RIVER BASIN

07234000 - Beaver River at Beaver, Okla.

LOCATION.--Lat $36^{\circ}49'20''$, long $100^{\circ}31'05''$, in SW $\frac{1}{4}$ sec. 7, T.4 N., R.24 E., Beaver County, at bridge on U.S. Highway 270 at Beaver, 1.5 mi downstream from Home Creek, 5 mi upstream from Clear Creek, and at mile 576.0.

DRAINAGE AREA.--7,955 mi², of which 4,270 mi² is probably noncontributing.

PERIOD OF RECORD.--1952, 1958 to 1959, 1962 to 1979.

WATER TYPE.--For specific conductance greater than 1,000 umho, 89 percent of the samples, the water was sodium chloride type. For specific conductance less than 1,000 umho, the water was calcium carbonate/bicarbonate type.

TREND.--Plots of the dissolved solids, hardness, chloride, and sulfate concentrations versus time indicate trends of increasing concentration. The Spearman's rhos at the 95-percent probability level also show positive trends for all four constituents.

PUBLIC WATER SUPPLY.--Ninety-four percent of the hardness values were greater than 180 mg/L and the average concentration was 622 mg/L. The hardness classification for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 84 percent of the chloride values, the recommended maximum sulfate concentration of 250 mg/L was exceeded by 71 percent of the sulfate values, and the recommended maximum iron concentration of 300 ug/L was exceeded by 10 percent of the iron values. The maximum cadmium contaminant level of 10 ug/L was exceeded by 7 percent of the cadmium values and the maximum lead contaminant level of 50 ug/L was exceeded by 10 percent of the lead values. Arsenic, chromium, and mercury did not exceed their maximum contaminant levels. Because of the frequency and magnitude by which the recommended maximum sulfate and chloride concentrations were exceeded and because the maximum cadmium and lead contaminant levels were exceeded, this water would not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from medium to very high with 74 percent of the samples having a very high salinity hazard. The sodium hazard ranged from low to very high with 51 percent of the SAR values equivalent to a high or very high sodium hazard. No boron data are available.

07234000 - Beaver River at Beaver, Okla.--Continued

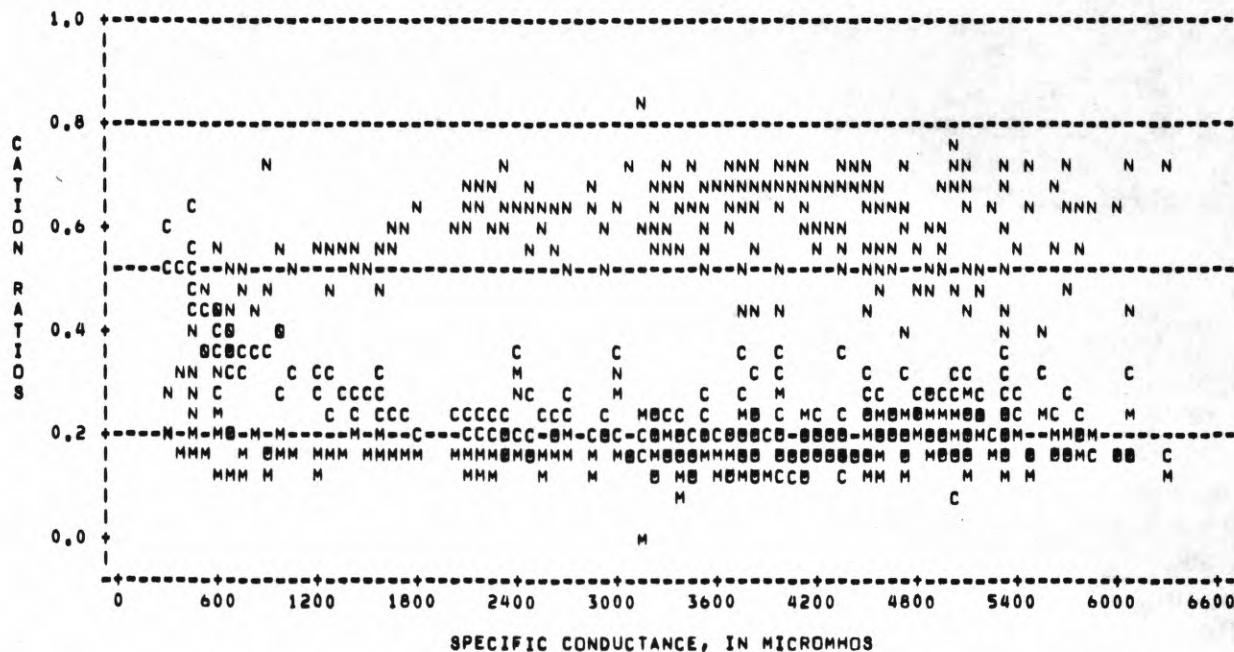
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|-----|------|-----|-------|------|-------|--------|
| Specific conductance | 502 | 3331 | 286 | 57800 | 3117 | 12.25 | 200.25 |
| Dissolved solids | 472 | 2006 | 164 | 4190 | 940 | -.17 | -.74 |
| pH | 485 | 8.2 | 7.0 | 9.0 | 0.4 | -.63 | .12 |
| Total hardness | 473 | 622 | 110 | 1800 | 329 | .90 | .80 |
| Chloride | 488 | 712 | 14 | 1700 | 367 | -.12 | -.60 |
| Sulfate | 490 | 398 | 18 | 1100 | 236 | .54 | -.13 |
| Iron | 10 | 93 | 0 | 660 | 201 | 3.06 | 9.48 |
| Fluoride | 31 | 1.0 | 0.4 | 1.7 | 0.4 | .21 | -.1.27 |
| Arsenic | 10 | 4 | 2 | 7 | 1.6 | 1.37 | 1.02 |
| Cadmium | 11 | 8 | 0 | 74 | 22 | 3.25 | 10.68 |
| Chromium | 10 | 4 | 0 | 20 | 8.3 | 1.69 | 1.19 |
| Lead | 10 | 14 | 0 | 75 | 23 | 2.46 | 6.32 |
| Mercury | 10 | 0.0 | 0.0 | 0.1 | 0.1 | .48 | -2.28 |
| SAR | 470 | 7.7 | 0.5 | 16 | 3.1 | -.27 | -.23 |
| Boron | 0 | | | | | | |

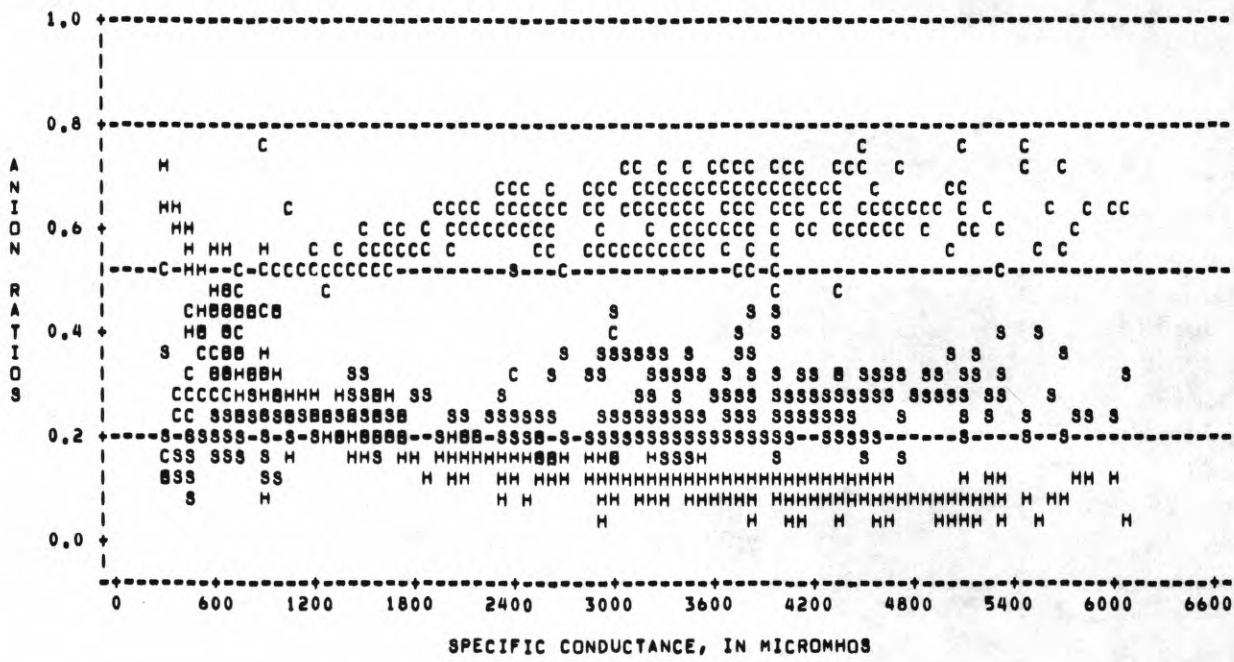
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 891 | 2142 | 3335 | 4142 | 5067 |
| Dissolved solids | 541 | 1330 | 2110 | 2660 | 3290 |
| pH | 7.5 | 7.9 | 8.2 | 8.3 | 8.5 |
| Total hardness | 215 | 389 | 590 | 770 | 1100 |
| Chloride | 130 | 460 | 750 | 960 | 1200 |
| Sulfate | 82 | 220 | 370 | 550 | 729 |
| Iron | 1 | 18 | 20 | 55 | 604 |
| Fluoride | 0.7 | 0.7 | 0.9 | 1.4 | 1.5 |
| Arsenic | 2 | 3 | 3 | 4 | 7 |
| Cadmium | 0 | 0 | 2 | 2 | 61 |
| Chromium | 0 | 0 | 0 | 8 | 20 |
| Lead | 0 | 1 | 4 | 16 | 70 |
| Mercury | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| SAR | 2.7 | 5.9 | 8.0 | 9.8 | 11 |
| Boron | | | | | |

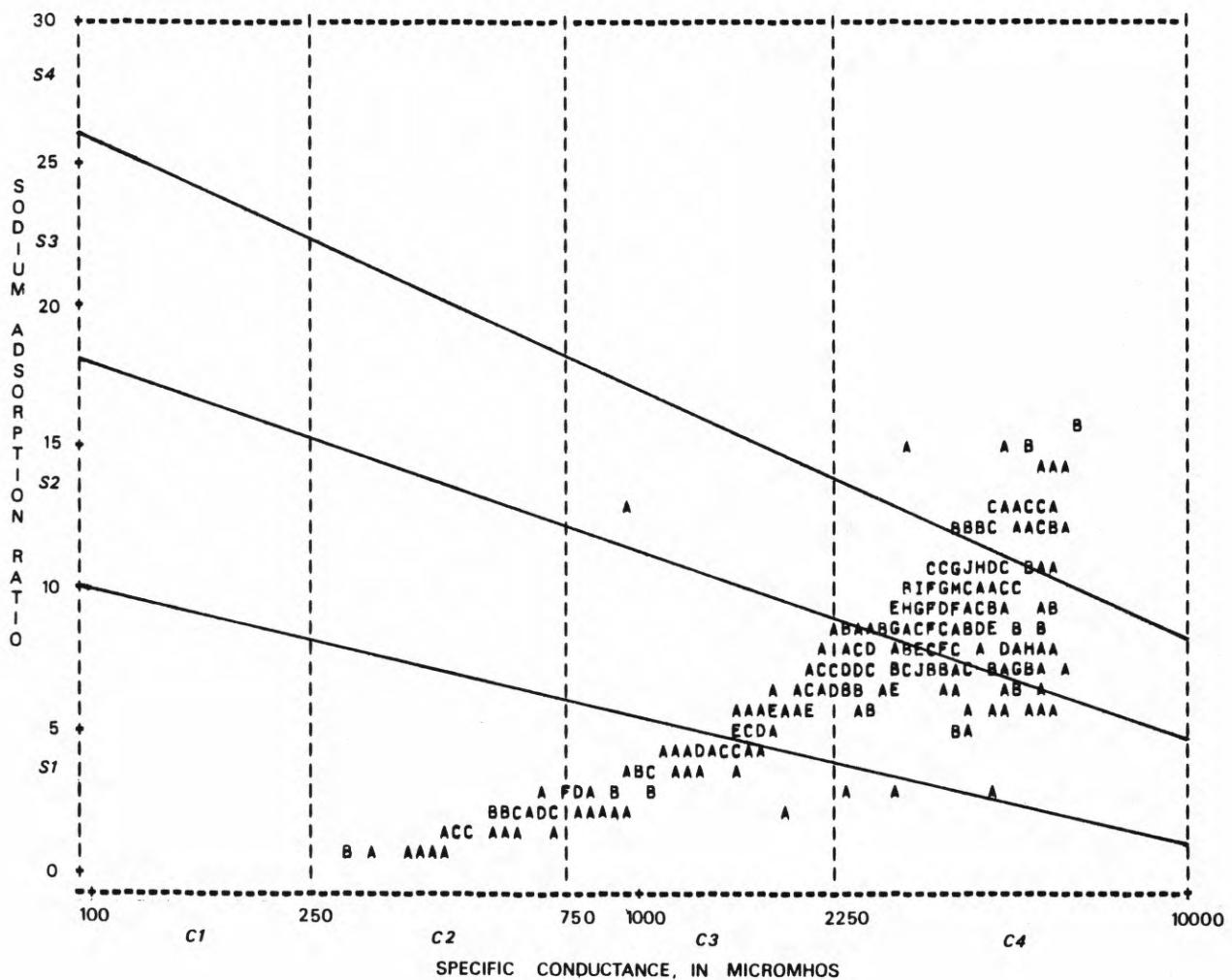
CATION RATIO PLOT
 N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=BEAVER RIVER AT BEAVER, OK



ANION RATIO PLOT
 H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=BEAVER RIVER AT BEAVER, OK



IRRIGATION DIAGRAM
C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
A = 1 088, B = 2 088, C = 3 088
STATION NAME OR LOCAL IDENTIFIER=BEAVER RIVER AT BEAVER, OK



NORTH CANADIAN RIVER BASIN

07233000 - Coldwater Creek near Hardesty, Okla.

LOCATION.--Lat $36^{\circ}38'38''$, long $101^{\circ}12'38''$, in NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 15, T.2 N., R.17 E., Texas County, at bridge on State Highway 3, 2 mi northwest of Hardesty, and at mile 5.7.

DRAINAGE AREA.--1,967 mi², of which 1,200 mi² is probably noncontributing.

PERIOD OF RECORD.--1952 to 1963.

WATER TYPE.--For specific conductance less than 750 umho, 19 percent of the samples, the water was calcium carbonate/bicarbonate type. For specific conductance greater than 750 umho the water was mixed type.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--All of the hardness values were greater than 180 mg/L and the average concentration was 333 mg/L. The hardness classification for this water is very hard. The recommended maximum sulfate concentration of 250 mg/L was exceeded by 1 percent of the sulfate values. No toxic metal data are available. Based on the data, this water should be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from medium to high with 81 percent of the samples in the high salinity hazard class. All of the SAR values were equivalent to a low sodium hazard. None of the boron values exceeded the recommended limit of 750 ug/L for boron sensitive plants.

07233000 - Coldwater Creek near Hardesty, Okla.--Continued

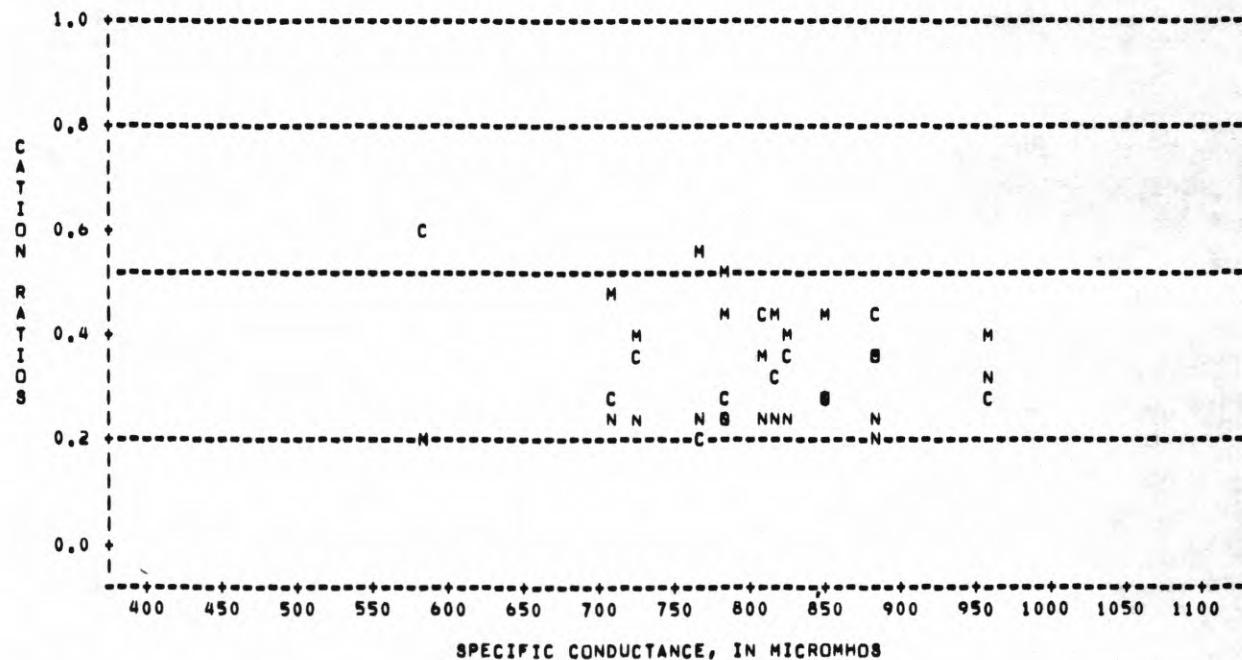
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|------|-----|-------|------|
| Specific conductance | 50 | 839 | 407 | 1080 | 147 | -1.15 | 1.41 |
| Dissolved solids | 25 | 556 | 295 | 748 | 131 | -.88 | -.08 |
| pH | 38 | 8.0 | 7.4 | 8.4 | 0.2 | -.93 | .56 |
| Total hardness | 38 | 333 | 200 | 430 | 54 | -.74 | .16 |
| Chloride | 50 | 39 | 2.7 | 61 | 13 | -1.17 | 1.50 |
| Sulfate | 25 | 176 | 16 | 252 | 75 | -1.52 | 1.02 |
| Iron | 0 | | | | | | |
| Fluoride | 0 | | | | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 38 | 1.3 | 0.2 | 2.6 | 0.5 | -.02 | 2.10 |
| Boron | 2 | 290 | 250 | 330 | | | |

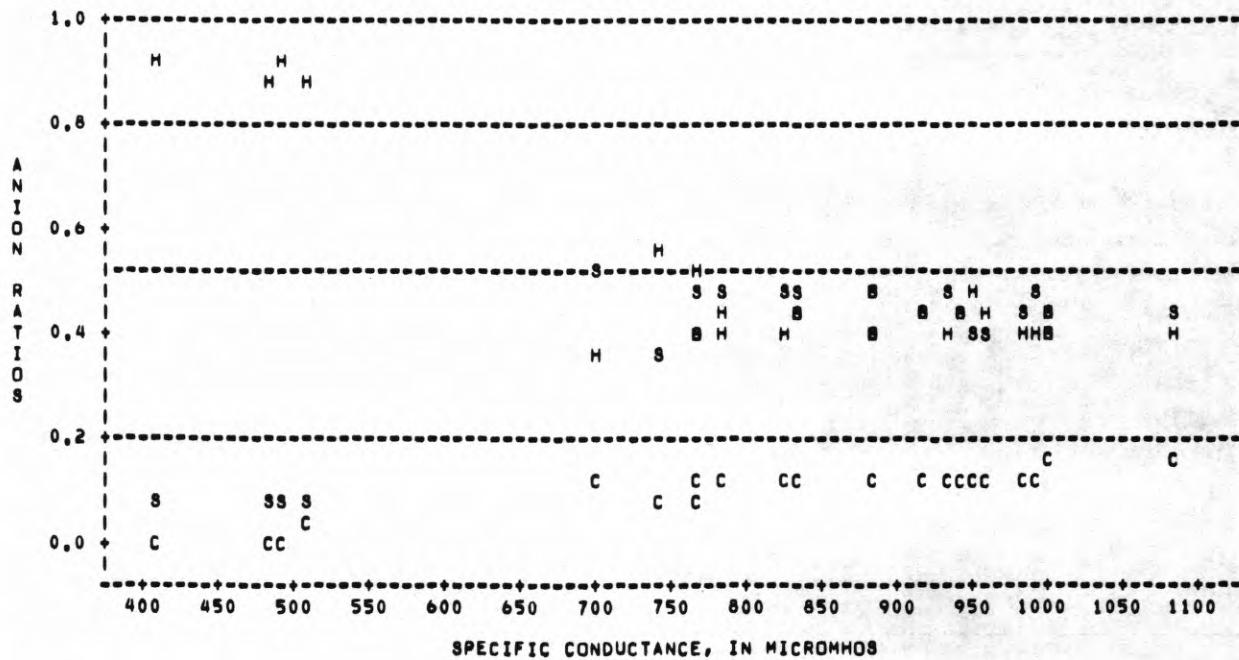
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 593 | 776 | 869 | 942 | 991 |
| Dissolved solids | 308 | 500 | 568 | 657 | 688 |
| pH | 7.5 | 7.9 | 8.0 | 8.2 | 8.2 |
| Total hardness | 253 | 305 | 343 | 372 | 392 |
| Chloride | 20 | 33 | 41 | 47 | 54 |
| Sulfate | 17 | 170 | 205 | 218 | 243 |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 0.3 | 1.1 | 1.3 | 1.5 | 1.6 |
| Boron | | | | | |

CATION RATIO PLOT
N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=COLDWATER CREEK NR HARDESTY, OK



ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=COLDWATER CREEK NR HARDESTY, OK



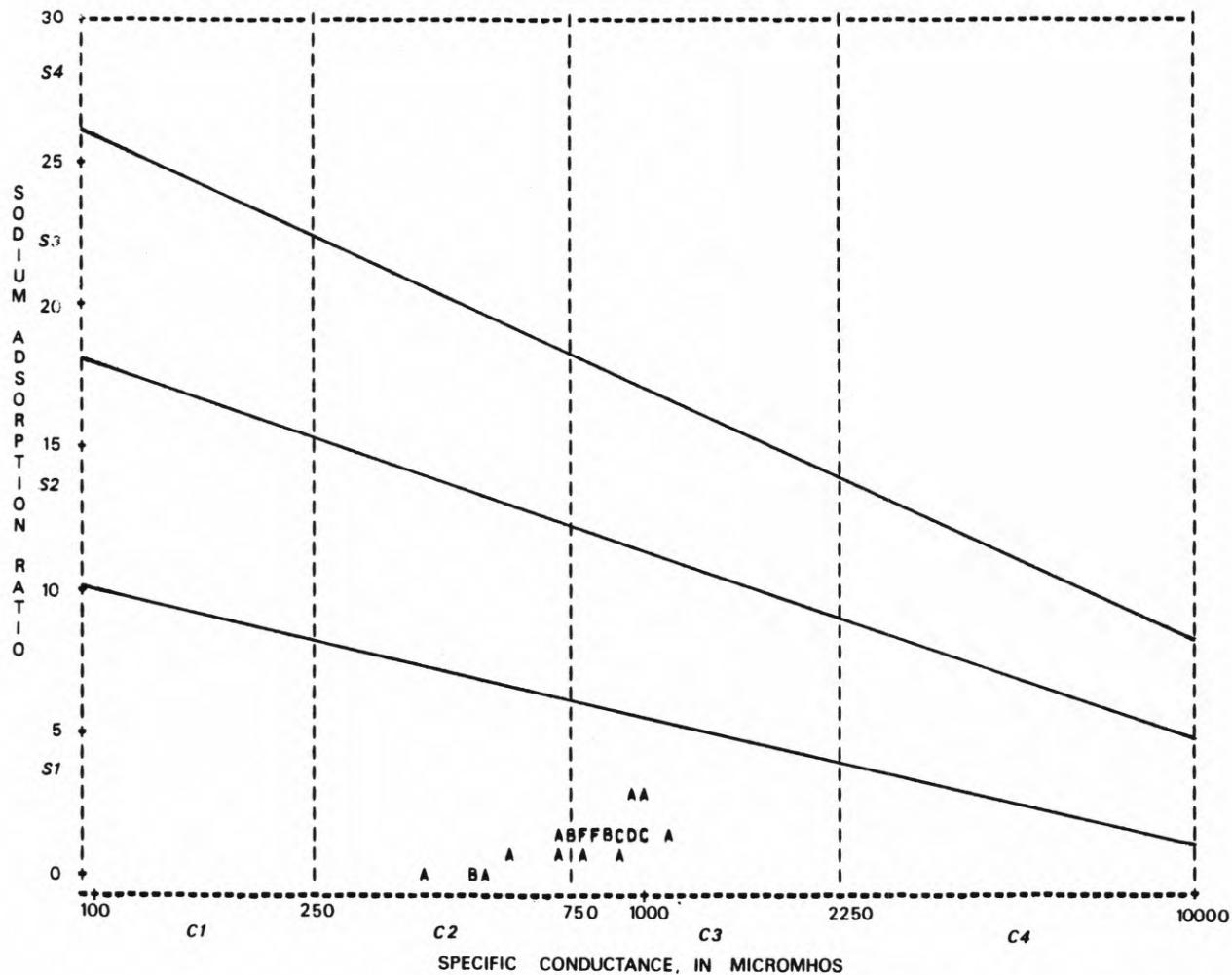
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=COLDWATER CREEK NR HARDESTY, OK



NORTH CANADIAN RIVER BASIN

07242090 - Grief Creek near Wetumka, Okla.

LOCATION.--Lat $35^{\circ}10'40''$, long $96^{\circ}15'00''$, in SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 4, T.8 N., R.10 E., Hughes County, at county road bridge 3 mi south of Wetumka.

DRAINAGE AREA.--Not determined.

PERIOD OF RECORD.--1962 to 1963.

WATER TYPE.--For specific conductance greater than 200 umho, 90 percent of the samples, the water was chloride type. For specific conductance less than 200 umho, the water was carbonate/bicarbonate type. The data are not adequate to determine the cation-specific conductance distribution.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--Fifty-four percent of the hardness values were greater than 120 mg/L and the average concentration was 121 mg/L. The hardness classification for this water varies from moderately hard to hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 17 percent of the chloride values. No toxic metal data are available. Because of the frequency by which the recommended maximum chloride concentration was exceeded, the suitability of this water for use as a public supply may be marginal.

IRRIGATION.--The salinity hazard ranged from medium to high with 64 percent of the samples having a medium salinity hazard. All of the SAR values were equivalent to a low sodium hazard. No boron data are available.

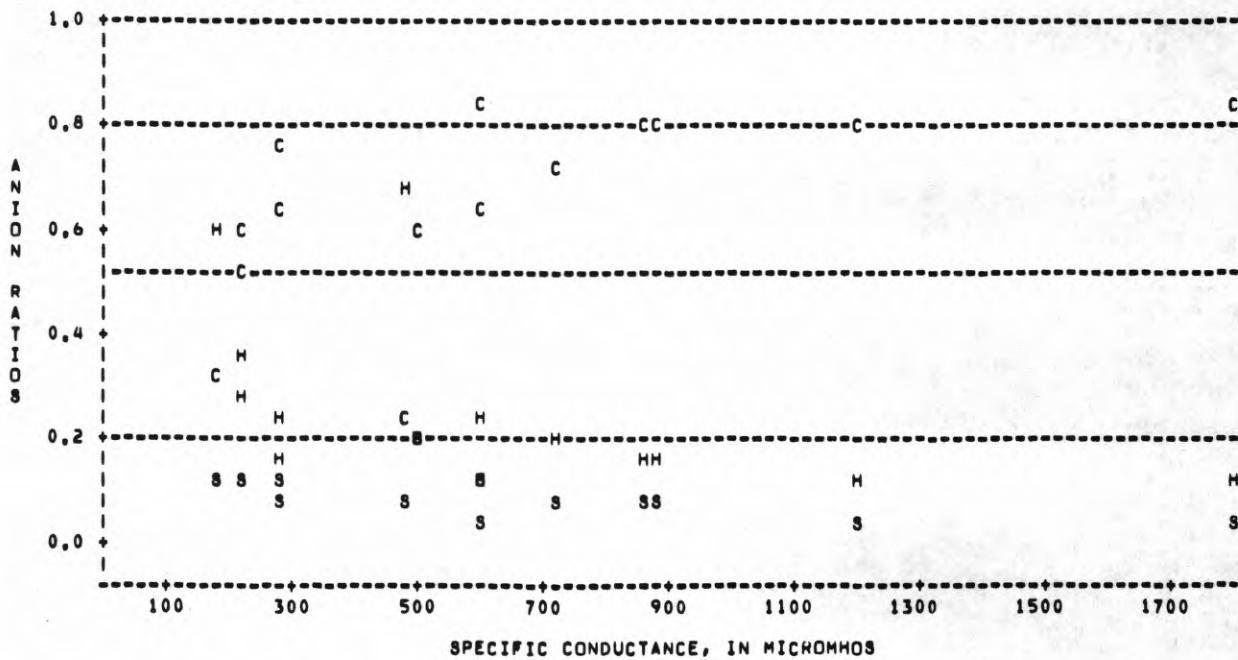
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|------|-----|------|------|
| Specific conductance | 15 | 645 | 177 | 1810 | 441 | 1.37 | 2.32 |
| Dissolved solids | 15 | 393 | 122 | 1080 | 265 | 1.37 | 2.09 |
| pH | 15 | 7.8 | 7.2 | 8.4 | 0.3 | .12 | -.69 |
| Total hardness | 15 | 121 | 44 | 330 | 75 | 1.52 | 3.25 |
| Chloride | 15 | 155 | 19 | 525 | 134 | 1.64 | 3.31 |
| Sulfate | 15 | 22 | 8.0 | 56 | 13 | 1.26 | 2.46 |
| Iron | 0 | | | | | | |
| Fluoride | 0 | | | | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 3 | 3.7 | 2.8 | 4.4 | | | |
| Boron | 0 | | | | | | |

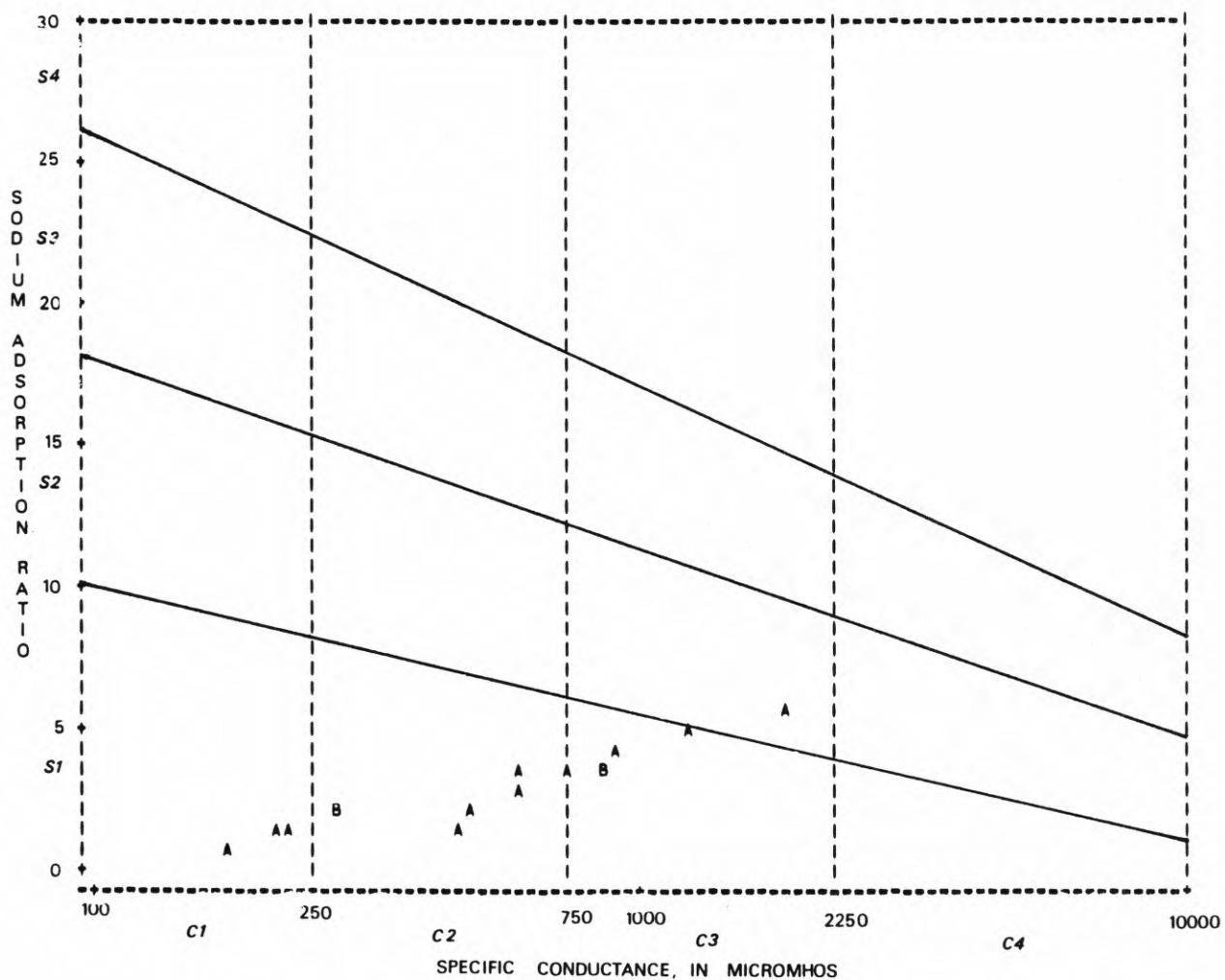
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 200 | 282 | 594 | 853 | 1450 |
| Dissolved solids | 135 | 161 | 355 | 508 | 899 |
| pH | 7.3 | 7.5 | 7.8 | 8.0 | 8.3 |
| Total hardness | 46 | 58 | 124 | 148 | 253 |
| Chloride | 31 | 44 | 130 | 210 | 402 |
| Sulfate | 8.6 | 11 | 23 | 29 | 42 |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | | | | | |
| Boron | | | | | |

ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=GRIEF CREEK NR WETUMKA, OK



IRRIGATION DIAGRAM
C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
A = 1 OBS, B = 2 OBS, C = 3 OBS
STATION NAME OR LOCAL IDENTIFIER=GRIEF CREEK NR WETUMKA, OK



NORTH CANADIAN RIVER BASIN

07242080 - Little Wewoka Creek near Wetumka, Okla.

LOCATION.--Lat $35^{\circ}13'00''$, long $96^{\circ}17'45''$, in SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 19, T.9 N., R.10 E.,
Hughes County, at State Highway 9 bridge, 3 mi west of Wetumka.

DRAINAGE AREA.--56 mi².

PERIOD OF RECORD.--1962 to 1963.

WATER TYPE.--The water was chloride type throughout the range of measured specific conductance. The data are not adequate to determine the cation-specific conductance distribution.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--Seventy-eight percent of the hardness values were greater than 180 mg/L and the average concentration was 759 mg/L. In general, the hardness classification for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 91 percent of the chloride values. No toxic metal data are available. Because of the frequency and magnitude by which the recommended maximum chloride concentration was exceeded, this water would not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from medium to very high with 72 percent of the samples in the very high salinity hazard class. The sodium hazard ranged from low to very high with 33 percent of the SAR values equivalent to a very high sodium hazard. No boron data are available.

UNIVARIATE STATISTICS

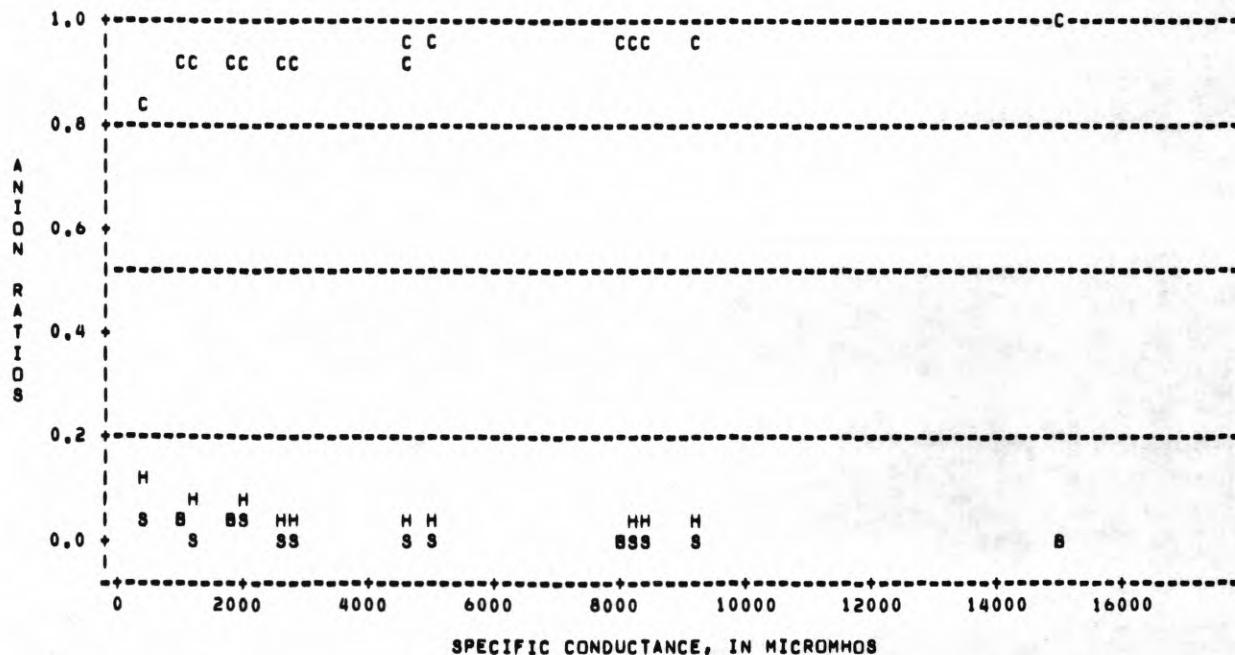
| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|-------|------|------|------|
| Specific conductance | 18 | 5550 | 488 | 15100 | 4385 | 1.07 | 0.60 |
| Dissolved solids | 18 | 3616 | 326 | 10600 | 2944 | 1.14 | .87 |
| pH | 18 | 7.8 | 7.3 | 8.1 | 0.2 | -.29 | -.17 |
| Total hardness | 18 | 759 | 66 | 2250 | 629 | .98 | .33 |
| Chloride | 18 | 1837 | 124 | 5380 | 1582 | 1.23 | 1.00 |
| Sulfate | 18 | 25 | 6.2 | 70 | 15 | 1.90 | 4.88 |
| Iron | 0 | | | | | | |
| Fluoride | 0 | | | | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 12 | 9.5 | 1.7 | 23 | 6.4 | .90 | .19 |
| Boron | 0 | | | | | | |

FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|-------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 933 | 2028 | 4760 | 8245 | 15101 |
| Dissolved solids | 529 | 1248 | 3115 | 5313 | 9610 |
| pH | 7.6 | 7.6 | 7.8 | 7.9 | 8.1 |
| Total hardness | 136 | 231 | 660 | 1205 | 1881 |
| Chloride | 266 | 600 | 1500 | 2750 | 5371 |
| Sulfate | 6.9 | 17 | 22 | 28 | 51 |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 2.2 | 4.0 | 7.9 | 15 | 21 |
| Boron | | | | | |

ANION RATIO PLOT

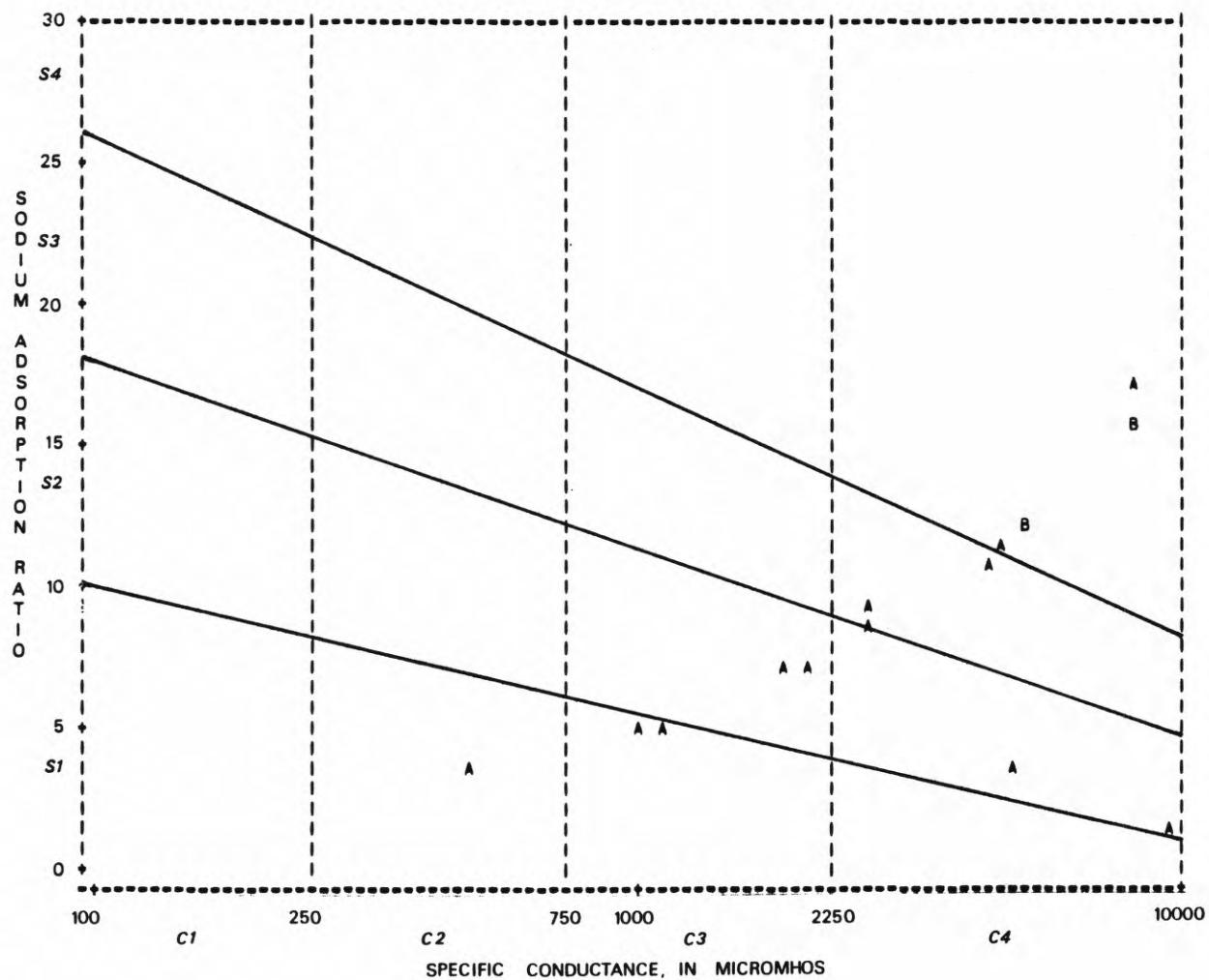
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=LITTLE WEWOKA CREEK NR WETUMKA, OK



IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=LITTLE NEWOKA CREEK NR WETUMKA, OK



NORTH CANADIAN RIVER BASIN

07237500 - North Canadian River at Woodward, Okla.

LOCATION.--Lat $36^{\circ}26'18''$, long $99^{\circ}16'40''$, in SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 25, T.23 N., R.20 W., Woodward County, at bridge on State Highway 15, 200 ft downstream from Atchison, Topeka, and Santa Fe Railway Co. bridge, 6.0 mi east of Woodward, 7.2 mi upstream from Indian Creek, 27.5 mi downstream from Wolf Creek, and at mile 460.2.

DRAINAGE AREA.--11,589 mi², of which 4,812 mi² is probably noncontributing.

PERIOD OF RECORD.--1955, 1961 to 1963, 1975 to 1979.

WATER TYPE.--The water was generally mixed type throughout the range of measured specific conductance. The sodium and chloride ions were dominant throughout the specific conductance range and their ratios were generally 40 to 50 percent. Therefore, although this water was classed as mixed, it is very nearly sodium chloride type.

TREND.--Plots of the dissolved solids, hardness, chloride, and sulfate concentrations versus time indicate trends of increasing concentration. The Spearman's rhos at the 95-percent probability level also indicate positive trends, increasing concentration, for the four constituents.

PUBLIC WATER SUPPLY.--Ninety-nine percent of the hardness values were greater than 180 mg/L and the average concentration was 509 mg/L. The hardness classification for this water is very hard. The recommended maximum pH of 9.0 was exceeded by 8 percent of the pH values, the recommended maximum chloride concentration of 250 mg/L was exceeded by 60 percent of the chloride values, and the recommended maximum sulfate concentration of 250 mg/L was exceeded by 55 percent of the sulfate values. The toxic metals arsenic, cadmium, chromium, lead, and mercury did not exceed their maximum contaminant levels. Because of the frequency by which the recommended maximum sulfate and chloride concentrations were exceeded, this water may not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from medium to very high with 37 percent of the samples having a very high salinity hazard. The sodium hazard ranged from low to high with 55 percent of the SAR values equivalent to a low sodium hazard. No boron data are available.

UNIVARIATE STATISTICS

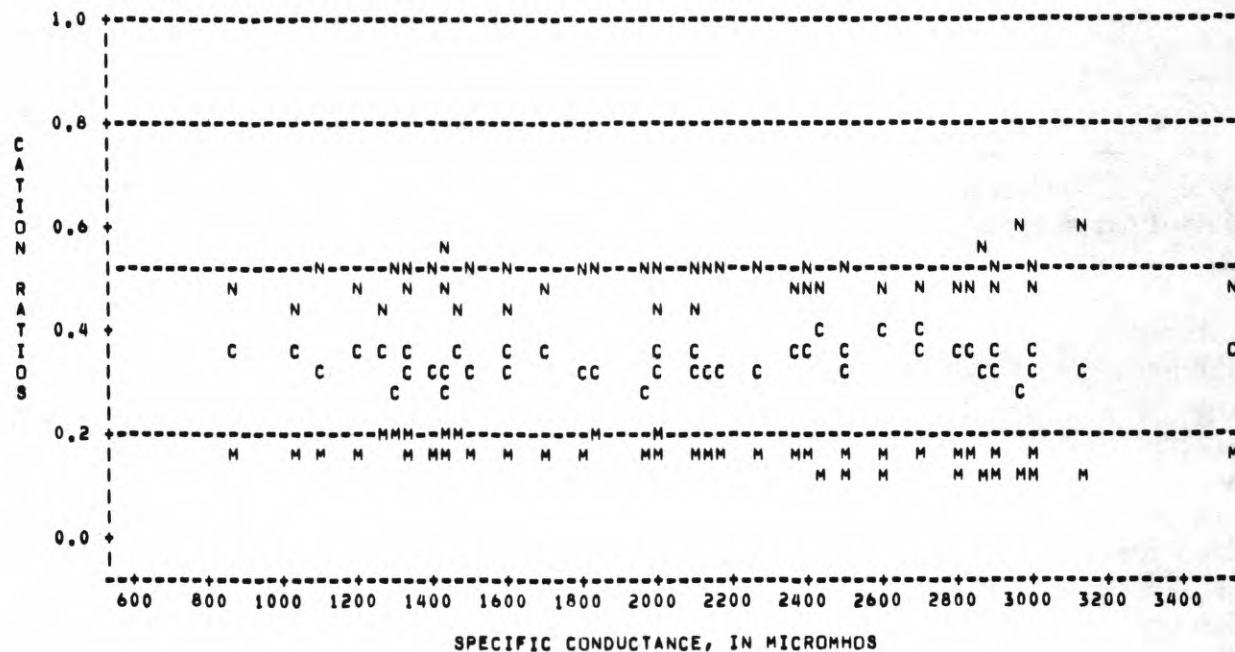
| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|-----|------|-----|------|-----|------|-------|
| Specific conductance | 113 | 1982 | 693 | 3540 | 676 | 0.27 | -1.04 |
| Dissolved solids | 74 | 1306 | 400 | 3110 | 549 | .83 | .78 |
| pH | 101 | 8.3 | 7.3 | 9.4 | 0.5 | .13 | -.36 |
| Total hardness | 75 | 509 | 172 | 970 | 187 | .39 | -.63 |
| Chloride | 87 | 307 | 100 | 600 | 120 | .55 | -.38 |
| Sulfate | 86 | 344 | 75 | 930 | 190 | .71 | -.21 |
| Iron | 19 | 39 | 10 | 140 | 35 | 2.39 | 5.05 |
| Fluoride | 54 | 0.7 | 0.3 | 1.0 | 0.1 | -.54 | 3.77 |
| Arsenic | 19 | 4 | 2 | 7 | 1.5 | .73 | -.23 |
| Cadmium | 19 | 1 | 0 | 4 | 1.0 | 1.39 | 2.32 |
| Chromium | 19 | 5 | 0 | 40 | 10 | 2.67 | 7.92 |
| Lead | 19 | 4 | 0 | 31 | 7.0 | 3.50 | 13.58 |
| Mercury | 19 | 0.0 | 0.0 | 0.1 | 0.0 | 1.17 | -.72 |
| SAR | 75 | 4.4 | 2.1 | 8.3 | 1.1 | .57 | 1.15 |
| Boron | 0 | | | | | | |

FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 1226 | 1410 | 1860 | 2600 | 2900 |
| Dissolved solids | 703 | 853 | 1215 | 1730 | 1965 |
| pH | 7.7 | 8.0 | 8.3 | 8.7 | 8.9 |
| Total hardness | 286 | 360 | 470 | 680 | 780 |
| Chloride | 175 | 210 | 295 | 380 | 502 |
| Sulfate | 137 | 190 | 278 | 515 | 583 |
| Iron | 20 | 20 | 30 | 40 | 130 |
| Fluoride | 0.6 | 0.7 | 0.7 | 0.8 | 0.9 |
| Arsenic | 2 | 3 | 3 | 5 | 6 |
| Cadmium | 0 | 0 | 1 | 1 | 3 |
| Chromium | 0 | 0 | 0 | 10 | 20 |
| Lead | 0 | 0 | 2 | 4 | 9 |
| Mercury | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| SAR | 3.0 | 3.5 | 4.3 | 5.0 | 5.7 |
| Boron | | | | | |

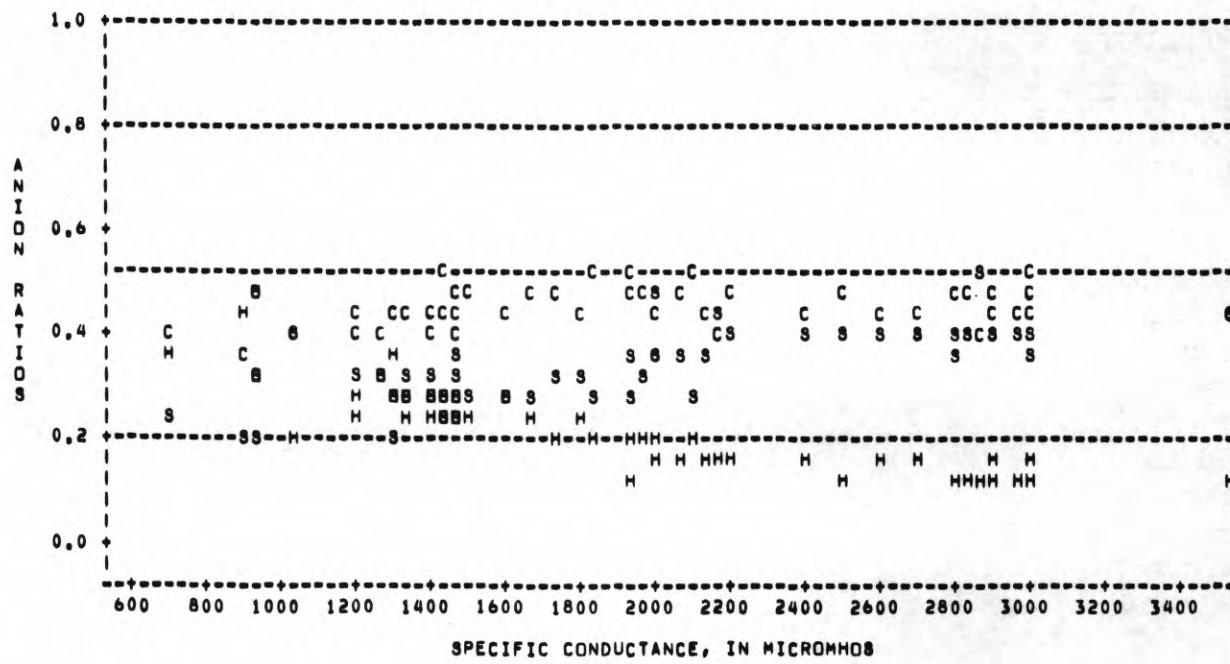
CATION RATIO PLOT

N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER AT WOODWARD, OK



ANION RATIO PLOT

H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER AT WOODWARD, OK



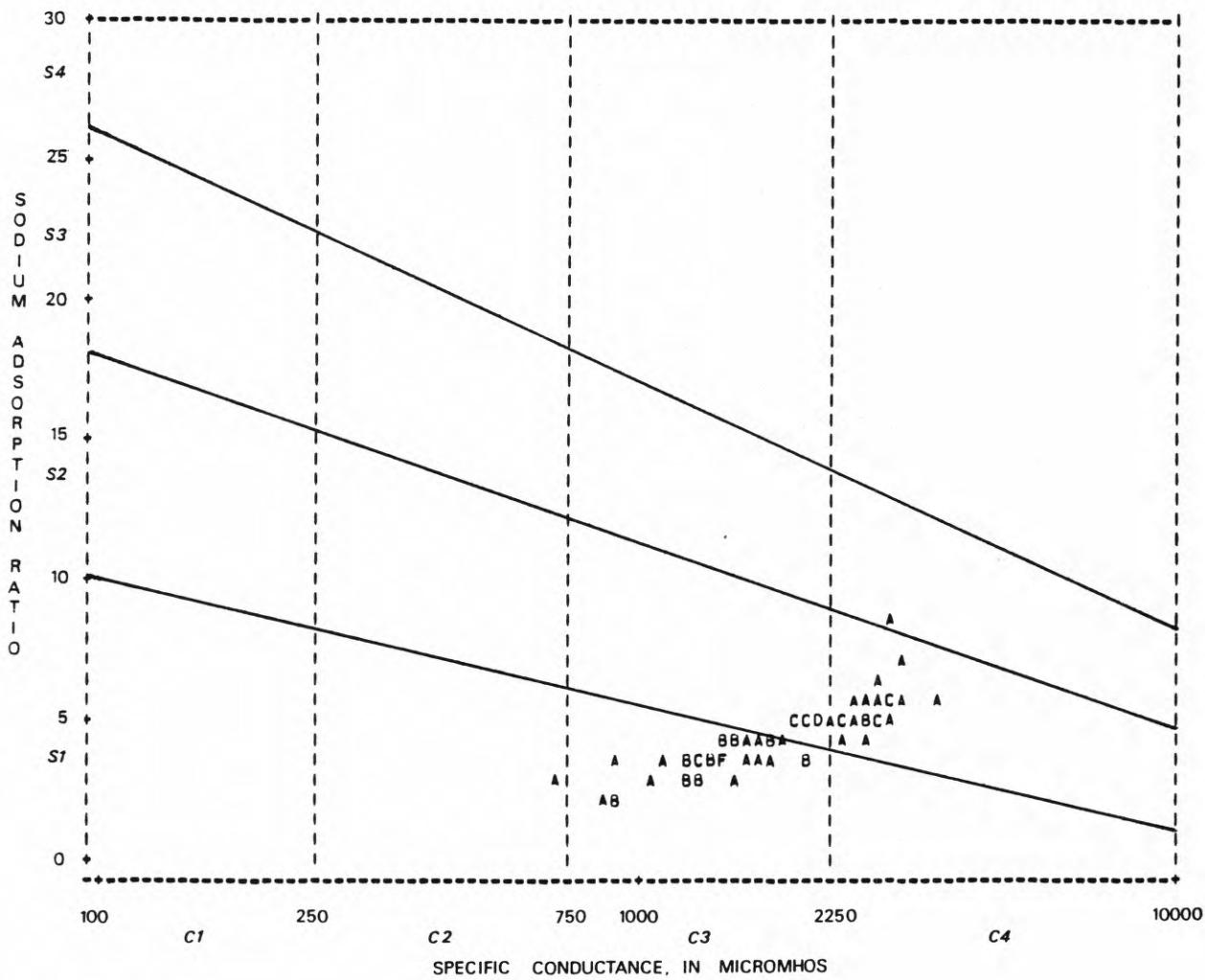
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 08S, B = 2 08S, C = 3 08S

STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER AT WOODWARD, OK



NORTH CANADIAN RIVER BASIN

07238000 - North Canadian River near Seiling, Okla.

LOCATION.--Lat $36^{\circ}11'06''$, long $98^{\circ}55'15''$, in NW $\frac{1}{4}$ sec. 28, T.20 N., R.16 W., Major County, at bridge on U.S. Highway 60, 2.0 mi upstream from Seiling Creek, 2.2 mi north of Seiling, 2.8 mi downstream from Deep Creek, and at mile 422.6.

DRAINAGE AREA.--12,261 mi², of which 4,847 mi² is probably noncontributing.

PERIOD OF RECORD.--1951, 1953 to 1959, 1968 to 1971, 1974 to 1975.

WATER TYPE.--For specific conductance less than 800 umho, 6 percent of the samples, the water was calcium carbonate/bicarbonate type. For specific conductance greater than 800 umho, the data indicate that the water probably was sodium sulfate type.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--Ninety-six percent of the hardness values were greater than 180 mg/L and the average concentration was 487 mg/L. The hardness classification for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 31 percent of the chloride values and the recommended maximum sulfate concentration of 250 mg/L was exceeded by 64 percent of the sulfate values. No toxic metal data are available. Because of the frequency and magnitude by which the recommended maximum chloride and sulfate concentrations were exceeded, this water may not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from medium to very high, with 85 percent of the samples having a high salinity hazard. The sodium hazard ranged from low to medium with 88 percent of the SAR values equivalent to a low sodium hazard. No boron data are available.

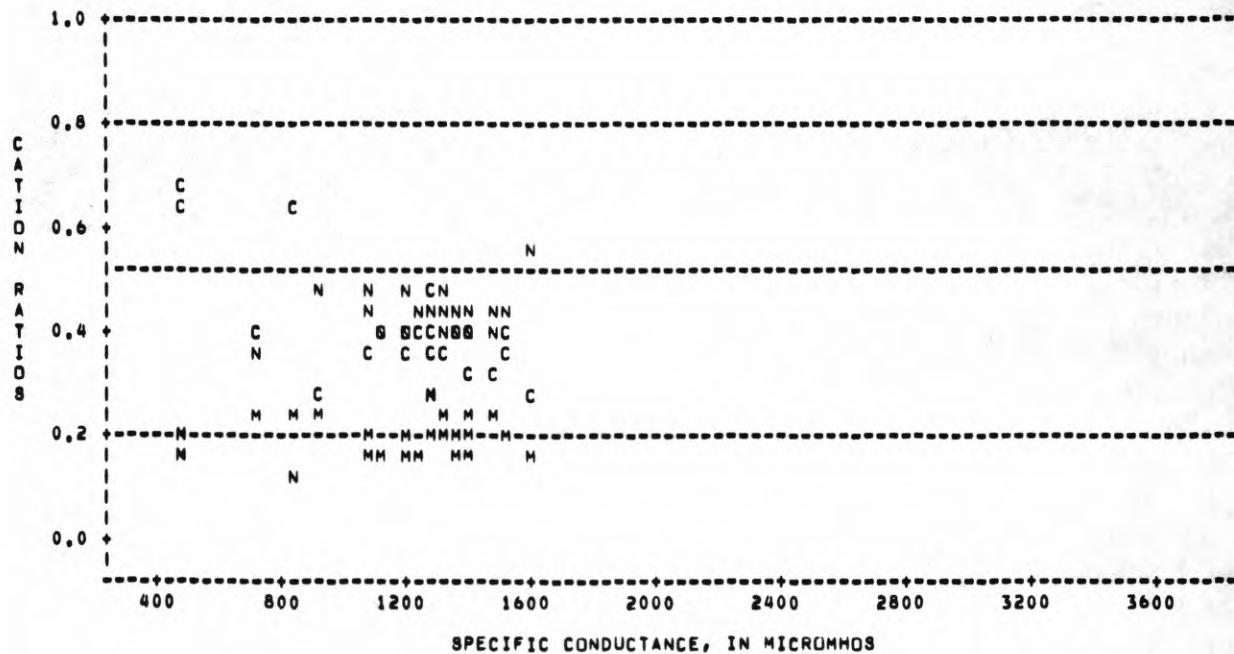
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|-----|------|-----|------|-----|-------|-------|
| Specific conductance | 170 | 1678 | 465 | 6900 | 660 | 3.03 | 22.79 |
| Dissolved solids | 94 | 1206 | 276 | 2750 | 436 | .55 | 1.43 |
| pH | 170 | 8.2 | 6.3 | 8.8 | 0.4 | -1.27 | 3.71 |
| Total hardness | 117 | 487 | 57 | 1590 | 228 | 1.59 | 4.30 |
| Chloride | 132 | 213 | 20 | 455 | 84 | -.01 | .03 |
| Sulfate | 92 | 321 | 36 | 935 | 178 | .77 | .59 |
| Iron | 0 | | | | | | |
| Fluoride | 8 | 0.5 | 0.0 | 0.8 | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 88 | 3.2 | 0.5 | 5.3 | 1.0 | -.46 | .11 |
| Boron | 0 | | | | | | |

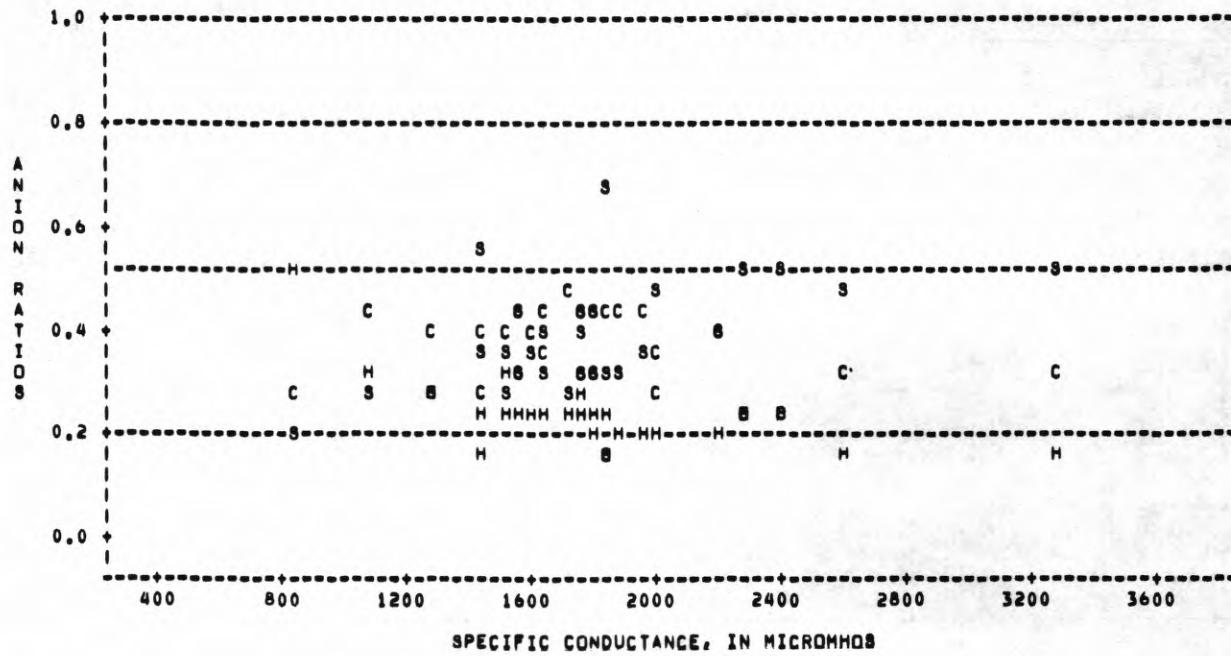
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 962 | 1308 | 1680 | 2000 | 2247 |
| Dissolved solids | 650 | 977 | 1170 | 1460 | 1725 |
| pH | 7.6 | 8.0 | 8.2 | 8.4 | 8.5 |
| Total hardness | 263 | 345 | 430 | 560 | 813 |
| Chloride | 109 | 170 | 208 | 271 | 335 |
| Sulfate | 98 | 200 | 284 | 459 | 594 |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 1.5 | 2.6 | 3.2 | 3.9 | 4.4 |
| Boron | | | | | |

CATION RATIO PLOT
 N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR SEILING, OK



ANION RATIO PLOT
 H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR SEILING, OK



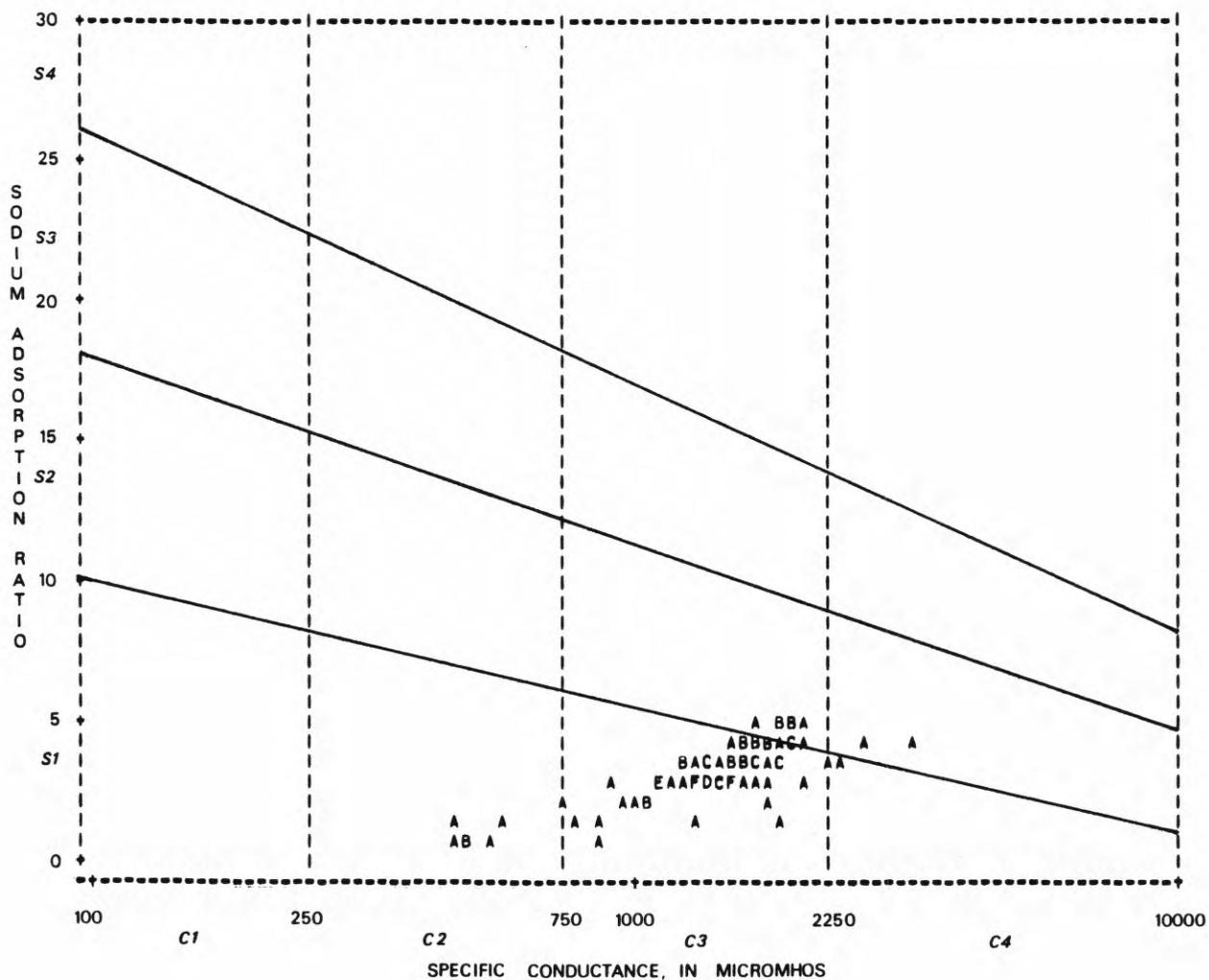
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR SEILING, OK



NORTH CANADIAN RIVER BASIN

07239000 - North Canadian River at Canton, Okla.

LOCATION.--Lat $36^{\circ}04'45''$, long $98^{\circ}35'25''$, in NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 33, T.19 N., R.13 W., Blaine County, 2,700 ft downstream from Canton Dam, 1.5 mi northwest of Canton, 4.8 mi upstream from Minnehaha Creek, and at mile 393.8.

DRAINAGE AREA.--12,484 mi², of which 4,883 mi² is probably noncontributing.

PERIOD OF RECORD.--1951 to 1959, 1973 to 1979.

WATER TYPE.--The water was mixed type throughout the range of measured specific conductance.

TREND.--Plots of the hardness, chloride, and sulfate concentrations versus time indicate the possibility of negative trends for hardness and chloride. The Spearman's rhos for hardness and chloride at the 95-percent probability level indicate negative trends. The Spearman's rho for sulfate indicates no trend. Current data are not available for the dissolved solids.

PUBLIC WATER SUPPLY.--Ninety-eight percent of the hardness values were greater than 180 mg/L and the average concentration was 348 mg/L. The hardness classification for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 12 percent of the chloride values and the recommended maximum sulfate concentration of 250 mg/L was exceeded by 28 percent of the sulfate values. No toxic metal data are available. Even though the recommended maximum sulfate and chloride concentrations were frequently exceeded, the concentrations were not so large as to make this water completely unsuitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from medium to high, with 86 percent of the samples having a high salinity hazard. All of the SAR values were equivalent to a low sodium hazard. The data indicate boron phytotoxic effects should not occur.

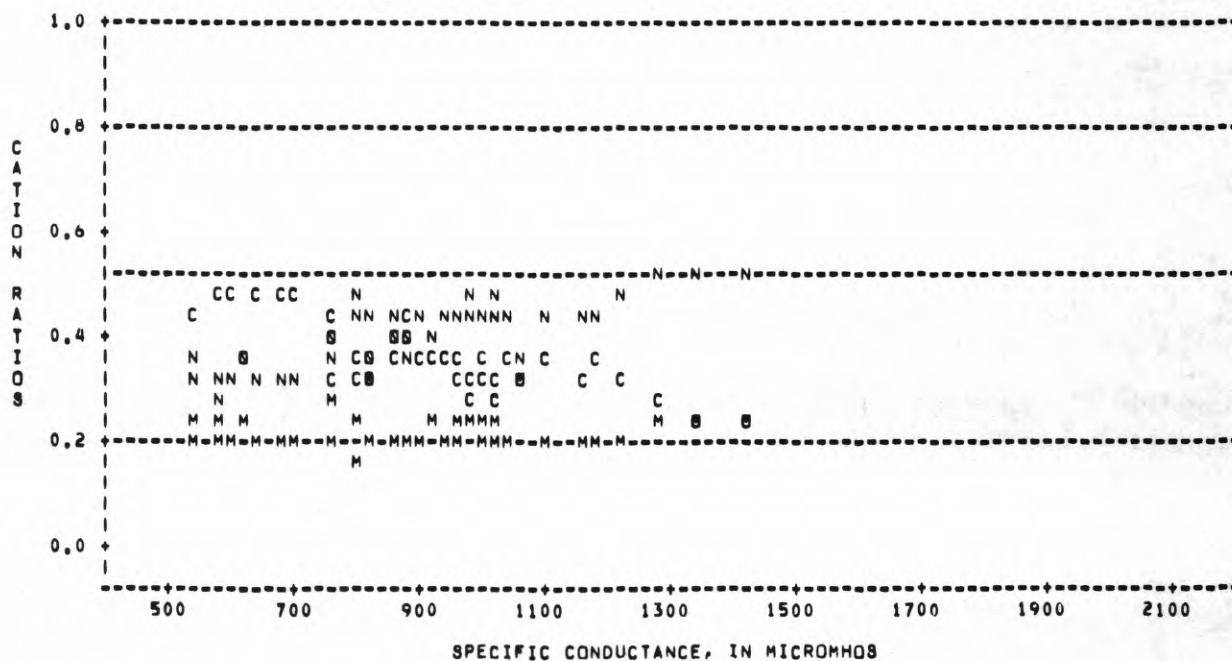
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|------|-----|-------|-------|
| Specific conductance | 94 | 1249 | 533 | 2000 | 405 | -0.09 | -1.22 |
| Dissolved solids | 47 | 557 | 314 | 861 | 132 | .18 | -.21 |
| pH | 93 | 8.1 | 7.1 | 8.8 | 0.4 | -.53 | -.26 |
| Total hardness | 81 | 348 | 174 | 794 | 122 | .87 | .68 |
| Chloride | 92 | 205 | 16 | 350 | 90 | .50 | 1.50 |
| Sulfate | 67 | 202 | 20 | 735 | 109 | 1.85 | 7.55 |
| Iron | 0 | | | | | | |
| Fluoride | 48 | 0.7 | 0.3 | 1.3 | 0.2 | .59 | .38 |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 47 | 2.3 | 1.2 | 4.0 | 0.7 | .33 | .03 |
| Boron | 45 | 154 | 0 | 580 | 116 | 1.44 | 3.36 |

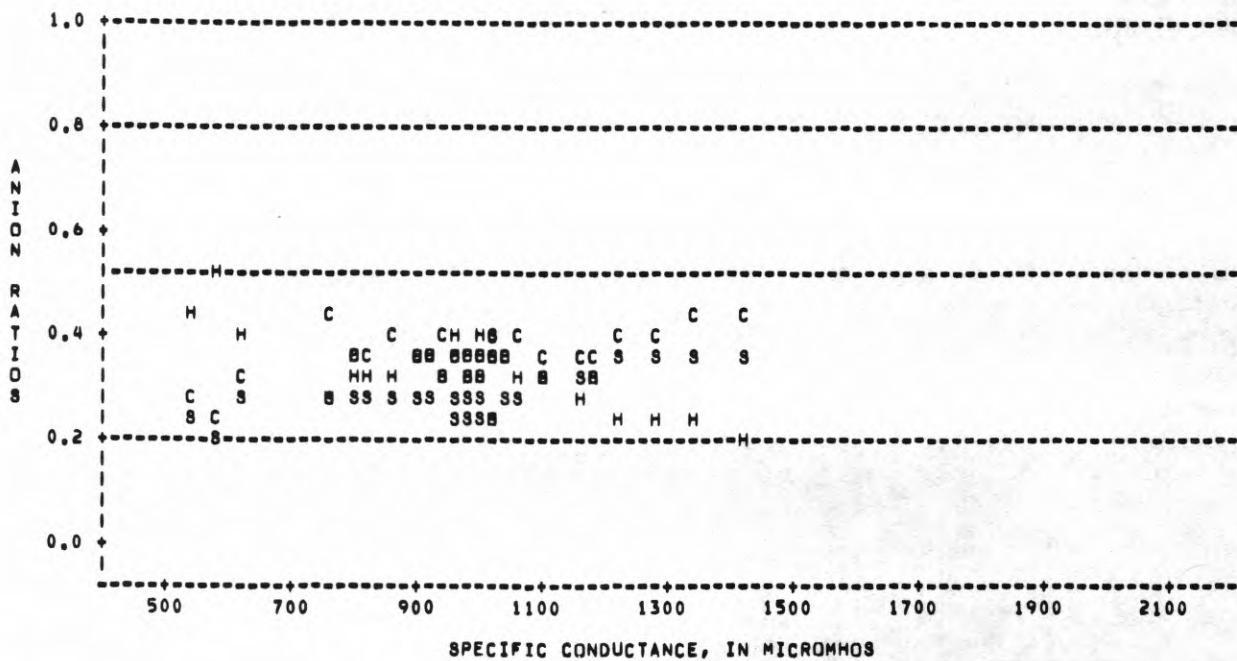
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 663 | 920 | 1295 | 1600 | 1775 |
| Dissolved solids | 362 | 463 | 575 | 621 | 758 |
| pH | 7.4 | 7.7 | 8.1 | 8.2 | 8.4 |
| Total hardness | 208 | 256 | 320 | 449 | 504 |
| Chloride | 106 | 130 | 205 | 228 | 258 |
| Sulfate | 94 | 124 | 202 | 260 | 306 |
| Iron | | | | | |
| Fluoride | 0.5 | 0.6 | 0.7 | 0.9 | 1.0 |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 1.3 | 1.8 | 2.3 | 2.7 | 3.0 |
| Boron | 12 | 60 | 150 | 195 | 300 |

CATION RATIO PLOT
 N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER AT CANTON, OK



ANION RATIO PLOT
 H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER AT CANTON, OK



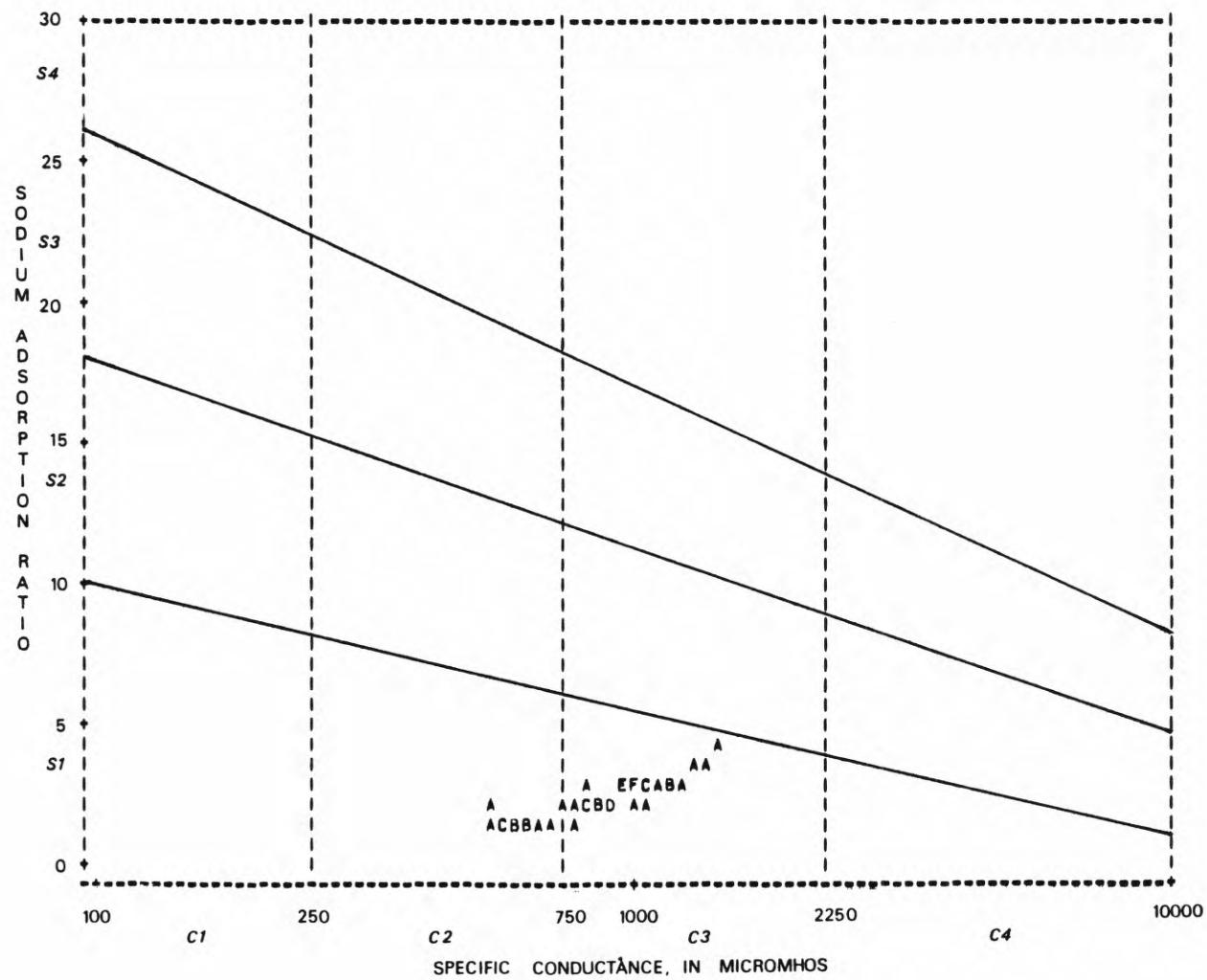
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER AT CANTON, OK



NORTH CANADIAN RIVER BASIN

07239450 - North Canadian River near Fort Reno, Okla.

LOCATION.--Lat $35^{\circ}36'59''$, long $98^{\circ}03'57''$, in E $\frac{1}{2}$ sec. 9, T.13 N., R.8 W., Canadian County, at bridge on county road, 4 mi northwest of Fort Reno, 3 mi east and 1 mi north of Calumet.

DRAINAGE AREA.--Not determined.

PERIOD OF RECORD.--1974 to 1975.

WATER TYPE.--The anions were mixed type throughout the range of measured specific conductance. There are no cation distribution data.

PUBLIC WATER SUPPLY.--There are no hardness data. One of eight sulfate values exceeded the recommended maximum sulfate concentration of 250 mg/L. The recommended maximum pH of 9.0 was exceeded by 4 percent of the pH values. No toxic metal data are available. The data are insufficient to evaluate the suitability of this water for use as a public supply.

IRRIGATION.--The salinity hazard was high for all samples. No SAR or boron data are available.

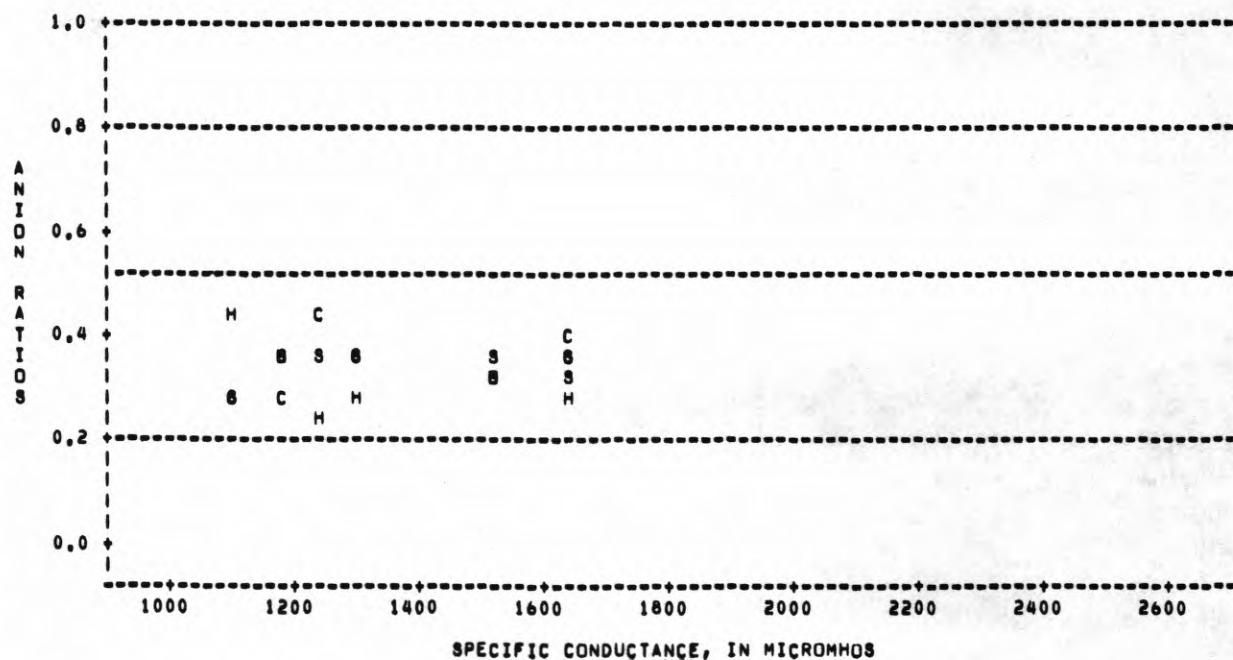
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|------|------|-----|-------|-------|
| Specific conductance | 34 | 1578 | 1080 | 2200 | 268 | -0.11 | -0.02 |
| Dissolved solids | 38 | 1011 | 634 | 1450 | 192 | -.10 | -.29 |
| pH | 39 | 8.3 | 7.6 | 9.5 | 0.3 | .99 | 4.38 |
| Total hardness | 0 | | | | | | |
| Chloride | 8 | 170 | 110 | 240 | | | |
| Sulfate | 8 | 226 | 150 | 270 | | | |
| Iron | 0 | | | | | | |
| Fluoride | 8 | 0.7 | 0.4 | 1.0 | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 0 | | | | | | |
| Boron | 0 | | | | | | |

FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 1080 | 1437 | 1600 | 1750 | 2065 |
| Dissolved solids | 642 | 894 | 990 | 1160 | 1326 |
| pH | 7.8 | 8.1 | 8.3 | 8.5 | 8.9 |
| Total hardness | | | | | |
| Chloride | | | | | |
| Sulfate | | | | | |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | | | | | |
| Boron | | | | | |

ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR FORT RENO, OK



NORTH CANADIAN RIVER BASIN

07239500 - North Canadian River near El Reno, Okla.

LOCATION.--Lat $35^{\circ}33'44''$, long $97^{\circ}57'32''$, on east line of sec. 32, T.13 N., R.7 W., Canadian County, at bridge on old U.S. Highway 81, 2.0 mi north of courthouse in El Reno, 2.2 mi downstream from Target Creek, and at mile 307.4.

DRAINAGE AREA.--13,042 mi², of which 4,899 mi² is probably noncontributing.

PERIOD OF RECORD.--1950 to 1951, 1953, 1973 to 1979.

WATER TYPE.--For specific conductance less than 400 umho, 10 percent of the samples, the water was calcium carbonate/bicarbonate type. For specific conductance greater than 400 umho, the water was mixed type.

TREND.--Plots of the hardness, chloride, and sulfate concentrations versus time do not indicate any trends. However, the Spearman's rho for each of the three constituents indicates a positive trend at the 95-percent probability level. There are no current data for the dissolved solids.

PUBLIC WATER SUPPLY.--Eighty percent of the hardness values were greater than 180 mg/L and the average concentration was 321 mg/L. In general, the hardness classification for this water is very hard. The recommended maximum pH of 9.0 was exceeded by 3 percent of the pH values, the recommended maximum chloride concentration of 250 mg/L was exceeded by 5 percent of the chloride values, the recommended maximum sulfate concentration of 250 mg/L was exceeded by 29 percent of the sulfate values, and the recommended maximum iron concentration of 300 ug/L was exceeded by 12 percent of the iron values. The data indicate that arsenic, cadmium, chromium, lead, and mercury should not exceed their maximum contaminant levels. Because the recommended maximums for pH, chloride, sulfate, and iron were exceeded, the suitability of this water for use as a public water supply may be questionable.

IRRIGATION.--The salinity hazard ranged from low to high with 72 percent of the samples having a high salinity hazard. All of the SAR values were equivalent to a low sodium hazard. The data indicate that boron phytotoxic effects should not occur.

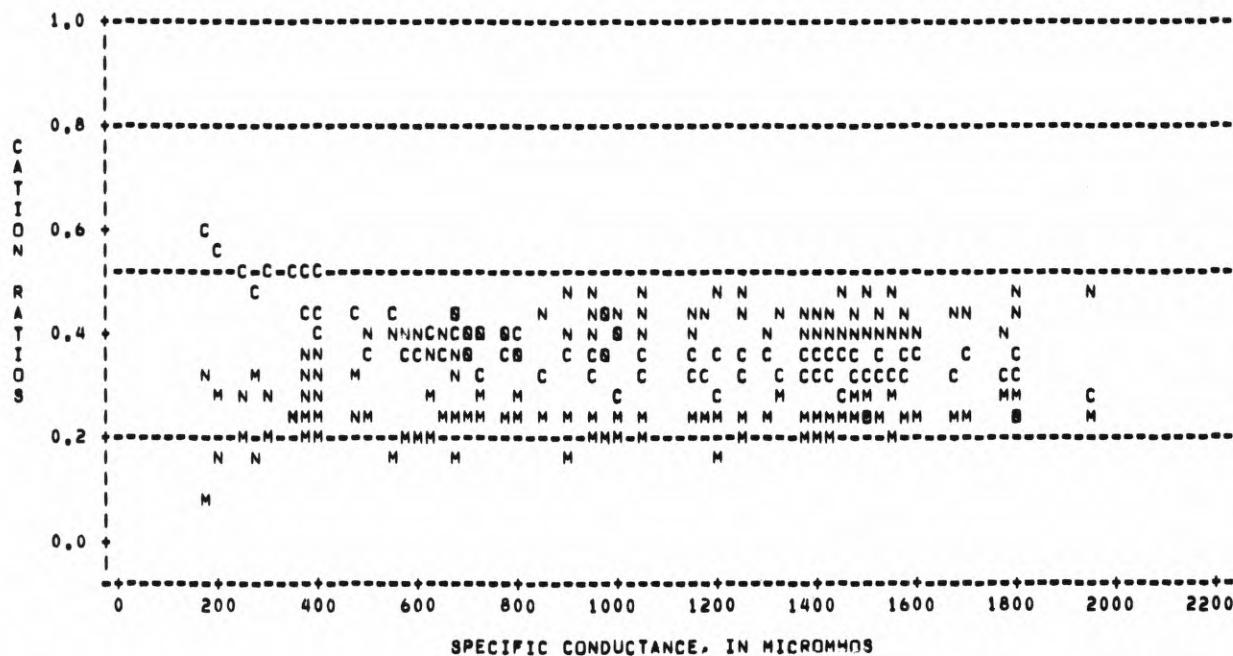
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|-----|------|-----|------|-----|-------|-------|
| Specific conductance | 236 | 1145 | 187 | 2200 | 516 | -0.10 | -1.12 |
| Dissolved solids | 173 | 621 | 120 | 1210 | 309 | .19 | -1.16 |
| pH | 238 | 8.0 | 7.0 | 9.4 | 0.4 | .01 | .29 |
| Total hardness | 204 | 321 | 80 | 727 | 148 | .24 | -1.04 |
| Chloride | 216 | 136 | 6.6 | 394 | 77 | .19 | -.57 |
| Sulfate | 207 | 189 | 13 | 1013 | 137 | 1.81 | 7.08 |
| Iron | 17 | 86 | 0 | 780 | 197 | 3.24 | 10.78 |
| Fluoride | 12 | 0.7 | 0.1 | 0.9 | 0.2 | -1.97 | 3.97 |
| Arsenic | 1 | 3 | | | | | |
| Cadmium | 16 | 1 | 0 | 3 | 1.0 | 1.42 | 1.10 |
| Chromium | 15 | 2 | 0 | 10 | 4.1 | 1.61 | .77 |
| Lead | 17 | 3 | 0 | 10 | 3.2 | 1.48 | .98 |
| Mercury | 1 | 0.1 | | | | | |
| SAR | 160 | 2.2 | 0.4 | 4.1 | 0.9 | -.06 | -.95 |
| Boron | 11 | 198 | 70 | 300 | 70 | -.27 | -.60 |

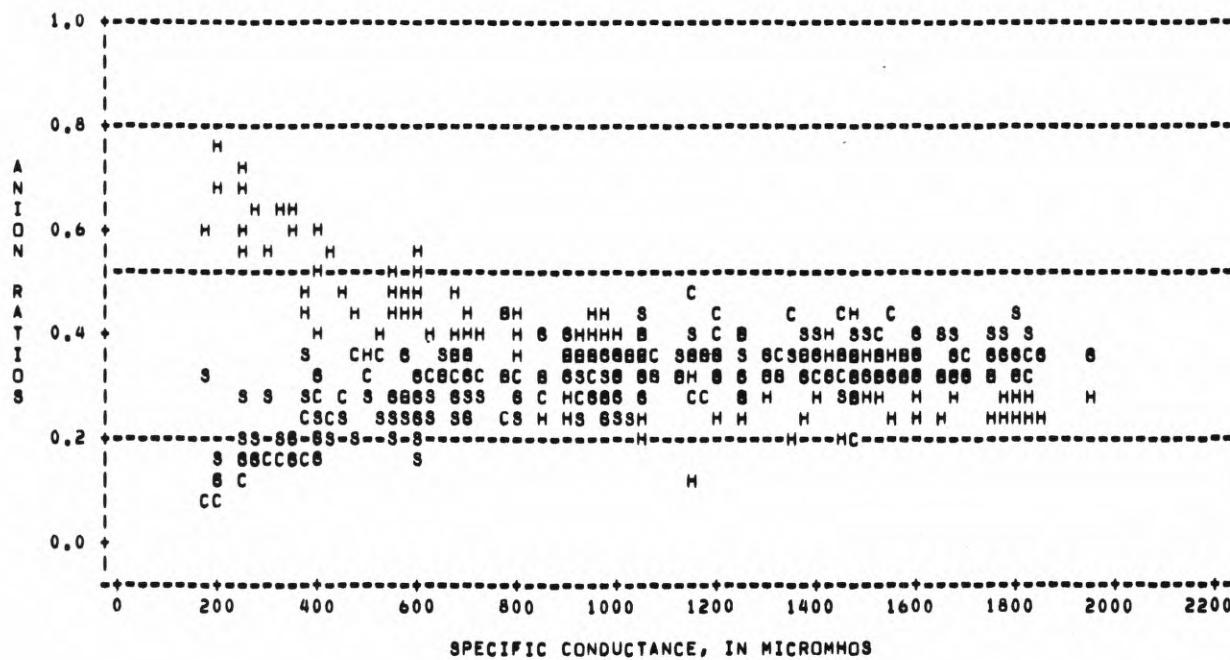
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 290 | 678 | 1195 | 1588 | 1783 |
| Dissolved solids | 160 | 366 | 596 | 906 | 1050 |
| pH | 7.3 | 7.7 | 8.0 | 8.3 | 8.5 |
| Total hardness | 108 | 194 | 300 | 460 | 520 |
| Chloride | 18 | 70 | 130 | 200 | 230 |
| Sulfate | 28 | 83 | 165 | 270 | 340 |
| Iron | 0 | 10 | 20 | 50 | 436 |
| Fluoride | 0.1 | 0.6 | 0.8 | 0.8 | 0.9 |
| Arsenic | | | | | |
| Cadmium | 0 | 0 | 0 | 1 | 2 |
| Chromium | 0 | 0 | 0 | 2 | 10 |
| Lead | 0 | 0 | 1 | 4 | 9 |
| Mercury | | | | | |
| SAR | 0.7 | 1.5 | 2.2 | 3.0 | 3.3 |
| Boron | 70 | 150 | 180 | 260 | 294 |

CATION RATIO PLOT
 N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR EL RENO, OK



ANION RATIO PLOT
 H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR EL RENO, OK



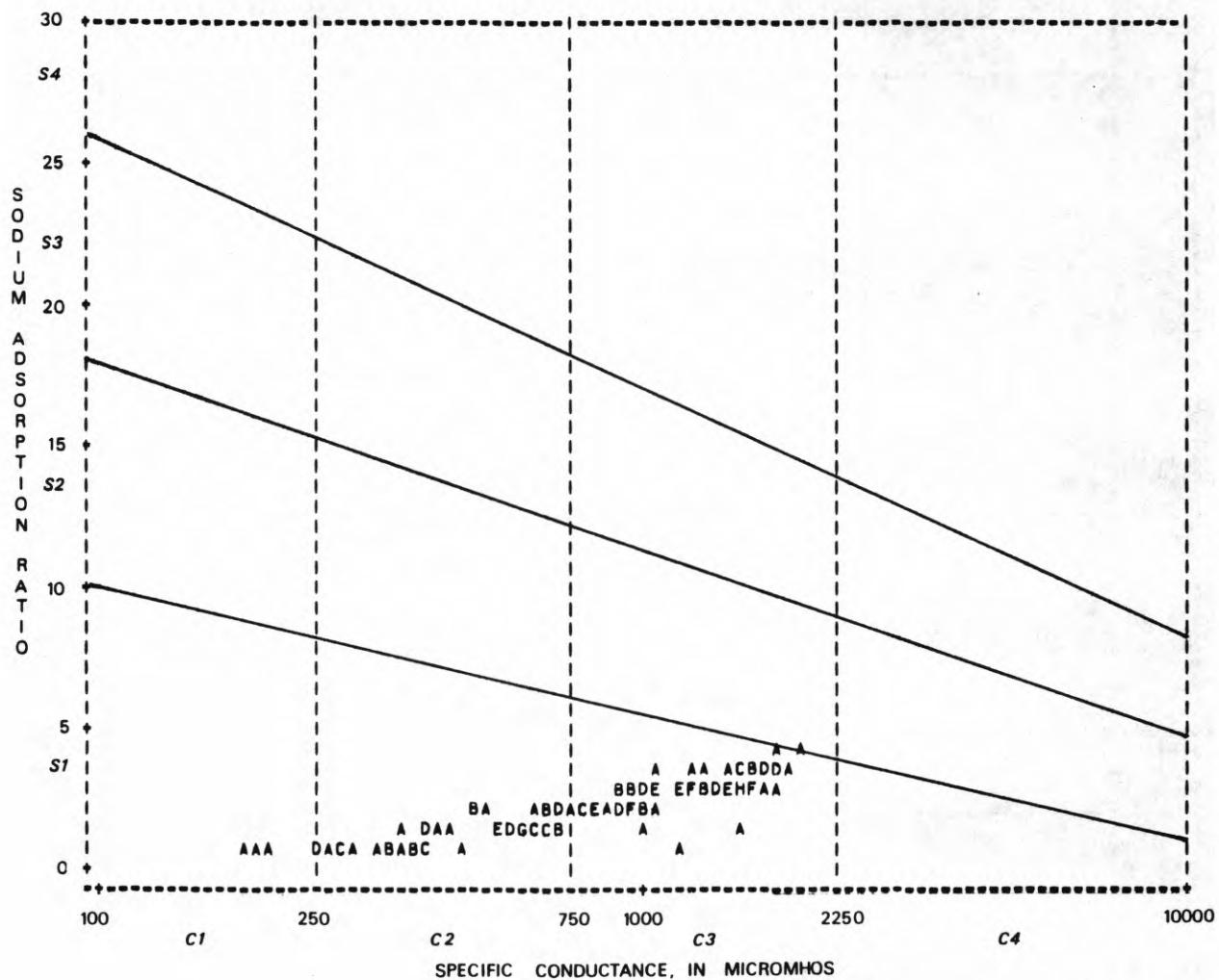
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR EL RENO, OK



NORTH CANADIAN RIVER BASIN

07239700 - North Canadian River near Yukon, Okla.

LOCATION.--Lat $35^{\circ}32'27''$, long $97^{\circ}44'31''$, in SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 5, T.12 N., R.5 W., Canadian County, at bridge on State Highway 4, 3 mi north of Yukon.

DRAINAGE AREA.--Not determined.

PERIOD OF RECORD.--1952 to 1954.

WATER TYPE.--The water was mixed type throughout the range of measured specific conductance.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--Eighty-five percent of the hardness values were greater than 180 mg/L and the average concentration was 255 mg/L. In general, the hardness classification for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 5 percent of the chloride values and the recommended maximum sulfate concentration of 250 mg/L was exceeded by 8 percent of the sulfate values. Only one analysis was available for the toxic metals cadmium, chromium, and lead and the concentrations were well within their maximum contaminant levels. No data are available for arsenic or mercury. Based on the data, this water should be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from low to high with 64 percent of the samples having a high salinity hazard. The sodium hazard ranged from low to medium with 96 percent of the SAR values equivalent to a low sodium hazard. The data indicate that boron phytotoxic effects should not occur.

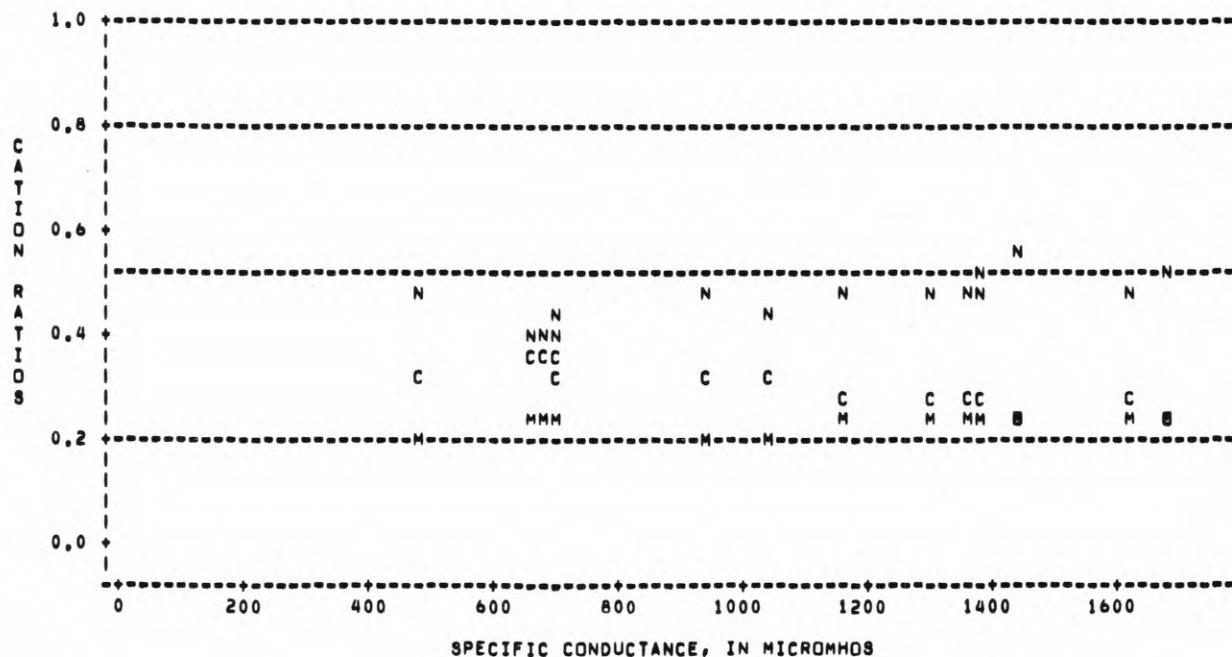
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|------|-----|------|-------|
| Specific conductance | 57 | 1001 | 179 | 1690 | 386 | 0.04 | -0.85 |
| Dissolved solids | 56 | 607 | 98 | 1060 | 241 | .13 | -.91 |
| pH | 56 | 8.0 | 7.2 | 8.4 | 0.3 | -.76 | .03 |
| Total hardness | 56 | 255 | 64 | 416 | 84 | .00 | -.42 |
| Chloride | 56 | 138 | 11 | 278 | 68 | .16 | -1.07 |
| Sulfate | 56 | 151 | 23 | 301 | 68 | .18 | -.96 |
| Iron | 1 | 40 | | | | | |
| Fluoride | 14 | 0.6 | 0.5 | 0.9 | 0.2 | 1.05 | -.70 |
| Arsenic | 0 | | | | | | |
| Cadmium | 1 | 0 | | | | | |
| Chromium | 1 | 0 | | | | | |
| Lead | 1 | 0 | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 56 | 3.0 | 0.6 | 5.0 | 1.1 | -.15 | -1.02 |
| Boron | 16 | 338 | 170 | 670 | 180 | .93 | -.81 |

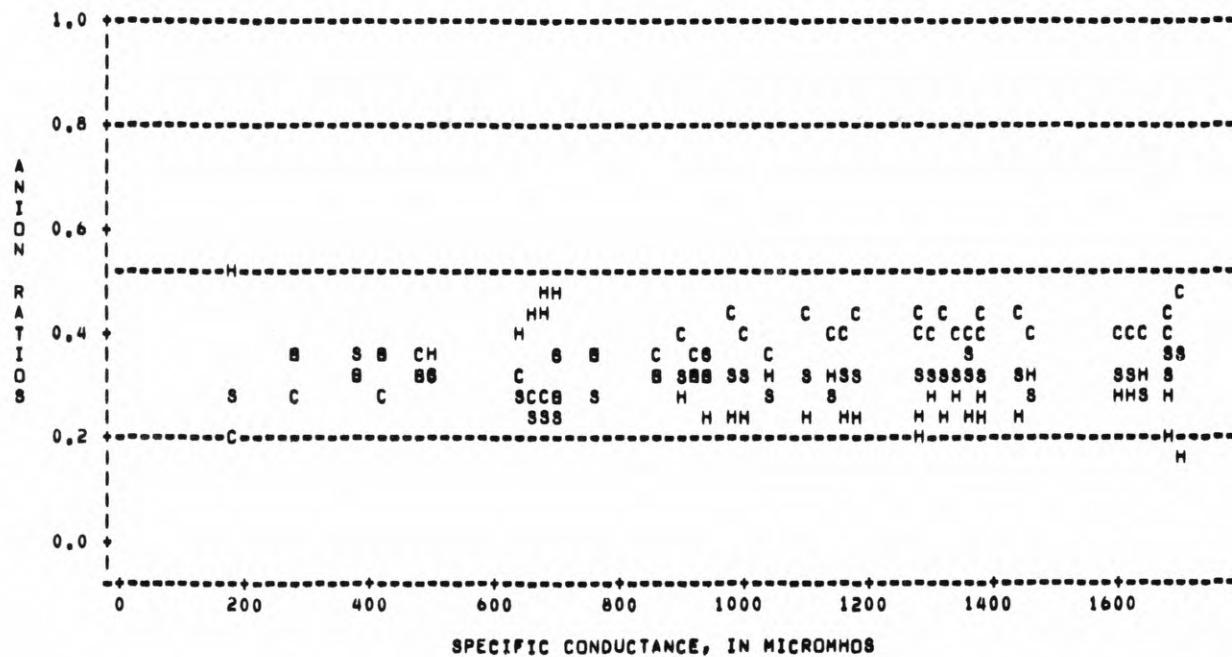
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 490 | 682 | 950 | 1350 | 1670 |
| Dissolved solids | 287 | 396 | 588 | 817 | 1040 |
| pH | 7.4 | 7.7 | 8.0 | 8.1 | 8.3 |
| Total hardness | 130 | 207 | 235 | 324 | 408 |
| Chloride | 60 | 72 | 134 | 198 | 250 |
| Sulfate | 73 | 83 | 151 | 206 | 264 |
| Iron | | | | | |
| Fluoride | 0.5 | 0.5 | 0.5 | 0.8 | 0.9 |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 1.8 | 1.8 | 3.2 | 3.9 | 4.6 |
| Boron | 177 | 210 | 240 | 525 | 670 |

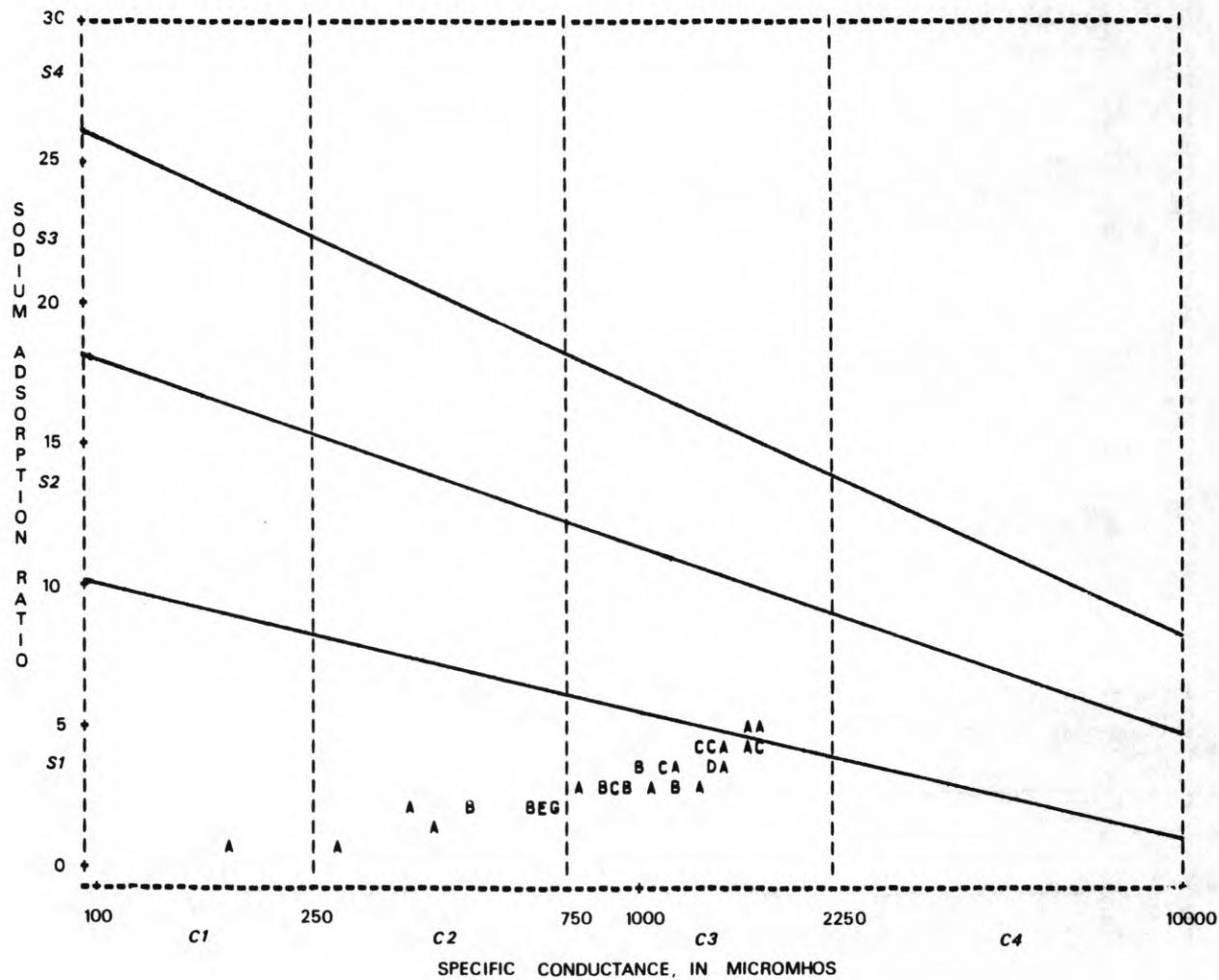
CATION RATIO PLOT
 N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR YUKON, OK



ANION RATIO PLOT
 H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR YUKON, OK



IRRIGATION DIAGRAM
C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
A = 1 OBS, B = 2 OBS, C = 3 OBS
STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR YUKON, OK



NORTH CANADIAN RIVER BASIN

07241500 - North Canadian River near Oklahoma City, Okla.

LOCATION.--Lat $35^{\circ}29'40''$, long $97^{\circ}25'40''$, in SE 4 SE 4 sec. 20, T.12 N., R.2 W., Oklahoma County, at bridge on U.S. Highway 62, 4.5 mi east of State Capitol in Oklahoma City, 5 mi upstream from Crutcho Creek, and at mile 261.2.

DRAINAGE AREA.--13,354 mi 2 , of which 4,899 mi 2 is probably noncontributing.

PERIOD OF RECORD.--1952, 1960 to 1963.

WATER TYPE.--For specific conductance greater than 2,000 umho, 65 percent of the samples, the water was sodium chloride type. For specific conductance less than 2,000 umho, the water generally was mixed type.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--Ninety-five percent of the hardness values were greater than 180 mg/L and the average concentration was 433 mg/L. The hardness classification for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 80 percent of the chloride values. For the only analysis available for cadmium and lead, their concentrations did not exceed maximum contaminant levels. No other toxic metal data are available. Because of the frequency and magnitude by which the recommended maximum chloride concentration was exceeded, this water may not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from medium to very high with 53 percent of the samples having a very high salinity hazard. The sodium hazard ranged from low to high with 86 percent of the SAR values equivalent to a low or medium sodium hazard. The data indicate that phytotoxic effects could occur in boron sensitive and semitolerant plants.

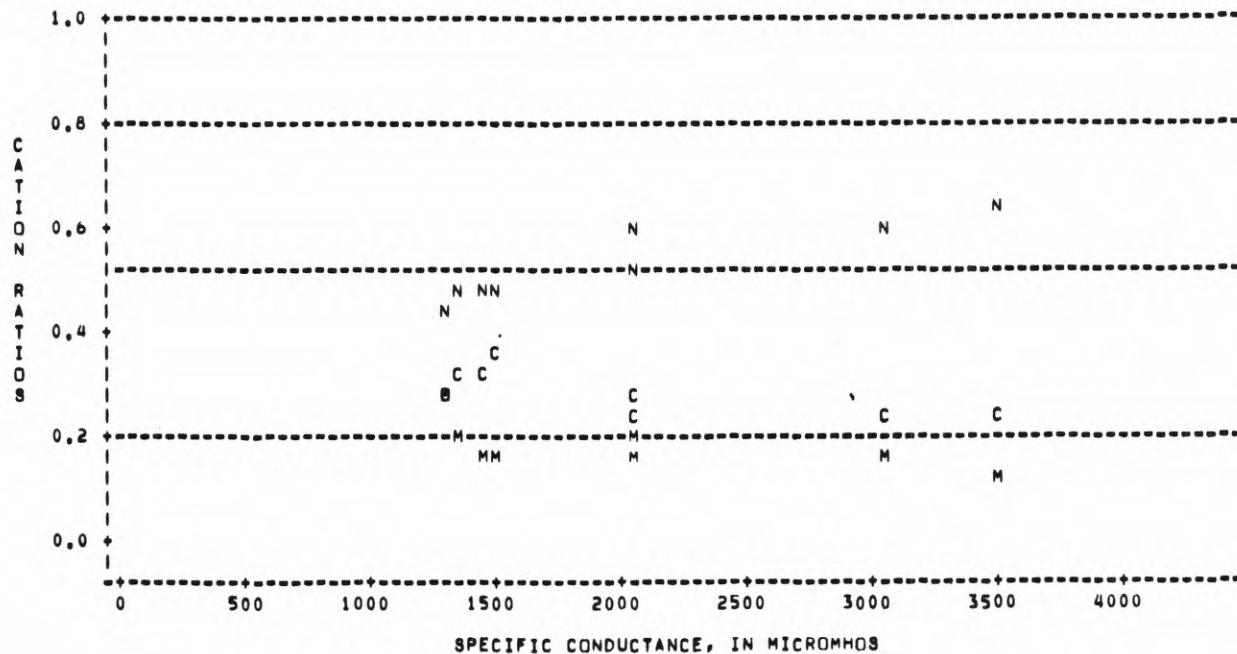
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|------|-----|-------|-------|
| Specific conductance | 22 | 2269 | 564 | 4040 | 812 | 0.06 | 0.06 |
| Dissolved solids | 21 | 1420 | 333 | 2600 | 543 | .10 | .05 |
| pH | 22 | 8.0 | 7.1 | 8.6 | 0.5 | -.11 | -1.42 |
| Total hardness | 21 | 433 | 152 | 635 | 110 | -.26 | 1.09 |
| Chloride | 21 | 523 | 79 | 1120 | 252 | .34 | .30 |
| Sulfate | 21 | 172 | 32 | 225 | 50 | -1.86 | 3.17 |
| Iron | 1 | 10 | | | | | |
| Fluoride | 8 | 1.3 | 0.5 | 5.6 | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 1 | 1 | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 1 | 8 | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 21 | 6.4 | 1.9 | 11 | 2.3 | -.27 | -.36 |
| Boron | 8 | 504 | 180 | 1500 | | | |

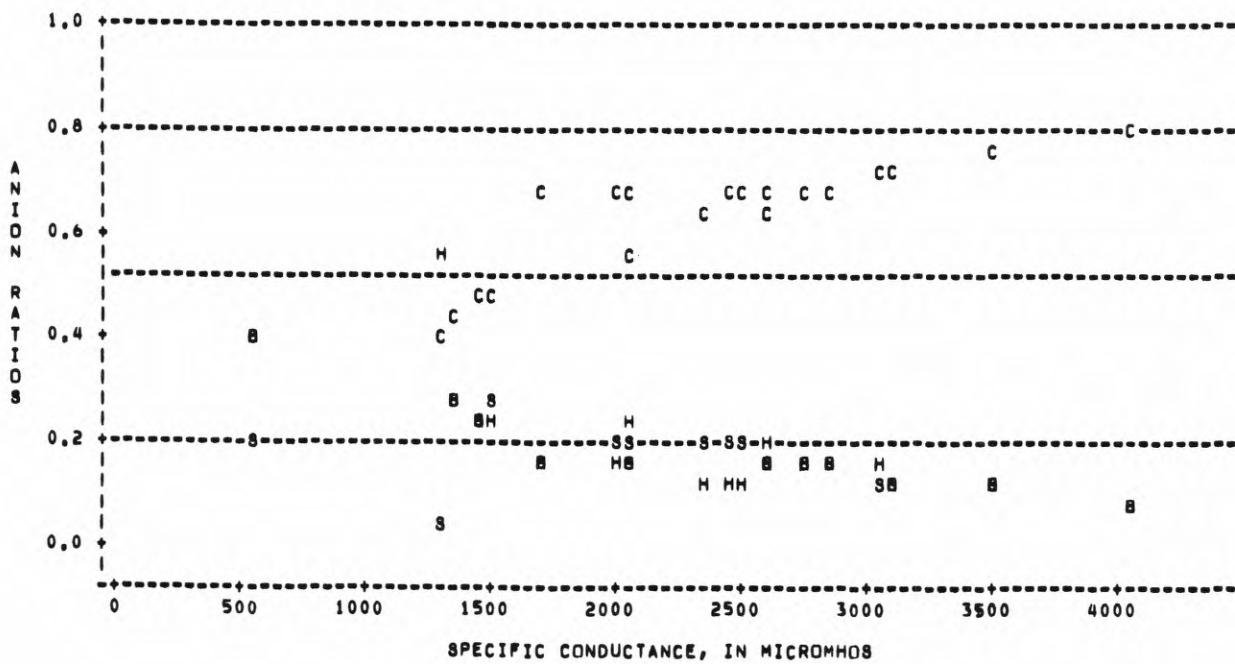
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 1312 | 1607 | 2390 | 2775 | 3369 |
| Dissolved solids | 719 | 1002 | 1520 | 1775 | 2174 |
| pH | 7.3 | 7.5 | 8.0 | 8.3 | 8.5 |
| Total hardness | 325 | 368 | 410 | 520 | 602 |
| Chloride | 187 | 318 | 550 | 655 | 875 |
| Sulfate | 64 | 169 | 180 | 202 | 219 |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 3.0 | 4.4 | 6.9 | 8.2 | 8.6 |
| Boron | | | | | |

CATION RATIO PLOT
N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR OK CITY, OK



ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR OK CITY, OK



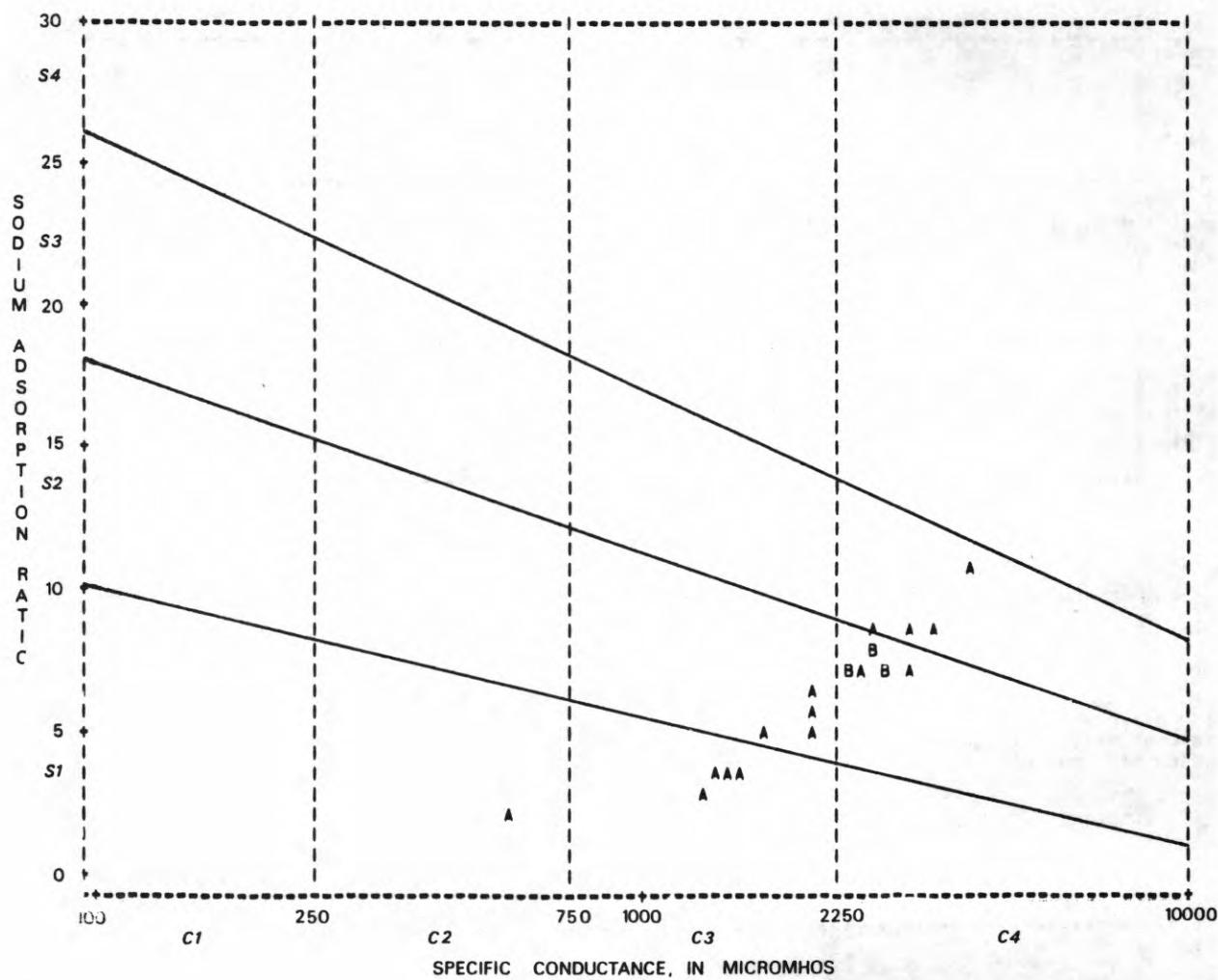
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR OK CITY, OK



NORTH CANADIAN RIVER BASIN

07241550 - North Canadian River near Harrah, Okla.

LOCATION.--Lat 35°30'01", long 97°11'37", in SW_{1/4}NW_{1/4} sec. 22, T.12 N., R.1 E., Oklahoma County, at county road bridge, 2.2 mi northwest of Harrah, 3.8 mi downstream from Choctaw Creek, and at mile 230.0

DRAINAGE AREA.--13,501 mi², of which 4,899 mi² is probably noncontributing.

PERIOD OF RECORD.--1969 to 1979.

WATER TYPE.--For specific conductance greater than 500 umho, 95 percent of the samples, the water was sodium chloride type. For specific conductance less than 500 umho, the water was calcium carbonate/bicarbonate type.

TREND.--Plots of the dissolved solids, hardness, chloride, and sulfate concentrations versus time do not indicate any trend. The Spearman's rhos for dissolved solids and hardness at the 95-percent probability level do not indicate trends. However, the Spearman's rho for chloride indicates a negative trend and the Spearman's rho for sulfate indicates a positive trend.

PUBLIC WATER SUPPLY.--Eighty-two percent of the hardness values were greater than 180 mg/L and the average concentration was 296 mg/L. In general, the hardness classification for this water is very hard. The recommended maximum pH of 9.0 and the recommended minimum pH of 5.0 were each exceeded by less than 1 percent of the pH values, the recommended maximum chloride concentration of 250 mg/L was exceeded by 52 percent of the chloride values, and the recommended maximum iron concentration of 200 ug/L was exceeded by 6 percent of the iron values. The maximum cadmium contaminant level of 10 ug/L was exceeded by 9 percent of the cadmium values and the maximum lead contaminant level of 50 ug/L was exceeded by 4 percent of the lead values. Arsenic, chromium, and mercury concentrations did not exceed their maximum contaminant levels. Because of the frequency and magnitude by which the recommended maximum chloride concentration was exceeded and because cadmium and lead maximum contaminant levels were exceeded, this water probably is not suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from low to very high with 84 percent of the samples having a high or very high salinity hazard. The sodium hazard ranged from low to very high with 62 percent of the SAR values equivalent to a low sodium hazard. About 10 percent of the boron values exceeded the 750 ug/L limit for sensitive plants. Some boron concentrations, about 5 percent, were large enough to cause phytotoxic effects in semitolerant and tolerant plants.

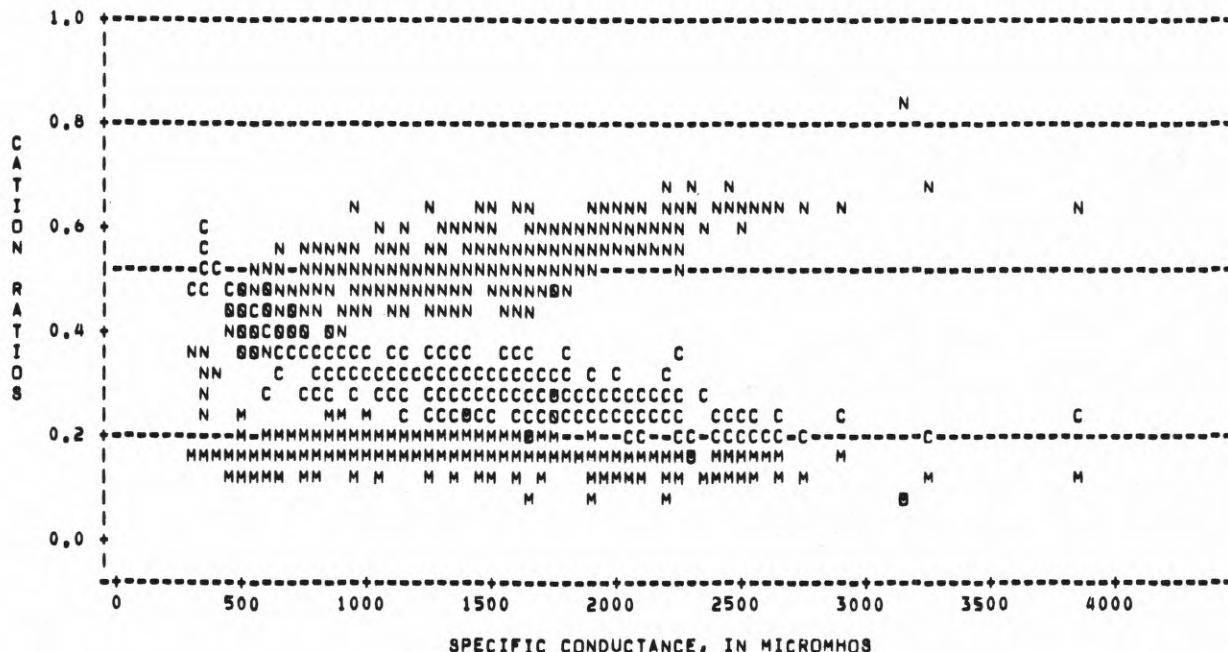
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|-----|------|-----|------|-----|------|-------|
| Specific conductance | 804 | 1441 | 165 | 3840 | 569 | 0.04 | -0.34 |
| Dissolved solids | 693 | 854 | 167 | 2310 | 345 | .04 | -.36 |
| pH | 786 | 8.0 | 4.2 | 9.8 | 0.4 | -.75 | 5.57 |
| Total hardness | 620 | 296 | 88 | 630 | 101 | -.06 | -.83 |
| Chloride | 624 | 269 | 26 | 1000 | 147 | .63 | .69 |
| Sulfate | 622 | 127 | 14 | 225 | 80 | 2.50 | 5.25 |
| Iron | 72 | 124 | 0 | 3300 | 390 | 7.83 | 64.26 |
| Fluoride | 5 | 1.0 | 0.8 | 1.3 | | | |
| Arsenic | 2 | 4 | 2 | 5 | | | |
| Cadmium | 93 | 3 | 0 | 30 | 5.0 | 3.11 | 11.46 |
| Chromium | 185 | 13 | 0 | 30 | 6.5 | 3.45 | 22.22 |
| Lead | 73 | 9 | 0 | 200 | 25 | 6.93 | 53.00 |
| Mercury | 7 | 0.0 | 0.0 | 0.1 | | | |
| SAR | 615 | 4.3 | 0.8 | 13 | 1.7 | .24 | .20 |
| Boron | 85 | 498 | 90 | 5100 | 925 | 3.97 | 14.93 |

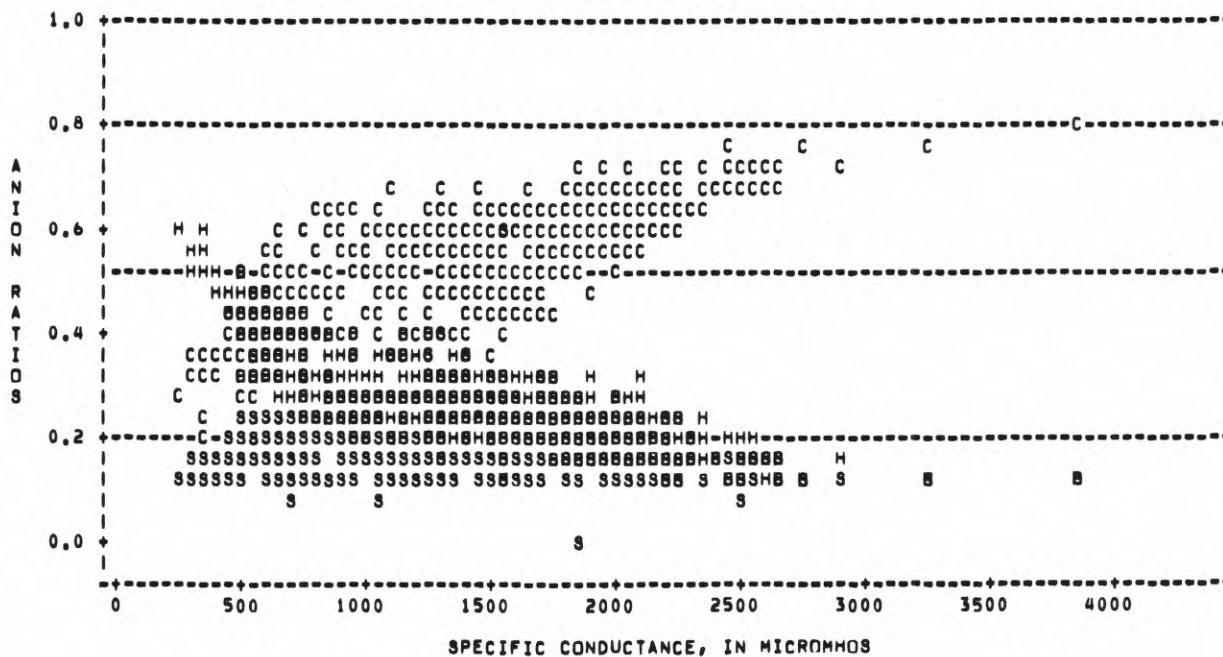
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 626 | 993 | 1500 | 1850 | 2140 |
| Dissolved solids | 356 | 565 | 896 | 1100 | 1266 |
| pH | 7.3 | 7.7 | 8.0 | 8.2 | 8.4 |
| Total hardness | 150 | 208 | 310 | 370 | 430 |
| Chloride | 84 | 152 | 260 | 370 | 460 |
| Sulfate | 44 | 75 | 120 | 150 | 190 |
| Iron | 0 | 20 | 50 | 120 | 207 |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | 0 | 0 | 1 | 2 | 9 |
| Chromium | 0 | 0 | 0 | 10 | 20 |
| Lead | 0 | 1 | 4 | 7 | 16 |
| Mercury | | | | | |
| SAR | 2.1 | 3.0 | 4.2 | 5.7 | 6.4 |
| Boron | 138 | 185 | 270 | 400 | 512 |

CATION RATIO PLOT
 N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR HARRAH, OK



ANION RATIO PLOT
 H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR HARRAH, OK



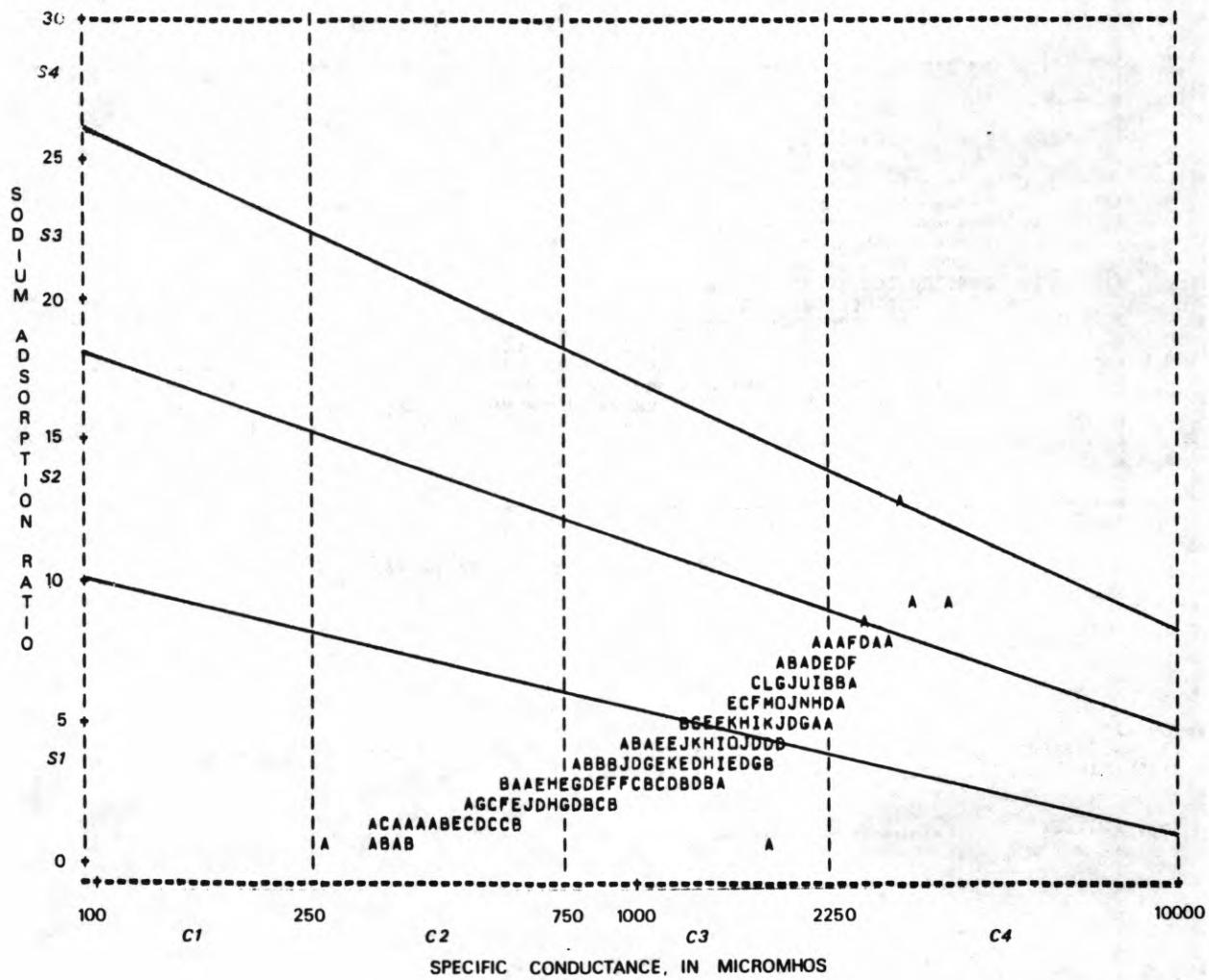
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR HARRAH, OK



NORTH CANADIAN RIVER BASIN

07242000 - North Canadian River near Wetumka, Okla.

LOCATION.--Lat 35°15'53", long 96°12'25", in center of SE^{1/4} sec. 12, T.9 N., R.10 E., Hughes County, at bridge on U.S. Highway 75, 2.3 mi upstream from Wewoka Creek, 2.5 mi northeast of Wetumka, and at mile 84.4.

DRAINAGE AREA.--14,290 mi², of which 4,899 mi² is probably noncontributing.

PERIOD OF RECORD.--1952, 1954 to 1979.

WATER TYPE.--For specific conductance greater than 500 umho, 94 percent of the samples, the water was sodium chloride type. For specific conductance less than 500 umho, the water was calcium carbonate/bicarbonate type.

TREND.--Plots of the dissolved solids, hardness, sulfate, and chloride concentrations versus time indicate no trend for hardness, positive trend for sulfate, and negative trend for chloride and dissolved solids. The Spearman's rhos at the 95-percent probability level for these constituents also indicate no trend for hardness, positive trend for sulfate, and negative trend for chloride and dissolved solids.

PUBLIC WATER SUPPLY.--Eighty-four percent of the hardness values were greater than 180 mg/L and the average concentration was 552 mg/L. In general, the hardness classification for this water is very hard. The recommended minimum pH of 5.0 was exceeded by less than 1 percent of the pH values, the recommended maximum pH of 9.0 was exceeded by 4 percent of the pH values, the recommended maximum chloride concentration of 250 mg/L was exceeded by 66 percent of the chloride values, and the recommended maximum sulfate concentration of 250 mg/L was exceeded by less than 1 percent of the sulfate values. Arsenic, cadmium, chromium, lead, and mercury concentrations did not exceed their maximum contaminant values. Because of the frequency and magnitude by which the recommended maximum chloride concentration was exceeded, this water would not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from low to very high with 29 percent of the samples having a very high salinity hazard. The sodium hazard ranged from low to very high with 28 percent of the SAR values equivalent to a very high sodium hazard. Four percent of the boron values were greater than 750 ug/L and could cause phytotoxic effects in boron sensitive plants.

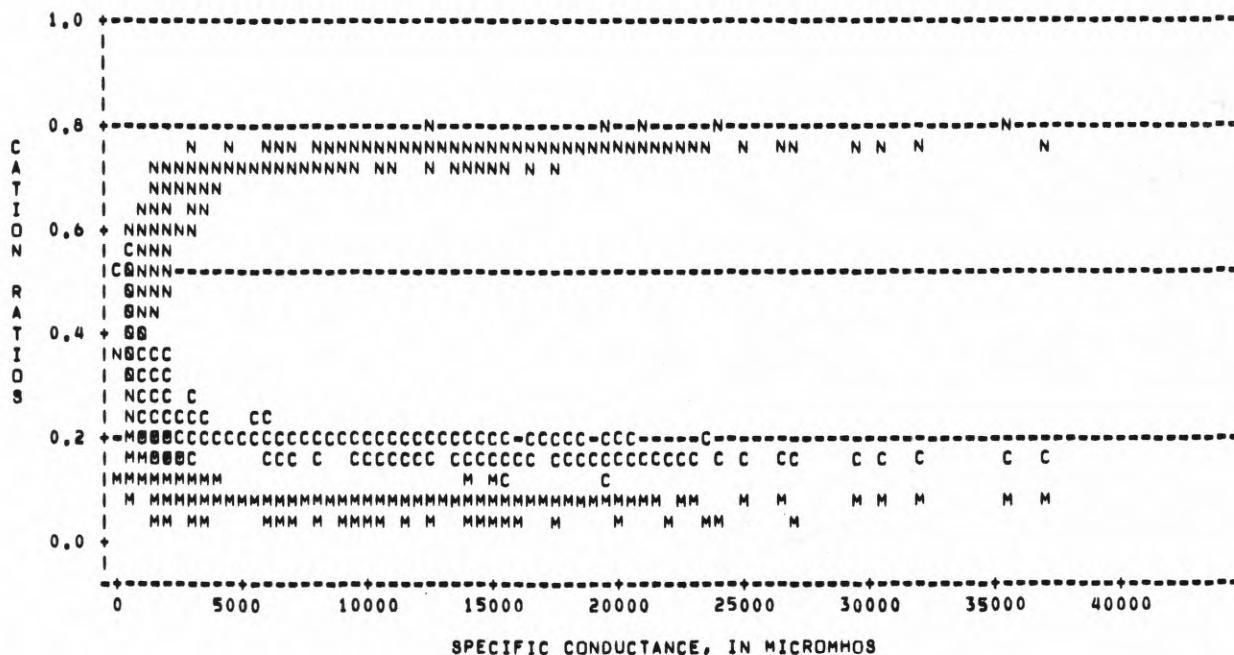
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|------|------|-----|-------|------|------|------|
| Specific conductance | 1461 | 3619 | 193 | 37100 | 5161 | 2.56 | 6.83 |
| Dissolved solids | 1415 | 2276 | 119 | 25800 | 3382 | 2.73 | 8.29 |
| pH | 1458 | 8.1 | 4.8 | 10.1 | 0.5 | -.59 | 4.61 |
| Total hardness | 1376 | 552 | 26 | 4640 | 628 | 2.58 | 7.26 |
| Chloride | 1435 | 1112 | 17 | 14300 | 1898 | 2.76 | 8.46 |
| Sulfate | 1431 | 73 | 4.9 | 351 | 42 | 1.16 | 2.73 |
| Iron | 7 | 67 | 20 | 240 | | | |
| Fluoride | 159 | 0.5 | 0.0 | 1.1 | 0.2 | .61 | .84 |
| Arsenic | 8 | 6 | 2 | 10 | | | |
| Cadmium | 8 | 2 | 1 | 6 | | | |
| Chromium | 8 | 6 | 0 | 30 | | | |
| Lead | 8 | 8 | 0 | 45 | | | |
| Mercury | 8 | 0.0 | 0.0 | 0.1 | | | |
| SAR | 1001 | 9.7 | 0.6 | 60 | 9.3 | 1.48 | 1.61 |
| Boron | 143 | 295 | 0 | 870 | 177 | 1.03 | 1.10 |

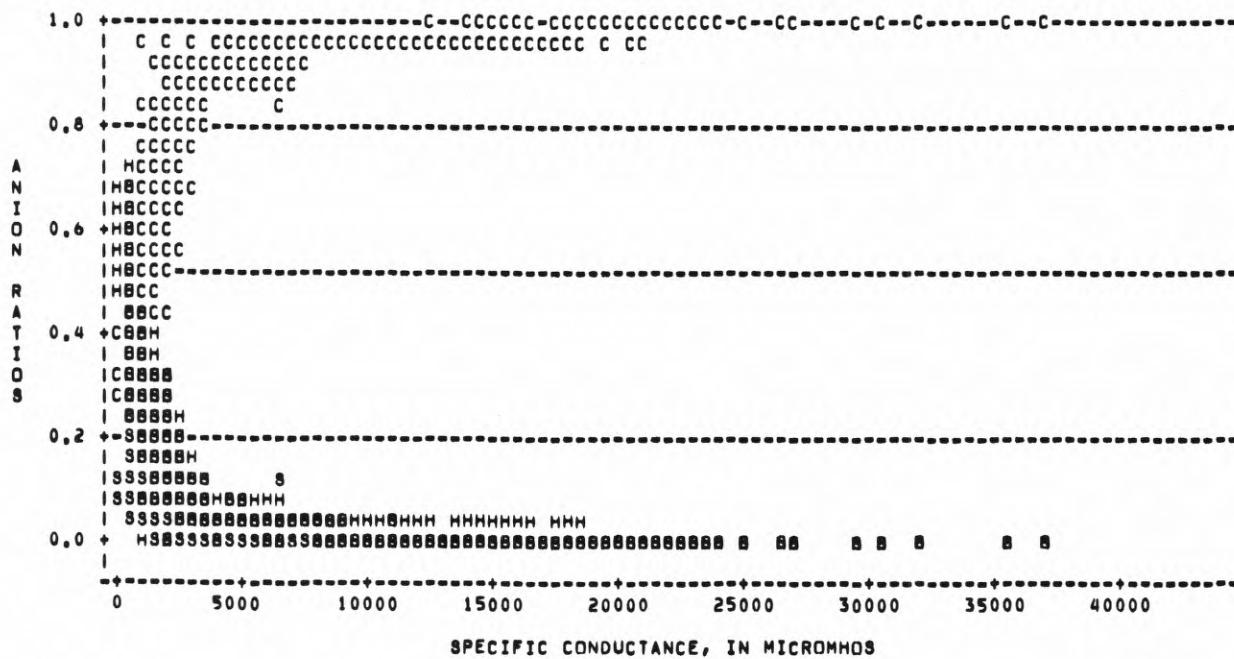
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|-------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 644 | 1060 | 1590 | 2765 | 11680 |
| Dissolved solids | 378 | 621 | 944 | 1740 | 7424 |
| pH | 7.4 | 7.8 | 8.1 | 8.4 | 8.6 |
| Total hardness | 152 | 228 | 330 | 469 | 1556 |
| Chloride | 109 | 200 | 340 | 770 | 3980 |
| Sulfate | 24 | 43 | 66 | 97 | 130 |
| Iron | | | | | |
| Fluoride | 0.4 | 0.4 | 0.5 | 0.6 | 0.8 |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 2.3 | 3.5 | 5.0 | 14 | 25 |
| Boron | 100 | 160 | 280 | 390 | 516 |

CATION RATIO PLOT
S IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR WETUMKA, OK



ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR WETUMKA, OK



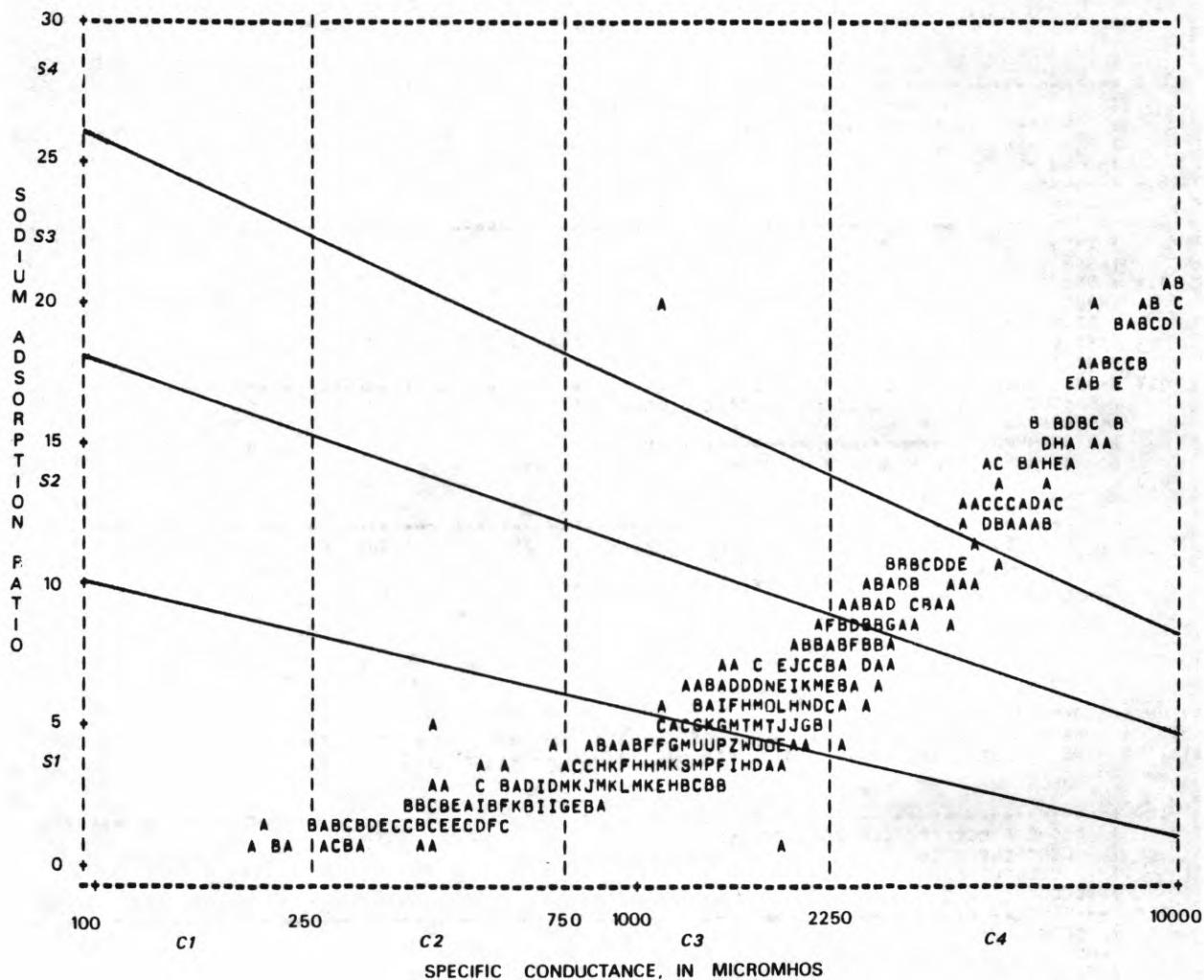
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=NORTH CANADIAN RIVER NR WETUMKA, OK



NORTH CANADIAN RIVER BASIN

07242050 - Wewoka Creek at Wewoka, Okla.

LOCATION.--Lat $35^{\circ}09'10''$, long $96^{\circ}29'30''$, in SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 17, T.8 N., R.8 E., Seminole County, at bridge on State Highway 56, at Wewoka.

DRAINAGE AREA.--Not determined.

PERIOD OF RECORD.--1962 to 1963.

WATER TYPE.--The water was chloride type throughout the range of measured specific conductance. No cation-specific conductance distribution data are available.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--All of the hardness values were greater than 180 mg/L and the average concentration was 591 mg/L. The hardness classification for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 95 percent of the chloride values. No toxic metal data are available. Because of the frequency and magnitude by which the recommended maximum chloride concentration was exceeded, this water would not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from high to very high with 72 percent of the samples having a very high salinity hazard. The sodium hazard ranged from medium to very high with 35 percent of the SAR values equivalent to a very high sodium hazard. No boron data are available.

UNIVARIATE STATISTICS

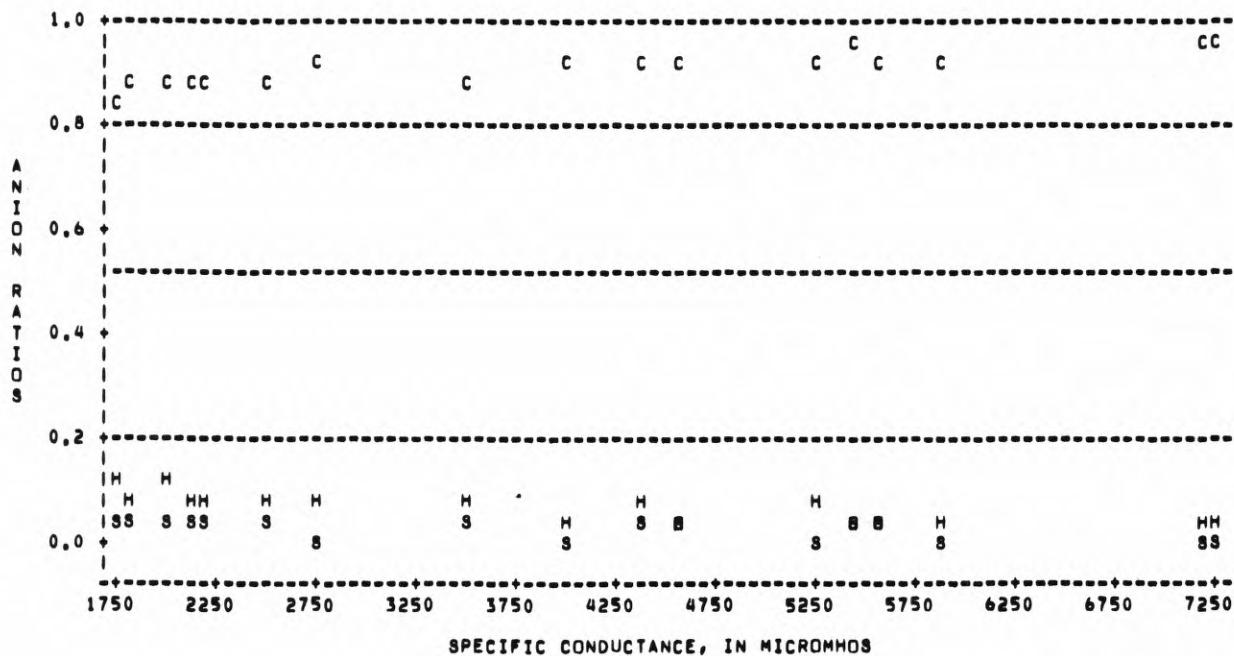
| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|------|------|------|------|-------|
| Specific conductance | 17 | 4012 | 1770 | 7270 | 1868 | 0.37 | -1.12 |
| Dissolved solids | 17 | 2438 | 1020 | 4570 | 1183 | .40 | -1.05 |
| pH | 17 | 8.1 | 7.8 | 8.4 | 0.2 | .09 | -1.73 |
| Total hardness | 17 | 591 | 248 | 1090 | 272 | .45 | -1.00 |
| Chloride | 17 | 1250 | 490 | 2400 | 638 | .49 | -.92 |
| Sulfate | 17 | 40 | 17 | 91 | 19 | 1.29 | 2.13 |
| Iron | 0 | | | | | | |
| Fluoride | 0 | | | | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 17 | 11 | 6.7 | 16 | 3.1 | .47 | -1.02 |
| Boron | 0 | | | | | | |

FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 1786 | 2145 | 3980 | 5510 | 7222 |
| Dissolved solids | 1028 | 1270 | 2370 | 3390 | 4466 |
| pH | 7.8 | 7.9 | 8.1 | 8.4 | 8.4 |
| Total hardness | 275 | 332 | 580 | 835 | 1050 |
| Chloride | 530 | 630 | 1230 | 1775 | 2400 |
| Sulfate | 19 | 25 | 33 | 50 | 66 |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 7.2 | 7.7 | 11 | 13 | 16 |
| Boron | | | | | |

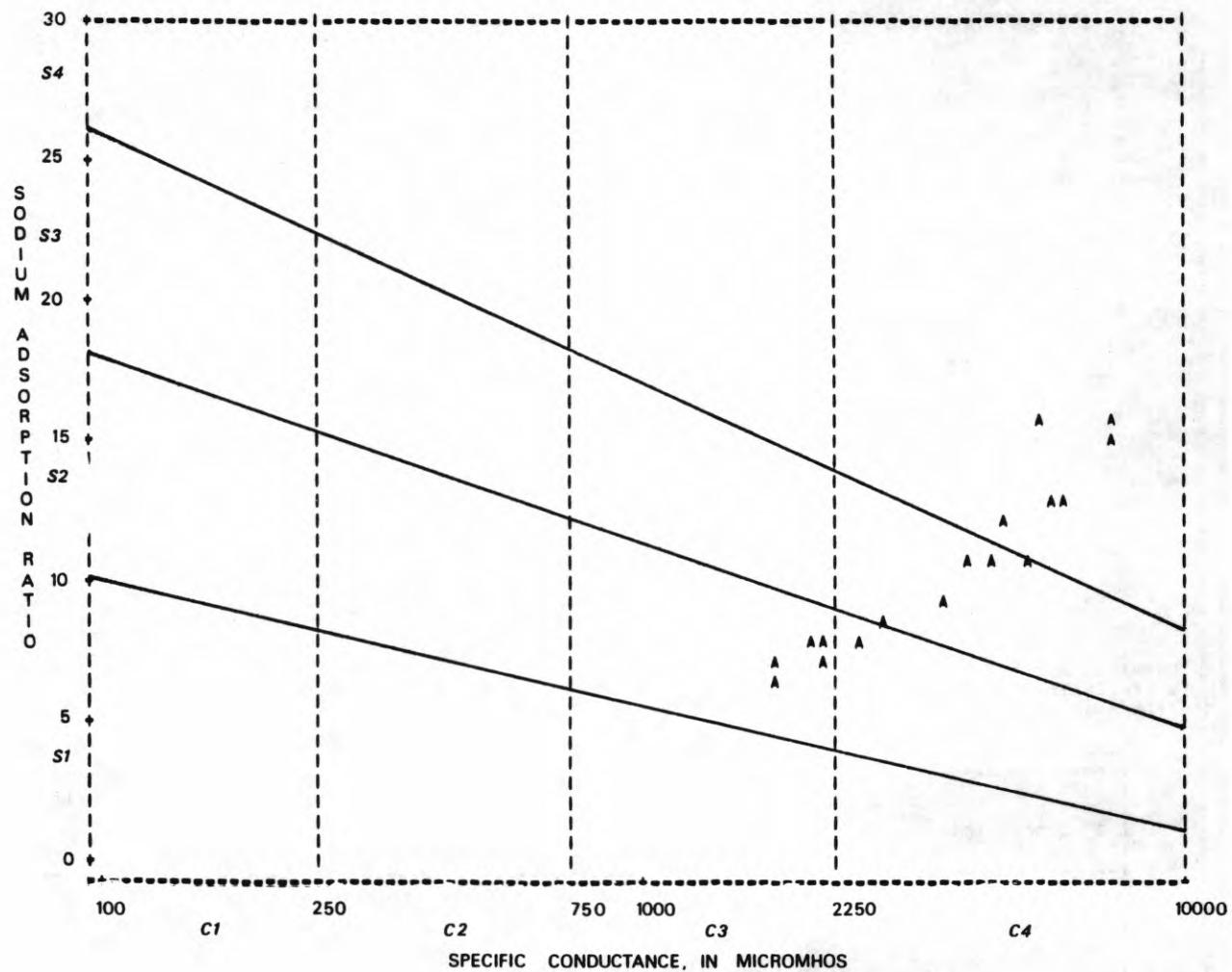
ANION RATIO PLOT

H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=WEWOKA CREEK AT WEWOKA, OK



IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
A = 1 OBS, B = 2 OBS, C = 3 OBS
STATION NAME OR LOCAL IDENTIFIER=WEWOKA CREEK AT WEWOKA, OK



NORTH CANADIAN RIVER BASIN

07242100 - Wewoka Creek near Wetumka, Okla.

LOCATION.--Lat $35^{\circ}13'15''$, long $96^{\circ}13'10''$, in NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 4, T.8 N., R.10 E., Hughes County, at bridge on U.S. Highway 75, 0.2 mi downstream from Grief Creek, 1.8 mi upstream from Little Grief Creek, 2.5 mi south of Wetumka, and at mile 8.2.

DRAINAGE AREA.--396 mi².

PERIOD OF RECORD.--1952 to 1957, 1960 to 1964.

WATER TYPE.--The water was sodium chloride type throughout the range of measured specific conductance.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--Eighty percent of the hardness values were greater than 180 mg/L and the average concentration was 1,202 mg/L. In general, the hardness classification for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 89 percent of the chloride values. No toxic metal data are available. Because of the frequency and magnitude by which the recommended maximum chloride concentration was exceeded, this water would not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from low to very high with 59 percent of the samples having a very high salinity hazard. The sodium hazard ranged from low to very high with about 12 percent of the SAR values equivalent to a very high sodium hazard. The data indicate that boron phytotoxic effects should not occur.

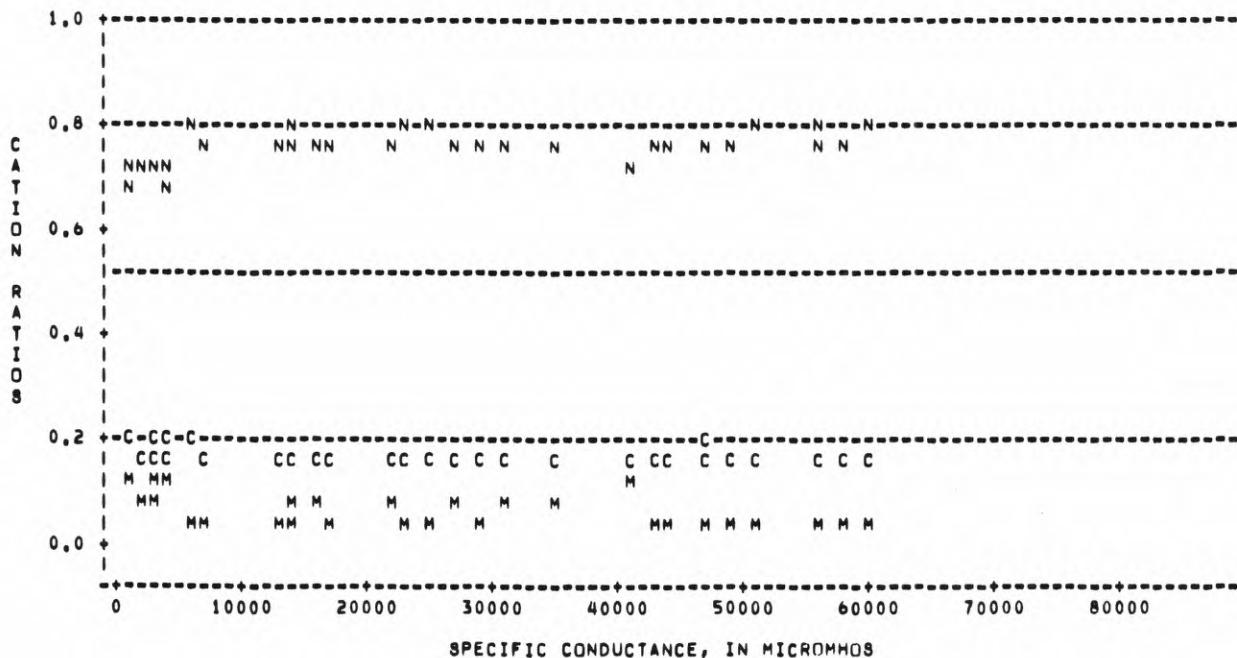
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|-----|------|-----|-------|-------|-------|-------|
| Specific conductance | 242 | 8365 | 183 | 87900 | 15558 | 2.93 | 8.39 |
| Dissolved solids | 198 | 1982 | 108 | 35600 | 3247 | 7.67 | 68.90 |
| pH | 242 | 7.8 | 6.0 | 8.6 | 0.4 | -1.15 | 2.07 |
| Total hardness | 242 | 1202 | 34 | 15600 | 2324 | 3.41 | 12.81 |
| Chloride | 242 | 3337 | 40 | 48100 | 7400 | 3.57 | 13.90 |
| Sulfate | 194 | 22 | 5.0 | 72 | 12 | 1.18 | 1.67 |
| Iron | 0 | | | | | | |
| Fluoride | 18 | 0.2 | 0.0 | 0.4 | 0.1 | .46 | .20 |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 33 | 36 | 5.3 | 64 | 19 | -.20 | -1.24 |
| Boron | 15 | 236 | 60 | 550 | 125 | 1.18 | 1.67 |

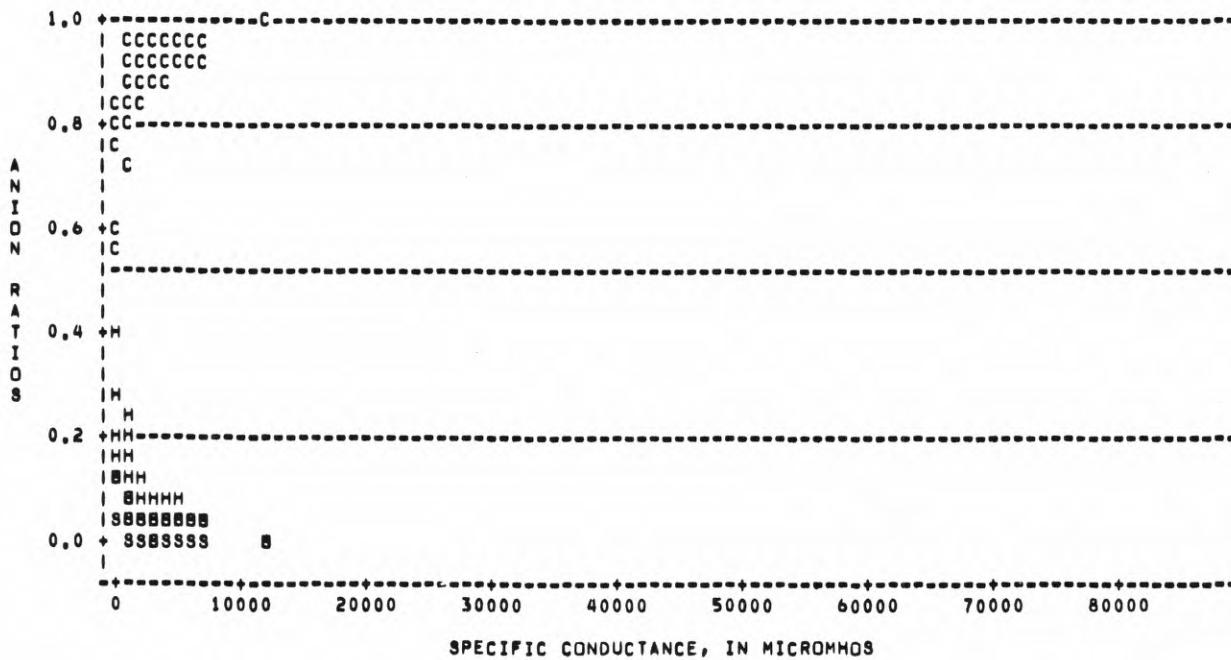
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|-------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 905 | 1450 | 2930 | 4885 | 29400 |
| Dissolved solids | 487 | 741 | 1375 | 2315 | 3212 |
| pH | 7.1 | 7.5 | 7.8 | 8.0 | 8.2 |
| Total hardness | 143 | 204 | 435 | 716 | 3998 |
| Chloride | 239 | 395 | 880 | 1600 | 11450 |
| Sulfate | 9.0 | 14 | 19 | 29 | 38 |
| Iron | | | | | |
| Fluoride | 0.1 | 0.1 | 0.2 | 0.2 | 0.4 |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 8.2 | 18 | 39 | 54 | 63 |
| Boron | 96 | 140 | 200 | 290 | 448 |

CATION RATIO PLOT
 N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=WEWOKA CREEK NR WETUMKA, OK



ANION RATIO PLOT
 H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=WEWOKA CREEK NR WETUMKA, OK



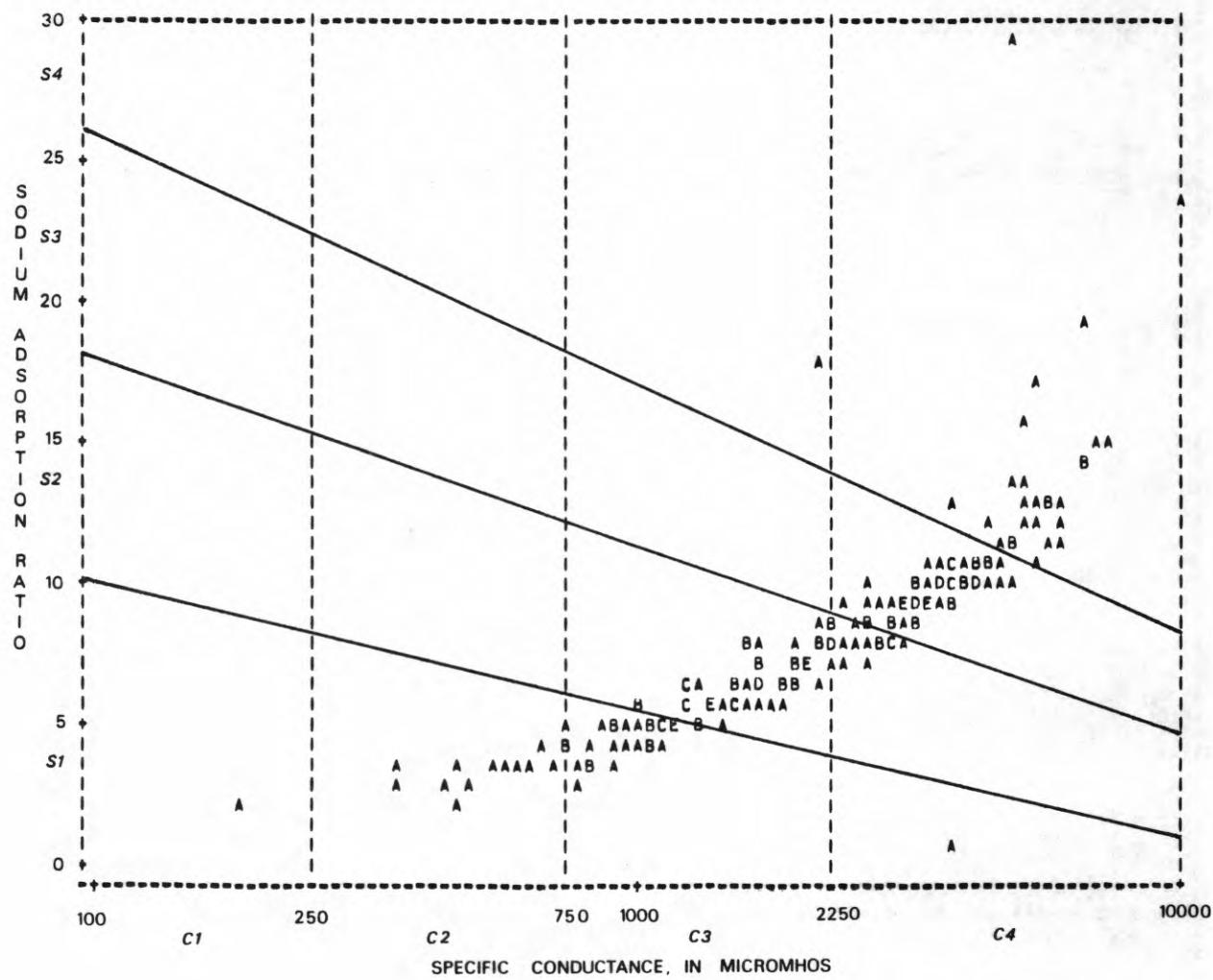
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=WEWOKA CREEK NR WETUMKA, OK



NORTH CANADIAN RIVER BASIN

07236000 - Wolf Creek near Fargo, Okla.

LOCATION.--Lat $36^{\circ}24'00''$, long $99^{\circ}37'25''$, in SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 11, T.22 N., R.23 W., Ellis County, at county road bridge, 0.2 mi downstream from Boggy Creek, 1.2 mi downstream from Sixteen Mile Creek, 1.5 mi north of Fargo, and at mile 18.7.

DRAINAGE AREA.--1,624 mi², of which 238 mi² is probably noncontributing.

PERIOD OF RECORD.--1958, 1960 to 1963.

WATER TYPE.--For specific conductance less than 700 umho, 21 percent of the samples, the water was bicarbonate type. For specific conductance greater than 700 umho the water was mixed type. There was no predominant cation throughout the range of measured specific conductance.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--Eighty-five percent of the hardness values were greater than 180 mg/L and the average concentration was 244 mg/L. In general, the hardness classification for this water is very hard. None of the measured constituents exceeded recommended maximum limits. No toxic metal data are available. Based on the data, this water should be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from medium to high with 78 percent of the samples having a high salinity hazard. All of the SAR values were equivalent to a low sodium hazard. None of the boron values exceeded the 750 ug/L recommended limit for boron sensitive plants.

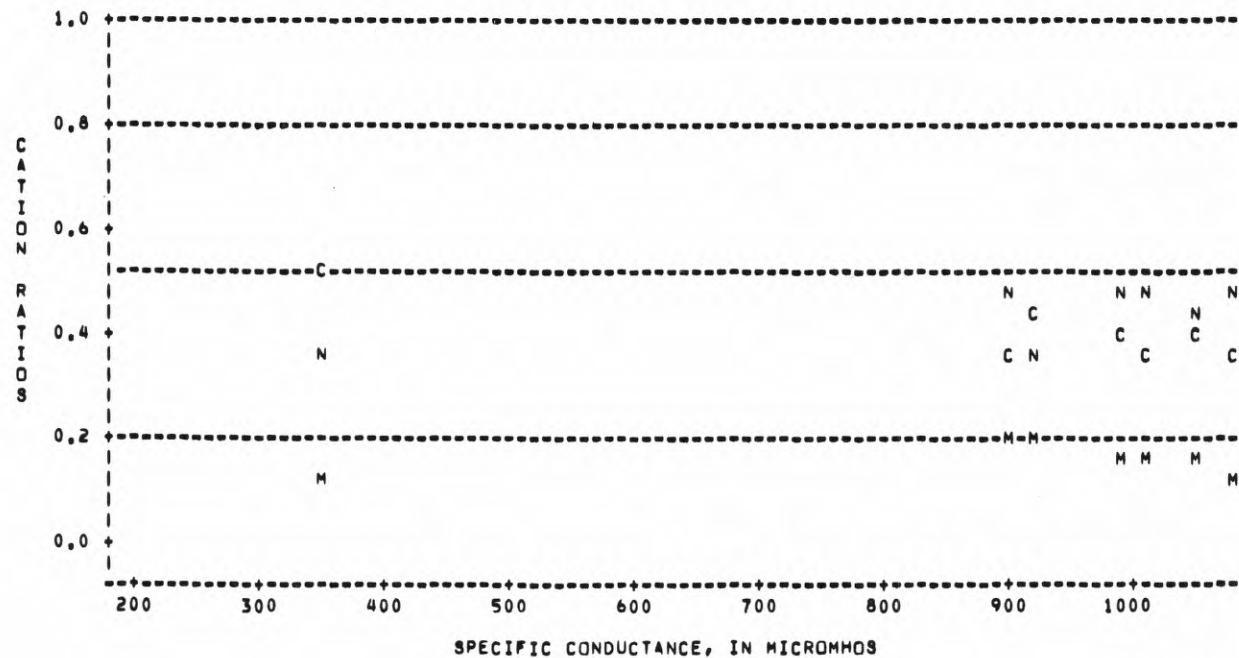
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|------|-----|-------|-------|
| Specific conductance | 44 | 866 | 320 | 1080 | 218 | -1.37 | 0.70 |
| Dissolved solids | 18 | 481 | 214 | 674 | 151 | -.60 | -1.10 |
| pH | 23 | 7.9 | 7.5 | 8.3 | 0.2 | -.18 | -.38 |
| Total hardness | 33 | 244 | 114 | 330 | 50 | -.66 | .33 |
| Chloride | 44 | 121 | 8.3 | 177 | 48 | -1.10 | .11 |
| Sulfate | 18 | 64 | 11 | 124 | 36 | -.13 | -1.14 |
| Iron | 0 | | | | | | |
| Fluoride | 1 | 0.7 | | | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 23 | 2.2 | 0.3 | 3.6 | 1.0 | -.66 | -.77 |
| Boron | 6 | 158 | 80 | 310 | | | |

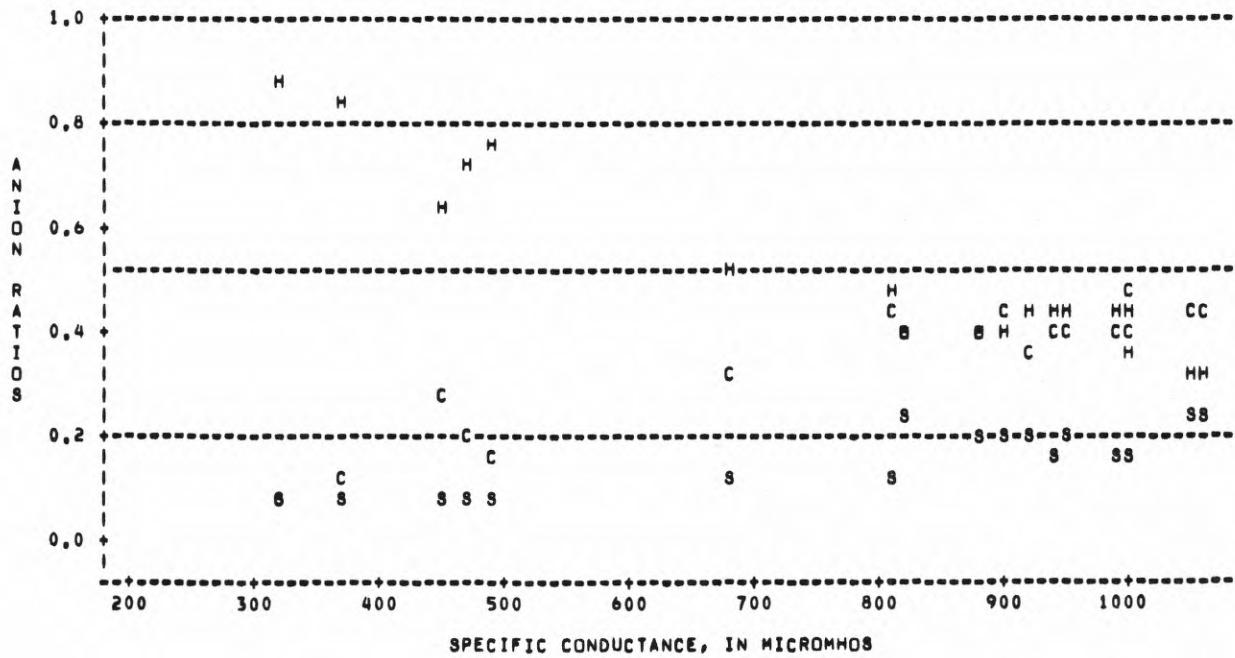
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 459 | 825 | 931 | 1018 | 1055 |
| Dissolved solids | 245 | 299 | 532 | 592 | 671 |
| pH | 7.6 | 7.8 | 7.9 | 8.1 | 8.2 |
| Total hardness | 163 | 217 | 250 | 278 | 309 |
| Chloride | 34 | 106 | 135 | 156 | 169 |
| Sulfate | 12 | 21 | 74 | 88 | 117 |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 0.4 | 1.2 | 2.6 | 3.0 | 3.5 |
| Boron | | | | | |

CATION RATIO PLOT
N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=WOLF CREEK NR FARGO, OK

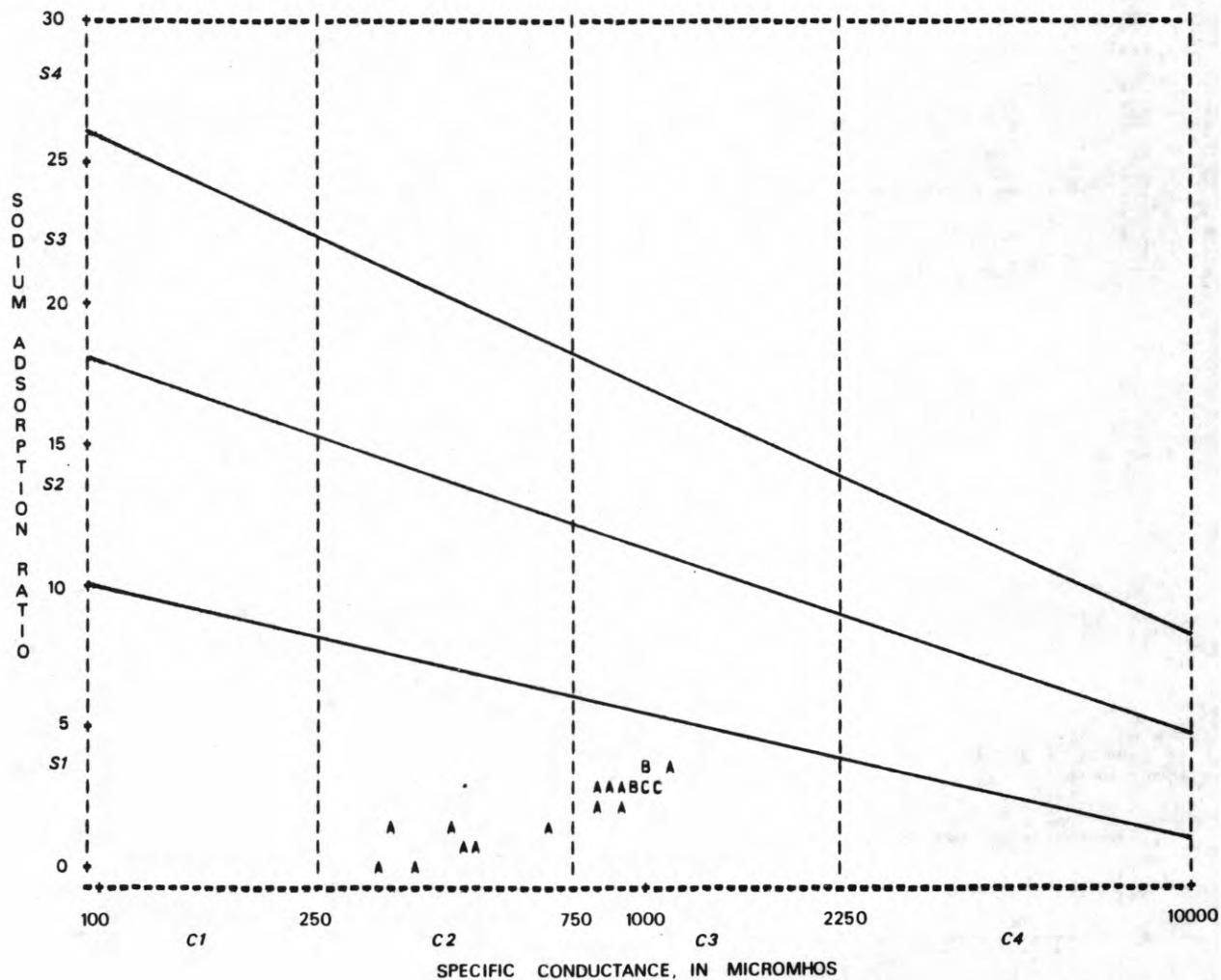


ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=WOLF CREEK NR FARGO, OK



IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
A = 1 OBS, B = 2 OBS, C = 3 OBS
STATION NAME OR LOCAL IDENTIFIER=WOLF CREEK NR FARGO, OK



DEEP FORK BASIN

07242500 - Bellcow Creek at Chandler, Okla.

LOCATION.--Lat $35^{\circ}42'08''$, long $96^{\circ}53'20''$, in NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 9, T.14 N., R.4 E., Lincoln County, at county road bridge in Chandler, 0.5 mi upstream from U.S. Highway 66 bridge, 1.2 mi downstream from Bellcalf Creek, and at mile 5.7.

DRAINAGE AREA.--46 mi².

PERIOD OF RECORD.--1949 to 1954.

WATER TYPE.--For specific conductance less than about 680 umho, 84 percent of the samples, the water was magnesium carbonate/bicarbonate type. For specific conductance greater than 680 umho the water was mixed type.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--Eighty-five percent of the hardness values were greater than 180 mg/L and the average concentration was 282 mg/L. In general, the hardness classification for this water is very hard. The recommended maximum pH of 9.0 was exceeded by 1 of 14 pH values. No toxic metal data are available. Based on the data, this water should be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from low to high with 89 percent of the samples having a medium salinity hazard. All of the SAR values were equivalent to a low sodium hazard. No boron data are available.

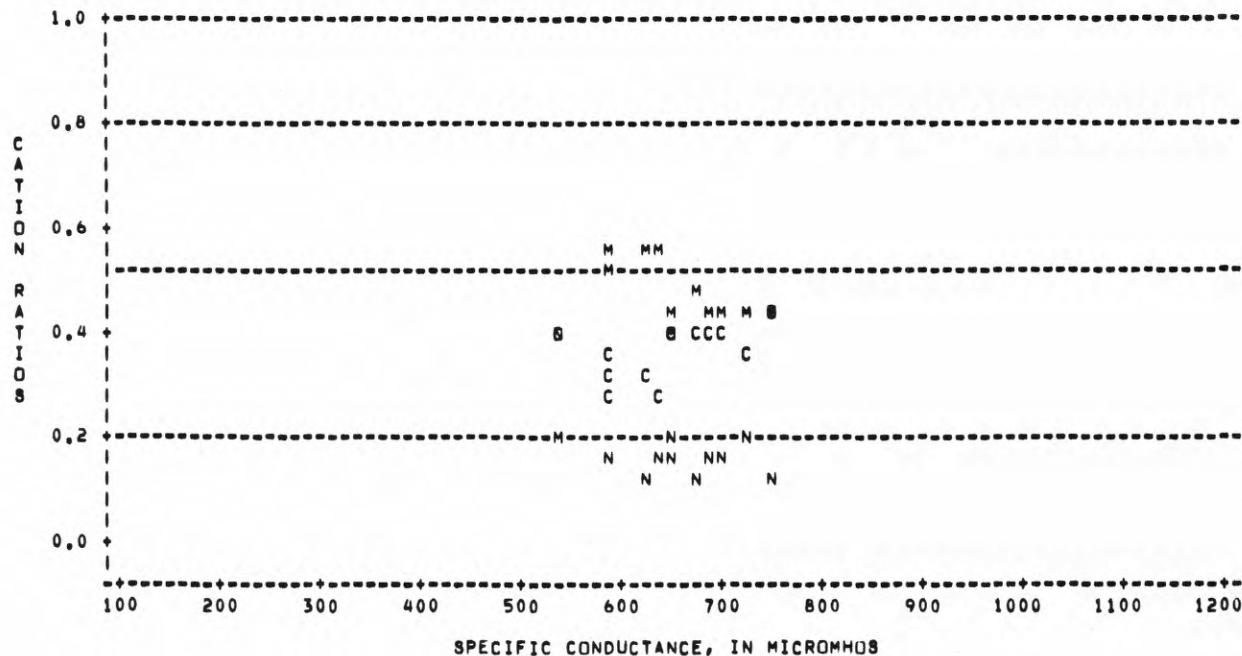
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|------|-----|-------|-------|
| Specific conductance | 58 | 584 | 130 | 1180 | 154 | -0.32 | 5.36 |
| Dissolved solids | 51 | 335 | 77 | 644 | 85 | -.94 | 4.87 |
| pH | 14 | 8.2 | 6.9 | 9.1 | 0.5 | -.94 | 4.77 |
| Total hardness | 58 | 282 | 50 | 382 | 74 | -1.67 | 2.37 |
| Chloride | 58 | 34 | 5.0 | 230 | 30 | 4.89 | 30.77 |
| Sulfate | 53 | 16 | 8.3 | 48 | 6.8 | 2.95 | 10.82 |
| Iron | 0 | | | | | | |
| Fluoride | 8 | 0.2 | 0.1 | 0.4 | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 14 | 0.7 | 0.5 | 1.6 | 0.3 | 2.54 | 7.42 |
| Boron | 0 | | | | | | |

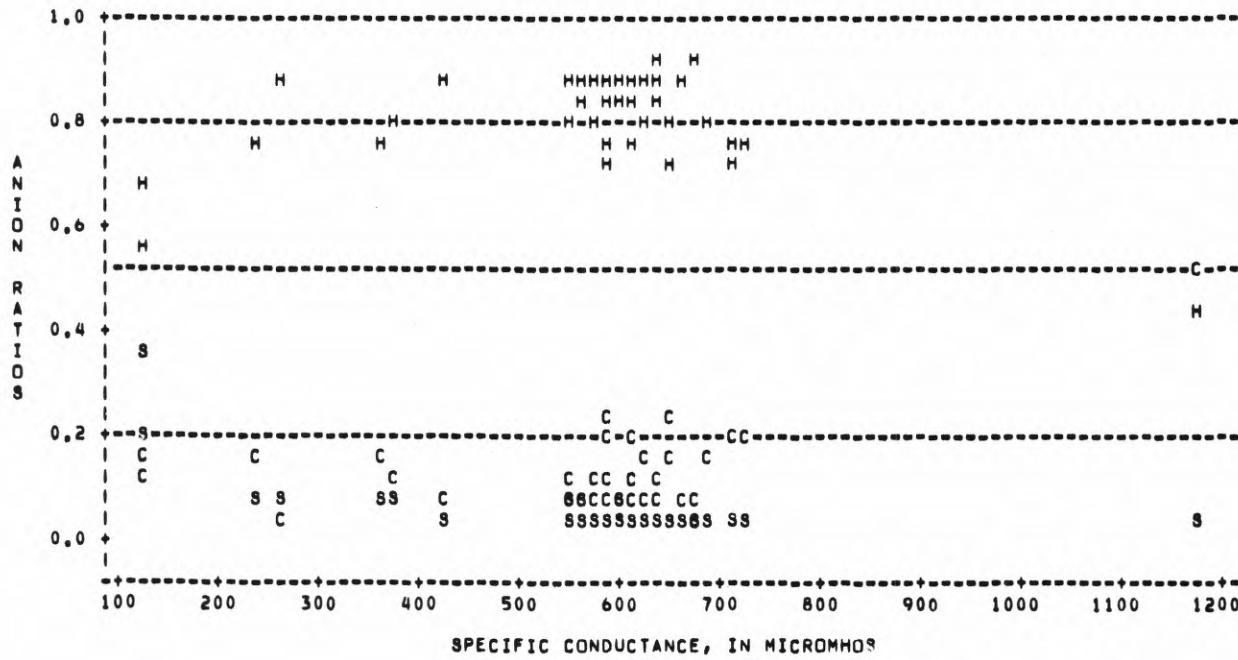
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 365 | 566 | 594 | 651 | 696 |
| Dissolved solids | 211 | 320 | 343 | 373 | 399 |
| pH | 7.4 | 8.1 | 8.2 | 8.3 | 8.8 |
| Total hardness | 150 | 273 | 303 | 327 | 350 |
| Chloride | 16 | 19 | 26 | 42 | 59 |
| Sulfate | 11 | 12 | 15 | 18 | 20 |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 0.5 | 0.5 | 0.6 | 0.8 | 1.2 |
| Boron | | | | | |

CATION RATIO PLOT
 N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=BELL CREEK AT CHANDLER, OK



ANION RATIO PLOT
 H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=BELL CREEK AT CHANDLER, OK



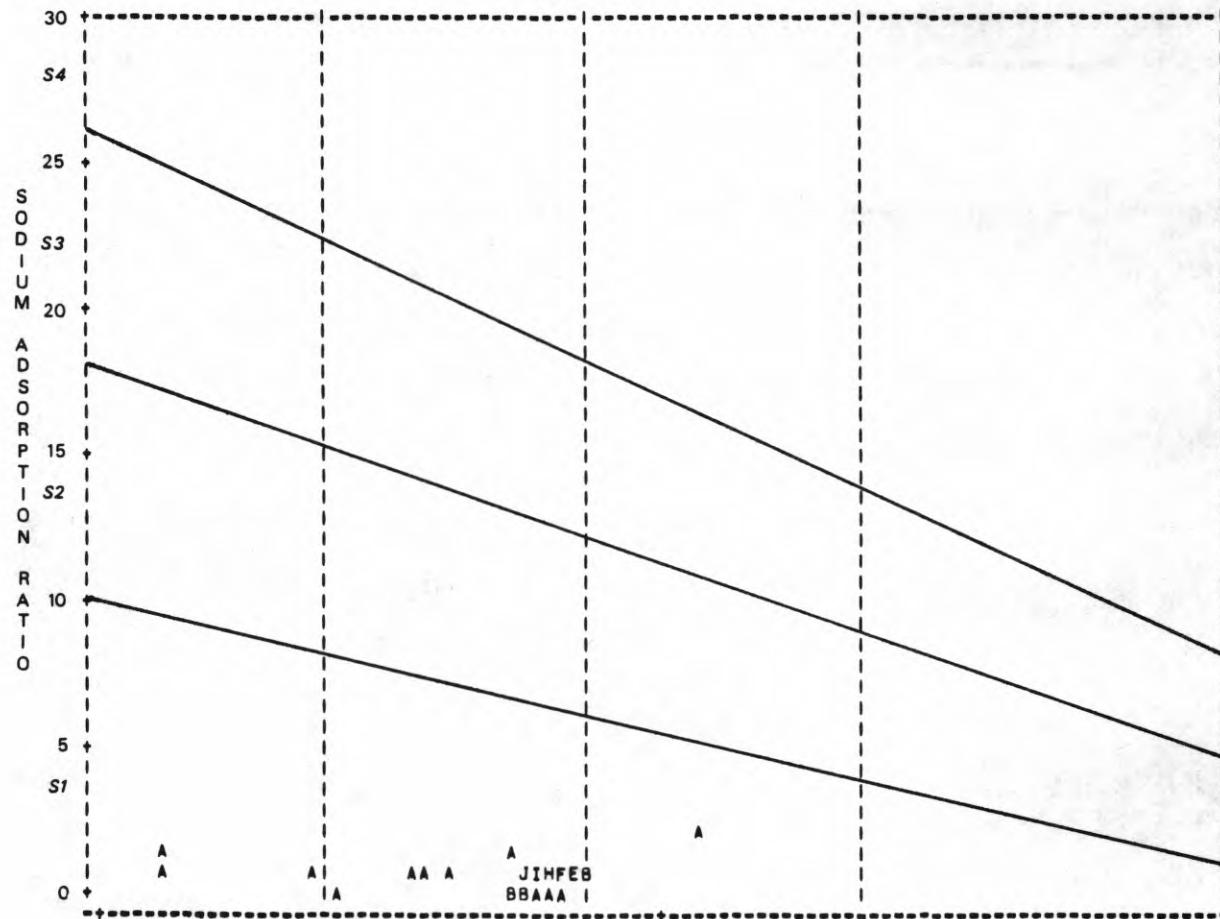
IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=BELL COW CREEK AT CHANDLER, OK



DEEP FORK BASIN

07242300 - Deep Fork at Witcher, Okla.

LOCATION.--Lat $35^{\circ}35'41''$, long $97^{\circ}25'06''$, in SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 16, T.13 N., R.2 W., Oklahoma County, at bridge on N.E. 122nd Street, 0.4 east of Witcher.

DRAINAGE AREA.--Not determined.

PERIOD OF RECORD.--1961 to 1962.

WATER TYPE.--For specific conductance greater than 1,400 umho, 52 percent of the samples, the water was sodium chloride type. The data are inadequate to determine water type for specific conductance less than 1,400 umho.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--All of the hardness values were greater than 180 mg/L and the average concentration was 327 mg/L. The hardness classification for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 53 percent of the chloride values. No toxic metal data are available. Because of the frequency by which the recommended maximum chloride concentration was exceeded, the suitability of this water for use as a public supply may be marginal.

IRRIGATION.--The salinity hazard ranged from medium to high with 87 percent of the samples having a high salinity hazard. The sodium hazard ranged from low to medium with 73 percent of the SAR values equivalent to a low sodium hazard. No boron data are available.

07242300 - Deep Fork at Witcher, Okla.--Continued

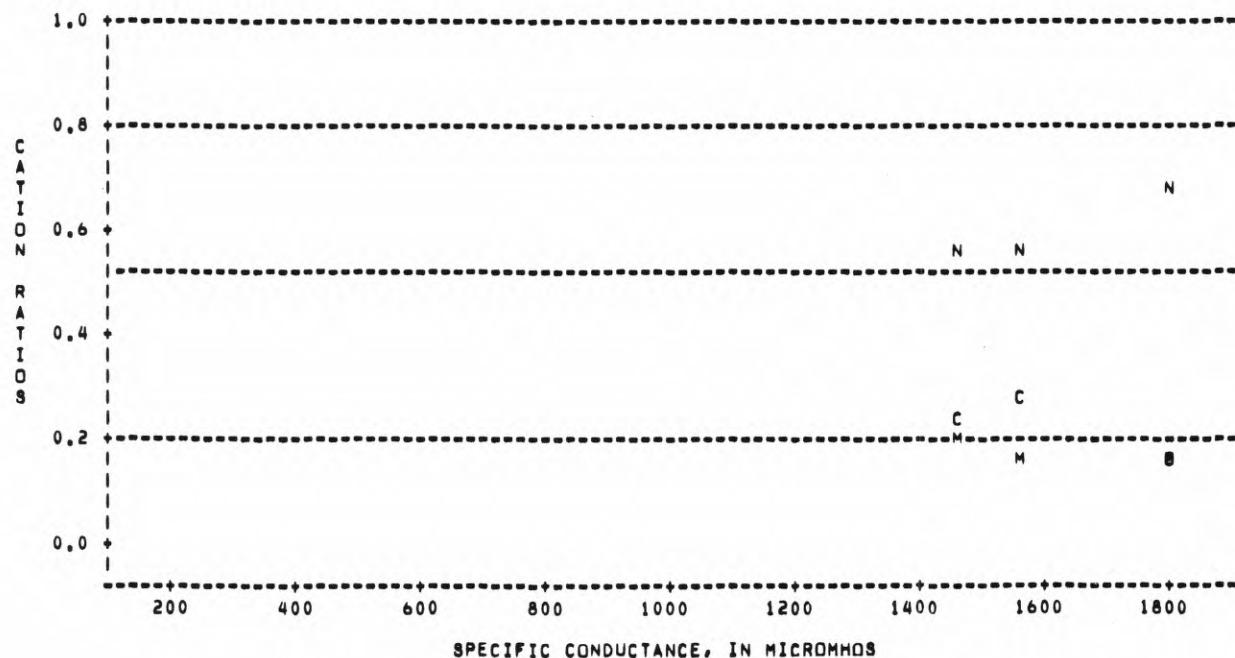
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|------|-----|-------|-------|
| Specific conductance | 16 | 1340 | 300 | 1800 | 405 | -1.29 | 1.81 |
| Dissolved solids | 11 | 898 | 650 | 1100 | 161 | -.22 | -1.17 |
| pH | 15 | 8.2 | 7.3 | 8.6 | 0.4 | -.35 | -.82 |
| Total hardness | 11 | 327 | 260 | 364 | 32 | -.99 | .68 |
| Chloride | 11 | 260 | 138 | 360 | 69 | -.31 | -.57 |
| Sulfate | 11 | 124 | 100 | 149 | 17 | .19 | -1.37 |
| Iron | 0 | | | | | | |
| Fluoride | 6 | 0.6 | 0.4 | 0.8 | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 11 | 4.4 | 2.6 | 7.2 | 1.2 | .80 | 1.95 |
| Boron | 0 | | | | | | |

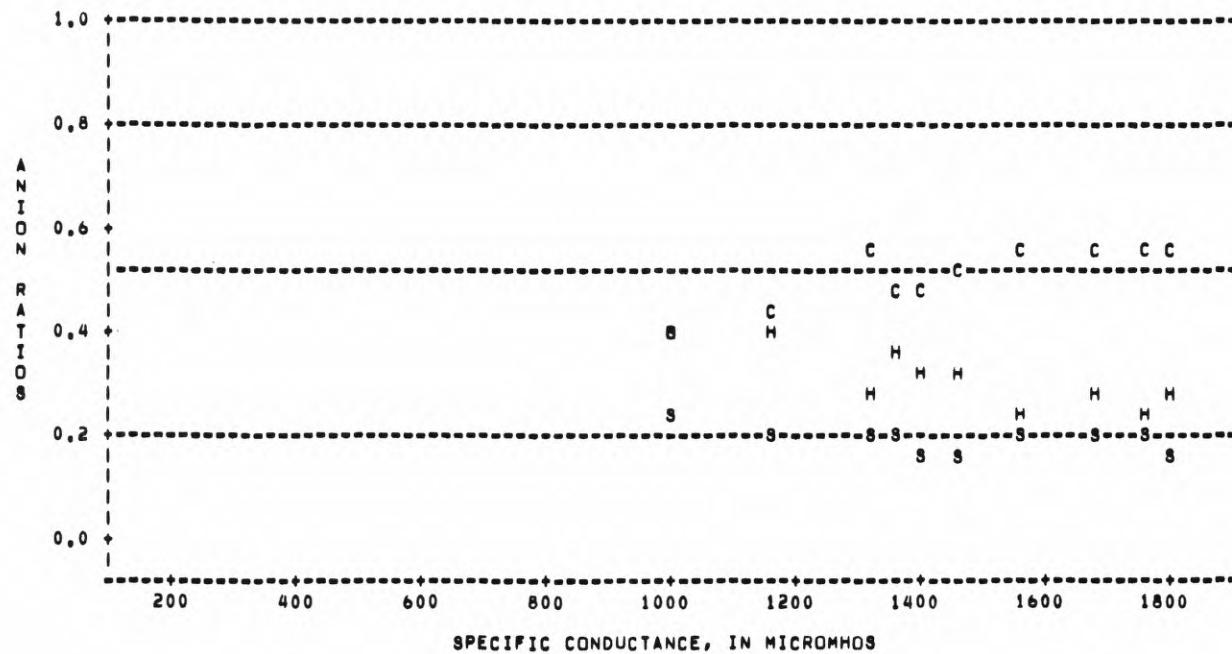
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 580 | 1183 | 1420 | 1650 | 1793 |
| Dissolved solids | 654 | 766 | 898 | 1080 | 1096 |
| pH | 7.4 | 7.7 | 8.2 | 8.4 | 8.6 |
| Total hardness | 266 | 315 | 335 | 354 | 363 |
| Chloride | 144 | 220 | 255 | 310 | 356 |
| Sulfate | 101 | 108 | 119 | 143 | 148 |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 2.6 | 3.7 | 4.5 | 4.7 | 6.8 |
| Boron | | | | | |

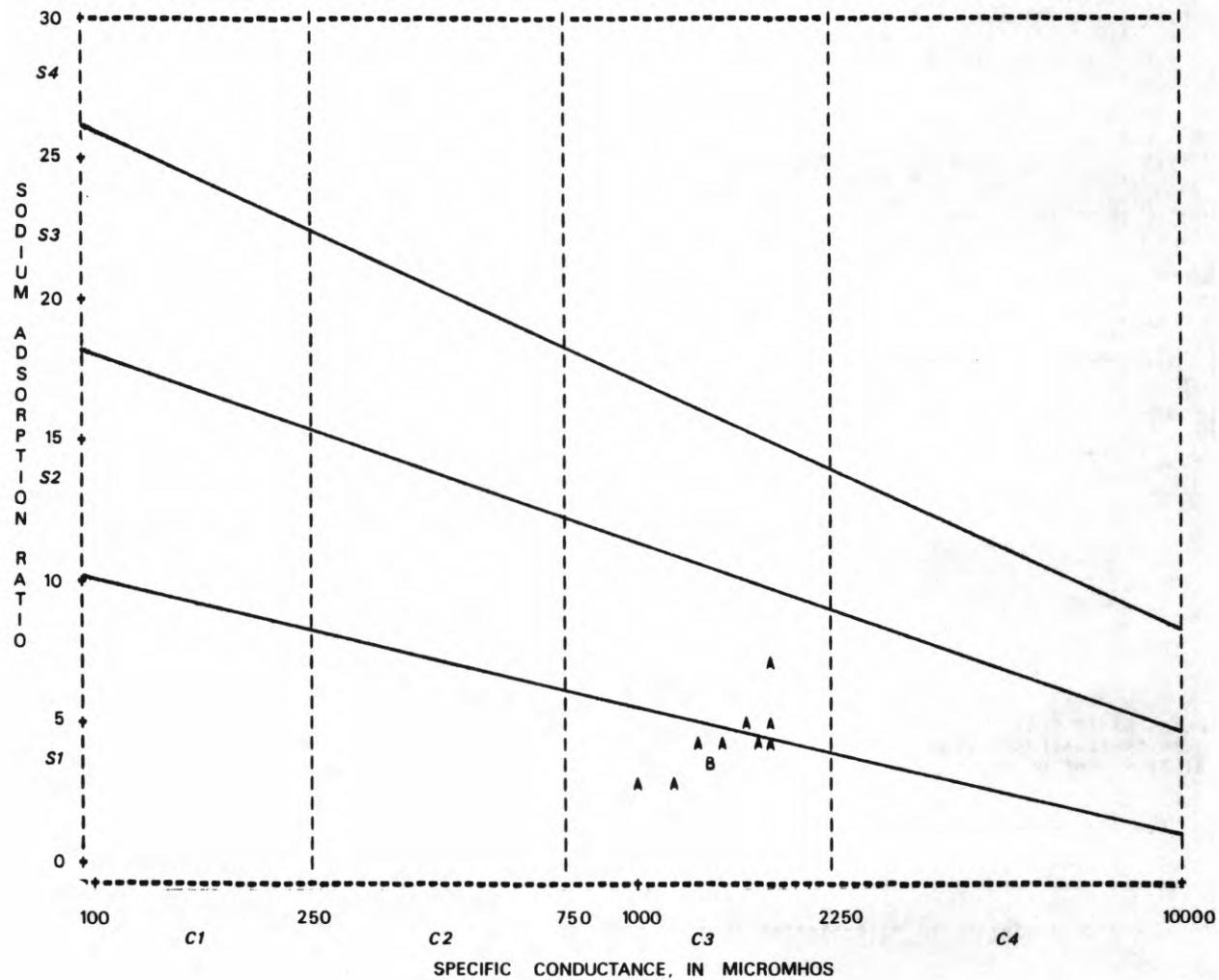
CATION RATIO PLOT
N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=DEEP FORK AT WITCHER, OK



ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=DEEP FORK AT WITCHER, OK



IRRIGATION DIAGRAM
C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
A = 1 OBS, B = 2 OBS, C = 3 OBS
STATION NAME OR LOCAL IDENTIFIER=DEEP FORK AT WITCHER, OK



DEEP FORK BASIN

07242350 - Deep Fork near Arcadia, Okla.

LOCATION.--Lat 36°38'58", long 97°21'12", on east line of NE $\frac{1}{4}$ sec. 36, T.14 N., R.2 W., Oklahoma County, at county road bridge, 1.9 mi southwest of Arcadia, 2.0 mi upstream from Coffee Creek, and at mile 213.1.

DRAINAGE AREA.--105 mi².

PERIOD OF RECORD.--1970 to 1979.

WATER TYPE.--For specific conductance greater than 600 umho, 87 percent of the samples, the water was sodium chloride type. For specific conductance less than 600 umho, the water was generally calcium carbonate/bicarbonate type.

TREND.--Plots of the dissolved solids, hardness, chloride, and sulfate concentrations versus time indicate the possibility of negative trends for dissolved solids, chloride, and sulfate. The Spearman's rhos at the 95-percent probability level show negative trends for dissolved solids, chloride, and sulfate and no trend for hardness.

PUBLIC WATER SUPPLY.--Eighty percent of the hardness values were greater than 180 mg/L and the average concentration was 242 mg/L. In general, the hardness classification for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 22 percent of the chloride values, the recommended maximum sulfate concentration of 250 mg/L was exceeded by less than 1 percent of the sulfate values, and the recommended maximum iron concentration of 300 ug/L was exceeded by 8 percent of the iron values. The maximum cadmium contaminant level of 10 ug/L was exceeded by 2 percent of the cadmium values. Arsenic, chromium, lead, and mercury concentrations did not exceed their maximum contaminant levels. Because cadmium exceeded its maximum contaminant level, the suitability of this water for use as a public supply may be marginal.

IRRIGATION.--The salinity hazard ranged from low to very high with 80 percent of the samples in the high-salinity hazard class. The sodium hazard ranged from low to high with about 80 percent of the SAR values equivalent to a low sodium hazard. None of the boron values exceeded the recommended maximum limit of 750 ug/L for boron sensitive plants.

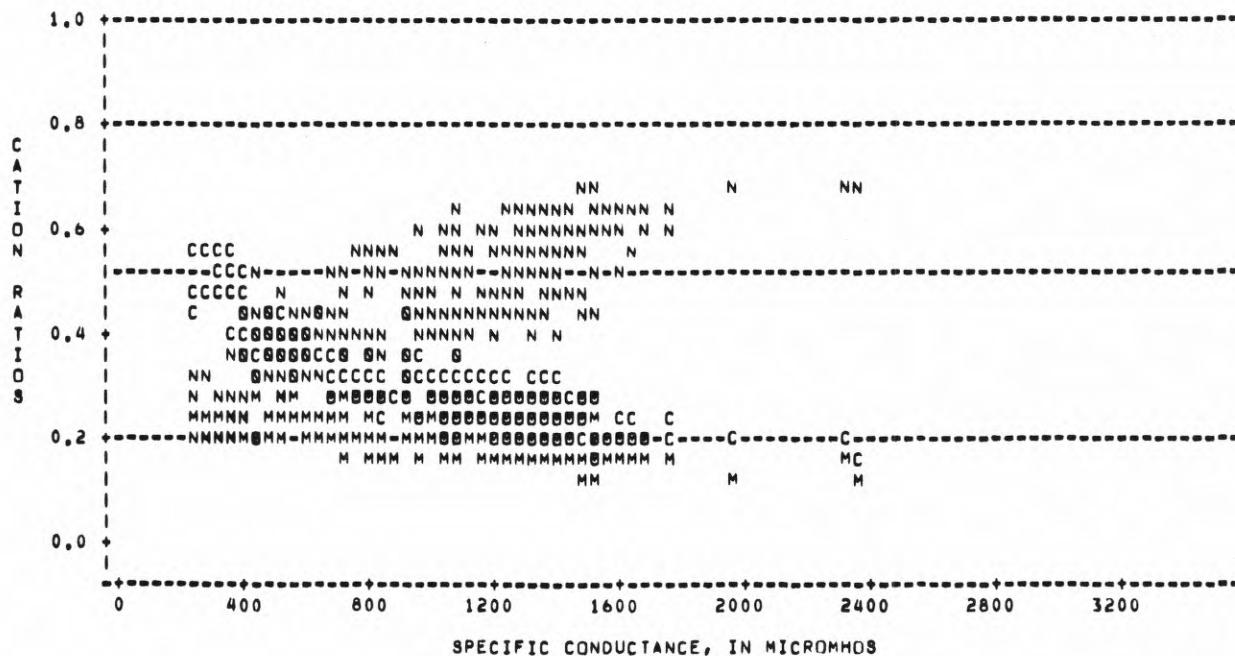
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|-----|------|-----|------|-----|-------|-------|
| Specific conductance | 694 | 1145 | 180 | 3100 | 400 | -0.34 | 0.33 |
| Dissolved solids | 519 | 658 | 136 | 1320 | 237 | -.41 | -.73 |
| pH | 684 | 7.7 | 6.3 | 8.5 | 0.4 | -.45 | 1.15 |
| Total hardness | 522 | 242 | 7.0 | 430 | 70 | -.08 | -.16 |
| Chloride | 550 | 175 | 9.3 | 540 | 87 | .18 | .15 |
| Sulfate | 521 | 123 | 12 | 600 | 35 | 1.86 | 1.87 |
| Iron | 80 | 171 | 0 | 3800 | 527 | 6.04 | 37.44 |
| Fluoride | 6 | 0.7 | 0.6 | 0.8 | | | |
| Arsenic | 2 | 6 | 4 | 8 | | | |
| Cadmium | 81 | 1 | 0 | 11 | 2.0 | 2.98 | 9.63 |
| Chromium | 86 | 3 | 0 | 40 | 7.0 | 2.92 | 10.34 |
| Lead | 87 | 4 | 0 | 35 | 5.6 | 2.71 | 10.05 |
| Mercury | 10 | 0.5 | 0.0 | 2.0 | 0.7 | 1.21 | .65 |
| SAR | 510 | 3.6 | 0.4 | 8.0 | 1.6 | .05 | -.59 |
| Boron | 9 | 250 | 34 | 450 | | | |

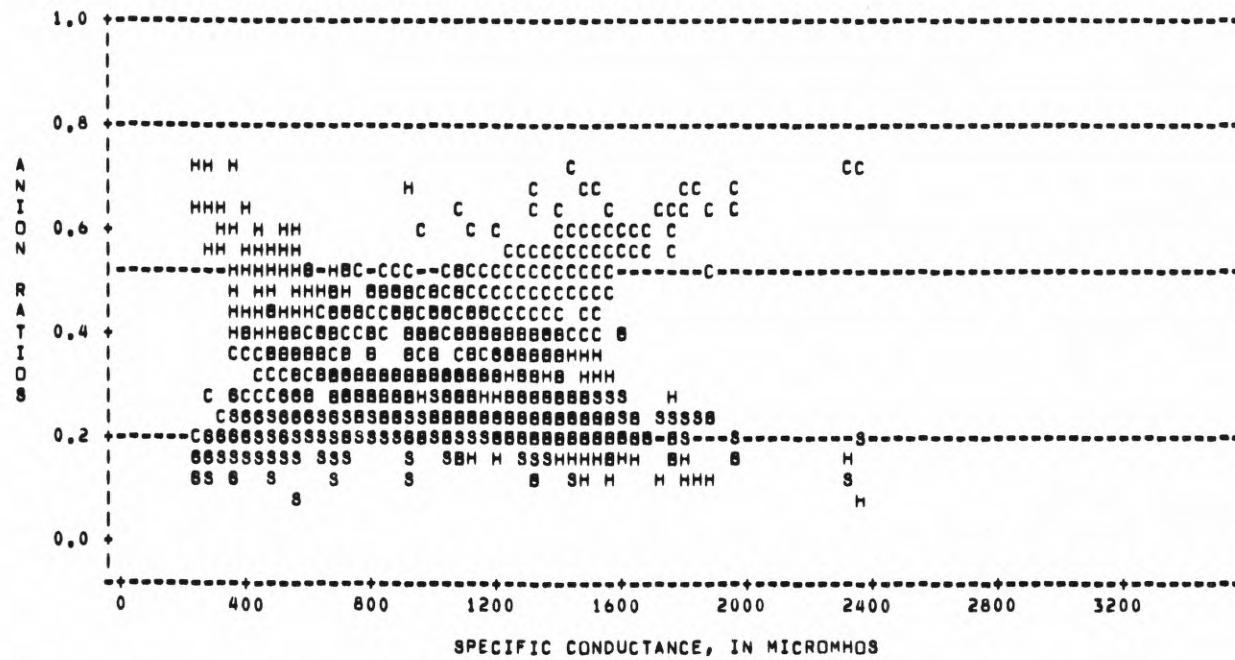
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 524 | 858 | 1250 | 1420 | 1550 |
| Dissolved solids | 294 | 455 | 733 | 828 | 919 |
| pH | 6.9 | 7.2 | 7.7 | 8.0 | 8.2 |
| Total hardness | 140 | 190 | 250 | 280 | 330 |
| Chloride | 50 | 108 | 190 | 230 | 280 |
| Sulfate | 44 | 74 | 120 | 150 | 160 |
| Iron | 20 | 30 | 70 | 110 | 169 |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | 0 | 0 | 1 | 1 | 3 |
| Chromium | 0 | 0 | 0 | 2 | 10 |
| Lead | 0 | 0 | 3 | 5 | 13 |
| Mercury | 0.0 | 0.0 | 0.2 | 1.1 | 1.9 |
| SAR | 1.4 | 2.5 | 3.6 | 4.8 | 5.5 |
| Boron | | | | | |

CATION RATIO PLOT
 N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=DEEP FORK NR ARCADIA, OK

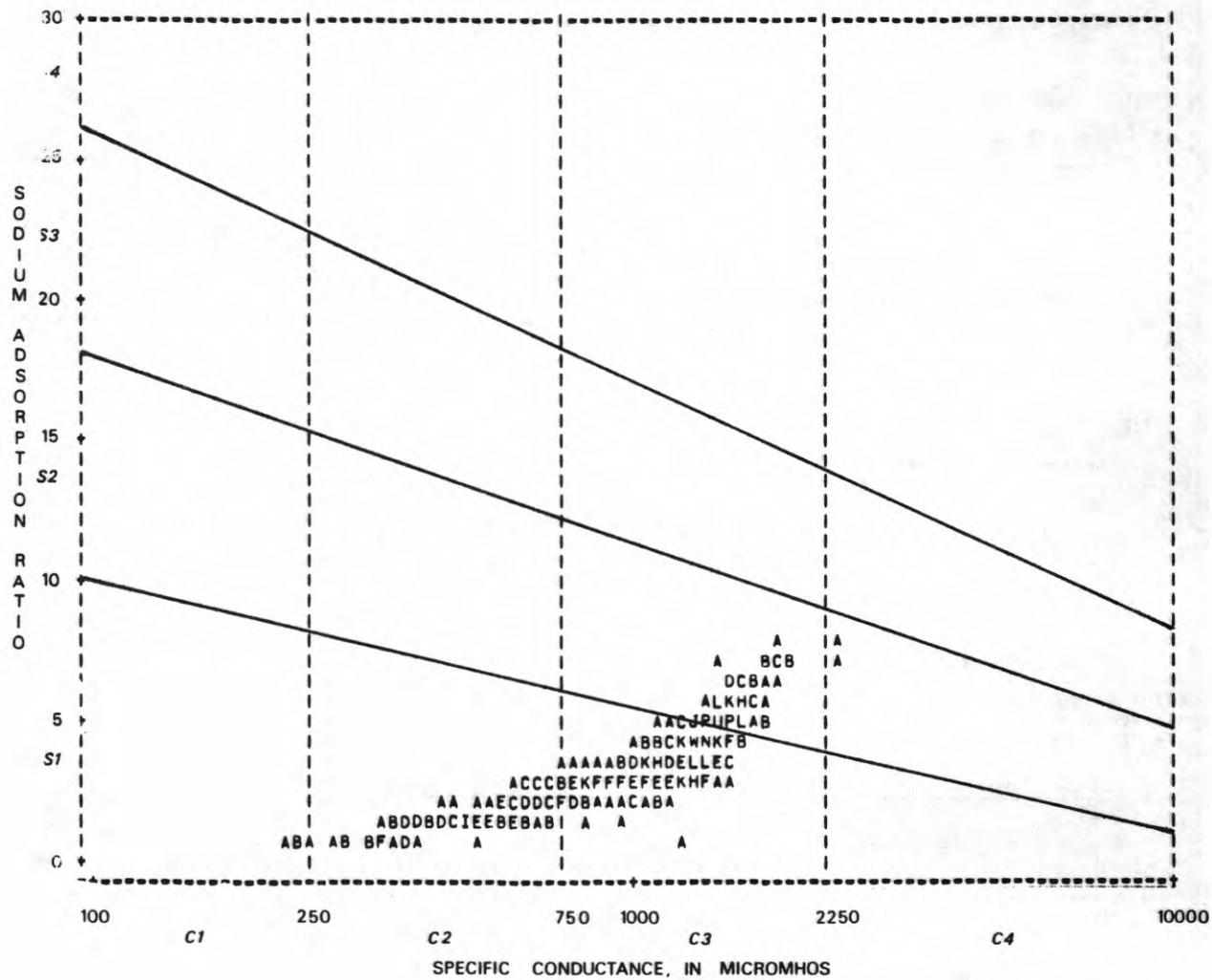


ANION RATIO PLOT
 H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=DEEP FORK NR ARCADIA, OK



IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
 C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
 A = 1 OBS, B = 2 OBS, C = 3 OBS
 STATION NAME OR LOCAL IDENTIFIER=DEEP FORK NR ARCADIA, OK



DEEP FORK BASIN

07242400 - Deep Fork near Chandler, Okla.

LOCATION.--Lat $35^{\circ}38'30''$, long $96^{\circ}53'30''$, in SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 21, T.14 N., R.4 E., Lincoln County, at bridge on State Highway 18, 3 mi south of Chandler.

DRAINAGE AREA.--Not determined.

PERIOD OF RECORD.--1960 to 1962.

WATER TYPE.--For specific conductance greater than about 1,500 umho, 9 percent of the samples, the water was sodium chloride type. For specific conductance less than 1,500 umho and greater than 1,000 umho, 71 percent of the samples, the water was mixed type. The water was carbonate/bicarbonate type for specific conductance less than 1,000 umho. There are no cation distribution data for specific conductance less than 1,000 umho.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--Ninety-eight percent of the hardness values were greater than 180 mg/L and the average concentration was 373 mg/L. The hardness classification for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 25 percent of the chloride values. No toxic metal data are available. Because of the frequency by which the recommended maximum chloride concentration was exceeded, the suitability of this water for use as a public supply may be marginal.

IRRIGATION.--The salinity hazard ranged from medium to high with 92 percent of the samples in the high salinity hazard class. All of the SAR values were equivalent to a low sodium hazard. No boron data are available.

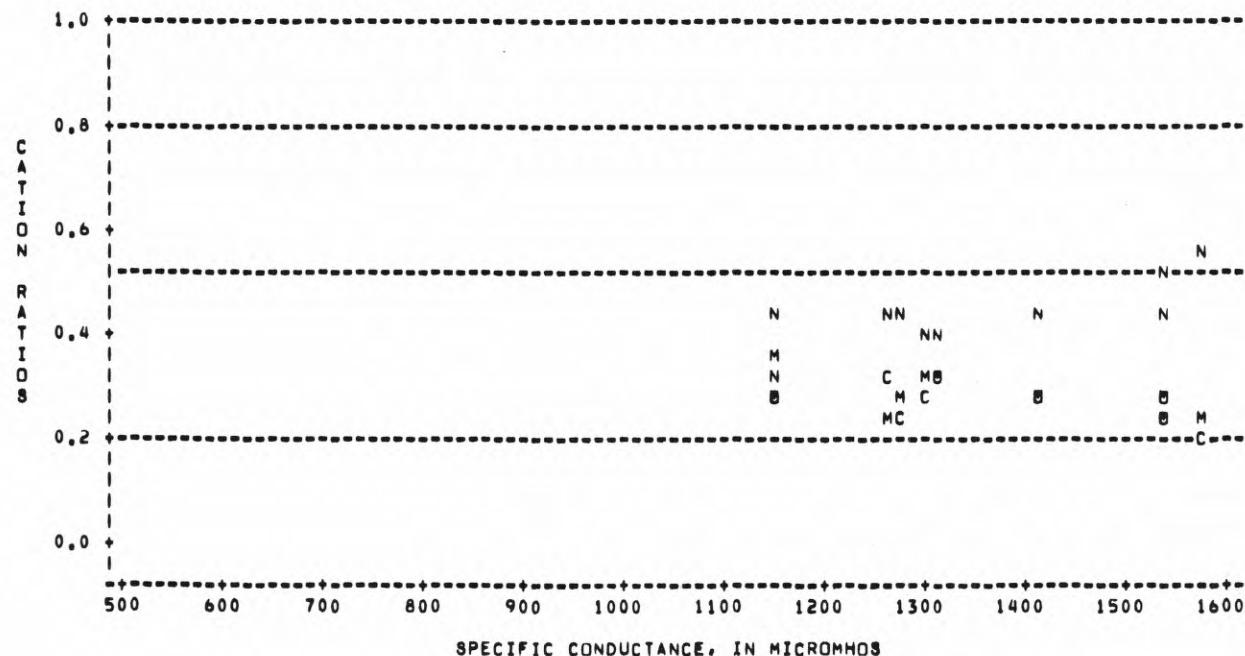
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|------|-----|-------|------|
| Specific conductance | 20 | 1249 | 546 | 1580 | 267 | -1.06 | 1.09 |
| Dissolved solids | 18 | 757 | 303 | 982 | 169 | -1.30 | 1.87 |
| pH | 20 | 8.7 | 7.3 | 8.9 | 0.4 | -1.98 | 3.14 |
| Total hardness | 20 | 373 | 178 | 480 | 65 | -1.48 | 3.30 |
| Chloride | 20 | 199 | 74 | 300 | 57 | -.29 | -.23 |
| Sulfate | 18 | 64 | 19 | 100 | 19 | -.41 | .96 |
| Iron | 0 | | | | | | |
| Fluoride | 1 | 0.4 | | | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 18 | 3.0 | 1.5 | 4.5 | 0.8 | .01 | -.11 |
| Boron | 0 | | | | | | |

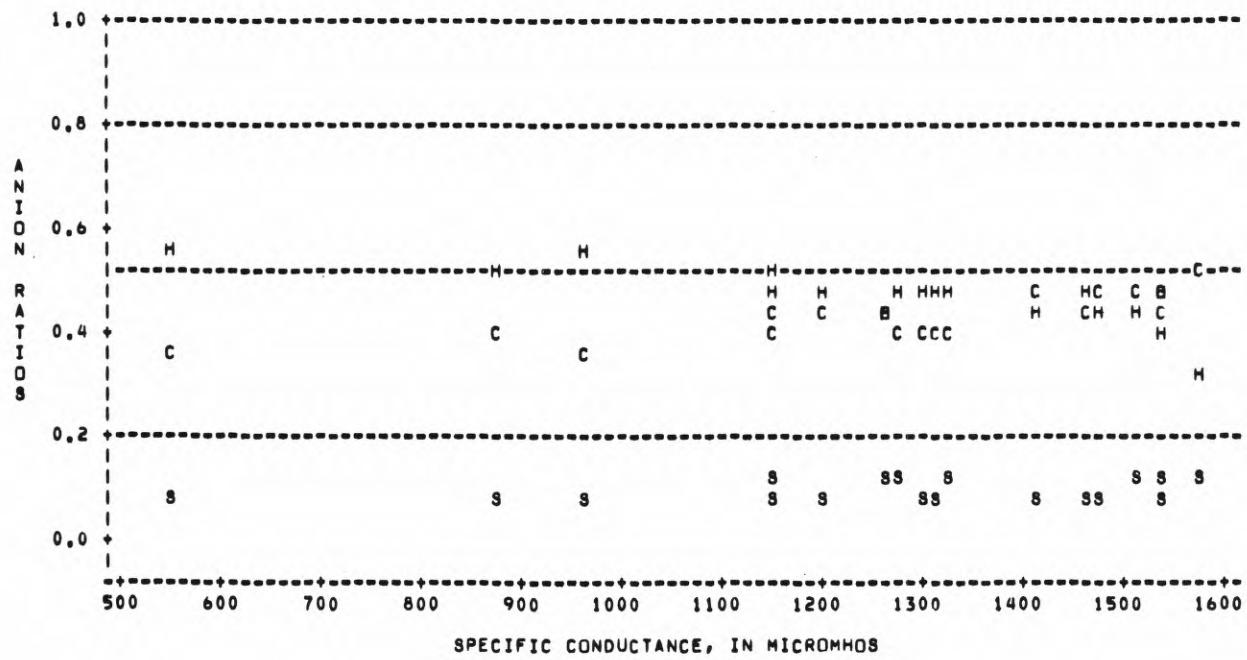
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 879 | 1150 | 1285 | 1468 | 1540 |
| Dissolved solids | 484 | 700 | 784 | 872 | 935 |
| pH | 7.4 | 8.5 | 8.7 | 8.8 | 8.9 |
| Total hardness | 288 | 345 | 389 | 414 | 425 |
| Chloride | 126 | 162 | 198 | 251 | 270 |
| Sulfate | 33 | 55 | 66 | 74 | 95 |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 1.9 | 2.4 | 3.0 | 3.4 | 4.2 |
| Boron | | | | | |

CATION RATIO PLOT
N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=DEEP FORK NR CHANDLER, OK

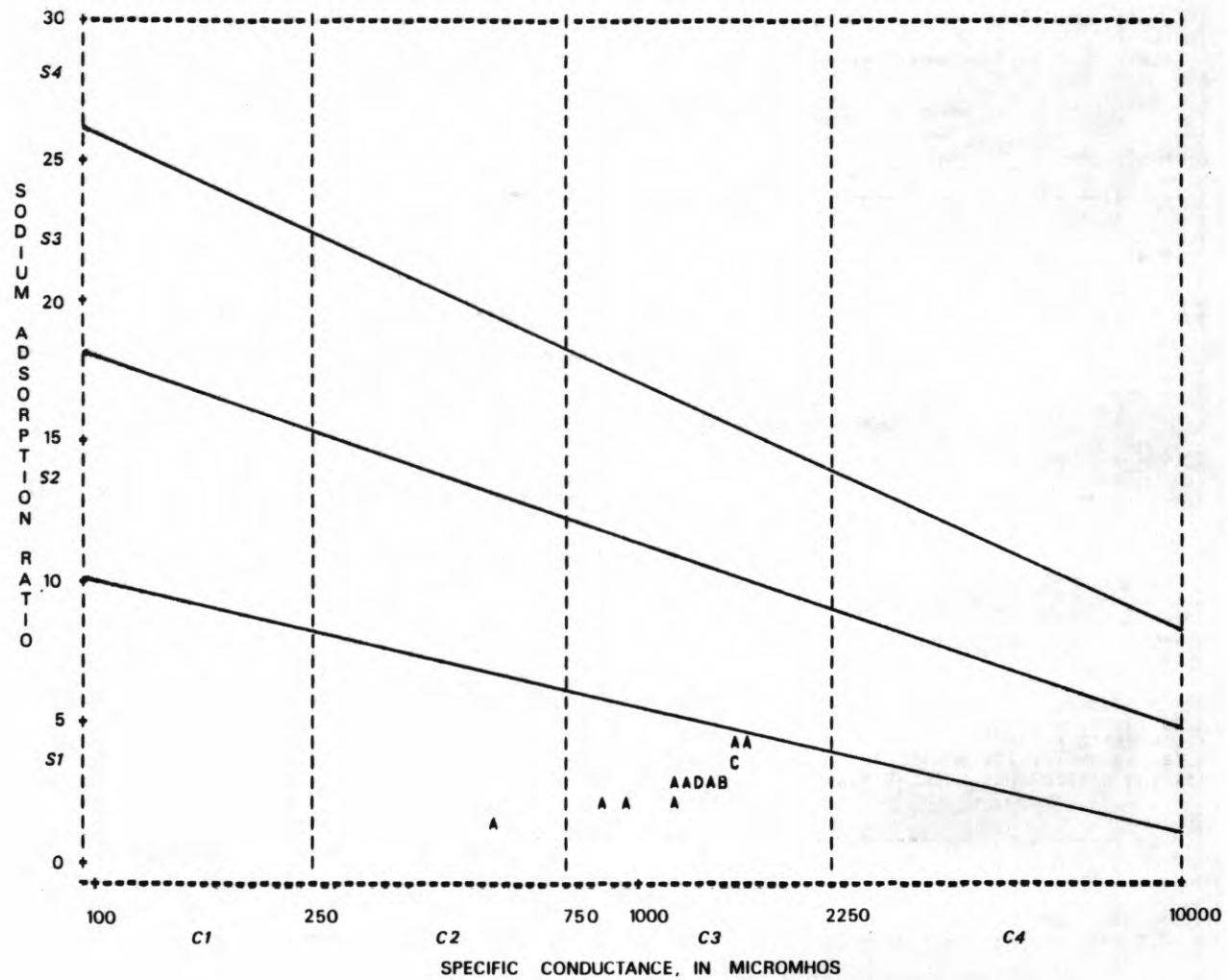


ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=DEEP FORK NR CHANDLER, OK



IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
A = 1 OBS, B = 2 OBS, C = 3 OBS
STATION NAME OR LOCAL IDENTIFIER=DEEP FORK NR CHANDLER, OK



DEEP FORK BASIN

07243500 - Deep Fork near Beggs, Okla.

LOCATION.--Lat $35^{\circ}40'15''$, long $96^{\circ}04'08''$, on line between sec. 19 and 26, T.14 N., R.12 E., Okmulgee County, at county road bridge, 3.0 mi upstream from Adams Creek, 4.0 mi south of Beggs, 8.0 mi downstream from Flat Rock (Checkerboard) Creek, and at mile 85.0.

DRAINAGE AREA.--2,018 mi².

PERIOD OF RECORD.--1952 to 1979.

WATER TYPE.--The water was sodium chloride type throughout the range of measured specific conductance.

TREND.--Plots of the dissolved solids, hardness, chloride, and sulfate concentrations versus time indicate a negative trend for chloride and a positive trend for sulfate. The Spearman's rhos at the 95-percent probability level also indicate negative trend for chloride and positive trend for sulfate. No trend was indicated for hardness and dissolved solids by either the plots or the Spearman's rhos.

PUBLIC WATER SUPPLY.--Sixty-five percent of the hardness values were greater than 180 mg/L and the average concentration was 248 mg/L. The hardness classification for this water varies between hard and very hard. The recommended maximum pH of 9.0 was exceeded by less than 1 percent of the pH values, the recommended maximum chloride concentration of 250 mg/L was exceeded by 37 percent of the chloride values, and the recommended maximum sulfate concentration of 250 mg/L was exceeded by less than 1 percent of the sulfate values. The maximum contaminant level for fluoride was exceeded by 1 out of 96 fluoride values. Arsenic, cadmium, chromium, lead, and mercury concentrations did not exceed their maximum contaminant values. Because of the frequency and magnitude by which the recommended maximum chloride concentration was exceeded, this water probably would not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from low to very high with 71 percent of the samples having a high or very high salinity hazard. The sodium hazard ranged from low to very high with 83 percent of the SAR values equivalent to a low sodium hazard. The data indicate that boron phytotoxic effects should not occur.

07243500 - Deep Fork near Beggs, Okla. --Continued

UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKW | KURT |
|----------------------|------|------|-----|------|------|------|-------|
| Specific conductance | 1822 | 1227 | 83 | 9250 | 1058 | 3.23 | 14.48 |
| Dissolved solids | 1780 | 697 | 86 | 5340 | 589 | 3.32 | 16.04 |
| pH | 1721 | 8.0 | 6.2 | 9.6 | 0.4 | -.45 | .94 |
| Total hardness | 1737 | 248 | 16 | 1310 | 149 | 2.01 | 7.49 |
| Chloride | 1791 | 286 | 7.3 | 3000 | 337 | 3.82 | 19.06 |
| Sulfate | 1795 | 38 | 1.6 | 313 | 27 | 2.57 | 12.20 |
| Iron | 12 | 69 | 0 | 250 | 90 | 1.35 | .51 |
| Fluoride | 96 | 0.4 | 0.0 | 3.1 | 0.3 | 5.78 | 47.02 |
| Arsenic | 7 | 3 | 1 | 6 | | | |
| Cadmium | 7 | 1 | 0 | 2 | | | |
| Chromium | 7 | 4 | 0 | 20 | | | |
| Lead | 7 | 11 | 0 | 32 | | | |
| Mercury | 7 | 0.0 | 0.0 | 0.3 | | | |
| SAR | 1303 | 3.6 | 0.4 | 18 | 2.3 | 2.43 | 8.37 |
| Boron | 74 | 304 | 0 | 750 | 173 | .40 | .05 |

FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 384 | 624 | 987 | 1413 | 2167 |
| Dissolved solids | 229 | 360 | 561 | 809 | 1240 |
| pH | 7.5 | 7.8 | 8.0 | 8.3 | 8.5 |
| Total hardness | 89 | 148 | 230 | 312 | 400 |
| Chloride | 64 | 114 | 190 | 310 | 560 |
| Sulfate | 13 | 20 | 31 | 46 | 72 |
| Iron | 0 | 2 | 25 | 125 | 244 |
| Fluoride | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 1.6 | 2.2 | 3.1 | 4.2 | 6.3 |
| Boron | 55 | 197 | 300 | 402 | 545 |

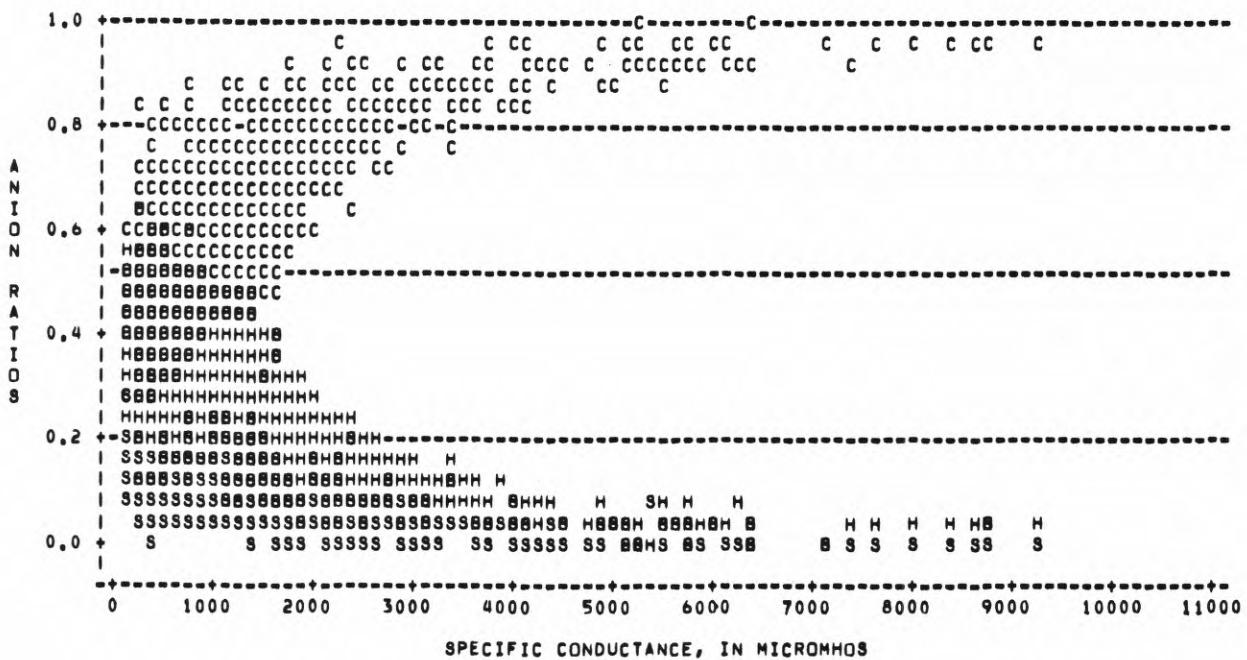
CATION RATIO PLOT

N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=DEEP FORK NR BEGGS, OK



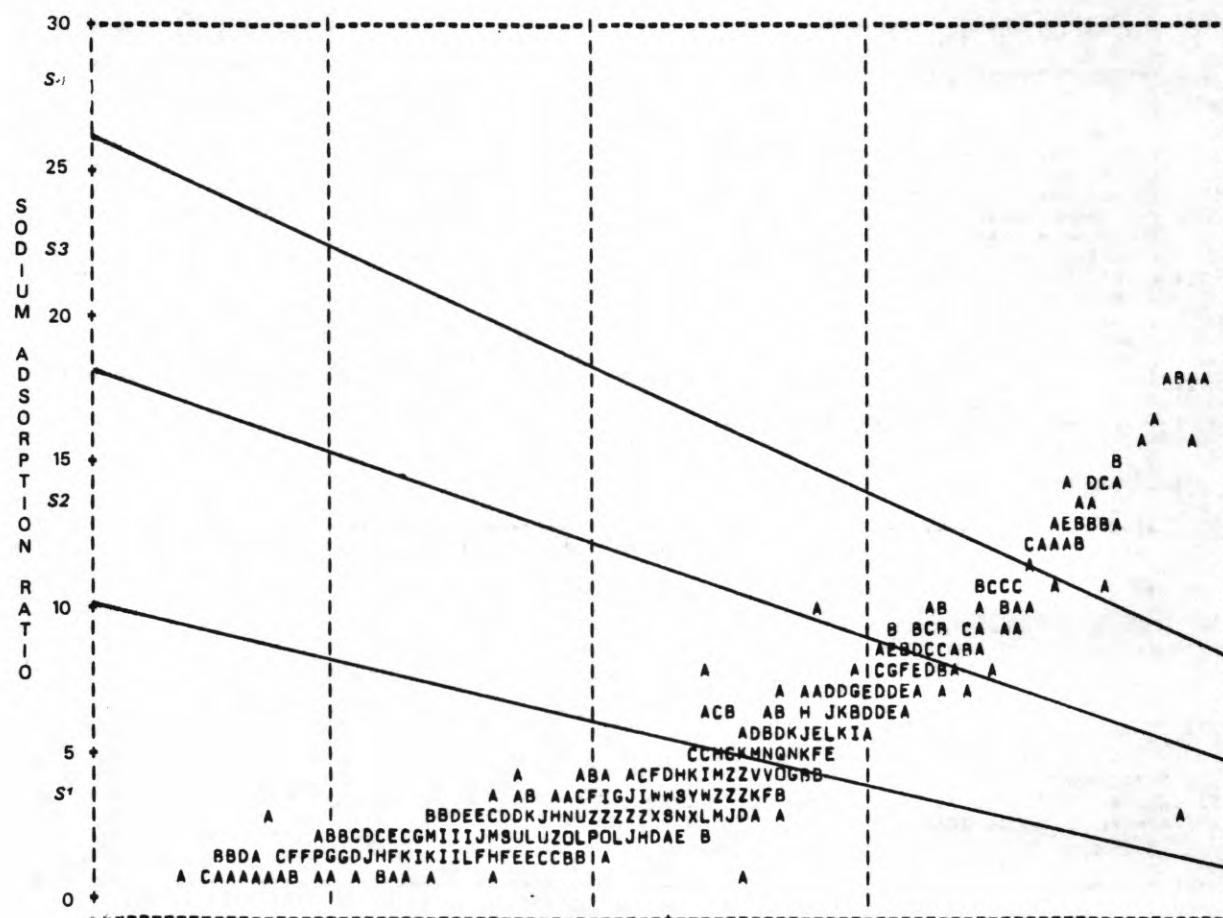
ANION RATIO PLOT

H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=DEEP FORK NR BEGGS, OK



IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
 C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
 A = 1 OBS, B = 2 OBS, C = 3 OBS
 STATION NAME OR LOCAL IDENTIFIER=DEEP FORK NR BEGG8, OK



DEEP FORK BASIN

07244000 - Deep Fork near Dewar, Okla.

LOCATION.--Lat $35^{\circ}28'43''$, long $95^{\circ}52'57''$, in SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 25, T.12 N., R.13 E., Okmulgee County, at bridge on U.S. Highway 266, 3.5 mi east of Dewar, and at mile 43.9.

DRAINAGE AREA.--2,307 mi².

PERIOD OF RECORD.--1949 to 1951.

WATER TYPE.--The water was sodium chloride type throughout the range of measured specific conductance.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--Sixty-two percent of the hardness values were greater than 180 mg/L and the average concentration was 246 mg/L. The hardness classification for this water varies between hard and very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 45 percent of the chloride values. No toxic metal data are available. Because of the frequency and magnitude by which the recommended maximum chloride concentration was exceeded, this water probably would not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from low to very high with 74 percent of the samples having a high or very high salinity hazard. The sodium hazard ranged from low to very high with 54 percent of the SAR values equivalent to a low sodium hazard. No boron data are available.

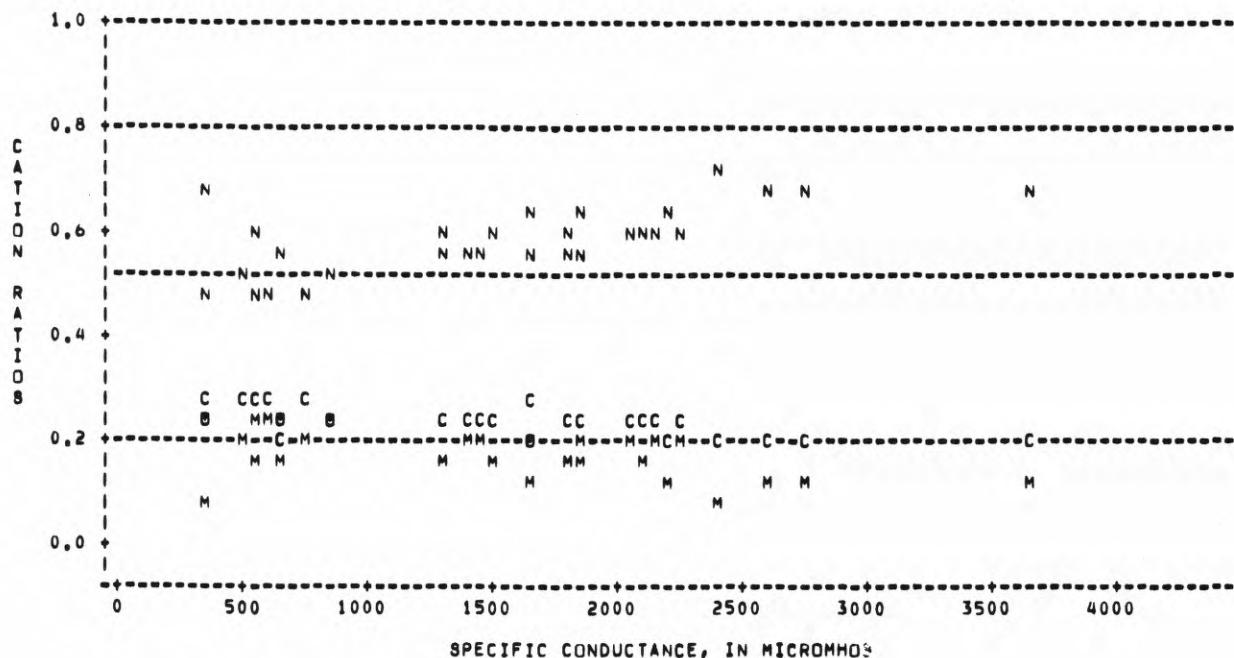
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|-----|------|-----|------|-----|------|------|
| Specific conductance | 285 | 1276 | 172 | 4120 | 819 | 1.06 | 0.59 |
| Dissolved solids | 285 | 751 | 166 | 2580 | 495 | 1.28 | 1.19 |
| pH | 81 | 7.9 | 6.8 | 8.7 | 0.5 | -.18 | -.39 |
| Total hardness | 285 | 246 | 40 | 624 | 128 | .68 | -.27 |
| Chloride | 285 | 326 | 31 | 1550 | 276 | 1.62 | 2.68 |
| Sulfate | 285 | 27 | 7.2 | 71 | 11 | .58 | .43 |
| Iron | 0 | | | | | | |
| Fluoride | 24 | 0.2 | 0.0 | 0.5 | 0.1 | .94 | .18 |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 30 | 4.9 | 1.7 | 10 | 2.2 | .64 | -.08 |
| Boron | 0 | | | | | | |

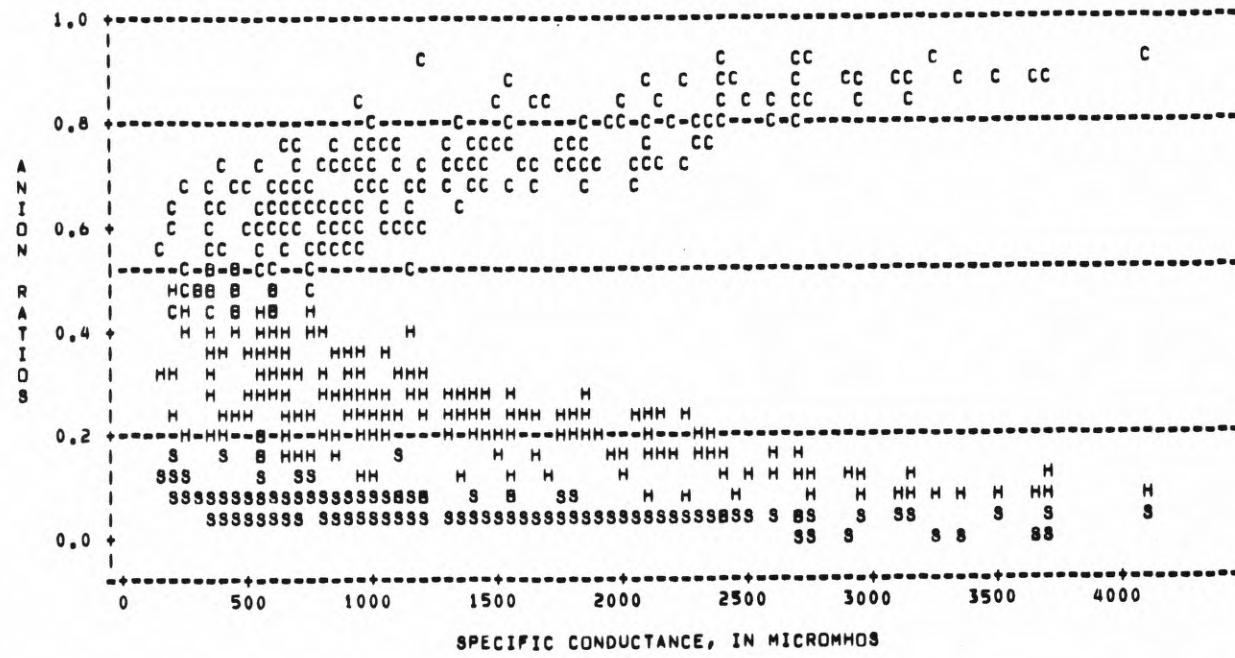
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 429 | 644 | 1010 | 1770 | 2480 |
| Dissolved solids | 262 | 382 | 588 | 1015 | 1494 |
| pH | 7.0 | 7.5 | 7.9 | 8.1 | 8.5 |
| Total hardness | 106 | 142 | 212 | 337 | 429 |
| Chloride | 76 | 137 | 228 | 444 | 715 |
| Sulfate | 14 | 19 | 25 | 34 | 41 |
| Iron | | | | | |
| Fluoride | 0.1 | 0.1 | 0.1 | 0.3 | 0.4 |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 2.2 | 2.8 | 5.0 | 6.0 | 8.9 |
| Boron | | | | | |

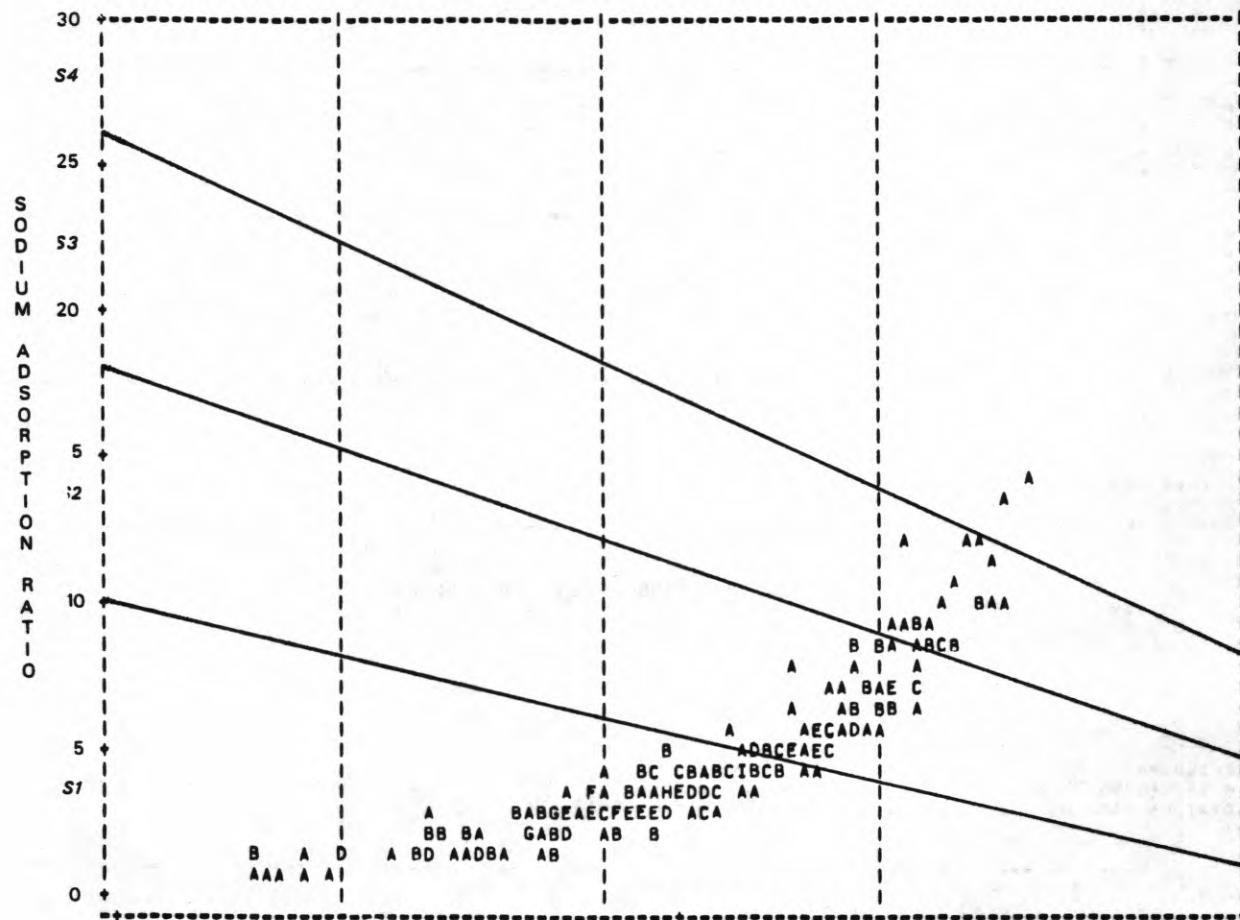
CATION RATIO PLOT
 N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=DEEP FORK NEAR DEWAR, OK



ANION RATIO PLOT
 H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=DEEP FORK NEAR DEWAR, OK



IRRIGATION DIAGRAM
 C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
 C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
 A = 1 OBS, B = 2 OBS, C = 3 OBS
 STATION NAME OR LOCAL IDENTIFIER=DEEP FORK NEAR DEWAR, OK



DEEP FORK BASIN

07243000 - Dry Creek near Kendrick, Okla.

LOCATION.--Lat $34^{\circ}46'55''$, long $96^{\circ}51'20''$, in NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 14, T.15 N., R.4 E., Lincoln County, at county road bridge, 1.0 mi downstream from Beaver Creek, and 4.5 mi west of Kendrick.

DRAINAGE AREA.--69.0 mi².

PERIOD OF RECORD.--1955, 1958 to 1960, 1966 to 1968, 1970 to 1973.

WATER TYPE.--For specific conductance less than 700 umho, 73 percent of the samples, the water was carbonate/bicarbonate type. For specific conductance greater than 700 umho the water was chloride type. The data are not adequate to assess the cation-specific conductance distribution.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--Forty-four percent of the hardness values were greater than 180 mg/L and the average concentration was 143 mg/L. The hardness classification for this water varies between hard and very hard. None of the measured constituents exceeded their recommended maximum concentrations. No toxic metal data are available. Based on the data, this water would be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from low to high with 76 percent of the samples having a low salinity hazard. All of the SAR values were equivalent to a low sodium hazard. None of the boron values exceeded the recommended 750 ug/L maximum concentration for boron sensitive plants.

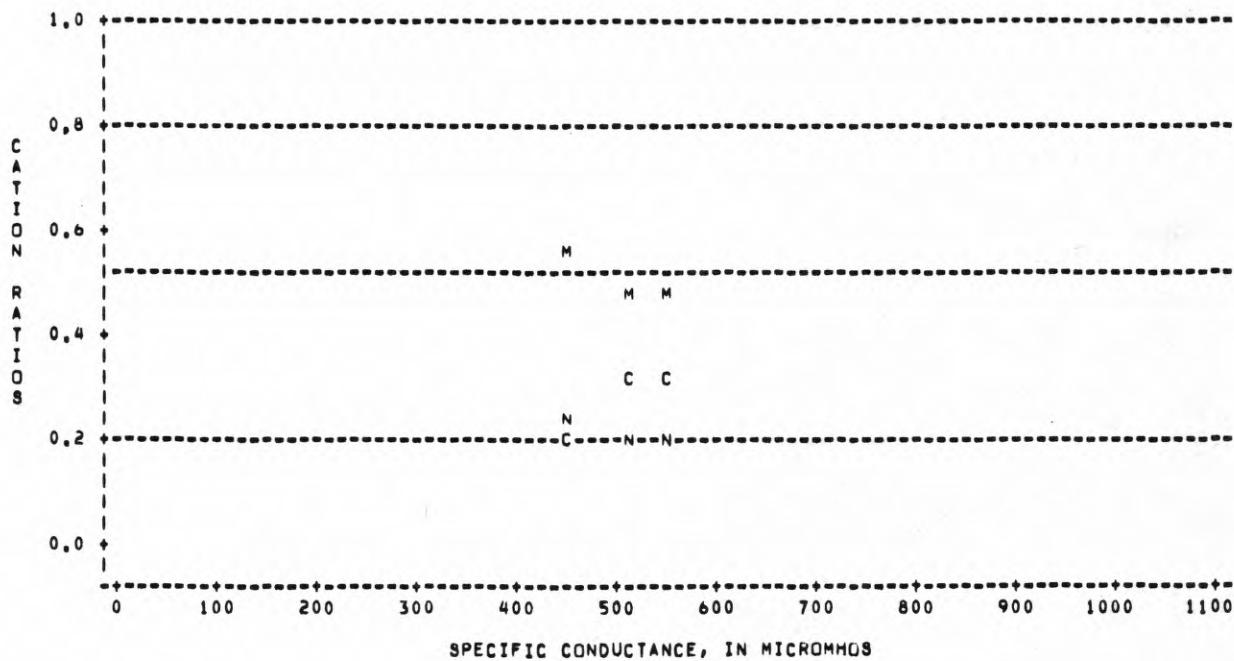
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|------|-----|------|-------|
| Specific conductance | 16 | 437 | 103 | 1020 | 323 | 0.62 | -1.06 |
| Dissolved solids | 14 | 239 | 55 | 618 | 199 | .89 | -.88 |
| pH | 16 | 7.8 | 6.5 | 8.5 | 0.7 | -.37 | -1.30 |
| Total hardness | 17 | 143 | 24 | 302 | 102 | .32 | -1.74 |
| Chloride | 16 | 48 | 4.9 | 178 | 56 | 1.48 | .98 |
| Sulfate | 13 | 12 | 1.8 | 22 | 5.8 | .32 | -.45 |
| Iron | 0 | | | | | | |
| Fluoride | 3 | 0.3 | 0.3 | 0.3 | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 17 | 1.1 | 0.2 | 4.3 | 1.0 | 2.22 | 5.63 |
| Boron | 3 | 50 | 30 | 80 | | | |

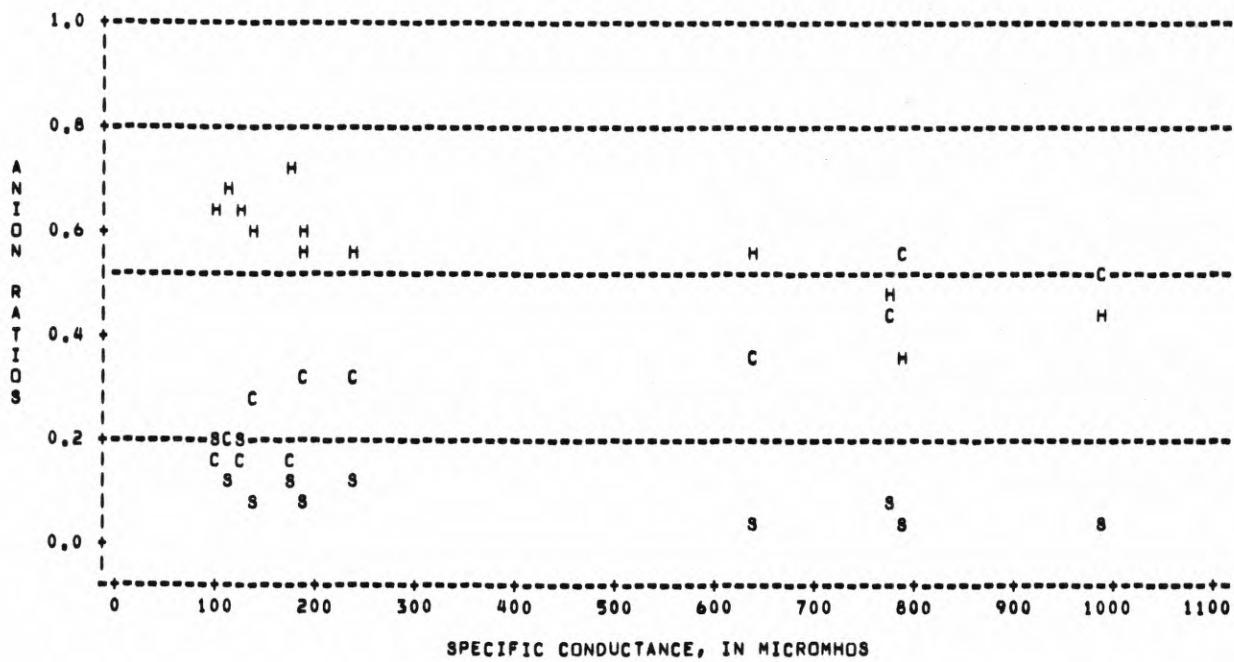
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 113 | 152 | 340 | 738 | 995 |
| Dissolved solids | 66 | 90 | 126 | 431 | 588 |
| pH | 6.8 | 7.0 | 7.8 | 8.4 | 8.5 |
| Total hardness | 37 | 54 | 72 | 235 | 299 |
| Chloride | 5.0 | 8.3 | 24 | 75 | 164 |
| Sulfate | 3.9 | 7.0 | 10 | 16 | 21 |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 0.3 | 0.4 | 0.7 | 1.4 | 2.6 |
| Boron | | | | | |

CATION RATIO PLOT
N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
STATION NAME OR LOCAL IDENTIFIER=DRY CREEK NR KENDRICK, OK

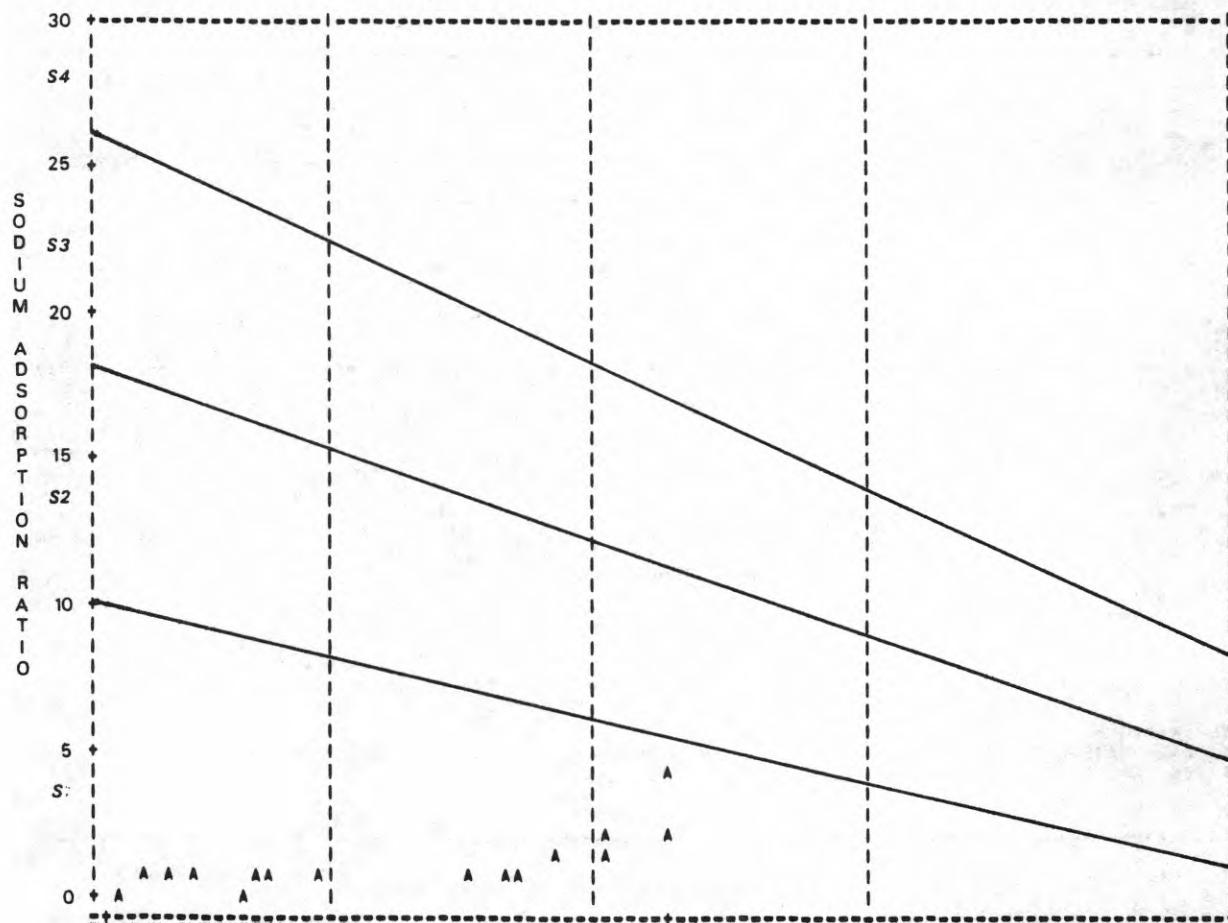


ANION RATIO PLOT
H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
STATION NAME OR LOCAL IDENTIFIER=DRY CREEK NR KENDRICK, OK



IRRIGATION DIAGRAM

C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD
C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD
A = 1 OBS, B = 2 OBS, C = 3 OBS
STATION NAME OR LOCAL IDENTIFIER=DRY CREEK NR KENDRICK, OK



DEEP FORK BASIN

07243450 - Little Deep Fork near Edna, Okla.

LOCATION.--Lat $35^{\circ}42'00''$, long $96^{\circ}13'50''$, in SE 1_4 SE 1_4 sec. 11, T.14 N., R.10 E., Creek County, at county road bridge, 0.2 mi south of Edna.

DRAINAGE AREA.--Not determined.

PERIOD OF RECORD.--1951 to 1957, 1960 to 1962.

WATER TYPE.--The water was sodium chloride type throughout the range of measured specific conductance.

TREND.--No current data are available.

PUBLIC WATER SUPPLY.--Eighty-five percent of the hardness values were greater than 180 mg/L and the average concentration was 665 mg/L. In general, the hardness classification for this water is very hard. The recommended maximum chloride concentration of 250 mg/L was exceeded by 87 percent of the chloride values. No toxic metal data are available. Because of the frequency and magnitude by which the recommended maximum chloride concentration was exceeded, this water would not be suitable for use as a public supply.

IRRIGATION.--The salinity hazard ranged from medium to very high with 62 percent of the samples having a very high salinity hazard. The sodium hazard ranged from low to very high with 33 percent of the SAR values equivalent to a high or very high sodium hazard. No boron data are available.

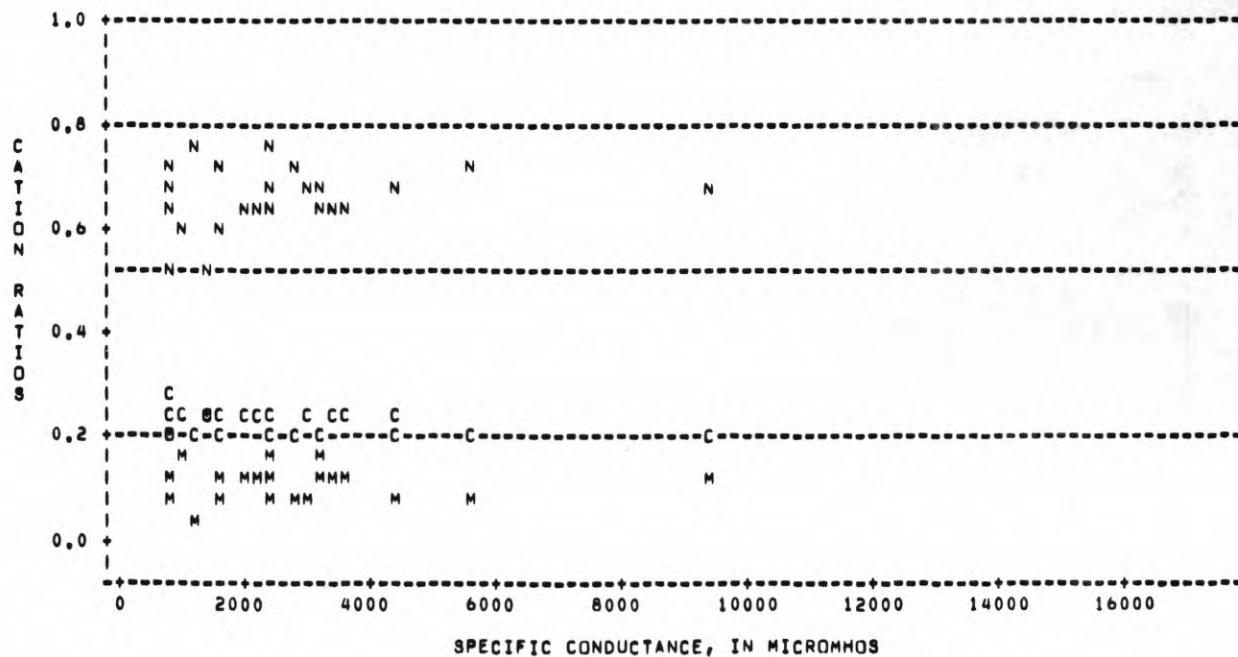
UNIVARIATE STATISTICS

| CONSTITUENT | N | MEAN | MIN | MAX | STD | SKEW | KURT |
|----------------------|----|------|-----|-------|------|------|-------|
| Specific conductance | 53 | 4569 | 554 | 14400 | 4050 | 1.15 | 0.02 |
| Dissolved solids | 16 | 1148 | 317 | 2450 | 586 | .62 | .15 |
| pH | 54 | 7.7 | 6.6 | 8.5 | 0.5 | -.40 | -.89 |
| Total hardness | 54 | 665 | 95 | 1990 | 544 | 1.11 | -.01 |
| Chloride | 54 | 1511 | 130 | 4880 | 1451 | 1.14 | -.10 |
| Sulfate | 17 | 19 | 4.1 | 31 | 8.4 | -.11 | -1.15 |
| Iron | 0 | | | | | | |
| Fluoride | 0 | | | | | | |
| Arsenic | 0 | | | | | | |
| Cadmium | 0 | | | | | | |
| Chromium | 0 | | | | | | |
| Lead | 0 | | | | | | |
| Mercury | 0 | | | | | | |
| SAR | 33 | 7.2 | 2.8 | 16 | 3.0 | .92 | 1.23 |
| Boron | 0 | | | | | | |

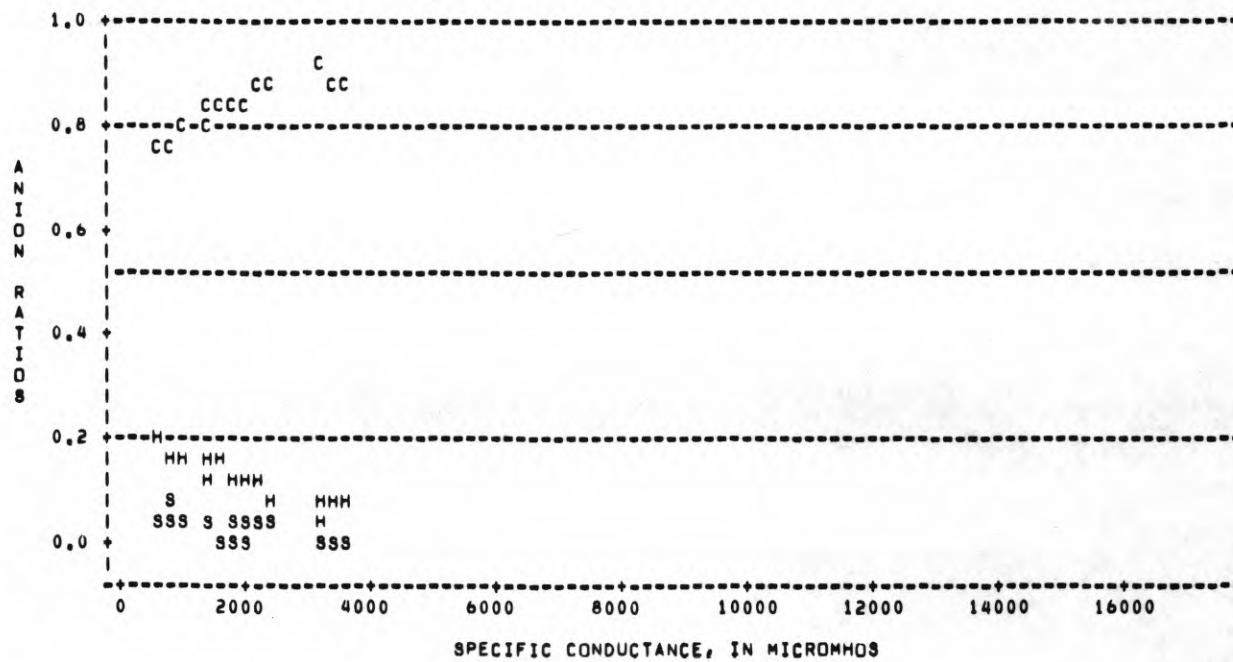
FREQUENCY DISTRIBUTION

| CONSTITUENT | PERCENTILE CONCENTRATION | | | | |
|----------------------|--------------------------|------|------|------|-------|
| | 10th | 25th | 50th | 75th | 90th |
| Specific conductance | 812 | 1735 | 2780 | 6035 | 11660 |
| Dissolved solids | 388 | 649 | 1085 | 1472 | 2079 |
| pH | 7.0 | 7.3 | 7.7 | 8.1 | 8.3 |
| Total hardness | 126 | 296 | 410 | 834 | 1605 |
| Chloride | 224 | 489 | 860 | 2152 | 4060 |
| Sulfate | 7.4 | 12 | 19 | 28 | 30 |
| Iron | | | | | |
| Fluoride | | | | | |
| Arsenic | | | | | |
| Cadmium | | | | | |
| Chromium | | | | | |
| Lead | | | | | |
| Mercury | | | | | |
| SAR | 3.5 | 5.0 | 6.9 | 8.8 | 11 |
| Boron | | | | | |

CATION RATIO PLOT
 N IS SODIUM ION RATIO, C IS CALCIUM ION RATIO, M IS MAGNESIUM ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=LITTLE DEEP FORK NR EDNA, OK



ANION RATIO PLOT
 H IS CARBONATE/BICARBONATE ION RATIO, C IS CHLORIDE ION RATIO, S IS SULFATE ION RATIO
 STATION NAME OR LOCAL IDENTIFIER=LITTLE DEEP FORK NR EDNA, OK



IRRIGATION DIAGRAM

IRRIGATION DIAGRAM
C1 AND S1 ARE LOW HAZARD, C2 AND S2 ARE MEDIUM HAZARD

C3 AND S3 ARE HIGH HAZARD, C4 AND S4 ARE VERY HIGH HAZARD

A = 1 OBS, B = 2 OBS, C = 3 OBS

STATION NAME OR LOCAL IDENTIFIER=LITTLE DEEP FORK NR EDNA, OK

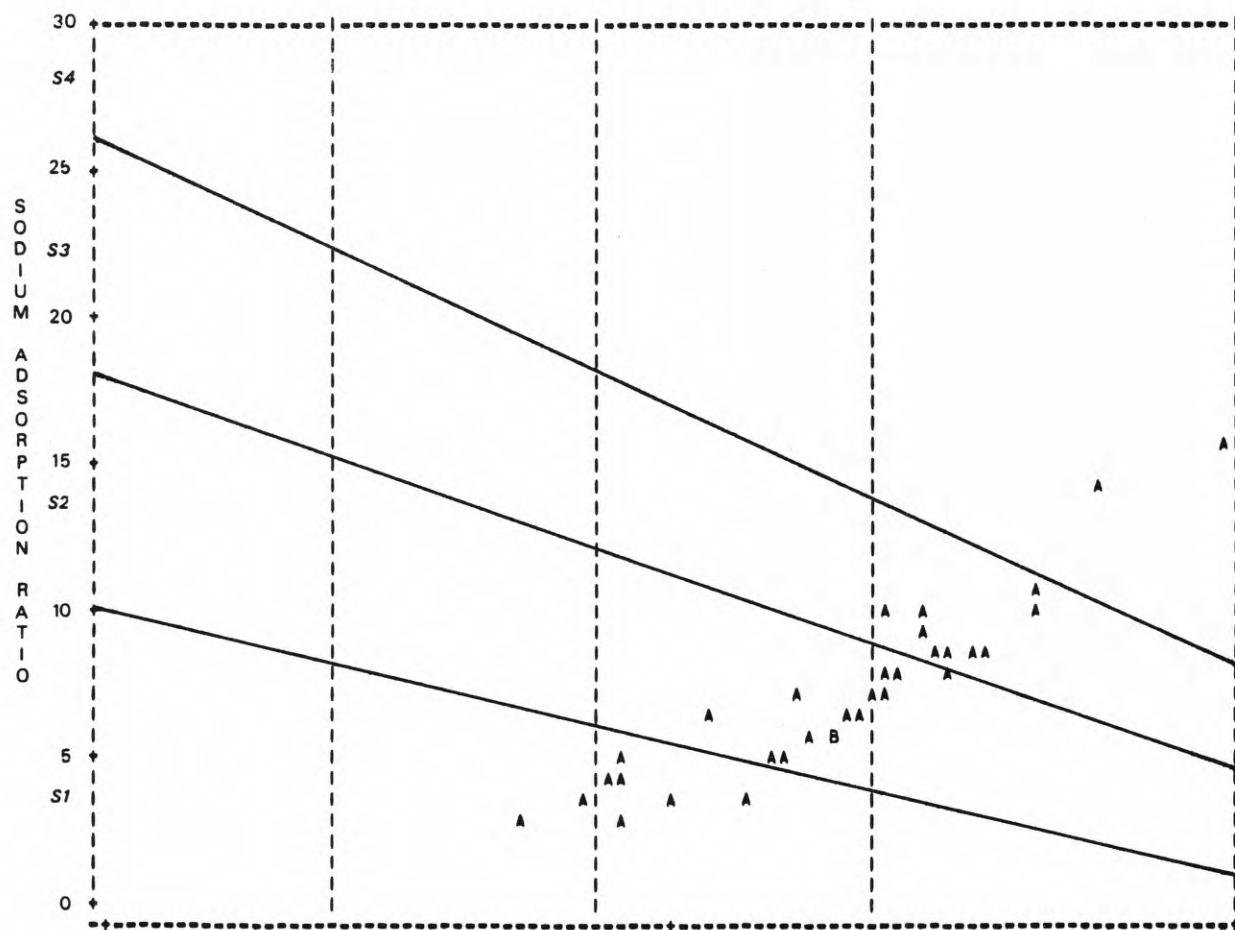


Table 3.--List of stations in downstream order

| Number | Station name | Page |
|----------|--|------|
| 07228200 | Canadian River near Roll, Okla.----- | 30 |
| 07228300 | Canadian River near Thomas, Okla.----- | 34 |
| 07228400 | Deer Creek at Hydro, Okla.----- | 58 |
| 07228500 | Canadian River at Bridgeport, Okla.----- | 38 |
| 07229100 | Canadian River near Noble, Okla.----- | 42 |
| 07229200 | Canadian River at Purcell, Okla.----- | 46 |
| 07229300 | Walnut Creek at Purcell, Okla.----- | 102 |
| 07230000 | Little River below Lake Thunderbird, near Norman, Okla.----- | 70 |
| 07230500 | Little River near Tecumseh, Okla.----- | 74 |
| 07230800 | Salt Creek near Dewright, Okla.----- | 90 |
| 07231000 | Little River near Sasakwa, Okla.----- | 78 |
| 07231500 | Canadian River at Calvin, Okla.----- | 50 |
| 07231975 | Brushy Creek near Haileyville, Okla.----- | 26 |
| 07231980 | Gaines Creek near Higgins, Okla.----- | 66 |
| 07231990 | Peaceable Creek near Haileyville, Okla.----- | 86 |
| 07232010 | Blue Creek near Blocker, Okla.----- | 22 |
| 07232024 | Deer Creek near McAlester, Okla.----- | 62 |
| 07232029 | Mathuldy Creek near Crowder, Okla.----- | 82 |
| 07232500 | Beaver River near Guymon, Okla.----- | 106 |
| 07232630 | Beaver River near Hooker, Okla.----- | 110 |
| 07233000 | Coldwater Creek near Hardesty, Okla.----- | 118 |
| 07234000 | Beaver River at Beaver, Okla.----- | 114 |
| 07236000 | Wolf Creek near Fargo, Okla.----- | 173 |
| 07237500 | North Canadian River at Woodward, Okla.----- | 130 |
| 07238000 | North Canadian River near Seiling, Okla.----- | 134 |
| 07239000 | North Canadian River at Canton, Okla.----- | 138 |
| 07239450 | North Canadian River near Fort Reno, Okla.----- | 142 |
| 07239500 | North Canadian River near El Reno, Okla.----- | 145 |
| 07239700 | North Canadian River near Yukon, Okla.----- | 149 |
| 07241500 | North Canadian River near Oklahoma City, Okla.----- | 153 |
| 07241550 | North Canadian River near Harrah, Okla.----- | 157 |
| 07242000 | North Canadian River near Wetumka, Okla.----- | 161 |
| 07242050 | Wewoka Creek at Wewoka, Okla.----- | 165 |
| 07242080 | Little Wewoka Creek near Wetumka, Okla.----- | 126 |
| 07242090 | Grief Creek near Wetumka, Okla.----- | 122 |
| 07242100 | Wewoka Creek near Wetumka, Okla.----- | 169 |
| 07242300 | Deep Fork at Witcher, Okla.----- | 181 |
| 07242350 | Deep Fork near Arcadia, Okla.----- | 185 |
| 07242400 | Deep Fork near Chandler, Okla.----- | 189 |
| 07242500 | Bellcow Creek at Chandler, Okla.----- | 177 |
| 07243000 | Dry Creek near Kendrick, Okla.----- | 201 |

Table 3.--List of stations in downstream order--Continued

| Number | Station name | Page |
|----------|--|------|
| 07243450 | Little Deep Fork near Edna, Okla.----- | 205 |
| 07243500 | Deep Fork near Beggs, Okla.----- | 193 |
| 07244000 | Deep Fork near Dewar, Okla.----- | 197 |
| 07245000 | Canadian River near Whitefield, Okla.----- | 54 |
| 07245020 | Taloka Creek at Stigler, Okla.----- | 94 |
| 07245030 | Taloka Creek near Stigler, Okla.----- | 98 |

131740